Journal of
Applied Accounting Research

Volume 19 Number 1 2018

Editorial advisory board

1. Earnings quality across different reporting regimes: listed, large private, medium-sized, small and micro companies in the UK
   Siming Liu and Len Skerratt

2. Corporate boards, ownership structures and corporate disclosures: evidence from a developing country
   Abdalrhman Alnabsha, Hussein A. Abdou, Collins G. Ntim and Ahmed A. Elamer

3. The role of intangible assets and liabilities in firm performance: empirical evidence
   Abdifatah Ahmed Haji and Nazli Anum Mohd Ghazali

4. IFRS and value relevance: a comparison approach before and after IFRS conversion in the European countries
   Ahmed Kouki

5. Assessing and ranking the financial risk of municipal governments: the case of Pennsylvania
   John M. Trussel and Patricia A. Patrick

6. Exploring forward-looking information in integrated reporting: a multi-dimensional analysis
   Elisa Menicucci

7. Exposing organizational tensions with a non-traditional budgeting system
   Nicolas Berland, Emer Curtis and Samuel Sponem

8. Management control system and strategy: the transforming role of implementation
   Graziano Coller, Maria Laura Frigotto and Ericka Costa

9. Does graphical reporting improve risk disclosure? Evidence from European banks
   Michael Jones, Andrea Melia, Silvia Gaia and Simone Aresu

10. Explaining implementation difficulties associated with activity-based costing through system uses
    Elodie Allain and Claude Laurin

www.emeraldinsight.com/loi/jaar
Earnings quality across different reporting regimes

Listed, large private, medium-sized, small and micro companies in the UK

Siming Liu  
Department of Economics and Finance, Brunel University, Uxbridge, UK, and

Len Skerratt  
Brunel Business School, Brunel University, Uxbridge, UK

Abstract

Purpose – Since the UK Companies Act 1981, different reporting standards have developed for different classes of company to reduce the reporting burden on non-listed companies. There are now different regimes for listed, large private, medium-sized, small and micro companies. This strategy raises the issue of whether earnings quality across the different classes of company is comparable. The paper aims to discuss this issue.

Design/methodology/approach – The paper uses the smoothness of earnings to measure reporting quality across the different types of companies from 2006 to 2013, based on 514,000 observations. Smoothness is an indicator of poor quality.

Findings – The authors find that listed companies have the highest earnings quality, closely followed by small and micro companies. In contrast, large private and medium-sized companies have much lower earnings quality. Overall, the authors find companies which switch between reporting regimes have lower earnings quality. The authors also find that earnings quality is not affected by the small company exemption from audit.

Research limitations/implications – Companies filing abbreviated accounts are excluded since they do not file an income statement. The recent revisions to UK GAAP (FRS 102 and FRS 105) are not examined due to insufficient data.

Practical implications – The Financial Reporting Council’s (FRC) strategy of reducing the financial reporting and auditing obligations for small companies seems not to have significantly affected earnings quality. However, the FRC may need to review the reporting requirements of large private and medium-sized companies and also the option of companies to switch between reporting regimes; in these settings earnings quality appears to be weaker.

Originality/value – The paper studies the effect of earnings quality across the different reporting regimes in the UK. Novel and important features of the study are that the sample covers a wide variety of small and micro companies which have not been analyzed previously; the results are disaggregated by year, for assurance that the results are not driven by a single rogue year; and the authors also address the small company exemption from audit, and the flexibility of non-listed companies to switch between regimes.

Keywords Audit, Earnings quality, Comparability, Switching, Reporting regimes, SMEs and micro companies

Paper type Research paper

1. Introduction

One of the key developments in UK financial reporting since the early 1980s has been the exemption of certain companies from the full reporting requirements applicable to listed companies. Starting in 1981 with the option for small- and medium-sized companies to file abbreviated accounts with the Registrar of Companies, followed by small companies being exempt from audit, there is now a structure in which there is a different set of
accounting standards for each of the following classes of company: listed; large private and medium-sized; small; and, finally (as a result of EU Directive 2012/6), micro companies. But what are the consequences of this multi-tier structure of reporting?

Much of the discussion has been about reducing the cost burden on companies, but little has been said about the effect on the quality of reporting. This issue is well captured by Nigel Sleigh-Johnson, the Head of ICAEW’s Financial Reporting Faculty, who said:

Only time will tell whether the reduction in the information required in small company accounts is a sensible reduction in Red Tape or a source of risk to the UK economy (ICAEW, 2015).

One possible intention of the multi-tier approach may have been to maintain comparability across the groups whilst reducing reporting costs for smaller companies. In this case, large companies with more complex operations and more serious agency problems would be subject to comprehensive standards, whilst smaller companies with relatively simple operations (and therefore with little opportunity for earnings management) would need less stringent rules. In contrast, another potential objective may have been that the quality of reporting should reflect the varying needs of users. In this case, smaller companies would be less regulated since users’ requirements are relatively modest, and it may be easier to obtain information outside of the cycle of the annual report and accounts. In this setting, one would expect the quality of the reporting to be superior for larger companies.

It is important to ascertain the consequences of the relaxation of rules for private companies since comparability is an important feature of the financial statements of companies (IASB, 2009, para. BC36; FRC, 2015, para. 2.11; Kim et al., 2016). Indeed, it was the basis of the dissension by James Leisenring from the International Accounting Standards Board’s standard for small- and medium-sized entities (IASB, 2009, para. DO3). Prior work on the differences between different classes of company in the UK is limited. The studies do not examine very small (micro) companies, which constitute the vast majority. Furthermore, they examine data of more than ten years ago and, therefore, do not reflect the current environment in which exemptions for different classes of company are substantial.

We extend this prior work significantly. The first contribution is to compare earnings quality from 2006 to 2013 for the different classes of company: listed companies that reported under International Financial Reporting Standards (IFRS); large private and medium-sized companies that reported under UK GAAP (FRSs, SSAPs and UITFs); and small and micro companies that reported under the Financial Reporting Standard for Smaller Entities (FRSSE). Although these regimes have now been replaced by IFRS, FRS 102 and FRS 105, it will be some time before a large data set is available based on the new standards. An important feature is to analyse micro companies which are a key focus of the EU Directive 2013/34; these companies constitute over 40 per cent of our large scale sample of 514,000 company-year observations. We also provide annual disaggregation so as to identify the permanence of any differences between company groups. A key finding is that listed companies have the highest earnings quality, closely followed by small and micro companies; large private and medium-sized companies have the poorest earnings quality. The result for listed companies is not surprising since they are required to follow IFRS. Also, small and micro companies are likely to have relatively straightforward transactions, with little opportunity for significant earnings management. In contrast, large private and medium-sized companies are neither required to follow IFRS and may have transactions for which there is more discretion under UK GAAP.

We also explore other key aspects of the multi-tier reporting regime. One feature is that non-listed companies are permitted to switch to a reporting regime designed for larger companies and also to switch back to the regime intended for the companies (the home regime). For example, small companies were intended to report under FRSSE, but were permitted to use UK GAAP or IFRS. The new reporting structure of IFRS, FRS 102 and FRS 105
maintains this flexibility. Our second contribution is to examine the effect of this regime switching. Although switching to a regime intended for a larger company would not seem to be controversial since the rules are likely to be tighter, switching in either direction may give rise to comparability issues, both over time and across companies. Furthermore, there is no study which focuses on this little discussed aspect of the regulation in the UK. Overall, we find that companies which switch between reporting regimes have lower earnings quality than those which remain in the home regime.

Another characteristic of the multi-tier reporting regime is that small and micro companies are exempt from audit. Our third contribution is to assess the effect of this option. We compare the earnings quality of the companies which exercised this option with those companies which did not. In contrast to prior research, our sample is large and covers the full range of small and micro companies for the years 2006-2013, with annual disaggregation. We find that, with the exception of 2013, the exemption of small and micro companies from audit does not reduce earnings quality.

The structure of the paper is as follows. Section 2 outlines the regulatory framework of the UK multi-tier reporting system. This is followed by a review of the prior literature on the impact of such a system, thus identifying the issues to be addressed in this study. Section 4 discusses the research method and data which we use. Then follows a discussion of the results in Section 5, and we conclude with a summary in Section 6.

2. The development of the multi-tier regime
One of the major developments in UK financial reporting over the last few years has been the emergence of different reporting regimes for different classes of company. It was the Companies Act 1981 that first defined small- and medium-sized companies and permitted them to file modified accounts (subsequently called abbreviated accounts by the Companies Act 1985) with the Registrar of Companies. Another significant change came in 1994, when small companies were not required to have an audit. A further relaxation of the reporting regulations for small companies came about in 1997 when they were allowed to adopt simpler accounting rules under the FRSSE, for both reporting to shareholders and the Registrar of Companies (Chopping and Skerratt, 1997). However, they were also permitted to report under regular UK GAAP if they chose.

At the other end of the company spectrum, in 2005, the EU required listed companies to follow IFRS, thus leaving unlisted medium-sized and large companies to be covered by a mix of the UK’s Financial Reporting Standards (FRS), the earlier issued Statements of Standard Accounting Practice (SSAP) and the recommendations of the Urgent Issues Task force (UITF)[1]. In order to rationalise the reporting rules for these companies which were neither small nor listed, the Accounting Standards Board[2] took advantage of the International Accounting Standards Board’s development, in 2009, of its International Accounting Standard for small- and medium-sized entities (IFRS for SME) and used it as a base for the development of FRS 102 issued in 2013 to regulate the financial reporting of medium-sized unlisted entities.

The next important development emanated from EU Directive 2012/6 (European Union, 2012) which gave exemptions from fourth and seventh directives to a new class of company, the micro company. In response to this, the FRSSE was amended in April 2014. Shortly after this came EU Directive 2013/34 (European Union, 2013) which combined and amended the existing fourth and seventh directives with the intention of reducing disproportionate costs imposed on small companies. The changes were so substantial that, in response, the Financial Reporting Council (FRC) withdrew the FRSSE, locating the reporting regulations for micro companies within a new standard (FRS 105) and the regulations for small companies in a special section of a revised FRS 102. The FRC maintained the option of non-listed companies to report under a regime intended for larger companies, and then to
switch back to the home regime if desired. In addition, as allowed under the EU Accounting Directive, the FRC increased the thresholds for small and medium companies.

Accounting standards are a significant determinant of earnings quality (Soderstrom and Sun, 2007). Therefore, an important question that arises is whether accounting statements will be comparable across the different regimes? One rationale for a multi-tier system is that agency issues and complexity vary across the tiers, the objective of regulation being the equalisation of earnings quality across the classes of company. Other justifications may give rise to differences in earnings quality. For example, users’ needs may be different; large companies typically have complex business operations, suggesting that disclosures need to be comprehensive, especially when stakeholders may find it difficult to obtain information outside of the cycle of the annual report and accounts. This situation contrasts with smaller companies which are likely to be less complex and provide information to stakeholders in a less formal way. In Section 3, we discuss the prior empirical research which may have some bearing on the likely effects of the multi-tier regime in the UK. This identifies the gaps in the literature and leads to the research questions which we address in this study.

3. Prior literature and research questions

3.1 The effect of equity market discipline on earnings quality

Much of the prior literature about earnings quality across different types of company is concerned with the discipline exerted by equity markets in stifling opportunistic reporting. However, listing status is only one of the factors which separate UK reporting regimes; the size of a company also matters. Therefore, the insights to be gained from this literature are limited, since the studies do not distinguish between different sizes of private company. Furthermore, in attempting to identify the impact of market discipline, they restrict their sample to where companies operate under the same reporting regime.

There are three main studies in this category. Beatty et al. (2002) find that during the period 1988-1998, US public banks have superior earnings quality to private banks. However, since the study relates only to the banking sector, the findings may not have implications for the current study. Ball and Shivakumar (2005) is the only UK study of differential reporting, investigating the public/private dichotomy for companies facing the same auditing and reporting requirements during the period 1989-1999. They find that public companies have a higher earnings quality than private companies. This may suggest that private companies will also have lower earnings quality when they are under a less restrictive reporting regime. However, the results have limited implications for the issues here since the measure of quality used is loss recognition, which is only one aspect of earnings quality, and the sample is now very dated. Furthermore, although the number of observations of 115,000 firm-years is very large in statistical terms, a wide range of small and micro companies are excluded.

A more recent study by Givoly et al. (2010) examines the difference between companies with public equity and those with private equity for the period 1978-2003. The results are mixed. As in Ball and Shivakumar (2005), they find that public equity companies appear to be superior in loss recognition tests. However, they also find that public equity companies undertake more earnings management, and report more opportunistically, than private companies. This serves to underline that loss recognition tests may not be a good proxy for more broadly based earnings quality measures.

3.2 Earnings quality across different reporting regimes

A number of other studies allow the reporting regime to vary across the sample, and are therefore more relevant to the current study. Burgstahler et al. (2006) investigate public and private companies from 1997 to 2003 across European countries. They find that private companies exhibit higher levels of earnings management than public companies.
However, the study may not have implications for our current issue for two reasons. First, the unit of observation is the industry in a particular country, resulting in a maximum of 269 observations for the tests, which are, therefore, unlikely to capture variations across companies. Second, the findings are for the aggregate sample, and therefore may be driven by differences between countries rather than differences across companies within a given country (e.g. if the ratio of public to private companies is different across countries).

Hope et al. (2013) compares US public and private companies from 2001 to 2009. Their sample is more representative of the small company sector than in prior US work; the median of total assets of private companies is $4.27 m compared with $337 m in Givoly et al.’s (2010) study. Hope et al. (2013) use a variety of earnings quality measures which show that public companies have higher earnings quality. However, when the tests are focussed on areas where companies are more likely to have managed earnings, they find that the superior earnings quality of public companies disappears.

3.3 Regime switching and audit exemption

We have not been able to identify research which directly examines the consequences of switching between different regimes in the UK. However, the issue is an example of a general concern of whether managers use accounting discretion to inform stakeholders or to behave opportunistically. Recent evidence here is based on the US experience and is mixed. For example, despite predictions that managerial discretion in determining goodwill write-offs would be used to convey private information on future cash flows, Ramanna and Watts (2012) and Li and Sloan (2015) find no evidence for this. In contrast, Hanley and Hoberg (2012) find that greater disclosure before an initial public offering is informative and results in more accurate offer pricing. This is particularly relevant to our study since private companies may attempt to improve the quality of reporting by switching to IFRS in anticipation of a public listing. However, Daske et al. (2013) distinguish between “label” and “serious” adopters of IFRS, and it is only the latter type of companies which benefit. From all the above evidence, it is difficult to predict the effect of switching within the UK multi-tier regime.

On the issue of audit exemption, Dedman and Kausar (2012) analyse the behaviour of the companies which became exempt in 2004. They find that those opting out of the audit had higher levels of discretionary accruals in the following year, leading to an upward shift in reported profit. However, the sample is very small (some 4,873 companies) and the coefficients, although statistically significant, are, in economic terms, extremely small. Furthermore, the companies they investigate are at the larger end of the small/micro company spectrum, since they became eligible for audit exemption only due to changes in the threshold. Therefore, the sample is unlikely to be representative of the population of companies which do not opt for an audit.

3.4 Research questions

Overall, the research on the effect of the UK multi-tier structure of reporting is limited. International evidence is mixed. Even where it is based on UK companies, it is dated and therefore does not reflect the current environment in which exemptions for some classes of company are substantial. Furthermore, very small companies, which constitute the vast majority, are excluded from the analysis. The study of the impact of audit exemption in the UK is similarly biased against very small companies. There is no direct evidence on the ability of private companies to switch between regimes. However, it is an illustration of the more general issue of whether managers use accounting discretion to inform stakeholders or to behave opportunistically; the evidence here is mixed.

In view of the lack of clear implications either from prior research or from the statements of UK regulators, as discussed above, we identify three key questions in the context of the
UK regulatory framework. These questions are addressed within the reporting structure in which listed companies applied IFRS, large private and medium-sized companies applied UK GAAP, and small and micro companies applied the FRSSE. Although there have been recent changes in the standards for private companies[3], it will be some time before a large enough data set is available based on these requirements.

The first question relates to the regimes under which the different classes of company were expected to report:

*RQ1.* Did the structure of UK financial reporting (in which listed companies reported under IFRS, large private and medium-sized companies reported under UK GAAP, small and micro companies reported under the FRSSE) give rise to variations in earnings quality?

The second question concerns the option for non-listed companies to switch between these reporting regimes.

*RQ2.* Did the regulations which allowed large private and medium-sized companies to switch to IFRS from UK GAAP (and back again), and which allowed small and micro companies to switch to IFRS or UK GAAP (and back again) result in an improvement, a reduction or no change in earnings quality?

The third question is associated with the option for small and micro companies to present unaudited accounts.

*RQ3.* Did the regulations which allowed small and micro companies to report unaudited accounts give rise to changes in earnings quality?

4. Research design and data used

4.1 Measuring the smoothness of earnings

We use earnings quality to assess the impact of the multi-tier reporting regime. Our measure of earnings quality is the smoothness of earnings and is based on Lang *et al.* (2003) and Barth *et al.* (2008). Standard setters adopt accruals accounting since the volatility of cash flow may mask underlying performance. However, accruals are not desirable if they smooth out the underlying performance itself (Dechow *et al.*, 2010). A common perception is that smooth earnings are appreciated by investors, and even that smooth earnings can reduce the cost of capital (Francis *et al.*, 2004); however, more recent evidence argues that this conclusion is unreliable, due to errors in measuring the cost of capital (McInnis, 2010). Furthermore, from a theoretical perspective, earnings management is likely to decrease a stock’s liquidity, and thereby increase the cost of capital (Ascioglu *et al.*, 2012).

There is consistent evidence that smoothing is negatively related to earnings quality. In particular, Ball and Shivakumar (2005, 2006) suggest that timely recognition of gains and losses tends to increase the volatility of earnings relative to cash flows. Ewert and Wagenhofer (2005, 2011) show that accounting standards that limit opportunistic discretion should result in a higher variability of reported earnings; and Khalil and Simon (2014) find that smoothness is positively related to discretionary accruals. Furthermore, the lack of smoothness is important since the ability of the reporting process to indicate change is a function which is valued by investors (see Barker and Imam, 2008, p. 321). All this suggests that smoothness is an appropriate measure of earnings quality for this study[4].

The smoothness of earnings is a firm-specific time series concept. However, there are drawbacks to measuring smoothness at the firm level, primarily the selection bias arising from the need to obtain a sufficient number of observations and the implied stability of the coefficients over time. Our approach is to include a time dimension by examining the change
in earnings, which is then set in the context of other companies in a cross-section, controlling for extraneous variables, following Lang et al. (2003) and Barth et al. (2008). A preliminary first step in identifying the smoothness of earnings in each group of companies is to mitigate the effect of economic factors by regressing the change in annual net income scaled by total assets on a number of control variables. The variance of the residuals from this regression \( V(\Delta NI) \) is then used as an estimate of the smoothness of earnings for the group. A smaller \( V(\Delta NI) \) is an indication of earnings smoothness. Specifically, we run the following regression for each group to examine earnings smoothness:

\[
\Delta NI_{i,t} = x_0 + x_1 Size_{i,t} + x_2 Growth_{i,t} + x_3 Lev_{i,t} + x_4 Dissue_{i,t} + x_5 Turn_{i,t} + x_6 CF_{i,t} + \epsilon_{i,t} \quad (1)
\]

where \( \Delta NI \) is the change in net income scaled by total assets; \( Size \) is the natural logarithm of end-of-year value of equity; \( Growth \) is the percentage change in sales; \( Lev \) is the end-of-year total liabilities divided by end-of-year equity book value; \( Dissue \) is the percentage change in total liabilities; \( Turn \) is sales divided by end-of-year total assets; and \( CF \) is the cash flow from operating activities divided by end-of-year total assets; \( i \) takes values in the range 1, ..., \( n \); and \( t \) takes values in the range 2006, 2007, ..., 2013. Following the study of Dechow (1994) and Hope et al. (2013), and taking note of there being no requirement for a cash flow statement to be prepared by SMEs, we define the cash flows from operations as \( CFO = E + Dep - WCA \), where \( CFO \) is cash flow from operation for the year; \( E \) is profit after tax and extraordinary items for the year; \( Dep \) is depreciation (amortisation) for the year; and \( WCA \) is working capital accruals, measured as the change in non-cash current assets minus the change in current liabilities other than short-term debt and taxes payable.

A potential weakness of the \( V(\Delta NI) \) measure is the way in which it controls for the economic factors which may affect the smoothness of earnings. Although the variables are firm specific, the coefficients of the model are estimated across the entire sample. This procedure is, therefore, unlikely to eliminate all the economic components of smoothness which operate at the firm level; consequently, the regression residual is likely to contain both firm-specific economic as well as accounting factors which affect smoothness. Our test mitigates this confounding of economic and accounting factors, and is again based on Lang et al. (2003) and Barth et al. (2008). We compare the smoothness of the change in net income, \( V(\Delta NI) \) from Equation (1), with the smoothness of the change in cash flow from operations, which is estimated in a similar way to the smoothness of earnings equation[5], but with \( \Delta CF \) as the dependent variable, as follows:

\[
\Delta CF_{i,t} = x_0 + x_1 Size_{i,t} + x_2 Growth_{i,t} + x_3 Lev_{i,t} + x_4 Dissue_{i,t} + x_5 Turn_{i,t} + x_6 CF_{i,t} + \epsilon_{i,t} \quad (2)
\]

where \( \Delta CF \) is the change in cash from operations scaled by total assets. We obtain the variance of residual from Equation (2), \( [V(\Delta CF)] \), as the smoothness of cash flows from operation and combine it with the variance of the residual from Equation (1) \( [V(\Delta NI)] \) to construct the ratio \( V(\Delta NI)/V(\Delta CF) \). The intuition behind this is that the term \( V(\Delta CF) \), like \( V(\Delta NI) \), will contain the firm-specific economic components of cash flow smoothness, since the parameter values are estimated across the sample as before; however, \( V(\Delta CF) \) is less likely to contain accounting components of earnings smoothing[6]. Taking the ratio of \( V(\Delta NI)/V(\Delta CF) \) attempts to scale out the firm-specific economic components of earnings smoothing, leaving those that relate to accounting methods. A smaller ratio is an indication of smoother earnings.

In order to compare the differences in earnings variability between each group of companies, following Barth et al. (2008), we estimate the standard error of the ratio \( V(\Delta NI)/V(\Delta CF) \) by a bootstrap procedure as follows. From the original sample, we randomly select (with replacement) a new sample of the same size as the original sample, and estimate Equations (1) and (2) again to obtain \( V(\Delta NI)/V(\Delta CF) \); this procedure is repeated 1,000 times to obtain the
standard deviation of the estimated sampling distribution, and hence, the standard error of the test statistic which approximates to a normal distribution. The standard deviation and mean of each distribution are reported in the tables[7].

4.2 The control for self-selection bias in medium-sized, small and micro companies
Medium-sized, small companies and micro companies may submit abbreviated accounts, with no income statement and cash flow statement. In these cases, we are not able to estimate their earnings quality. However, a number of these companies voluntarily report their income statement and, therefore, presumably not randomly. Since we want to examine earnings quality for these observations, we have to control for the self-selection bias. We do this (Givoly et al., 2010; Szczesny and Valentinic, 2013) by including an inverse Mills ratio as an independent control variable in our earnings quality test. The variables which are expected to affect the probability that the companies will produce a full set of accounts are size and the existence of debt. Larger companies have less to fear from strategic aspects of the business being understood from the income statement; and as debt increases, banks are more likely to require an income statement for setting debt covenants. In order to obtain the inverse Mills ratio, we model the probability of existence of the profit and loss statement by running a probit regression on lagged total assets (TA_{t-1}) and lagged debt to asset ratio (DA_{t-1}). The variable Pr (P/L statement) takes a value of 1 if the company has voluntarily provided a profit and loss account, and 0 otherwise. We assume that the decision to produce an income statement is made in the period immediately preceding the current period. The estimated probit model is:

\[ \text{Pr (P/L statement)} = \beta_0 + \beta_1 \text{TA}_{t-1} + \beta_2 \text{DA}_{t-1} + \varepsilon \]  

(3)

We then modify our Equations (1) and (2) for medium-sized, small and micro companies by including the inverse Mills ratio (Mills) as an independent control variable for these companies, as follows:

\[ \Delta NI_{ij} = \alpha_0 + \alpha_1 \text{Size}_{ij} + \alpha_2 \text{Growth}_{ij} + \alpha_3 \text{Lev}_{ij} + \alpha_4 \text{Dissue}_{ij} \]
\[ + \alpha_5 \text{Turn}_{ij} + \alpha_6 \text{CF}_{ij} + \alpha_7 \text{Mills}_{ij} + \nu_{ij} \]  

(4)

\[ \Delta CF_{ij} = \alpha_0 + \alpha_1 \text{Size}_{ij} + \alpha_2 \text{Growth}_{ij} + \alpha_3 \text{Lev}_{ij} + \alpha_4 \text{Dissue}_{ij} \]
\[ + \alpha_5 \text{Turn}_{ij} + \alpha_6 \text{CF}_{ij} + \alpha_7 \text{Mills}_{ij} + \nu_{ij} \]  

(5)

4.3 The effects of switching and audit exemption
In order to estimate the effects of switching, we identify companies switching between UK GAAP and IFRS[8] during the sample period, and examine the earnings quality for the identified companies across different classes of companies. We examine the quality of earnings in the year of the switch by measuring the differences in earnings smoothness between the groups; as before we use Equations (1) and (2) for listed and large private companies, and Equations (4) and (5) for medium-sized, small and micro companies.

The audit exemption thresholds for small companies are currently aligned with accounting thresholds. Therefore, in order to examine the effect of audit exemption on earnings quality, we divide both the small and the micro companies samples into two groups: companies with audited accounts and companies with unaudited accounts. We then apply our earnings smoothness tests to compare companies with audited accounts and those with unaudited accounts for both the small and the micro company groups.
4.4 Data and sample selection

The main data applied in this paper are obtained from the “Financial Analysis Made Easy” (FAME) database supplied by Bureau Van Dijk, a common source of data for work in this area (Ball and Shivakumar, 2005; Dedman and Kausar, 2012; Dedman et al., 2014; Collis, 2012).

In the UK, sections 382 and 465 of the Companies Act 2006 define private companies as small or medium for the purpose of accounting requirements. A micro company[9] is one that satisfies at least two of the following criteria: a turnover of not more than £632,000; a balance sheet total of not more than £316,000; and a maximum of 10 employees. A small company is one that satisfies at least two of the following criteria: a turnover of not more than £6.5 million; a balance sheet total of not more than £3.26 million; and a maximum of 50 employees. A medium-sized company is one that is not classified as small and satisfies at least two of following criteria: a turnover of not more than £25.9 million; a balance sheet total of not more than £12.9 million; and a maximum of 250 employees. A large private company is one that is too large to be medium sized and is not listed. Our sample consists of listed companies together with all of the above company categories.

We document the sample selection procedure in Table I. We obtain companies that have available data between 2006 and 2013[10], selecting publicly listed and private companies

### Panel A: sample selection from FAME

All active firms in the FAME database with listing status information 3,131,051
- Less subsidiaries companies 259,447
- Less financial services firms 7,912
- Less firms with qualified accounts 2,059
- Less firms without a value of total assets in any year, 2006-2013 2,114,134

Initial sample – no. of firms 747,499

### Panel B: breakdown of sample for earnings quality analysis across size categories

<table>
<thead>
<tr>
<th>Size Category</th>
<th>Listed firms</th>
<th>Large private firms</th>
<th>Medium-sized firms</th>
<th>Small firms</th>
<th>Micro firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial sample</td>
<td>1,419</td>
<td>3,448</td>
<td>9,023</td>
<td>403,693</td>
<td>329,916</td>
</tr>
<tr>
<td>Less: firms filing abbreviated Accounts (Pr = 0)</td>
<td>N/A</td>
<td>N/A</td>
<td>(764)</td>
<td>(285,639)</td>
<td>(246,429)</td>
</tr>
<tr>
<td>Less: firms with missing data</td>
<td>(290)</td>
<td>(693)</td>
<td>(2,220)</td>
<td>(39,862)</td>
<td>(27,870)</td>
</tr>
<tr>
<td>No. of firms used in Equations (1) and (2)</td>
<td>1,129</td>
<td>2,755</td>
<td>6,039</td>
<td>78,192</td>
<td>55,617</td>
</tr>
<tr>
<td>No. of firm-years used in Equations (1) and (2)</td>
<td>6,318</td>
<td>13,067</td>
<td>20,630</td>
<td>256,562</td>
<td>217,647</td>
</tr>
</tbody>
</table>

### Panel C: breakdown of sample for switching accounting regimes

<table>
<thead>
<tr>
<th>Accounting Regime</th>
<th>Listed firms</th>
<th>Large private firms</th>
<th>Medium-sized firms</th>
<th>Small firms</th>
<th>Micro firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of firms used in Equations (1) and (2)</td>
<td>1,129</td>
<td>2,755</td>
<td>6,039</td>
<td>78,192</td>
<td>55,617</td>
</tr>
<tr>
<td>Firms not switching accounting standards</td>
<td>977</td>
<td>2,686</td>
<td>5,999</td>
<td>78,088</td>
<td>55,617</td>
</tr>
<tr>
<td>Firms which followed IFRS</td>
<td>977</td>
<td>132</td>
<td>56</td>
<td>111</td>
<td>0</td>
</tr>
<tr>
<td>Firms which followed GAAP</td>
<td>0</td>
<td>2,554</td>
<td>5,943</td>
<td>77,977</td>
<td>55,617</td>
</tr>
<tr>
<td>Firms switching accounting standards</td>
<td>152</td>
<td>69</td>
<td>40</td>
<td>104</td>
<td>0</td>
</tr>
<tr>
<td>Instances of switching from GAAP to IFRS</td>
<td>152</td>
<td>65</td>
<td>37</td>
<td>78</td>
<td>0</td>
</tr>
<tr>
<td>Instances of switching from IFRS to GAAP</td>
<td>0</td>
<td>32</td>
<td>19</td>
<td>68</td>
<td>0</td>
</tr>
</tbody>
</table>

Notes: All observations are observed during the sample period, 2006-2013. The instances of switching from GAAP to IFRS plus the instances of switching from IFRS to GAAP may not add up to the number of firms switching accounting standards due to firms having multiple switches during the sample period. The instances of switching accounting standards are examined in Table IV panels B and C.

Table I:
Sample selection
based on their listing status in the FAME classification. The period 2006-2013 is chosen since this includes a period in which the UK economy was weak following the collapse in 2007 (ONS, 2014); the year 2006 is included for comparison. In order to inform future policy, it is important to focus on such periods during which comparability issues may arise due to large one-off items and also earnings management to obscure poor performance. We exclude banks, other financial institutions (SIC codes 6000-6799) and also companies without a known value of total assets between 2006 and 2013 in order to mitigate data errors. We also exclude companies with qualified accounts during the sample period because they are likely to have different reporting incentives. Our initial sample has 747,499 companies. However, due to the lack of companies’ data to compute earnings quality measures, the resulting sample is reduced to 514,224 firm-year observations, comprising of 6,318 for listed companies, 13,067 for large private companies, 20,630 for medium-sized companies, 256,562 for small companies and 217,647 for micro companies.

Table II (panels A-E) gives the summary statistics of the accounting variables used in the study. We note that total assets and total sales are more varied for listed companies than for private companies; also, large private companies are more varied in size than the other private groups. Turning to our testing variables, we observe that the standard deviations of ΔNI and ΔCF are larger for small and micro companies than for large private and medium-sized companies. This suggests that small and micro companies are unlikely to have a higher level of earnings smoothness than others. Furthermore, small and micro companies have negative growth, suggesting that smaller companies are struggling during the period of downturn; they also have higher leverage indicating that they have a greater reliance on debt to finance the business.

5. Results and analysis

5.1 The smoothness of earnings

Table III presents results of the smoothness of earnings tests for the sample period 2006-2013[11]. For the $V(\Delta NI)$ measure, small and micro companies have higher values than other firms (0.1132 for small companies, 0.1707 for micro companies), which suggests that sample wide parameters do not eliminate all the firm-specific economic variability. This is consistent with small and micro companies covering a wide spectrum of economic operations. After scaling by cash flow variability, the $V(\Delta NI)/V(\Delta CF)$ measure is largest for listed companies (0.3313) closely followed by small and micro companies, 0.2485 and 0.2231, respectively. The earnings of large private and medium-sized companies are much smoother with relatively low values of 0.0587 and 0.0695, respectively. We give the standard deviation of the bootstrap distribution as an estimate of the standard error, and the mean for comparison with the sample statistic; the differences discussed above are statistically significant and are also found when we disaggregate across the sample years.

Overall, these results indicate that IFRS is effective in constraining the incentives for earnings management which exist in listed companies. The quality of earnings in small and micro companies is nearly as informative as in listed companies, suggesting that the strategy of giving reporting exemptions to small and micro companies has not lowered earnings quality. In contrast, the earnings of large private and medium-sized companies are significantly smoother, suggesting that their reported performance may not be comparable with that of listed, small and micro companies.

5.2 The effect of switching between regimes

In our second test, we rerun the earnings smoothness tests to examine the effect of switching between reporting regimes. Table IV reports the results for firms switching reporting
<table>
<thead>
<tr>
<th>Variable</th>
<th>Listed companies</th>
<th>Large private companies</th>
<th>Medium-sized companies</th>
<th>Small companies</th>
<th>Micro companies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Total assets (in millions)</td>
<td>1,866</td>
<td>12.8</td>
<td>317</td>
<td>6.9052</td>
<td>6.85</td>
</tr>
<tr>
<td>Total sales (in millions)</td>
<td>1,409</td>
<td>10.9</td>
<td>144</td>
<td>0.7807</td>
<td>14.72</td>
</tr>
<tr>
<td>ΔNI</td>
<td>0.0008</td>
<td>0.1478</td>
<td>0.0046</td>
<td>0.0543</td>
<td>0.0042</td>
</tr>
<tr>
<td>ΔCF</td>
<td>0.0044</td>
<td>0.2683</td>
<td>0.0063</td>
<td>0.2955</td>
<td>0.0176</td>
</tr>
<tr>
<td>Size</td>
<td>10.8693</td>
<td>2.617</td>
<td>10.5425</td>
<td>0.983</td>
<td>8.6921</td>
</tr>
<tr>
<td>Growth</td>
<td>0.0621</td>
<td>0.2727</td>
<td>0.0671</td>
<td>0.1738</td>
<td>0.0624</td>
</tr>
<tr>
<td>Lev</td>
<td>0.5387</td>
<td>0.3291</td>
<td>0.6655</td>
<td>0.2848</td>
<td>0.7041</td>
</tr>
<tr>
<td>Discue</td>
<td>0.2268</td>
<td>0.7082</td>
<td>0.1173</td>
<td>0.3409</td>
<td>0.0911</td>
</tr>
<tr>
<td>Turn</td>
<td>0.9621</td>
<td>0.7589</td>
<td>1.6667</td>
<td>1.1204</td>
<td>2.118</td>
</tr>
<tr>
<td>CF</td>
<td>-0.0141</td>
<td>0.3072</td>
<td>0.0645</td>
<td>0.2112</td>
<td>0.0776</td>
</tr>
</tbody>
</table>

No. of firm-years observations: Listed companies, Large private companies, Medium-sized companies, Small companies, Micro companies.

Notes: ΔNI is the change in earnings, where earnings is scaled by end-of-year total assets; ΔCF is the change in cash flow from operating activities, where cash flow from operating activities is scaled by end-of-year total assets; size is the logarithm of the end-of-year total assets; Growth is the percentage change in sales; Lev is end-of-year total liabilities divided by end-of-year book value of equity; Discue is the percentage change in total liabilities; Turn is sales divided by end-of-year total assets; CF is the cash flow from operating activities, scaled by end-of-year total assets. All variables are measured during the sample period, 2006-2013.
regimes during the sample period 2006-2013. For comparison, panels A, A(1) and A(2) report the results for companies which did not change regime, and is consistent with Table III; that is, large private and medium-sized companies appear to have a lower quality of earnings than other groups. In addition, panel A(1) shows that following IFRS does not guarantee earnings quality since there is variation across the different types of companies; these results are similar to Kvaal and Nobes (2012) who document the variation in accounting practice across European countries, even though they are all following IFRS.

Table IV panel B gives the results for companies which switched from UK GAAP to IFRS. Since IFRS was compulsory for listed companies for accounting periods commencing 1 January 2005, the 152 observations identified for listed companies are presumably those which became listed during the sample period. Table IV panel B also shows that the large private companies which voluntarily switched to IFRS improved their earnings quality very slightly, since they have a smoothing measure of 0.0722 compared with 0.0537 for those which followed UK GAAP, as shown in panel A(2). It is possible that these large private companies may have been considering listed status and, thus, improved their reporting quality to gain more accurate offer pricing in the future, as found by Hanley and Hoberg (2012). In contrast, the small- and medium-sized companies which switched to IFRS have

<table>
<thead>
<tr>
<th>Year</th>
<th>Variable</th>
<th>Listed companies</th>
<th>Large private companies</th>
<th>Medium companies</th>
<th>Small companies</th>
<th>Micro companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>No. of firms</td>
<td>768</td>
<td>1,367</td>
<td>1,970</td>
<td>34,087</td>
<td>38,136</td>
</tr>
<tr>
<td></td>
<td>V(ΔNI)</td>
<td>0.3199</td>
<td>0.0589</td>
<td>0.0783</td>
<td>0.2474</td>
<td>0.2325</td>
</tr>
<tr>
<td></td>
<td>SD, mean of</td>
<td>(1.27e-04,</td>
<td>(1.04e-06,</td>
<td>(1.05e-06,</td>
<td>(1.39e-04,</td>
<td>(2.09e-04,</td>
</tr>
<tr>
<td></td>
<td>bootstrap distribn</td>
<td>(1.27e-04,</td>
<td>(1.04e-06,</td>
<td>(1.05e-06,</td>
<td>(1.39e-04,</td>
<td>(2.09e-04,</td>
</tr>
<tr>
<td>2007</td>
<td>V(ΔNI)/V(ΔCF)</td>
<td>0.3979</td>
<td>0.0579</td>
<td>0.0715</td>
<td>0.2519</td>
<td>0.2285</td>
</tr>
<tr>
<td>2008</td>
<td>V(ΔNI)/V(ΔCF)</td>
<td>0.3857</td>
<td>0.0771</td>
<td>0.0851</td>
<td>0.2461</td>
<td>0.2266</td>
</tr>
<tr>
<td>2009</td>
<td>V(ΔNI)/V(ΔCF)</td>
<td>0.3620</td>
<td>0.0606</td>
<td>0.0802</td>
<td>0.2500</td>
<td>0.2088</td>
</tr>
<tr>
<td>2010</td>
<td>V(ΔNI)/V(ΔCF)</td>
<td>0.2088</td>
<td>0.0417</td>
<td>0.0549</td>
<td>0.2497</td>
<td>0.2198</td>
</tr>
<tr>
<td>2011</td>
<td>V(ΔNI)/V(ΔCF)</td>
<td>0.3807</td>
<td>0.0649</td>
<td>0.0672</td>
<td>0.2458</td>
<td>0.2257</td>
</tr>
<tr>
<td>2012</td>
<td>V(ΔNI)/V(ΔCF)</td>
<td>0.4001</td>
<td>0.0594</td>
<td>0.0762</td>
<td>0.2455</td>
<td>0.2315</td>
</tr>
<tr>
<td>2013</td>
<td>V(ΔNI)/V(ΔCF)</td>
<td>0.3789</td>
<td>0.0595</td>
<td>0.0730</td>
<td>0.2448</td>
<td>0.2232</td>
</tr>
</tbody>
</table>

Notes: V(ΔNI) is the variability of earnings, which is measured by the variance of the residuals from Equations (1) and (4) to capture the smoothness of earnings; V(ΔNI)/V(ΔCF) is the ratio of variability of earnings to the variability of cash flows from operating activities, where the variability of earnings is measured by the variance of the residuals from Equations (1) and (4), and the variability of cash flows is measured by the variance of the residuals from Equations (2) and (5). This ratio is to capture the smoothness of earnings related to the smoothness of cash flows. We report, in parenthesis, the means and standard deviations of the bootstrapped variance of residuals [V(ΔNI)] and the ratio [V(ΔNI)/V(ΔCF)]. The standard deviation of the bootstrap distribution is our estimate of the standard error of the test statistic which approximates to a normal distribution. All variables are measured during the sample period, 2006-2013.
smoother earnings than those companies which followed UK GAAP during the period; small companies have a smoothing value of 0.1605 compared with 0.2487 in panel A(2), whilst medium-sized companies have a smoothing value of 0.0178 compared with 0.0718 in panel A(2). This is suggestive of a situation in which companies switch to IFRS without any accompanying improvement in reporting quality.

Table IV panel C shows that all the private companies (small, medium-sized and large) which switched back from IFRS to UK GAAP have more earnings smoothing than those which remained with UK GAAP, as shown in panel A(2). The overall conclusion about switching is that, with the exception of large private companies which slightly reduced smoothing by switching to IFRS (perhaps in anticipation of an initial public offering), the evidence from both panels B and C suggests that switching (in whatever direction) reduces earnings quality.

Table IV.
The effect of switching regimes on earnings quality for different groups of companies

<table>
<thead>
<tr>
<th>Variable</th>
<th>Listed companies</th>
<th>Large private companies</th>
<th>Medium companies</th>
<th>Small companies</th>
<th>Micro companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: observations where there is no change accounting standards during the sample period</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of firm-years</td>
<td>5,466</td>
<td>12,725</td>
<td>20,500</td>
<td>256,142</td>
<td>217,647</td>
</tr>
<tr>
<td>( V(\Delta NI)/V(\Delta CF) )</td>
<td>(0.3316)</td>
<td>(0.0582)</td>
<td>(0.0719)</td>
<td>(0.2486)</td>
<td>(0.2231)</td>
</tr>
<tr>
<td>bootstrap distribn</td>
<td>(0.0720)</td>
<td>(0.0782)</td>
<td>(0.0719)</td>
<td>(0.2486)</td>
<td>(0.2231)</td>
</tr>
<tr>
<td>Panel A (1): observations for companies which followed IFRS during the sample period</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of firm-years</td>
<td>5,466</td>
<td>651</td>
<td>182</td>
<td>531</td>
<td></td>
</tr>
<tr>
<td>( V(\Delta NI)/V(\Delta CF) )</td>
<td>(0.3311)</td>
<td>(0.0587)</td>
<td>(0.0806)</td>
<td>(0.1795)</td>
<td></td>
</tr>
<tr>
<td>SD, mean of</td>
<td>(4.37E-03)</td>
<td>(1.60E-03)</td>
<td>(4.19E-03)</td>
<td>(8.91E-03)</td>
<td></td>
</tr>
<tr>
<td>bootstrap distribn</td>
<td>(0.0786)</td>
<td>(0.0812)</td>
<td>(0.1804)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panel A (2): observations for companies which followed UK GAAP during the sample period</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of firm-years</td>
<td>12,074</td>
<td>20,318</td>
<td>255,611</td>
<td>217,647</td>
<td></td>
</tr>
<tr>
<td>( V(\Delta NI)/V(\Delta CF) )</td>
<td>(0.0537)</td>
<td>(0.0718)</td>
<td>(0.2486)</td>
<td>(0.2231)</td>
<td></td>
</tr>
<tr>
<td>SD, mean of</td>
<td>(1.74E-02)</td>
<td>(6.73E-03)</td>
<td>(6.51E-03)</td>
<td>(3.08E-02)</td>
<td></td>
</tr>
<tr>
<td>bootstrap distribn</td>
<td>(0.0540)</td>
<td>(0.0718)</td>
<td>(0.2486)</td>
<td>(0.2231)</td>
<td></td>
</tr>
<tr>
<td>Panel B: observations for companies which changed accounting standards from UK GAAP to IFRS during the sample period</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of firm-years</td>
<td>152</td>
<td>65</td>
<td>37</td>
<td>78</td>
<td></td>
</tr>
<tr>
<td>( V(\Delta NI)/V(\Delta CF) )</td>
<td>(0.2891)</td>
<td>(0.0722)</td>
<td>(0.0718)</td>
<td>(0.1605)</td>
<td></td>
</tr>
<tr>
<td>SD, mean of</td>
<td>(1.74E-02)</td>
<td>(6.73E-03)</td>
<td>(6.51E-03)</td>
<td>(3.08E-02)</td>
<td></td>
</tr>
<tr>
<td>bootstrap distribn</td>
<td>(0.0540)</td>
<td>(0.0718)</td>
<td>(0.2486)</td>
<td>(0.2231)</td>
<td></td>
</tr>
<tr>
<td>Panel C: observations for companies which changed accounting standards from IFRS to UK GAAP during the sample period</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of firm-years</td>
<td>32</td>
<td>19</td>
<td>68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( V(\Delta NI)/V(\Delta CF) )</td>
<td>(0.0277)</td>
<td>(0.0150)</td>
<td>(0.1421)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD, mean of</td>
<td>(1.04E-02)</td>
<td>(2.31E-02)</td>
<td>(5.56E-01)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>bootstrap distribn</td>
<td>(0.0363)</td>
<td>(0.1571)</td>
<td>(0.1750)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: \( V(\Delta NI) \) is the variability of earnings, which is measured by the variance of the residuals from Equations (1) and (4) to capture the smoothness of earnings; \( V(\Delta NI)/V(\Delta CF) \) is the ratio of variability of earnings to the variability of cash flows from operating activities, where the variability of earnings is measured by the variance of the residuals from Equations (1) and (4), and the variability of cash flows is measured by the variance of the residuals from Equations (2) and (5). This ratio is to capture the smoothness of earnings related to the smoothness of cash flows. We report, in parenthesis, the means and standard deviations of the bootstrapped variance of residuals \( V(\Delta NI) \) and the ratio \( V(\Delta NI)/V(\Delta CF) \). The standard deviation of the bootstrap distribution is our estimate of the standard error of the test statistic which approximates to a normal distribution. Variables in panel A are measured during the sample period, 2006-2013. Variables in panels B and C are measured during the year of the switch.
5.3 The effect of audit exemption

Table V presents the effect of audit exemption on earnings quality. A feature of the results is that the trend away from audit, documented by Dedman et al. (2014) for the years 2003-2006, continues. For small companies, in 2006, there were 17,245 companies which had an audit compared with 16,842 which did not; by 2013, the numbers were 2,907 and 27,635, respectively. The story for micro companies is similar. These numbers also document the decline of both small and micro companies during the recession.

With respect to small companies, for all years combined, the $V(\Delta NI)/V(\Delta CF)$ measure in Table V shows that audited accounts have much the same earnings smoothness (0.2472) as small company non-audited accounts (0.2491). This finding is along similar lines to those of vanTendeloo and Vanstraelen (2008), who, in a European study of private companies 1998-2002, find that earnings smoothing in the UK does not vary much between Big 4 and non-Big 4 audited companies. However, we find that, in recent years, small company audited accounts are slightly smoother than non-audited accounts; for example, in 2011, the smoothness measure was 0.2170 compared with 0.2475 for non-audited accounts, which suggests that the disciplining effect of audit on earnings quality was slightly weakened after the recession period.

Table V also shows the results for micro companies. For all years combined, audited micro companies appear to have similar earnings quality to unaudited micro companies;

<table>
<thead>
<tr>
<th>Year</th>
<th>Variable</th>
<th>Small companies</th>
<th>Micro companies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Audited accounts</td>
<td>Non-audited accounts</td>
</tr>
<tr>
<td>All Years</td>
<td>No. of firm-years</td>
<td>75,976</td>
<td>180,586</td>
</tr>
<tr>
<td></td>
<td>$V(\Delta NI)$</td>
<td>0.0996</td>
<td>0.1193</td>
</tr>
<tr>
<td></td>
<td>Mean, SD of bootstrap distribn</td>
<td>(0.1067, 2.63E-04)</td>
<td>(0.1154, 1.59E-04)</td>
</tr>
<tr>
<td></td>
<td>$V(\Delta NI)/V(\Delta CF)$</td>
<td>0.2472</td>
<td>0.2491</td>
</tr>
<tr>
<td></td>
<td>Mean, SD of bootstrap distribn</td>
<td>(0.2507, 8.68E-04)</td>
<td>(0.2478, 5.16E-04)</td>
</tr>
<tr>
<td>2006</td>
<td>No. of firms</td>
<td>17,245</td>
<td>16,842</td>
</tr>
<tr>
<td></td>
<td>$V(\Delta NI)/V(\Delta CF)$</td>
<td>0.2257</td>
<td>0.2429</td>
</tr>
<tr>
<td>2007</td>
<td>No. of firms</td>
<td>16,706</td>
<td>16,936</td>
</tr>
<tr>
<td></td>
<td>$V(\Delta NI)/V(\Delta CF)$</td>
<td>0.2464</td>
<td>0.2566</td>
</tr>
<tr>
<td>2008</td>
<td>No. of firms</td>
<td>15,654</td>
<td>17,291</td>
</tr>
<tr>
<td></td>
<td>$V(\Delta NI)/V(\Delta CF)$</td>
<td>0.2490</td>
<td>0.2433</td>
</tr>
<tr>
<td>2009</td>
<td>No. of firms</td>
<td>13,047</td>
<td>18,998</td>
</tr>
<tr>
<td></td>
<td>$V(\Delta NI)/V(\Delta CF)$</td>
<td>0.2456</td>
<td>0.2530</td>
</tr>
<tr>
<td>2010</td>
<td>No. of firms</td>
<td>3,835</td>
<td>27,827</td>
</tr>
<tr>
<td></td>
<td>$V(\Delta NI)/V(\Delta CF)$</td>
<td>0.2353</td>
<td>0.2504</td>
</tr>
<tr>
<td>2011</td>
<td>No. of firms</td>
<td>3,370</td>
<td>27,571</td>
</tr>
<tr>
<td></td>
<td>$V(\Delta NI)/V(\Delta CF)$</td>
<td>0.2170</td>
<td>0.2475</td>
</tr>
<tr>
<td>2012</td>
<td>No. of firms</td>
<td>3,212</td>
<td>27,486</td>
</tr>
<tr>
<td></td>
<td>$V(\Delta NI)/V(\Delta CF)$</td>
<td>0.1897</td>
<td>0.2501</td>
</tr>
<tr>
<td>2013</td>
<td>No. of firms</td>
<td>2,907</td>
<td>27,635</td>
</tr>
<tr>
<td></td>
<td>$V(\Delta NI)/V(\Delta CF)$</td>
<td>0.2262</td>
<td>0.2463</td>
</tr>
</tbody>
</table>

Notes: $V(\Delta NI)$ is the variability of earnings, which is measured by the variance of the residuals from Equations (1) and (4) to capture the smoothness of earnings; $V(\Delta NI)/V(\Delta CF)$ is the ratio of variability of earnings to the variability of gross flows from operating activities, where the variability of earnings is measured by the variance of the residuals from Equations (1) and (4), and the variability of cash flows is measured by the variance of the residuals from Equations (2) and (5). This ratio is to capture the smoothness of earnings related to the smoothness of cash flows. We report, in parenthesis, the means and standard deviations of the bootstrapped variance of residuals [$V(\Delta NI)$] and the ratio [$V(\Delta NI)/V(\Delta CF)$]. The standard deviation of the bootstrap distribution is our estimate of the standard error of the test statistic which approximates to a normal distribution. All variables are measured during the sample period, 2006-2013.

Table V. The effect of audit on earnings quality for small and micro companies.
the \( \frac{V(\Delta NI)}{V(\Delta CF)} \) measure is similar for both groups (0.2278 and 0.2211, respectively). At the individual year level, there is evidence that the audit improves earnings quality. For 2011-2013, the \( \frac{V(\Delta NI)}{V(\Delta CF)} \) measure is larger for audited accounts than for unaudited accounts; the greatest difference is in 2013, when for a small number of companies (579), the ratio was 0.3470 compared with 0.2203 for non-audited accounts. Although the explanation for this is beyond the current paper, it is noteworthy that the period is one in which the number of micro companies is declining. It may be that in this context, some micro companies were in need of finance from banks, which require good-quality financial information, including an audit.

6. Conclusions

Since the Companies Act 1981, there has emerged a multi-tier framework for financial reporting in the UK. This development was extended by the 2013 Accounting Directive from the EU, which has the objective of reducing disproportionate costs imposed on smaller companies. An important issue which arises from this multi-tier approach is how the quality of reporting is affected.

UK regulation itself offers no guidance on this question and the existing research is both limited and dated. In particular, the studies exclude very small and micro companies which are the focus of the 2013 EU directive, requiring the reporting burden to be reduced for this group. We address this gap in the literature and review the quality of earnings between the different types of company from 2006 to 2013. We classify companies according to whether they are listed, large private, medium-sized, small or micro. The inclusion of very small and micro companies leads to a large sample of over 514,000 company-year observations. Earnings quality is measured by its lack of smoothness, which is a general measure and recognised to reflect the quality of accounting standards and the needs of stakeholders.

We find that the earnings of listed companies have the highest quality reflecting the success of IFRS in restraining the well-recognised incentives for earnings management. This is closely followed by small and micro companies. In contrast, the smoothing behaviour of large private and medium-sized companies is approximately six times as large as listed companies and four times as large as small and micro companies. This finding is consistent with opportunistic behaviour undertaken by large private and medium-sized companies having transactions for which there is more discretion under UK GAAP than under IFRS.

A feature of UK standards is that non-listed companies are allowed to report under a regime intended for larger companies; for example, medium-sized companies may report using IFRS instead of UK GAAP. We find that the number of companies which switch regimes is small. Large private companies which switched to IFRS have improved earnings quality; they may have been considering listed status and, thus, improved their reporting quality to gain more accurate offer pricing in the future. Switching by other private companies suggests opportunism. Medium-sized companies that switch regime, whether from or back to the home regime, have the poorest earnings quality of all medium-sized companies. Similarly, small companies which remain in their home regime and follow UK GAAP have a higher earnings quality than other small companies.

Another flexibility, allowed only to small and micro companies, is to be exempt from audit. We assess whether exercising this option leads to a decline in quality. Overall, the results indicate that earnings quality is much the same for both audited and unaudited financial statements, suggesting that small and micro companies act in the best interests of their stakeholders even when they are not under the audit spotlight. However, we also find some indication, for the more recent 2011-2013 period, that micro companies which choose an audit have a higher earnings quality than those which do not. We do not investigate the cause of this, but perhaps it is related to the increased demand by micro companies for bank finance after the 2008 recession.
Two reservations are in order. First, we have not been able to measure the impact of the option for micro-, small- and medium-sized companies to submit abbreviated accounts since we assess companies according to their earnings quality and the companies involved do not file an income statement. From a policy viewpoint, this limitation may not be too critical since the option is likely to be exercised less frequently when, from 2016, shareholder approval is required every year. Second, our analysis is based on reporting requirements prior to the recently issued FRS 102/FRS 105 for medium sized, small and micro companies. However, it will be some time before suitable data are available based on those standards. Therefore, given the stability of our results over time and the very limited evidence to date, we believe that this study gives some worthwhile insight into answering the question of whether the directive is a “sensible reduction in red tape or a source of risk to the UK economy” (ICAEW, 2015). Overall, our results, based on past evidence, show that it is possible to reduce the reporting burden on small and micro companies without compromising the quality of reporting.

Notes
1. These large- and medium-sized companies, as well as small companies, were also permitted to report under IFRS if they so wished. However, the Companies Act 2006, s395 and s403 placed restrictions on switching back to the home regime, but these were subsequently relaxed to allow companies to switch back within a five year period.
2. The Accounting Standards Board (ASB) was the chief regulatory body for accounting standards in the UK prior to the reorganisation in July 2012 when it was superseded by the Financial Reporting Council (FRC).
3. Large private and medium-sized companies are intended to report under FRS 102 (effective from 1 January 2015), small companies under a special section of FRS 102 and micro companies under FRS 105 (effective from 1 January 2016).
4. In common with studies in this area, we concentrate on recognition rather than disclosure, since research (e.g. Schipper, 2007) suggests that disclosure does not compensate for inadequate recognition.
5. As in Barth et al. (2008), the values of the variables below the 5th percentile and above the 95th level are winsorized to mitigate the influence of outliers.
6. However, to the extent that the control variables are inadequately measured by the accounting system, \(V(\Delta CF)\) may still be contaminated by accounting factors.
7. We also report the statistics for \(V(\Delta NI)\) which are constructed in a similar way.
8. The FAME database: we use records only whether a company follows UK GAAP or IFRS, and not whether the FRSEE is adopted within UK GAAP.
10. We also need prior year data to calculate changes in working capital, but this is not part of our sample period for the smoothing tests.
11. Of note is the fact that earnings quality for 2006 and 2007 is similar for all types of company, suggesting that the \(V(\Delta NI)/V(\Delta CF)\) measure is able to eliminate volatility due to the recession which commenced in 2007.

References


Further reading


Corresponding author

Siming Liu can be contacted at: Siming.Liu@brunel.ac.uk

For instructions on how to order reprints of this article, please visit our website: www.emeraldgrouppublishing.com/licensing/reprints.htm
Or contact us for further details: permissions@emeraldinsight.com
Corporate boards, ownership structures and corporate disclosures
Evidence from a developing country

Abdalrhman Alnabsha
Department of Accountancy and Finance,
University of Huddersfield Business School, Huddersfield, UK

Hussein A. Abdou
Department of Accounting, Finance and Economics,
Faculty of Business and Law, Manchester Metropolitan University,
Manchester, UK and
Management Department, Mansoura University, Mansoura, Egypt

Collins G. Ntim
Department of Accounting, Southampton Business School,
University of Southampton, Southampton, UK and

Ahmed A. Elamer
School of Business and Enterprise, University of the West of Scotland, Paisley, UK and
Management Department, Mansoura University, Mansoura, Egypt

Abstract

Purpose – The purpose of this paper is to investigate the effect of corporate board attributes, ownership structure and firm-level characteristics on both corporate mandatory and voluntary disclosure behaviour.

Design/methodology/approach – Multivariate regression techniques are used to estimate the effect of corporate board and ownership structures on mandatory and voluntary disclosures of a sample of Libyan listed and non-listed firms between 2006 and 2010.

Findings – First, the authors find that board size, board composition, the frequency of board meetings and the presence of an audit committee have an impact on the level of corporate disclosure. Second, results indicate that ownership structures have a non-linear effect on the level of corporate disclosure. Finally, the authors document that firm age, liquidity, listing status, industry type and auditor type are positively associated with the level of corporate disclosure.

Research limitations/implications – Future research could investigate disclosure practices using other channels of corporate disclosure media, such as corporate websites. Useful insights may be offered also by future studies by conducting in-depth interviews with corporate managers, directors and owners regarding these issues.

Practical implications – The evidence relating to the important role that corporate governance mechanisms play in shaping the expectations relating to the level of corporate voluntary and/or mandatory disclosures may be useful in informing investor decisions, as well as future policy and regulatory initiatives.

Originality/value – This paper contributes to the existing literature by examining the governance-disclosure nexus relating to both mandatory and voluntary disclosures in both listed and non-listed firms operating in a developing country setting.

Keywords Corporate governance, Content analysis, Voluntary disclosure narrative, Board and ownership structures, Corporate disclosure behaviour, Multi-theoretical perspective

1. Introduction

The quality and quantity of information disclosed in a company’s annual report depends on a country’s rules and regulations. Such factors include the level of economic development; development of the accounting profession; legislation in force; and existence of a sophisticated
financial market (Chen and Roberts, 2010). This reflects the current situation in Libya, where changes in the economy, regulations relating to financial reporting and laws have affected financial reporting practices (Kribat et al., 2013). As such, the Libyan context arguably offers an interesting setting for further analysis for a number of reasons. First, the Libyan economy used to be unique due to the peculiar characteristics of its previous political regime and the general rise in contribution of the petroleum sector to its economy over the last 30 years. A large proportion of this source of income has been used to establish industrial companies in non-oil sectors over the last two decades (Almehdi, 1997). Second, the Libyan legal system developed from a combination of Islamic legal principles and French civil law. Third, the use of Libyan Commercial Law (LCL) in 1954 was a pioneering effort in the corporate governance field. The establishment of the LCL in 1954 facilitated the development of corporate governance in Libya. In particular, it provided guidelines for establishing, registering, managing, governing and dissolving all forms of firms. Moreover, it also recommended the kind and type of sanctions that may be imposed on companies if they fail to meet the requirements of the law. Fourth, despite the growth in the economy, the accounting profession in Libya is still relatively under-developed. Finally, corporate ownership is largely concentrated in the form of government, family (directors) and foreign institutional investors. As such, these Libyan-specific issues arguably offer an interesting setting to examine the drivers of corporate disclosures. Consequently, the current study seeks to examine the extent to which corporate board mechanisms, ownership structures and firm-level characteristics may influence the level of corporate disclosures in this distinct corporate context.

Not surprisingly, there has been increasing interest in the issue of corporate governance, accountability, disclosure and transparency in recent years (Aljifri et al., 2014; Wang and Hussainey, 2013). However, a careful assessment of this literature reveals a number of discernible weaknesses. First, there is growing consensus that corporations engage in increased financial and non-financial disclosures for multiple theoretical reasons. This implies that the ability of any single theory to explain the varied motivations underlying corporate disclosures is limited. However, existing studies are either largely descriptive in nature (Cooke, 1989; Inchausti, 1997; Ho and Shun, 2001) or underpinned often by a single theoretical framework (Chen and Roberts, 2010). Arguably, this limits current understanding of the various motivations underlying corporate disclosures. Second, although corporate reporting consists of mandatory and voluntary disclosures, existing studies have focussed almost exclusively on understanding the determinants of, and motivations for, corporate voluntary disclosures (Al-Janadi et al., 2016; Choi, 1973; Gray et al., 1995). Third, although the majority of corporations are not listed, existing studies examining the motivations for, and determinants of, corporate disclosures have focussed mainly on listed corporations (Barako et al., 2006). By contrast, there is an acute dearth of studies analysing corporate disclosures in non-listed corporations (Cooke, 1989; Ho and Shun, 2001; Inchausti, 1997; Meek et al., 1995), and thereby impairing current understanding of corporate disclosure behaviour with respect to non-listed firms. Finally, despite increasing importance of developing countries around the world, existing studies examining corporate disclosure behaviour are primarily concentrated in developed countries with largely similar institutional and contextual characteristics (Ntim and Soobaroyen, 2013a, b). In contrast, developing countries, such as Libya, have different economic, institutional, legal and political environments and thus, the effect of corporate governance, ownership and firm-level variables on corporate disclosure can be expected to be different from those that have been found for firms operating in developed countries. Therefore, an examination of the various factors that may influence corporate disclosure behaviour in developing countries, where empirical evidence is limited, can help in providing a complete understanding of corporate disclosure behaviour (Aljifri et al., 2014; Cooke, 1989; Wang and Hussainey, 2013).
Consequently, this paper seeks to extend, as well as contribute to the current literature in a number of ways. First and unlike many prior studies that have simply examined how firm-level characteristics, such as firm size and industry, affect corporate disclosure behaviour, this study examines how corporate boards, executives and owners in addition to firm-level features drive the level of corporate disclosure. Second, distinct from prior studies, the current study examines the antecedents of both mandatory and voluntary disclosures. Finally, in contrast to previous studies, this study analyses both listed and non-listed firms, and thereby providing new empirical insights relating to the disclosure behaviour of both listed and non-listed firms.

The remainder of the paper is organised as follows. Section 2 presents a review of the relevant literature and hypotheses development. The research method is outlined in Section 3. Section 4 presents the empirical results. The final section (Section 5) presents the conclusions, policy implications of the results and directions for future research.

2. Empirical literature and hypotheses development

2.1 Corporate governance characteristics and disclosure

2.1.1 Board size. According to agency theory, board size is a key determinant in monitoring managers. Samaha et al. (2012) suggest that organisations that have larger boards are less likely to be dominated by senior executives, and as a result, are more likely to disclose more financial and non-financial information than organisations with smaller boards. On the other hand, others claim that larger boards are often associated with poor communication and monitoring, including corporate disclosures, and therefore having a negative impact on the level of corporate disclosure (Jensen, 1993). In addition, resource-dependence theory postulates that larger boards are more likely to consist of greater diversity of expertise and stakeholder representation, which can contribute to improved corporate reputation through enhanced disclosures.

Empirically, most prior research supports a positive association between board size and corporate disclosure behaviour (Laksmana, 2008; Samaha et al., 2015; Wang and Hussainey, 2013). However, some researchers found no relationship between board size and disclosure level (e.g. Ebrahim and Fattah, 2015), whilst others argue that board size may have a negative impact on the board effectiveness. This is because free-riding tends to be common within larger boards, whereby leading members tend to be less motivated to take part in decision making, which can lead to low levels of disclosure (Yermack, 1996; Byard et al., 2006). Thus, we hypothesise that:

H1. There is a significant positive association between board size and the level of corporate disclosure.

2.1.2 Chief executive officer (CEO) role duality. CEO role duality is where the CEO of a firm also serves as the chairman of the board. From the agency perspective, such duality in position provides the CEO with power that might negatively affect the board’s control. It is argued that effectiveness in board monitoring can be achieved by having a large number of independent directors, which can lead to greater transparency and disclosure (Gul and Leung, 2004). From a resource-dependence theory perspective, separating the board chairman and CEO positions can improve a firm’s legitimacy in its environment (legitimacy theory), as well as stakeholders’ participation (stakeholder theory) by encouraging equality and fairness in executive decision making. As such, CEO duality may negatively impact on the objectivity of a CEO’s decisions (Freeman and Reed, 1983; Ntim, Opong and Danbolt, 2012).

Prior empirical research has provided mixed results regarding the role duality-disclosure nexus. For example, some past studies have reported no significant association between
these two variables (Arcay and Muiño, 2005; Ho and Shun, 2001), whilst others have found a negative relationship between the two variables (e.g. Eng and Mak, 2003; Gul and Leung, 2004; Ntim and Soobaroyen, 2013a). Hence, we hypothesise that:

H2. There is a significant negative association between role duality and the level of disclosure.

2.1.3 Board composition. Fama and Jensen (1983) argue that corporate boards with a higher proportion of independent non-executive directors (NEDs) are more influential in monitoring and controlling managerial decisions. According to agency and stakeholder theories, the board of directors is perceived not only as a key mechanism of internal control for monitoring managers and mitigating agency problems between managers and shareholders, but also acting as a mechanism to advance the interests of other stakeholders, such as employees and communities (Chen and Roberts, 2010).

Empirically, the findings of some studies indicate a positive association between NEDs and voluntary disclosure (e.g. Ntim, Opong and Danbolt, 2012; Samaha et al., 2015), whilst other researchers found either no association (Aljifri et al., 2014; Ho and Shun, 2001) or a negative association (e.g. Ghazali and Weetman, 2006; Gul and Leung, 2004). Therefore, we conjecture that:

H3. There is a significant positive association between the proportion of NEDs and the level of disclosure.

2.1.4 Frequency of meetings. Ntim and Osei (2011) and Laksmana (2008) report a positive relationship between the frequency of board meetings and the level of disclosure. In contrast, Vafeas (1999) and Alhazaimeh et al. (2014) find no significant relationship between the frequency of board meetings and voluntary disclosure. Thus, we hypothesise that:

H4. There is a significant positive association between the number of board meetings and the level of disclosure.

2.1.5 Existence of audit committee. According to agency theory, the existence of an audit committee can help firms to reduce agency conflicts. It is considered to be an important element for the board of the directors to internally control decision making and enhance the quality of information flow between owners and managers (Arcay and Muiño, 2005; Fama, 1980).

Empirically, Ho and Shun (2001), Barako et al. (2006) and Samaha et al. (2015) find that the presence of an audit committee has a positive impact on corporate disclosure behaviour. On the other hand, others have reported no association between disclosure and the presence of an audit committee (Alhazaimeh et al., 2014; Aljifri et al., 2014). Hence, we hypothesise that:

H5. There is a significant positive association between the existence of an audit committee and the level of disclosure.

2.2 Ownership structure variables and disclosure

2.2.1 Foreign ownership. Alhazaimeh et al. (2014) and Haniffa and Cooke (2002) find that there is a significant positive association between foreign ownership and the extent of corporate voluntary disclosure. However, Aljifri et al. (2014) find no association between foreign ownership and corporate financial disclosure. Thus, we hypothesise that:

H6. There is a significant positive association between foreign ownership and the level of disclosure.

2.2.2 Government ownership. High levels of government ownership with a strong political connection can offer protection against greater scrutiny and discipline by weak regulatory
framework, which can lead to low levels of disclosure in such firms. Theoretically, firms with higher state ownership may easily obtain funding from the government, and therefore, these firms tend to attract investors with less incentive to disclose increased information. Conversely, these firms are under greater public scrutiny, leading to pressure to disclose more information.

Empirically, Alhazaimeh et al. (2014), Ntim, Opong and Danbolt (2012) and Khan et al. (2013) report a positive association between government ownership and voluntary disclosure. However, Ghazali and Weetman (2006) find an insignificant association, and Ebrahim and Fattah (2015) report a negative association between government ownership and voluntary disclosure. Therefore, we hypothesise that:

\[ H7. \] There is a significant positive association between government ownership and the level of disclosure.

2.2.3 Institutional ownership. Institutional investors play an influential role in the structure of corporate governance. From an agency theory perspective, institutional ownership is considered as a key part of effective control over a company, whereby managers, as influential stakeholders (stakeholder theory), disclose more information to meet the informational needs of institutional shareholders.

Empirically, Ebrahim and Fattah (2015) provide evidence that suggests a positive association between institutional investors' ownership and the extent of voluntary disclosure. However, Alhazaimeh et al. (2014) and Ntim and Soobaroyen (2013a) find a negative association between institutional ownership and the level of disclosure. With regard to the Libyan context, the government's plan to privatise its enterprises has led to an increase in the level of institutional ownership in Libyan privatised firms. Therefore, we expect firms with high institutional ownership to disclose more information. Hence, we hypothesise that:

\[ H8. \] There is a significant positive association between institutional ownership and the level of disclosure.

2.2.4 Director ownership. Agency theory suggests that there is a contradictory association between voluntary disclosures and director ownership. The extent of managerial ownership can serve as a way of aligning the interests of managers with those of shareholders, and thereby leading to an increase in the level of disclosure (Jensen and Meckling, 1976). Empirically, Eng and Mak (2003) and Wang and Hussainey (2013) found a negative association between director ownership and voluntary disclosure. Thus, we hypothesise that:

\[ H9. \] There is a significant negative association between director ownership and the level of disclosure.

3. Research methodology

3.1 Data collection and sampling

This paper examines Libyan companies' annual reports in terms of the association between corporate governance characteristics, ownership structure and the extent of disclosure. A disclosure index is developed to measure the level of disclosure[1]. In order to provide a comprehensive picture of corporate reporting in the Libyan context, annual reports of three sectors, namely, banks, manufacturing and services were collected. The rationale for choosing these sectors is that "after the oil and gas sector", they are the dominant sectors in the Libyan economy in terms of their contribution to the total gross domestic product. The oil and gas sector is excluded, as most of the companies operating in this sector are
either foreign companies or partners of foreign companies with more advanced accounting and reporting practices (Table I).

Annual reports for five years (2006-2010) were collected from the LSM, company websites, Audit Bureau and Tax Authority. Out of 28 listed companies on the LSM, the annual reports of 22 companies were obtained. In addition, we collected annual reports from 23 large non-listed firms from the Audit Bureau. The period (2006-2010) was selected as 2006 witnessed the emergence of the LSM. Also, due to the Libyan uprising, which started in 2011, annual reports from 2011 onwards were not available. Consequently, a total of 211 annual reports were collected, of which 193 were usable.

3.2 Variable measurement and model specification

3.2.1 Dependent variable: construction of the disclosure index. As there is a lack of a general theoretical framework regarding the choice and selection of items to be included in a disclosure index, the extant Libyan Government regulations and laws were used to construct the disclosure index. As this part of the study did not focus on a specific user group, an unweighted index was applied. The following rules were used to build a comprehensive index: the items required by statutory regulations (e.g. ITL); a review of relevant disclosure literature to identify items specific to this study; and items included in the annual reports published by Libyan companies (e.g. Elmagrhi et al., 2016; Ntim, Danbolt and Thomas, 2012; Ntim, Opong and Danbolt, 2012; Wang and Hussainey, 2013).

This resulted in an index, consisting of 141 information items divided into mandatory and voluntary items. The mandatory list (MD) consists of 33 items, whilst the voluntary list (VD) is made up of 108 items that are expected to be disclosed in the annual reports of Libyan firms. A binary coding scheme was used in which the presence of an item is scored 1, otherwise 0. Thus, with this unweighted scoring scheme, the higher a firm’s score, the better its disclosure will seem to be and vice versa.

3.2.2 Reliability and validity of the disclosure index. The final index was subjected to extensive review by three accounting specialists, one of them in the area of disclosure and transparency and two accountants at the LSM. These reviews resulted in adding four voluntary items and eliminating seven other items. In addition, each report was reviewed twice.

<table>
<thead>
<tr>
<th></th>
<th>Number of firms</th>
<th>Number of observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrials</td>
<td>130</td>
<td>650</td>
</tr>
<tr>
<td>Financial</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Services</td>
<td>100</td>
<td>500</td>
</tr>
<tr>
<td>Initial sample</td>
<td>250</td>
<td>1,250</td>
</tr>
<tr>
<td>Less: small and medium companies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrials</td>
<td>115</td>
<td>575</td>
</tr>
<tr>
<td>Financial</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Services</td>
<td>86</td>
<td>430</td>
</tr>
<tr>
<td>(205)</td>
<td>(1,025)</td>
<td></td>
</tr>
<tr>
<td>Less: missing data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrials</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Financial</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Services</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>(7)</td>
<td>(32)</td>
<td></td>
</tr>
<tr>
<td>Industrials</td>
<td>13</td>
<td>65</td>
</tr>
<tr>
<td>Financial</td>
<td>13</td>
<td>65</td>
</tr>
<tr>
<td>Services</td>
<td>13</td>
<td>65</td>
</tr>
<tr>
<td>Final sample</td>
<td>39</td>
<td>193</td>
</tr>
</tbody>
</table>

Table I. Sample selection process
First, the annual reports were reviewed in order to familiarise ourselves with a firm’s business and activities, and thus assess the relevance of the index to that firm. The reliability of this index was piloted for a sample of 40 annual reports. Second, the annual reports were scored again to ensure consistency with the original scoring. The relevance of the mandatory items was determined by Libyan legislations, whilst voluntary items were similar to those used in previous studies.

3.2.3 Regression model. The multiple regression model employed is as follows:

\[
DL = \beta_0 + \beta_1 \text{BoardS} + \beta_2 \text{DualP} + \beta_3 \text{BoCo} + \beta_4 \text{FreMee} + \beta_5 \text{AuCo} \\
+ \beta_6 \text{ForOwn} + \beta_7 \text{InstOwn} + \beta_8 \text{GovOwn} + \beta_9 \text{DirOwn} + \beta_{10} \text{FS} \\
+ \beta_{11} \text{FA} + \beta_{12} \text{Gaering} + \beta_{13} \text{Prof} + \beta_{14} \text{Liq} + \beta_{15} \text{Lis} + \beta_{16} \text{IndTyp} \\
+ \beta_{17} \text{AudTyp} + \beta_{18} \text{Year} + e
\]

where \(DL\) denotes \(MD\) (the mandatory disclosure); \(VD\) (the voluntary disclosure) and \(ODL\) (the overall disclosure level); \(\beta_0\) is the constant term; \(\text{BoardS}\) is the board size; \(\text{DualP}\) is the role duality; \(\text{BoCo}\) is the board composition; \(\text{FreMee}\) is the frequency of meetings; \(\text{AuCo}\) is the auditor committee; \(\text{ForOwn}\) is foreign ownership; \(\text{InstOwn}\) is institutional ownership; \(\text{GovOwn}\) is government ownership; \(\text{DirOwn}\) is director ownership; \(\text{FS}\) is firm size; \(\text{FA}\) is firm age; \(\text{Prof}\) is profitability; \(\text{Liq}\) is liquidity; \(\text{Lis}\) is listing status; \(\text{IndTyp}\) is industry type; \(\text{AudTyp}\) is auditor type, \(\text{Year}\) is the year; and \(e\) is the error term. A summary of the definition and measurement of the variables is shown in Table II.

4. Empirical results

4.1 Descriptive statistics

Table III illustrates the descriptive statistics of the variables. The table indicates that the level of compliance of the Libyan firms with the mandatory requirements is 77 per cent. This level is still lower than the finding of previous studies (Gao and Kling, 2012; Omar and Simon, 2011). With regard to the \(VD\), Table III indicates that the extent of \(VD\) in the annual reports of the Libyan firms is 65 per cent with a minimum score of 59 items. The average level of \(VD\) (65 per cent) is higher when compared with previous studies (Omar and Simon, 2011). The overall disclosure level is nearly 68 per cent with a minimum score of 81 items and maximum of 114 items out of the total of 141 items of the disclosure index. There has been a steady increase in corporate disclosures \(MD\), \(VD\) and \(ODL\) over time, consistent with previous studies (Omar and Simon, 2011). Regarding the independent variables, the average board size is 8 members. Approximately 36 per cent of the companies CEOs serve also as board chairmen, and the mean percentage of NEDs on the board is approximately 15 per cent.

4.2 Correlation analysis

Table IV shows the correlation analysis between all variables of the study. Since there is no high correlation among the variables, our analysis shows that there is no serious multicollinearity problem present among the independent variables.

Table IV shows further that board size, board composition, frequency of meetings, audit committee, foreign ownership, firm size, gearing, profitability, listing status, industry type and auditor type are significantly and positively correlated with the overall disclosure level \(ODL\). On the other hand, role duality and government ownership are negatively correlated with the \(ODL\).
4.3 Multivariate regression results and discussion

The results of the regression analysis of the determinants of corporate disclosure are shown in Table V. The results presented in Table V show that approximately 54, 85 and 82 per cent of the variation in the disclosure index (MD, VD and ODL, respectively) between the sample companies could be explained by the nine independent variables together with the inclusion of eight control variables. These results are similar to those of Haniffa and Cooke (2002) of 46 per cent, as well as Samaha et al.’s (2012) reported finding of 62 per cent.

Generally, the results indicate that the corporate governance variables are associated with the ODL. First, the analysis finds that the coefficient estimate on Boards is negative and statistically significant with the ODL. This finding provides evidence that small boards of directors are more effective and supports previous studies that reported similar findings (Yermack, 1996; Byard et al., 2006). Theoretically, this is consistent with the predictions of agency theory, which suggest that larger boards are associated with poor communication, co-ordination and free-riding problems, often leading to poor monitoring of corporate executives, and thereby impacting negatively on corporate disclosures.

Second, the study does not find any significant association between CEO role duality and the ODL. This result is in line with the findings of previous studies that found no significant association between the extent of disclosure and role duality, such as Arcay and Muiño (2005) and Ghazali and Weetman (2006). Similarly, the study finds that the coefficient estimate on BoCo is negative and statistically significant with the ODL. This finding rejects H3. This finding is in

<table>
<thead>
<tr>
<th>Abbreviated name</th>
<th>Full name</th>
<th>Description</th>
<th>Predicted sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MD</td>
<td>Total mandatory disclosure</td>
<td>Percentage of scored mandatory disclosure</td>
<td>+</td>
</tr>
<tr>
<td>VD</td>
<td>Total voluntary disclosure</td>
<td>Percentage of scored voluntary disclosure</td>
<td>-</td>
</tr>
<tr>
<td>ODL</td>
<td>Overall disclosure level</td>
<td>Percentage of overall disclosure items</td>
<td>+</td>
</tr>
<tr>
<td>Independent variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boards</td>
<td>Board size</td>
<td>The number of board members</td>
<td>+</td>
</tr>
<tr>
<td>DualP</td>
<td>Duality in position</td>
<td>1 if company’s CEO serves as a board chairman, 0 otherwise</td>
<td>-</td>
</tr>
<tr>
<td>BoCo</td>
<td>Board composition</td>
<td>Ratio of the number of non-executive directors to the total number of the directors</td>
<td>+</td>
</tr>
<tr>
<td>FreMee</td>
<td>Frequency of meetings</td>
<td>Number of board meetings during the year</td>
<td>+</td>
</tr>
<tr>
<td>AuCo</td>
<td>Audit committee</td>
<td>1 if an audit committee exists, 0 otherwise</td>
<td>+</td>
</tr>
<tr>
<td>ForOwn</td>
<td>Foreign ownership</td>
<td>Foreign ownership to total owners’ ratio</td>
<td>+</td>
</tr>
<tr>
<td>GovOwn</td>
<td>Government ownership</td>
<td>Government ownership to total owners’ ratio</td>
<td>+</td>
</tr>
<tr>
<td>InstOwn</td>
<td>Institutional ownership</td>
<td>Institutional ownership to total owners’ ratio</td>
<td>+</td>
</tr>
<tr>
<td>DirOwn</td>
<td>Director ownership</td>
<td>The percentage of shares outstanding held by the board of directors</td>
<td>-</td>
</tr>
<tr>
<td>Control variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FS</td>
<td>Firm size</td>
<td>The natural logarithm of total assets</td>
<td>+</td>
</tr>
<tr>
<td>FA</td>
<td>Firm age</td>
<td>Number of years since foundation</td>
<td>+</td>
</tr>
<tr>
<td>Gearing</td>
<td>Gearing</td>
<td>The ratio of total debt to equity</td>
<td>+</td>
</tr>
<tr>
<td>Prof</td>
<td>Profitability</td>
<td>Net profit to total shareholders’ equity</td>
<td>+</td>
</tr>
<tr>
<td>Liq</td>
<td>Liquidity</td>
<td>Company’s current assets to current liabilities</td>
<td>+</td>
</tr>
<tr>
<td>List</td>
<td>Listing status</td>
<td>1 if the company is listed and 0 otherwise</td>
<td>+</td>
</tr>
<tr>
<td>IndTyp</td>
<td>Industry type</td>
<td>1 = financial (banks or insurance), 0 otherwise</td>
<td>+</td>
</tr>
<tr>
<td>AudTyp</td>
<td>Auditor type</td>
<td>1 = a company audited by one of the big four, 0 otherwise</td>
<td>+</td>
</tr>
<tr>
<td>YD</td>
<td>Year</td>
<td>Dummies for each of the five years (2006-2010)</td>
<td>-</td>
</tr>
</tbody>
</table>

Table II.
Definition and measurement of variables
line with the findings of Eng and Mak (2003) and Barako et al. (2006), who reported the same negative association, but it is inconsistent with the findings of Wang and Hussainey (2013) and Samaha et al. (2015), who reported a positive link between outside directors and disclosure. This negative association contradicts the predictions of agency, stakeholder and legitimacy theories regarding the presence of outside directors on corporate boards. This contradiction may be related to the cultural influence in such countries, where the appointment of independent NEDs is often based heavily on the social connections instead of the individuals’ professional competency. Further, the analysis finds that the coefficient estimate of FreMee is positive and statistically significant with the ODL. This finding supports H4. This implies that a higher frequency of board meetings contributes towards improving the quality of managerial monitoring, and therefore results in a positive influence on corporate disclosure.

Third, our findings suggest that there is a significant positive association between AuCo and the ODL. This means that H5 is empirically supported. Our findings regarding the role of audit committee in explaining the ODL is consistent with those of Barako et al. (2006) and Samaha et al. (2015). Theoretically, this finding implies that the existence of an audit committee seems to help firms in reducing agency conflicts, particularly if NEDs dominate it. With regard to the ownership structure variables, Table V does not show any statistically significant evidence regarding the association between ownership structure variables and the ODL (including MD and VD). Therefore, our results do not support H6-H9. Our results are in line with Ghazali and Weetman (2006), who found that there was no association between ownership structure and the extent of voluntary disclosure in Malaysia.

The findings contained in Table VI for listed firms are largely consistent with our primary findings in Table V. With regard to non-listed companies, board composition (BoCo) and frequency of meetings (FreMee) are statistically significant with the ODL only, whilst the results are generally similar to those presented in Table V.
<table>
<thead>
<tr>
<th></th>
<th>MD</th>
<th>VD</th>
<th>ODL</th>
<th>BoardS</th>
<th>DualP</th>
<th>BoCo</th>
<th>FreMee</th>
<th>AuCo</th>
<th>ForOwn</th>
<th>GovOwn</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD</td>
<td>0.831**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VD</td>
<td></td>
<td>0.897**</td>
<td></td>
<td>0.279**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ODL</td>
<td>0.166*</td>
<td>0.301**</td>
<td>0.031**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BoardS</td>
<td>−0.220**</td>
<td>−0.246**</td>
<td>−0.249**</td>
<td>−0.172*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DualP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.124</td>
<td>−0.032</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BoCo</td>
<td>0.154*</td>
<td>0.277**</td>
<td>0.257**</td>
<td>0.234**</td>
<td>0.192**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FreMee</td>
<td>0.234**</td>
<td>0.377**</td>
<td>0.357**</td>
<td>0.304**</td>
<td>−0.147*</td>
<td>0.135</td>
<td>0.244**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AuCo</td>
<td>0.265**</td>
<td>0.393**</td>
<td>0.373**</td>
<td>0.064</td>
<td>−0.112</td>
<td>0.135</td>
<td></td>
<td>0.244**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ForOwn</td>
<td>0.175*</td>
<td>0.245**</td>
<td>0.235**</td>
<td>−0.030</td>
<td>−0.077</td>
<td>0.018</td>
<td>0.022</td>
<td>0.127</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GovOwn</td>
<td>−0.330**</td>
<td>−0.397**</td>
<td>−0.394**</td>
<td>−0.170*</td>
<td>0.107</td>
<td>−0.072</td>
<td>−0.168*</td>
<td>−0.109</td>
<td>−0.441**</td>
<td>−0.320**</td>
</tr>
<tr>
<td>InsOun</td>
<td>0.002</td>
<td>−0.022</td>
<td>−0.018</td>
<td>0.043</td>
<td>0.040</td>
<td>−0.192**</td>
<td>0.060</td>
<td>−0.116</td>
<td>−0.315**</td>
<td>−0.320**</td>
</tr>
<tr>
<td>DirOun</td>
<td>0.031</td>
<td>0.073</td>
<td>0.068</td>
<td>0.103</td>
<td>−0.030</td>
<td>0.424**</td>
<td>0.086</td>
<td>0.029</td>
<td>0.153*</td>
<td>−0.276**</td>
</tr>
<tr>
<td>FS</td>
<td>0.136</td>
<td>0.203**</td>
<td>0.264**</td>
<td>0.040</td>
<td>−0.131</td>
<td>0.088</td>
<td>0.158*</td>
<td>0.248**</td>
<td>0.319**</td>
<td>−0.001</td>
</tr>
<tr>
<td>FA</td>
<td>0.059</td>
<td>0.110</td>
<td>0.109</td>
<td>−0.117</td>
<td>−0.029</td>
<td>0.220**</td>
<td>−0.054</td>
<td>−0.081</td>
<td>0.056</td>
<td>−0.166*</td>
</tr>
<tr>
<td>Gearing</td>
<td>0.285**</td>
<td>0.275**</td>
<td>0.281**</td>
<td>0.105</td>
<td>−0.038</td>
<td>0.100</td>
<td>0.166*</td>
<td>0.011</td>
<td>0.099</td>
<td>0.020</td>
</tr>
<tr>
<td>Prof</td>
<td>0.440**</td>
<td>0.489**</td>
<td>0.492**</td>
<td>0.233**</td>
<td>−0.215**</td>
<td>0.142*</td>
<td>0.065</td>
<td>0.367**</td>
<td>0.216**</td>
<td>−0.226**</td>
</tr>
<tr>
<td>Liq</td>
<td>0.040</td>
<td>−0.109</td>
<td>−0.070</td>
<td>−0.089</td>
<td>0.023</td>
<td>0.082</td>
<td>−0.108</td>
<td>−0.041</td>
<td>−0.070</td>
<td>0.063</td>
</tr>
<tr>
<td>List</td>
<td>0.560**</td>
<td>0.631**</td>
<td>0.635**</td>
<td>0.440**</td>
<td>−0.394**</td>
<td>0.285**</td>
<td>0.278**</td>
<td>0.150*</td>
<td>0.162*</td>
<td>−0.450**</td>
</tr>
<tr>
<td>IndTyp</td>
<td>0.388**</td>
<td>0.470**</td>
<td>0.455**</td>
<td>0.231**</td>
<td>−0.074</td>
<td>−0.027</td>
<td>−0.007</td>
<td>0.109</td>
<td>0.108</td>
<td>−0.084</td>
</tr>
<tr>
<td>AudTyp</td>
<td>0.574**</td>
<td>0.727**</td>
<td>0.715**</td>
<td>0.398**</td>
<td>−0.327**</td>
<td>0.303**</td>
<td>0.362**</td>
<td>0.220**</td>
<td>0.243**</td>
<td>−0.473**</td>
</tr>
</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th>InstOwn</th>
<th>DirOwn</th>
<th>FS</th>
<th>FA</th>
<th>Gearing</th>
<th>Prof</th>
<th>Liq</th>
<th>List</th>
<th>IndTyp</th>
<th>AudTyp</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD</td>
<td>VD</td>
<td>ODL</td>
<td>BoardS</td>
<td>DualP</td>
<td>BoCo</td>
<td>PreMee</td>
<td>AuCo</td>
<td>ForOwn</td>
<td>GovOwn</td>
</tr>
<tr>
<td>InstOwn</td>
<td>DirOwn</td>
<td>FS</td>
<td>FA</td>
<td>Gearing</td>
<td>Prof</td>
<td>Liq</td>
<td>List</td>
<td>IndTyp</td>
<td>AudTyp</td>
</tr>
<tr>
<td>Instr</td>
<td>Prod</td>
<td>-0.025</td>
<td>-0.196**</td>
<td>-0.251**</td>
<td>0.007</td>
<td>0.228**</td>
<td>0.097</td>
<td>-0.323**</td>
<td>-0.119</td>
</tr>
<tr>
<td>Prod</td>
<td>-0.066</td>
<td>-0.035</td>
<td>0.268**</td>
<td>0.066</td>
<td>0.061</td>
<td>0.110</td>
<td>0.187**</td>
<td>-0.124</td>
<td>0.148*</td>
</tr>
<tr>
<td>Gearing</td>
<td>-0.323**</td>
<td>-0.119</td>
<td>0.331**</td>
<td>-0.072</td>
<td>0.061</td>
<td>0.110</td>
<td>0.187**</td>
<td>-0.124</td>
<td>0.148*</td>
</tr>
<tr>
<td>Prod</td>
<td>-0.066</td>
<td>-0.035</td>
<td>0.268**</td>
<td>0.066</td>
<td>0.061</td>
<td>0.110</td>
<td>0.187**</td>
<td>-0.124</td>
<td>0.148*</td>
</tr>
<tr>
<td>List</td>
<td>-0.034</td>
<td>0.189**</td>
<td>0.120</td>
<td>0.012</td>
<td>0.266**</td>
<td>0.342**</td>
<td>-0.146*</td>
<td>0.273**</td>
<td></td>
</tr>
<tr>
<td>IndTyp</td>
<td>-0.067</td>
<td>-0.259**</td>
<td>0.309**</td>
<td>-0.119</td>
<td>0.301**</td>
<td>0.437**</td>
<td>-0.518**</td>
<td>0.373**</td>
<td></td>
</tr>
<tr>
<td>AudTyp</td>
<td>0.069</td>
<td>0.133*</td>
<td>0.180*</td>
<td>0.108</td>
<td>0.190**</td>
<td>0.403**</td>
<td>-0.130</td>
<td>0.720**</td>
<td>0.285***</td>
</tr>
</tbody>
</table>

**Note:** **Significant at the 0.05 and 0.01 levels (two-tailed), respectively**
4.4 Additional analyses

We conducted a number of additional analyses to check the robustness of the results. A number of past studies have shown that endogeneity can be a major problem within accounting and finance research of this nature, and therefore there is the need to sufficiently address any such potential endogeneity problems. We address potential endogeneity problems in this study as follows. First, an instrumental variable is created using an alternative weighted index to test for endogeneity. Each sub-group is assigned an equal weight to the total. For example, the ODL consists of two groups in which 50 per cent is awarded to each group. Our results are presented in columns 7-9 of Table VI. The results are consistent with those reported in Table V. This suggests that our evidence is largely robust to sub-group estimations.

Second, two-stage least squares (2SLS) is employed to check for any potential endogeneity. To ensure that the 2SLS is appropriate, we first regress the unstandardised predicted values against the unstandardised residuals to check for any potential correlations (e.g. Elmagrhi et al., 2016). The results of 2SLS are presented in Table VI. The results in Table VII support the primary results reported in Table V with no evidence of association except for government ownership (GovOwn) with a statistically significant association with the ODL (apart from observable minor sensitivities in the magnitude of the coefficients).

Third, we divided our sample into financial and non-financial companies as suggested by previous research (Elmagrhi et al., 2016). Table VII indicates that, for non-financial
companies, the results are consistent with our primary findings in Table V. With regard to financial companies, board size (BoardS) and role duality (DualP) are positively and statistically significant with the ODL. For ownership variables, the results presented in Table VII are generally similar to those presented by OLS in Table V, where no evidence of association is found. Interestingly, Table VII indicates that foreign ownership (ForOwn) and institutional ownership (InstOwn) are positively and statistically significant with the ODL.

Finally, previous studies argued that there is a non-linear relationship between board characteristics and ownership variables and corporate disclosure practices (Elmagrhi et al., 2016). To detect the presence of non-linear relationship between corporate governance

<table>
<thead>
<tr>
<th>Variables</th>
<th>Listed</th>
<th>Non-listed</th>
<th>Weighted index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MD</td>
<td>VD</td>
<td>ODL</td>
</tr>
<tr>
<td>Corporate governance variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BoardS</td>
<td>0.043**</td>
<td>0.024**</td>
<td>0.014**</td>
</tr>
<tr>
<td>DualP</td>
<td>0.379</td>
<td>0.001***</td>
<td>0.089*</td>
</tr>
<tr>
<td>BoCo</td>
<td>0.769</td>
<td>0.001***</td>
<td>0.089*</td>
</tr>
<tr>
<td></td>
<td>−0.032</td>
<td>−0.022</td>
<td>−0.026</td>
</tr>
<tr>
<td>FreMee</td>
<td>0.238</td>
<td>0.000***</td>
<td>0.004***</td>
</tr>
<tr>
<td></td>
<td>0.123</td>
<td>0.178</td>
<td>0.174</td>
</tr>
<tr>
<td>AuCo</td>
<td>0.077**</td>
<td>0.002***</td>
<td>0.004***</td>
</tr>
<tr>
<td></td>
<td>0.181</td>
<td>0.148</td>
<td>0.168</td>
</tr>
<tr>
<td>Ownership variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ForOwn</td>
<td>0.528</td>
<td>0.273</td>
<td>0.728</td>
</tr>
<tr>
<td>GovOwn</td>
<td>0.102</td>
<td>0.452</td>
<td>0.688</td>
</tr>
<tr>
<td></td>
<td>0.237</td>
<td>−0.049</td>
<td>0.033</td>
</tr>
<tr>
<td>InstOwn</td>
<td>0.591</td>
<td>0.896</td>
<td>0.839</td>
</tr>
<tr>
<td>DirOwn</td>
<td>0.915</td>
<td>0.261</td>
<td>0.452</td>
</tr>
<tr>
<td></td>
<td>0.014</td>
<td>0.068</td>
<td>0.057</td>
</tr>
<tr>
<td>Control variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FS</td>
<td>0.195</td>
<td>0.144</td>
<td>0.824</td>
</tr>
<tr>
<td></td>
<td>−0.181</td>
<td>0.063</td>
<td>0.017</td>
</tr>
<tr>
<td>FA</td>
<td>0.523</td>
<td>0.058**</td>
<td>0.131</td>
</tr>
<tr>
<td></td>
<td>0.062</td>
<td>0.084</td>
<td>0.068</td>
</tr>
<tr>
<td>Gearing</td>
<td>0.057**</td>
<td>0.185</td>
<td>0.069**</td>
</tr>
<tr>
<td>Prof</td>
<td>0.210</td>
<td>0.066</td>
<td>0.113</td>
</tr>
<tr>
<td></td>
<td>0.164</td>
<td>0.063</td>
<td>0.120</td>
</tr>
<tr>
<td>Liq</td>
<td>0.005***</td>
<td>0.031**</td>
<td>0.005***</td>
</tr>
<tr>
<td></td>
<td>0.347</td>
<td>0.121</td>
<td>0.196</td>
</tr>
<tr>
<td>List</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>IndTyp</td>
<td>0.000***</td>
<td>0.000***</td>
<td>0.000***</td>
</tr>
<tr>
<td>AudTyp</td>
<td>0.536</td>
<td>0.575</td>
<td>0.602</td>
</tr>
<tr>
<td></td>
<td>0.180</td>
<td>0.002***</td>
<td>0.009***</td>
</tr>
<tr>
<td></td>
<td>0.139</td>
<td>0.130</td>
<td>0.157</td>
</tr>
<tr>
<td>YD</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Durbin-Watson</td>
<td>1.728</td>
<td>2.059</td>
<td>1.998</td>
</tr>
<tr>
<td>F-value</td>
<td>3.768</td>
<td>33.259</td>
<td>20.049</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.363</td>
<td>0.869</td>
<td>0.797</td>
</tr>
</tbody>
</table>

Note: *, **, ***Significant at the 10, 5 and 1 per cent levels, respectively
<table>
<thead>
<tr>
<th>Variables</th>
<th>Financial MD</th>
<th>Financial VD</th>
<th>Financial ODL</th>
<th>NLM MD</th>
<th>NLM VD</th>
<th>NLM ODL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate governance variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BoardS</td>
<td>0.743</td>
<td>0.021**</td>
<td>0.072*</td>
<td>0.140</td>
<td>0.0117</td>
<td>-0.192</td>
</tr>
<tr>
<td></td>
<td>-0.308</td>
<td>-1.283</td>
<td>-1.081</td>
<td>0.028</td>
<td>-0.165</td>
<td>-0.137</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BoardS²</td>
<td>0.877</td>
<td>0.025**</td>
<td>0.093*</td>
<td>0.126</td>
<td>0.100</td>
<td>-0.071</td>
</tr>
<tr>
<td></td>
<td>-0.594</td>
<td>-5.093</td>
<td>-4.124</td>
<td>0.008</td>
<td>-0.072</td>
<td>-0.076</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DualP</td>
<td>0.890</td>
<td>0.059***</td>
<td>0.191</td>
<td>0.074*</td>
<td>0.102</td>
<td>0.114</td>
</tr>
<tr>
<td></td>
<td>-0.039</td>
<td>0.316</td>
<td>0.236</td>
<td>0.115</td>
<td>0.109</td>
<td>-0.154</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BoCo</td>
<td>0.891</td>
<td>0.055***</td>
<td>0.148</td>
<td>0.093*</td>
<td>0.224</td>
<td>0.153</td>
</tr>
<tr>
<td></td>
<td>-0.220</td>
<td>-1.828</td>
<td>-1.482</td>
<td>-0.057</td>
<td>0.085</td>
<td>0.051</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FreqMee</td>
<td>0.914</td>
<td>0.125</td>
<td>0.220</td>
<td>-0.112</td>
<td>0.041</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AuCo</td>
<td>0.464</td>
<td>0.502</td>
<td>0.274</td>
<td>0.299</td>
<td>0.433</td>
<td>0.961</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ownership structure variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ForOwn</td>
<td>0.716</td>
<td>0.019**</td>
<td>0.064*</td>
<td>0.117</td>
<td>0.002***</td>
<td>0.002***</td>
</tr>
<tr>
<td></td>
<td>-0.309</td>
<td>-1.180</td>
<td>-1.001</td>
<td>0.294</td>
<td>0.289</td>
<td>0.303</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ForOwn²</td>
<td>0.016**</td>
<td>0.000***</td>
<td>0.000***</td>
<td>0.0809</td>
<td>0.121</td>
<td>0.288</td>
</tr>
<tr>
<td></td>
<td>-0.292</td>
<td>-0.325</td>
<td>-0.330</td>
<td>-0.049</td>
<td>0.153</td>
<td>0.106</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GovOwn</td>
<td>0.916</td>
<td>0.045**</td>
<td>0.136</td>
<td>0.448</td>
<td>0.028**</td>
<td>0.041**</td>
</tr>
<tr>
<td></td>
<td>-0.196</td>
<td>1.682</td>
<td>0.888</td>
<td>0.153</td>
<td>0.223</td>
<td>0.214</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GovOwn²</td>
<td>0.931</td>
<td>0.033**</td>
<td>0.114</td>
<td>0.758</td>
<td>0.209</td>
<td>0.269</td>
</tr>
<tr>
<td></td>
<td>0.233</td>
<td>3.383</td>
<td>2.696</td>
<td>0.059</td>
<td>0.118</td>
<td>0.107</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>InstOwn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>InstOwn²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DirOwn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DirOwn²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th>Variables</th>
<th>MD</th>
<th>2SLS</th>
<th>VD</th>
<th>ODL</th>
<th>MD</th>
<th>2SLS</th>
<th>VD</th>
<th>ODL</th>
<th>MD</th>
<th>2SLS</th>
<th>VD</th>
<th>ODL</th>
<th>MD</th>
<th>2SLS</th>
<th>VD</th>
<th>ODL</th>
<th>NLM</th>
<th>ODL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FS</td>
<td>0.928</td>
<td>0.058***</td>
<td>0.183</td>
<td>0.214</td>
<td>0.592</td>
<td>0.805</td>
<td>0.141</td>
<td>0.263</td>
<td>0.955</td>
<td>0.101</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FA</td>
<td>-0.134</td>
<td>1.658</td>
<td>1.256</td>
<td>-0.169</td>
<td>0.035</td>
<td>-0.017</td>
<td>-0.144</td>
<td>0.051</td>
<td>-0.004</td>
<td>0.080</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gearing</td>
<td>0.977</td>
<td>0.054***</td>
<td>0.160</td>
<td>0.780</td>
<td>0.418</td>
<td>0.451</td>
<td>0.420</td>
<td>0.291</td>
<td>0.282</td>
<td>0.251</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prof</td>
<td>0.709</td>
<td>0.020***</td>
<td>0.066*</td>
<td>0.154</td>
<td>0.035</td>
<td>-0.017</td>
<td>-0.144</td>
<td>0.051</td>
<td>-0.004</td>
<td>0.080</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liq</td>
<td>0.661</td>
<td>0.154</td>
<td>0.286</td>
<td>0.155</td>
<td>0.086*</td>
<td>0.044**</td>
<td>0.000***</td>
<td>0.002***</td>
<td>0.000***</td>
<td>0.000***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AudTyp</td>
<td>0.272</td>
<td>-0.520</td>
<td>-0.334</td>
<td>0.324</td>
<td>0.193</td>
<td>0.235</td>
<td>0.308</td>
<td>0.156</td>
<td>0.210</td>
<td>0.181</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>List</td>
<td>0.963</td>
<td>0.030***</td>
<td>0.112</td>
<td>0.069***</td>
<td>0.079*</td>
<td>0.008***</td>
<td>0.278</td>
<td>0.042**</td>
<td>0.063*</td>
<td>0.003***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>AudTyp</code></td>
<td>0.180</td>
<td>0.002***</td>
<td>0.009***</td>
<td>0.841</td>
<td>0.001***</td>
<td>0.006***</td>
<td>0.096*</td>
<td>0.118</td>
<td>0.071*</td>
<td>0.222</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VD</td>
<td>0.139</td>
<td>0.150</td>
<td>0.157</td>
<td>0.022</td>
<td>0.198</td>
<td>0.160</td>
<td>0.222</td>
<td>0.120</td>
<td>0.157</td>
<td>0.136</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Durbin-Watson</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.363</td>
<td>0.869</td>
<td>0.797</td>
<td>0.726</td>
<td>0.934</td>
<td>0.929</td>
<td>0.350</td>
<td>0.786</td>
<td>0.724</td>
<td>0.372</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>193</td>
<td>193</td>
<td>193</td>
<td>65</td>
<td>65</td>
<td>65</td>
<td>128</td>
<td>128</td>
<td>128</td>
<td>193</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:** *t*-Statistics are in parenthesis. ****Significant at the 10, 5 and 1 per cent levels, respectively
variables and the extent of corporate disclosure, this study re-estimated the ODL by including the squared values of $BoardS^2$, $ForOwn^2$, $GovOwn^2$, $InstOwn^2$ and $DirOwn^2$. The last column in Table VII presents the results of the non-linear model (NLM). The coefficients on $BoardS^2$, $GovOwn^2$ and $InstOwn^2$ are statistically insignificant. However, the coefficients on $ForOwn^2$ and $DirOwn^2$ are significant, indicating an evidence of non-linearity between these two variables and the dependent variable (ODL). The findings of the remaining variables are still the same as our findings reported previously in Table V (apart from observable minor sensitivities in the magnitude of the coefficients). As a result, these findings support the probability of the presence of non-linearity link only between $ForOwn^2$ and $DirOwn^2$ and the ODL.

5. Conclusion

This paper investigates the association between corporate governance characteristics, ownership structure and corporate disclosure behaviour in Libya. Generally, the results suggest that the corporate governance variables are significant in explaining the extent of corporate disclosure in an annual report. First, we can conclude that board size and board composition are found to be negatively related to the overall disclosure level, whilst the frequency of meetings and audit committee have a positive and statistically significant association with the overall disclosure level. With regard to ownership structure variables, no relationship is found between these variables and the overall level of disclosure. Despite the changes taking place during the investigated period (2006-2010) when the Libyan economy started to witness a huge transfer of ownership of government enterprises to private investors ("privatisation"), none of the ownership variables were found to support the agency relationship within the Libyan context.

This paper extends, as well as makes a number of new contributions to the existing literature. Unlike previous studies that have examined how firm-level characteristics, such as firm size and industry, affect corporate disclosure behaviour, the current study examines how corporate boards and ownership structure drive the level of corporate disclosure. Thus, this contributes to a small, but gradually increasing number of studies that have evaluated the effect of corporate governance and ownership structures on the level of corporate disclosure. Furthermore, distinct from prior studies that have focussed mainly on examining the determinants of only voluntary disclosure, the current research examines the antecedents of both mandatory and voluntary disclosures. Finally, this study has analysed both listed and non-listed firms, and thereby it has allowed for new empirical insights relating to the disclosure behaviour of both listed and non-listed firms in a developing country.

The results have a number of implications. The results show that the disclosure level varies substantially among Libyan listed and unlisted firms. This provides Libyan authorities with a strong motivation to strengthen legal enforcement more by enhancing corporate governance and disclosure practices by establishing a compliance committee. This implies that Libyan authorities should consider imposing further mandatory requirements on Libyan firms to further protect investors and stakeholders. Further, the results reveal that ownership concentration has a negative effect on corporate disclosure. This suggests that regulatory authorities may need to further reduce ownership concentration by amending listing rules that set a greater requirement for outside shareholders.

Finally, there are a number of avenues for future research. There is an opportunity for future research to investigate disclosure practices using other channels of corporate disclosure, such as corporate websites in order to ascertain whether they have the same explanatory variables, as those of annual reports. Future research, in Libya, could extend the sample size as the sample size for this study was limited by data availability and constraints of manual data collection. Useful insights may be offered also by future
studies by conducting in-depth interviews with corporate managers, directors and owners regarding these issues. A comparative study with other countries in the region, with alternative or more advanced accounting and governance practices would provide an opportunity for further research.

Note
1. For the individual items contained in the index, see the additional supplementary materials available on the Journal’s webpage.

References


**Further reading**


### Appendix

#### Mandatory disclosure items

<table>
<thead>
<tr>
<th>No.</th>
<th>Information item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Balance sheet</td>
<td>0-1</td>
</tr>
<tr>
<td>2</td>
<td>Income statement or profit and loss account</td>
<td>0-1</td>
</tr>
<tr>
<td>3</td>
<td>Cash flow statement</td>
<td>0-1</td>
</tr>
<tr>
<td>4</td>
<td>Statement of changes in equity</td>
<td>0-1</td>
</tr>
<tr>
<td>5</td>
<td>Board of directors’ report</td>
<td>0-1</td>
</tr>
<tr>
<td>6</td>
<td>Notes to the financial statements</td>
<td>0-1</td>
</tr>
<tr>
<td>7</td>
<td>External auditor’s report</td>
<td>0-1</td>
</tr>
<tr>
<td>8</td>
<td>Firm name</td>
<td>0-1</td>
</tr>
<tr>
<td>9</td>
<td>Firm’s legal form (Does the paid up share capital equal or exceed 30% of the subscribed share capital?)</td>
<td>0-1</td>
</tr>
<tr>
<td>10</td>
<td>Amounts claimed from shareholders and not yet paid</td>
<td>0-1</td>
</tr>
</tbody>
</table>

**Balance sheet items**

<table>
<thead>
<tr>
<th>No.</th>
<th>Information item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Properties</td>
<td>0-1</td>
</tr>
<tr>
<td>12</td>
<td>Movables, fixed constructions and equipment</td>
<td>0-1</td>
</tr>
<tr>
<td>13</td>
<td>Industrial patents and rights of utilisation of intellectual products</td>
<td>0-1</td>
</tr>
<tr>
<td>14</td>
<td>Concessions, registered marks and economic value of the shop</td>
<td>0-1</td>
</tr>
<tr>
<td>15</td>
<td>Raw materials and goods</td>
<td>0-1</td>
</tr>
<tr>
<td>16</td>
<td>Money and paper money available at hand or deposited with a third party</td>
<td>0-1</td>
</tr>
<tr>
<td>17</td>
<td>Financial security of fixed and variable profits</td>
<td>0-1</td>
</tr>
<tr>
<td>18</td>
<td>Partnerships with statement of what is purchased by the company of their shares</td>
<td>0-1</td>
</tr>
<tr>
<td>19</td>
<td>Debts on company clients</td>
<td>0-1</td>
</tr>
<tr>
<td>20</td>
<td>Debts of the company to banks</td>
<td>0-1</td>
</tr>
<tr>
<td>21</td>
<td>Other debts claimed from third parties</td>
<td>0-1</td>
</tr>
<tr>
<td>22</td>
<td>Firm capital</td>
<td>0-1</td>
</tr>
<tr>
<td>23</td>
<td>Legal reserve balance</td>
<td>0-1</td>
</tr>
<tr>
<td>24</td>
<td>Reserve provided for in the Memorandum and optional reserve</td>
<td>0-1</td>
</tr>
<tr>
<td>25</td>
<td>Amounts of depreciation and impairments</td>
<td>0-1</td>
</tr>
<tr>
<td>26</td>
<td>Amounts allocated for compensation of firm employees</td>
<td>0-1</td>
</tr>
<tr>
<td>27</td>
<td>Debts restricted with guarantees in kind</td>
<td>0-1</td>
</tr>
<tr>
<td>28</td>
<td>Debts claimed by suppliers</td>
<td>0-1</td>
</tr>
<tr>
<td>29</td>
<td>Debts of the firm to banks or other suppliers</td>
<td>0-1</td>
</tr>
<tr>
<td>30</td>
<td>Debts claimed by related companies</td>
<td>0-1</td>
</tr>
<tr>
<td>31</td>
<td>Loan securities issued and still existing</td>
<td>0-1</td>
</tr>
<tr>
<td>32</td>
<td>Other debts claimed from the firm</td>
<td>0-1</td>
</tr>
<tr>
<td>33</td>
<td>What is deposited optionally or compulsory by third parties</td>
<td>0-1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>33</td>
</tr>
</tbody>
</table>

#### Voluntary disclosure items

**General information**

<table>
<thead>
<tr>
<th>No.</th>
<th>Information item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brief history of the firm</td>
<td>0-1</td>
</tr>
<tr>
<td>2</td>
<td>Description of organisational structure</td>
<td>0-1</td>
</tr>
<tr>
<td>3</td>
<td>Firm address/Telephone/Fax/E-mail</td>
<td>0-1</td>
</tr>
<tr>
<td>4</td>
<td>Firm website address</td>
<td>0-1</td>
</tr>
<tr>
<td>5</td>
<td>Purpose of the firm’s activity and vision</td>
<td>0-1</td>
</tr>
<tr>
<td>6</td>
<td>Date and details of establishment</td>
<td>0-1</td>
</tr>
<tr>
<td>7</td>
<td>General outlook of business activities</td>
<td>0-1</td>
</tr>
<tr>
<td>8</td>
<td>List of branches location</td>
<td>0-1</td>
</tr>
<tr>
<td>9</td>
<td>The period covered by financial statement</td>
<td>0-1</td>
</tr>
<tr>
<td>10</td>
<td>Comparative financial statements</td>
<td>0-1</td>
</tr>
<tr>
<td>11</td>
<td>The currency used for the preparation of financial statements</td>
<td>0-1</td>
</tr>
<tr>
<td>12</td>
<td>Firm plans for the following years and future capital expenditures</td>
<td>0-1</td>
</tr>
</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th></th>
<th>Corporate governance</th>
<th>0-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td>List of board members</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Board member qualifications and experience</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Duties of board of members</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Information about changes in board members</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Classification of managers as executive or outsider</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Number of board of members meetings held and date</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>Number of shares held by members of the board</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>Compensation policy for top management</td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>Information on audit committee and its members</td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>Composition of board of directors: executives and non-executives</td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>Number of employees</td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>Chairman’s statement</td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>External auditors’ report</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accounting policies</td>
<td>0-1</td>
</tr>
<tr>
<td>26.</td>
<td>Compliance with IASs</td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>Accounting valuation (historical, current or replacement cost)</td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>Foreign currency transactions, translation and differences treatment</td>
<td></td>
</tr>
<tr>
<td>29.</td>
<td>Events after the balance sheet date</td>
<td></td>
</tr>
<tr>
<td>30.</td>
<td>Revenue recognition</td>
<td></td>
</tr>
<tr>
<td>31.</td>
<td>Valuation of property, plant and equipment and depreciation</td>
<td></td>
</tr>
<tr>
<td>32.</td>
<td>Inventory physical count and valuation</td>
<td></td>
</tr>
<tr>
<td>33.</td>
<td>Research and development costs</td>
<td></td>
</tr>
<tr>
<td>34.</td>
<td>Treatment of other intangible assets</td>
<td></td>
</tr>
<tr>
<td>35.</td>
<td>Tax treatment</td>
<td></td>
</tr>
<tr>
<td>36.</td>
<td>Long-term contracts</td>
<td></td>
</tr>
<tr>
<td>37.</td>
<td>Changes in accounting policies and reasons</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Balance sheet</td>
<td>0-1</td>
</tr>
<tr>
<td>38.</td>
<td>Assets and liabilities grouped according to their nature</td>
<td></td>
</tr>
<tr>
<td>39.</td>
<td>Assets and liabilities listed in order of their liquidity</td>
<td></td>
</tr>
<tr>
<td>40.</td>
<td>Assets and liabilities should not be offset</td>
<td></td>
</tr>
<tr>
<td>41.</td>
<td>Cash</td>
<td></td>
</tr>
<tr>
<td>42.</td>
<td>Investments</td>
<td></td>
</tr>
<tr>
<td>43.</td>
<td>Accumulated depreciation for each item of fixed assets</td>
<td></td>
</tr>
<tr>
<td>44.</td>
<td>Proportion of fixed assets leased</td>
<td></td>
</tr>
<tr>
<td>45.</td>
<td>Schedule of movement in fixed assets</td>
<td></td>
</tr>
<tr>
<td>46.</td>
<td>Amount of intangible assets</td>
<td></td>
</tr>
<tr>
<td>47.</td>
<td>Investments in projects under construction</td>
<td></td>
</tr>
<tr>
<td>48.</td>
<td>Market values of investments</td>
<td></td>
</tr>
<tr>
<td>49.</td>
<td>Total value of current assets</td>
<td></td>
</tr>
<tr>
<td>50.</td>
<td>Total value of inventories</td>
<td></td>
</tr>
<tr>
<td>51.</td>
<td>Market value of inventories</td>
<td></td>
</tr>
<tr>
<td>52.</td>
<td>Breakdown of inventories</td>
<td></td>
</tr>
<tr>
<td>53.</td>
<td>Market values of marketable securities</td>
<td></td>
</tr>
<tr>
<td>54.</td>
<td>Balances of receivables</td>
<td></td>
</tr>
<tr>
<td>55.</td>
<td>Breakdown of receivables into trade and others</td>
<td></td>
</tr>
<tr>
<td>56.</td>
<td>Bank balance</td>
<td></td>
</tr>
<tr>
<td>57.</td>
<td>Bank balance breakdown (current and deposit)</td>
<td></td>
</tr>
<tr>
<td>58.</td>
<td>Liabilities order</td>
<td></td>
</tr>
<tr>
<td>59.</td>
<td>Liabilities classification</td>
<td></td>
</tr>
<tr>
<td>60.</td>
<td>Total value of loans and long-term liabilities</td>
<td></td>
</tr>
<tr>
<td>61.</td>
<td>Total value of current Liabilities</td>
<td></td>
</tr>
<tr>
<td>62.</td>
<td>Classified current liabilities</td>
<td></td>
</tr>
<tr>
<td>63.</td>
<td>Tax liabilities</td>
<td></td>
</tr>
<tr>
<td>64.</td>
<td>Instalments of long-term loans payable</td>
<td></td>
</tr>
</tbody>
</table>

Table AI. (continued)
Corresponding author
Hussein A. Abdou can be contacted at: h.abdou@mmu.ac.uk

For instructions on how to order reprints of this article, please visit our website:
www.emeraldgrouppublishing.com/licensing/reprints.htm
Or contact us for further details: permissions@emeraldinsight.com
The role of intangible assets and liabilities in firm performance: empirical evidence

Abdifatah Ahmed Haji and Nazli Anum Mohd Ghazali
Department of Accounting, International Islamic University Malaysia, Kuala Lumpur, Malaysia

Abstract

Purpose – The purpose of this paper is primarily to explore the extent of intangible assets and liabilities of large Malaysian companies. The authors also examine whether intangible assets and liabilities of a firm have similar or contrasting roles in firm performance.

Design/methodology/approach – Using a direct and straightforward measure of intangible assets and liabilities, the authors examine a large pool of data from large Malaysian companies over a six-year period spanning from 2008 to 2013.

Findings – The longitudinal analyses show a significant number of the sample companies, between 34 and 59.33 percent, have a consistent pattern of intangible liabilities. The authors also find firms with intangible liabilities have significantly underperformed financially than a control group of firms. In addition, the authors find that intangible liabilities have significant negative impact on firm performance whereas intangible assets have a contrasting positive impact on firm performance.

Research limitations/implications – One limitation of this study is that the authors have only used a single measure of intangible assets and liabilities. Albeit the measures used are straightforward and more objective, there could be other measures to capture intangibles.

Practical implications – The research findings have several theoretical as well as policy implications. Theoretically, the authors extend the resource-based view to the intangible asset-liability mix, affirming the crucial role of intangible resources in financial performance whilst introducing the unfavorable role of intangible liabilities in corporate financial performance. In terms of policy implications, the research findings provide initial empirical input to emerging calls for broader perspectives of intangibles, beyond intangible assets to include intangible liabilities, and therefore belong to an emerging paradigm toward the nature of intangibles.

Originality/value – This study documents a rare empirical account of the contrasting roles of intangible assets and liabilities in corporate financial performance.

Keywords Malaysia, Firm performance, Resource-based view, Intangible assets, Intangible liabilities

Paper type Research paper

Introduction

Accounting researchers and practitioners have long discussed about the ability, or indeed inability, of standard financial reports to reflect the actual value of a firm (Lev, 2008; Skinner, 2008a; Penman, 2009). In particular, the accounting treatment of intangibles is one of the most debated, repeated and unresolved issues in accounting, both in academic research as well as in standard setting (Skinner, 2008a; Wrigley, 2008; Penman, 2009; Lev et al., 2009). The widening gap between market value of companies and reported book values is cited as an indication of the significance of intangibles in the modern economy, with the difference between market and book values, in some cases, reaching as high as 80 percent (Penman, 2009; Lev et al., 2009). For instance, market forecasts show that Apple’s market value, currently over 700 billion USD, is expected to hit the 1 trillion mark in few years (Reuters, 2015). Apple’s financial records show that its book value is substantially lower than its ballooning market value. The hidden, or unaccounted, value between market and book values of Apple, and many other companies, such as Microsoft and Dell is categorically attributed to intangible (intellectual) assets (Penman, 2009; Lev et al., 2009; Edvinsson, 2013).
In contrast, studies suggest that intangible liabilities also exist (Harvey and Lusch, 1999; Giuliani, 2013). Intangible liabilities, such as environmental spills, air pollution and poor corporate reputation can negatively impact market value of a company. For example, the recent Volkswagen diesel emissions scandal has significantly decreased the company’s market value by nearly 30 percent since the news emerged in March 2015 (CNN News, 2015).

Despite acknowledging the significance of intangibles in the modern economy, accounting researchers struggle the identification, measurement and systematic disclosure of intangibles. Wrigley (2008, p. 259) argues that “the best valuation you can get – already exists for the aggregate intangibles for a business,” claiming that the “market cap at the year-end minus the tangible book value could be used as the value of the intangibles.” More specifically, a number of academic researchers maintain that “if the market value of a firm exceeds its book value then there are unrecorded intangible assets (Lev, 2008; Lev et al., 2009). On the other hand, “if a firm is selling for less than book value it has some unrecorded intangible liabilities” (Harvey and Lusch (1999, p. 87). In essence, intangibles assets (liabilities) are significantly driving (restraining) how businesses create (destroy) value in the modern economy (Chen et al., 2005; Lev et al., 2009; Stam, 2009; De Santis and Giuliani, 2013).

However, the existing academic research and practitioner commentaries on intangibles is largely one-sided, given the dominant focus on intangible assets (Lev, 2008; Wrigley, 2008; Lev et al., 2009; Bloom, 2009), rather than both intangible assets and liabilities (Govthorpe, 2009). A limited number of normative studies notwithstanding (Govthorpe, 2009; De Santis and Giuliani, 2013), the role of intangible liabilities in firm performance is either sidelined or ignored. Hence, while empirical evidence reveals that intangible assets have positive impact on corporate financial performance (Chen et al., 2005; Lev et al., 2009), little is still known about the role of intangible liabilities in firm performance (De Santis and Giuliani, 2013; Giuliani, 2013).

This study examines the role of intangible assets and liabilities in corporate financial performance. In particular, we first investigate whether intangible liabilities arise in practice, especially within the context of large companies. Using a straightforward measure based on financial data, we examine intangible assets and liabilities of a large sample of Malaysian companies over a six-year period (2008-2013). Second, given intangible assets (liabilities) entail unaccounted corporate resources (obligations), we compare the financial performance of matched-paired samples: a group of companies which had consistently recoded intangible assets, and another matched group of firms with consistent intangible liabilities. Third, we examine the relation between sustained intangible assets/liabilities and performance over time. In doing so, we determine whether intangible assets and liabilities have contrasting roles in firm performance.

Our results first show a significant number of the sample companies have large amount of intangible liabilities, with the trend analyses revealing that a substantial number of the sample companies had unrecorded amount of intangible liabilities over time. Second, consistent with the predictions of economics-related theories, we find that firms with intangible assets have superior financial performance than comparison group of firms with intangible liabilities. Third, the findings, robust to controls of company-specific characteristics and various measures of financial performance, show that intangible assets have significant positive impact on firm performance whereas intangible liabilities have significant negative impact on firm performance. Finally, we find that last year’s intangible assets contribute to current year performance, whereas last year’s intangible liabilities have negative impact on current performance. Overall, the results of this study show that intangible assets and liabilities have contrasting roles in firm performance.

This study provides a number of contributions to the extant intangible literature. First, in departure from prior empirical studies which have largely focused on intangible assets, this study adopts a wider perspective of intangibles by considering both intangible assets and liabilities. The empirical observation asserted in this study shows the dual and
contrasting roles of intangible assets (liabilities) in the value creation (destruction) process of a firm. Therefore, the findings of this study affirm prior studies that observed a positive link between intangible assets and firm performance (Chen et al., 2005; Shiu, 2006; Lev et al., 2009; Clarke et al., 2011), whilst introducing the unfavorable role of intangible liabilities. Second, given the preference to focus on the bright side of intangibles, standard setters and the business community as well as academic scholars concentrate only on intangible assets, either sideling or ignoring intangible liabilities (Stam, 2009; Gowthorpe, 2009).

Moreover, the extant academic research as well as practitioner commentaries on intangibles is remarkably silent on intangible liabilities, with the exception of very few normative studies (Harvey and Lusch, 1999; Stam, 2009; Gowthorpe, 2009; De Santis and Giuliani, 2013). We argue that differentiation of intangible constructs is useful in making sense of intangibles. A significant contribution of this study is that it provides empirical account of the existence of intangible liabilities and highlights the need to conceptualize broader theoretical and practical frameworks for intangibles (De Santis and Giuliani, 2013; Giuliani, 2013). In particular, we argue that the ongoing initiatives pertaining capitalization and disclosure of intangibles should go beyond intangible assets by taking into consideration intangible liabilities. Within the context of the emerging integrated reporting (IR) agenda, the results of this study highlight the need to go beyond the “capitals” framework and consider the inclusion of corresponding intangible liabilities.

This study focuses on Malaysian stock market for two main reasons. First, the Malaysian economy, similar to other second-tier emerging economies (e.g. China, Singapore, Indonesia, etc.), is increasingly becoming a knowledge-based economy, driven by knowledge-intensive industries (Kweh et al., 2013). In particular, Malaysian-listed companies are found to have significant amount of intellectual assets, with an increasing trend over time (Salamudin et al., 2010; Ahmed Haji, 2016). However, little is still known about how different intangible constructs especially intangible liabilities impact the financial performances of companies in emerging economies. Second, Bursa Malaysia, which is the main regulatory authority, continues to introduce comprehensive corporate reporting reforms which go beyond financial information and include specific reporting requirements of non-financial aspects of public-listed companies. For example, Bursa Malaysia’s CSR reporting framework, which was introduced in 2007, and more recently the sustainability reporting framework in 2015, require public-listed companies to report on environmental, social and governance aspects of a company. However, the reporting reforms focus only on non-financial capitals, such as human, social and natural capitals, and therefore ignore specific disclosure requirements for corresponding non-financial liabilities. This study, therefore, informs the ongoing policy initiatives in Malaysia, and other similar emerging economies, by highlighting the significance of intangible liabilities. The next section reviews the extant intangible literature with a focus on contrasting views on intangible accounting treatment.

**Literature review**

**Perspectives on intangible treatment**

Leading researchers and practitioners view intangibles as a productive organizational resource that can assist firms to achieve sustained competitive advantage (Edvinsson and Malone, 1997; Hall, 2001; Brennan, 2001; Lev, 2001; Edvinsson, 2013). Intangibles or intellectual capital (IC), in this regard, is grossly conceptualized as the difference between a firm’s market value and its book value (Hall, 2001; Lev, 2008; Wrigley, 2008). Hence, firms with higher market values than book values are said to have some unrecorded intellectual assets (Wrigley, 2008; Lev, 2008). Evidence shows that the market value of a firm is often significantly higher than the accounting book value (Lev, 2001; Penman, 2009; Lev et al., 2009; Ahmed Haji, 2016), with the unaccounted hidden value amounting to more than 80 percent in
some cases (Lev et al., 2009). For instance, Penman (2009) demonstrates that Microsoft Corporation and Dell Inc, two firms known to have significant amount of intangibles, had hidden values of 84.14 (price-to-book ratio of 6.3) and 90.93 percent (price-to-book ratio of 11) in 2008, respectively. The glaring difference between market and book values was initially thought as only a blip, with the stock market attributing much of the widening gap to the “internet bubble” in the 1990s (Basu and Waymire, 2008). But decades on, the gap is not getting any narrower, seemingly due to a shift in the nature of the economy which largely drives value from intangibles (Lev et al., 2009; Edvinsson, 2013).

There is a division within accounting scholarship on possible approaches to account for intangibles (Lev, 2008; Skinner, 2008b; Walker, 2009; Lev, 2008; Dumay, 2012). In particular, two main lines of thought on intangibles exist. One view maintains that the hidden values, or the gap between market and book values, of a firm is a reflection of unaccounted intangible assets (liabilities) (Harvey and Lusch, 1999; Lev, 2008). On this line of thought, proponents call for reform in current accounting standards: capitalize intangibles to compensate the market-to-book ratio; and mandate a standardized intangible disclosure (Lev et al., 2009). The argument for reform is based on three observations. First, intangibles have grown significantly in value and importance that they are now the key drivers of business performance (Lev, 2001; Bloom, 2009; Lev et al., 2009; Penman, 2009; Edvinsson, 2013). Second, proponents argue that, given the significance of hidden values and the absence of such information from the balance sheet, investors and other information users are potentially misled (Lev, 2008; Wrigley, 2008). Third, capital market-based evidence shows users of information place tremendous value on non-financial information, particularly information on intangibles (Merkley, 2014). In sum, proponents of reform call for significant reforms in intangible accounting treatment to compensate fundamental flaws in existing financial reporting, reforms similar to segment reporting (Lev et al., 2009).

The view, albeit acknowledging the importance and growth of intangibles, rejects proposals to reform and believe that there is nothing wrong with current accounting treatments of intangibles (Skinner, 2008a; Basu and Waymire, 2008; Elwin, 2008; Walker, 2009; Penman, 2009). For instance, the anti-reform perspective categorically refutes the idea of intangible capitalization and disclosure. Skinner (2008a) challenges the calls for reform and argues that capital markets work rather well, and disclosures pertaining intangibles should be incentive-based, rather than standard-driven. In essence, Skinner and others (e.g. Elwin, 2008; Walker, 2009) are critical about the costs and benefits associated with standardizing intangible accounting with no or little evidence of incremental benefits of intangible reforms. In particular, these scholars question the premises of the calls for reform given that, in the first place, “the role of the balance sheet is not to arrive at a book value that tracks market value” (Skinner, 2008b, p. 216). A growing number of researchers concur this perspective, maintaining that the difference is just a difference of many encompassing variables and not just intangible assets or liabilities (Walker, 2009; Dumay, 2012).

A suggested solution is to use the income statement, not the balance sheet, to value a firm (Basu and Waymire, 2008; Elwin, 2008; Penman, 2009). Using an income statement perspective, Penman (2009, p. 358) argues that the omission of intangibles or hidden values from the balance sheet is not necessarily a problem because “there is also an income statement, and the value of intangible (and other) assets can be ascertained from the income statement.” Penman illustrates that the current financial reporting regime does not fail to value intangibles – the income statement can be used to derive the value of a firm’s intangible assets and to arrive at a value close to or similar to the market capitalization of a firm. He argues that analysts and other capital market players hardly worry about a company’s balance sheet and would rather value a company based on its income statement, not its balance sheet (also see Basu and Waymire, 2008; Elwin, 2008). Penman concludes that any deficiencies associated with the balance sheet (e.g. omission of intangible assets)
are compensated by the income statement and therefore current accounting statements, when examined collectively, can be insightful. Penman and others (Basu and Waymire, 2008; Elwin, 2008) do not mention the issue of "intangible liabilities" and whether or not the income statement can be used to derive such values.

The common ground of the dialogue in the preceding discussion is that intangibles are significant in the modern economy and play a critical role in organizational value creation/destruction process. Notwithstanding differences in its accounting treatment, researchers acknowledge that the market-to-book ratio, or hidden values, whether they are a reflection of a firm's intangible assets/liabilities or not, is a phenomenon that requires critical examination and explanation (Lev, 2008; Wrigley, 2008; Penman, 2009; Dumay, 2012). In the following section, we discuss the role of the current study.

Scope of the study
This study provides empirical account of the role of intangibles in corporate financial performance. In particular, our focus is to examine the role of intangible liabilities in firm performance (Harvey and Lusch, 1999; Stam, 2009; Gwlothorpe, 2009; De Santis and Giuliani, 2013). The preceding discussion, and the natural process, concerning intangibles is largely one-sided, given its narrow focus on intangible assets (Gwlothorpe, 2009), assumed to exist when a firm’s market value is higher than its reported book value (Wrigley, 2008). But in our study, we make a case for a comparatively contrasting situation where the market value of a firm is lower than its reported net assets, in which case the company is said to have unrecorded intangible liabilities (Harvey and Lusch, 1999; De Santis and Giuliani, 2013). In particular, Harvey and Lusch (1999, p. 87) advanced that:

[...] if the market value of a firm exceeds its book value it is usually argued that intangible or intellectual capital exists. This being the case, one could similarly argue that if a firm is selling for less than book value it has some unrecorded intangible liabilities. These liabilities are not a responsibility owed to an external entity but rather represent a dilution in shareholder equity which has the equivalent effect of an increased liability.

In essence, not all intangibles are assets, and companies could have significant intangible liabilities. Barney (1991), for instance, maintains that not all aspects of a firm’s physical capital resources, human capital and organizational capital contribute to its value creation endeavors as some of the organizational resources can prevent firms to execute value creation, becoming intangible liabilities (Barney, 1986). Examples of intangible liabilities include, albeit not limited to, poor corporate reputation, employee turnover, dangerous work conditions, reputational loss, environmental incidents, fraud cases, poor organizational culture and broader political environment among others (Barney, 1986; Harvey and Lusch, 1999; Caddy, 2000; Stam, 2009). These intangibles can potentially destroy organizational value (Caddy, 2000; Stam, 2009; Giuliani, 2013). The recent Volkswagen diesel emissions scandal illustrates that the occurrence of intangible liabilities has significant impact on firm value. The share price of VW has plunged nearly 30 percent since the news first emerged in March 2015 (CNN News, 2015).

The limited academic research on intangible liabilities is largely due to two main reasons. First, the discussion usually surrounds around large firms with seasoned investments in intangibles (Penman, 2009). While size alone may not be the driving force for intangible assets, it could nonetheless be a factor. Second, given the existence of goodwill and brand values in large and established companies, there seems to be a categorical assumption that the book-to-market ratio is always greater than 1 which, as a result, disqualifies any discussion pertaining intangible liabilities (Stam, 2009; Gwlothorpe, 2009). This study, therefore, examines the role of both intangible assets and liabilities in firm performance.
By simultaneously examining the roles of intangible assets and liabilities in firm performance, this study informs both the ongoing evaluations of accounting standard setters for various intangible constructs (Skinner, 2008a), as well as reporting reforms for wider organizational reporting practices. In particular, this study is useful to the IR initiative, which only focuses on multiple capitals and ignores corresponding liabilities.

Theory and hypotheses
Economics-related theories propound that intangible assets drive corporate financial performance. The resource-based theory, for example, posits that firms in a similar line of business have different performances (Marzo, 2014), and that a company’s success (performance) is largely driven by the resources it owns (Wernerfelt, 1984; Galbraeth, 2005). Barney (1991) discusses three types of resources: physical capital, human capital and organizational capital. The latter two, intangible in nature, are what is now considered a firm’s intangible assets. Lev et al. (2009) argue that while all firms own and use these three resources, there is notable difference in their ability to convert them into financial success. For instance, companies that have significant investments in intangible resources, such as technological systems, employee development programs and effective employee compensation packages, have often superior financial performance than comparable companies with no such investments (Lev et al., 2009). Empirical evidence, albeit inconclusive, shows that intangible resources, overall, have significant positive impact on firm performance (Chen et al., 2005; Shiu, 2006; Lev et al., 2009; Clarke et al., 2011). However, other studies found limited support (Firer and Williams, 2003; Maditinos et al., 2011).

Given the focus on intangible assets, there is limited empirical evidence on the role of intangible liabilities in the value creation process of a company (Giuliani, 2013). This study adopts the resource-based view to examine the contrasting roles of intangible assets and liabilities in firm performance. In doing so, we compare the financial performance of companies with high levels of intangible assets and matched companies with intangible liabilities.

Researchers argue that the level of hidden values is a reliable indicator of a firm’s intangible assets and liabilities (Harvey and Lusch, 1999; De Santis and Giuliani, 2013; Giuliani, 2013). Building on this assumption, this study draws from the resource-based view that a company’s performance is largely driven from the resources it owns (Wernerfelt, 1984; Galbraeth, 2005). Therefore, we expect firms with high levels of intangible assets to outperform financially than firms with unrecorded intangible liabilities. The following hypotheses are therefore proposed:

- **H1.** Other things being equal, firms with unrecorded intangible assets record superior financial performance than firms with unrecorded intangible liabilities.

- **H2.** There is a significant positive relationship between intangible assets and financial performance of a firm.

- **H3.** There is a significant negative relationship between intangible liabilities and financial performance of a firm.

The impact of intangible assets and liabilities on performance may take time. Previous studies, which have considered the lagging effect of intangible resources on future years’ performance, find that prior year’s intangible assets have significant impact on subsequent year’s financial performance (Chen et al., 2005; Clarke et al., 2011). However, none of the previous studies have examined the impact of intangible liabilities on firm performance. This study extends existing research by introducing the role of intangible liabilities in firm
performance. The following hypotheses capture the lagging effects of last year’s intangible assets and liabilities on current performance:

\[ \text{H4. Last year’s intangible assets have a significant positive impact on current year’s financial performance.} \]

\[ \text{H5. Last year’s intangible liabilities have a significant negative impact on current year’s financial performance.} \]

Research methods

Sampling procedures

The main objective of this study is to examine the roles of intangible assets and liabilities in firm performance. The sample of this study is drawn from the largest 300 Malaysian companies, by market capitalization, over a six-year period spanning from 2008 to 2013. We use a matched-paired sampling methodology to select companies with intangible assets and liabilities. Our sample period is limited to six years to increase chances of data traceability whilst still providing a longitudinal coverage. This period also corresponds to a number of significant incidents, including the global financial crises, corporate governance and reporting reforms as well as Malaysia’s convergence to IFRS (Abdullah et al., 2015; Ahmed Haji, 2016).

To avoid selection bias in terms of firm size, we have limited the analyses to top 300 firms to control the “size effect,” whilst also disqualifying the notion that the potentiality to have high levels of intangible liabilities (negative hidden values) is a “smaller-size” syndrome. We classified potential sample companies into two cases: first, firms with sustained intangibles assets across the research period; and second, firms with sustained intangible liabilities across the same period. One benefit of the matched-paired method is that it avoids “sampling on success” because studying a contrasting set of cases would enlighten whether the variable in question had anything to do with that success (Collins and Porras, 2002; Collins and Hansen, 2011).

Our sampling approach was grounded by three main criteria. First, the selected companies must have been in the top 300 companies by market capitalization as of December 31, 2013. We started our selection from 2013 and went backward to ensure that the company, despite its level of hidden value, was a top company in the latest year of our research period. In the negative hidden value cases, this selection shows that the companies enjoyed a higher market value than non-selected cases with positive hidden values in spite of its negative hidden value. Second, the selected companies must have consistently recorded a positive (negative) hidden value over the six-year study period. Given fluctuations in stock market, the prevalence of negative or positive hidden value is largely a random event. To monitor such a scenario and, at the same time, examine the role of hidden values in firm performance, we have excluded firms that had a fluctuating hidden value. As a result, we have targeted and selected firms with sustained positive or negative hidden values over the six-year study period. Finally, the company must have been a listed company throughout the six-year study period.

As shown in Table I, 71 firms had consistent positive hidden values over the six-year period, resulting in a total of 426 firm-year observations (i.e. $71 \times 6$ years = 426). In the comparison group, we have identified 50 firms that had consistent negative hidden values over time, producing 300 firm-year observations ($50 \times 6$ years = 300). Table I summarizes the sampling procedures and data selection process.

Variables measurement

Dependent variables. We use four measures of firm performance (ROA, ROE, net income and profit margin) to ascertain that the correlation between financial performance and intangible
assets/liabilities is not specific to certain performance measures. The four performance measures are the dependent variables while intangible assets and liabilities represent the independent variables of this study.

We run several panel regression models to examine the relationship between firm performance and intangible assets/liabilities. We first examine the impact of both current and last years’ intangible assets on firm performance. We then run a second set of regressions to determine the role of current and last years’ intangible liabilities in firm performance. We measure intangible assets and liabilities as the difference between market value and book value of the sample companies, with a positive difference entailing intangible assets while negative difference (i.e. book value is higher than the market capitalization) indicates the presence of intangible liabilities. This approach is consistent with prior studies (Harvey and Lusch, 1999; Garcia-Parra et al., 2009; Giuliani, 2013; De Santis and Giuliani, 2013). For instance, Wrigley (2008, p. 259) advances:

\[
\ldots\text{the best valuation you can get -- already exists for the aggregate intangibles for a business.}
\]

The market cap at the year-end minus the tangible book value could be used as the value of the intangibles. There just follows an exercise in attribution of that value between the different sorts of intangible assets. The problem is that the component parts are completely subjective and I would argue that there is little point in paying valuers to make this attribution.

In a similar vein, other studies maintain that the difference between market value and book values can be categorically allocated to intangible assets and liabilities (Harvey and Lusch, 1999; Garcia-Parra et al., 2009; De Santis and Giuliani, 2013). Harvey and Lusch (1999, p. 87) maintain that if the book values are higher than the market capitalization, there are some unrecorded intangible liabilities. This approach is lauded as an “immediate method” to conceptualize intangible liabilities and has a financial accounting logic of assets, liabilities and net equity (Garcia-Parra et al., 2009; De Santis and Giuliani, 2013; Giuliani, 2013). However, we acknowledge a limitation of this approach as it grossly attributes the entire difference between market and book value of a firm to intangible assets or liabilities. Stock market fluctuations in share prices can, to a certain extent, account for the difference between a firm’s market value and its book value (Dumay, 2012; De Santis and Giuliani, 2013). To mitigate this problem, we undertake longitudinal analyses to identify sustained positive/negative hidden values.

\textbf{Control variables.} We control a number of variables to determine the impact of intangible assets and liabilities on firm performance. These variables are firm size, firm age, industry and leverage. Table II provides a summary of the measurement and operationalization of all research variables.

\textbf{Data analyses}

We employ panel data regression analyses to determine the role of intangible assets and liabilities in firm performance. We conducted the Hausman specification test to identify the

\begin{table}[h]
\centering
\begin{tabular}{lcccccccccc}
\hline
\hline
\textbf{Number of firms with positive hidden value} & 122 & 164 & 176 & 171 & 198 & 178 & 136 & 124 & 129 & 130 & 102 \\
\textbf{Number of firms with negative hidden value} & 122 & 164 & 176 & 171 & 198 & 178 & 136 & 124 & 129 & 130 & 102 \\
\hline
\textbf{Number of years} & 5 & 5 & 5 & 5 & 5 & 5 & 5 & 5 & 5 & 5 & 5 \\
\textbf{Firm-year observations} & 426 (71 \times 6 years = 426) & 300 (50 \times 6 years = 300) \\
\hline
\end{tabular}
\caption{Occurrence of positive and negative hidden values over time}
\end{table}
appropriate method between the “fixed-effects model” and the “random-effects model.” To simplify, the Hausman specification test suggests if the probability value ($p$-value) of the test is greater than 0.05, the random-effects model should be used and vice-versa (Gujarati and Porter, 2009). In this study, the Hausman specification test has been conducted and, depending on the results of the test, either the random-effects model or fixed-effects model were performed for the various regression analyses. In most cases, however, the results, regardless of the test, were largely similar.

Before running the panel regression models, the correlation analyses were conducted to check the existence of multicollinearity problems among the independent variables. The results presented (unreported) show that there is no multicollinearity problems among the independent variables as the highest correlation coefficient among the independent variables is below 0.7 cut-off point, thereby allowing the inclusion of all the independent variables into the same regression model.

The panel regression models. Building on the preceding discussion, the following panel regression equations were used:

$$\begin{align*}
\text{ROA/ROE/NI/P Margin}_{it} &= \beta_0 + \beta_1 \text{IA}_{it} + \beta_2 \text{SIZE}_{it} \\
&+ \beta_3 \text{AGE}_{it} + \beta_4 \text{INDUSTRY}_{it} + \beta_5 \text{LEV}_{it} + \epsilon_{it} \\
\text{ROA/ROE/NI/P Margin}_{it} &= \beta_0 + \beta_1 \text{IA}_{it-1} + \beta_2 \text{SIZE}_{it-1} + \beta_3 \text{AGE}_{it-1} \\
&+ \beta_4 \text{INDUSTRY}_{it-1} + \beta_5 \text{LEV}_{it-1} + \epsilon_{it}
\end{align*}$$

Table II. Measurement of research variables

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
<th>Type</th>
<th>Operationalization</th>
<th>Source of data</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA</td>
<td>Intangible assets</td>
<td>Dependent/independent variable</td>
<td>Difference between market value and book value</td>
<td>OSIRIS data stream</td>
</tr>
<tr>
<td>IL</td>
<td>Intangible liabilities</td>
<td>Dependent/independent variable</td>
<td>Difference between market value and book value</td>
<td>OSIRIS data stream</td>
</tr>
<tr>
<td>ROA</td>
<td>Return on assets</td>
<td>Dependent/independent variable</td>
<td>Net income to total assets</td>
<td>OSIRIS data stream</td>
</tr>
<tr>
<td>ROE</td>
<td>Return on equity</td>
<td>Dependent/independent variable</td>
<td>Net income to total equity</td>
<td>OSIRIS data stream</td>
</tr>
<tr>
<td>NIncome</td>
<td>Net income</td>
<td>Dependent/independent variable</td>
<td>Net profit for the year</td>
<td>OSIRIS data stream</td>
</tr>
<tr>
<td>PMargin</td>
<td>Profit margin</td>
<td>Dependent/independent variable</td>
<td>Percentage of profit margin for the year</td>
<td>Net profit to total sales</td>
</tr>
<tr>
<td>Size</td>
<td>Firm size</td>
<td>Control variable</td>
<td>Total assets (log of total assets)</td>
<td>OSIRIS data stream</td>
</tr>
<tr>
<td>Age</td>
<td>Firm Age</td>
<td>Control variable</td>
<td>Date of incorporation: number of years incorporated</td>
<td>EMIS securities database</td>
</tr>
<tr>
<td>Industry</td>
<td>Industry</td>
<td>Control variable</td>
<td>Dummy variable of 1 for IC intensive firms, 0 otherwise</td>
<td>Bursa Malaysia</td>
</tr>
<tr>
<td>Lev</td>
<td>Leverage</td>
<td>Control variable</td>
<td>Total debt to total assets</td>
<td>OSIRIS data stream</td>
</tr>
</tbody>
</table>

Research findings

Descriptive results
The descriptive results shown in Table I reveal that hidden values, both positive and negative, do prevail among large firms in Malaysia. We find that a significant number of the sample companies had consistently recorded “negative hidden values” over the six-year...
research period (2008-2013). For instance, in the year 2008, 178 firms (59.33 percent) from the largest 300 firms, by market capitalization, had “negative hidden values,” that is, a book value higher than the market value, with the remaining 122 firms (40.67 percent) recording “positive hidden values.” The results in Table I also show the hidden values of the firms in the following years, with the evidence revealing that the lowest number of firms with negative hidden values was 102 firms in 2013. In terms of the number of firms with negative hidden values, there was no particular trend as, for instance, there was a decrease in the number of firms with negative hidden values from 178 firms in 2008 to 136 in 2009 and then to 124 in 2010 before increasing to 129 firms in 2011 and 130 in 2012. This suggests that the convergence to IFRS in Malaysia did not preclude the widening gap between market and book values. The recent global financial crises as well as corporate governance reforms did not also alter the occurrence of negative hidden values among top companies in Malaysia.

Given the significant number of companies with negative hidden values, these findings are unexpected for a number of reasons. First, given that our sample is limited to large companies, we expected the bulk of the sample companies to have market values higher than book values. The evidence, which suggests otherwise, leads us to our second unexpected finding: the mean scores in hidden values, as shown in panels A and B of Table III, reveal that “positive hidden values” are increasing over time whereas “negative hidden values” are deteriorating. Given these findings, we have undertaken further analyses to investigate whether the presence of “positive” or “negative” hidden values is just a random phenomenon. We discuss this in the next section (Table IV).

**Trend of hidden values**

A compelling argument maintains that “hidden values” are subject to market and share price fluctuations, and given the frequency of market changes, it does not have any particular trend. In other words, a given firm can have positive or negative hidden value at any point of time. To refute or support this claim, we have undertaken extensive analyses involving individual firms to understand the nature and pattern of hidden values over time. We find that 71 firms had consistently demonstrated positive hidden values over the six-year research period, whereas another 50 firms had consistent negative hidden values over the same period. As shown in Table V, the trend of positive hidden values has increased significantly over time at \( p = 0.001 \). However, the trend analyses show that negative hidden values have significantly deteriorated at \( p = 0.001 \), suggesting that the sample companies with negative hidden value

<table>
<thead>
<tr>
<th>Years</th>
<th>n</th>
<th>Min (%)</th>
<th>Max (%)</th>
<th>Mean</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: intangible assets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>71</td>
<td>3,322</td>
<td>37,335,866</td>
<td>2,429,911</td>
<td>6,381,031</td>
<td>4.39</td>
<td>20.53</td>
</tr>
<tr>
<td>2009</td>
<td>71</td>
<td>1,438</td>
<td>22,701,168</td>
<td>2,884,125</td>
<td>5,063,847</td>
<td>2.70</td>
<td>6.89</td>
</tr>
<tr>
<td>2010</td>
<td>71</td>
<td>7,846</td>
<td>38,875,384</td>
<td>4,137,099</td>
<td>7,152,095</td>
<td>2.94</td>
<td>9.49</td>
</tr>
<tr>
<td>2011</td>
<td>71</td>
<td>34,778</td>
<td>31,437,048</td>
<td>5,172,465</td>
<td>9,016,544</td>
<td>2.46</td>
<td>5.55</td>
</tr>
<tr>
<td>2012</td>
<td>71</td>
<td>74,617</td>
<td>40,346,462</td>
<td>5,484,713</td>
<td>9,560,894</td>
<td>2.46</td>
<td>5.34</td>
</tr>
<tr>
<td>Panel B: intangible liabilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>50</td>
<td>-2,826,810</td>
<td>-25,555</td>
<td>-497,308</td>
<td>507,561</td>
<td>-2.95</td>
<td>10.16</td>
</tr>
<tr>
<td>2009</td>
<td>50</td>
<td>-2,337,181</td>
<td>-11,755</td>
<td>-453,635</td>
<td>449,354</td>
<td>-2.60</td>
<td>7.48</td>
</tr>
<tr>
<td>2011</td>
<td>50</td>
<td>-2,889,446</td>
<td>-25,791</td>
<td>-479,622</td>
<td>541,288</td>
<td>-2.90</td>
<td>9.52</td>
</tr>
<tr>
<td>2012</td>
<td>50</td>
<td>-3,463,220</td>
<td>-46,630</td>
<td>-566,554</td>
<td>596,420</td>
<td>-3.09</td>
<td>11.82</td>
</tr>
</tbody>
</table>

Table III. Descriptive results
continue to have higher levels of negative hidden values, an indication of intangible liabilities (Harvey and Lusch, 1999; De Santis and Giuliani, 2013).

From this point, we draw two main conclusions. First, a substantial number of Malaysian companies have unrecorded intangible liabilities. Given the number of companies with consistent hidden values over time, our findings refute the notion that hidden values occur only as a result of market fluctuations. Given the consistency and presence of hidden values in large firms, we show that hidden values are more than mere market fluctuations. Second, we also learn that there is a particular pattern in the trend of hidden values, with positive hidden values showing an increasing trend whilst the trend in negative hidden values has deteriorated over time. This implies that the stock market captures both positive and negative hidden values and reacts accordingly. Third, we find that the presence of hidden values, both positive and negative, is not related to a particular industry or business sector but is spread across various industries.

**Performance: is there a difference in the financial performance?** Using four proxies of financial performance (ROA, ROE, net income and profit margin), we compare the financial performances of firms with “positive hidden values” to a comparison group of firms with “negative hidden values” over the six-year period. As shown in Table VI, we find that firms with positive hidden values have consistently significant superior financial performance than the comparison firms with negative hidden values over the six-year period. The results provide support to H1. The findings are also in line with the resource-based view that a company’s

---

**Table IV.** Descriptive results for intangible assets and liabilities

<table>
<thead>
<tr>
<th></th>
<th>Observations</th>
<th>Mean</th>
<th>Max</th>
<th>Min</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: descriptive results of independent variables: firms with intangible assets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROA (%)</td>
<td>426</td>
<td>12.91</td>
<td>57.04</td>
<td>−42.71</td>
<td>10.91</td>
<td>0.31</td>
<td>5.19</td>
</tr>
<tr>
<td>ROE (%)</td>
<td>426</td>
<td>23.06</td>
<td>608.81</td>
<td>−241.04</td>
<td>40.79</td>
<td>6.92</td>
<td>113.79</td>
</tr>
<tr>
<td>NIncome</td>
<td>426</td>
<td>433,533</td>
<td>6,771,300</td>
<td>−2,523,988</td>
<td>856,645</td>
<td>3.38</td>
<td>18.91</td>
</tr>
<tr>
<td>PMargin (%)</td>
<td>426</td>
<td>20.94</td>
<td>88.76</td>
<td>−87.19</td>
<td>17.20</td>
<td>−0.25</td>
<td>7.69</td>
</tr>
<tr>
<td>Size</td>
<td>426</td>
<td>18,164,955</td>
<td>560,000,000</td>
<td>58,017</td>
<td>63,102,484</td>
<td>5.41</td>
<td>35.44</td>
</tr>
<tr>
<td>Age</td>
<td>426</td>
<td>28.12</td>
<td>103</td>
<td>0</td>
<td>20.12</td>
<td>1.40</td>
<td>5.43</td>
</tr>
<tr>
<td>Industry</td>
<td>426</td>
<td>0.37</td>
<td>1</td>
<td>0</td>
<td>0.48</td>
<td>0.55</td>
<td>1.31</td>
</tr>
<tr>
<td>Leverage (%)</td>
<td>426</td>
<td>43.64</td>
<td>94.87</td>
<td>2.08</td>
<td>23.79</td>
<td>0.46</td>
<td>2.29</td>
</tr>
<tr>
<td>Panel B: descriptive results of independent variables: firms with intangible liabilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROA (%)</td>
<td>300</td>
<td>5.45</td>
<td>21.4</td>
<td>−20.3</td>
<td>5.26</td>
<td>−0.17</td>
<td>4.93</td>
</tr>
<tr>
<td>ROE (%)</td>
<td>300</td>
<td>8.75</td>
<td>49.3</td>
<td>−53.34</td>
<td>9.34</td>
<td>−0.99</td>
<td>11.13</td>
</tr>
<tr>
<td>NIncome</td>
<td>300</td>
<td>66,429</td>
<td>1,596,920</td>
<td>−474,963</td>
<td>154,153</td>
<td>4.50</td>
<td>39.25</td>
</tr>
<tr>
<td>PMargin (%)</td>
<td>299</td>
<td>17.18</td>
<td>68.39</td>
<td>−77.43</td>
<td>18.68</td>
<td>−0.28</td>
<td>5.40</td>
</tr>
<tr>
<td>Size</td>
<td>300</td>
<td>3,080,172</td>
<td>59,951,600</td>
<td>438,246</td>
<td>8,145,335</td>
<td>5.12</td>
<td>29.33</td>
</tr>
<tr>
<td>Age</td>
<td>300</td>
<td>29.66</td>
<td>89</td>
<td>4</td>
<td>15.62</td>
<td>0.80</td>
<td>4.54</td>
</tr>
<tr>
<td>Industry</td>
<td>300</td>
<td>0.24</td>
<td>1</td>
<td>0</td>
<td>0.43</td>
<td>0.43</td>
<td>1.22</td>
</tr>
<tr>
<td>Leverage (%)</td>
<td>300</td>
<td>39.55</td>
<td>89.58</td>
<td>7.54</td>
<td>19.18</td>
<td>0.62</td>
<td>2.84</td>
</tr>
</tbody>
</table>

Note: The reduced number of observations for PMargin is due to missing value of this particular variable.

**Table V.** One-way repeated measures ANOVA: trend of hidden values over time (2008-2013)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive hidden values</td>
<td>2,429,911</td>
<td>2,884,125</td>
<td>4,137,099</td>
<td>4,698,264</td>
<td>5,172,465</td>
<td>5,484,713</td>
<td>0.001***</td>
</tr>
<tr>
<td>Negative hidden values</td>
<td>−497,308</td>
<td>−453,635</td>
<td>−374,356</td>
<td>−479,622</td>
<td>−566,554</td>
<td>−503,338</td>
<td>0.001***</td>
</tr>
</tbody>
</table>

Note: ***Significant at the 1 percent level
### Intangible Assets and Liabilities

#### Table VI.

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ROA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n value</td>
<td>71</td>
<td>50</td>
<td>71</td>
<td>50</td>
<td>71</td>
<td>50</td>
</tr>
<tr>
<td>Mean score</td>
<td>12.23</td>
<td>5.23</td>
<td>12.11</td>
<td>4.42</td>
<td>13.58</td>
<td>5.93</td>
</tr>
<tr>
<td>t-value</td>
<td>4.397</td>
<td>0.000**</td>
<td>6.135</td>
<td>0.000**</td>
<td>5.540</td>
<td>0.000**</td>
</tr>
<tr>
<td>2 Groups</td>
<td>4.397</td>
<td>0.000**</td>
<td>6.135</td>
<td>0.000**</td>
<td>5.540</td>
<td>0.000**</td>
</tr>
<tr>
<td><strong>ROE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n value</td>
<td>71</td>
<td>50</td>
<td>71</td>
<td>50</td>
<td>71</td>
<td>50</td>
</tr>
<tr>
<td>Mean score</td>
<td>19.13</td>
<td>8.73</td>
<td>22.14</td>
<td>7.37</td>
<td>24.19</td>
<td>8.66</td>
</tr>
<tr>
<td>t-value</td>
<td>2.178</td>
<td>0.031*</td>
<td>6.205</td>
<td>0.000**</td>
<td>5.360</td>
<td>0.000**</td>
</tr>
<tr>
<td>2 Groups</td>
<td>2.178</td>
<td>0.031*</td>
<td>6.205</td>
<td>0.000**</td>
<td>5.360</td>
<td>0.000**</td>
</tr>
<tr>
<td><strong>Profit margin</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n value</td>
<td>71</td>
<td>50</td>
<td>71</td>
<td>50</td>
<td>71</td>
<td>50</td>
</tr>
<tr>
<td>Mean score</td>
<td>19.31</td>
<td>11.84</td>
<td>21.25</td>
<td>14.67</td>
<td>22.44</td>
<td>19.07</td>
</tr>
<tr>
<td>t-value</td>
<td>2.120</td>
<td>0.036*</td>
<td>2.458</td>
<td>0.015*</td>
<td>1.159</td>
<td>0.249</td>
</tr>
<tr>
<td>2 Groups</td>
<td>2.120</td>
<td>0.036*</td>
<td>2.458</td>
<td>0.015*</td>
<td>1.159</td>
<td>0.249</td>
</tr>
</tbody>
</table>

**Notes:** **Significant at the 0.05 and 0.01 levels (two-tailed), respectively**

In Table VI, independent samples t-tests are performed to compare the performance of matched pairs of companies, focusing on ROA, ROE, and Profit margin. The results indicate statistically significant differences in these performance indicators across the years, suggesting variations in the intangible assets and liabilities of the companies during the observed period.
performance is driven by the resources it owns. In this context, we argue that “positive hidden values,” which reflect unrecorded intangible assets, drive firm performance, whereas negative hidden values, an indication of intangible liabilities, hinder firm performance. One possible explanation for the superior financial performance of the companies with intangible assets is that investments in intangible resources (e.g. human capital, R&D, technological systems) have the potential to enhance business profitability. The absence of such intellectual investments results in poor financial performance. For instance, a firm that invests in its employees through training programs and provides the necessary systems with effective compensation packages would outperform a firm without such investments (Lev et al., 2009).

Empirical results: panel regressions. Performance and hidden values: direct relationship with current year performance. To determine the role of intangible assets and liabilities in corporate performance, we have performed several panel regressions. The objective is to show correlations, not causality. The first panel regression analyses in Table VII report the relationship between intangible assets and firm performance, using four alternating performance measures (ROA, ROE, net income and profit margin). The findings show that all four measures of performance (ROA, ROE, net income and profit margin) have significant positive association with intangible assets. This finding suggests that hidden intangible resources enhance the financial performance of companies. The results, which are in line with several prior studies (e.g. Chen et al., 2005; Clarke et al., 2011), are consistent with H2.

The findings presented in Table VIII show the relationship between corporate performance and intangible liabilities. The results reveal a significant negative association between all four financial performance measures and our measure of intangible liabilities. Hence, the findings provide support to H3. These findings suggest that intangible assets drive financial performance of a company (H2), whereas intangible liabilities have a contrasting negative influence on corporate financial performance (H3).

Performance and hidden value: direct relationship with following year performance. We examined whether the observed link between performance and intangible assets/liabilities has a time lag, that is, the impact of last year’s intangible assets/liabilities on current year’s financial performance. We have specified additional models to capture the lagged effects of the independent variables. We first show in Table IX the impact of lagged intangible assets on subsequent year’s financial performance. The results indicate that last year’s intangible assets have a strong significant positive impact on all four performance measures in the current year.

<table>
<thead>
<tr>
<th>Variables</th>
<th>IA and ROA (model 1)</th>
<th>IA and ROE (model 2)</th>
<th>IA and net income (model 3)</th>
<th>IA and profit margin (model 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>Sig</td>
<td>Coefficient</td>
<td>Sig</td>
</tr>
<tr>
<td>IA</td>
<td>2.147</td>
<td>0.000***</td>
<td>9.089</td>
<td>0.000***</td>
</tr>
<tr>
<td>Size</td>
<td>−3.200</td>
<td>0.000***</td>
<td>−11.448</td>
<td>0.000***</td>
</tr>
<tr>
<td>Age</td>
<td>0.703</td>
<td>0.3978</td>
<td>1.994</td>
<td>0.5469</td>
</tr>
<tr>
<td>Industry</td>
<td>−0.747</td>
<td>0.6447</td>
<td>−2.987</td>
<td>0.6344</td>
</tr>
<tr>
<td>Lev</td>
<td>−0.137</td>
<td>0.000***</td>
<td>0.391</td>
<td>0.0047***</td>
</tr>
<tr>
<td>$R^2$ (%)</td>
<td>20.93</td>
<td>6.91</td>
<td>54.99</td>
<td>16.67</td>
</tr>
<tr>
<td>Adjusted $R^2$ (%)</td>
<td>19.99</td>
<td>5.80</td>
<td>54.45</td>
<td>14.66</td>
</tr>
<tr>
<td>$F$-statistic</td>
<td>22.232</td>
<td>6.235</td>
<td>102.63</td>
<td>8.301</td>
</tr>
<tr>
<td>Prob. ($F$-statistic)</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Notes: IA, intangible assets; size, firm size using log of total assets; age, number of years incorporated; industry, dummy variable of 1 for intangible intensive firms, 0 otherwise; lev, leverage using percentage of total debt to total assets. *,**,***Significant at the 10, 5 and 1 percent levels, respectively
The results, which are consistent with H4, are in line with several prior studies that have observed a significant positive association between prior year’s IC resources and subsequent firm performance (e.g. Chen et al., 2005; Shiu, 2006; Clarke et al., 2011). The results in Table X show the impact of lagged intangible liabilities for subsequent year’s performance. The results show that a prior year’s intangible liabilities have a significant negative impact on current year’s performance. The results provide support to H5. Due to the absence of a prior study which examined the role of intangible liabilities in firm performance, we provide initial evidence pertaining the role of intangible assets in firm performance.

**Discussion and conclusion**

The literature and commentary discussions on intangibles were described as “one-sided,” focusing only on intangible assets, and failing to consider intangible liabilities (Gowthorpe, 2009; Stam, 2009). We find that the existing research on intangible liabilities as highly normative, with little or no concrete empirical evidence (De Santis and Giuliani, 2013). There still remain
questions on whether there is such thing as “intangible liabilities” (Caddy, 2000; Stam, 2009), and in particular, the role of intangible liabilities in firm performance. The purpose of this study is to explore the existence of “intangible liabilities” and provide initial empirical account toward the roles of intangible assets and liabilities in firm performance. Following prior studies (e.g. Harvey and Lusch, 1999; Wrigley, 2008; De Santis and Giuliani, 2013), we use sustained positive/negative hidden values to measure intangible assets and liabilities.

We find a significant number of our sample companies, between 34 and 59.33 percent from the largest 300 companies in Malaysia, have substantial amount of unrecorded intangible liabilities over the six-year period. The research results also show that a significant number of top 300 companies (50 firms) had sustained intangible liabilities throughout the sample period. Contrary to expectations, the findings reveal that the occurrence of “negative hidden values,” or hidden values altogether, is not a random, industry-specific or smaller-size syndrome phenomena. Quite contrary, the existence of hidden values goes beyond specific industries, reforms in corporate governance, reporting and macroeconomics conditions.

The empirical findings also reveal that firms with “positive hidden values,” a reflection of intangible assets, significantly outperform financially a control group of firms with “negative hidden values.” In addition, we find that intangible assets have a significant positive impact on firm performance whereas intangible liabilities have contrasting negative impact on both current and subsequent financial performance of the sample companies. Based on the research findings, we argue that the inclusion of information on intangible assets and liabilities in corporate reports, regardless of the structure of such disclosures, would allow investors to make an informed decision (Wrigley, 2008; Lev et al., 2009; Bloom, 2009). Perhaps the IR agenda, which aims to accommodate “multiple capitals” and their increases, decreases and transformations, represents an opportunity to report intangible assets and corresponding liabilities.

The research findings have several important theoretical as well as policy implications. First, the findings are consistent with the resource-based view that firm performance is a function of organizational resources, both physical and intangible resources. We extend this theoretical notion to the intangible asset-liability mix, affirming the crucial role of intangible assets in corporate performance whilst introducing the unfavorable role of intangible liabilities in corporate financial performance. Second, the research findings provide initial empirical input to emerging calls for considering broader and different perspectives of intangibles (Caddy, 2000; Gowthorpe, 2009; Stam, 2009), and therefore belong to an emerging (shifting) paradigm toward the nature of intangibles. Third, from a policy

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>Sig</th>
<th>Coefficient</th>
<th>Sig</th>
<th>Coefficient</th>
<th>Sig</th>
<th>Coefficient</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL$_{t}$</td>
<td>-2.507</td>
<td>0.000***</td>
<td>-5.033</td>
<td>0.000***</td>
<td>-0.533</td>
<td>0.000***</td>
<td>-9.272</td>
<td>0.000***</td>
</tr>
<tr>
<td>Size$_{t}$</td>
<td>0.463</td>
<td>0.5146</td>
<td>2.750</td>
<td>0.045**</td>
<td>0.970</td>
<td>0.000***</td>
<td>11.369</td>
<td>0.0001***</td>
</tr>
<tr>
<td>Age$_{t}$</td>
<td>0.125</td>
<td>0.7029</td>
<td>0.063</td>
<td>0.9197</td>
<td>-0.023</td>
<td>0.7166</td>
<td>-0.271</td>
<td>0.835</td>
</tr>
<tr>
<td>Industry$_{t}$</td>
<td>-0.713</td>
<td>0.3382</td>
<td>-2.148</td>
<td>0.1355</td>
<td>-0.215</td>
<td>0.0287***</td>
<td>-9.145</td>
<td>0.0021***</td>
</tr>
<tr>
<td>Leverage$_{t}$</td>
<td>-0.092</td>
<td>0.0003****</td>
<td>-0.075</td>
<td>0.1174</td>
<td>-0.024</td>
<td>0.000***</td>
<td>-0.447</td>
<td>0.000***</td>
</tr>
<tr>
<td>$R^2$ (%)</td>
<td>26.54</td>
<td>14.03</td>
<td>20.03</td>
<td>13.57</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted $R^2$ (%)</td>
<td>23.78</td>
<td>10.81</td>
<td>17.03</td>
<td>10.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prob. ($F$-statistic)</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:** IL, intangible liabilities; size, firm size using log of total assets; age, number of years incorporated; industry, dummy variable of 1 for intangible intensive firms, 0 otherwise; Lev, leverage using percentage of total debt to total assets. *,**,***Significant at the 10, 5 and 1 percent levels, respectively.
perspective, the findings show a significant number of large firms have substantial amount of intangible liabilities. Given the current relegation of intangibles from existing financial accounting standards, our call is not only for consideration of intangibles in terms of capitalization and disclosure (Lev, 2008; Lev et al., 2009), but one which emphasizes the broader perspective of intangibles and the necessary inclusion of intangible liabilities in the ongoing discussions pertaining intangible accounting (Skinner, 2008a). Finally, our findings have important implications for the auditing profession in assessing going concern of listed firms. We suggest that auditors become alert about the presence of significant amount of intangible liabilities when making going concern assessments.

These findings should be interpreted within the context of several limitations. First, this study has only relied on a single measure of intangible liabilities. Albeit this measure is straightforward and more objective (Harvey and Lusch, 1999; Wrigley, 2008; De Santis and Giuliani, 2013), there could be other measures to capture intangible liabilities. One way to address this is to collect intangible liabilities data from companies through surveys. Second, the study did not consider audit reports of firms having negative hidden values. Future research should study audit reports to see if auditors have any reservation in going concern statements for companies with negative hidden values. Third, the evidence is drawn from a single country and could be influenced by country-specific micro- and macro-level conditions. Studies incorporating several countries should extend the findings asserted in this study to provide further insights. Finally, this study has only examined a limited number of factors influencing the interplay between hidden values and firm performance. For instance, corporate governance could play an important role in the creation (mitigation) of intangible assets (liabilities). This can be the focus of future research.

Notes
1. There a number of studies that reject the notion that the difference between market and book value is attributable to intangible assets or liabilities (e.g. Dumay, 2012).
2. Harvey and Lusch (1999) identify four categories of intangible liabilities, namely, process issues; human issues; informational issues; and configuration issues.
3. Only in the case of profit margin do the results show insignificant difference between the two groups; albeit still, firms with positive hidden values outperform than the comparison group.

References


Reuters (2015), “Apple $1 trillion stock market value could be years away”, available at: www.reuters.com/article/2015/02/13/us-apple-marketcap-idUSKBN0LH05E20150213


Further reading


About the authors

Abdifatah Ahmed Haji holds an MSc Degree in Accounting from the International Islamic University, Malaysia. His research interests are in the areas of corporate reporting, intellectual capital and corporate governance. He has published papers in peer-reviewed international academic journals, such as *Journal of Intellectual Capital*, *Journal of Human Resource Costing and Accounting*, *International Journal of Disclosure and Governance*, *Journal of Humanomics*, *Asian Review of Accounting*, *Managerial Auditing Journal* and others.

Nazli Anum Mohd Ghazali is a Professor at the Department of Accounting, International Islamic University, Malaysia. She received her Bachelor and Master degrees from Lancaster University, England, and her PhD Degree in Accounting and Finance from Strathclyde University, Scotland. Her research interests are in the areas of disclosure, corporate governance, corporate social responsibility, risk management and ethics. She has published papers in journals of repute, such as the *Journal of International Accounting, Auditing and Taxation*, *Corporate Governance: The International Journal of Business in Society*, *Social Responsibility Journal*, *International Journal of Commerce and Management*, *International Journal of Business Governance and Ethics*, *International Journal of Disclosure and Governance*, *Journal of Intellectual Capital*, *Journal of Humanomics*, *Asian Review of Accounting*, *Managerial Auditing Journal* and others.

For instructions on how to order reprints of this article, please visit our website: www.emeraldgrouppublishing.com/licensing/reprints.htm
Or contact us for further details: permissions@emeraldinsight.com
IFRS and value relevance
A comparison approach before and after IFRS conversion in the European countries

Ahmed Kouki
Department of Accounting, Faculty of Economics and Management of Sfax, Sfax, Tunisia and
LARTIGE Laboratory, Sfax, Tunisia

Abstract

Purpose – The purpose of this paper is to compare the value relevance of accounting information between International Financial Reporting Standards (IFRS)-firms and non-IFRS-firms over five years before mandatory IFRS adoption from 2000 to 2004 and six years after IFRS adoption from 2006 to 2011.

Design/methodology/approach – The sample includes 1,166 firm-year observations that cover firms from three European countries. Different econometric tests, multivariate and panel regressions have been used to verify the hypotheses.

Findings – In the pre-IFRS period, voluntary IFRS adoption did not improve the value relevance of accounting information. The results indicate that the information contents of non-IFRS-firms in the post-adoption period have higher quality than in the pre-adoption period. The findings show a higher association between accounting information, stock prices and stock returns over both periods, however, the difference in results is not statistically significant.

Research limitations/implications – This study was not generalized to other stock exchanges that have a significant weight in the European Union, such as the FTSE 100 companies or the SP/MIB.

Practical implications – This study has some implications for standards setters, firms and practitioners. The transition to IFRS reduces the diversity of accounting systems and institutional conditions (capital market structure, Taxation systems). In addition, mandatory IFRS adoption engendered changes in firms’ business and organizational models that led accountants to improve their educational and training programs.

Originality/value – This paper contributes to the value relevance as well as IFRS literature by using a sample from code-law origin countries that switched from a debt-oriented system to shareholder-oriented system. It offers a comparative approach between IFRS-firms and Non-IFRS-firms in the pre- and post-adoption periods. In contrast, prior studies focused on the comparison during only one period. This empirical evidence should be of interest to investors and policymakers in other markets.

Keywords Isomorphism, Value relevance, Environmental determinism theory, European countries, Mandatory IFRS adoption

Paper type Research paper

1. Introduction

Since 1990, the economic environment has been characterized by the globalization of financial markets, the rise of multinationals and the complexity of interfirm relationships. Therefore, the need for companies to have comparable and comprehensive accounting information is confronted with the diversity of accounting clusters and heterogeneous of accounting practices around the world. In addition, in the early 2000, accounting scandals, such as Enron and Worldcom, were reflected in the failing of existent accounting clusters (such as US GAAP) (Liu et al., 2014). In fact, the issue for international accounting harmonization was seen to be sufficient and practical. As a result, International Financial Reporting Standards (IFRS) take a great importance in the accounting standardization and several countries enabled their companies to voluntarily adopt international standards (Kim and Shi, 2012). In 2002, the European Union (EU) required that their listed companies prepare their consolidated financial statements accordingly for IFRS starting on 1 January 2005.

This paper examines whether the value relevance of the equity book value, earnings and changes in earnings improved after the transition to IFRSs. The quality of accounting information is one of the most fundamental elements that could affect the
stakeholders’ economic decision making (Deaconu et al., 2010). The information content of accounting numbers should reflect the true and fair view of the firm’s financial situation (Chandrapala, 2013).

The value relevance of accounting information is a classical matter in the accounting literature. Beaver (1968) and Ball and Brown (1968) were the first to investigate the value relevance of accounting earnings. Over the last two decades, the globalization of financial markets and the emergence of multinational firms have enhanced the necessity to have reliable, comparable and more relevant accounting information. Then, the International Accounting Standards Board (IASB) developed the IFRS with the aim of establishing a common accounting language across the world (Ball, 2006). New standards are intended to increase the investors’ confidence in the financial markets. Since 1 January 2005, the European Community (EC) Regulation 1606/2002 required that Europeans listed companies adopt IFRS to prepare their consolidated accounts. The transition to IFRS sets the value relevance of accounting information at the center of the debate about the legality, sincerity and regularity of financial statements.

Since the mandatory IFRS adoption in Europe, researchers’ attention has focused on whether accounting information is more relevant under the domestic standards (DS) or under IFRS (Barth et al., 2008; Kim and Yoon, 2012; Tsalavoutas et al., 2012; Md Khokan et al., 2013; Elshandidy, 2014; Veith and Werner, 2014). Cordazzo (2013) argued that the requirement for IFRS by the European countries affected many areas of accounting practice through the introduction of fair value, revenue recognition, impairment tests, deferred taxes, leases, etc. The transition to IFRS ensures the comparability and the reliability of consolidated accounts. Germany, France and Belgium represent a suitable context for research because of their distinctive accounting regimes. The accounting practice in these countries is a system that recognizes the probable losses or expenses and profits or revenues in these countries only when they are realized (Basu, 1997). On the other hand, in these countries, the accounting profession is old and the legal system is more conservative. Tsalavoutas et al. (2012) suggest that the accounting quality in common-law countries (e.g. The USA and the UK) is more value relevant than the one in code-law countries (e.g. Germany and France). IFRSs are shareholder-oriented regimes and prone to the Anglo-Saxon accounting practice. Furthermore, we choose a sample consisting of code-law countries, which requires that listed companies prepare their financial statements according to IFRS with the aim of observing the change in the value relevance of accounting information when sampled countries switch from DS to the IFRS.

The value relevance of accounting information is measured before and after the IFRS adoption by the price model (PM) of Ohlson (1995) and the returns model (RM) of Easton and Harris (1991). We conduct the data analysis based on a comparative study over the pre-IFRS period (from 2000 to 2004) and the post-IFRS period (from 2006 to 2011) through a sample of 106 firms listed at DAX 30 (Germany), SBF 120 (France) and BEL 20 (Belgium). The empirical analysis provided three levels of results. First, the findings showed that, in the pre-IFRS period, the voluntary IFRS adoption did not improve the value relevance of accounting information. Second, the results indicated that accounting information of non-IFRS-firms in the post-adoption period has higher quality than in the pre adoption period. It was found that, after the transition to IFRS, non-IFRS-firms showed a higher association between accounting information, stock prices and stock returns. Third, we compared the value relevance of accounting information for IFRS-Firms over the pre- and post-adoption period. The results showed a higher association between accounting information, stock prices and stock returns over both periods, however, the difference in results is statistically not significant.

The remainder of the paper is organized as follows. In Section 2, we present the theoretical background. Section 3 develops the literature review and the hypotheses and Section 4 describes the research design. Section 5 presents the results and discussion and Section 6 offers conclusions and a summary.
2. Theoretical background
The strategic choice or decision (the EC Regulation 1606/2002) of the European countries to adopt the IFRS can be justified by the contributions of environmental determinism theory and isomorphism theory.

2.1 Environmental determinism theory
According to this theory, accounting is the product of its environment. Before the IFRS mandatory adoption, on January 1, 2005 in Europe, the economic environment has been characterized by the pressure of multinationals. Moreover, financial globalization was seen as a process of integrating the various capital markets and the openness of all the national markets to the international one to achieve a single global capital market. Accounting in The EU suffers from the diversity of accounting clusters and the multitude of accounting policies and choices. This matter demands harmonization of accounting approaches and standards (Callao et al., 2009). In Germany, following the Metallgesellschaft scandal, the German parliament passed on 5 March, 1999, the law on transparency as in April 1998 (KonTraG and KapAEG). The approval of this law aims at the compliance of the German accounting system with the international accounting standards (Ferentinou and Anagnostopoulou, 2016). In France, the French Parliament ratified the law No. 98-261 on 6 April 1998 to establish the general and sectoral accounting requirements. In addition, following the financial scandal (Enron) in 2000, the French Parliament passed the financial security law in 2003. Likewise, in 2003, the Belgian state implemented the law of 22 May 2003 on the organization of budget and accounting of the Federal SQtate. All these legal procedures to reform the accounting systems of these countries were not able to resist across the requirements of financial globalization. For this reason, all the publicly listed companies in the EU countries were required to prepare their financial statements in accordance with the IFRS. The IFRS adoption led to changes in the number of accounting choices and policies compared to the DS (Ferentinou and Anagnostopoulou, 2016). The scope of the IASB is to establish a common accounting language in the world. This radical accounting transition is a manifestation of environmental determinism theory as mentioned by Gernon and Wallace (1995) and Rodrigues and Craig (2007).

2.2 New institutional theory (Isomorphism)
DiMaggio and Powell (1983) are the pioneers of the new institutional theory. This theory attempts to explain the phenomenon of homogeneity in organizations and the influence of the institutional environment on these organizations. New institutionalism is based on the concept of isomorphism. DiMaggio and Powell (1983) described three forms of isomorphism. This concept can be used to clarify the process that led to the mandatory IFRS adoption by the European countries. The first form is the coercive isomorphism, which is manifested in the political pressure of the EC that required that all publicly listed firms prepare their financial statements according to both the international and legitimate the IASB standards. The second form is the mimetic isomorphism. Rodrigues and Craig (2007) suggested that the mimetic isomorphism describes how organizations emulate the actions of similar organizations that are perceived as more legitimate or successful in the institutional environment. On this level, the IASB persuaded the European countries to adopt its standards. This assumption intensifies the competition between the FASB and the IASB in the perspective of international standardization. In the early 1990, the Securities and Exchange Commission required that firms register outside the USA and be listed on a US primary market to reconcile their financial statements with the US GAAP (Amir et al., 1993). In this study, the authors suggested that the reconciliation of accounting amounts with the US GAAP are value relevant. Then, both institutions signed a consensus of convergence to reduce the differences between the US GAAP and IFRS. Hoarau (2003) called this imitation...
mutual recognition. This action between the FASB and the IASB is a manifestation of mimetic isomorphism. The third form is the normative isomorphism, which refers to the professionalism and funding. For instance, the Big Four had an impact on the process of developing international standards by the professional and financial resources.

3. Prior literature and hypothesis development

The value relevance represents the ability of accounting information to explain the firm’s market value (Suadiye, 2012). Inder and Myung-Sun (2003) argue that the accounting information is value relevant if it ensures the investors’ decision making and reflects the true and fair view of the financial statements. Prior to the mandatory IFRS adoption in Europe, the value relevance literature was based on comparative studies between countries’ legal origin (common-law vs code-law), the accounting systems (multitude of accounting clusters), the accounting conservatism, etc. However, after the mandatory IFRS adoption, the accounting literature declined to compare the value relevance of accounting information before and after the IFRS adoption and/or between the voluntary IFRS adoption and the mandatory IFRS adoption or between the countries that reported their financial statements in accordance with their DS and others that prepared their consolidated accounts by referring to the IFRS.

With the aim of examining the effect of the IFRS adoption on the value relevance of accounting information, we compared the value relevance of the equity book value, the earnings and the change in earnings between the pre- and the post-IFRS periods in Germany, France and Belgium. In this paper, we measure the value relevance through the PM of Ohlson (1995) and the RM of Easton and Harris (1991). The PM explains the market value by the equity book value per share and the earnings per share, whereas the RM explains the stock returns by earnings and change in the earnings (Lang et al., 2003, 2006; Barth et al., 2012; Chua et al., 2012). The debate on the value relevance has been the subject of several studies in accounting literature before and after the IFRS adoption (Basu, 1997; Holthausen and Watts, 2001; Khurana and Kim, 2003; Graham et al., 2003; Lang et al., 2003; Francis et al., 2004; Barth et al., 2008, 2012; Kim and Yoon, 2012; Hamadi and Hamadeh, 2012; Tsalavoutas et al., 2012; Suadiye, 2012). In our study, we adopt a comparative approach of equity book value, earnings and change in earnings between voluntary and mandatory IFRS adoption in Germany, France and Belgium.

Voluntary IFRS adoption was a response of accounting environmental pressures in the late 1990s. In the EU, several countries (e.g. Germany (KonTraG and KapAEG) and France (law n° 98-261)) allowed their companies to prepare consolidated financial statements in accordance with the IFRS or the US GAAP (Van Tendeloo and Vanstraelen, 2005). Likewise, Harris and Muller (1999) used a comparative study related to the value relevance of earnings and book value between International Accounting Standards (IAS) and the US GAAP. The results showed that IAS information is more associated with PM than US GAAP information, and that the US GAAP information is more associated with the RM than IAS information. Before 2005, findings issued from the voluntary IFRS adoption studies offered mixed results. In the German context, Bartov et al. (2005) conducted a study to compare the value relevance of the IAS voluntary adoption with the German and US standards. Their results showed an increase in the value relevance of earnings on the IAS and US standards than on the DS (German GAAP). This finding is inconsistent with those of Hung and Subramanyam (2007) which demonstrate that equity book value and earnings are not more value relevant under IAS than under the German GAAP. This difference was explained by Soderstrom and Sun (2007) by the use of two different samples. The sample used by Bartov et al. (2005) is larger than the one used by Hung and Subramanyam (2007). Similarly, in the Chinese context, Liu et al. (2014) compared the value relevance of accounting information between A-shares (traded by Chinese Accounting Standards (CAS)) and B-shares, firms (traded by the IAS) belonging over the 1999/2005 period. This study
found that the information contents of CAS and IAS are value relevant to investors in the
Chinese capital markets, but IAS amounts provided more useful information to investors.
In this context line, Kinnunen et al. (2000) used a sample of the Helsinki Stock Exchange to test
the value relevance of earnings between the local GAAP and IAS. They found that restating
Finnish GAAP incomes, according to the IAS, are is value relevant to foreign investors, but
not for local shareholders. Using a sample of 327 companies that voluntarily adopted IAS over
the 1994/2003 period, Barth et al. (2008) examined the value relevance of the book value and
earnings and found that the adj. R² for the model significantly increased after the switch to
IAS. The authors suggested that the value relevance of the book value and earnings was
higher following the IAS voluntary adoption. Auer (1996) examined the information contents
of earnings announcements for a sample of 35 Swiss companies that switched from the Swiss
GAAP to the IAS standards and found a significant improvement of the variability of
abnormal returns for the firms’ sample. He also suggested that under the IAS standards,
earnings have more information content than under the Swiss GAAP. Given the difference
between the voluntary IFRS adoption and local standards, it is hypothesized that:

\[ H1a. \text{ Voluntary IFRS adoption increases the value relevance of equity book value and earnings.} \]

\[ H1b. \text{ Voluntary IFRS adoption increases the value relevance of earnings and the change in earnings.} \]

Paananen and Lin (2009) showed that the earnings quality of companies listed in the
German stock exchange became less relevant following the mandatory IFRS adoption. This
result is consistent with the study of Tsalavoutas et al. (2012) on a sample of companies
listed on the Greek stock exchange. Similarly, Gjerde et al. (2008) in Norway and Callao et al.
(2007) in Spain, indicated that the IFRS mandatory IFRS adoption had not increased the
value relevance of accounting information in both countries. Nonetheless, Barth et al. (2008)
conducted a comparative study between IFRS-firms and firms that prepared their financial
statements according to DS. The authors found that firms applying the IFRS had more
value relevance of accounting numbers than firms applying DS. In addition, Suadiye (2012)
study the value relevance of Turkey listed companies before and after IFRS that the
transition to the IFRS increases the value relevance of accounting information. Indeed,
Iatridis and Rouvolis (2010) found that the value relevance of earnings and net assets of
companies listed on the Athens Stock Exchange became incrementally significant after the
IFRS adoption. Tsalavoutas and Dionysiou (2014) found that the level of mandatory
disclosure is value relevant and the net income of high-compliance companies has a
significantly higher coefficient than that of low compliance companies.

Prior value relevance research discriminated between studies which indicated that the
IFRS adoption improves the accounting quality (Barth et al., 2008; Iatridis and Rouvolis,
2010; Suadiye, 2012) and others that suggested the opposite (Gjerde et al., 2008; Callao et al.,
2007; Paananen and Lin, 2009; Tsalavoutas et al., 2012). It is hypothesized that:

\[ H2a. \text{ The transition to the IFRS increases the value relevance of equity book value and earnings.} \]

\[ H2b. \text{ The transition to the IFRS increases the value relevance of earnings and the change in earnings.} \]

4. Research design
4.1 Sample and data
Data were collected from the database “Thomson one banker.” Our sample consists of
data from Germany, France and Belgium listed companies for the period from 2000 to 2011.
We exclude data from 2005, as this is the transition year to IFRS. We exclude banks, insurance companies, and other financial institutions because it has specificities in their accounting practices. We divided the sample into two subsamples (Pre-IFRS period from 2000 to 2004 and Post-IFRS period from 2006 to 2011).

The matching approach of selected countries (Germany, France and Belgium) is that the three countries are civil-law and tend to favor more conservative accounting treatments before mandatory IFRS adoption. It’s worth noting that German, French and Belgium companies could be IFRS early adopters. This is due to the implementation of kapAEG and KonTRaG in 1998 and No. 98-261 on 6 April 1998, respectively in Germany and France. In addition, selected firms belong to the most important stock market index, namely, DAX 30 in Germany, SBF 120 in France and BEL 20 in Belgium. IFRS was developed by an international body (IASB) that prone an Anglo-Saxon ideology. Consequently, the European countries, have tended to favor accounting practices based on shareholder-oriented regime, required that their listed companies use the IFRS in the preparation of consolidated accounts.

The first subsample consists of 25 companies that voluntarily adopt IFRS, represent 23.58 percent of subsample1, and 81 companies that disclose their financial statements referred to DS, represent 76.42 percent of the subsample 1. For the period from 2000 to 2004 there are a 530 firm-year observations. In the second subsample, all companies disclosed their financial statements referred to IFRS and the firm-year observations are about 636. Full sample consists of 106 firms into 11 years belonging 3 countries (namely: France, Germany and Belgium) and 14 industries ($N = 1166$ firm-year observations). Panel A and panel B of Table I present a summary of the sample selection.

4.2 Models and variables

4.2.1 PM. The model developed by Ohlson (1995) assumes the correlation of accounting information with the firm’s market value (stock price). The dependent variable is the stock price ($P$), collected six months after the fiscal year. This variable is explained by the equity book value per share and earnings per share.

4.2.1.1 Pre-IFRS period (2000-2004). This period is characterized by the preparation of financial statements in accordance with DS, with the exception of a few companies that voluntarily adopt IFRS (23.58 percent of the subsample1). We introduce in the model the IFRS as a dummy variable that takes the value of “1” if the company voluntarily adopts IFRS and “0” otherwise. The model is presented as follows:

$$P_{it} = \beta_0 + \beta_1 \text{BVEPS}_{it} + \beta_2 \text{EPS}_{it} + \beta_3 \text{IFRS}_{it} + \epsilon_{it}. \quad (1)$$

where $P$ is the stock price for firm $i$ at time $t$, measured six months after the firm’s fiscal year end; book value of equity per share (BVEPS) of firm $i$ at time $t$, measured by divided the book value of equity by the number of shares outstanding; earnings per share (EPS) of firm $i$ at time $t$, measured by divided the net income by the number of shares outstanding; IFRS: Dummy variable that takes the value of “1” if firm voluntarily adopts IFRS and “0”, otherwise; $\epsilon_{it}$ error term.

4.2.1.2 Post-IFRS period (2006-2011). During this period European listed companies develop, necessarily, their financial statements in accordance with IFRS. Therefore, the model is presented as follows:

$$P_{it} = \beta_0 + \beta_1 \text{BVEPS}_{it} + \beta_2 \text{EPS}_{it} + \epsilon_{it} \quad (2)$$

4.2.2 RM. Easton and Harris (1991) develop a model in which consider that the stock return of firms is explained by the earning and change in earnings. We estimate this model on the pre- and post-IFRS periods.
### Table I. Firms sample description

<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>Firms</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Voluntary IFRS adoption</td>
</tr>
<tr>
<td>Domestic standards (DS)</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandatory IFRS adoption</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>Retail</td>
</tr>
<tr>
<td>Manufacturing</td>
</tr>
<tr>
<td>Biotechnology</td>
</tr>
<tr>
<td>Construction</td>
</tr>
<tr>
<td>Consumer goods and services</td>
</tr>
<tr>
<td>Real state</td>
</tr>
<tr>
<td>Personal and household</td>
</tr>
<tr>
<td>products</td>
</tr>
<tr>
<td>Business services</td>
</tr>
<tr>
<td>Aerospace and defense</td>
</tr>
<tr>
<td>Oil and gas</td>
</tr>
<tr>
<td>Utilities</td>
</tr>
<tr>
<td>Iron and steel</td>
</tr>
<tr>
<td>Healthcare</td>
</tr>
<tr>
<td>Technology</td>
</tr>
</tbody>
</table>
4.2.2.1 Pre-IFRS period (2000-2004). We measure the value relevance of accounting information referred to the Easton and Harris (1991) model. We introduce in the econometric model the IFRS, as a dummy variable, that takes the value of “1” if the firm voluntarily adopts the IFRS and “0” otherwise. The model (3) is presented as follows:

\[ \text{Return}_{it} = \beta_0 + \beta_1 \text{EPS}_t/P_{(t-1)} + \beta_2 \Delta \text{EPS}_t/P_{(t-1)} + \beta_3 \text{IFRS}_t + e_{it} \]  

(3)

where \( \text{returns} \) is the stock returns for firm \( i \) at time \( t \), measured by the ratio \((P_t + D_t)/P_{(t-1)}\); \( \Delta \text{EPS} \): The annual change in earnings for firm \( i \) at time \( t \), measured by the ratio \((\text{EPS}_t - \text{EPS}_{(t-1)})/\text{EPS}_{(t-1)}\); \( \text{EPS} \) of firm \( i \) at time \( t \), measured by divided the net income by the number of shares outstanding; \( \text{IFRS} \): dummy variable that takes the value of “1” if firm voluntarily adopts IFRS and “0”, otherwise; \( e_{it} \): error term.

4.2.2.2 Post-IFRS period (2006-2011). In this period, European listed companies develop, necessarily, their financial statements in accordance with IFRS. Therefore, the model is presented as follows:

\[ \text{Return}_{it} = \beta_0 + \beta_1 \text{EPS}_t/P_{(t-1)} + \beta_2 \Delta \text{EPS}_t/P_{(t-1)} + e_{it} \]  

(4)

5. Results and discussion

5.1 Univariate analysis

In the univariate analysis, we identify the tendency of each variable. Then, two statistical tests will be performed: the mean comparison test (student test) and the variance comparison test (Fisher-Snedecor test). The aim of these tests is to check if there are significant changes in the characteristics of the sample after the transition to IFRS.

5.1.1 PM. Table II summarizes the descriptive statistics for both models (1) and (2). The mean and median of \( P \) are in order of 34.718 and 27.069 during the pre-IFRS period (2000-2004) and in order of 43.261 and 37.256 in the post-IFRS period (2006-2011). The mean (median) of BVEPS increased from 21.201 (13.237) before IFRS adoption to 27.395 (19.232) after IFRS adoption. For the EPS, the mean and the median increased, respectively, from 2.236 to 2.972 and 1.247 to 2.215. Results find that the standard deviation of BVEPS increases from 25.482 in the pre-adoption period to 26.487 after IFRS adoption.

By applying the mean comparison test, we observe that \( P \) is significantly higher after IFRS adoption at the 5 percent threshold than before IFRS adoption (\( t \)-test = 1.965), but it is worth noting that the variance comparison test shows that \( P \) has not significantly changed in standard deviation value after IFRS adoption. Among the independent variables, the mean (standard deviation) of BVEPS increased from 21.20 (25.48) in the pre-adoption period to 27.39 (26.48) in the post-IFRS period. The mean and variance tests demonstrate that the mean value of BVEPS is significantly higher after the transition to IFRS at the 10 percent level compared to the pre-IFRS period (\( t \)-test = 1.735), but the standard deviation has not significantly changed. For EPS, the mean comparison test shows that the mean value of this

<table>
<thead>
<tr>
<th>Variables</th>
<th>n</th>
<th>Mean (DS)</th>
<th>t-test</th>
<th>Mean (IFRS)</th>
<th>SD(DS)</th>
<th>F-test</th>
<th>SD (IFRS)</th>
<th>Median (DS)</th>
<th>Median (IFRS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>106</td>
<td>34.71</td>
<td>1.965**</td>
<td>43.26</td>
<td>33.41</td>
<td>2.286</td>
<td>29.76</td>
<td>27.069</td>
<td>37.25</td>
</tr>
<tr>
<td>BVEPS</td>
<td>106</td>
<td>21.20</td>
<td>1.735*</td>
<td>27.39</td>
<td>25.48</td>
<td>0.925</td>
<td>26.48</td>
<td>13.23</td>
<td>19.23</td>
</tr>
<tr>
<td>EPS</td>
<td>106</td>
<td>2.23</td>
<td>1.241</td>
<td>24.67</td>
<td>23.277**</td>
<td>5.114</td>
<td>12.41</td>
<td>2.21</td>
<td></td>
</tr>
</tbody>
</table>

Notes: *p < 0.1; **p < 0.05; ***p < 0.01

Table II. Descriptive statistics and parametric tests related to (1) and (2)
variable has not significantly changed after IFRS adoption. However, the variance comparison test found that EPS has significantly changed after IFRS adoption compared to the pre-adoption period of IFRS.

5.1.2 RM. Table III presents the descriptive statistics for both models (3) and (4). The mean and median of Return are in the order of 0.117 and 0.116 during the pre-IFRS period (2000-2004) to 0.092 and 0.078 in the post-IFRS period (2006-2011). For the EPS, the mean (median) increased from 0.037 (0.049) before the transition to IFRS to 0.65 (0.059) after IFRS adoption. For the $\Delta$EPS, the mean and median decreased, respectively, from 0.035 and 0.004 to 0.009 and 0.003 between the two periods.

By applying the mean and the variance comparison tests, we observe on a univariate level that the standard deviation of Return is significantly higher after IFRS adoption at the 1 percent level. Whereas, the standard deviation of EPS and $\Delta$EPS is significantly lower in the second reporting period at the 1 percent threshold. Among the mean comparison test, results show that there is no significant change in the mean of all variables. This is consistent with prior studies that confirm that the introduction of IFRS generally improves the quality of earnings.

5.2 Bivariate analysis

5.2.1 PM. Panel A of Table IV reports the correlation matrix for the pre-IFRS period. Panel B reports the correlation matrix for the post-IFRS period. Results show the existence of a positive and significant correlation between the P and BVEPS at the 1 percent level in all panels. Indeed, P and EPS are positively related and the correlation is not significant in the pre-IFRS period, however, in the post-IFRS period these variables are positively related and the correlation is significant at the 1 percent threshold. BVEPS and EPS are positively related in both periods, but it is worth noting that the correlation is not significant in the pre-IFRS period and significant at the 1 percent level in the post-IFRS period.

<table>
<thead>
<tr>
<th>Variables</th>
<th>n</th>
<th>Mean (DS)</th>
<th>t-test</th>
<th>Mean (IFRS)</th>
<th>SD (DS)</th>
<th>F-test</th>
<th>Sd (IFRS)</th>
<th>Median (DS)</th>
<th>Median (IFRS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return</td>
<td>106</td>
<td>0.117</td>
<td>0.232</td>
<td>0.092</td>
<td>0.365</td>
<td>1.889***</td>
<td>0.397</td>
<td>0.116</td>
<td>0.078</td>
</tr>
<tr>
<td>EPS</td>
<td>106</td>
<td>0.037</td>
<td>0.597</td>
<td>0.065</td>
<td>0.465</td>
<td>11.052***</td>
<td>0.139</td>
<td>0.049</td>
<td>0.059</td>
</tr>
<tr>
<td>$\Delta$EPS</td>
<td>106</td>
<td>0.035</td>
<td>0.556</td>
<td>0.009</td>
<td>0.440</td>
<td>7.273***</td>
<td>0.163</td>
<td>0.004</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Table III. Descriptive statistics and parametric tests related to (3) and (4)

Note: ***p < 0.01

<table>
<thead>
<tr>
<th>Variables</th>
<th>P</th>
<th>BVEPS</th>
<th>EPS</th>
<th>IFRS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: correlation matrix before IFRS adoption</td>
<td>P 1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BVEPS</td>
<td>0.546***</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPS</td>
<td>0.111</td>
<td>0.120</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>IFRS</td>
<td>-0.038</td>
<td>-0.052</td>
<td>0.087</td>
<td>1.000</td>
</tr>
<tr>
<td>Panel B: correlation matrix after IFRS adoption</td>
<td>P 1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BVEPS</td>
<td>0.650***</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPS</td>
<td>0.486***</td>
<td>0.439***</td>
<td>1.000</td>
<td></td>
</tr>
</tbody>
</table>

Table IV. Correlations matrix for the price model

Note: ***p < 0.01
5.2.2 RM. Panel A of Table V reports the correlation matrix for the pre-IFRS period. Panel B reports the correlation matrix for the post-IFRS period. We observe that the Return is positively and not significantly related to EPS and ΔEPS in all panels. EPS and ΔEPS are positively and significantly related at the 1 percent level in both periods.

5.3 Multivariate analysis and discussions
In this section, we aim to test the hypotheses related, on the one hand, to the effect of voluntary IFRS adoption on the value relevance of book value, earnings and change in earnings in the first reporting period (2000-2004). On the other hand, related to the effect of the transition to IFRS on the value relevance of accounting information. In order to validate our findings, we use an additional regression model (robustness checks) that is running on the full sample by using interaction variables.

5.3.1 A comparative approach between voluntary IFRS adoption and domestics standards. We examine the effect of voluntary IFRS adoption on the value relevance of book value, earnings and change in earnings across the firm-year observations. Firms applying IFRS and local GAAP could show differences in value relevance in the preadoption period. We compare the value relevance of the two groups of firms in the preadoption period. We use an econometric tools to compare the relative value relevance of firms that voluntarily adopt IFRS and firms that remain their local GAAP.

5.3.1.1 Value relevance based on PM. In order to test the existence of specific effects, we apply the homogeneity test to model (1). The result of this test confirms the existence of specific effects ($F$-statistic = 4.38 and $p$-value = 0.000). To specify the types of retained effects (are fixed or random effects), we run the Hausman test. This test displays a $\chi^2$ value equal to 21.87 and a $p$-value equal to 0.000. This result suggests that the model (1) is a fixed effect model.

Table VI compares the value relevance of accounting information between voluntarily adopt and non-adopt firms of IFRS in the pre-IFRS period based on the PM. During the first reporting period, our multiple regressions want to investigate the effects of voluntary IFRS adoption on the value relevance of the equity book value and earnings. Using the WLS method to estimate the model (1) in the pre-IFRS period, results show that $\text{adj. } R^2$ is in the order of 0.0754. This matter stipulating that the explanatory variables contributed to the explanation of the stock price at the proportion of 7.54 percent and the model is globally significant ($F$-statistic = 12.31; $p$-value = 0.000). Indeed, we observe that the regression coefficient of the BVEPS, is positive and statistically significant at the 1 percent level ($\beta_1 = 0.372; \text{ } p$-value = 0.000). Indeed, IFRS is

<table>
<thead>
<tr>
<th>Return</th>
<th>EPS</th>
<th>ΔEPS</th>
<th>IFRS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>EPS</td>
<td>0.167</td>
<td>0.008</td>
<td>0.625***</td>
</tr>
<tr>
<td>ΔEPS</td>
<td>0.121</td>
<td>0.625***</td>
<td>1.000</td>
</tr>
<tr>
<td>IFRS</td>
<td>-0.045</td>
<td>0.008</td>
<td>-0.033</td>
</tr>
</tbody>
</table>

**Panel B: correlation matrix after IFRS adoption**

<table>
<thead>
<tr>
<th>Return</th>
<th>EPS</th>
<th>ΔEPS</th>
<th>IFRS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>EPS</td>
<td>0.080</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>ΔEPS</td>
<td>0.149</td>
<td>0.704***</td>
<td>1.000</td>
</tr>
</tbody>
</table>

**Table V. Correlations matrix related to return based model**

Note: ***$p$ < 0.01
significant with a negative coefficient of −12.201 and a p-value of 0.065. A tentative explanation for such a result is that the voluntary IFRS adoption affects the value relevance of accounting information for firms in the pre-adoption period. In addition, a negative coefficient on IFRS indicates a decrease in the value relevance of earnings and book value of equity. Our findings are different from the study of Landsman et al. (2012). In this study, the authors demonstrate that voluntary IFRS adoption increases the information content of earnings. Therefore, our first sub-hypothesis (H1a), which predicts that voluntary IFRS adoption increases the value relevance of book value and earnings, is rejected.

### 5.3.1.2 Value relevance based on return model

The homogeneity test applied to the model (3) demonstrates the existence of the specific effect. By applying the Hausman test, we obtain a random effect model ($\chi^2 = 3.66$ and a $p$-value = 0.3001).

Table VII compares the value relevance of earnings and change in earnings between adopters and non-adopters firms of IFRS in the pre-IFRS period based on the return model. During the first reporting period, our multiple regressions want to investigate the effects of voluntary IFRS adoption on the value relevance of earnings and change in earnings. Following the estimation of the model (3) in the pre-IFRS period, results show that adj. $R^2$ is in the order of 0.0258. This topic stipulating that the explanatory variables contributed to the explanation of the stock price at the proportion of 2.58 percent and the model is globally significant ($F$-statistic = 15.14; $p$-value = 0.000). Indeed, we observe that the regression coefficient of the EPS, is positive and statistically significant at the 1 percent level ($\beta_1 = 0.125$; $p$-value = 0.000). This matter stipulating that a one-unit increase in the company’s earnings means an increase of the stock return of 0.125 units. ΔEPS has a

![Table VI. Regression of models (1) and (5) related to voluntary IFRS adoption (price model)](image)

![Table VII. Regression of models (3) and (4) related to voluntary IFRS adoption (return model)](image)
positive and not significant coefficient ($\beta_2 = 0.014; p\text{-value} = 0.801$). Indeed, IFRS is not significant with a negative coefficient of $-0.033$ and a $p\text{-value}$ of 0.331. This finding shows that the voluntary IFRS adoption does not affect the value relevance of earnings and change in earnings for firms in the pre-adoption period. Findings stipulate the rejection of the sub-hypothesis ($H1b$), which predicts that voluntary IFRS adoption increases the value relevance of earnings and change in earnings.

The results issue from the regression of both models (1) and (3) reveal the rejection of our first hypothesis ($H1a$ and $H1b$). This finding stipulates that the value relevance of accounting information does not improve via voluntary IFRS adoption. We conclude that the voluntary IFRS adoption is a manifestation of mimetic isomorphism and an important event in the Anglo-Saxon accounting history (IASB advocates Anglo-Saxon principles of accounting practice). Voluntary IFRS adoption can be viewed as a costly firm's strategic choice that facilitates the transition of European's companies to mandatory IFRS adoption.

5.3.2 A comparative approach between mandatory IFRS adoption and domestics standards. 5.3.2.1 Value relevance based on PM. In order to test the existence of specific effects, we apply the homogeneity test for the model (2) in the pre- and post-adoption IFRS period. For the model in the pre-IFRS period, the result confirms the existence of specific effects ($F$-value = 4.38 and $p$-value = 0.000). Similarly, following the run of this test to the model in the post-IFRS period, we obtain a $F$-value equal to 5.71 and $p$-value of 0.000. Results show the existence of specific effects for both periods. To specify the types of retained effects (are fixed or random effects) we compute the Hausman test. This test applied to model (2), in the first reporting period, displays a $\chi^2$ value equal to 21.87 and a $p$-value equal to 0.000. This result suggests that is a fixed effect model. The same test is applied to the parameters of the model, in the second reporting period, shows a value of $\chi^2$ equal to 4.78 and a $p$-value equal to 0.0915. This result finds that is a random effect model. Results indicate that, for the pre-adoption period, the estimation method is the “Within regression” and for the post-adoption period, we use the “GLS regression” method. The Breusch-Pagan test suggests the presence of heteroscedasticity problem for both models. To correct this problem, we use the method robust.

Table VIII compares the value relevance of accounting information between the pre- and the post-IFRS periods. Following the estimation of the model (2) in the pre-IFRS period, results show that adj. $R^2$ is in the order of 0.0696. This matter stipulating that the explanatory variables contributed to the explanation of the stock price at the proportion of 6.96 percent and the model is globally significant ($F$-statistic = 16.67; $p$-value = 0.000). In the post-IFRS period, the adj. $R^2$ of the regression of the stock price by the equity book value and earnings is about 47.11 percent. The difference in the adj. $R^2$ between the two periods is

<table>
<thead>
<tr>
<th>Variables</th>
<th>Subsample1 (N = 530) Pre-IFRS period</th>
<th>Subsample2 (N = 636) Post-IFRS period</th>
<th>Full sample (N = 1166)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model (2)</td>
<td>Model (2)</td>
<td>Model (7)</td>
</tr>
<tr>
<td>Intercept</td>
<td>26.535*** (15.39)</td>
<td>25.459*** (12.75)</td>
<td>22.724 (1.46)</td>
</tr>
<tr>
<td>BVEPS</td>
<td>0.381*** (5.58)</td>
<td>0.529*** (7.44)</td>
<td>0.693*** (19.07)</td>
</tr>
<tr>
<td>EPS</td>
<td>0.041 (0.95)</td>
<td>1.114*** (2.86)</td>
<td>0.084** (2.16)</td>
</tr>
<tr>
<td>POST</td>
<td></td>
<td>4.183*** (3.25)</td>
<td>4.183*** (3.25)</td>
</tr>
<tr>
<td>BVEPS × POST</td>
<td></td>
<td></td>
<td>1.230*** (6.36)</td>
</tr>
<tr>
<td>EPS × POST</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.0696</td>
<td>0.4711</td>
<td>0.3745</td>
</tr>
<tr>
<td>$F$-statistic</td>
<td>16.67***</td>
<td>79.111***</td>
<td>424.75***</td>
</tr>
</tbody>
</table>

Notes: Values in parentheses are t-statistics. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$
statistically significant ($F$-statistic $= 17,785$) at the 1 percent level using the Fisher signification test[1] (Jaccard and Turrisi, 2003; Hardy, 1993). Findings show that the information content of earnings and book value of equity disclosed in accordance with IFRS better explain the firms’ stock price than DS. These results imply that the mandatory IFRS adoption increases the value relevance of accounting information based on the Ohlson’s PM. Indeed, we observe that the regression coefficient of the BVEPS, is positive and statistically significant at the 1 percent level ($\beta_1 = 0.381; \text{p-value} = 0.000$) in the pre-IFRS period. Similarly, in the post-IFRS period, this variable has a positive and statistically significant coefficient at the 1 percent level ($\beta_1 = 0.528; \text{p-value} = 0.000$). The difference in the coefficients is statistically significant. For the variable EPS, it has a positive and not significant coefficient ($\beta_2 = 0.041; \text{p-value} = 0.341$) in the pre-IFRS period. Compared to the first reporting period, this variable is positively and significantly related to the stock price in the post-IFRS period ($\beta_2 = 1.114; \text{p-value} = 0.000$). A tentative explanation for such a result is that the voluntary IFRS adoption decreases the value relevance of accounting information for firms in the pre-adoption period. Comparing the results over the two periods, it appears that earnings and equity book value are associated with higher value relevance following the mandatory IFRS adoption. The findings are in line with our expectations that the adoption of higher quality standards (IFRS) leads to increase the value relevance of both book value of equity and earnings. We find that our sub-hypothesis ($H2a$) related to the price based model is confirmed. Such results are in line with prior studies of Barth et al. (2008), Suadiye (2012).

5.3.2.2 Value relevance based on RM. In order to test the existence of specific effects, we apply the homogeneity test for the model (4) in both periods. In the pre-IFRS period, the result confirms the existence of specific effects ($F$-value $= 1.42$ and $\text{p-value} = 0.008$). Then, the use of the Hausman test for this model found that the retained effect is random ($\chi^2 = 3.66; \text{p-value} = 0.3001$). This issue stipulates that the estimation method in the pre-adoption period is the “GLS regression”. The Breusch-Pagan test suggests the presence of heteroscedasticity problem for the model. To correct this problem, we use the method robust. In the post-IFRS period, the homogeneity test shows that there is no specific effect, therefore, the estimation method is the “OLS regression.”

We estimate the model (4), respectively, for the pre- and post-IFRS periods. Table IX reports the results related to the GLS and the OLS regressions using “Return” as a dependent variable for both reporting periods. The purpose is to examine whether the value relevance of earnings and change in earnings increase or not after the mandatory IFRS adoption. Moreover, we aim to test if the coefficients of variables EPS and $\Delta$EPS are significantly different between the two periods. For both periods, results indicate that the

<table>
<thead>
<tr>
<th>Variables</th>
<th>Subsample ($N = 530$) Pre-IFRS period</th>
<th>Subsample ($N = 636$) Post-IFRS period</th>
<th>Full sample ($N = 1166$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.112*** (6.23)</td>
<td>0.097*** (5.36)</td>
<td>0.111 (6.72)</td>
</tr>
<tr>
<td>EPS</td>
<td>0.124*** (2.85)</td>
<td>–0.139 (-0.89)</td>
<td>0.093** (2.15)</td>
</tr>
<tr>
<td>$\Delta$EPS</td>
<td>0.015 (0.34)</td>
<td>0.448*** (3.33)</td>
<td>0.076* (1.71)</td>
</tr>
<tr>
<td>POST</td>
<td>–0.025 (-1.13)</td>
<td>0.257* (1.66)</td>
<td>0.022 (0.47)</td>
</tr>
<tr>
<td>EPS $\times$POST</td>
<td>–0.257 (-1.63)</td>
<td>0.425*** (3.08)</td>
<td></td>
</tr>
<tr>
<td>$\Delta$EPS $\times$POST</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table IX. Regression of models (4), (9) and (10) related to return model

Notes: Values in parentheses are t-statistics. *p < 0.1; **p < 0.05; ***p < 0.01
adj. $R^2$ value is in order of 2.58 percent for the pre-IFRS period and in order of 3.46 percent for the post-IFRS period. Findings suggest that the explanatory power of the model in the post-adoption is higher than this of the model in the pre-adoption period. Results show that the mandatory IFRS adoption increases the value relevance of accounting information based on the Easton and Harris's RM. Among the coefficients of the independent variables, it is worth noting that the variable EPS has a positive and statistically significant coefficient at the 1 percent level ($\beta_1 = 0.124; p$-value $= 0.005$) in the pre-IFRS period. Nonetheless, we note that the coefficient of this variable is negative and not significant in the post-IFRS period ($\beta_1 = -0.139; p$-value $= 0.374$). Indeed, the coefficient of $\Delta$EPS is positive and not significant in the first reporting period, but it is significant at the 1 percent threshold ($\beta_2 = 0.448; p$-value $= 0.001$) in the second reporting period. Comparing the results into the two periods, it appears that earnings (EPS) better explain the stock return of firms in the pre-IFRS period than in the post-IFRS period. Nonetheless, the change in earnings ($\Delta$EPS) is more value relevant following the mandatory IFRS adoption. The findings are not in line with our expectations that the transition to IFRS leads to increase the value relevance of both earnings and earnings change. We find an important association between stock return and earnings change in the post-IFRS period, however, earnings have not effect on the stock return following the mandatory IFRS adoption. Mandatory IFRS adoption in the sample selection countries can be viewed as a manifestation of coercive isomorphism (EC Regulation 1606/2002) and environmental determinism theories imposed by institutional and environmental factors. We find that our sub-hypothesis ($H2b$) related to the return based model is partially confirmed.

5.3.3 A comparative approach between IFRS-Firms into the pre- and post-adoption periods.

We compare the value relevance of accounting information for IFRS-Firms in the pre- and post-adoption periods. The aim of this analysis is to validate the differences in value relevance between IFRS and NIFRS firms in the post reporting period. Based on the PM for both periods, findings show that the adj. $R^2$ progress from 0.5205 in the pre-adoption period to 0.5296 in the post-adoption period. This matter stipulates that the explanatory power in the second reporting period is higher than in the first reporting period, but statistically not significant. Among the coefficients of the independent variables, it is worth noting that the variable BVEPS has a positive and statistically significant coefficient at the 1 percent level in the pre-IFRS period. Similarly, we note that the coefficient of this variable is positive and significant at the 1 percent threshold. Indeed, the coefficient of EPS is positive and significant in both reporting periods. Comparing the results into the two periods, it appears that earnings and equity book value are associated with higher stock prices.

Referred to the return model, in the pre-IFRS period, results show that adj. $R^2$ is in the order of 0.0182. This matter stipulating that the explanatory variables contributed to the explanation of the stock return at the proportion of 1.82 percent. In the post-IFRS period, the adj. $R^2$ of the regression of stock return by earnings and change in earnings is about 0.022. The difference in the adj. $R^2$ between the two periods is statistically significant. Indeed, we observe that the regression coefficient of the EPS is positive and statistically significant at the 10 percent level in the pre-IFRS period. But, in the post-IFRS period, this variable has a negative and statistically not significant coefficient. For the variable $\Delta$EPS, it has a negative and not significant coefficient in the pre-IFRS period. In contrary, in the second reporting period, this variable is positively and significantly related to the stock return at 10 percent threshold. Comparing the results into the two periods, it appears that earnings and change in earnings are associated with lower value relevance.

Overall results are shown in Table X and imply that the mandatory IFRS adoption has not effect on the value relevance of accounting information for firms that voluntarily adopt IFRS (IFRS-Firms) before the transition year.
5.3.4 Robustness checks. 5.3.4.1 Voluntary IFRS adoption and value relevance (PM). To confirm the rejection of (H1a) in the pre-IFRS period, we run the regression of \( P \) on BVEPS and EPS only. The adj. \( R^2 \) of this regression is 0.0696. We add the IFRS as a dummy variable that takes “1” if a company voluntary adopts IFRS and “0” otherwise and run regression again. Results show that the adj. \( R^2 \) ranging from 0.0696 to 0.0754 and IFRS is negative and statistically significant at the level of 10 percent. Then, we add the interactions of BVEPS and EPS with the variable IFRS. The regression model is computed as follows:

\[
P_{it} = \beta_0 + \beta_1 \text{BVEPS}_{it} + \beta_2 \text{EPS}_{it} + \beta_3 \text{IFRS}_{it} + \beta_4 \text{BVEPS} \times \text{IFRS}_{it} + \beta_5 \text{EPS} \times \text{IFRS}_{it} + \epsilon_{it}
\]

The interactions aim to measure the incremental effects of the tested variables. IFRS \( \times \) BVEPS has a positive and significant at the 5 percent level effect on the stock price (\( P \)). The coefficient of IFRS \( \times \) BVEPS is 0.744 and \( p \)-value = 0.026. However, IFRS \( \times \) EPS is negative with a coefficient of −2.313 and significant at the 1 percent level (\( p \)-value = 0.000). The incremental effect of earnings associated with voluntary IFRS adoption decreases the value relevance of accounting information.

Overall results presented in Table VI show that the adj. \( R^2 \) of the model (5) increases compared to those of the model (1), nonetheless, the coefficients of IFRS and IFRS \( \times \) EPS are negative and statistically significant. These findings indicate that voluntary IFRS adoption decreases the value relevance of accounting information. During the pre-IFRS period, it is worth noting the effect of accounting scandals (Enron, Parmalat, etc.) on the credibility and the relevance of accounting information. This environmental factor (environmental determinism) provides an explanation of the negative relationship between accounting information and the market value (Kouki, 2015). Results validate the rejection of our first hypothesis in which we posit that voluntary IFRS adoption increases the value relevance of accounting information.

5.3.4.2 Voluntary IFRS adoption and value relevance (return model). To confirm the rejection of (H1b) in the pre-IFRS period, we run the regression of “Return” on EPS and \( \Delta \)EPS only. The adj. \( R^2 \) of this regression is 0.0248. We add the IFRS as a dummy variable that takes “1” if a company voluntary adopts IFRS and “0” otherwise and run regression again. Results show that the adj. \( R^2 \) ranging from 0.0248 to 0.0258 and IFRS is negative and statistically not significant. In fact, we observe that our sub-hypothesis \( H1b \) is rejected and it’s not necessary to run the regression of the model given below with

<table>
<thead>
<tr>
<th>Variables</th>
<th>Pre-IFRS period</th>
<th>Post-IFRS period</th>
<th>Full sample (( N = 275 ))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PM</td>
<td>RM</td>
<td>PM</td>
</tr>
<tr>
<td>Intercept</td>
<td>8.305*** (2.75)</td>
<td>0.075*** (2.85)</td>
<td>31.352*** (6.56)</td>
</tr>
<tr>
<td>BVEPS</td>
<td>1.195*** (7.48)</td>
<td>0.495*** (3.84)</td>
<td>9.121*** (9.53)</td>
</tr>
<tr>
<td>EPS</td>
<td>1.195*** (2.57)</td>
<td>0.347* (1.86)</td>
<td>0.697** (2.14)</td>
</tr>
<tr>
<td>( \Delta )EPS</td>
<td>−0.309 (−1.52)</td>
<td>−0.356 (−1.34)</td>
<td></td>
</tr>
<tr>
<td>POST</td>
<td>10.692*** (3.38)</td>
<td>0.086 (1.43)</td>
<td></td>
</tr>
<tr>
<td>BVEPS ( \times ) POST</td>
<td>0.295*** (3.16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPS ( \times ) POST</td>
<td>0.295*** (3.16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. ( R^2 )</td>
<td>0.5205</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F-statistic</td>
<td>54.89***</td>
<td>2.15</td>
<td></td>
</tr>
</tbody>
</table>

Table X. Regression of models related to IFRS-Firms in the pre- and post-IFRS period

Notes: Values in parentheses are t-statistics. *p < 0.1; **p < 0.05; ***p < 0.01
interactions of BVEPS and EPS with the variable IFRS (Table VII). The regression model noted is computed as follows:

\[
\text{Return}_{it} = \beta_0 + \beta_1 \text{EPS}_{it} + \beta_2 \Delta\text{EPS}_{it} + \beta_3 \text{IFRS}_{it} + \beta_4 \text{EPS} \times \text{IFRS}_{it}
\]

\[+ \beta_4 \text{EPS} \times \text{IFRS}_{it} + \epsilon_{it}
\]

(6)

5.3.4.3 A comparative approach between mandatory IFRS adoption and local GAAP. In order to validate our main hypothesis (H2a and H2b), we use an additional regression model. This regression is run on the full sample (2000 to 2011, except 2005), using interaction variables.

PM (H2a): to confirm the sub-hypothesis (H2a) based on PM, we use an additional regression of model (2) on the full sample. In the first step, we run the regression of P on BVEPS and EPS only. The adj. \(R^2\) of this regression is 0.3694. Then, we introduce POST as a dummy variable that assumes a value of “1” for the post-IFRS period and “0” otherwise and run the regression again of the model given below:

\[
P_{it} = \beta_0 + \beta_1 \text{BVEPS}_{it} + \beta_2 \text{EPS}_{it} + \beta_3 \text{POST}_{it} + \epsilon_{it}
\]

(7)

Results show that the adj. \(R^2\) increases from about 0.3694 to about 0.3728 and POST is positive with a coefficient of 4.183 and statistically significant at the 1 percent level (\(p\)-value = 0.001). These findings indicate that mandatory IFRS adoption contributes to the improvement of accounting quality of firms. In the last step, we add the interactions of BVEPS and EPS with POST. The regression model noted is computed as follows:

\[
P_{it} = \beta_0 + \beta_1 \text{BVEPS}_{it} + \beta_2 \text{EPS}_{it} + \beta_3 \text{POST}_{it} + \beta_4 \text{BVEPS} \times \text{POST}_{it}
\]

\[+ \beta_5 \text{EPS} \times \text{POST}_{it} + \epsilon_{it}
\]

(8)

where \(\beta_1\) and \(\beta_2\) measure the value relevance of book value of equity and earnings in the pre-IFRS period and \(\beta_4\) and \(\beta_5\) capture their incremental effects in the post-IFRS period.

For testing our first sub-hypothesis, we should examine the significance of \(\beta_4\) and \(\beta_5\). BVEPS \(\times\) POST is negative with a coefficient of \(-0.080\) and statistically not significant. However, EPS \(\times\) POST is positive with the coefficient of 1.230 and statistically significant at the 1 percent threshold (\(p\)-value = 0.000). The adj. \(R^2\) of the model (8) increases from about 0.3728 to about 0.3928. We interpret these results by the way that the transition to IFRS increases the value relevance of accounting information. This improvement can be related to mandatory requirements for fair value measurement in several standards such as IAS 39 and IFRS 2. Indeed, others standards offer to firms the possibility to the optional use of Fair value accounting (FVA) like IAS 16, IAS 36 and IFRS 3. The results of the additional regression model, validate our sub-hypothesis (H2a). Table VIII reports the results of the regression models (2), (7) and (8).

RM (H2b): to confirm the sub-hypothesis (H2b) based on RM, we use an additional regression model (4). In the first step, we run the regression of Return on EPS and \(\Delta\)EPS only. Then, we introduce POST as a dummy variable that assumes a value of “1” for the post-IFRS period and “0” otherwise and run the regression again of the model given below:

\[
\text{Return}_{it} = \beta_0 + \beta_1 \text{EPS}_{it} + \beta_2 \Delta\text{EPS}_{it} + \beta_3 \text{POST}_{it} + \epsilon_{it}
\]

(9)

Results show that the adj. \(R^2\) increases from about 0.0155 to about 0.0157 and POST is positive with a coefficient of 0.257 and statistically significant at the 10 percent level.
These findings indicate that mandatory IFRS adoption contributes to the improvement of accounting quality of firms. In the last step, we add the interactions of EPS and ΔEPS with POST. The regression model noted (below) is computed as follows:

\[ \text{Return}_{it} = \beta_0 + \beta_1 \text{EPS}_{it} + \beta_2 \Delta \text{EPS}_{it} + \beta_3 \text{POST}_{it} + \beta_4 \text{EPS} \times \text{POST}_{it} \\
+ \beta_5 \Delta \text{EPS} \times \text{POST}_{it} + \epsilon_{it} \]

(10)

where \( \beta_1 \) and \( \beta_2 \) measure the value relevance of earnings and change in earnings in the pre-IFRS period and \( \beta_4 \) and \( \beta_5 \) capture their incremental effects in the post-IFRS period.

For testing our second sub-hypothesis, we should examine the significance of \( B_4 \) and \( B_5 \). EPS \times POST is negative with a coefficient of \(-0.257\) and statistically not significant. However, ΔEPS \times POST is positive with the coefficient of 0.425 and statistically significant at the 1 percent threshold (\( p\)-value = 0.000). The adj. \( R^2 \) of the model (10) increases from about 0.0157 to about 0.0225. Findings show that the explanatory power of earnings and change in earnings is low, but we conclude that the transition to IFRS is significantly improved the value relevance (adj. \( R^2 \)) of accounting information. The results of the additional regression model, validate our sub-hypothesis (H2b). Table IX summarizes the results of the regression models (4), (9) and (10).

The overall results may be explained by the greater use of fair value in the valuation of assets and liabilities following the transition to IFRS. FVA leads to greater value relevance of the equity book value, earnings, and earnings change in explaining stock price and stock return. IFRSs contribute to the improvement of the association between accounting information and market value. Following the comparison of the results issue from the regression of the PM and the return model, we note that the transition to IFRS increases the value relevance of the book value of equity, earnings and earnings change.

6. Summary and concluding remarks

In this study, we compare the value relevance of accounting information for three groups of firms over two periods. First, we compare the value relevance of equity book value, earnings and change in earnings of IFRS-firms (voluntary IFRS adoption) and non-IFRS-firms (DS) in the pre-adoption period. On a second level, we compare the value relevance of non-IFRS-firms over the pre- and post-adoption periods. Finally, we compare the value relevance of IFRS-firms over the pre- and post-adoption periods.

Our findings show that the voluntary IFRS adoption in the pre-IFRS period has not improved the value relevance of the equity book value, earnings, and change in earnings. The results suggest that the voluntary IFRS adoption negatively affects the value relevance of the equity book value and earnings for firms in the pre-adoption period. Our findings are different from the study of Landsman et al. (2012) which demonstrated that voluntary the IFRS adoption increases the information content of the earnings. Therefore, our first sub-hypothesis (H1a), which predicts that voluntary IFRS adoption increases the value relevance of the equity book value and earnings, is rejected. In addition, after testing the sub-hypothesis (H1b), the result shows that the voluntary IFRS adoption does not affect the value relevance of earnings and change in earnings for firms in the pre-adoption period. This result stipulates the rejection of H1b, which predicts that voluntary IFRS adoption increases the value relevance of the earnings and change in earnings.

On another level, our results indicate that the accounting information of non-IFRS-firms in the post-adoption period is of higher quality than in the pre-adoption period. Then, we compare the value relevance of accounting information of IFRS-firms over the pre- and post-adoption period. Our results show a higher association between, on the one hand, the equity book value and the earnings with stock prices and, on the other hand, between earnings and
change in earnings with stock returns over both periods. However, we conclude that the difference in the results is statistically not significant. Comparing the results about both periods, it appears that equity book value and change in the earnings are highly associated, respectively, with stock price and stock return following the mandatory IFRS adoption. On the other hand, the earnings do not have an effect on the stock returns. These findings are in line with our expectations that the adoption of higher quality standards (IFRS) leads to the increase of the value relevance of both the equity book value and the earnings. This finding stipulates that our sub-hypothesis ($H_{2a}$) related to the price based model is confirmed. Such results are in line with prior studies of Barth et al. (2008), Suadiye (2012). Moreover, We found an important association between the stock return and change in earnings during the post-IFRS period, however, the earnings do not have an effect on the stock return following the mandatory IFRS adoption. These findings are not in line with our expectations that the transition to IFRS leads to the increase of the value relevance of both earnings and change in earnings. The mandatory IFRS adoption in the selected sample countries can be viewed as a manifestation of coercive isomorphism (EC Regulation 1606/2002) and environmental determinism theories imposed by institutional and environmental factors. We also found that our sub-hypothesis ($H_{2b}$) related to the return based model is partially confirmed.

This study contributes to the existing literature in three ways. First, its use of a sample of three code-law origin countries, namely Germany, France and Belgium that switched from a debt-oriented system to shareholder-oriented regime and that earlier adopt IFRS. Second, its use of a comparative approach in the value relevance of accounting information, on the one hand, during the pre-adoption period between IFRS-firms and non-IFRS-firms and, on the other hand, over the pre- and post-adoption periods between IFRS and NIFRS firms. In contrast, prior research focused on the comparison between IFRS and NIFRS firms during the pre-adoption period only or the post-adoption period only. Innovativeness is based on the selection of these countries, as there are not so many studies that have investigated the value relevance in the European countries over the IFRS transition. Finally, our study provides an opportunity for investors to have more confidence to the information content of the financial statements disclosed in accordance with the IFRS, but they should be careful about the volatility of the stock prices and the rise of financial crises that can threaten the performance of the financial markets. Some limitations arise from this study. First, the sample size is slightly reduced, which may bias the results. Second, we did not introduce any control variable in relation to the economic environment and the cultural specificities of the selected countries, which may affect the results.

The results of our study could be of some implications for standards setters, firms and practitioners. For the standards setters, we suggest that the transition to the IFRS has succeeded in solving the problems of diversity of the accounting systems and the multitude of accounting practice in countries with different accounting specificities and diverse institutional conditions (capital market structure, Taxation systems). Similarly, firms have the opportunity to examine the degree of the IFRS effect on the relevance of their accounting information and compare their results after a period of earlier IFRS adoption. Moreover, for practitioners, the mandatory IFRS adoption is at the origin of the major changes in the business and organizational models of firms’ accounting practices, which led accountants to improve their educational setting and training programs.

Future research may deal with the analysis of the opportunity of developing the markets (the accounting practices which refer to the local standards) to adopt the IFRS standards. This analysis will be based on the critical study of the accounting systems compared to the international clusters and present the involvement of the IFRS in the governance systems of firms in the developing countries as well as on the taxation system, the legal, institutional and cultural factors. The study of Manganaris et al. (2016) is a recent research that focuses on the institutional factors, the IFRS and the value relevance in the Europeans banks.
Note

1. Fisher statistic test: \( F = \frac{(R_1^2 - R_0^2)/q}{(1 - R_1^2)/(n - p - 1)} \)

References


**Corresponding author**
Ahmed Kouki can be contacted at: koukiahmed10@gmail.com
Assessing and ranking the financial risk of municipal governments

The case of Pennsylvania

John M. Trussel

College of Business, University of Tennessee at Chattanooga, Chattanooga, Tennessee, USA, and

Patricia A. Patrick

Smeal College of Business, Pennsylvania State University, University Park, Pennsylvania, USA

Abstract

Purpose – The purpose of this paper is to develop a model to assess and rank the financial risk of a municipal government (“municipality”). Financial risk is the likelihood that a municipality will experience financial distress.

Design/methodology/approach – Logistic regression is used with financial indicators to assess the level of financial risk. Then, the municipalities are ranked according to their financial risk. As predictor variables for the regression model, indicators are used that were developed by a Pennsylvania state agency to monitor the financial condition of municipalities.

Findings – Financial risk is positively associated with debt service, population, tax effort, and public service on roadways, while negatively correlated with intergovernmental revenues, operating position, user charges, capital outlays, fund balances, and tax revenue concentration. The financial risk model is able to correctly classify up to 99 percent of municipalities as either at risk or not at risk of financial distress.

Research limitations/implications – The financial risk model was developed using data from one state in the USA. Further research is needed to test the model’s application to other states and countries.

Practical implications – Financial risk is on the rise since the Great Recession. This study may be used by municipal managers, citizens, creditors, and regulators to assess and rank the financial risk of a municipality.

Originality/value – This study provides a method of classifying municipalities as either at risk or not at risk of financial distress. Previous models of the financial condition of municipalities do not provide a method of assessing and ranking financial risk.

Keywords Financial distress, Public sector, Financial risk, Municipal governments

Paper type Research paper

1. Introduction

Municipal governments exist primarily to provide services to its citizens (Department of Community and Economic Development (DCED), 2001; Honadle, 2003). These governments have a difficult time providing such services when they are financially distressed. Financial distress exists when the needs of the citizenry are greater than the resources of the municipal government (“municipality”). Financial risk is the likelihood that a municipality will experience financial distress. The purpose of this study is to develop a model to assess and rank the financial risk of a municipality. Such a model is valuable to stakeholders of a
municipality, such as municipal managers, citizens, creditors, and regulators. The model is developed using municipalities in Pennsylvania.

This study is important because anecdotal evidence suggests that financial risk is on the rise since the Great Recession. For example, in October 2011, Pennsylvania Governor Corbett declared the city of Harrisburg (the capital of Pennsylvania) to be in a fiscal state of emergency (Roberts, 2011). Several Pennsylvania boroughs and townships were also added to the list of distressed municipalities (Department of Community and Economic Development (DCED), 2012). We define a municipality at risk of financial distress if it provided an affirmative answer on the Survey of Financial Condition (SOFC) gathered by the Pennsylvania Department of Community and Economic Development (DCED) between 2007 and 2010. According to the SOFC data, 5 percent of Pennsylvania’s municipalities are at risk of financial distress during this period.

The financial risk model is developed using logistic regression with financial indicators to assess the level of financial risk. Then, the municipalities are ranked into deciles according to their financial risk. The regression model includes predictor variables developed by the Department of Community and Economic Development (DCED) (2008) to monitor the financial condition of municipalities in Pennsylvania. We extend the previous research by using an alternative definition of financial distress, by incorporating a well-defined set of indicators from a unique database, and by adding a financial risk ranking system.

The results indicate that financial risk is positively associated with debt service, population, tax effort, and public service on roadways, while negatively correlated with intergovernmental revenues, operating position, user charges, capital outlays, fund balances, and tax revenue concentration. The financial risk model is able to correctly classify up to 99 percent of municipalities as either at risk or not at risk of financial distress.

The next section provides the background on financial risk in the public sector and the data gathered by the DCED. The indicators of financial risk are discussed in Section 3. Section 4 includes the empirical testing, and the Section 5 concludes the paper.

2. Background on financial risk in municipalities
Financial risk is the probability that a municipality will become financially distressed, a condition in which a municipality is experiencing financial problems. Financial problems include such things as the inability to meet obligations as they come due or the inability to provide services to citizens. However, measuring financial risk and the existence of financial distress are very complex matters (Citizens Research Council of Michigan (CRCM), 2000). Some researchers measure the existence of financial distress as the presence of persistent budget deficits using indicators derived from financial information (Trussel and Patrick, 2009, 2012), others measure it as significant reductions in public service expenditures (Patrick and Trussel, 2011). Some measure it as the deterioration of the tax base (Pennsylvania Economy League (PEL), 2007). Some researchers measure financial distress as the declining condition of municipality’s infrastructure assets, a municipal bond default, a downgrade in a bond-rating, or a municipality’s need for financial assistance from the state government (CRCM, 2000).

2.1 An overview of the literature
Previous research addresses the issue of measuring and assessing financial distress. Groves et al. (1981), for example, use a set of financial indicators to assess the fiscal condition of 24 cities. They develop a theoretical model, which captures external factors with several basic financial indicators, and they develop financial ratios for each factor. In the end, the model includes six broad categories – revenues, expenditures, earnings, debt structure, unfunded liabilities, and condition of capital plant – and approximately 30 related financial ratios. This model, further developed by Groves and Valente (1994) is a widely accepted fiscal monitoring tool for local governments.
There are other fiscal assessment tools, such as Brown’s (1993) ten-point test to conduct a trend analysis, Ammons’ (1995) attempt to establish municipal benchmarks, and Kleine et al.’s (2003) ten-point scale for Michigan. There have been several other studies of financial distress in local governments (e.g. Brown, 1996; Campbell, 1990; Honadle, 1998; Stevens and LaPlante, 1987; Weinberg, 1984). Stevens and LaPlante (1987) suggest that studies of financial distress are best when limited to a specific group of relatively homogenous local governments.

There are three methodological issues that surface in the literature on financial distress – defining the existence, identifying the causes of financial distress, and predicting the likelihood of financial distress. Financial distress is defined in various ways in the government sector literature. Most definitions describe what the entity experiences as a result of financial problems. For example, the US Government Accountability Office (GAO) defines a fiscally distressed local government as one “in which residents bear substantially higher tax burdens in order to obtain levels of public services comparable to better-off communities” (GAO, 1990). Most definitions are more conceptual and difficult to operationalize. Trussel and Patrick (2009) attempt to rectify this problem by defining a fiscally distressed local government as one that experiences a significant and persistent imbalance between revenues and expenditures. As discussed in the next section, we define a municipality at risk of financial distress if it provided an affirmative answer on the SOFC gathered by the Pennsylvania DCED between 2007 and 2010.

Many previous studies develop indicators of financial distress in local governments as proxy measures for the causes of financial distress. For example, Groves and Valente (1994) developed an indicator system with 36 quantifiable variables grouped into seven categories: revenue expenditure, operating position, debt, unfunded liability, capital plant, and community needs and resources. As discussed in Section 3, we use indicators for our financial risk model primarily from the DCED. Trussel and Patrick (2009) summarize the indicators used in many of the seminal studies on financial distress.

Prior to 2009, very few studies in the governmental sector used the risk factors as inputs into a predictive model of financial distress. Kloha et al. (2005a), for example, measure ten indicators of financial distress on a binary scale (the attribute is present or not) and rank a sample of governments according to a ten-point scale. Although they apply their rankings to a sample of local governments in Michigan, they do not test their model on a sample of distressed entities. Also, they do not test the statistical significance of the indicators in a two-state (distressed or not) multivariate model. Trussel and Patrick (2009, 2012) and Patrick and Trussel (2011) use logistical regression, control for the prior probability of financial distress, and capture the expected costs of misclassification (ECM).

We extend the previous research by using an alternative definition of financial distress, by incorporating a well-defined set of indicators from a unique database, and by adding a financial risk ranking system. We define a municipality at risk of financial distress if it provided an affirmative answer on the SOFC gathered by the Pennsylvania DCED between 2007 and 2010. We use indicators defined by the DCED. Our financial risk model is developed using logistic regression with financial indicators to assess the level of financial risk. Then, the municipalities are ranked into deciles according to their financial risk. This allows for a user to easily compute and rank a municipality’s financial risk.

2.2 Defining financial risk

There is little consensus on what constitutes financial risk or financial distress, and many constructs have been utilized in the past (Trussel and Patrick, 2009). Most use endogenous metrics developed using financial data to both define financial risk and to predict it with no external validation of the financial state. For example, previous studies use metrics
such as a persistent decline in operating margins to define the state of financial distress (Trussel and Patrick, 2009, 2013). These studies then use similar (endogenous) financial data to develop the predictors of financial distress. There is no exogenous verification of the state of financial distress. In the corporate sector, a declaration of bankruptcy typically serves as external (exogenous) verification that an entity is experiencing financial distress (e.g., Altman, 1968). However, very few municipalities use the bankruptcy laws when facing financial hardships due to difficulty in applying such laws.

Administrators in the Commonwealth of Pennsylvania employ a survey instrument to identify municipalities at risk of financial distress. The Municipalities Financial Recovery Act of 1987 (P. L. 246, No. 47, as amended in 1992 by P. L. 336, No. 69; also known as the Financially Distressed Municipalities Act and hereinafter referred to as Act 47) states that a key public policy of Pennsylvania is to foster the financial stability of municipal governments, so that they may provide public health, safety, and welfare to the people living in the Commonwealth (DCED, 2001).

Act 47 establishes 11 criteria for deeming a municipality to be at risk of financial distress. Three of the criteria measure the breadth and depth of a municipality’s deficits, where a deficit is defined as an excess of expenditures over revenues. Some of the other Act 47 criteria measure whether a municipality has missed important payments, such as payrolls, rental payments, principal or interest payments on bonds, or payments to creditors after judgments have been issued against the municipality. Other criteria look at whether the municipality has failed to remit payroll taxes or fund the municipality’s pension plan. The last few criteria measure whether the municipality has unsuccessfully sought to adjust a large claim, filed a plan under Chapter 9 of the Bankruptcy Code, or decreased public services. The SOFC questions used by the Commonwealth to deem a municipality at risk of financial distress are included in the Appendix. In this study, following the DCED, a municipality is considered to be at risk of financial distress if its officials answer in the affirmative to any of these questions during the sample period, as discussed below. No other studies have used these data.

3. Indicators of financial distress
In this section, the indicators of financial distress are identified. Financial distress is often associated with indicators that measure the balance between the needs and resources of the people and the resources of the municipality (Congressional Budget Office, 1978; CRCM, 2000). Selecting a set of indicators is challenging (Cahill et al., 1994; Kloha et al., 2005a). Some researchers use financial indicators, others use socio-demographic and economic indicators to proxy distress. Trussel and Patrick (2009) provide an extensive review of the financial indicators used in previous research to identify financial distress.

The DCED (2008) developed a financial monitoring system to gain a “comprehensive, long-term understanding of the municipality’s financial condition” (p. 1). This system includes 26 indicators that are used to create an “early warning process which calls attention to problem areas as they emerge and before problems get out of hand” (p. 1). However, some of the data needed to compute these indicators are not collected by the DCED. This study adopts 21 indicators that are similar to the indicators recommended in the DCED’s financial monitoring system, and they are based on data that are collected by the DCED. These indicators are broken into several categories, discussed below, and are summarized in Table I. The categories or factors include measures related to operations, debt, capital structure, liquidity, employees, taxes, and other measures.

The five indicators that are not included due to missing data are budget data, number of employees, property values, and demographic data such as household income levels. Some of these data are likely captured, at least in part, by the 21 variables that are captured. For example, budget shortfalls are partially captured by operating deficits. Also, in Table I,
the indicators are divided into categories or factors, such as liquidity measures. The missing variables all fall within one of these categories, so that there are other variables that are purported to capture each factor. For example, the missing budget measures fall within the “Operating Measures” category.

3.1 Indicators based on operations
Indicators based on operations are intended to measure the municipality’s operating performance. Operating performance includes the relative amount of revenues and expenditures and the relationships between these two categories. The Department of Community and Economic Development (DCED) (2011) warns that municipalities with decreasing revenue
need to find alternative sources of revenue, if they wish to maintain their current level of services:

(1) Revenue per Capita (REVCAP), computed as total revenue divided by population, is a measure of the revenue associated with each citizen in the municipality. Revenue per capita can be used to assess the strength of a municipality’s tax base (DCED, 2011).

(2) Intergovernmental Revenues (IGR), computed as revenue from other governments to total revenues, is a measure of dependence on other governments for funds. This indicator measures the ability of a municipality to raise the funds needed to provide public services. It is a measure of dependence on intergovernmental revenue (PEL, 2007). Municipalities that rely heavily on IGR, relative to total revenues, are more likely to experience fiscal distress if they are unable to replace the funds they receive from the federal, state, or other local governments when such sources diminish (Reid, 1986).

(3) Expenditures per Capita (EXPCAP), computed as total expenditures divided by population, is a measure of the expenditures associated with each citizen in the municipality. Increases in expenditures per capita can become problematic if revenue per capita remains stable or if no new services have been added (DCED, 2011).

(4) Operating Position (OPERPOS), computed as total revenues to total expenditures, measures the relationship of revenues to expenditures. Operating position reflects the government’s ability to balance its annual budget, maintain reserves for emergencies, and generate the cash needed to pay liabilities (DCED, 2011).

(5) User Charges (USERCHG) is computed as revenues from fees and user charges to expenditures for such services. This indicator measures the percentage of total services provided that are recaptured with fees charged for using these services. Municipal services such as parks usually do not have user fees, whereas parking lots often do.

(6) Public Works – Roadways (ROADS), computed as revenues from liquid fuels taxes to expenditures for roadway maintenance, measures the percentage of roadway maintenance recouped by liquid fuels funds (gas taxes imposed at the pumps). Pennsylvania municipalities maintain over 42,500 of local roadways with limited liquid fuels funds, making roadway maintenance a costly endeavor.

3.2 Indicators based on debt
Debt indicators capture the municipality’s use of debt to finance its operations. The use of debt causes municipalities to divert revenues from programs to service the debt (Trussel and Patrick, 2009). Large amounts of debt could cause cash flow problems and may lead to financial distress (DCED, 2011):

(1) Debt Service (DEBTSVC) is computed as debt service to total revenues and measures the percentage of total revenues spent servicing the outstanding debt. The DCED (2011) believes that debt service ratios of 15-20 percent can be problematic, if revenues fall.

(2) Debt to Revenue (DEBTREV) is the relationship of total debt to total revenue. Pennsylvania imposes debt limits on its municipalities, based on this ratio, to prevent excessive borrowing and minimize financial risk. Debt management is important to the overall financial health of a municipality.

(3) Debt per Capita (DEBTFCAP) is total liabilities divided by population and measures debt relative to each citizen in the municipality. Debt per capita measures the ability of the citizens to repay the municipality’s outstanding debt, as opposed to paying the value of the underlying collateral held on the debt (DCED, 2011).
3.3 Indicators based on capital structure
Capital structure indicators are similar to the debt indicators, as they attempt to capture the relative amounts of debt and equity (fund balance) that the municipality employs:

1. Debt to Assets (CAPSTR) is total debt to total assets. This ratio is especially relevant in Pennsylvania where municipalities have unlimited ability to tax real property (DCED, 2011). Debt to assets measures the ability of the municipality to repay the value of the underlying collateral (DCED, 2011).

2. Fund Balance to Revenues (EQUITY1) is the fund balance to total revenues. Fund balances in municipalities are equivalent to equity balances in private organizations, as fund balances represent the accumulation of revenues over expenditures since inception. Municipalities that cannot balance their annual budgets will incur deficits and have to raise taxes, reduce expenditures, borrow, find new sources of revenue, or face financial distress (DCED, 2011).

3. Fund Balance to Assets (EQUITY2) is the fund balance to total assets. Similar to the ratio above, we measure the municipalities’ ability to balance its annual budget since inception. In this ratio, we measure the municipalities’ ability to operate within its means as a percentage of total assets as opposed to total revenues in EQUITY1.

3.4 Indicators based on liquidity
Liquidity indicators measure the municipality’s ability to pay its short-term obligations. Many of Pennsylvania’s municipalities keep their books on the cash basis and may not recognize the insufficiency of their cash surpluses to meet future obligations (DCED, 2011). We use three measures of a municipality’s liquidity position:

1. Cash to Revenue (LIQUID1) is cash plus investments to total revenues. Low cash reserves relative to revenues can signal cash flow problems in the short-term increasing financial risk.

2. Cash to Debt (LIQUID2) is cash plus investments to total debt. Low cash reserves relative to total debt can indicate the inability to meet obligations as they become due increasing financial risk.

3. Current Ratio (LIQUID3) is current assets to current liabilities. Low current ratios indicate that a municipality may not be able to pay its current liabilities as they become due increasing financial risk.

3.5 Indicators based on employees
The employee indicators measure the amount of employee-related benefits that the municipality has:

1. Pension Costs (PENSION), measured as return on pension plan assets divided by pension expenditures, measures the ability of the return on plan assets to cover plan expenditures. Pension costs represent long-term obligations to current and past employees, and are one of the biggest commitments facing municipalities today (DCED, 2011). Pennsylvania statute requires its municipalities to fund unfunded pension liabilities (DCED, 2011).

2. Employee Benefits (BENEFITS), employee benefit costs to total compensation, measures the extent of benefits in total compensation. Employee benefits are a rapidly growing cost, often representing over 30 percent of total compensation (DCED, 2011), increasing financial risk.
3.6 Indicators based on taxes

Tax indicators measure issues related to taxes charged by a municipality:

1. Tax Revenue Concentration (CONCEN), which is tax revenues to total revenues, represents the percentage total revenues that collected in taxes of all types. This ratio shows the ability of a municipality to fund its operations using own-source revenues, decreasing financial risk.

2. Tax Capacity (TAXCAP) is measured as tax mills charged to the maximum tax mills that are allowed by law. This ratio shows the capacity of a municipality to increase property taxes, if needed (DCED, 2011).

3.7 Other indicators and control variable

Other indicators do not fit into one of the previous categories:

1. Population is measured as the natural log of the total population of the municipality. The population of a municipality is highly correlated with its revenues and is often used to proxy a municipality’s size (Trussel and Patrick, 2009). Damanpour (1991) finds that larger organizations have better access to resources, information, and innovations. While the resources of a large municipality might help it avoid financial distress, PEL (2007) and Advisory Commission on Intergovernmental Relations (1985) find that larger, older, industrialized municipalities more likely to be distressed. Most of the distressed municipalities in Pennsylvania tend to be cities (DCED, 2012). These municipalities tend to have large populations, but they also have high population densities, brownfields, and high percentages of those living in poverty (Brookings, 2003).

2. Capital Outlay (CAPOUTLAY) is computed as capital expenditures to total expenditures. This ratio measures the percentage of total expenditures allocated to capital outlays. Capital outlays reflect a municipality’s willingness and ability to maintain its infrastructure assets (DCED, 2011). Decreasing capital outlays can indicate deferred maintenance, a decision that can cause problems in the long run (DCED, 2011).

3. Type of Municipality (TYPE) controls for the nature of the municipality. In Pennsylvania, municipalities are formed as either a city, borough, first-class township or second-class township. This reflects a municipality’s population density, the historical circumstances surrounding its designation, and the type of services it provides (PEL, 2007). Following Trussel and Patrick (2009), we control for municipality type.

4. Empirical tests

In this section, the data sources, the municipalities in the study, and the method of data analysis are identified and discussed.

4.1 The data sources

To develop the financial risk model, data are obtained from the DCED for 2007-2010. The DCED collects annual Audit and Financial Reports (Form DCED-CLGS-30) from every municipality. These reports contain revenue, expenditure, and long-term debt information about the municipalities. The data are not adjusted for inflation because such adjustments (not shown) do not impact the results of the analyses. To test the model, data are also collected from the same source for 2011.
The data consist of 56 cities, 959 boroughs, 92 first-class townships, and 1,455 second-class townships, for a total of 2,562 municipalities. Panel data are used for all four years, 2007-2010, resulting in 10,248 municipality years. There are 590 municipality years with missing data, and 669 municipality years are eliminated as outliers based on the extreme one-percentile for all indicators except population. This leaves a total of 8,989 municipality years, as summarized in Panel A of Table II.

The municipalities are divided into two groups (at risk and not at risk of financial distress) and used $t$-tests to compare the differences between the groups. Survey of Financial Condition (Form DCED-CLGS-69) data from the DCED were collected for every municipality covered by Act 47 for the years 2007-2010, and these data are used to identify financial risk. Table II shows the municipalities partitioned by their status. A municipality that answered in the affirmative for any of the 11 questions in the Appendix is considered at risk of financial distress. There are 447 municipalities at risk of financial distress during the period in question. Panel B of Table II shows the municipalities partitioned by their financial status. There were 5 percent of the municipalities at risk of financial distress during the period. By far, cities have the largest percentage at risk of financial distress at 30 percent, compared with other types of municipalities at 4-5 percent. Panel C of Table II displays the financial status by year. The percentage of municipalities that are financially distressed increases from 4 percent in 2007 to 7 percent in 2010.

4.2 The univariate profile of financial risk
Panel A of Table III displays the descriptive statistics for all of the indicators of financial risk from Table I segregated by status (at risk or not at risk of financial distress). Also displayed are the results of the $t$-tests on the differences of the means of each indicator by status. The results suggest a (univariate) financial profile of a municipality at risk of financial distress. At the 5 percent significance level, 14 of the indicators have statistically significant differences between the means of municipalities at risk compared to those not at risk of financial distress.

<table>
<thead>
<tr>
<th>Panel A: estimation sample</th>
<th>Municipalities</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total municipality years</td>
<td></td>
<td>10,248</td>
<td>100.00</td>
</tr>
<tr>
<td>Less: missing data</td>
<td></td>
<td>−590</td>
<td>−5.8</td>
</tr>
<tr>
<td>Less: outliers</td>
<td></td>
<td>−669</td>
<td>−6.5</td>
</tr>
<tr>
<td>Final sample</td>
<td></td>
<td>8,989</td>
<td>87.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B: sample partitioned by financial risk status</th>
<th>Not FD</th>
<th>FD</th>
<th>Total</th>
<th>Pct. FD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borough</td>
<td>3,071</td>
<td>171</td>
<td>3,242</td>
<td>5%</td>
</tr>
<tr>
<td>City</td>
<td>113</td>
<td>48</td>
<td>161</td>
<td>30%</td>
</tr>
<tr>
<td>First-class township</td>
<td>310</td>
<td>12</td>
<td>322</td>
<td>4%</td>
</tr>
<tr>
<td>Second-class township</td>
<td>5,048</td>
<td>216</td>
<td>5,264</td>
<td>4%</td>
</tr>
<tr>
<td>Total</td>
<td>8,542</td>
<td>447</td>
<td>8,989</td>
<td>5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel C: sample partitioned by year</th>
<th>Not FD</th>
<th>FD</th>
<th>Total</th>
<th>Pct. FD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>2,176</td>
<td>87</td>
<td>2,263</td>
<td>4%</td>
</tr>
<tr>
<td>2008</td>
<td>2,140</td>
<td>108</td>
<td>2,248</td>
<td>5%</td>
</tr>
<tr>
<td>2009</td>
<td>2,143</td>
<td>106</td>
<td>2,249</td>
<td>5%</td>
</tr>
<tr>
<td>2010</td>
<td>2,083</td>
<td>146</td>
<td>2,229</td>
<td>7%</td>
</tr>
<tr>
<td>Total</td>
<td>8,542</td>
<td>447</td>
<td>8,989</td>
<td>5%</td>
</tr>
</tbody>
</table>

Table II. Summary of the sample
Table III. The profile of financial risk in municipalities

<table>
<thead>
<tr>
<th>FD</th>
<th>Status</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>REVCAP</td>
<td>NFD</td>
<td>8,542</td>
<td>477.038</td>
<td>348.382</td>
<td>3.474</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>FD</td>
<td>447</td>
<td>535.638</td>
<td>333.610</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>IGR</td>
<td>NFD</td>
<td>8,542</td>
<td>0.256</td>
<td>0.167</td>
<td>3.391</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>FD</td>
<td>447</td>
<td>0.229</td>
<td>0.158</td>
<td>3.391</td>
<td>0.001</td>
</tr>
<tr>
<td>EXP CAP</td>
<td>NFD</td>
<td>8,542</td>
<td>464.496</td>
<td>373.670</td>
<td>4.184</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>FD</td>
<td>447</td>
<td>539.988</td>
<td>334.510</td>
<td>2.689</td>
<td>0.000</td>
</tr>
<tr>
<td>OPERPOS</td>
<td>NFD</td>
<td>8,542</td>
<td>1.064</td>
<td>0.220</td>
<td>5.518</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>FD</td>
<td>447</td>
<td>1.006</td>
<td>0.167</td>
<td>5.518</td>
<td>0.000</td>
</tr>
<tr>
<td>USER CHG</td>
<td>NFD</td>
<td>8,542</td>
<td>0.245</td>
<td>0.284</td>
<td>0.179</td>
<td>0.238</td>
</tr>
<tr>
<td></td>
<td>FD</td>
<td>447</td>
<td>0.261</td>
<td>0.242</td>
<td>0.179</td>
<td>0.238</td>
</tr>
<tr>
<td>ROADS</td>
<td>NFD</td>
<td>8,542</td>
<td>0.462</td>
<td>0.285</td>
<td>2.689</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td>FD</td>
<td>447</td>
<td>0.425</td>
<td>0.237</td>
<td>2.689</td>
<td>0.007</td>
</tr>
<tr>
<td>DEBT SVC</td>
<td>NFD</td>
<td>8,542</td>
<td>0.051</td>
<td>0.080</td>
<td>0.499</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>FD</td>
<td>447</td>
<td>0.089</td>
<td>0.111</td>
<td>0.499</td>
<td>0.000</td>
</tr>
<tr>
<td>DEBT REV</td>
<td>NFD</td>
<td>8,542</td>
<td>0.415</td>
<td>0.801</td>
<td>0.049</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>FD</td>
<td>447</td>
<td>0.533</td>
<td>0.803</td>
<td>0.049</td>
<td>0.002</td>
</tr>
<tr>
<td>DEBT CAP</td>
<td>NFD</td>
<td>8,542</td>
<td>264.862</td>
<td>608.157</td>
<td>3.542</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>FD</td>
<td>447</td>
<td>370.652</td>
<td>741.924</td>
<td>1.907</td>
<td></td>
</tr>
<tr>
<td>CAP STR</td>
<td>NFD</td>
<td>8,542</td>
<td>0.562</td>
<td>1.534</td>
<td>3.000</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>FD</td>
<td>447</td>
<td>0.787</td>
<td>1.757</td>
<td>3.000</td>
<td>0.003</td>
</tr>
<tr>
<td>EQUITY 1</td>
<td>NFD</td>
<td>8,542</td>
<td>1.165</td>
<td>1.187</td>
<td>2.051</td>
<td>0.040</td>
</tr>
<tr>
<td></td>
<td>FD</td>
<td>447</td>
<td>1.046</td>
<td>1.294</td>
<td>2.051</td>
<td>0.040</td>
</tr>
<tr>
<td>EQUITY 2</td>
<td>NFD</td>
<td>8,542</td>
<td>0.883</td>
<td>0.239</td>
<td>9.502</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>FD</td>
<td>447</td>
<td>0.770</td>
<td>0.314</td>
<td>9.502</td>
<td>0.000</td>
</tr>
<tr>
<td>LIQUID 1</td>
<td>NFD</td>
<td>8,542</td>
<td>0.774</td>
<td>0.675</td>
<td>6.684</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>FD</td>
<td>447</td>
<td>0.557</td>
<td>0.583</td>
<td>6.684</td>
<td>0.000</td>
</tr>
<tr>
<td>LIQUID 2</td>
<td>NFD</td>
<td>5,096</td>
<td>27.222</td>
<td>1,307.460</td>
<td>0.832</td>
<td>0.405</td>
</tr>
<tr>
<td></td>
<td>FD</td>
<td>337</td>
<td>60.37</td>
<td>27.083</td>
<td>0.832</td>
<td>0.405</td>
</tr>
<tr>
<td>LIQUID 3</td>
<td>NFD</td>
<td>5,123</td>
<td>1,379.689</td>
<td>24,361.457</td>
<td>0.297</td>
<td>0.766</td>
</tr>
<tr>
<td></td>
<td>FD</td>
<td>325</td>
<td>254.428</td>
<td>1,885.574</td>
<td>0.297</td>
<td>0.766</td>
</tr>
<tr>
<td>PENSION</td>
<td>NFD</td>
<td>5,064</td>
<td>61.028</td>
<td>2,091.457</td>
<td>0.378</td>
<td>0.705</td>
</tr>
<tr>
<td></td>
<td>FD</td>
<td>334</td>
<td>53.60</td>
<td>36.562</td>
<td>0.378</td>
<td>0.705</td>
</tr>
</tbody>
</table>

(continued)
### Panel B: correlation coefficients

|          | IGR   | EXPCAP | OPERPOS | USERCHG | ROADS  | DEBTSERV | DEBTREV | DEBTCAP | CAPSTR | LIQUID1 | LIQUID2 | LIQUID3 | PENSION | BENEFIT | CONCEN | TAXCAP | CAPOUT | lnPOPUL |
|----------|-------|--------|---------|---------|--------|-----------|---------|---------|--------|---------|---------|--------|---------|---------|--------|--------|--------|--------|---------|
| IGR      | -0.26 |        |         |         |        |           |         |         |        |         |         |        |         |         |        |        |        |         |
| EXPCAP   | 0.02* | -0.24* |         |         |        |           |         |         |        |         |         |        |         |         |        |        |        |         |
| OPERPOS  | 0.05* | 0.02*  | -0.21* |         |        |           |         |         |        |         |         |        |         |         |        |        |        |         |
| USERCHG  | 0.49* | -0.53* | 0.37*  | 0.21*  |        |           |         |         |        |         |         |        |         |         |        |        |        |         |
| ROADS    | -0.27*| 0.45*  | -0.30* | 0.35*  | -0.15* |           |         |         |        |         |         |        |         |         |        |        |        |         |
| DEBTSERV | 0.21* | -0.16* | 0.19*  | 0.08*  | 0.21*  | -0.10*   |         |         |        |         |         |        |         |         |        |        |        |         |
| DEBTREV  | 0.25* | -0.24* | 0.23*  | 0.04*  | 0.37*  | -0.11*   | 0.42*   |         |        |         |         |        |         |         |        |        |        |         |
| DEBTCAP  | 0.51* | -0.25* | 0.19*  | 0.05*  | -0.16* | 0.38*    | 0.81*   |         |        |         |         |        |         |         |        |        |        |         |
| CAPSTR   | 0.08* | -0.07* | 0.10*  | -0.02 | 0.14*  | -0.04*   | 0.29*   | 0.51*   | 0.35*  |         |         |        |         |         |        |        |        |         |
| LIQUID1  | 0.04* | 0.24*  | -0.24* | 0.03*  | -0.18* | 0.20*    | -0.27*  | -0.29*  | -0.32* | -0.33*  |         |        |         |         |        |        |        |         |
| LIQUID2  | -0.06*| 0.01   | -0.09* | 0.15*  | -0.02 | 0.14*    | -0.17*  | -0.01   | -0.03  | -0.03   | -0.19*  |         |        |         |        |        |        |         |
| LIQUID3  | 0.01  | 0.01   | 0.02   | -0.03* | 0.01   | 0.00     | -0.01   | -0.01   | -0.02  | -0.02   | -0.01   | -0.01  | -0.01  | -0.01  | -0.01  | -0.01  | -0.01  |         |
| PENSION  | 0.01  | 0.00   | 0.00   | 0.02   | 0.00   | 0.00     | 0.00    | 0.01    | 0.01   | 0.01    | 0.01    | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   |         |
| BENEFIT  | -0.13*| 0.08*  | -0.10* | -0.03* | -0.09* | 0.08*    | -0.07*  | -0.08*  | -0.08* | -0.08*  | -0.02   |         |        |         |        |        |        |        |         |
| CONCEN   | -0.39*| -0.30* | -0.33* | -0.10* | -0.51* | -0.17*   | -0.05*  | -0.17*  | -0.23* | -0.08*  | -0.04*  |         |        |         |        |        |        |        |         |
| TAXCAP   | 0.04* | -0.10* | 0.03*  | -0.01 | 0.03*  | -0.12*   | 0.13*   | 0.03*   | 0.03*  | 0.07*   |         |         |        |         |        |        |        |        |         |
| CAPOUT   | 0.23* | -0.07* | 0.28   | -0.16* | 0.08*  | -0.17*   | 0.12*   | 0.19*   | 0.21*  | 0.04*   |         |         |        |         |        |        |        |        |         |
| lnPOPUL  | 0.25  | -0.43  | 0.22   | -0.08* | 0.14*  | -0.40*   | 0.21*   | 0.18*   | 0.23*  | 0.05*   |         |         |        |         |        |        |        |        |         |

(continued)
<table>
<thead>
<tr>
<th></th>
<th>EQUITY1</th>
<th>EQUITY2</th>
<th>LIQUID1</th>
<th>LIQUID2</th>
<th>LIQUID3</th>
<th>PENSION</th>
<th>BENEFIT</th>
<th>CONCEN</th>
<th>TAXCPCTY</th>
<th>CAPOUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>IGR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXP CAP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPERPOS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USERCHG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROADS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEBTSERV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEBTREV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEBTCAP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAPSTR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EQUITY1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EQUITY2</td>
<td>0.13*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIQUID1</td>
<td>0.56*</td>
<td>0.19*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIQUID2</td>
<td>−0.01</td>
<td>0.01</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIQUID3</td>
<td>0.00</td>
<td>0.02</td>
<td>0.05*</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PENSION</td>
<td>−0.01</td>
<td>−0.02</td>
<td>−0.01</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BENEFIT</td>
<td>−0.05*</td>
<td>0.08*</td>
<td>0.02</td>
<td>0.01</td>
<td>0.03*</td>
<td>−0.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONCEN</td>
<td>−0.10*</td>
<td>−0.01</td>
<td>−0.01</td>
<td>0.00</td>
<td>−0.03*</td>
<td>0.00</td>
<td>0.07*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAXCPCTY</td>
<td>−0.13*</td>
<td>−0.12*</td>
<td>−0.26*</td>
<td>0.00</td>
<td>−0.03*</td>
<td>−0.01</td>
<td>−0.02</td>
<td>0.08*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAPOUT</td>
<td>0.14*</td>
<td>−0.14*</td>
<td>−0.02</td>
<td>−0.01</td>
<td>0.00</td>
<td>−0.05*</td>
<td>−0.09*</td>
<td>−0.02</td>
<td>0.18*</td>
<td>0.05*</td>
</tr>
<tr>
<td>lnPOPUL</td>
<td>0.11*</td>
<td>−0.23*</td>
<td>−0.21*</td>
<td>−0.01</td>
<td>−0.01</td>
<td>0.02</td>
<td>−0.01</td>
<td>0.18*</td>
<td>0.05*</td>
<td>0.24*</td>
</tr>
</tbody>
</table>

Note: *Pearson correlation coefficients are significant at less than the 0.05 level (two-tailed)
Regarding their operating profile, those municipalities at risk have higher revenues per capita, expenses per capita, public works ratios, but lower intergovernmental ratios, and operating positions than those that are not at risk. The user charges are not significantly different between the two groups. Although those at risk have higher revenues per capita, they have lower operating positions, meaning that they have relatively more expenditures than their counterparts that are not at risk of financial distress.

At-risk municipalities have higher debt ratios for all three indicators in the debt usage category. They also have more debt to assets and lower fund balances relative to both revenues and assets. At-risk municipalities also have lower cash to revenues ratios; however, the other liquidity ratios are not significantly different between the two groups. Thus, the municipalities at risk have a financial profile consisting of significantly more debt in their capital structure and marginally lower liquidity levels.

The indicators related to employees (pensions and benefits) and capital outlays are not significantly different between the two groups of municipalities. Also, one of the two indicators related to taxes is significant. Those at risk of financial distress have more capacity to raise property taxes; however, this would be a politically difficult move for a municipality at risk of financial distress. Finally, at-risk municipalities are larger in terms of population than their counterparts. This fact concurs with the observation that cities, which tend to have larger populations, have higher incidences of financial distress (see Panel B of Table II). These profiles of municipalities at risk are based upon univariate statistics that do not control for the other indicators.

Several of the indicators are similar in nature; thus, the Pearson correlations of the indicators are computed to detect potential multicollinearity, a problem caused by excessively high correlations between pairs of indicators. When indicators are highly correlated the regression model may be mispecified. Pearson correlations were calculated and shown in Panel B of Table III for the indicators and a high level of correlations exists between revenues per capital and expenditures per capita (0.92) and between debt per capita and debt to revenue (0.81). These correlations may cause multicollinearity and both expenditures per capita and debt per capita were omitted from the multivariate model. Also, three indicators, cash to debt, current ratio, and pension costs have a large amount of missing data, with nearly half of the municipalities missing these data. Since there are so many missing data points, these indicators were also omitted from the multivariate model. Including these five variables does not change the tenor of the results, but including them reduces the power of the model.

4.3 The multivariate model of financial risk

The hypothesis is that financial risk is related to the indicators summarized in Table I. Following previous research, such as Trussel and Patrick (2009, 2012, 2013), we use logistic regression to analyze the significance of the multivariate model, since the dependent variable is categorical (a municipality is either at risk or not at risk of financial distress). The panel data are adjusted for autocorrelation, by assuming that repeated measurements have a first-order autoregressive relationship. The correlation between any two elements is equal to \( \rho \) for adjacent elements, \( \rho^2 \) for elements that are separated by a third element, and so on.

The underlying latent dependent variable is financial risk, which is the probability of experiencing financial distress for municipality \( i \). This probability is related to the observed variable, \( \text{Status}_i \), through the relation:

- \( \text{Status}_i = 1 \), if the municipality answered “Yes” to any question on the SOFC; and
- \( \text{Status}_i = 0 \), otherwise.

As previously noted, the model of financial risk includes all the indicators from Table I, except EXPCAP and DEBTCAP, which were omitted above due to likely multicollinearity,
and LIQUID2, LIQUID3, and PENSION, which were omitted due to large amounts of missing data. Using logistic regression, financial risk is the predicted probability of the \( k \)th status for municipality \( i \), \( P(\text{Status}_i\text{,}_k) \) and is calculated as follows:

\[
P(\text{Status}_i\text{,}_k) = \frac{1}{1 + e^{-Z}}
\]

(1)

where:

\[
Z_i = \beta_0 + \beta_1 \text{REVECAP} + \beta_2 \text{IGR} + \beta_3 \text{OPERPOS} + \beta_4 \text{USERCHG} + \beta_5 \text{ROADS}
\]

\[
+ \beta_6 \text{DEBTSVC} + \beta_7 \text{DEBTREV} + \beta_8 \text{CAPSTR} + \beta_9 \text{EQUITY1} + \beta_{10} \text{EQUITY2}
\]

\[
+ \beta_{11} \text{LIQUID1} + \beta_{12} \text{BENEFIT} + \beta_{13} \text{CONCEN} + \beta_{14} \text{TAXCAP}
\]

\[
+ \beta_{15} \text{CAPOUTLAY} + \beta_{16} \text{POPULATION} + \beta_{17} \text{TYPE}
\]

The results of the logistic regression model are shown in Table IV. Overall the quasi-likelihood under independence model criterion (QIC) value of 3,196.025 indicates the model fits the data well. Three of the indicators are positively associated with financial risk and are statistically significant at the 0.05 level: DEBTSEVR, POPULATION, and ROADS. BENEFIT is marginally significant and positive. IGR, OPERPOS, USERCHG, CAPOUTLAY, EQUITY2, and CONCEN are significantly and negatively correlated with financial risk. LIQUID1 is marginally significant and negative. The other variables are not significant. Thus, controlling for the other indicators, municipalities at risk of financial distress have significantly higher debt service, population, and public highway ratios than their counterparts. They also have significantly lower intergovernmental revenues, operating positions, user charges, capital outlays, fund balance to assets, and tax concentration than those that are not at risk.

<table>
<thead>
<tr>
<th>Variable</th>
<th>( B )</th>
<th>( SE )</th>
<th>Wald ( \chi^2 )</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>−1.894</td>
<td>1.162</td>
<td>2.659</td>
<td>0.103</td>
</tr>
<tr>
<td>Repurposed</td>
<td>0.000</td>
<td>0.000</td>
<td>0.501</td>
<td>0.479</td>
</tr>
<tr>
<td>IGR</td>
<td>−2.053</td>
<td>0.928</td>
<td>4.896</td>
<td>0.027</td>
</tr>
<tr>
<td>OPERPOS</td>
<td>−1.153</td>
<td>0.312</td>
<td>13.694</td>
<td>0.000</td>
</tr>
<tr>
<td>USERCHG</td>
<td>−1.197</td>
<td>0.547</td>
<td>4.785</td>
<td>0.029</td>
</tr>
<tr>
<td>ROADS</td>
<td>0.705</td>
<td>0.213</td>
<td>10.910</td>
<td>0.001</td>
</tr>
<tr>
<td>DEBTSVC</td>
<td>1.453</td>
<td>0.511</td>
<td>8.099</td>
<td>0.004</td>
</tr>
<tr>
<td>DEBTREV</td>
<td>−0.094</td>
<td>0.098</td>
<td>0.931</td>
<td>0.335</td>
</tr>
<tr>
<td>CAPSTR</td>
<td>0.045</td>
<td>0.031</td>
<td>2.046</td>
<td>0.153</td>
</tr>
<tr>
<td>EQUITY1</td>
<td>0.066</td>
<td>0.065</td>
<td>1.057</td>
<td>0.304</td>
</tr>
<tr>
<td>EQUITY2</td>
<td>−0.597</td>
<td>0.232</td>
<td>6.610</td>
<td>0.010</td>
</tr>
<tr>
<td>LIQUID1</td>
<td>−0.319</td>
<td>0.173</td>
<td>3.408</td>
<td>0.065</td>
</tr>
<tr>
<td>BENEFIT</td>
<td>0.339</td>
<td>0.182</td>
<td>3.472</td>
<td>0.062</td>
</tr>
<tr>
<td>CONCEN</td>
<td>−2.688</td>
<td>0.899</td>
<td>8.933</td>
<td>0.003</td>
</tr>
<tr>
<td>TAXCAP</td>
<td>2.126</td>
<td>0.285</td>
<td>55.788</td>
<td>0.000</td>
</tr>
<tr>
<td>CAPOUTLAY</td>
<td>−1.028</td>
<td>0.440</td>
<td>5.467</td>
<td>0.019</td>
</tr>
<tr>
<td>Population</td>
<td>0.243</td>
<td>0.082</td>
<td>8.875</td>
<td>0.003</td>
</tr>
<tr>
<td>TYPE = Borough</td>
<td>−0.037</td>
<td>0.187</td>
<td>0.040</td>
<td>0.842</td>
</tr>
<tr>
<td>TYPE = City</td>
<td>0.792</td>
<td>0.366</td>
<td>4.675</td>
<td>0.031</td>
</tr>
<tr>
<td>TYPE = First-Class Township</td>
<td>−0.412</td>
<td>0.250</td>
<td>1.101</td>
<td>0.294</td>
</tr>
</tbody>
</table>

Table IV. Regression of the financial risk indicators
4.4 Predicting financial distress

Logistic regression is used to test the predictive ability of the model. The observed logistic regression equation (from Table IV) for entity \( i \) at time \( t \) is as follows:

\[
P(i, t) = \frac{1}{1 + e^{-Z_i}}
\]

where:

\[
Z_i = -1.894 - 0.001(\text{REVCAP}) - 2.053(\text{IGR}) - 1.153(\text{OPERPOS})
- 1.197(\text{USERCHG}) + 0.705 \text{roads} + 1.453 \text{DEBTSVC}
- 0.094 \text{DEBTREV} + 0.045 \text{CAPSTR} + 0.066 \text{EQUITY1}
- 0.597 \text{EQUITY2} - 0.319 \text{LIQUID1} + 0.339 \text{BENEFIT}
- 2.688 \text{CONCEN} + 2.126 \text{TAXCAP} - 1.028 \text{CAPOUTLAY}
+ 0.243 \text{POPULATION} - 0.037 \text{BOROUGH} + 0.792 \text{CITY}
- 0.412 \text{FIRST CLASS TOWNSHIP}
\]

The predicted dependent variable, financial risk or the probability of financial distress for municipality \( i \), is computed using the actual indicators for each municipality in the sample. The resulting probabilities are used to classify municipalities as at risk of financial distress or not. Jones (1987) suggests two ways of adjusting the cutoff probability for classifying as at risk or not at risk of financial distress. First, the prior probability of financial distress is incorporated, and second, the expected cost of misclassification is included. The following applies a similar methodology used by Trussel and Patrick (2009, 2011, 2013).

Using logit, the proportion of at-risk municipalities in the sample must be the same as the proportion in the population to account for the prior probability of financial distress. If the proportion is not the same, then the constant must be adjusted (Maddala, 1991). This is more of a problem when a paired sample method is used, which is not the case here. Since the proportion of at-risk municipalities in the population of all municipalities is unknown, the assumptions are made that the proportion of municipalities in Pennsylvania is an unbiased estimator of the proportion in the population of all municipalities. Since 5 percent of the municipalities in the sample are at risk of financially distress, the prior probability of financial distress is assumed to be 0.05.

The ratios of the cost of type I errors (incorrectly classifying financially distressed municipalities as not financially distressed – a false positive) to type II errors (incorrectly classifying municipalities that are not financially distressed as financially distressed – a false negative) must also be determined. The particular cost function is difficult to ascertain and will depend on the user of the information. For example, a creditor may want to minimize loan losses (and thus type I errors); however, he or she will suffer an opportunity cost (type II error) if credit is granted to another borrower at a lower rate. In most cases, the cost of a type II error is likely to be much smaller than a type I error. Thus, several relative cost ratios (and cutoff probabilities) are incorporated into our analysis. Specifically, included are the relative costs of type I to type II errors of 1:1, 10:1, 20:1, 30:1, 40:1, 60:1, and 100:1 (Beneish, 1999; Trussel, 2002).

The results of using the logit model to classify municipalities as financially distressed or not are included in Panel A of Table V for the initial 2007-2010 sample. The cutoff probabilities presented are those that minimize the ECM. Following Beneish (1999), the ECM are computed as follows:

\[
\text{ECM} = P(FD) P_1 C_1 + [1 - P(FD)] P_0 C_0,
\]

Financial risk of municipal governments
where \( P(D) \) is the prior probability of financial distress; \( P_I \) and \( P_{II} \) the conditional probabilities of type I and type II errors, respectively; and \( C_I \) and \( C_{II} \) the costs of type I and type II errors, respectively.

The validity of the model is tested on out-of-sample 2011 data using the same cutoff probabilities from the initial (2007-2010) sample. Panel B of Table V includes the results for the 2011 sample. The results indicate that the model can identify financially distressed municipalities, with 77 percent (at a cost ratio of 100:1) to 99 percent (at a cost ratio of 1:1) of the municipalities in the initial sample correctly classified. In the 2011 sample, 17 percent to 88 percent of the municipalities are correctly classified.

To test the usefulness of the model, we compare these results to a naïve strategy. This strategy classifies all municipalities as financially distressed (not financially distressed) when the ratio of relative costs is greater than (less than or equal to) the prior probability of financial distress. This switch in strategy between classifying all organizations as not financially distressed to classifying all of them as financially distressed occurs at relative cost ratios of 20:1 (i.e. 1/0.05, the prior probability of financial distress). If all municipalities are classified as financially distressed (not financially distressed), then the naïve strategy makes no type I (type II) errors. In this case, \( P_I \) (\( P_{II} \)) is 0, and \( P_{II} \) (\( P_I \)) is 1. The expected cost of misclassification for the naïve strategy of classifying all municipalities as not financially distressed (financially distressed) reduces to 0.95\( C_{II} \) (0.05\( C_I \)).

We also report the relative costs or the ratio of the ECM for our model to the ECM for the naïve strategy in Table V. Relative costs below 1 are an indication of a cost-effective model. For the initial sample and the 2011 sample, our model consistently has a lower ECM than the naïve strategy across all ranges of costs of type I and type II errors. These results provide evidence that the financial risk model is cost-effective in relation to a naïve strategy for the ranges of the costs of type I and type II errors.

4.5 Applying the prediction model

One of the municipalities from the sample is used to illustrate the model. The model allows one to predict the status of the municipality as at risk of financial distress or not at risk.
From the results of the logistic regression, financial risk is the probability of the financial
distress for municipality $i$ at time $t$, $P(i, t)$:

$$P(i, t) = \frac{1}{1 + e^{-Z_i}}$$

(2)

where:

$$Z_i = -1.894 - 0.001(\text{REVCAP}) - 2.053(\text{IGR}) - 1.153(\text{OPERPOS})$$

$$-1.197(\text{USERCHG}) + 0.705 \text{ROADS} + 1.453 \text{DEBTsvc}$$

$$-0.094 \text{DEBTREV} + 0.045 \text{CAPSTR} + 0.066 \text{EQUITY1}$$

$$-0.597 \text{EQUITY2} - 0.319 \text{LIQUID1} + 0.339 \text{BENEFIT}$$

$$-2.688 \text{CONCEN} + 2.126 \text{TAXCAP} - 1.028 \text{CAPOUTLAY}$$

$$+ 0.243 \text{POPULATION} - 0.037 \text{BOROUGH} + 0.792 \text{CITY}$$

$$-0.412 \text{FIRST CLASS TOWNSHIP}$$

Substituting the actual variables from the example second-class township (in parentheses),
obtains:

$$Z_i = -1.894 - 0.001(257) - 2.053(0.128) - 1.153(1.067) - 1.197(0.013)$$

$$+ 0.705(1.415) + 1.453(0) - 0.094(0) + 0.045(0) + 0.066(1.968)$$

$$-0.597(0.989) - 0.319(1.988) + 0.339(0.100) - 2.688(0.789)$$

$$+ 2.126(0.005) - 1.028(0) + 0.243(6.919) - 0.037(1) + 0.792(0) - 0.412(0)$$

$$Z_i = -3.994$$

$$P = 1/(1 + e^{-3.994})$$

$$P = 0.014$$

From Panel A of Table V, the municipality is predicted not to be financially distressed, since
the actual financial risk (0.014) is less than the cutoff at all levels of the ratio of type I to
type II errors below 60:1. The entity’s actual status is not financially distressed. In this case,
the model correctly predicted the financial status of this municipality unless the cost ratio is
above 40:1.

4.6 Robustness tests
The assumptions made while developing and testing the model are tested for robustness.
The prior probability of financial distress in developing the prediction model was assumed
to be 5 percent, since 5 percent of the municipalities in the initial sample were financially
distressed. The sensitivity of the model to other specifications of the prior probability of
financial distress is evaluated by using prior probabilities of 0.025 and 0.10. The changes do
not alter the results significantly. These prior probabilities were chosen to represent half
and twice the probability found in the sample and are likely the lower and upper bounds of
the actual prior probability, given 0.05 found in the sample.
4.7 Ranking financial risk

Following Trussel and Greenlee (2004), the financial risk of each municipality is ranked to aid in the interpretation of such risk. Recall that financial risk is defined in this study as the probability of financial distress determined by the model above. The municipalities are ranked by deciles according to their financial risk. The first category represents the 10 percent of the municipalities with the lowest financial risk (lowest computed $P_i$), while the last category represents the 10 percent of the municipalities with the highest financial risk.

The deciles are displayed in Table VI, which shows the upper cutoff probability for each decile. For example, the first decile shows a probability of 0.015 and the second decile shows a probability of 0.020. If a municipality has a computed probability of greater than 0 and less than or equal to 0.015, then it is in the first decile and among those with the lowest probability of financial distress. The municipality from the previous example would have a rank of 1 on a scale of 1-10, since the financial risk is 0.014. This indicates the lowest level of financial risk. The 1-10 ranking is based on the cutoff for each decile. The third (fourth) column in Table VI represents the percentage of municipalities at risk of financial distress in the initial 2007-2010 sample (holdout 2011 sample) that fall into each decile. In the initial (holdout 2011) sample, 61 (47) percent of the municipalities at risk of financial distress were ranked in the three highest deciles. Only 13 (21) percent of the municipalities at risk were ranked in the three lowest deciles. The combination of using the predicted status from Table V and ranking the financial risk using Table VI provides a method for evaluating and ranking the financial risk of municipalities that is based on the results of the financial risk model presented in Section 4 and included in Table IV.

5. Conclusion

Financial risk is a major concern for municipalities and their citizens. If financial problems exist, municipalities may have to curtail public services. In Pennsylvania, the DCED has steps in place to detect and mitigate financial distress. In this study, we use the DCED’s definition of financial distress, which is based upon an annual survey (SOFC), and most of the DCED’s financial indicators to develop a multivariate model of financial risk and a system to rank financial risk. We extend the previous research by using an alternative definition of financial distress, by incorporating a well-defined set of indicators, and by adding a financial risk ranking system. We define a municipality at risk of financial distress if it provided an affirmative answer on the SOFC gathered by the Pennsylvania DCED between 2007 and 2010. We use indicators defined by the DCED. Our financial risk model is developed using logistic regression with financial indicators to

<table>
<thead>
<tr>
<th>Decile rank</th>
<th>Upper cutoff</th>
<th>At risk 2007-2010 sample (%)</th>
<th>At risk 2011 sample (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.015</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>0.020</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>0.025</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>0.029</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>0.034</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>6</td>
<td>0.040</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>7</td>
<td>0.048</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>0.062</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>9</td>
<td>0.096</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>1.000</td>
<td>40</td>
<td>27</td>
</tr>
</tbody>
</table>

Table VI. Percentiles of financial risk
assess the level of financial risk. Then, the municipalities are ranked into deciles according to their financial risk. This allows for a user to easily compute and rank a municipality’s financial risk.

Using data from the DCED in a logistic regression, the results indicate that municipalities at risk of financial distress have significantly higher debt service, population, public service operations, and tax efforts than those that are not at risk. Municipalities at risk also have less intergovernmental revenues, operating positions, user charges, capital outlays, fund balances, and tax revenue concentrations than those that are not at risk. The model can correctly predict up to 99 percent of the municipalities as either at risk or not at risk of financial distress. Finally, a system to rank municipalities according to their financial risk is developed. This information should be valuable to all of the municipalities’ stakeholders, including citizens, creditors, municipal, and state bureaucrats interested in evaluating financial risk. For example, creditors may use this model in making lending decisions, since they can rank the financial risk of a municipality. State bureaucrats may use this model to determine if early financial intervention is necessary. The DCED may use the model as due diligence in monitoring financial distress, as require by Act 47. The study is limited to the state of Pennsylvania for the years 2007-2011. Future studies should be completed to extend these results to other states, to other countries and to other time frames.

References
Congressional Budget Office (1978), “City need and the responsiveness of federal grant programs”, Congressional Budget Office, Washington, DC.


General Accountability Office (GAO) (1990), *Distressed Communities: Public Services Declined in California as Budget Pressures Mounted* (GAO-HRD-90-95), General Accounting Office (GAO), Washington, DC.


Further reading


Appendix

The survey of financial condition questions

Question 1: Has your municipality maintained a deficit over a three-year period, with a deficit of 1% or more in each of the previous fiscal years?

Question 2: Have your municipality’s expenditures exceeded revenues for a period of three years or more?

Question 3: Has your municipality defaulted in payment of principal or interest on any of its bonds or notes or in payment of rentals due any authority?

Question 4: Has your municipality missed a payroll for 30-days?

Question 5: Has your municipality failed to make required payments to judgment creditors for 30-days beyond the date of the recording of the judgment?

Question 6: Has your municipality, for a period of at least 30-days beyond the due date, failed to forward taxes withheld on the income of employees or failed to transfer employer or employee contributions to social security?

Question 7: Has your municipality accumulated and operated for each of two successive years a deficit equal to 5% or more of its revenue?

Question 8: Has your municipality failed to make the budgeted payment of its minimum obligation as required by Section 302 of the Act of December 18, 1984, known as the Municipal Pension Fund Act, during the fiscal year for which the payment was budgeted and failed to take action within that time period to make required payments?

Question 9: Has your municipality sought to negotiate resolution or adjustment of a claim in excess of 30% against a fund or budget and failed to reach an agreement with creditors?

Question 10: Has your municipality filed a municipal debt readjustment plan pursuant to Chapter 9 of the Bankruptcy Code?

Question 11a: Was your municipality at the maximum general purpose real estate tax limit as of the last municipal fiscal year?

Question 11b: If yes, have you reduced police, highway or other services this fiscal year because of your inability to raise general purpose real estate taxes?

Corresponding author

John M. Trussel can be contacted at: john-trussel@utc.edu

For instructions on how to order reprints of this article, please visit our website:

www.emeraldgrouppublishing.com/licensing/reprints.htm

Or contact us for further details: permissions@emeraldinsight.com
Exploring forward-looking information in integrated reporting
A multi-dimensional analysis

Elisa Menicucci
Department of Business Studies, University of Roma Tre, Rome, Italy

Abstract

Purpose – The purpose of this paper is to investigate the effect of firm characteristics on forward-looking disclosure (forward-looking information (FLI)) within the context of integrated reporting (IR). The study assesses the extent of FLI provided in integrated reports and empirically fills the research gap into the topics of FLI disclosed in the IR.

Design/methodology/approach – A manual content analysis is run to investigate the level and the topics of FLI in 282 integrated reports available in the International Integrated Reporting Council (IIRC) website. An index composition consisting of 27 information items is developed from the list of content elements comprised in the Integrated Reporting Framework (IIRC, 2013). Three hypotheses are proposed and eight models are tested within a multivariate regression analysis in order to explore the effects of three main variables (firm size, profitability and leverage) on FLI.

Findings – The study confirms that firms are reluctant to provide FLI in integrated reports. The results show that profitability and firm size have a statistically significant relationship with the level of specific topics of FLI. Conversely, leverage is found to be insignificant in explaining the extent of FLI.

Research limitations/implications – To improve the reliability of findings presented in this study, several others may be conducted by inspecting more variables that may affect the extent of FLI or by increasing the number of companies included in the sample.

Practical implications – The results provide comprehensive insights into the current forward-looking disclosure practices of early adopters in integrated reports and can be a useful evidence for preparers of it. This paper has also practical implications especially for managers and regulators (e.g. IIRC) since it encourages further efforts to promote FLI if firms want that the disclosure offered in the IR is perceived as “informative” by their significant stakeholders.

Originality/value – The research adds to the prior disclosure literature concerning FLI since acquired results are ambiguous. There are a very restricted number of studies that have explained the variation of FLI in the light of firm characteristics and no study has analyzed this research topic within the context of IR.

Keywords Firm characteristics, Disclosure, Integrated reporting, Forward-looking information

1. Introduction

As a crucial source of disclosure, forward-looking information (FLI) has been receiving a growing attention in recent disclosure studies. The dynamic and increasing evolution of economic conditions emphasizes the potential deficiencies of historical information of listed companies because it cannot satisfy investors’ diversified information needs along with economic development. In some cases, historical information is unable to provide stakeholders with sufficient insight regarding critical success factors, opportunities, risks and management plans from a forward-looking perspective. It is also believed that FLI would improve investors’ ability to assess future cash flows, to forecast future earnings and to make better investment decisions (Hussainey et al., 2003; Brockman and Cicon, 2013). FLI is the category of voluntary information that allows users to assess a company’s future prospects and forecasts about the future of the business state of affairs (Bujaki et al., 1999). It includes management’s plans, assessments of opportunities and risks, forecasted data and business predictions about the company’s operations and “the organization’s expectations about the external environment the organization is likely to
face in the short, medium and long term” (International Integrated Reporting Council (IIRC), 2013). Furthermore, FLI regards financial estimates such as future earnings, expected returns and anticipated cash flows and sales volume (Alkhatib, 2012; Alkhatib and Marji, 2012; Uyar and Kilic, 2012a, b). In many cases, it is possible to recognize FLI by the use of words such as “predict,” “expect,” “estimate,” “anticipate,” “forecast” or other comparable terms (Aljifri and Hussainey, 2007; Alkhatib, 2014). Hussainey (2004) argued that the categorization of FLI is not as easy as stated above because some kinds of information classified as historical could carry statements concerning the future. According to the Institute of Chartered Accountants in England and Wales (2003), FLI entails any information that might have an effect on subsequent financial statements and on the company’s future performance (Bozzolan et al., 2009; Robert, 2010; Beyer and Dye, 2012; Uyar and Kilic, 2012b; Liu, 2015).

The move from a report of historical financial results to a focus on the longer-term viability of the entity and on the strategies (e.g. goals, targets and actions) represents a key characteristic of the integrated reporting (IR) according to the International Integrated Reporting Council (IIRC). An integrated report should demonstrate how the strategy of the organization is linked to its key performance indicators (KPIs), as well as how it has performed against those KPIs in the current year and its future targets. In our study, we developed hypotheses about the relationship between FLI and firm characteristics that might influence disclosure strategies followed by organizations whose reports are available in the Integrated Reporting Emerging Practice Examples Database. In particular, this paper examines the effect of firm characteristics on the level of FLI disclosed in 282 integrated reports, considering different measures of FLI. With this purpose, firm characteristics which have a direct impact on the level of FLI are taken into account by a detailed inspection of the related disclosure literature. Our study contributes to the prior studies on disclosure strategies (Quagli, 2008) by showing that the amount of FLI presented in integrated reports is influenced (or not) by firm characteristics. It should be noted that a very limited number of studies have examined the impact of firm characteristics on disclosure of FLI and no study has analyzed this research topic within the context of IR yet.

Within such a context, this study measures the amount of FLI in integrated reports and empirically investigates the firm characteristics that may affect the extent of FLI disclosed. The paper is organized as follows. Section 2 describes the concept of FLI within the framework of IR and the previous literature on forward-looking disclosure. Moreover, research hypotheses based on the existing studies are developed here. Section 3 explains the research design and defines the sample data collection and the research methodology used to achieve the research objectives. Section 4 examines the results of the empirical analysis. Section 5 summarizes the research findings and outlines the main conclusions of the study, limitations and suggestions for future research.

2. Literature review and hypotheses development

There have been several studies regarding the effect of firm characteristics on disclosure (Kent and Ung, 2003; Alsaeed, 2006) and this topic has received a considerable attention in the academic literature. Especially, there are many studies that try to investigate what motivates companies to disclose FLI. Other studies examined empirically the benefits of FLI and the relationship with the corporate future performance (Clarkson et al., 1994; Bryan, 1997). Furthermore, some previous studies focused on determinants of the disclosure level of FLI and principally on the relations between earnings forecast and firm characteristics. More specifically, a number of studies have analyzed the association between firm characteristics and FLI (Meek et al., 1995; Patton and Zelenka, 1997; Celik et al., 2006; Aljifri and Hussainey, 2007; Abed et al., 2011). For example, a paper (Kent and Ung, 2003) demonstrated that larger companies with less volatile earnings are inclined to disclosure more FLI than smaller companies with comparatively volatile earnings.
We found some common elements that are used to classify further the determinants of disclosure. In the literature, these factors are categorized into two main categories: namely those that are controlled by the management (internal factors) and those that are beyond the control of management (external factors). Based on the majority of the prior studies concerning the disclosure of FLI, we select the association between the extent of disclosure and firm-specific determinants (internal factors). The research topic of this study is the determination of which and how firm characteristics affect the level of FLI. The majority of studies analyzed the association between FLI and firm-specific attributes directly affecting the disclosure behavior of companies but empirical evidence on this topic is uncertain and sometimes fails to provide conclusive results (Donnelly and Mulcahy, 2008). Firm-specific determinants of FLI are determined by a detailed examination of the relevant disclosure literature that led us to formulate the following hypotheses.

2.1 Profitability
The association between profitability and voluntary disclosure has been investigated in the prior literature (Oyelere et al., 2003; Marston, 2003; Marston and Polei, 2004; Wang and Claiborne, 2008) and much evidence in empirical research confirmed the role of profitability as a determinant of corporate disclosure (Cerf, 1961; Wallace et al., 1994; Skinner, 1994; Frankel et al., 1995; Lang and Lundholm, 1996; Tasker, 1998). However, other studies (Ahmed and Courtis, 1999) argued that empirical evidence on the relationship between profitability and disclosure is unclear and provides mixed results. Otherwise, several studies agreed on the existence of a positive association between profitability and voluntary disclosure (Hussainey et al., 2003; Wang and Hussainey, 2013). For example, Hussainey et al. (2003) observed that higher profitability might encourage management to disclose more financial information on the ability to maximize the shareholders' value. Furthermore, a number of prior studies analyzed the relationship between firm characteristics and forecast information (Meek et al., 1995; Patton and Zelenka, 1997; Celik et al., 2006; Aljifri and Hussainey, 2007; Abed et al., 2011). For example, Aljifri and Hussainey (2007) stated a significant correlation between profitability and the level of FLI. Moreover, a positive relationship between FLI and performance was observed in the previous literature on forecast disclosures (Firth, 1979; Cooke, 1989; Hessainey et al., 1995; Principe, 2004; Hussainey and Hussainey, 2015). The majority of literature claimed that firms with higher profit margin are more likely to disclose additional FLI than those with lower return on equity (ROE) (Cahan and Hossain, 1996). On the contrary, Walker and Tsalta (2001), Kent and Ung (2003) and Hussainey et al. (2005) found no such correlation between performance and the extent of FLI while other prior studies documented a negative association between forecast disclosures and profitability (Celik et al., 2006; Aljifri and Hussainey, 2007; Abed et al., 2011). For instance, according to Wallace and Naser (1995), profitable companies may not provide further information because their investors are particularly gratify. A significant negative correlation between profitability and the level of disclosure has been demonstrated previously also by Belkaoui and Kahl (1978). Other studies instead (Raffournier, 1995; Ettridge et al., 2002; Aljifri, 2006) verified an irrelevant relationship between profitability and information reporting. Similarly, according to Alsaeed (2006), profitability was found to be insignificant in signaling the variation of voluntary disclosure.

In line with the prior literature (Vanstraelen et al., 2003; Hussainey et al., 2005; Beretta and Bozolan, 2008; Bravo et al., 2009), this study considers ROE as profitability-related measure and derives it by dividing net income by average total equity. Based on the previous literature, a firm’s profitability has been stated to be positively associated with FLI. Hence, with respect to the majority of disclosure literature mentioned above, the following hypothesis (H1) is stated:

H1. There is a positive relationship between ROE and the level of FLI.
2.2 Firm size
Size of the firm is the most widely used variable in the existing literature to explain firm's disclosure levels. Much evidence in prior studies on the determinants of corporate disclosure documented the existence of an interactive effect between firm size and forward-looking disclosure (Cerf, 1961; Cooke, 1992; Uyar and Kilic, 2012b; Alkhatib, 2012; Alkhatib and Marji, 2012). Particularly, a stream of empirical research found that larger companies are more inclined to disclose greater amounts of disclosure (Wallace et al., 1994; Beattie et al., 2004; Hassan et al., 2006; Alsaeed, 2006) and to follow better disclosure practices (Ahmed and Courtis, 1999). In particular, empirical findings from previous studies demonstrated that FLI is positively related with company size (Walker and Tsai, 2001; Kent and Ung, 2003; Vanstraalen et al., 2003; Leventis and Weetman, 2004; Gao et al., 2005; Hassan et al., 2006; Celik et al., 2006; Lim et al., 2007; Hossain and Hammami, 2009; Abed et al., 2011). For example, Kent and Ung (2003) inspected the voluntary disclosure of future earnings information in annual reports for Australian listed companies and found that larger companies with less volatile earnings tend to provide more future earnings information than smaller companies with relatively volatile earnings. There are several reasons for such a positive relationship. For instance, Hassan et al. (2006) argued that large companies might have a lot of resources to sustain additional information costs if they provide more relevant disclosure to different users.

Just two studies, instead, demonstrated the absence of significant relationship between firm size and FLI (Aljifi, 2006; Aljifi and Hussainey, 2007) because the findings have shown that companies of varying sizes tend to have no differences in their forward-looking disclosure. Literature review suggests a broad variety of criteria for measuring the size of a company, e.g. capital employed and sales turnover (Firth, 1979), total assets and turnover (Cooke, 1991) and market capitalization (Debrency et al., 2002). In our study, we measure the firm size (SIZE) by natural logarithm of book value of total assets. Based on some of the prior studies, we hypothesize that:

\[ H2. \text{ There is a positive relationship between SIZE and the level of FLI.} \]

2.3 Leverage
Leverage is another variable generally employed in the previous literature to investigate the determinants of corporate disclosure. Empirical results from prior studies provided mixed evidence on the association between leverage and disclosure behavior. For example, some studies demonstrated a statistical significant relationship between disclosure and leverage (Malone et al., 1993; Hassan et al., 1994; Wallace et al., 1994), while others failed to find any support for the proposed linkage between the two variables (Chow and Wong-Boren, 1987; Ahmed and Nicholls, 1994; Wallace and Naser, 1995; Hossain et al., 1995; Raffournier, 1995; Celik et al., 2006).

Yet, much results of prior studies (Belkaoui and Kahl, 1978; Malone et al., 1993; Wallace et al., 1994; Zarzeski, 1996; Ahmed and Courtis, 1999) confirmed that highly leveraged firms tend to disclose more information than less leveraged firms in order to satisfy creditors' needs for disclosure (Alkhatib, 2012; Uyar and Kilic, 2012a). For example, O’Sullivan et al. (2008) recognized leverage as a variable that influences positively the amount of voluntary disclosure. Also some of the researchers in “agency theory” claimed that the higher the debt to equity levels, the greater the amount of information a company may communicate (Watts, 1977). For instance, Jensen and Meckling (1976) and Smith and Warner (1979) observed that companies with high debt ratio show a higher level of agency costs, suggesting a positive relationship between leverage and the amount of financial disclosure. It is argued that such companies are more likely to share a great quantity of information with their lenders to reduce financial costs. Moreover, some of the literature
concerning corporate disclosure confirmed a positive relationship between debt ratio and the amount of FLI (Ahmed and Courtis, 1999; Bravo et al., 2009; Aljifri and Hussainey, 2007). Conversely, Celik et al. (2006) failed to find any validation for the correlation between leverage and FLI.

Leverage (LEV) is measured with reference to the debt to equity ratio that is defined as total debt divided by book value of equity. The results of some of the previous studies lead us to the following hypothesis (H3):

H3. There is a positive relationship between LEV and the level of FLI.

3. Methodology

The level of FLI is measured by examining firms’ integrated reports that are available in the Integrated Reporting Examples Database as of December 1, 2015. We selected this database because it contains examples of emerging practice in IR from businesses worldwide and it is publicly accessible from the IIRC official website. The population of reports belongs to organizations from various industry sectors (i.e. Telecommunication, Consumer Goods, Oil and Gas, Basic Materials, Utilities, Financial, Technologies, Industrial, Health Care). This provided us with a population of 282 reports available at the end of 2015. All data used in the analysis were manually collected from the available reports (referring to 2011, 2012, 2013, 2014 and 2015) and from Bloomberg databases for these years.

Each IR was individually scrutinized in order to determine FLI voluntary strategies lead by companies. Two steps of investigation allowed to answer the research questions. First, a summative content analysis was performed to measure the quantity and the contents of FLI by developing a multi-dimensional (i.e. concerning different contents related to FLI) framework of investigation with reference to the IIRC (2013) Framework. Then, the collected evidences were used to develop a multivariate statistical analysis assessing the effects of three firm characteristics on FLI disclosure. Quantity of FLI disclosed in IR was measured by the method of content analysis that has been widely applied to quantify the extent of disclosure in previous studies (Harte and Owen, 1991; Cunningham and Gadenne, 2003; Abed and Roberts, 2011). The research follows the Krippendorff’s (2013) methodology to run content analysis by codifying information pieces to measure the extent of disclosure. Content analysis needs the selection of the recording units (i.e. “text units”) that is defined as a word or a sentence/phrase, a paragraph or a page proportion containing a single piece of information (Beattie et al., 2004; Beattie and Thomsson, 2007; Campbell and Abdul Rahman, 2010). This research takes “word” as the recording unit because it is deemed a more reliable unit of analysis than the number of sentences/phrases or the number of paragraphs (Hackston and Milne, 1996). Every word of sentences/phrases referring to FLI was highlighted and coded in the integrated reports. A scoring system based on the content analysis is constructed to measure the level of different contents related to FLI disclosed in every IR and an unweighted approach is implemented (Cooke, 1998). This approach gives the same importance to all items of FLI to avoid subjective judgment in assigning weights to information items, since this research concerns the level of disclosure rather than the relevance of disclosed items. As a result, each word of sentences/phrases referring to FLI is computed one point under the scoring system. Pictures, captions to pictures of activities, graphs and diagrams are kept out from the analysis as their inclusion would imply a high level of subjectivity (Ahmed and Sulaiman, 2004). Hence, the content analysis encompasses only narrative text (qualitative and quantitative).

As in the prior literature, in this study, we use the disclosure index approach based on the presence or absence of an item (Johnson et al., 2001; O’Sullivan et al., 2008; Cheung et al., 2010). A disclosure index is applied to inspect forward-looking disclosure by assigning a value of 1 in case an item of FLI is disclosed and 0 if it is not. Without a definite academic
literature concerning the contents of FLI, we built a checklist of specific information items using the guiding principle “Strategic focus and future orientation” according to the IIRC (2013). The categories referring to the topics of information are drawn from the IIRC Framework. In order to verify the dependent variables, we organized FLI in six categories which correspond to the six content elements that are included in an integrated report. According to the IR Framework (IIRC, 2013), the categories are divided in 27 disclosure items. The list of items is presented in Table I.

All integrated reports are analyzed to verify the number of words containing FLI disclosed by each firm. Each IR is scrutinized searching for every set of words ranking in the FLI categories and then words giving FLI are counted. For valid regressions to be drawn, it is important that the classification procedure be reliable and valid (Weber, 1990; Krippendorff, 2013). To test the intercoder reliability, the inter-rater reliability Krippendorff’s $\alpha$ coefficient was calculated. The average value found of this coefficient is equal to 0.89 which is above the 0.80 acceptable level required (Gujarati, 2006). This suggests that the coding procedure is reliable, i.e. there is agreement between the coders about their quality estimation made. To develop and test the disclosure index

<table>
<thead>
<tr>
<th>Categories</th>
<th>Topics of information</th>
</tr>
</thead>
</table>
| I. Organizational overview and external environment (ORG) | 1. The organization’s culture, ethics and values  
2. The organization’s ownership and operating structure  
3. The organization’s principal activities and markets  
4. The organization’s competitive landscape and market positioning  
5. The organization’s position within the value chain  
6. Significant factors affecting the external environment and the organization’s response |
| II. Governance (GOV) | 7. The organization’s leadership structure including the skills and diversity  
8. Specific processes used to make strategic decisions and to establish and monitor the culture of the organization  
9. Particular actions those charged with governance  
10. The relationship between culture, ethics and value with key stakeholders and capital |
| III. Business model (BUS) | 11. Remuneration and incentives  
12. Key inputs  
13. Key business activities  
14. Key outputs |
| IV. Risks and opportunities (RISK) | 15. Key outcomes  
16. Specific external source of risks and opportunities  
17. Specific internal source of risks and opportunities  
18. The organization’s assessment of the likelihood that a risk or opportunity will come to fruition and the magnitude of its effect if it does  
19. The specific steps being taken to mitigate or manage key risks or to create value from key opportunities |
| V. Strategy and resource allocation (STR) | 20. The organization’s short, medium and long term strategic objectives  
21. The strategies to achieve strategic objectives  
22. The resource allocation plans to implement the strategy  
23. The linkage between the organization’s strategy and resource allocation plans  
24. What differentiates the organization to give it competitive advantage and enable it to create value |
| VI. Performance (PERF) | 25. The organization’s effects on the capitals  
26. The state of key stakeholder relationship and how the organization responds to key stakeholder’s legitimate needs and interests  
27. The linkage between current performance and the organization’s outlook |

Table I. Disclosure index composition
the basic steps are: define the recording unit (word); define the categories; test coding of a sample of text; assess reliability (the variables generated from the coding represent what we intended it to represent); revise coding rules in order to code all the text in the same way; repeat test coding and revising until reliability is satisfactory; and assess achieved reliability.

Forward-looking disclosure strategies are investigated by the consideration of different information attributes: information quantity, information coverage and the distinction of information among the six mentioned categories referring to different topics of information (Menicucci, 2013). As a result, various measures of FLI are involved as dependent variables in the empirical analysis to inspect the relationship between firm characteristics and FLI strategies. The measure of quantity (FLI_QNT) is included in the analysis taking into account the natural logarithm of the total amount of words containing FLI. Other measures of information are also considered. The measure of coverage (FLI_COV) is measured as the number of words concerning FLI deflated by the total number of words disclosed. Moreover, we employ some measures which embody the proportion of FLI referring to each of the categories described in Table I. Therefore, forward-looking disclosure strategies are examined by looking at different characteristics of FLI: quantity (FLI_QNT); coverage (FLI_COV); information about organizational overview and external environment (FLI_ORG), governance (FLI_GOV), business model (FLI_BUS), risks and opportunities (FLI_RISK), strategy and resource allocation (FLI_STR), performance (FLI_PERF). Each of these measures is alternatively included in the statistical analysis.

In order to investigate the level of FLI first and second to identify its determinants, we adopted both a descriptive and a multivariate analysis. As in many prior disclosure studies, multivariate analysis is carried out using an OLS regression model in order to explore the joint effect of firm characteristics on the level of FLI in the integrated reports of the selected companies. Eight models are tested in the analysis, and each one includes a different assessment of FLI (dependent variable). Specifically, the regression analysis includes separately eight measures of FLI (FLI_QNT, FLI_COV, FLI_ORG, FLI_GOV, FLI_BUS, FLI_RISK, FLI_STR and FLI_PERF) as dependent variables and three independent variables. On the basis of previous literature, we employ the variables described in the hypotheses development as measures of firm characteristics. Therefore, the independent variables considered in this study are the following: ROE (profitability, measured by ROE); SIZE (firm size, measured by natural logarithm of total assets); and LEV (leverage, measured by total debt to equity).

The definition of dependent, independent and control variables employed in the analysis are presented in Table II.

An OLS regression model is estimated to test the hypotheses of this study:

\[ \text{FLI} = \beta_0 + \beta_1 \text{ROE} + \beta_2 \text{SIZE} + \beta_3 \text{LEV} + \beta_4 \text{FLI}_{-\text{TONE}} + \beta_5 \text{FLI}_{-\text{EVID}} + \varepsilon \]

FLI refers to forward-looking information disclosed by each firm. Different measures of FLI are alternatively included in the analysis (FLI_QNT, FLI_COV, FLI_ORG, FLI_GOV, FLI_BUS, FLI_RISK, FLI_STR, FLI_PERF). ROE refers to profitability and it is calculated as the ratio of net income to total equity. SIZE refers to the size of firm and it is measured with reference to the natural logarithm of balance sheet total assets. Leverage (LEV) is measured as the total debt divided by equity.

The model controls whether the amount of FLI disclosed is related with a positive tone of disclosure, which in turn may be associated with an increasing of quantity of FLI. The tone disclosure score on FLI (FLI_TONE) is assessed as the number of words referring to a positive statement deflated by the total number of words on FLI. FLI is positive since it comprises good news for the company and negative if it is non-positive or neutral. The second control
variable considered is the type of evidence (quantitative or qualitative). FLI is coded as quantitative when the statement includes numbers (monetary or non-monetary), and as qualitative in all other cases. The evidence disclosure score on FLI (FLI_EVID) is measured as the number of words on qualitative FLI deflated by the total number of words on FLI.

The robustness of the results is assessed by comprising an additional variable that may explain the amount of FLI. According to the importance of the effect of a continent-specific institutional factor in IR (Jensen and Berg, 2012), the sensitivity test considers a dummy variable (EUR) that is equal to 1 if firms are included in European countries and 0 otherwise.

Finally, the variance inflator factor (VIF) analysis is used to assess the potential collinearity between explanatory variables. The result of the VIF analysis in each of the regression models indicates the absence of multicollinearity (Neter et al., 1996) since the collinearity among the independent variables is not significant in all the models (below the ten thresholds).

4. Results and discussion

This section examines the empirical methods used to verify the research hypotheses of the study and illustrates the results. It includes two statistical methods: a descriptive analysis and a regression one.

4.1 Descriptive analysis

Table III presents the results of descriptive analysis regarding the level of FLI disclosed by the selected firms and the measures of firm characteristics which are included in the analysis, using data from 2011 to 2015, depending on the year of the report. Table III reports the minimum, maximum, mean and standard deviation of the continuous variables used in the multivariate statistical analysis. The results highlight that companies disclose a small number of words covering FLI. A wide range of variation of FLI is also found. The quantity of FLI has remarkable dispersion in the scores, as shown by the
minimum, maximum and standard deviation values. The extent of FLI (FLI_QNT) ranges from 4.833 to 9.134. On average, firms provide 5.006 words referring to FLI, which indicate a low level of disclosure concerning future prospects, strategy and expectations. Minimum and maximum values of FLI_COV show a low proportion of FLI disclosed in integrated reports. Within the sample data set, a wide range of variation is marked also with regard to the independent variables as represented by their minimum and maximum values. The firm size (SIZE) ranges from 7.488 to 17.936 with a mean of 9.522 and a standard deviation of 2.769. The profitability (ROE) ranges from $-36.420$ to 28.620 with a mean of 10.202 and a standard deviation of 10.788, while the leverage ratio (LEV) ranges from 0.090 to 5.650 with a mean of 1.065 and a standard deviation of 1.256.

There are some firms that report only non-positive FLI (FLI_TONE equals to 0) as well as others that report only positive information on FLI (FLI_TONE equals to 1). Similarly, some firms concentrate all FLI on the topic “Risk and opportunities” (FLI_RISK equals to 1) and, conversely, other firms fail to provide any FLI on “Organizational overview and external environment,” “Governance” and “Business model” (FLI_ORG, FLI_GOV and FLI_BUS equal to 0). Interestingly, FLI referring to the six information categories indicates very significant differences across the firms that compose the sample. The percentage of FLI regarding each of all the categories covered in our study has considerable dispersion in the scores, as signified by the minimum, maximum and standard deviation values. For instance, FLI_ORG ranges from 0 to 0.847 with a mean of 0.325. On average, companies provide FLI about the “Organizational overview and external environment” topic (approximately 32.5 percent over the total FLI disclosed by firms), even though some firms do not divulge this kind of information.

4.2 Regression analysis
The existence of an econometric problem of data set applied in the multivariate statistical analysis is tested in the correlation matrix which presents pairwise correlations among the variables used in the regression analysis. By examining individual correlations between independent and dependent variables, the coefficients indicate that a multivariate regression analysis can be performed (Table IV).

The results confirm that no collinearity problem subsists between the independent variables since multicollinearity can be considered a problem when the correlation is above 0.80 (Kennedy, 2008). The degree of correlation between each of the variables is not elevated.
<table>
<thead>
<tr>
<th>Variables</th>
<th>FLI_QNT</th>
<th>FLI_COV</th>
<th>FLI_ORG</th>
<th>FLI_GOV</th>
<th>FLI_BUS</th>
<th>FLI_RISK</th>
<th>FLI_STR</th>
<th>FLI_PERF</th>
<th>ROE</th>
<th>SIZE</th>
<th>LEV</th>
<th>FLI_TONE</th>
<th>FLI_EVID</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLI_QNT</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLI_COV</td>
<td>0.6361</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLI_ORG</td>
<td>-0.3251</td>
<td>-0.2843</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLI_GOV</td>
<td>0.0020</td>
<td>-0.0719</td>
<td>-0.2410</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLI_BUS</td>
<td>0.4896</td>
<td>0.4892</td>
<td>-0.5755</td>
<td>-0.2844</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLI_RISK</td>
<td>-0.2785</td>
<td>-0.2413</td>
<td>-0.2705</td>
<td>-0.1878</td>
<td>-0.3688</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLI_STR</td>
<td>-0.7743</td>
<td>-0.2518</td>
<td>-0.1583</td>
<td>-0.2079</td>
<td>-0.3722</td>
<td>-0.1478</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLI_PERF</td>
<td>0.4787</td>
<td>0.2597</td>
<td>0.2873</td>
<td>-0.1918</td>
<td>-0.2666</td>
<td>-0.3083</td>
<td>-0.4410</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROE</td>
<td>-0.1977</td>
<td>-0.0239</td>
<td>-0.2377</td>
<td>0.2908</td>
<td>0.1311</td>
<td>0.3691**</td>
<td>0.2440</td>
<td>-0.4416*</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIZE</td>
<td>0.0682</td>
<td>-0.0432</td>
<td>-0.0074</td>
<td>0.0073</td>
<td>-0.0689</td>
<td>-0.1691</td>
<td>0.4284*</td>
<td>-0.0439</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEV</td>
<td>0.0100</td>
<td>0.0429</td>
<td>-0.0048</td>
<td>-0.0252</td>
<td>0.1127</td>
<td>-0.1282</td>
<td>0.0145</td>
<td>0.0214</td>
<td>-0.1064</td>
<td>0.3449*</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLI_TONE</td>
<td>0.0366</td>
<td>0.4478</td>
<td>-0.0287</td>
<td>0.4616</td>
<td>0.8160</td>
<td>0.5215</td>
<td>0.7088</td>
<td>0.2582</td>
<td>0.7088</td>
<td>0.3547</td>
<td>0.1713</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>FLI_EVID</td>
<td>0.1823</td>
<td>0.1382</td>
<td>0.2574</td>
<td>-0.1610</td>
<td>0.4774</td>
<td>-0.1613</td>
<td>0.3232</td>
<td>0.5261</td>
<td>0.1382</td>
<td>0.3328</td>
<td>0.3772</td>
<td>-0.0287</td>
<td></td>
</tr>
</tbody>
</table>

Notes: *, **, *** Significant at 0.10, 0.05 and 0.01 levels, respectively
and the highest correlation found between LEV and SIZE is very acceptable. The coefficients indicate that the multivariate statistical analysis is valid and reliable. Additionally, the data reveal statistically significant correlations between ROE and FLI_PERF (at 0.10 level) and between ROE and FLI_RISK (at 0.05 level). Furthermore, a positive association between SIZE and FLI_PERF is demonstrated (at 0.05 level). Table V displays the results of the OLS regression analysis.

The OLS regression results reveal that the amount of FLI is affected by profitability (ROE) and firm size (SIZE).

The association between ROE and FLI varies (positive or negative) depending on the type of information. SIZE is found to have a positive and statistically significant relationship with FLI_PERF, whereas the other independent variable (LEV) does not demonstrate any significant effect on the level of disclosure related to the future (i.e. FLI). Table V contains regression data regarding each model. Model 1 and Model 2 display the impact of firm characteristics respectively on FLI_QNT and FLI_COV. Models 3-8 show the relationship between firm characteristics and different categories of FLI (FLI_ORG, FLI_GOV, FLI_BUS, FLI_RISK, FLI_STR, FLI_PERF).

For hypotheses testing, regression data show that ROE influences specific categories of FLI disclosed in integrated reports, but it has no association with FLI_QNT and FLI_COV. In particular, regression results confirm that ROE affects positively FLI_RISK (Model 6) as expected (H1) and negatively FLI_STR (Model 7) and FLI_PERF (Model 8). Thus, H1 is not supported by empirical evidence for FLI_QNT (Model 1), FLI_COV (Model 2), FLI_STR (Model 7) and FLI_PERF (Model 8) and neither results concerning FLI_ORG (Model 3), FLI_GOV (Model 4) and FLI_BUS (Model 5) indicate any significant statistically association with ROE.

Regarding Model 7 and Model 8, the results reveal that ROE influences negatively FLI about “Strategy and resource allocation” (FLI_STR) and “Performance” (FLI_PERF). The value of the regression coefficients shows that companies with high profitability tend to disclose less FLI_STR (10 percent level) and less FLI_PERF (1 percent level). One probable reason for the results concerning these types of information is that managers may be reluctant to communicate information on future strategies and objectives, even if this information is extremely useful to improve analysts’ forecasts and transparency in capital markets. These findings disprove H1 but are consistent with a number of studies (Aljifri and Hussainey, 2007; Abed et al., 2011) that found a negative relationship between profitability and forward-looking disclosure. On the other hand, the existence of a significant positive relationship between ROE and FLI_RISK is likely occurring because such firms would convey a positive message to their creditors about risk and opportunities for the efficient running of capital markets.

Conversely, H1 is supported by Model 6 tested in our study. The results demonstrate a positive and statistically significant relationship between profitability and the variable FLI_RISK. The coefficient, significant at the level of 0.05, presents a value of 0.00635307 and the adjusted $R^2$ (0.161885) confirms that independent variables explain 16.18 percent of variation of the dependent variable. Hence, the OLS regression results demonstrate that profitable firms are more inclined to share FLI regarding “Risk and opportunities” with their stakeholders to assure them to assess opportunities and risks and to decrease risk premium in rate of ROE.

With reference to firm size effect, regression results show a positive and statistically significant relationship between SIZE and the variable FLI_PERF (Model 7), supporting H2 and corroborating previous FLI evidence (Kent and Ung, 2003). The coefficient, significant at the level of 0.05, suggests that bigger firms are likely to convey more information about future results, plans and projects to help stakeholders to forecast future financial performance.

Regarding the last independent variable, our H3 is not supported by the findings of our study. Regression analysis shows that LEV has an insignificant influence on the level of FLI.
### Model 1 – dependent variable: FLI_QNT

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>SE</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>const</td>
<td>1,234.25</td>
<td>282.85</td>
<td>1.3636</td>
</tr>
<tr>
<td>ROE</td>
<td>−19.0029</td>
<td>15.5426</td>
<td>−1.2226</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.0023843</td>
<td>0.0049673</td>
<td>0.4800</td>
</tr>
<tr>
<td>LEV</td>
<td>−50.6125</td>
<td>159.032</td>
<td>−0.3183</td>
</tr>
<tr>
<td>FLI_TONE</td>
<td>0.0327959</td>
<td>0.0924595</td>
<td>0.3547</td>
</tr>
<tr>
<td>FLI_EVID</td>
<td>0.00387298</td>
<td>0.00427524</td>
<td>1.3737</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.045336</td>
<td>Adjusted $R^2$</td>
<td>−0.034220</td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>−332.5707</td>
<td>P-value (F)</td>
<td>0.638473</td>
</tr>
<tr>
<td>Schwarz criterion</td>
<td>679.8970</td>
<td>Akaike criterion</td>
<td>673.1415</td>
</tr>
<tr>
<td>SE of regression</td>
<td>1,041.076</td>
<td>Hannan-Quinn</td>
<td>675.5840</td>
</tr>
</tbody>
</table>

### Model 2 – dependent variable: FLI_COV

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>SE</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>const</td>
<td>0.028939</td>
<td>0.00793447</td>
<td>3.6473</td>
</tr>
<tr>
<td>ROE</td>
<td>−4.75126e-05</td>
<td>0.000436</td>
<td>−0.1090</td>
</tr>
<tr>
<td>SIZE</td>
<td>−6.64397e-08</td>
<td>1.3934e-07</td>
<td>−0.4768</td>
</tr>
<tr>
<td>LEV</td>
<td>0.00207317</td>
<td>0.00446116</td>
<td>0.4647</td>
</tr>
<tr>
<td>FLI_TONE</td>
<td>0.0037015</td>
<td>0.0214269</td>
<td>1.5289</td>
</tr>
<tr>
<td>FLI_EVID</td>
<td>0.00387298</td>
<td>0.00427524</td>
<td>1.3737</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.008482</td>
<td>Adjusted $R^2$</td>
<td>0.074144</td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>86.68742</td>
<td>P-value (F)</td>
<td>0.957972</td>
</tr>
<tr>
<td>Schwarz criterion</td>
<td>−158.6193</td>
<td>Akaike criterion</td>
<td>−165.3748</td>
</tr>
<tr>
<td>SE of regression</td>
<td>0.028178</td>
<td>Hannan-Quinn</td>
<td>−162.9323</td>
</tr>
</tbody>
</table>

### Model 3 – dependent variable: FLI_ORG

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>SE</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>const</td>
<td>0.398411</td>
<td>0.0653797</td>
<td>6.0938</td>
</tr>
<tr>
<td>ROE</td>
<td>−0.00523031</td>
<td>0.00356079</td>
<td>−1.4689</td>
</tr>
<tr>
<td>SIZE</td>
<td>4.26228e-07</td>
<td>1.3934e-07</td>
<td>0.3767</td>
</tr>
<tr>
<td>LEV</td>
<td>0.00111815</td>
<td>0.0033498</td>
<td>−0.3844</td>
</tr>
<tr>
<td>FLI_TONE</td>
<td>0.00735601</td>
<td>0.0035338</td>
<td>0.7099</td>
</tr>
<tr>
<td>FLI_EVID</td>
<td>0.011815</td>
<td>0.0033498</td>
<td>0.3557</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.008482</td>
<td>Adjusted $R^2$</td>
<td>0.074144</td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>86.68742</td>
<td>P-value (F)</td>
<td>0.957972</td>
</tr>
<tr>
<td>Schwarz criterion</td>
<td>−158.6193</td>
<td>Akaike criterion</td>
<td>−165.3748</td>
</tr>
<tr>
<td>SE of regression</td>
<td>0.028178</td>
<td>Hannan-Quinn</td>
<td>−162.9323</td>
</tr>
</tbody>
</table>

### Model 4 – dependent variable: FLI_GOV

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>SE</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>const</td>
<td>0.163089</td>
<td>0.0694181</td>
<td>2.3494</td>
</tr>
<tr>
<td>ROE</td>
<td>0.0033847</td>
<td>0.00381453</td>
<td>0.8873</td>
</tr>
<tr>
<td>SIZE</td>
<td>4.9999e-07</td>
<td>1.2912e-06</td>
<td>−0.4101</td>
</tr>
<tr>
<td>LEV</td>
<td>0.0163089</td>
<td>0.0378249</td>
<td>0.3844</td>
</tr>
<tr>
<td>FLI_TONE</td>
<td>0.0006063</td>
<td>0.0292045</td>
<td>0.6997</td>
</tr>
<tr>
<td>FLI_EVID</td>
<td>0.037923</td>
<td>Adjusted $R^2$</td>
<td>0.042250</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.008482</td>
<td>Adjusted $R^2$</td>
<td>0.074144</td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>−0.069829</td>
<td>P-value (F)</td>
<td>0.02441</td>
</tr>
<tr>
<td>Schwarz criterion</td>
<td>14.89518</td>
<td>Akaike criterion</td>
<td>8.138659</td>
</tr>
<tr>
<td>SE of regression</td>
<td>0.255505</td>
<td>Hannan-Quinn</td>
<td>10.58224</td>
</tr>
</tbody>
</table>

### Model 5 – dependent variable: FLI_BUS

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>SE</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>const</td>
<td>0.177080</td>
<td>0.0796281</td>
<td>2.7121</td>
</tr>
<tr>
<td>ROE</td>
<td>0.0033847</td>
<td>0.00381453</td>
<td>0.8873</td>
</tr>
<tr>
<td>SIZE</td>
<td>2.55886e-07</td>
<td>1.1038e-06</td>
<td>−0.5107</td>
</tr>
<tr>
<td>LEV</td>
<td>0.0163089</td>
<td>0.0378249</td>
<td>0.3844</td>
</tr>
<tr>
<td>FLI_TONE</td>
<td>0.00278929</td>
<td>0.9855622</td>
<td>1.6611</td>
</tr>
<tr>
<td>FLI_EVID</td>
<td>0.0098921</td>
<td>0.0066888</td>
<td>1.5641</td>
</tr>
</tbody>
</table>

Table V. OLS regression analysis

(continued)
In particular, regression results disprove a correlation between this independent variable and all the measures of FLI considered in the analysis as dependent variables. This is in contrast with $H3$ which states that the extent of FLI disclosed in integrated reports is positively related to leverage. Hence, $H3$ is rejected, although our findings are consistent with a number of previous studies which suggested an insignificant relationship between this variable and disclosure of FLI. For example, Aljifri and Hussainey (2007) disproved an association between the level of forward-looking disclosure and debt ratio. As well, Celik et al. (2006) showed an insignificant relationship between leverage and the extent of FLI. Finally, no statistically significant effect is highlighted for the control variables FLI_TONE and FLI_EVID.

The results of the sensitivity test where we added the explanatory variable EUROPE are also explored. The results confirm the positive and statistically significant association

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>SE</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^2$</td>
<td>0.047521</td>
<td>Adjusted $R^2$</td>
<td>−0.061156</td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>−0.026829</td>
<td>$P$-value (F)</td>
<td>0.802448</td>
</tr>
<tr>
<td>Schwarz criterion</td>
<td>12.90616</td>
<td>Akaike criterion</td>
<td>7.638659</td>
</tr>
<tr>
<td>SE of regression</td>
<td>0.199968</td>
<td>Hannan-Quinn</td>
<td>11.16244</td>
</tr>
</tbody>
</table>

**Model 6 – dependent variable: FLI_RISK**

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>SE</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^2$</td>
<td>0.2622</td>
<td>Adjusted $R^2$</td>
<td>4.1357</td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>−271.2364</td>
<td>$P$-value (F)</td>
<td>0.092028</td>
</tr>
<tr>
<td>Schwarz criterion</td>
<td>557.4084</td>
<td>Akaike criterion</td>
<td>550.6528</td>
</tr>
<tr>
<td>SE of regression</td>
<td>225.1805</td>
<td>Hannan-Quinn</td>
<td>553.0554</td>
</tr>
</tbody>
</table>

**Model 7 – dependent variable: FLI_STR**

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>SE</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^2$</td>
<td>0.249659</td>
<td>Adjusted $R^2$</td>
<td>5.0507</td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>−12.27195</td>
<td>$P$-value (F)</td>
<td>0.339778</td>
</tr>
<tr>
<td>Schwarz criterion</td>
<td>−12.27195</td>
<td>Akaike criterion</td>
<td>−19.02746</td>
</tr>
<tr>
<td>SE of regression</td>
<td>0.181936</td>
<td>Hannan-Quinn</td>
<td>−16.58488</td>
</tr>
</tbody>
</table>

**Model 8 – dependent variable: FLI_PERF**

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>SE</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^2$</td>
<td>0.20622</td>
<td>Adjusted $R^2$</td>
<td>4.1357</td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>−100.1545</td>
<td>$P$-value (F)</td>
<td>0.37926</td>
</tr>
<tr>
<td>Schwarz criterion</td>
<td>221.9568</td>
<td>Akaike criterion</td>
<td>220.3088</td>
</tr>
<tr>
<td>SE of regression</td>
<td>0.441663</td>
<td>Hannan-Quinn</td>
<td>233.1462</td>
</tr>
</tbody>
</table>

Notes: *,**,***Significant at 0.10, 0.05 and 0.01 levels, respectively

Table V.
between ROE and FLI_RISK, in support of \( H1 \). FLI_STR and FLI_PERF are negatively and significantly associated with ROE, while SIZE is significantly related to FLI_PERF, in support of \( H2 \). The results do not demonstrate any significant relationship between LEV and FLI, not confirming \( H3 \). In brief, the results of the sensitivity tests support the findings of all the models. Finally, as underlined in Section 4, the robustness of the data collected is supported by the evidence of the VIF analysis in all the models where no problem of collinearity appears between explanatory variables.

5. Conclusions and further studies

The aim of this paper is to investigate the effect of three firm characteristics on forward-looking disclosure within the context of IR. First, the core results of the univariate analysis show that firms disclose little FLI. The evidence collected also confirms that integrated reports typically contain little quantitative FLI, in line with the previous disclosure literature. Furthermore, this first step of the analysis fills the research gap into the topics of FLI in the IR, providing an answer to prior calls for research on the quality of FLI provided in IR. The regression results for the sample of 282 firms show that profitability (ROE) and firm size (SIZE) are associated with FLI. On the contrary, our findings demonstrate that the independent variable LEV has no correlation with the level of FLI. Profitability is found to be significantly related to specific types of FLI disclosed in integrated reports. This result is consistent with previous empirical research that suggests a relationship between disclosure and firm performance (Merkley, 2014). In particular, the regression results demonstrated a negative and statistical significant association between ROE and the amount of FLI on “Strategy and resource allocation” (FLI_STR) and “Performance” (FLI_PERF). On the contrary, the findings confirm a positive association between ROE and FLI about “Risks and opportunities” (FLI_RISK), in line with \( H1 \). With reference to firm size (SIZE), the multivariate analysis verified that bigger firms tend to communicate more FLI_PERF than smaller ones, consistent with \( H2 \). Furthermore, the evidence does not show any significant relationship between FLI and leverage (LEV), not supporting \( H3 \). The univariate analysis shows a low disclosure level of FLI being IR largely a form of voluntary disclosure (with exceptions, i.e. South Africa and Brazil). IIRC (2013) proposed a framework to assist in the preparation of IR but no existing disciplines require companies to display FLI concerning specific items within IR. Anyway, these proposals are non-mandatory guidelines issued by IIRC for the preparation of a decision-useful IR and the extent of forward-looking disclosure is left to the discretion of management (Marquardt and Wiedman, 2005; Li, 2008; Athanasakou and Hussainey, 2014).

This study is deemed to contribute to the current literature concerning FLI. Even though there are a wide number of disclosure studies, only a few are focusing on disclosure in integrated reports. This research adds to the prior literature and it will improve the perception of the variables that could impact on FLI within the context of IR. There are a very restricted number of studies that have explained the variation of FLI in the light of firm characteristics and moreover acquired results are ambiguous. The findings imply a step forward in the disclosure literature and have several important implications. First, the results provide comprehensive insights into the current forward-looking disclosure practices of early adopters in integrated reports and can be a useful evidence for preparers of it, since no research paper has examined the determinants of FLI in such a context yet. Second, the study will assist investors in their decision-making process and will especially be significant for the institutional ones looking for profitable and secure investment opportunities. This paper has also practical implications especially for managers, who may strategically use this information when they design disclosure policies to influence investors. The study has also implications for regulators (e.g. IIRC) in the preparation of rules and recommendations about disclosure requirements since it encourages further efforts to promote FLI.
It is hoped that this study will enhance the understanding of the factors that affect FLI disclosure and will fuel the debate concerning the need for the establishment of specific guidelines regarding the disclosure of FLI in financial reporting. Based on this study, future research may be conducted by inspecting more variables potentially affecting the extent of FLI or by increasing the number of companies analyzed. In further studies, relationship among disclosure of FLI, structural variables, performance variables and the level of development of capital markets could be tested for some other emerging markets. By doing this, the quality and the reliability of the findings may be improved and thus users of annual reports may be better pleased.

As with any research, this study has some limitations which provide avenues for further research. First, the research is restricted to firms’ reports that are available in the Integrated Reporting Emerging Practice Examples Database as of December 1, 2015. The dimension of the sample could be extended, by analyzing more companies as soon as their reports are available in the IIRC database. Second, the items composing the disclosure index were subjectively combined from the existing IIRC’s Framework of good practice (Kabalski, 2012) regarding IR (IIRC, 2013). Third, the measure of FLI is based on an unweighted approach. As a result, the application of an equal weight for each word referring to FLI in the content analysis does not reflect the importance of disclosure as perceived by users. For instance, quantitative forward-looking disclosure items are more relevant than other types of information and some disclosure topics may have a greater value relevance over other items to one particular industry than to others. Regarding this limitation, future research may be carried out by assigning more weight to more relevant FLI for stakeholders’ information needs.

References


About the author

Elisa Menicucci is Assistant Professor of Business Administration at the University of Roma Tre since June 2016. Menicucci received the Degree in Economics and Business Administration from the Faculty of Economics, Polytechnic University of Marche, 110/110 cum laude, in 2002, the Degree in Economics and Management from the Faculty of Economics, Polytechnic University of Marche, 110/110 cum laude, in 2004, and the PhD Degree in Business Administration from Polytechnic University of Marche, in 2009. Menicucci is a Temporary Professor in Business Administration at the Polytechnic University of Marche; has been a Teaching Expert in Business Valuation at LUMSA University. Menicucci’s research activity includes business administration accounting in banking sector, business valuation, IAS/IFRS and Integrated Reporting. Elisa Menicucci can be contacted at: elisa.menicucci@uniroma3.it

For instructions on how to order reprints of this article, please visit our website: www.emeraldgrouppublishing.com/licensing/reprints.htm
Or contact us for further details: permissions@emeraldinsight.com
Exposing organizational tensions with a non-traditional budgeting system

Nicolas Berland
University Paris Dauphine, PSL Research University CNRS,
UMR, DRM – MOST, Paris, France
Emer Curtis
Discipline of Accounting and Finance, National University of Ireland, Galway,
Ireland, and
Samuel Sponem
HEC Montréal, Montreal, Canada

Abstract

Purpose – The Beyond Budgeting movement has argued that traditional budgets failed to contribute to the management of tensions associated with the increasing complexity of business models. The literature has reported a range of budgeting practices developed to address these problems, which the authors refer to collectively as “non-traditional (NT) budgets.” The purpose of this paper is to consider how the design and use of a NT budgeting system facilitates the management of multiple organizational tensions.

Design/methodology/approach – The study reports the findings of an in-depth case study on three business units (BUs) of the French chemical giant SSB, a company that implemented a NT budget inspired by the Beyond Budgeting Round Table model.

Findings – The authors provide detailed empirical insights into the design and use of a NT budgeting system and analyze the manner in which the new system exposes organizational tensions across multiple axes.

Research limitations/implications – It is a limitation of the study that only three of SSB 21 BU’s which implemented the NT budget project were examined in depth. This limitation is mitigated to some extent by the review of audit reports in respect of the implementation of the NT budget in a total of 15 BU’s.

Practical implications – The study contributes a means of analyzing NT budgets in terms of the different types of organizational tensions generated, which should be of use to both researchers and practitioners in researching, designing, and evaluating NT budgets.

Originality/value – This study provides detailed empirical insights into the design and use of a NT budgeting system and evidence of the success of this system in exposing organizational tensions across multiple axes. The study illustrates how productive tensions can be generated through the analysis of discrepancies between alternative views of organizational performance.

Keywords Budget, Tensions, BBRT, Non-traditional budgeting

Paper type Case study

Introduction

Traditional budgeting practices are built on a mechanistic vision of an organization, ideally suited to a controllable process and an analyzable environment (Ansari, 1979). Uncertainty and inherent tensions are acknowledged, but management control systems (MCSs) aim to constrain their impact on the implementation of a predefined strategy (Anthony, 1965).

The increasing complexity of business models built on innovation, customer orientation, and a market logic are characterized by the increasing importance of organizational tension and paradox (Davila, 2010; Simons, 1995; Smith and Lewis, 2011). These developments have complicated strategic management and given rise to a consequent demand for MCS that expose a range of tensions. For example, Simons (1995) identified a range of tensions to be managed between innovativeness and predictable goal achievement, unlimited opportunity
and limited attention, intended and emerging strategy and between self-interest and the desire to contribute. The ambidexterity literature points to the challenge of managing tension between exploration and exploitation (Bedford, 2015; Ylinen and Gullkvist, 2014). The accounting literature on global organizations identifies tensions between vertical and lateral relations, centralization and decentralization and between standardization and differentiation (Busco et al., 2008). If MCSs fail to expose such tensions in a coherent and consistent way, there is a risk that they will be managed on an ad hoc basis, if at all.

The development of complex business models has resulted in significant criticism of traditional budgets that suppress tensions, focusing on predictable goal achievement at the expense of creative innovation (Hansen and Van der Stee, 2004; Hope and Fraser, 2003; Libby and Lindsay, 2010). Prior literature has pointed to problems created where budgets are used for both planning and performance evaluation, and noted particularly that the use of budgets for performance evaluation can lead to dysfunctional behavior (e.g. Samuelson, 1986). The Beyond Budget Round Table (BBRT) movement has proposed alternatives to traditional budgets that seek to address such imbalances (Hope and Fraser, 2003). Rather than suppressing tensions within a single control system, the proposed alternatives seek to break the single traditional budgeting process into a range of control processes better suited to the diverse roles of planning, forecasting, and performance evaluation.

While developments of budgeting in line with some of the ideas set out by Hope and Fraser (2003) have been reported, recent research has not found evidence of widespread abandonment of budgeting (Libby and Lindsay, 2010; Sponem and Lambert, 2016). Rather than demonstrating the existence of one BBRT model, recent studies suggest the existence of a variety of budgetary practices that potentially address a range of organizational tensions (Bourmitrov and Kaarboe, 2013; Hentt-Aho and Jarvinen, 2013; Østergren and Stensaker, 2011). For the purposes of this paper, we loosely define such alternative practices as “non-traditional” (NT) budgetary practices. We consider that key feature of such practices is that they seek to replace the traditional annual budgets with a range of practices that decouple the conflicting roles of traditional budgets.

There is, however, a dearth of empirical evidence about the design and use of such NT budgeting systems. Calls have been made for researchers to study alternative approaches to budgeting in their organizational context and in relation to other control practices (Malmi and Brown, 2008). Further, these newer forms of budgets have not been analyzed in terms of their ability to generate or manage the organizational tensions that prompted their development in the first place. Thus, the objective of this paper is to provide empirical evidence about the design and use of NT budgets and to explore their role in managing organizational tensions. The study also considers the outcomes of decoupling planning and performance evaluation roles of budgets for the generation and management of organizational tensions. Thus our research question is as follows:

**RQ1.** How can a non-traditional budgeting system facilitate the management of multiple organizational tensions?

This research reports the findings of an in-depth case study on a French chemical giant SSB (a pseudonym) that replaced its annual budgeting process with a new control system. SSB was an early adopter of Beyond Budgeting ideas set out in Hope and Fraser’s (2003) seminal text. The paper contributes to the literature by providing detailed empirical insights into the design and use of a NT budgeting system. The system described in this study incorporates two managerial innovations. First, it facilitates strategic validity control (Ferreira and Otley, 2009) through imposing a tight limitation on the number strategic actions (SAs) and associated action plans (APs) pursued by the company. Second, the system supports the creation of “partial budgets” based on APs, rather than a bottom-up, line-by-line budget.
The case contributes evidence of the success of this system in exposing organizational tensions across multiple axes. It suggests that exposing tensions with a NT budgeting system can help to resolve classical management dilemmas. We identify a prioritizing tensions that help to check if limited management attention sufficiently focused; an innovation tension that provokes discussion about the level of balance between innovation and predictable goal achievement; a cross-functional tension that invites analysis of whether the demands on functional areas are consistent with their capacity to deliver on strategy implementation; a performance measurement tensions that presents alternative insights into the financial implications of actions; and a strategic tension that creates opportunities to adapt the strategy.

The study illustrates how productive tensions can be generated through the analysis of discrepancies between alternative views of organizational performance portrayed by the decoupled elements of the NT budget, and between the NT budget and other unrelated control systems used by the company. While under traditional budgeting practices, discrepancies are typically viewed as a problem and tensions are to be considered as dysfunctional behaviors, in the context of this NT budget, they are viewed as useful, providing insightful information about uncertainties the organization must deal with.

The remainder of this paper is set out as follows. The next section considers prior literature about tensions and MCS. Research methods used in the study are then described, followed by a presentation of the findings. This is followed by a discussion, and conclusion and limitations of the study.

Literature review

In setting out prior literature relevant to our research question, we consider tensions at three levels. First, there are tensions inherent in the organization irrespective of any form of budgeting or other control system (Simons, 1995). Second, the literature has identified the capacity of MCS such as budgets to expose or generate productive organizational tensions (Mundy, 2010). Finally, the literature has pointed to tensions between the different roles that budgets have sought to fulfill simultaneously (Barrett and Fraser, 1977). These tensions are considered in the next three sub-sections.

Organizational tensions

Consideration of organizational tensions to explain managerial phenomena has been a subject of research in the strategic management literature for some time, leading to the development of the ambidexterity literature and paradox theory (e.g. Smith et al., 2010; Smith, 2014; Smith and Lewis, 2011). The range and definition of specific types of tensions to be managed identified in the prior literature has varied significantly. Simons (1995) identified three types of tensions that must be balanced to facilitate the control of business strategy, namely unlimited opportunity vs limited attention, intended vs emergent strategy, and self-interest and desire to contribute. Other types of organizational tensions to be managed have also been identified in the literature. Seal and Mattimoe (2014) pointed to the tension between different functional areas; Mundy (2010) referred to the much debated tensions between long- vs short-term performance; Busco et al. (2008) identified numerous organizational tensions associated specifically with the integration of global organizations. Focusing on the ambidexterity literature, Bedford (2015, p. 13) pointed out that “exploration and exploitation are also closely related to other fundamental organizational tensions – e.g. incremental and radical innovation (Abernathy and Clark, 1985; Davila et al., 2009; Tushman and O’Reilly, 1996) […] [and] […] variation-reducing and variation-increasing strategic processes” (Adler et al., 1999; Burgelman, 1991; Burgelman and Andrew, 2001).

Clearly, the tensions identified in prior literature set out above do not represent an exhaustive list, nor are tensions identified in prior literature necessarily relevant in all firms. It seems unlikely that a comprehensive list could be drawn up, given that tensions are likely
to vary with the context and contingencies of particular firms and industries. However, prior literature does provide a good starting point for the analysis of MCS in terms of their capacity to manage organizational tensions.

The role of MCS in managing organizational tensions
The role of tensions in the design of control systems has attracted the attention of researchers in the MCS literature (e.g. Bedford, 2015; Simons, 1995; Ylinen and Gullkvist, 2014). Organizational tensions, such as the tension between creative innovation and predictable goal achievement (Simons, 1995), exist independently of any MCS. However, MCS can have a significant impact on the manner in which management’s attention is drawn to such tensions through the information they produce. Thus, MCSs have the capacity to expose organizational tensions.

Prior literature also points to the capacity of MCS to generate tensions. Marginson (2002) noted that “top management’s use of KPIs creates tension [...] Tensions and the possibilities for trade-offs created by the simultaneous use of several organizational performance measures may lead to an organizational bias in favour of one or more measures and at the expense of others” (p. 1027). Prior literature has also highlighted that tensions can be generated between different systems of control. For example, Simons (1995) argued that four levers of control allow management to use MCS to balance organizational tension between creative innovation and predictable goal achievement. He argues that countervailing forces generate dynamic tension when MCS are used as levers of control in opposing ways. Henri (2006) reasoned that dynamic tension can result from the balanced use of a single control system (a performance measurement system in his study) in an interactive and diagnostic fashion. Mundy (2010) presented findings on the sequential use of levers of control by management to achieve a balance that allows “productive tensions to materialize” (p. 515). Kruis et al. (2016) provided empirical insights into the different configurations of the levers used by firms to balance the tensions they experience between creative innovation and predictable goal achievement. They identified four distinct patterns of balance in their study: strategic vigilance, strategic exploitation, strategic responsiveness and strategic stability. Tillema and van der Steen (2015) identified tensions between traditional control systems and a newly introduced lean management system. They demonstrate how such tensions induce processes of colonization, decoupling, compromising, incremental implementation or obscuring, as organizational actors attempt to reconcile these tensions.

Organizational tensions and budgets
Literature setting out the dysfunctional consequences of budgeting has been around for decades (Argyris, 1952; Barrett and Fraser, 1977; Hopwood, 1972). Traditional budgeting systems are a cybernetic form of control that include planning, measurement, and performance evaluation elements (Flamholtz, 1983). This traditional budgeting has been criticized for being too costly, fostering a culture of compliance and not enabling the coupling of strategy and operations (Ekholm and Wallin, 2000; Hansen et al., 2003). These studies have particularly noted that tension is generated when the articulated or intentional use of budgets is for organizational planning, whereas they are actually used for individual performance evaluation (Hansen et al., 2003; Samuelson, 1986). These critiques are leveled at the more or less centralized nature of the budgeting process rather than at the tool itself (Libby and Lindsay, 2010), and suggest the need to reposition budgeting within its organizational context.

The turn of the twenty-first century has brought renewed efforts to unseat this highly ingrained practice emanating from the BBRT, CAM-I, and other academic quarters. The BBRT proposed the abandonment of budgeting in favor of the model adopted by
Svenska Handelsbanken where the annual budget was replaced by decoupling the roles of planning and performance evaluation. Proponents proposed the development of a “rolling forecast” based on multiple, frequently changing parameters (Wallander, 1999) and the removal of a fixed performance contract in favor of relative performance evaluation, thus decoupling target setting from forecasting (Hope and Fraser, 2003).

In arguing for new practices, Hope and Fraser (1997) pointed to the changes encompassed in a world where stability is replaced by turbulence, time to market and innovativeness are the primary drivers of economic success, and national frontiers give way to a globalized market. However, they underline that the importance of “old world” focus on internal performance, incremental change and cost reduction does not diminish with an emerging focus on competitor performance, radical innovation and value creation. This creates tensions that cannot be adequately addressed by traditional budgets.

Despite the criticisms of traditional budgeting and some reports of non-budget organizations (OGrady and Akroyd, 2016), calls by Hope and Fraser have not resulted in widespread abandonment of budgeting (Libby and Lindsay, 2010). In fact, recent research has reported a huge diversity of budget designs and uses (Sponem and Lambert, 2016). Frow et al. (2010) supported this, suggesting that firms who claim to have profoundly modified budgeting processes have made adaptations rather than radical abandonments. A small number of recent studies have explored in-depth the nature of the changes made in companies claiming to have substantially modified their budgeting systems (Bourmistrov and Kaarboe, 2013; Elmassri and Harris, 2011; Henttu-Aho, 2016; Henttu-Aho and Jarvinen, 2013; Östergren and Stensaker, 2011; Sandalgaard and Bukh, 2014). While identifying some common elements to such developments, these authors have also reported fragmentation in modified budgeting practice. Thus there are questions to be addressed regarding how these NT budgeting practices are functioning and whether they are succeeding in facilitating the management of the types tensions identified by Hope and Fraser (1997).

The relative lack of in-depth research on NT budgets adds weight to the arguments of critics who have claimed for decades that theoretical development of these MCS has been overlooked because researchers have focused more on what can be measured than on organizational practices (Briers and Hirst, 1990; Libby and Lindsay, 2010). Ferreira and Otley (2009) criticized researchers for focusing on specific aspects of MCS alone and for not taking a holistic view of how new MCSs operate as part of a package of controls (Malmi and Brown, 2008; Östergren and Stensaker, 2011). These studies call for researchers to study alternative approaches to budgeting in their organizational context, and notably in relation to other control practices.

Research methods
Research site selection
The findings in this paper are drawn from an intensive case study carried out over a four-year period on the French company SSB, a world-class firm in the chemicals industry. The firm was created in 1998 following a spin-off between Sanofi and Hoechst imposed by the European Commission. When the study began, the firm employed 30,000 people, its turnover exceeded €7.4 billion and it marketed products in more than 150 countries.

The case study was chosen on the basis of a theoretical sampling (Yin, 1994). The firm announced publicly that it had abolished its budget and was one of the case studies cited in Hope and Fraser’s (1997) book. Following an article in the press about the ongoing experience of implementing this NT budget system, the project manager was contacted directly to seek access for an in-depth study. One of the authors took up a position as a non-participative observer in the firm. Thus, the researchers had extensive access to both documentary evidence and interviewees over a four-year period. This access facilitated in-depth insights into the significant changes that were going on in the organization at the time.
Data collection and analysis methods

We approached this qualitative field study as an interpretative process (Denzin and Lincoln, 2011) considering that the main task of the researcher is to “make sense of his or her observations by moving back and forth between data, theory, and related literature” (Jordan and Messner, 2012, p. 548). In order to acquire the necessary proximity to the research site, prior to commencing the interviews with managers responsible for implementing and operating the new NT budgeting system, we sought to understand the motivations for abandoning traditional budgets together with the objectives and intended design of Spring. This was obtained through interviews with the chief operating officer, the project manager who headed up the Spring project and the World Class Manufacturing manager.

During the field research, the firm was organized into a classic divisional structure. A management board oversees eight divisions split into 21 business units (BUs). Three BUs were studied in-depth to provide empirical evidence about the implementation of NT budget in practice.

In each of these BUs, the director, two operational managers (BU managers or functional heads), and the management controller were interviewed. A fourth BU (BU 6 in Table A1) was subject to a smaller number of interviews (notably with the managerial accountant). Eight plant directors were also interviewed.

A total of 33 semi-structured interviews were conducted during the study, including 12 separate interviews with the project manager (see Table A1). Themes investigated during the interviews included: strategy, control systems, performance assessment, rewards, budgeting process, the ways managers learn, and the benefits they draw from the budget. Evidence collected from interviewees was supplemented by internal documents and audit reports from 15 BUs relating to the implementation of the NT system, which were conducted by the Group COO and the Spring project manager. Other documentary evidence in the form of international presentations, consultants’ reports and financial reports were used to corroborate interview evidence.

We wrote a factual and descriptive report of the empirical findings for the three cases examined in-depth. Oral and written reports were presented to the interviewees. Their critical comments were invited to ensure the validity of the interpretations by the researcher. Similarly, the eight plant directors interviewed were provided with written notes of their interviews for their comment and finally an overall summary of the case study was prepared and presented both orally and in writing to the project manager for his comment. In addition, classroom case studies developed from the data were presented to MBA students and subject to interpretation and critical analysis.

We carefully analyzed and compared the cases and identified common themes and important issues concerning the use of the new system implemented. We then re-organized the original transcripts around key issues and gathered evidence of the generation, exposure, and management of organizational tensions. In conducting this analysis, we were conscious of such tensions that had been previously identified in prior literature; however, the analysis was not limited to those tensions. Analysis of tensions was conducted independently by two researchers, discussed and debated at length and evidence supporting this analysis was gathered in the form of quotations from interviewees.

Findings

Background

From its creation in 1998, SSB was operating in difficult circumstances with, for example, declining markets and heavy debt. In order to address the difficulties SSB introduced a project to replace the traditional budgeting system.

Top management reported that the organization had become completely sterilized by the traditional and mechanistic budgeting process. The traditional budget in use in SSB was viewed
as a strongly compliance-based process which was conducted almost exclusively by management accountants. Most variances from set targets were explained by management accountants and dealt with through a process of justifying variances after the fact. The result of this was that some managers got bogged down in the detail of line by variances and paid little attention to strategic priorities. Links with strategy were poor, with little by way of innovation emanating from the process. It was largely perceived as a device to keep expenses in line with budgetary plans regardless of the developing economic and business situation. The culture of conformity was very strong and lacked a strategic focus.

Before action plans were like plasters on wooden legs. Let me explain: we did the budget and when everything was wrapped up, we looked for which action plans we could implement. Obviously, the exercise was impossible. Action plans were constrained by the figures in the budget and the game was to calibrate our actions in relation to the budget and not in relation to the challenges the BU had to face (BU 14 Plant Manager).

SSB launched a new set of MCSs, collectively known as “Spring” to revitalize the firm’s management processes. The next section analyzes findings in relation to three types of tensions exposed in the strategic and action planning phase: prioritizing tension, innovation tension, and cross-functional tension. The following section analyzes two types of tensions exposed during the implementation and monitoring phase: strategic tension and performance measurement tension.

**Exposing tensions in strategic and action planning**

**Prioritizing tensions**

The strategic planning system generally commences in February each year with the corporate management team setting out the vision, mission, values, and overall corporate strategy for a five-year period. The BUs are then tasked to set out a strategy to meet these top-down objectives leading to the identification of a limited set of key value drivers (KVDs) for the BU. This process takes place in the period from March to May. Once the strategy is agreed at BU level, it must be distilled to a maximum of five SAs to achieve the KVDs. The imposed limitation of five SAs creates a prioritizing tension for senior managers between the unlimited opportunities that they perceive and the limited capacity of their attention.

In a second step, between May and September, action planning is undertaken whereby a maximum of five APs are devised in order to drive operational activity to achieve each SAs. The limit on the number of APs imposed by the Spring system on the directors of the BUs aimed to create an additional prioritizing tension.

A significant benefit of this design is the capacity of the system to create a strong focus for management attention around SAs and associated APs. One operational manager explains the benefits of this focus:

We define too many actions plans and improvement plans. People are happy to be extracted from their day to day routine but most of the time we want to do too many things, with too many actions plans, with unclear aims associated to each of them (BU 9 Plant Manager).

Some of the plant managing directors did not fully grasp the profoundly participative nature of this system. For instance, some managing directors drew up APs they had produced on their own, without conferring with their teams. This produced plans that reflected singular viewpoints on the business:

Their teams discovered the Spring action plans at the same time as we did [the project team and the managing director] during a summary meeting. Also, we quickly realized in the months that followed the implementation of the action plans that a number of constraints, that had in fact been known to some [subordinates] all along, had not been taken into account and everything had to be redone (Head of Spring Project).
These discussions force debates about the tension between unlimited opportunity and limited attention. However, the trade-offs made in these discussions are not necessarily clear. To probe such trade-offs, senior managers are encouraged to focus on the “opportunities to be avoided” (Simons, 1995), in other words, what falls outside the boundaries delineated by the five SAs:

When I ask people what their priorities are, they always have a list to recite. On the other hand, when I ask them what priorities they have had to drop, the answer takes time when, in all logic, they should also have a list. It’s a sign that the work has not been done well (Chief Operating Officer BU 3).

This type of probing generates more prioritizing tension between unlimited opportunity and limited management attention (Simons, 1995), as operational managers are required to justify their chosen SAs.

**Innovation tension**

In addition to compelling managers to deal with the tension between unlimited opportunity and limited attention, the use of the prioritizing process creates a forum for cross-functional, bottom-up, and top-down discussion and debate where strategic choices can emerge. The negotiation of appropriate APs between senior and operational managers within the BUs exposes an axis of tension between creative innovation and predictable goal achievement. We label this tension as innovation tension. The following quotation of a general manager illustrates this phenomenon:

Focusing on the most significant strategic actions is not at all straightforward. It can lead you to think about only one marginal part of the whole issue. Dividing things 80/20 was carried out at the management board level of the business unit. At E&C [another company division], there was a two-day seminar to think this through. Everything went well on the first day. The second day, I asked what part of turnover we would build the strategy on and there I saw that we were talking about 40% of turnover (or even less). Why? Because talking about what we call “commodities” with defensive strategies is not very salesman-like. We prefer to talk about the “specialties”. However, there are very few real ‘specialties’ at SSB […] (BU 3 General Manager).

This quote shows that debates over the choice of SAs generates tension between “business as usual”, what the interviewee refers to as “commodities” and “creative innovation.”

**Cross-functional tensions**

SSB developed a cross-functional matrix that links KVDs and SAs to the departments or functions responsible for delivering them. This internal tool is used as a way to expose potential cross-functional tensions before they emerge as a problem. Figure 1 provides an illustration of the impact matrix.

In Figure 1, the impact matrix uses color codes (red, orange and green, respectively, for high, medium, and low, seen as shaded boxes in the diagram) to illustrate the impact of each SA on each function involved in its delivery. It is also used to identify the appropriate function to lead each SA. For example, consideration would be given to finding a suitable leader from either production or sales for the second SA, and the leader will need sufficient credibility to influence resource allocation across all three departments involved in delivering on the SA. Thus, the impact matrix identifies where the combined impact of proposed SAs may make excessive demands on a particular function. As such, this tool seeks to manage potential tensions between functions.

The need for this tool was recognized as a result of problems achieving the objectives set by APs that were launched without a cross-functional assessment of the resources required
to support them. One manager describes an example where APs were selected, ignoring the impact matrix:

The impact matrix wasn’t used. [The General Manager] insisted on its use to select projects and to justify the abandonment of some non-strategic projects to the corporate management team. Trade-offs between long term and short term ought to be justified too (Manager BU 3).

The impact matrix exposes potential cross-functional tensions before they emerge during the implementation of SAs, by which time bottlenecks in particular departments could frustrate progress on multiple SAs.

Exposing tensions during the implementation and monitoring phases

Performance measurement tensions

The new control systems created on the one hand, a form of partial budget related to specific actions plans, and on the other hand a full financial forecast for external users. Operational managers set the partial budgets for each SA and AP over five quarters on a rolling basis, focused on four key indicators: turnover, operating result, capital expenditure, and free cash flow. These estimates are used as inputs into the software package developed to support the action planning, which stands-alone, independent from other management accounting systems. Operational managers find setting targets for APs a challenging process:

We had to explain that targets came from action plans: targets must flow up the reporting line. At the beginning, there was drift; people were setting operational targets centrally. However, the aim was for the operational manager himself to convey the figure upwards (once a quarter) with the help of the management accountant who helps him to construct his cost model. Then, he discusses his targets with his superior. The latter does not accept the targets as such, but considers it and then sends it on upwards (Head of Spring Project).

Target setting obliges managers to think through the economic consequences of their actions and explain their financial results in operational terms:

Each level must make strategy proposals and show their impact on results. This exercise is in fact almost impossible because it is often very difficult to say what the costs and benefits are that arise from such and such actions in particular. But the value of the exercise does not stem from the figures produced so much as from the effort required to justify actions which strengthens cohesion in decision making and thus triggers probing debate, since figures can, by nature, always be disputed (Head of Spring Project).
Two years ago, we asked the finance director to explain why fixed overheads had risen. Now, it is for managers to answer this sort of question because they input data into [Spring] and are responsible for their figures (Head of Spring Project).

Naturally the company continues to produce detailed monthly management accounts based on a standard costing system.

Independent of the financial targets set for APs, a rolling forecast is prepared. In order to avoid the game playing effects that could negate both the relevance and reliability of the forecast, this process is separated, both in time and in terms of its organization, from the process of developing the operational forecasts for the SAs and APs.

One of the main consequences of the implementation of Spring (unanticipated but very valuable) was the creation of tensions between the conflicting views of organizational performance portrayed by these different control systems. For example, discrepancies arise where progress on achieving operational targets set for APs is good, but poor results for the BU as a whole are reported in the dashboard of financial and non-financial measures. In the words of one operational manager:

All of this creates problems of reconciliation between Spring and other control systems because the scope is different (Plant Manager BU 13).

Discrepancies between results reported in relation to partial Spring budgets and results reported for the BU as a whole can also arise because the operational management, who developed the partial budgets and reported the associated results, have either a poor understanding of the financial implications of the APs or alternatively a poor understanding of their cost structures. For example, an AP could specify a target of 10 percent increase in market share, and the partial budget could predict an associated increase in the operating profit.

Investigation of such discrepancies generates performance measurement tension, that is tension between the views of organizational performance produced by different control practices. Consistent with work of Marginson (2002) and Tillema and van der Steen (2015) such tensions are generated between control systems. These tensions must be addressed by the operational managers, who acknowledged that such investigations involved time and cost; however, the benefits of the learning was seen to outweigh such costs:

Many things could be improved in our management system. But is that desirable? When the system outputs erroneous and surprising data, it’s a good opportunity to ask questions. That’s what such a system is for: to challenge us, not to provide figures. A good system is one which leaves room for us to think and which does not eradicate thinking by running too smoothly (Manager, BU 4).

An alternative example of these types of discrepancies can be associated with the prioritization of SAs and APs. If, as anticipated, the Pareto rule applied and 20 percent of actions were related to 80 percent of outcomes, then performance on APs should largely mirror BU performance as a whole. However, in certain instances the Pareto rule did not work. For example, one BU set out its strategy based on new product innovation and thus the SAs and APs related to innovative projects. Quarterly reviews of the APs and partial budgets in Spring showed good results. However, the full financial forecast for the BU showed declining results. Investigation of this discrepancy identified that the results of this BU were significantly influenced by a slow decline in the sales of one of their older, generic “cash cow” products, which was not the subject of an AP. Hence, this BU, having defined a strategy based on innovation, had to amend both the strategy and associated SAs. The BU focused more on the cash cows that had the potential to deliver the volumes necessary to reach the BU’s profitability targets.
Other examples of explanations of discrepancies between alternative views of organizational performance were given by other plant managers:

It can happen that some action plans turn out to be contradictory. It shouldn’t happen because the action plans should be consistent with the global vision […] [But] last year, for example, [NAME] didn’t reduce maintenance costs on machinery because the number of breakdowns had to be decreased to increase productivity. We have to say no to some proposals in order to have a coherent set of action plans (Plant Manager BU 14).

We have two information systems that work in parallel, Spring and World Class Manufacturing (WCM). Spring facilitates monitoring of strategic information. WCM produces 20 standardized indicators that are used to benchmark each BU or plant within the group. Good performance in Spring doesn’t compensate for a poor on WCM indicators (Plant Manager BU 11).

The above quotations illustrate the diversity of explanations for discrepancies exposed by performance measurement tensions.

Investigation of such discrepancies provokes a probing analysis of the implementation of existing strategy, which gave rise to strategic tensions, discussed in the next section.

Strategic tensions
Monitoring of the implementation of SAs and associated APs replaced the previous budgeting system as the primary means of regular performance management. Review of the implementation takes place at quarterly meetings of the BU management team. However, rather than explaining past performance, the purpose of these meetings is to consider the implications for the future, by requiring managers to project forward five quarters. These meetings provide an opportunity to discuss progress on APs and associated financial performance.

The intention of the quarterly meetings is to create a never-ending process of formulation and reformulation of strategy. These discussions, together with the investigation of performance measurement discrepancies described above, provoke a probing analysis of the implementation of existing strategy. This generates strategic tension between the implementation of existing strategy and emergent strategy from the development of corrective APs of reprioritization of APs.

This strategic tension, generated from the use of the action planning system to monitor performance, is similar in ways to innovation tension, in that both tensions address strategic choice. However, the distinction between them is that innovation tension addresses strategic choice in the planning phase of this NT budgeting process, whereas strategic tension addresses strategic choices in the implementation phase. Thus, strategic tension facilitates flexibility and emergent strategy.

The quarterly review of APs creates strategic tensions between intended and emergent strategies through the sharing of experience. Managers in different geographic locations and similar businesses compare their APs, rather than their financial performances, in order to gain a better understanding of challenges in their BUs:

This system allows me each month to ask myself questions about my activity and my results. It allows me to compare myself with other plants in the group (in Poland, for example) and to call that plant’s manager to share with him our common problems. It’s a very useful tool for investigation (Manager, BU4).

In other BUs, a significant outcome of these interactions was the identification of areas of risk. For instance, in one of the division, the comparison between the viewpoints of functional and operational managers regarding interest rate or growth rate forecasts in different geographic zones enabled managers to improve their understanding of regional dynamics. As a consequence, this improved their ability to avoid overproduction or shortfalls in local inventories.
The task of providing explanations where actual outcomes of APs vary from targets now falls to operational managers instead of management accountants, which had been the case in the past. One operational manager explained the contrast of this process with the previous budgeting processes in the company as follows:

Before Spring, the managing director and the management accountant met and laid down some figures, either one or the other depending on the division: they worked in tandem. Management accountants never nosed around; they made off-the-cuff propositions to the managing director, and the managing director suggested changes for political reasons. They both then presented it to their hierarchy. They made their forecasts without asking anyone for anything (BU 15 Plant Manager).

To sum up, the NT budgeting changed the performance management in the company and compelled directors and accountants to think about strategy together.

Discussion
The literature review noted the importance of managing a diverse range of organizational tensions in complex globalized businesses. This study sought to explore how a NT budgeting system can facilitate the management of multiple organizational tensions. Our findings show how both the design and use of SSB’s NT budgeting processes facilitate the generation and management of organizational tensions. We also identify unanticipated, but productive tensions between NT budgeting practices and other unrelated control system. These finding are considered in the first sub-section below. The following sub-section considers the outcomes of decoupling planning and performance evaluation roles of traditional budgets, for the generation and management of organizational tensions.

Managing organizational tensions with a NT budget
The need for MCS to manage organizational tensions has been cited as one of the key reasons for modifying traditional budgets (Hope and Fraser, 1997, 2003). Prior literature has focused on organizational tensions, such as the tension between creative innovation and predictable goal achievement (Simons, 1995), or the tension created between enabling and coercive control systems (Mundy, 2010). However, the capacity of NT budgets to facilitate and improve the management of such tensions has not as yet attracted any significant research attention.

In this study, we show how the different types of organizational tensions are generated either by control practices encompassed within the Spring system, or between Spring and other control practices which form part of SSB’s total package of controls. In some cases, the control practices were specifically designed to expose particular tensions. In other cases, the use of the control systems created a forum for discussion and debate where tensions were generated. Table I presents a summary of our analysis.

Our analysis of SSB’s NT budget identified prioritizing tension, which results from tension between unlimited opportunity and limited managerial attention identified by Simons (1995). This type of tension is generated by the design of Spring, which requires management to set out a limited number of SAs and APs. The objective of the prioritization is to avoid scattered energy (Davila, 2010), whereby managers seek to achieve too many objectives at the same time and is key to exposing a second important axis of tension. Innovation tension is exposed using the prioritization process to generate discussion and debate about the choices between plans focused on innovative projects and plans focused on maximizing revenue and profits from existing products. This is akin to the types of tensions dealt with in the ambidexterity literature, which examines the challenges of engaging simultaneously in exploration and exploitation (Bedford, 2015; Ylinen and Gullkvist, 2014). The impact matrix tool was used to identify potential cross-functional tension (Seal and Mattimoe, 2014) as strategic choices were evaluated in terms of both their impact on the
global BU and on the capacity of different functional units to deliver on them. This tool seeks to anticipate organizational tensions such that they could be managed before they became problematic.

The remaining two tensions identified in the study are exposed during the monitoring and reporting processes of SSB’s NT budget. While a traditional budget focuses on

<table>
<thead>
<tr>
<th>Tensions exposed in the case</th>
<th>Organizational tensions addressed</th>
<th>Source of the tension</th>
<th>Role of the NT budgeting practices in management of this tension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prioritizing tensions</td>
<td>Unlimited opportunity vs limited attention (Simons, 1995)</td>
<td>Tension is generated by the design of the NT budgeting practices</td>
<td>In the case the NT budget is designed to generate prioritizing tension between unlimited opportunity and limited management attention. This is tension is generated by the requirement to identify a maximum of five SAs and APs that limit the focus of management attention. This tension is designed to address the question: Is limited management attention sufficiently focused?</td>
</tr>
<tr>
<td>Innovation tension</td>
<td>Creative innovation vs predictable goal achievement (Simons, 1995)</td>
<td>Tension is generated by the use of the NT budgeting practices to generate discussion and debate</td>
<td>This is tension is generated by creating a forum for debates about a strategic choices driven by the requirement to identify a maximum of five SAs and APs. This tension is designed to address the question: Is there a balance between innovation and predictable goal achievement?</td>
</tr>
<tr>
<td>Cross-functional tension</td>
<td>Individual function vs business unit performance (Seal and Mattimoe; 2014)</td>
<td>Potential tension between functions is exposed by the design of NT budgeting practices</td>
<td>Potential for cross-functional tension is exposed when competing choices for SAs are analyzed by reference to the impact matrix. This tool seeks to anticipate and manage such tension before it emerges during the implementation of SAs, by which time bottlenecks in particular departments could potentially frustrate multiple SAs. This tension is designed to address the question: Are the relative demands on functional areas consistent with their capacity to deliver on strategy implementation?</td>
</tr>
<tr>
<td>Performance measurement tensions</td>
<td>Tensions between the use of control systems to fulfill conflicting roles, such as planning and performance evaluation</td>
<td>Tensions are generated between decoupled NT budgeting practices and between NT budgeting practices and other MCS</td>
<td>The decoupling of strategic and action planning from forecasting fulfilled by traditional budgets but creating different control practices to serve different roles, generates productive tension when discrepancies arise between different views of performance. This tension addresses the question: Can we reconcile different representations of our performance?</td>
</tr>
<tr>
<td>Strategic tensions</td>
<td>Intended vs emergent strategy (Simons, 1995)</td>
<td>Tension is generated by the use of the NT budgeting practices to encourage discussion and debate around the appropriateness of current strategy</td>
<td>This tension addresses the question: How do we encourage and facilitate the emergent strategies</td>
</tr>
</tbody>
</table>
variances, SSB’s quarterly review focuses both on progress in implementing prioritized APs and on the continuing appropriateness of the priorities set in terms of strategy. Performance measurement tension is created at the nexus of different control systems, by comparing different views of organizational performance. Tillema and van der Steen (2015) also reported tensions at the nexus of traditional control systems and, in their case, a lean management system. Our evidence suggests that the search for discrepancies between alternative performance measurement practices is as important as assessing the coherence and consistency between them, as they present avenues for identifying potential strategic uncertainties (Simons, 1995). Inevitably, significant work was created in reconciling these different accounts of organizational performance. However, this reconciliation activity provided valuable insights into the outcomes of strategic choices and the financial implications of SAs. The final tension we identify is strategic tension, which relates to the exposure of tensions between intended and emergent strategy (Simons, 1995). The distinction between intended and emergent strategy becomes less obvious as the reprioritization and amendment of strategic plans results in the continuous updating of intended strategy.

This case suggests that exposing tensions with a NT budgeting system can help to resolve classical management dilemmas (Table I). The prioritizing tensions help to check if limited management attention sufficiently focused. The innovation tension provokes discussion about the level of balance between innovation and predictable goal achievement. The cross-functional tension invites analysis of whether the demands on functional areas arising from SAs and APs are consistent with their capacity to deliver on strategy implementation. The performance measurement tensions present alternative insights into the financial implications of actions, and the strategic tension creates opportunities to adapt the strategy.

Dealing with tensions between the different roles of budgeting
To address the inertia of the former budgeting processes, SSB decoupled its budget in to a set of control practices, each of which addressed specific problems of management: strategy setting; forecasting; performance evaluation. This sought to resolve the problem of attributing too many potentially conflicting roles to the budget, identified by prior literature (Barrett and Fraser, 1977; Samuelson, 1986). Our findings describe how the strategy setting, forecasting, and performance evaluation processes functioned independently and at different times. Thus, a collection of loosely coupled systems replaced a single annual budgeting process.

In response to criticism that traditional budgets provide a strong bias in favor of predictable goal achievement, the Beyond Budgeting movement advocated a complete abandonment of budgets in favor of more dynamic planning and resource allocation systems. In SSB we found a profoundly modified budgeting system rather than a total abandonment of the budget (Bourmistrov and Kaarboe, 2013; Frow et al., 2010; Henttu-Aho and Jarvinen, 2013; Libby and Lindsay, 2010; Østergren and Stensaker, 2011). In common with other NT budgets described in the literature, SSB’s new system includes the decoupling of target setting and forecasting. This separation addresses one of the perceived key problems of budgeting: the problem of setting of stretch targets for performance management purposes yet creating over-optimistic market expectations where these targets are also used for planning purposes. Bourmistrov and Kaarboe (2013) studied the manner in which the unbundling of target setting, forecasting, and dynamic resource allocation supports strategically oriented decisions and facilitates moving decision makers into the “stretch-zone”. Henttu-Aho and Jarvinen (2013) studied five major industrial companies based in Finland involved in the paper and steel industries. Similar to our findings in SSB, they found that three of these companies had successfully decoupled these functions.
However, a novel feature we observe in our case is the creation of a set of partial budgets, in respect of SAs and related APs only. These partial budgets do not easily reconcile either to the full set of quarterly management accounts or the rolling forecast. Similarly, comparison of the partial budgets to the dashboard of KPIs could at times present conflicting views of organizational performance. Thus the creation of a partial budget had significant consequences for the evaluation of organizational performance. The achievement of objectives in relation to specific APs (and related partial budgets) did not necessarily translate in good performance for the organization as a whole.

This lack of achievement in terms of financial performance could be explained (i) by a choice of APs which were inadequately aligned with intended corporate strategy or (ii) because the company was operating in an adverse economic environment.

Discrepancies in the case of (i) above can arise if the implementation of the intended strategy is not leading to the achievement of desired performance. Analysis of these types of discrepancies operates as a potent strategic validity control. According to Ferreira and Otley (2009):

> The role of strategic validity controls is to signal the need to review strategies […] the use of strategic validity controls […] primarily serves the important role of identifying the failure of intended strategies and the rise of emergent strategies (Mintzberg, 1978) (pp. 274-275).

In the case of (ii) above, it is a question of considering the achievement (or non-achievement) of objectives in the context of the prevailing economic environment. Thus good performance, measured relative to preset objectives, in a very favorable market, may not actually be good, if judged against the prevailing economic environment, whereas poor performance relative to preset objectives could be judged to be an excellent achievement in unforeseen adverse market conditions. This comparison of partial budgets to total BU financial performance provoked more searching questions of the relationship between the achievement of objectives and the outcomes for BU results. This helped the organization to address dilemmas of internal vs external objectives raised by the BBRT movement (Hope and Fraser, 1997).

The reconciliation of discrepancies between these (and other MCS) in SSB presents a different view to that of prior literature on discrepancies between roles of budgeting (Samuelson, 1986) and more generally some arguments of BBRT about inconsistencies of budgeting. Our results explain why “multiplying the roles assigned to a budget does not necessarily lead to significant criticism” (Sponem and Lambert, 2016, p. 58). While under traditional budgeting practices discrepancies are typically viewed as a problem and tensions are considered as dysfunctional behaviors that must be suppressed, in the context of this NT budget, they are viewed as useful, providing insightful information about uncertainties inherent in the organization. These findings provide some interesting parallels with finding of Tillema and van der Steen (2015), albeit in a somewhat different context. In their study, a variety of coping mechanisms, such as colonizing, compromising, and decoupling, were developed at local sites to deal with tensions that arose due to discrepancies between performance measures based on lean manufacturing and standard cost variances. These mechanisms were developed to attempt to contain or limit the tensions. In contrast in our case, given the high level of buy-in to the new systems at multiple levels of the organization, such tensions were embraced and understanding discrepancies was seen as more important than containing them. Ylinen and Gullkvist (2014) found that:

> demands for innovation and efficiency requires a blend of “emergent” (organic) and “planned” (mechanistic) approaches, and that managing tensions between flexibility and efficiency may prove key to strong project performance. Combining opposing forms of control such as OC and MC enables the desired direct and indirect effects of OC and MC to simultaneously yield high positive levels of both.

The findings of our study provide insights into how the tensions exposed by loosely coupled systems of controls can yield positive effects.
Conclusion

There is a dearth of empirical evidence about the design and use of NT budgeting systems (Libby and Lindsay, 2010). These newer forms of budgets have not been analyzed in terms of their ability to generate or manage the organizational tensions that prompted their development. The objective of this paper was to provide empirical evidence about the design and use of NT budgets and to explore their role in managing organizational tensions. Our findings illustrate that decoupling traditional budgeting systems into elements that explicitly expose tensions between the different roles of traditional budgets can produce positive effects. Our study contributes an analysis of the different types of tension generated and exposed as a result of the implementation of this NT budget.

Our paper illustrates the benefits of analyzing a control system and/or a package of controls in terms of the type of tensions generated. From a theoretical perspective, the set of tensions exposed in our case does not represent an exhaustive list of possible tensions. For example, Simons (1995) has pointed to the organizational tension between self-interest and the desire to contribute. In SSB, individual managers were evaluated during an annual review, where a range of issues are considered, including but not limited to, the manager’s role in achievement of operational targets. However, there are no specific control practices that expose the tension between the self-interest of individual managers and the performance achieved in respect of a specific AP. Clearly such practices could be developed, and this would facilitate the management of another axis of tension within the overall package of controls. Likewise, prior literature has noted the tension between short-term and long-term performance (Mundy, 2010). Similarly, the NT budget system we studied has no specific control practices to ensure that this tension demands managerial attention. In a couple of instances interviewees referred specifically to the need to be cognizant of the long vs short term trade-offs in setting strategic priorities. Opportunities for debating strategy in the context of choosing SAs and APs provide an appropriate context for such tensions to emerge. However, the absence of a specific control practice which forces managers to articulate such trade-offs (similar to the impact matrix), suggest that the system does not create the relevant tension and thus the trade-off will be addressed on an ad hoc basis, if at all.

It is a limitation of the study that only three of SSB’s 21 BU’s which implemented Spring were examined in depth. This limitation is mitigated to some extent by the review of audit reports in respect of the implementation of Spring in a total of 15 BU’s. It is also a limitation that interviews were not taped, however, taking detailed notes, immediate write-up and validation by interviewees, together with gathering extensive documentation, mitigated this.

The study presents useful implications for practice. The analysis of a package of control in terms of the organizational tensions generated and exposed has the potential to alert management to important trade-offs which are either biased or ignored due to gaps in the control system. This study not only shows that tension can be intentionally designed into a coherent control system like Spring, but also draws attention to the potential for (unanticipated) productive tension to emerge between unrelated control practices, which have different control objectives. Future research could usefully expand on the manner in which a range of practices encompassed in NT budgets are designed and used to facilitate the management of organizational tensions.

References


Hope, J. and Fraser, R. (2003), Beyond Budgeting: How Managers can Break Free from the Annual Performance Trap, Harvard Business School, Boston, MA.


Appendix

<table>
<thead>
<tr>
<th>Job title</th>
<th>Level</th>
<th>Functional area</th>
<th>Number of interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate interviews</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COO</td>
<td>Corporate</td>
<td>Manager</td>
<td>1</td>
</tr>
<tr>
<td>Head of Spring project</td>
<td>Corporate</td>
<td>Longitudinal project</td>
<td>12</td>
</tr>
<tr>
<td>WCM manager</td>
<td>Corporate</td>
<td>Longitudinal project</td>
<td>1</td>
</tr>
<tr>
<td>BU case studies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head of BU</td>
<td>Business unit BU 11</td>
<td>Manager</td>
<td>1</td>
</tr>
<tr>
<td>Operational manager</td>
<td>Business unit BU 11</td>
<td>Manager</td>
<td>1</td>
</tr>
<tr>
<td>Management accountant</td>
<td>Business unit BU 11</td>
<td>Finance</td>
<td>1</td>
</tr>
<tr>
<td>Head of BU</td>
<td>Business unit BU 4</td>
<td>Manager</td>
<td>1</td>
</tr>
<tr>
<td>Operational manager</td>
<td>Business unit BU 4</td>
<td>Manager</td>
<td>1</td>
</tr>
<tr>
<td>Quality manager</td>
<td>Business unit BU 4</td>
<td>Quality</td>
<td>1</td>
</tr>
<tr>
<td>Management accountant</td>
<td>Business unit BU 4</td>
<td>Finance</td>
<td>1</td>
</tr>
<tr>
<td>Head of BU</td>
<td>Business unit BU 3</td>
<td>Manager</td>
<td>1</td>
</tr>
<tr>
<td>Management accountant</td>
<td>Business unit BU 3</td>
<td>Finance</td>
<td>1</td>
</tr>
<tr>
<td>Operational manager</td>
<td>Business unit BU 3</td>
<td>Manager</td>
<td>1</td>
</tr>
<tr>
<td>Management accountant</td>
<td>Business unit BU 6</td>
<td>Finance</td>
<td>1</td>
</tr>
<tr>
<td>Plant director interviews</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant director</td>
<td>BU 3</td>
<td>Manager</td>
<td>1</td>
</tr>
<tr>
<td>Plant director</td>
<td>BU 6</td>
<td>Manager</td>
<td>1</td>
</tr>
<tr>
<td>Plant director</td>
<td>BU 9</td>
<td>Manager</td>
<td>1</td>
</tr>
<tr>
<td>Plant director</td>
<td>BU 11</td>
<td>Manager</td>
<td>1</td>
</tr>
<tr>
<td>Plant director</td>
<td>BU 13</td>
<td>Manager</td>
<td>1</td>
</tr>
<tr>
<td>Plant director</td>
<td>BU 14</td>
<td>Manager</td>
<td>1</td>
</tr>
<tr>
<td>Plant director</td>
<td>BU 15</td>
<td>Manager</td>
<td>1</td>
</tr>
<tr>
<td>Plant director</td>
<td>BU 16</td>
<td>Manager</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>33</td>
</tr>
</tbody>
</table>

Table AI. Spring meetings with corporate management
Managers interviewed: Finance department member and head of Spring project - 7

Corresponding author
Nicolas Berland can be contacted at: nicolas.berland@dauphine.fr

For instructions on how to order reprints of this article, please visit our website:
www.emeraldgrouppublishing.com/licensing/reprints.htm
Or contact us for further details: permissions@emeraldinsight.com
Management control system and strategy: the transforming role of implementation

Graziano Coller, Maria Laura Frigotto and Ericka Costa
Department of Economics and Management, University of Trento, Trento, Italy

Abstract

Purpose – The purpose of this paper is to encourage a discussion of the implementation of management control systems (MCSs) in the MCS-strategy relationship. Borrowing from the literature on software development, the authors propose two archetypes of MCS implementation – waterfall and agile – and employ them to understand how the MCS-strategy fit unfolds over time.

Design/methodology/approach – The authors empirically ground the archetypes on two exploratory case studies based on the collection of extensive qualitative data.

Findings – The authors show that MCSs change not only in relation to strategy, but also in response to an autonomous source: implementation. These two implementation archetypes differ in their degrees of specification, in the ways in which the transitions among their implementation phases occur and in the sources and ways in which their feedback loops affect the MCS; however, both shed light on the dynamic dimension of fit and show that the fit should be assessed over time.

Research limitations/implications – The two archetypes are derived from two exploratory cases. Further research may both strengthen the framework by testing the validity of the archetypes for a wider set of empirical cases and enrich the framework by investigating the determinants of agile and waterfall MCS implementation.

Practical implications – The introduction of MCS implementation to the determinants of fit or misfit provides practitioners with a further interpretation and an action driver for fit or misfit. MCS implementation should be coordinated with the pace of change of strategy and should be changed in relation to the possibility for an organisation to move from a process- to a people-centred system (or vice versa).

Originality/value – The authors propose two archetypes of MCS implementation, both of which support the empirical interpretation and theoretical reconceptualisation of the concept of the MCS-strategy fit in terms of dynamic fit.

Keywords Strategy, Implementation, Case study, MCS, Agile/Waterfall, Dynamic fit

Paper type Research paper

1. Introduction

In recent decades, research on management control system (MCS) has focussed mainly on understanding the fit between MCS and the internal and external contexts in which organisations operate. This is the so-called “contingency” approach, which has been adopted in the analysis of the relationship between MCS and strategy. Several reviews on the contingency approach appeared in the literature (e.g. Chapman, 1997; Chenhall, 2003; 2007; Dent, 1990; Fisher, 1995; Gerdin and Greve, 2004, 2008; Grabner and Moers, 2013; Hartmann and Moers, 1999, 2003; Langfield-Smith, 1997, 2005, 2007; Otley, 1980, 2016), and the main criticisms raised by these reviews concern the definition and operationalisation of four concepts: MCS, strategy, fit and effectiveness (Otley, 2016).

Central to this debate is the concept of fit: both strategy and MCSs have been considered “black boxes”, not to be opened (Chua, 2007); instead, the focus has been on the equilibrium (fit) between these boxes (Chenhall, 2003, 2007). The main goal is to identify the best MCS design to support the implementation of strategy (Gerdin and Greve, 2008), and, along this line, quantitative empirical studies has attempted to infer which MCSs are appropriate for different strategic archetypes (Chenhall, 2003), assuming that causation flows from contingency to structure (Donaldson, 1999).
The focus on fit may lead to interpret the MCS-strategy relationship as something static. However, the static idea of fit is at odds with the recent developments in the definitions of MCS packages and systems (Grabner and Moers, 2013), with the growing focus on the use (Simons, 1995) and with the “dynamic tension” (Frigotto et al., 2013; Mundy, 2010; Seal and Mattimoe, 2014; Strauss et al., 2013) needed to develop strategy.

Within this academic debate, this paper aims to better understand the black box of the MCS by exposing the implementation of MCSs in the context of the strategy-MCS relationship. The approach needed to accomplish this task is a longitudinal qualitative analysis (Mundy, 2010), as this can provide a more detailed view than quantitative research (Otley, 2016).

In this paper, we turn the attention from the implementation of strategy to the implementation of MCS, and the role the latter plays in the MCS-strategy relationship. Borrowing from the software development literature (Dybå and Dingsoyr, 2008), we propose two archetypes of implementation –namely, waterfall and agile – and employ them to show how the fit between MCS and strategy develops over time. Our view suggests that fit and misfit should be assessed over time and in terms of dynamic fit.

Two in-depth longitudinal case studies are presented as illustrations of the waterfall and agile implementations of MCSs. We adopt a holistic view of control and define MCSs in terms of control packages (Malmi and Brown, 2008). We use the frameworks of Anderson (1995) and de La Villarmois and Levant (2011) to identify the different implementation phases.

Our paper contributes to the literature on the MCS-strategy relationship (Langfield-Smith, 2007) by proposing two archetypes of MCS implementation and by promoting the idea of a dynamic fit between MCS and strategy. We add that the fit or misfit between MCS and strategy may also derive from the MCS implementation mode as a further determinant in the relationship.

The paper is organised as follows. Section 2 introduces the concepts of waterfall and agile software development and adapts them to the implementation of the MCS. Section 3 addresses the methodological aspects of the paper and introduces our case studies. Section 4 presents the case studies as illustrations of waterfall and agile implementations of MCSs. Section 5 points out the contribution of the paper and its implications to scholars and practitioners. Section 6 presents some concluding remarks and outlines directions for further research.

2. The role of implementation in the MCS-strategy relationship

Despite a prevailing conception in which strategy determines MCS design and MCS change follows a strategic change the literature suggests that: MCS displays a certain resistance to change, and MCS plays a role in producing change, as it collects and conveys information to be considered for acting and deciding (Hopwood, 1987; Dent, 1990). Rather than establishing the primacy of strategy over MCS, recent literature has highlighted that both strategy and MCS evolve over time via an intertwined dynamic: that is, they influence each other and change together (Frigotto et al., 2013). In other words, the literature considers change to primarily concern either strategy and then MCS or strategy and MCS together.

By implementation, we mean the process carried out in organisations to translate a designed MCS into an active and effective MCS. By dynamic fit (or misfit), we mean the status of the continuous interaction of MCS and strategy along their co-evolutionary path, in which both elements also display a proper dynamic of change. This concept of intertwined dynamic (Frigotto et al., 2013) differs from the idea of designed MCS at single points in time (Malmi and Brown, 2008). Along this changed conception of the locus of leading change, from strategy to the MCS-strategy relationship, the proper path of change for the MCS has not yet been considered per se. In this paper, we address MCS, not for what it does or does not do for change, but for how it changes on its own, meaning how it modifies itself along
such intertwined dynamics. For this purpose, we centre our study on the concepts of MCS implementation and understand the relationship between MCS and strategy along an intertwined co-evolution, we thus developing a dynamic concept of fit.

While the distinction between design and implementation has been extensively considered on the strategy side of the MCS-strategy relationship (e.g. Daft and Macintosh, 1984; Bhimani and Langfield-Smith, 2007), MCSs have typically been intended as tools for implementing strategy, with which strategy must fit. As such, MSCs have typically been observed as “MCSs in use” and have not frequently been theoretically or empirically articulated into design or implementation. Simons (1995) distinguished the elements of MCSs (i.e. belief and boundary systems, administrative controls and performance measurement systems (PMSs)) that are typically designed from their (diagnostic and interactive) use within organisations. Tessier and Otley (2012) further clarified that MCS uses should be part of their design; however, they also acknowledged the existence of an “effective MCS” through the consideration of employee perceptions which is not currently an MCS design attribute.

The role of implementation has also been recognised by Chenhall and Euske (2007), who find that the way in which an MCS is actually implemented in an organisation is central to its success. Their work confronts the same kind of MCS in two different organisations, and observes that the success of the MCS depends on how the organisation implements it.

A different way in which implementation can be traced back in the MCS literature is by reconstructing how a longitudinal perspective on MCS change has been acquired. Henri (2006) and Mundy (2010) claim that MCS supports change by developing the capability to balance the tension between controlling and enabling different MCS uses that might become necessary. While the core of these studies lies in their capabilities, which might be designed, they acknowledge that different uses of MCS in relation to strategic change might emerge over time. A further step towards the conceptualisation of implementation was made by Strauss et al. (2013), who study how the MCS packages of start-up firms emerge and consolidate over the initial stages of organisational life and find that, through different implementations, components of MCS become coupled, decoupled and converted into empty shells. When they are coupled, they are integrated with one another and with the organisational evolutionary path; when they are decoupled, they are used as isolated tools to meet special needs or special requests from, for example, stakeholders; finally, when they become empty shells, these MCS components are no longer used for control purposes, but are adopted as well-accepted templates, even though they do not contain firm-specific data.

Finally, implementation entered the literature on MCSs via the information technology (IT) implementation of a conceptualised MCS (Granlund and Mouritsen, 2003). Implementation impacts and potentially changes the designed MCS, but is an exogenous input to both MCS and strategy. Anderson (1995) defines the following six phases of implementation: initiation, adoption, adaptation, acceptance, routinisation and assimilation. The first two phases, initiation and adoption, describe the process through which the MCS is designed, i.e. the selection of the most appropriate MCS given the context. The initiation phase relates to the understanding of organisational internal needs (including strategy) and of the changing competitive environment. The adoption phase involves the selection of a solution defined by a set of control mechanisms that fits with strategy and that will be adopted by the firm.

The design process produces a project of MCS which has to materialise through the following four phases of implementation. The adaptation phase, in which unforeseen aspects are addressed and limits of the initial design are overcome, may impose some changes in the original design. Within acceptance phase, a minimum level of MCS use and maintenance is required to ensure its survival. Routinisation consists the use of the MCS as a regular way of doing things in a particular order. Lastly, assimilation occurs when
control mechanisms are used and integrated in other systems (de La Villarmois and Levant, 2011, pp. 235-236).

A focus on MCS design (initiation and adoption phases) would limit our understanding of the dynamic interplay between MCS and strategy, i.e. it would imply a static idea of fit, defined at the single point in time when the MCS is designed. Therefore, in order to gain a holistic understanding of the dynamic MCS-strategy relationship, we suggest to consider both the role and the typology of implementation from a longitudinal perspective. This new approach enables an enrichment of the concept of fit in a dynamic sense. Moreover, while previous contributions pointed out that implementation is relevant and provided a framework for understanding it, they have also implied that the implementation phases occur sequentially and that achieving assimilation represents a benefit for the organisation resulting in performance improvements. In our perspective, design (or redesign) and implementation of MCSs may not necessarily occur sequentially, but can follow different paths. In the following section, we provide our theoretical development of this point.

2.1 Agile vs waterfall software development

We elaborate on the concept of implementation building through the literature on software development. The software development life cycle (SDLC) is a generic model of software development consisting of the following phases (Moran, 2014): requirement solicitation and management, technical analysis and design, implementation of software solutions, validation and verification, deployment and maintenance. There are two basic alternative approaches to the implementation of the SDLC: the waterfall approach and the agile approach. Theoretically, these approaches represent two extremes on a continuum. The waterfall approach sees the SDLC as a strictly linear process, in which each phase must be completed before the following is commenced. The agile approach “promotes rapid and repeated transitions through all phases (some of which could even be said to be merged) resulting in the iterative derivation of a solution” (Moran, 2014, p. 4).

The waterfall approach became the dominant paradigm in the late 1960s, when large-scale software projects challenged programmers’ limits and a new academic discipline of software engineering emerged (Rajlich, 2006). Software engineers approached software development in the same fashion that non-software engineers approached product development:

The waterfall metaphor is widely used in the construction industry and product manufacturing. It requires the developer first to collect the requirements that describe the functionality of the future product, and then to create a design that will be followed during the entire construction. When the product is finished, it is transferred to the user and any residual problems that may surface afterward are resolved through maintenance (Rajlich, 2006, p. 68).

The engineering approach implies that problems be fully specifiable in advance and that optimal and predictable solutions exist for every problem (Dybå and Dingsøyr, 2008). However, the main problem with this approach is requirements volatility and unpredictability: “requirements are not fully known in advance and are often added during the course of the project” (Rajlich, 2006, p. 68).

The agile approach to software development consists of a set of practices that have been proposed by “experienced practitioners” in response to traditional methods based on the engineering approach described above (Dybå and Dingsøyr, 2008). The agile approach responds to the unpredictable changes by relying on people and their creativity, rather than on processes (Brhel et al., 2015). In agile software development, priority is given to “individuals and interaction over processes and tools” (Beck et al., 2001). The development of these methods is not based on process definitions (Fontana et al., 2015), and it should incorporate a flexible approach for addressing changes to project scope and requirement definitions (Bang, 2007).
The waterfall and agile approaches are opposite ways of dealing with requirement volatility and unpredictability (Nerur et al., 2005; Rajlich, 2006). On one hand, the waterfall approach is process-centric: all sources of variation are identified and addressed a priori through processes (Cockburn and Highsmith, 2001). Drawing a further parallel with product manufacturing, product characteristics (e.g. shape, functionality, colours and accessories) must be defined, production plants must be built or adapted to the production of the specific design, and finally production must take place, following the specific process coded into the manufacturing system. Any change in the product design requires an adaptation of the manufacturing process. Similarly, the waterfall approach to software development implies that the set of problems addressed by the software (i.e. the product characteristics) be fully specified in advance. The software is basically the production equipment that is needed to address a specific set of problems and is deployed to the customer. On the other hand, the agile approach is people-centric: variation is addressed through people’s creativity, and the primary goal is to satisfy customers at the time of delivery, rather than at the time of project initiation (Cockburn and Highsmith, 2001). The “production process” is more artisan; product characteristics are not coded in a specific production process, but are instead obtained through artisan know-how. Upon project initiation, there is a rough idea of what is needed by the customer. The final product is shaped through implementation. Similarly, the agile approach to software development implies that requirements are roughly defined and continuously refined and changed over the course of implementation.

2.2 Agile vs waterfall implementations of MCS

In this section, we propose a parallel between implementation of software and of MCS, as in both systems we recognise similarities in phases, as defined by Anderson (1995), and properties (as summarised in Table I).

In both systems: aims need to be initially translated into requirements which convey into a first design, the initial design is then tested and adapted to address unforeseen aspects and the systems are finally bridged to effective use.

Taking the parallel between software and MCS implementation further, we can distinguish between agile and waterfall MCS implementations by adapting the waterfall and agile paradigms of software development to the MCS context. In fact, these paradigms illustrate two extreme MCS implementation types which are defined by the way in which implementation phases deploy over time, with waterfall and agile approaches representing opposite poles. These two differ not only in the way in which transitions between phases occur, but also in the sources of and ways in which feedback loops affect MCS and in the ways in which fit or misfit emerges and is addressed.

<table>
<thead>
<tr>
<th>Software</th>
<th>Implementation phases</th>
<th>MCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design of the software</td>
<td></td>
<td>Design of the MCS package</td>
</tr>
<tr>
<td>Definition of software requirements to fit with customer’s needs</td>
<td>Initiation</td>
<td>Definition of MCS requirements to fit with strategy</td>
</tr>
<tr>
<td>Software requirements are coded into software procedures and programs</td>
<td>Adoption</td>
<td>MCS requirements are translated into MCS components</td>
</tr>
<tr>
<td>Adaptation of the software</td>
<td>Adaptation</td>
<td>Adaptation of the MCS</td>
</tr>
<tr>
<td>Software initial design is tested and adapted to address unforeseen issues</td>
<td></td>
<td>MCS initial design is tested and adapted to address unforeseen issues</td>
</tr>
<tr>
<td>Use of the software</td>
<td>Acceptance</td>
<td>Use of the MCS</td>
</tr>
<tr>
<td>Software is used by customers</td>
<td>Routinisation</td>
<td>MCS is used within the organisation</td>
</tr>
<tr>
<td></td>
<td>Assimilation</td>
<td></td>
</tr>
</tbody>
</table>

Table I. Parallelism between software and MCS implementation
In a waterfall implementation of an MCS, the transitions among phases are linear and sequential. The adaptation phase may produce only minor changes to the original design. Acceptance is enforced in a top-down manner and is followed by routinisation and assimilation as the natural consequences of acceptance. Feedback loops affect implementation only through minor redesigns of the MCS. In a waterfall implementation process, a misfit between changing requirements and the MCS may be signalled by “empty shells” in the MCS (Strauss et al., 2013) or by the MCS suffering “atrophy due to lack of benefits to users” (Chenhall and Euske, 2007) because outdated MCS components tend to fall into disuse rather than being removed (Otley, 2016).

In an agile MCS implementation, transitions are repeated through all phases, and there are continuous feedback loops that derive from both MCS use and strategy and that further impact MCS implementation. The MCS might be designed during the initiation and adoption phases, or it might emerge in response to the gradual needs for information and control, with no deliberate moment of design. The dynamics of this mirrors the observation that an MCS is not a stable system in time, but is the result of a continuous process (Otley, 2016). Within an agile implementation process, it is difficult to distinguish among adaptation, acceptance, routinisation and assimilation, since the MCS is continuously adapted. The existence of decoupled components or empty shells in the MCS (Strauss et al., 2013) may be physiological. Existing components may continuously adapt to the changing requirements or may be placed in “stand-by” (as empty shells) in favour of newly introduced (and decoupled) components. Further, decoupled components may become essential in further evolutions of the MCS. Agile implementation may provide a suitable response to the increasing levels of environmental uncertainty that organisations face and to the corresponding need for adaptation (Otley, 2016).

3. Method and case description
Consistent with previous studies in the field (Ahrens and Chapman, 2007; Ahrens and Dent, 1998; Mundy, 2010), a case study method was adopted in order to facilitate a thorough analysis and theoretical elaboration of the role of MCS implementation.

We developed two case studies to serve our theoretical exploratory purposes (Yin, 2014). Our selection was theoretical (Eisenhardt and Graebner, 2007), as we chose two cases which clearly displayed the targeted MCS-strategy relationship; however, the cases also displayed some dynamics that extant theories could not explain or grasp. Building on Siggelkow (2007), we used these case studies to elaborate our theoretical contribution to the literature on MCSs and strategy, in which we devise a role for MCS implementation in the MCS-strategy relationship and, more deeply, identify two types of MCS implementations: agile and waterfall. These theoretical types are empirically grounded and can be interpreted as archetypes. The role of MCS implementation is properly studied through a holistic view of the set of controls that exist in organisations (Langfield-Smith, 1997, 2007). Consistently, we define MCS in terms of a package of controls (Malmi and Brown, 2008), and we consider their coordinated and dynamic adoption over time to be a system (Grabner and Moers, 2013), rather than a static and fragmented perspective. This allows us to overcome the partial inclusions of MCS related to the different definitions of specific controls available in the literature.

For the analysis of the implementation, we build on Anderson (1995) and de La Villarmois and Levant (2011) to identify a set of different implementation phases and to describe the various specific activities of each phase that we could expect to find in our analysis. Within this framework, we were able to focus on the interactions among or the sequence of activities and on the position and frequency of feedback loops (e.g. at the end of a complete implementation phase or as continuous implications of single actions) to build our MCS implementation types.

The MCS waterfall implementation type is grounded in the case of Alpha, a primary player in the Italian IT market as a distributor, assembler and service provider. Alpha was
founded in 1993, and after ten years, it had achieved €82 M in sales and had a network of 81 shops. We focus our analysis on these first ten years (1993-2003) when Alpha grew from a garage business to a nationwide company, since it was during this time that the company faced increasing organisational complexity.

The MCS agile implementation type is grounded in the case of Beta, a grocery retailer operating in Northeastern Italy, which was founded in 1938. Beta experienced a more gradual growth than Alpha, reaching approximately €400 M in sales and 1,600 employees in 2014. We focus our analysis on the last 14 years (2001-2014), when Beta displayed a relatively stable organisational size and complexity.

Both Alpha and Beta are family businesses; thus, their company governance is a neutral variable. However, each company’s MCS package is unique and somewhat peculiar: the MCS takes the shape of a PMS in Alpha and of an integrated reporting system (BOARD), which also includes a social and environmental accounting and reporting (SEAR) aspect, in Beta. As suggested by Arjaliès and Mundy (2013), since SEAR is integrated into the MCS, it can be considered a part of it.

Despite their peculiarities, both of these cases illustrate the MCS-strategy relationship, and both were selected because they display two extremely different ways of framing and developing this relationship. In other words, they are similar because they refer to the same conceptual relationship and, as such, they are good candidates for theoretical selection (Yin, 2014; Eisenhardt and Graebner, 2007).

However, a rigorous method was required to control for the role of the peculiarities in the studied MCS-strategy relationship. It was important to consider at least three such issues. First, we studied the industry in which our cases are embedded. Both cases display opportunities for growth and a specific evolution of consumer needs towards targets specific to the industry: higher sustainability (Beta) and integrated service (Alpha). Second, the two trends occurred during different time frames (1993-2003 for Alpha and 2001-2014 for Beta), illustrating the frame during which the MCS-strategy relationship experienced its evolution. Taking the same time frame for both cases would have captured a meaningless window for at least one of the two; however, we are also aware that two cases sharing the same time frame would have had a greater validity – we acknowledge this difference as a limitation of our work. Third, the differences in the strategies implemented or the kind of MCS adopted were peculiar to each case; however, these peculiarities can be included in the range of empirical variabilities of the strategies and the MCS concepts.

In our analysis, we tried to determine whether these elements play peculiar roles in the MCS-strategy relationship. As we convey in our narratives, neither the industries, the time windows nor the peculiarities of strategy or MCS (measured as the specific decision to extend the sales network or to refocus the product range) appeared to be strong enough to account for or to have played a significant role in the dynamics observed in the MCS-strategy relationship. Conversely, we think that the peculiarity of our cases plays a role in supporting the potential generalisability of our theoretical argument, though its assessment still requires further research.

For both cases, our contribution is based on extensive data collection, including interviews, observations and archival data over more extensive time periods, all of which contribute to our perspective on each company’s context and evolution. See Table II for a detailed description of the data sets.

4. Illustration of MCS implementation

4.1 The Alpha case study

Alpha is a producer and reseller of customised personal computers (PCs) and related software. From 1993 to 2003, Alpha’s store network experienced a rapid growth, and its MCS was designed and implemented in a linear and sequential way.
Alpha’s strategy was to sustain sales and develop its store network by offering a huge catalogue of products while keeping inventory low. As sales increased, Alpha’s founder decided to open new stores in nearby cities, which were meant to be reproductions of the first shop. A PMS was introduced in 1993 to support management and direct employee behaviour through an internet-based software, which was personally developed by Alpha’s CEO and founder to monitor store sales, headquarters assembly and product distribution throughout the network. “The PMS was developed internally by us, this is our value added and a strength we have had since the beginning of our history” (Interviewee No. 5); “It was not common to have a web-based PMS in the Nineties, when I showed it, people were amazed […] Not even in Taiwan they believed that it was working, even though informatically they were very advanced” (Interviewee No. 1).

Through the PMS, any store was able to order a customised PC; this procedure was a step-by-step process, through which nearly any hardware component available on the market could be chosen and correctly matched to other components. New components could be easily added to the catalogue and made immediately available to all stores in the network by the headquarters: “we added products to our catalogue after we had only previewed a sample… we tried it, if it was working, that’s it, it was added to the catalogue. We were faster than others in listing products in our catalogue” (Interviewee No. 1). Moreover, Alpha included in its catalogue almost all other IT products (e.g. printers, audio players, laptops, cameras). Products and components were ordered from suppliers only after they had already been sold to a customer, and PCs were assembled and shipped to stores for customer delivery within a few days of purchase.

The PMS was designed to allow Alpha to control all store activities, and any new procedures had to be defined at headquarters and subsequently coded into the software for daily use in each store: “the goal was tracking operations […] at the centre of our system there are procedures. We first develop procedures and transfer them in our information system, this is an important device, procedures are developed by people [at headquarters] and we need an instrument to force people [in stores] to follow them” (Interviewee No. 2). Therefore, the PMS resulted in Alpha being totally process-centred: Procedures guided
action and were expected to always be the same, admitting only minor adjustments. Indeed, the initial design of PMS never changed during the analysed period. The acceptance of the PMS was initially fostered by hiring “IT-holic” store managers, such that the first stores in the network were operated by managers with “a genuine passion for technology” (Interviewee No. 1), who were naturally inclined to accept a technology-driven PMS. “I first met Alpha’s CEO at the biggest IT fair in Italy [called SMAU]. I was a financial promoter at that point in my life, but when the SMAU was on, I used to spend entire days exploring IT novelties” (Interviewee No. 7). Later on Alpha could not find as many “IT-holic” managers to keep pace with the growth in the store network; thereafter, acceptance was conveyed through a series of activities directly driven by Alpha’s headquarters. New store employees and managers were trained to learn and accept Alpha’s PMS. For example, an e-mail-based discussion forum was launched to allow each store manager to directly communicate with other stores and with headquarters (with the CEO personally reading and posting messages). Issues discussed on the forum ranged from technical support to advertising policies, and they addressed critical points of both the organisation and its product strategy, as well as the particular needs of local markets. Further annual employee meeting was organised to build a “large family of IT experts” (Interviewee No. 1). Several technical training courses were then organised at company headquarters, and the attainment of advanced technical certifications for hardware and software products was strongly supported. A network and distribution manager was hired “to assist store managers and promote compliance to Alpha’s procedures. He was in charge of building a bridge between the headquarters and stores, monitoring and supporting staff activities in stores” (Interviewee No. 2). These activities were also designed to foster the acceptance of a strictly process-oriented way of running the business.

Routinisation was the natural consequence of acceptance: There was only one “regular way of doing things” (Interviewee No. 2), which was coded into the standard procedures of the PMS, and the focus of the MCS was compliance with procedures. The PMS represented “the only way” of doing things: “everything runs around the PMS”, “The PMS works through the internet. When we don’t have connection, to us it is like not having eyes, ears […] it’s like not having anything and not being able to do anything” (Interviewee No. 5). Alpha’s modus operandi was almost completely defined within the software, and the software was effective in forcing employees to complete tasks, since it monitored almost all in-store activities.

The adoption and routinisation of the PMS were so assimilated into store activities that store managers voluntarily extended the adoption of PMS procedures and routines beyond the scope of Alpha’s core business. Store managers decided to use Alpha’s PMS to handle products from different suppliers and after-sales activities; in other words, they were so familiar with the PMS that they sought to use it to handle any and all in-store activities.

The process-oriented implementation of PMS in Alpha was successful because of the ability of the PMS to direct people to follow a predefined standard procedure. However, the downside of this approach was that the system required a huge amount of data to work properly. Initially, extensive data entry was required strictly for hardware customisation processes and was therefore easily accepted by both customers and store managers. However, ten years later, with a huge catalogue to manage and a growing demand for standard products, this extensive data entry process became a barrier to sales. For example, for “each new customer entering a store, a new customer profile had to be entered in the system, with no exceptions. It does not matter if those customers were simply requesting a quote, buying a fully customised PC or [buying] a simple ink-cartridge” (Interviewee No. 7). The ability to monitor each in-shop activity required a huge volume of data to be entered into the software system. To fulfil the data entry requirements, store managers were forced
to reduce their store opening hours and potentially serve lower volumes of customers. Following store complaints about the hefty data entry demands, Alpha decided to contain its requirements: “a new generic-customer profile was added to the system, and each store could use that profile to sell simple products or to propose quotes for customised hardware” (Interviewee No. 7). This generic customer profile allowed Alpha to adapt the PMS without affecting its underlying processes.

In summary, Alpha implemented its MCS in a linear and sequential way, and only minor adaptations or variations were recognised. The MCS in Alpha was initially designed with a high level of specification. The initial design of MCS perfectly fitted the strategy at the time of the design; however, during implementation, external changes in the competitive environment along with changes in internal structures and in Alpha’s strategy (e.g. more shops to coordinate) did not influence (through adaptation) the MCS. Therefore, the MCS no longer fitted the changing strategy because of its straightforward design and process-oriented implementation of PMS.

4.2 Waterfall MCS implementation in Alpha

Alpha’s implementation of its MCS followed a linear path from adaptation to assimilation, consistent with a waterfall approach (see Table III, Panel A). Alpha’s PMS responded to the company’s need to manage the complexity resulting from its built-to-order, just-in-time approach and its wide network of stores. The fundamental design principle of the PMS was, thus, to define a priori the best step-by-step procedure to monitor performance at both the headquarters and the stores. The PMS was essentially Alpha’s CEO’s way of seeing

<table>
<thead>
<tr>
<th>Adaptation</th>
<th>Acceptation</th>
<th>Routinisation</th>
<th>Assimilation</th>
</tr>
</thead>
<tbody>
<tr>
<td>As Alpha grows, the PMS grows: new statistics, new procedures.</td>
<td>The use of PMS by the distribution network is implicit in membership.</td>
<td>Headquarters and stores check data weekly/monthly.</td>
<td>Stores voluntarily extend their adoption of PMS procedures and routines.</td>
</tr>
<tr>
<td>The PMS adapts to Alpha’s needs: add-ons based on stores’ requests.</td>
<td>Discussion forum comprised of network stores for feature requests and support.</td>
<td>Network managers support PMS routinisation.</td>
<td>Data entry: reduced opening time required to fulfil data entry needs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data entry for each new customer (long queues).</td>
<td>Data entry for each new customer (long queues).</td>
</tr>
</tbody>
</table>

Panel B: Beta Social and Environmental Accounting and Reporting: an agile implementation

As Beta grows, the SEAR changes (from an external perspective – legitimacy – to an internal perspective – culture). Different way to collect data (with the introduction of BOARD, a business intelligence tool). From the social report to the integrated report. Discussions with different stakeholders (multi-stakeholder focus group “Incontriamoci” – an informal meeting with more than 250 employees in order to share common values). From the social report to the integrated report. Actions become part of the business practices, even when awareness of the principles and values is low (i.e. the withdrawal of products near their expiry date). SEAR becomes a strategic tool, different from the initial design. SEAR helps in the aligning of processes and becomes “common heritage”. SEAR fosters a shared modus operandi. (Examples: recycled paper, deep fryer oil, closed refrigerator).

Table III. Case studies of waterfall (Panel A) and agile (Panel B) implementation.
everything that happened inside Alpha’s headquarters and distribution network. All further adaptations of the PMS (e.g. the inclusion of new procedures, the inclusion of reporting tools in the software, the discussion forum and the role of the network managing director) were refinements that reinforced the original design. They could be paralleled through bug-solving in software development. Each adaptation was devoted to tightening control. Effectiveness was defined as the company’s ability to keep inventory low and achieve delivery times of only a few days.

This original design never changed. Consider, for example, the discussion forum, which played two complementary roles in the PMS. First, through the forum, the company headquarters offered technical support, and peers were able to discuss critical aspects of the organisation. It also helped in promoting the adoption of uniform (i.e. standardised and predictable) solutions to various problems. Second, the discussion on advertising policy and overall product strategy focussed on governing complexity: new products could be added to the catalogue if requested by stores, and products slotted to be promoted on the market could be chosen together with their corresponding stores. Similar considerations applied to all other system changes.

During the implementation of the MCS, there was little interaction between strategy and the PMS. All requirements were perfectly defined a priori, and all possible sources of variations were included in the original MCS design.

Towards the final phases of the waterfall implementation, when the PMS was better used and assimilated, it produced some strange and paradoxical results. Alpha focussed on following routines and conforming to procedures, which were designed to manage the business’ complexity. However, the significant data entry requirements (which were necessary for the PMS to properly work) created long queues of customers and reduced the stores’ opening times. The paradox, thus, was that the performance system that was designed to generate revenue made it impossible to follow the basic rules for generating revenue, such opening stores in order to make offers available to customers. In fact, it is not possible to sell products and/or offer services during time spent filling in forms (e.g. entering new customer profiles) or when stores are closed, especially if customers expect them to be open.

4.3 The Beta case study
Beta is a grocery retailer that, from 2001 to 2014, experienced gradual growth in terms of number of sales, customers and new supermarkets. These changes were reflected in its existing MCS, which was initially anchored to traditional mechanisms, including budgeting and PMSs, and which gradually changed over time in order to match the company’s evolving strategies.

In 2001, Beta designed and adopted a SEAR system in order to increase accountability towards stakeholders. Beta delivered its first standalone social report with the intent to “respond to a political situation” (Interviewee No. 1). Indeed, in 2001, Beta sought to demonstrate that, though it was and planned to remain a for-profit organisation, it conducted its business in a socially responsible and sustainable way, with a long-term orientation. As one interviewee stated, “We are socially responsible when we perform better in the long term, by also distributing the wealth fairly. This means ethics in business management” (Interviewee No. 1). The introduction of SEAR was connected to the need to gain legitimacy within the region in which Beta operates. Specifically, Beta is located in the Trentino Region of Northeastern Italy, where its major competitor is a consortium of Catholic consumer cooperatives[1] which is perceived as socially responsible a priori based on its values, beliefs and orientation towards the common good. As one respondent said, “Our main competitor is the world of cooperation, which plays an extremely important role for both geographical spread and for history” (Interviewee No. 1).
In the initial stages, Beta designed and formalised SEAR along with its organisational aspects, ethical values, functions and mission, as well as its various sustainability indicators. In 2001 and 2002, SEAR was then implemented throughout its adoption in a highly “hand-crafted” way: In order to draw up the standalone social report, the corporate social responsibility manager contacted all other managers (e.g. human resources, financial, technical) and collected, in different Excel files, all the data necessary to implement the indicators that had previously been designed and discussed by the board of directors. This process was lengthy and resulted in several discrepancies and inefficiencies among the different organisational functions. Moreover, the process was “often perceived as a burden on the different areas because it was something added to the day-by-day activities” (Interviewee No. 20) because it was decoupled with the existing MCS.

The social report was then adopted and disseminated through a public event/workshop delivered to the whole community. All stakeholder categories, including “the representatives of the local government, the suppliers, the lenders, some representatives of the media and of the scientific community; however, leaving in the background the working staff” (Interviewee No. 20), were invited.

However, Beta recognised the SEAR failure to enhance the company’s reputation and to fill the legitimacy gap between the local community and its stakeholders. Therefore, Beta adapted it by modifying its original design in terms of its purpose and strategy, the type of report and its way of collecting data. These changes did not occur simultaneously, but were instead achieved through continuous adaptations, acceptances, routinisations and assimilations over several years.

In terms of purpose and strategies, Beta realised that the external perspective of legitimacy embedded in the previous system was not deeply rooted in its internal culture, values and beliefs. Therefore, Beta refocussed and adapted the SEAR system towards more selected stakeholders. Thus, in 2005, Beta abandoned its public legitimacy meeting and began to conduct small, multi-stakeholder focus groups in order to disseminate the social report to a selected audience, with representation for each type of stakeholder. These multi-stakeholder focus groups enabled another gradual refinement and adaptation of the SEAR itself.

Indeed, the acceptance of the changed purpose, with its internal perspective, encouraged Beta to adapt the SEAR report type. Therefore, in 2007, Beta re-adjusted its SEAR to reflect the system’s new managerial purpose. At this time, the CEO decided to adapt the standalone social report previously employed into an integrated report in order to reinforce the embeddedness of social responsibility in the company’s daily practices. He claimed: “Since social responsibility is embedded and integrated in day-by-day management, even SEAR must be integrated” (Interviewee No. 1). The integrated report, which combined both economic-financial and social-environmental information, was naturally addressed to internal stakeholders, i.e. the managers and the employees. Moreover, the implementation and acceptance of the adapted SEAR was facilitated by a new workers’ meeting – called “Let’s meet” – with more than 250 employees at different hierarchical level. The focus of this meeting was to share the CEO’s values and beliefs with and within the company. This re-adapted SEAR was different from that originally designed both in terms of purpose and content, and had a significant impact on organisational culture: “The integrated report is the document which enabled Beta to build culture and values and to involve employees and get them a sense of belonging to the organisation” (Interviewee No. 8). Such meetings encouraged acceptance of the new SEAR integrated reporting approach and promoted its internal purpose in terms of a sense of belonging (i.e. to an organisation with a common skillset and culture).

These changes in the SEAR system – the new purpose and the new report – were first accepted through the “Let’s meet” meeting and then gradually routinised and assimilated by Beta’s internal stakeholders (i.e. the employees) through day-to-day activities.
The implementation of the new SEAR-integrated approach, allowed a deep assimilation and integration of values and beliefs into Beta’s managerial decisions; these became modus operandi. For instance, if Beta bought a new refrigerator, “it spends lot of time in looking for a solution with a low environmental impact, even if it costs 12 instead of 10” (Interviewee No. 5). Similarly, if Beta bought a new deep fryer, it sought a machine with a lower environmental impact; this was because the purchase manager “knows that if he proposes a machine which is not coherent with the common values and beliefs of the organisation, he will not receive the approval for the purchase. […] Therefore, the values and principles we have are clear to all workers at all levels” (Interviewee No. 1).

Another value, which became completely assimilated into everyday routines, was the attention to the environment. For example, Beta began to use only recycled paper for printing promotional flyers. This practice became so ingrained that, when the marketing manager worked with other partners who did not use recycled paper, joint initiatives were hardly pursued: “she does not want to give up on this value, and nobody forced her on this!” (Interviewee No. 5).

Once Beta’s sustainable values and beliefs became deeply rooted and integrated within the company’s day-by-day modus operandi, the company decided to rethink and redesign the SEAR system once more in order to better integrate the process of collecting data. Therefore, in 2009, the process of collecting data was completely integrated with the economic and financial dimensions of the previous MCS. In particular, Beta developed a business intelligence software called BOARD, which was able to merge the traditional MCS’ economic and financial indicators with social and environmental ones (e.g. staff turnover, wages and products). In keeping with the adapted purpose, the existing MCS and SEAR evolved to better satisfy Beta’s internal managerial and strategic needs: “data belonging to different sources has been integrated in one unique container, which then allows us to elaborate in a more accurate manner the data used for delivering the integrated report” (Interviewee No. 20).

SEAR became completely different from its initial design, which sought to produce a “hand-crafted” standalone social report to support legitimacy. It has evolved to become a strategic internal tool capable of coordinating, monitoring and managing information concerning the economic and financial dimensions of Beta, including both social and environmental issues.

4.4 Agile MCS implementation in Beta

The implementation of SEAR in Beta followed a discontinuous way, which adapted and evolved over time to match the company’s changing strategies, consistent with an agile approach (see Table III, Panel B).

The initial design of the SEAR system involved delivering a report to selected stakeholders in order to present Beta in a positive light and to solve the legitimacy disturbances it faced in its operating territory. Following the failure of this intended purpose, Beta gradually revised the role of the SEAR system, the type of report by which SEAR was conveyed and the way data were collected through the BOARD system. Following its first design in 2001, Beta adapted SEAR for internal purposes (i.e. becoming more accountable to stakeholders) by means of collaborative works and multi-stakeholder focus groups, as human and social factors of agile development (Dyba and Dingsøyr, 2008). Coherent with an agile approach (Fontana et al., 2015), Beta improved its SEAR processes through experimentation as a way to probe for new solutions. Therefore, the SEAR system evolved over time through different implementations of its intended purposes, such that “It is no more a mere accounting instrument, but it is actually a strategic tool which helps Beta – as a collective of working people – to set the path” (Interviewee No. 5).

After the new purpose had been accepted by internal stakeholders (e.g. through multi-stakeholder focus-group and Incontriamoci meetings), SEAR enabled Beta to produce integrated reports, which were shared with employees during the Incontriamoci meetings to
help them feel close to the organisation and to build a “common skillset and culture” (Interviewee No. 5). This common background enables the implementation of managerial practices and routines that are deeply coherent with the organisation’s values and beliefs (i.e. social and environmental values); the implementation of SEAR helped Beta achieve this internal purpose.

The agile implementation of SEAR was visible in the gradual routinisation and assimilation of the company’s social responsibility behaviours (Dybä and Dingsøyr, 2008) at all strategic levels. Over time, SEAR’s initial design gradually transformed – through repeated transitions of all phases and continuous feedback loops – from a financial statement add-on to the only form of integrated disclosure. Similarly, the “hand-craft” data collection routine that characterised the early SEAR design gradually transformed into structured data collection procedures. Beta adopted a “SEAR working solution”, which interacted with the changing strategy to orient SEAR more towards internal dimensions, with employees seen as key stakeholders. Day-by-day activities drove the actual implementation of these procedures: through gradual refinements, SEAR transformed from an external burden into a system that is, today, considered to be setting the path for the entire organisation. Gradually, SEAR procedures were integrated with previously existing data collection procedures, which were focussed mainly on financial performance and were included in the BOARD business intelligence tool. This long period of refining both the strategy and the MCS resulted in an assimilation of values, beliefs and procedures. SEAR, therefore, aligned Beta’s skills, beliefs, attitudes and values, ultimately facilitating successful agile development (Dybä and Dingsøyr, 2008).

Today, in Beta, there is no need to explain to employees why they should act in a certain way or force them to act in a certain way: they do not try to cheat on the customer (ham example), they do buy equipment with lower environmental impacts, they do use recycled paper. What they do day-by-day is, maybe unconsciously, coherent with values and beliefs; and is the result of a continuous adaptation of both strategy and MCS. As a matter of fact, SEAR enabled “to align organisational processes that before SEAR and integrated reporting had been conducted separately” (Interviewee No. 5).

5. Discussion and implications

In this paper, we contribute to the contingency approach of the MCS-strategy relationship by drawing attention to the concepts of MCS implementation and dynamic fit.

MCS implementation is a process through which an MCS is made active and effective over time. Stated differently, the implementation of an MCS is the process of developing, adapting and bringing an MCS to use in a specific setting. From a classical perspective an MCS is defined and redefined over time in relation to designed functions or targets that it is expected to accomplish within a strategic plan (Daft and Macintosh, 1984; Bhimani and Langfield-Smith, 2007). However, the actions organisations take to make their MCSs active and effective are attributable not only to strategy and strategic change, but also to changes made by the MCSs themselves through implementation. We claim that an MCS is made active and effective (i.e. is implemented) in different ways and that the waterfall and agile modes are archetypes of the several possible effective implementations organisations actually display.

In the waterfall implementation (see Table IV for a synthesis), an MCS is fully defined through its initial design and is activated as planned. For example, Alpha designed its MCS package to manage in-store activities according to a set of precisely defined procedures. Procedures were designed to solve a set of predictable and standard problems, and were enforced through the PMS software and through the network and distribution manager, the annual meeting and training courses. Transitions through implementation phases are linear and sequential, and the MCS is expected to remain always the same, admitting only
minor variations. For example, the generic-customer profile introduced to reduce back office activities did not change the design of the procedure for billing activities. This type of MCS is process-centred: procedures guide action and constitute the backbone of the organisation, which cannot change. Feedbacks from MCS use produce, at most, minor MCS redesigns, while feedbacks from strategy might occasionally produce major redesigns.

With respect to the relationship with strategy, feedback loops are not related to strategy or to changing contexts. MCS proceeds over time in a way that is consistent with the initial design requirements. However, since implementation requires time, though the original design of the MCS reflects the strategy at the time of the process start, it does not necessarily reflect later developments. If, after some time, requirements change in response to changing contexts or strategies, a new MCS design and a new waterfall implementation (for this new design) must be introduced. For example, the focus on routines and procedures in Alpha's MCS implementation initially allowed it to manage business complexity, but later became a barrier to sales leading to paradoxical results such as reducing stores' opening time.

In an agile MCS implementation, by contrast, if an MCS design exists, the way in which the MCS becomes active and effective is very unloyal to that design. The MCS is flexible and receptive to change; it is continuously transformed, and any design appears as a rough sketch of what it becomes through change. Predictability of what the MCS will become through this process is very low. Variation is continuous, and transitions through implementation phases are recursive. Such an MCS is people-centred: people’s beliefs and values guide action and are interpreted through the MCS, which changes continuously in order to better reflect new beliefs and values. People embed their beliefs and values; thus, they understand and welcome operations that reflect them. They also complete or complement MCSs that give them some choice. Feedbacks from both MCS use and strategy produce continuous changes in MCS design. For example, Beta designed its SEAR as a small part (component) of its control package in order to present the organisation in a positive light to and address legitimacy issues faced in its operating territory. However, the SEAR evolved by continuous and smooth transitions to become BOARD: an integrated tool capable of coordinating, monitoring and managing financial, social and environmental issues in an integrated way.

With respect to the relationship with strategy, feedback is constantly related to strategy and is used to update an “MCS working solution”. On one hand, the MCS is constantly 

<table>
<thead>
<tr>
<th>Transition through phases</th>
<th>MCS change predictability</th>
<th>MCS specification</th>
<th>MCS centered on</th>
<th>Kind and impact on MCS of feedback</th>
<th>Relationship with strategy</th>
<th>Dynamic fit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waterfall</td>
<td>Linear and sequential</td>
<td>High</td>
<td>Full specification at time of project initiation through design</td>
<td>Feedback from MCS use: minor redesign Feedback from strategy: stair change in design</td>
<td>Top-down; Loosely coupled</td>
<td>Follow a stair tread (a new waterfall cycle is needed)</td>
</tr>
<tr>
<td>Agile</td>
<td>Recursive</td>
<td>Low</td>
<td>Specification over time through use</td>
<td>Feedback from both MCS use and strategy: continuous change</td>
<td>Bottom-up; Tightly coupled</td>
<td>Smooth transitions</td>
</tr>
</tbody>
</table>
challenged by the changing strategy and environment, which continuously demand new MCS requirements; on the other hand, the MCS defines what is considered important for the development of strategy. The evolutions of both the MCS and the strategy are incremental and tightly coupled, and the MCS is continuously transformed through use. As a result, the MCS reflects the strategy at any point in time, and not only at time of the initial design. The coupling of the MCS and strategy is assessed on a continuous basis. For example, this is clear in the way Beta continuously adapted the SEAR system to its strategy in terms of purpose, type of report and method of collecting data.

From this perspective, both strategy and MCSs provide autonomous sources of change, and given that the two elements change together in a co-evolutionary process, the idea of a static fit is hardly meaningful (Grabner and Moers, 2013). In this paper, we stress the idea of a dynamic fit between MCSs and strategy that refers to the interplay between the two transforming elements. In particular, we stress two points.

First, fit or misfit in the MCS-strategy relationship might depend, not on strategy changes, but on the way in which the MCS is implemented. In fact, fit (or misfit) occurs because of the changes in both strategy and endogenous to the MCS (and, thus, reflected in the MCS implementation type). For instance, assuming a stable strategy, when the MCS is implemented through a waterfall approach, the MCS-strategy relationship displays fitness; conversely, when the MCS is implemented through an agile approach, the MCS-strategy relationship displays misfit, since the MCS is changed as it is implemented, but the strategy remains as was originally planned.

Second, fit and misfit are dynamic, meaning that they change over time. Consider a case opposite to the one previously illustrated and assume a changing strategy. When the MCS is implemented through a waterfall approach, the MCS-strategy relationship displays a deeper and deeper misfit; conversely, when the MCS is implemented through an agile approach, the MCS-strategy relationship displays fitness. With a waterfall implementation, the MCS redesign rebalances the MCS-strategy relationship and rebuilds fitness, which is again disrupted over time as strategy changes; thus, fitness (or misfit) follows a stair trend, meaning that it shows the typical trend of the staircase function[2].

The elaboration of the two implementation types and the theorisation of their impact on the MCS-strategy relationship lead us to ask what determines whether an organisation displays a waterfall or an agile approach. While we leave this question to further research, external determinants mediated by strategy may be the answer. For example, volatile, uncertain or new environments might require agile MCS implementations, while more stable contexts may be more efficient and effective with waterfall MCS implementations. However, internal determinants can also be hypothesised to play a role, since these are reflected in the centrality of people or procedures in agile and waterfall implementations, respectively.

In terms of implications, our contribution speaks to both scholars and practitioners by drawing attention to MCS implementation as a crucial process in defining the MCS-strategy relationship.

First, this means that the consideration and accurate definition of MCS design does not guarantee MCS-strategy fitness, even when strategy does not change. In fact, MCS changes autonomously through implementation. Whether the implementation type can be included in the design of the MCS, as the levers of control perspective has done for MCS uses (Simons, 1995; Tessier and Otley, 2012), is an open question for scholars, and at this point of research, we are not ready to define the determinants of one or the other implementation type. However, through this study, we have made implementation types visible and recognisable. As an implication, practitioners who are now able to trace these implementation types may appreciate their role in the MCS-strategy relationship, particularly when fit or misfit is observed, and may correct them in relation to the pace of change of strategy and the strategic environment, and the potential for the organisation to move from a process- to a people-centred system (or vice versa).
Second, acknowledging the role of MCS implementation implies acknowledging that the MCS-strategy relationship plays out dynamically. In this light, it is important to consider the way in which the co-evolution and the dynamics occur: in terms of stair treads, as when MCS and strategy are loosely coupled, or continuously, as when MCS and strategy are tightly coupled.

6. Conclusions
The aim of this paper was to encourage discussion on the role of implementation in the MCS-strategy relationship adopting a longitudinal perspective and a holistic conception of MCS as a package. Accordingly, we paid attention to implementation, including, namely, the process through which intentions and plans are put into action, as the locus of the MCS-strategy relationship over time. We redefined fitness in terms of waterfall or agile implementation, and we presented two cases, which served as illustrations of two different archetypes of MCS-strategy implementation types which form the theoretical extremes of a continuum of possible observable combinations.

The waterfall implementation builds on strong MCS and strategy designs that are made more accurate and precise over time. However, these MCS and strategy refinements do not confront or affect one another. The result is a potential “loss of relationship”, such that contradictions may easily arise between MCS and strategy. Within a waterfall implementation, the evolution of the relationship between a given MCS and strategy follows a “stair tread” and takes place through the periodic redesign of the MCS. This mode represents the typical case considered within the contingency approach.

Agile implementation assumes both MCS and strategy to be temporal working solutions for a focal organisation. This perspective facilitates many more changes on both the strategy and MCS sides than the waterfall model does. It also stresses that the focal element of this implementation type is the “tight relationship” between MCS and strategy, in which constant confrontation drives coordinated change. The evolution of the MCS-strategy relationship is incremental, and both MCS and strategy are continuously redesigned.

Acknowledgement
This paper was greatly benefitted from the comments raised by the participants at the 2015 Sidrea Workshop in Perugia, the 2015 Management Accounting Research Group conference in Birmingham, and the 2017 European Accounting Association Annual Congress in Valencia. The authors would particularly thank the editor and the two anonymous reviewers for their constructive comments. For their contribution to data collection for the Alpha and Beta cases, the authors also wish to give credit, respectively, to Paolo Collini and Michele Andreaus.

Notes
1. The consortium of Catholic consumer cooperatives is a nationwide network of grocery stores with approximately 100 cooperatives in Trentino alone.
2. Note that in the case assuming stable strategy, misfit occurring in agile implementation is rebalanced and fitness is rebuilt through a strategy redesign and the dynamic fit follows a stair tread.

References


Further reading


Corresponding author

Graziano Coller can be contacted at: graziano.collier@unitn.it
Does graphical reporting improve risk disclosure? Evidence from European banks

Michael Jones
School of Economics Finance and Management, University of Bristol, Bristol, UK
Andrea Melis
Dipartimento di scienze economiche ed aziendali, Università degli Studi di Cagliari, Cagliari, Italy
Silvia Gaia
Essex Business School, University of Essex, Colchester, UK, and
Simone Aresu
Dipartimento di scienze economiche ed aziendali, Università degli Studi di Cagliari, Cagliari, Italy

Abstract

Purpose – The purpose of this paper is to examine the voluntary disclosure of risk-related issues, with a focus on credit risk, in graphical reporting for listed banks in the major European economies. It aims to understand if banks portray credit risk-related information in graphs accurately and whether these graphs provide incremental, rather than replicative, information. It also investigates whether credit risk-related graphs provide a fair representation of risk performance or a more favourable impression than is warranted.

Design/methodology/approach – A graphical accuracy index was constructed. Incremental information was measured. A multi-level linear model investigated whether credit risk affects the quantity and quality of graphical credit risk disclosure.

Findings – Banks used credit risk graphs to provide incremental information. They were also selective, with riskier banks less likely to use risk graphs. Banks were accurate in their graphical reporting, particularly those with high levels of credit risk. These findings can be explained within an impression management perspective taking human cognitive biases into account. Preparers of risk graphs seem to prefer selective omission over obfuscation via inaccuracy. This probably reflects the fact that individuals, and by implication annual report users, generally judge the provision of inaccurate information more harshly than the omission of unfavourable information.

Research limitations/implications – This study provides theoretical insights by pointing out the limitations of a purely economics-based agency theory approach to impression management.

Practical implications – The study suggests annual reports’ readers need to be careful about subtle forms of impression management, such as those exploiting their cognitive bias. Regulatory and professional bodies should develop guidelines to ensure neutral and comparable graphical disclosure.

Originality/value – This study provides a substantive alternative to the predominant economic perspective on impression management in corporate reporting, by incorporating a psychological perspective taking human cognitive biases into account.

Keywords Banks, Impression management, Corporate reports, Credit risk graphs, Incremental information, Omission strategy

Paper type Research paper

1. Introduction

This paper explores the role of graphical reporting in credit risk disclosure by major European-listed commercial banks. Lending is the main activity of these financial institutions. Their loan portfolio represents a significant part of their assets and one of the main sources of their income and risk (Ahn and Choi, 2009) with higher levels of credit risk increasing banks’ probability of default (Imbierowicz and Rauch, 2014). Unpaid loans...
decrease banks’ profitability, and may result in bank failure. This study seeks to understand how banks portray credit risk-related information and whether they provide incremental, rather than replicative, graphical information in their risk reports. It also investigates whether credit risk-related graphs fairly represent the graph’s underlying risk performance or are used for impression management. Risk disclosure is still limited (Abraham and Shrives, 2014), both in financial and non-financial companies. Banks have different reporting structures compared to non-financial companies (Beattie and Jones, 1997) and follow distinctive regulations and accounting practices (Elshandidy et al., 2015). Risk disclosure is crucial for banks as banks are risk-taking enterprises and, especially during the recent credit crunch, this has negatively affected depositors, shareholders and taxpayers (Linsley and Shrives, 2005; Woods et al., 2008b; Magnan and Markarian, 2011). Risk should be properly managed and publicly disclosed to allow investors and other stakeholders to evaluate banks’ risk profile (Linsley and Shrives, 2005).

Recent research has questioned the usefulness of current risk reporting practice (e.g. Linsley and Shrives, 2005; Woods et al., 2008a; Oliveira et al., 2011a; Bischof and Daske, 2013; Maffei et al., 2014; Elshandidy et al., 2015; Allini et al., 2016). Risk disclosure has been criticised for not being detailed, nor forward-looking, nor sufficient for assessing the overall risk profile (Linsley and Lawrence, 2007; Magnan and Markarian, 2011) nor relevant for the decision-making process (Beretta and Bozzolan, 2004; Pérignon and Smith, 2010). Moreover, the reported risk-related information tends to be “boiler plate” in nature, difficult to read, lacks comparability and, therefore, is of limited value (Linsley and Lawrence, 2007; Woods et al., 2008a, b; Ryan, 2012).

Ryan (2012) argues that companies should present risk disclosures in formats that promote their usability, such as graphs (Beattie and Jones, 2008). Graphs can help users understand banks’ risk. They attract reader’s attention, facilitate comparisons and identify trends in a readily, “eye-catching”, accessible form (Hill and Milner, 2003; Beattie and Jones, 2008). Graphs can be used by annual report’s preparers to provide neutral incremental information to the readers. However, graphs in annual reports can also be opportunistically used by managers for impression management (Beattie and Jones, 2008). The concept of impression management originates in social psychology and refers to the practice of presenting information so that it will be perceived favourably by others (Hooghiemstra, 2000). The predominant perspective on impression management in corporate reporting is based on a purely economics-based, agency theory approach (Merkel-Davies and Brennan, 2007). Managers are assumed to be driven by economic rationality, with economic incentives to exploit information asymmetries by providing biased information (Merkel-Davies and Brennan, 2011). In line with this perspective, graphs have been found to be selective (i.e. they enhance positive and de-emphasise negative information), and to provide favourable, inaccurate and misrepresented information (e.g. Beattie and Jones, 1992, 1999; Mather et al., 1996; Falschlunger et al., 2015). Merkel-Davies and Brennan (2007) suggest that alternative theoretical perspectives, such as a psychological perspective, could explain impression management behaviours in corporate reporting. We explored this by analysing the omission of accounting information (i.e. selectivity) vs commission (i.e. the provision of fabricated or exaggerated information). From an economic perspective, individuals do not evaluate the consequences of wrongful (i.e. unfair and biased) omission and commission differently (Baron, 1986). Therefore, managers could either choose selective omission or wrongful commission to provide a more favourable impression of corporate performance. By contrast, a psychological perspective views individuals as having an omission bias, i.e. evaluating negative omissions less harshly than wrongful commissions (e.g. Spranca et al., 1991; Cushman et al., 2006). Consequently, like the economics-based perspective, managers might use graphs selectively, by omitting information that does not
provide a favourable view. However, in contrast to the economics-based perspective, they might avoid practices of wrongful commission, such as providing inaccurate and misrepresented information, that can cause greater “condemnation” and public concern (DeScioli, Christner and Kurzban, 2011).

The remainder of this paper is structured as follows. In the next section, we discuss the prior literature and develop the hypotheses. In Section 3, we present our methodology, including sample selection, data gathering and analysis. In Sections 4 and 5, we present findings followed by our discussion and conclusion.

2. Literature review and hypotheses development
2.1 Risk reporting in the banking sector
Risk disclosure is an important part of risk management (Basel Committee on Banking Supervision (BCBS), 2006; Allini et al., 2016). Companies have several incentives for risk disclosures, such as reducing stakeholders’ uncertainty, decreasing the cost of capital (Linsley et al., 2006), strengthening their reputation and increasing legitimacy (Oliveira et al., 2011a). Companies also have incentives to decrease risk disclosures harmful to their competitive position (Woods et al., 2008b). Investors benefit from effective risk disclosure as they can compare expected returns with associated risks, thus maximising the utility of their portfolio-investment decisions (e.g. Beretta and Bozzolan, 2004; Linsley and Shrives, 2005; Abdullah et al., 2015). However, when risk disclosure is generic, qualitative and boiler plate rather than substantive, its utility is limited (Abraham and Shrives, 2014).

Regulators, standard setters, practitioners and academics have all been concerned with the quality and quantity of risk disclosure (e.g. BCBS, 2006; Companies Act, 2006; Abraham and Shrives, 2014). There have been calls for a greater and higher-quality transparency in risk reporting in the banking sector, as banks are risk-taking enterprises whose activities have been found, especially during the recent credit crunch, to be unpredictable and unstable (Linsley and Shrives, 2005; Magnan and Markarian, 2011; Bischof and Daske, 2013). Risk should be properly managed and disclosed by revealing relevant information for investors and other stakeholders (Linsley and Shrives, 2005). Although banks were the focus of public attention during the recent financial crisis (Erkens et al., 2012), risk disclosure in the banking sector has been under-researched, compared to non-financial firms (Linsley et al., 2006, Maffei et al., 2014).

European banks’ risk disclosure is subject to complex regulation by the International Accounting Standards Board, by national central banks and by national and European regulatory bodies (e.g. the Basel Committee on Banking Supervision, the European Banking Authority). Despite different regulatory bodies imposing greater transparency, no regulatory requirement exists for European banks to include graphs of risk variables (Pérignon and Smith, 2010). Graphical reporting, thus, remains a fully voluntary disclosure choice.

Prior research shows that the level of banks’ risk disclosure has increased over time, following an increase in minimum requirements imposed (e.g. Bischof, 2009). However, risk reporting’s usefulness for decision-making has not improved at a similar rate (Pérignon and Smith, 2010; Maffei et al., 2014). Recent studies have found risk reporting to be unclear, very general and qualitative, not sufficiently forward-oriented, non-comparable and, thus, unhelpful for the assessment of risk exposure on an on-going basis (e.g. Linsley et al., 2006, Woods et al., 2008b; Oliveira et al., 2011b; Maffei et al., 2014).

The opaqueness and difficulty in interpreting and comparing risk reporting could be reduced by using tables or other well-structured communication formats (Ryan, 2012), such as graphs (Beattie and Jones, 2008).
Studies on graphical reporting and impression management have mainly analysed non-financial firms, excluding financial institutions and commercial banks (Beattie and Jones, 2008), despite the important role graphical reporting can play in presenting understandable risk information by banks.

2.2 Impression management

The dominant perspective in impression management studies in a corporate reporting context is based on economics theories, particularly agency theory (Merkel-Davies and Brennan, 2007). Agency theory focuses on the most efficient contract of governing the relationship between managers and investors, given that both are regarded as rational, self-interested decision-makers (Eisenhardt, 1989). Using this theoretical perspective, previous studies have found that managers used corporate reports opportunistically (Hooghiemstra, 2000). Managers conceal failures and emphasise successes (Courtis, 1998). Individuals can give a false impression of reality by omitting key information (omission) or by purposefully misrepresenting information, either via exaggeration or fabrication (wrongful commission). The distinction between omission and commission is, in itself, not relevant from an economics-based impression management perspective, given the same consequences (Baron, 1986). Both omissions and commissions offer a more favourable portrayal of company’s performance than is warranted (e.g. Beattie and Jones, 1999; Mather et al., 1996; Falschlunger et al., 2015).

Economics-based hypotheses based on full rationality, however, have limited psychological validity (Merkel-Davies and Brennan, 2007). Individuals make decisions based on limited rationality (Simon, 1955) as, even when full information is available, their analysis of it is only moderate. Individuals’ judgments and choices are influenced by the way in which alternatives are framed (Tversky and Kahneman, 1981). A psychological perspective can thus provide useful insights into corporate graphical reporting strategies.

Psychological studies report that individuals often evaluate omissions and commissions differently. Individuals often evaluate decisions to commit actions (i.e. commissions) more negatively than decisions to omit actions (i.e. omissions), even though either decision could have the same negative consequence. This phenomenon is called “omission bias” (Spranca et al., 1991). Omission bias seems to be caused by a perceived difference in causality, responsibility or both (Spranca et al., 1991). As omissions tend to provide less evidence about the intentions of the actor, third parties will tend to be more uncertain about the preparers’ intentions for omissions. “Wrongful” omissions are thus judged less harshly than “wrongful” commissions (DeScioli, Bruening and Kurzban, 2011).

Omission bias has several consequences. First, individuals tend to consider harm caused by action as worse than equivalent harm caused by inaction (Cushman et al., 2006). Second, they view omission as less deceptive than commission (Van Swol et al., 2012), even when the actor’s intention to deceive is judged to be the same (Haidt and Baron, 1996). As third parties judge omissions less harshly, ceteris paribus, then individuals will choose “wrongful” omissions to incur less blame (DeScioli, Bruening and Kurzban, 2011). The preference for omission is therefore not necessarily unconscious, but may be strategic. Individuals have been found to choose omission more frequently when there was the possibility of punishment (DeScioli, Christner and Kurzban, 2011).

2.3 Hypotheses development

Public attention to banks’ risk management has been very high, given the enormous risks taken by financial institutions at the expense of depositors, shareholders and taxpayers (Linsley and Shrives, 2005; Woods et al., 2008b; Magnan and Markarian, 2011). This public scrutiny has provided incentives for banks to increase transparency on their
credit risks, but also to manage disclosures to provide a “favourable” impression of their credit risk. These incentives are likely to be affected by the current level of credit risk the bank faces.

The economics-based and psychological-based impression management perspectives (e.g. Merkl-Davies and Brennan, 2011) both share the view that riskier banks might not want to release “negative” news to the public and consequently will decrease the quantity of voluntary risk disclosures (Abdullah et al., 2015). By omitting information, high-risk banks build a “risk story” (Linsley and Shrives, 2005, p. 213) that is favourable to them, simultaneously avoiding public negative reactions.

Despite the lack of neutrality and of comparability of information over time (Beattie and Jones, 2008), given omission bias, annual report users are unlikely to blame preparers as no information is exaggerated or fabricated. Given the importance of credit risk, banks could be selective using credit risk graphs only when they report positive, rather than negative, credit risk. Therefore, we expect that:

H1. Banks are less likely to portray credit risk graphs when they face a higher level of credit risk.

Risk reporting’s effectiveness and usefulness depends not only on the amount of information provided, but also on the disclosure quality (Beretta and Bozzolan, 2004; Pérignon and Smith, 2010). Textual complexity can obfuscate the adverse information conveyed (Cho et al., 2010). Visual inaccuracies can also serve the same purpose. Inaccurate design can mislead the annual report’s readers, with or without accounting experience (Muiño and Trombeta, 2009; Pennington and Tuttle, 2009). The quality of risk reporting could be affected by the level of risk the bank faces (e.g. Linsley et al., 2006; Maffei et al., 2014).

An economics-based perspective of impression management suggests that managers may engage in wrongful commission by providing an inaccurate and favourable view of corporate performance (Courtis, 1998; Beattie and Jones, 1999; Cho et al., 2012). High-risk commercial banks might, therefore, have greater incentives to obfuscate their credit risk performance via inaccurate disclosures to reduce the negative impact of their high riskiness on readers’ perceptions. Previous studies have found firms with negative performance were more likely to “obfuscate” the message, by producing less readable reports (Li, 2008).

However, from a psychological perspective, self-serving annual report’s preparers could decide to exploit omission bias. Banks, especially those with a high credit risk, are likely to be subject to high levels of public scrutiny. Managers might avoid practices of wrongful commissions, such as the provision of inaccurate information in the risk report, as the latter can cause greater “condemnation” and public concern than selective omissions. In line with a psychological-based perspective of impression management, banks with a high credit risk will therefore be less, rather than more, likely to obfuscate credit risk disclosure. Taking into account the economics-based and psychological-based contrasting view on the influence of riskiness on graphs’ accuracy, we expect that:

H2. The level of inaccuracy in banks’ credit risk graph is likely to be related to the level of the bank’s credit risk.

3. Methodology
3.1 Sample and data gathering
We selected the commercial banks based in the largest five European economies (France, Germany, Italy, Spain and the UK) by gross domestic product and listed from 2006 to 2010.
We focussed on commercial banks as they are the main players in their industry (Oliveira et al., 2011b), have a different activity and risk profile compared to savings and investment banks (e.g. Bischof, 2009; Laidroo, 2016), give weight to credit risk (e.g. Imbierowicz and Rauch, 2014) and have been considered to have high levels of public visibility and scrutiny (Oliveira et al., 2011a) which is likely to affect impression management practices.

Using the database Bankscope, we identified 157 listed banks. We excluded the following: listed subsidiaries of a holding bank already in the sample (20), financial companies that were not commercial banks (75), banks not listed (or whose annual reports were not available) in all the years studied 2006-2010 (15). The final sample comprised 47 commercial banks (235 firm-year observations): 10 French, 9 German, 17 Italian, 6 Spanish and 5 UK banks.

We downloaded the consolidated annual reports from the banks’ websites and collected data about all the graphs included in both the risk reports within the management report and in the notes to the financial statements. We call these sections “risk reports”. To understand whether graphs provided additional information, we also collected all the information related to the variable portrayed in the graph in the five pages surrounding the graph (two pages before and after the graph’s page and the graph’s page). We chose five pages as a cut-off (Beattie and Jones, 2001; O’Sullivan and Percy, 2004). Data on the bank’s risk, stock market performance, profitability, size and audit firm were collected from Bankscope.

3.2 Data analysis

The overall analysis was conducted in two stages. First, we explored the use of credit risk graphs in risk reports and investigated whether credit risk graphs portrayed information accurately and whether these graphs provided incremental, rather than merely replicative, information. Second, we investigated whether the level of banks’ risk influenced the use of credit risk graphs (H1) and/or graphs’ accuracy/inaccuracy (H2).

Both the graphs’ accuracy and the extent of the additional information were coded by three researchers. The coding instrument is considered as valid, in terms of well-specified decision categories and decision rules (Beattie and Thomson, 2007), based on the previous literature on graphical reporting.

3.2.1 Graphical accuracy. To evaluate the level of graphical accuracy, a set of predefined decision rules was first identified to ensure the reliability of the coding process and measurement, and to reduce subjectivity (Marzouk and Marzouk, 2016). Then, three researchers separately applied this set of predefined decision rules to a few cases (ten banks). When any discrepancy between the evaluations was found, it was discussed by three researchers and, if necessary, the decision rules were redefined to make them more stringent and clear. The level of accuracy of all the risk graphs was then evaluated by three researchers who worked independently, with each researcher analysing approximately one-third of the annual reports. Any discrepancies were discussed by the three researchers and resolved. The few cases of discrepancy were all resolved easily. The level of accuracy was then calculated and the scores for each element of the accuracy index assigned. The self-constructed graph accuracy index incorporates the following aspects considered relevant by the extant literature (Beattie and Jones, 1999, 2008; Hill and Milner, 2003): title of the graph, clarity of the variable portrayed (i.e. clear presence of the variable’s name portrayed in the graph’s title, key or axes), presence of data values within the graph, presence of X and Y axes, gridlines, Y axis that begins at 0, and conventional trend. Each item in the index was scored from 0 to 1. Table I includes the details of the scoring procedure.
For each graph, we calculated a graph accuracy index as the ratio of the sum of the scores awarded to each item divided by the maximum possible potential score achievable by that graph. The total available scores exclude items not applicable to a particular graph[1]. This exclusion, together with the proportional score approach, allows comparable accuracy scores to be constructed for each firm (e.g. Bassett et al., 2007). We then calculated an overall graph accuracy index as the sum of the graph accuracy index for all the graphs inserted in the risk report divided by the total number of risk graphs.

Figures 1 and 2 provide real-life examples of the illustration of different levels of graphs’ accuracy for credit risk graphs. Figure 1 represents three credit risk graphs with a high level of accuracy, while Figure 2 represents three anonymised and adapted credit risk graphs with a relatively low level of accuracy.

### 3.2.2 Graphical additional information

Risk disclosure is provided in different formats including narrative, tabular and graphical data (Woods et al., 2008a). These reporting...
Notes: The three graphs are all accurately designed with: title of the graph, variables clearly identified, x and y axes clearly numerically labelled and with clearly displayed units of measurement, zero-origin, gridlines (except the third graph) and conventional order. The graph accuracy index equals 1 for the first two graphs, 0.875 for the third graph. Permissions to reproduce the original graphs have been obtained by the companies. The authors are extremely grateful to the companies for this.
formats provide information in different ways, to achieve different purposes (Vessey, 1991), although they may contain similar information. Narratives are appropriate to discuss simple issues and explain particular insights gained through data analysis. Visual representation formats (e.g. graphs) are more appropriate for complex issues (Speier and Morris, 2003) as they require less cognitive effort (So and Smith, 2004). Tables are considered an appropriate format for displaying symbolic information, such as discrete sets of values. By contrast, graphs are deemed to be appropriate for displaying spatial information (i.e. time or cross-sectional comparisons, Vessey, 1991) as they provide additional information beyond the data itself (see Beattie and Jones, 1993).

We considered a graph as providing complete additional information (score 1) when no information about the variable portrayed in the graph was reported in the surrounding five pages analysed; as providing partial additional information (score 0.5), when some information was reported and providing no additional information (score 0), when all the information about the variable was reported in the surrounding pages. To evaluate the overall level of additional graphical information in the risk report, we divided the sum of the scores on additional information provided by each graph, by the total number of graphs. Figure 3 provides an anonymised and adapted example, based on real risk reports, of differences in the additional information.

3.2.3 Empirical model. To investigate our hypotheses, we developed two different regression models, differing only in terms of the dependent variable. The first model tested \( H1 \): the dependent variable is the number of credit risk graphs inserted in the risk sections of a bank’s annual report (hereafter graph usage)[2]. We employed a multi-level panel regression model containing both fixed and random components. The fixed effects are analogous to the standard regression coefficients and are estimated directly. The random effects take the form of random intercepts (Baum, 2006). In particular, our model tests the influence of our control factors and independent variables, considering bank \( j \) at time \( t \),
The vast majority of credit risk related to Western Europe (60%) and the USA (38%) with the remainder being concentrated in various emerging countries. The risk profile for the emerging countries remained similar to that obtained in 2007.

The group was focused in developed countries. In the US risk developed from 46% to 50% while it decreased in the rest of the world from 40% to 35%.

The diagram below shows the spread of credit risk across countries.

Notes: Panel A: the three graphs refer to the distribution of credit risk by geographic area. The graph on the left does not portray any additional information, as the same data are included in the text. The risk report would have provided the same amount of information even without the graph. The graph in the middle portrays partial additional information, as the text provides the same information for the US area but less precise information for the UK, Europe and the Rest of the World. By contrast, the graph on the right portrays full additional information, compared to the information included in the five surrounding pages. The information contained in this graph is for illustrative purposes only and is not intended to be representative of any specific financial product, project, institution or individual. Panel B: the three graphs refer to the distribution of doubtful loans by geographic area. The graph on the left does not portray any additional information, as the same data are included in the text. The graph in the middle portrays partial additional information, as the text provides the same information for two countries (Spain and the UK) but no information for the other regions. By contrast, the graph on the right portrays full additional information, compared to the information included in the five surrounding pages. The information contained in this graph is for illustrative purposes only and is not intended to be representative of any specific financial product, project, institution or individual.

Figure 3. Anonymised and adapted but real-life examples of graphs with no additional information (left), partial additional information (middle) and full additional information (right).
controlling for fixed-year effects \((\lambda_t)\), country-level random effects \(u^{(1)}_t\) and bank-level random effects \(u^{(2)}_j\):

\[
\text{Credit risk graphs}_{j,i,t} = \alpha_0 + \beta_1 \text{bank credit risk}_{j,i,t} + \gamma_1 \text{bank size}_{j,i,t} \\
+ \gamma_2 \text{profitability}_{j,i,t} + \gamma_3 \text{stock market performance}_{j,i,t} \\
+ \gamma_4 \text{audit firm}_{j,i,t} + \lambda_t + Z^{(1)}_{j,i} u^{(1)}_t + Z^{(2)}_{j} u^{(2)}_j + \epsilon_{j,i,t}
\]

(1)

In the second regression model, used to test \(H2\), the dependent variable is the credit risk’s graph accuracy index:

\[
\text{Credit risk graph accuracy index}_{j,i,t} = \alpha_0 + \beta_1 \text{bank credit risk}_{j,i,t} + \gamma_1 \text{bank size}_{j,i,t} \\
+ \gamma_2 \text{profitability}_{j,i,t} + \gamma_3 \text{stock market performance}_{j,i,t} \\
+ \gamma_4 \text{audit firm}_{j,i,t} + \lambda_t + Z^{(1)}_{j,i} u^{(1)}_t + Z^{(2)}_{j} u^{(2)}_j + \epsilon_{j,i,t}
\]

(2)

Following previous studies (e.g. Poon and Firth, 2005; Shehzad et al., 2010; Delis and Kouretas, 2011; Lee and Hsieh, 2014), we used two alternative measures to estimate the level of bank credit risk: impaired loans to gross loans and loan loss reserves to impaired loans. The impaired loans to gross loans ratio assesses the quality of the loans that a bank has on its books and its ability to mitigate credit risk. A higher (lower) ratio indicates a higher (lower) amount of total doubtful loans and thus a higher (lower) risk of non-collection of the amounts due. The loan loss reserves to impaired loans ratio estimates the expected probability of eventual default by loans and the extent to which the total loss is covered. High levels denote a higher probability that potential losses on loans will be covered and a greater ability to mitigate credit risk.

In all regression models, we controlled for the following variables:

3.2.4 Bank size. Larger firms have been found to provide more risk reporting disclosures (e.g. Linsley and Shrives, 2006) and to use more graphs (e.g. Hrasky and Smith, 2008). Bank size was estimated as the natural logarithm of banks’ total assets at the end of the financial year.

3.2.5 Financial performance. Higher financial performance provides managers with the incentive to disclose greater information to signal their superior performance to the market (e.g. Wallace and Naser, 1995). Companies typically use more graphs portraying a positive, rather than a negative, performance (e.g. Beattie and Jones, 1992; Falschlunger et al., 2015). Profitability (the ratio of net income to average equity, ROAE) and stock market performance (the bank’s annual stock return) were used to estimate banks’ financial performance and measured at the end of the financial year.

3.2.6 Audit firm. High-profile audit firms might exert pressure on banks to disclose more data (Bassett et al., 2007) and more accurate risk-related information (Hassan, 2009). This is a dichotomous variable (1 if the annual report was audited by a BIG 4 audit firm, 0 otherwise).

3.2.7 Additional information. Banks might be keener to design a credit-risk graph accurately when the graph provides additional rather than replicative information to that reported in the narratives or tables, as the graph is the only source of information. By contrast, banks could be less accurate in graphical design when the credit-risk graph provides merely replicative information, as the risk report’s readers could use narratives or tables to understand that information. This variable is calculated as in Paragraph 3.2.2.
4. Results

4.1 Descriptive statistics

Table II reports the number of risk reports with at least one credit risk graph. We identified that 86 out of 235 (37 per cent) risk reports included at least one credit risk graph. Over time, the use of graphs was similar. Each risk report contained, on average, almost four graphs (see Table II). We found some evidence of different national patterns: Spanish banks used the most graphs (11.1 graphs per report) while Italian banks the least (1.2 graphs per report). Credit risk graphs were rarely forward-looking: only 2 per cent of graphs portrayed future-related information. In total, 36 per cent of the graphs were time series (see Panel B of Table II).

We found banks to be highly, although not fully, accurate in risk graphical reporting. The average value of the graph accuracy index was 0.86 out of 1, with some inter-country differences (German banks' graph accuracy index was equal to 0.89, and UK banks to 0.72). Importantly, credit risk graphs did provide substantial additional information as Panel B of Table II shows that 74 per cent of the information graphically portrayed was additional, on average.

Table III reports descriptive statistics on banks' characteristics. The average level of a bank's credit risk (i.e. the ratio of impaired loans to gross loans) was 4.6 per cent. This percentage increased markedly over time from 3 per cent in 2006 to 6.4 per cent in 2010. The percentage of loan loss reserves to impaired loans, the other proxy for overall credit risk, was 75.7 per cent. It decreased markedly over time.

4.2 Multivariate analysis

The correlation matrix (not reported for brevity) shows that the independent variables have correlations lower than 0.61. The only exception is the correlation between the two proxies used to measure credit risk, the impaired loans to gross loans ratio and the loan loss reserves to impaired loans ratio, that equals −0.73.

The variance inflation factor (VIF) values (reported in Table IV) are lower than 5, thus multicollinearity is unlikely to be a concern (Baum, 2006). Table IV documents our tests of
Table III: Companies' characteristics

<table>
<thead>
<tr>
<th>Panel A: Whole sample</th>
<th>Mean</th>
<th>Median</th>
<th>SD</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit risk (impaired loans/gross loans in %)</td>
<td>4.6</td>
<td>4.0</td>
<td>3.3</td>
<td>0.1</td>
<td>17.2</td>
</tr>
<tr>
<td>Credit risk (loan loss reserves/impaired loans)</td>
<td>75.7</td>
<td>61.4</td>
<td>62.6</td>
<td>18.4</td>
<td>452.0</td>
</tr>
<tr>
<td>Bank size (total assets in millions €)</td>
<td>378,440.0</td>
<td>44,000.0</td>
<td>612,566.0</td>
<td>248.0</td>
<td>2,600,000.0</td>
</tr>
<tr>
<td>Profitability (ROAE, in %)</td>
<td>8.8</td>
<td>9.3</td>
<td>11.2</td>
<td>–86.7</td>
<td>46.2</td>
</tr>
<tr>
<td>Stock Return (in %)</td>
<td>–7.7</td>
<td>–9.9</td>
<td>42.3</td>
<td>–92.6</td>
<td>206.9</td>
</tr>
<tr>
<td>Audit firm (in %)</td>
<td>78.7</td>
<td>100.0</td>
<td>41.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B: Country and year-analysis (mean values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
</tr>
<tr>
<td>Credit risk (impaired loans/gross loans in %)</td>
</tr>
<tr>
<td>Credit risk (loan loss reserves/impaired loans)</td>
</tr>
<tr>
<td>Bank size (total assets in millions €)</td>
</tr>
<tr>
<td>Profitability (ROAE, in %)</td>
</tr>
<tr>
<td>Stock Return (in %)</td>
</tr>
<tr>
<td>Audit firm (in %)</td>
</tr>
</tbody>
</table>
hypotheses. Models 1a and 1b report the multilevel regression used to estimate $H1$ while Models 2a and 2b test $H2$. In Models 1a and 2a, the impaired to gross loans ratio is used as a proxy to estimate banks’ credit risk, while in Models 1b and 2b the loan loss reserves to impaired loans ratio is used.

Models 1a and 1b show that banks with higher credit risk portrayed significantly less credit risk-related information ($p < 0.05$). This result is in line with both economic and psychological-based impression management perspectives. Banks selectively omitted credit risk-related information when facing higher credit risk. By contrast, they increased disclosure, by using more graphs, when facing a lower credit risk, thus providing a more favourable view of their results. Thus, $H1$ is supported.

Models 2a and 2b show that, in line with $H2$, credit risk affected graphical accuracy. More specifically, banks with higher credit risk were significantly more likely to portray credit risk graphs accurately ($p < 0.05$). These findings provide supports for the psychological-based impression management. In the scenario of high public scrutiny due to the high credit risk, bank’s risk report preparers omitted to portray credit risk-related graphs, while, at the same time, designing the remaining credit risk graphs more accurately, to avoid negative external reactions.

Banks designed credit risk graphs more accurately when these graphs provided additional information ($p < 0.10$), i.e. they tend to be more accurate when the information portrayed is more relevant, as not reported elsewhere.

### Notes:
The table presents the z-values. Country-level random effects and bank-level random effects are included in the models. In Model 1a, we lost 37 observations because there were no disclosed data on the impaired loans to gross loans ratio, and 1 observation because of missing data on the stock market performance. In Model 1b, we lost 40 observations because there was no disclosed data on the loan loss reserves to impaired loans ratio and 1 observation because of missing data on the stock market performance. In Model 2a, our subsample starts from 86 observations (number or reports with at least one credit risk graph). Then we lost 6 observations because the lack of data on the impaired loans to gross loans ratio and 1 observation because of missing data on the stock market performance. In Model 2b, we lost 7 observations because there was no disclosed data on the loan loss reserves to impaired loans ratio and 1 observation because of missing data on the stock market performance. *, **, ***Denote that difference is significant at the 0.10, 0.05 and 0.01 levels, respectively.

### Table IV.
Relationship between bank’s credit risk and credit risk graph usage and accuracy

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Model 1a</th>
<th>Model 1b</th>
<th>Model 2a</th>
<th>Model 2b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impaired loans to gross loans ratio</td>
<td>-2.14**</td>
<td>2.04**</td>
<td>2.14**</td>
<td>-2.51**</td>
</tr>
<tr>
<td>Loan loss reserves to impaired loans ratio</td>
<td>2.59**</td>
<td>2.69***</td>
<td>-2.89***</td>
<td>-2.83***</td>
</tr>
<tr>
<td>Profitability</td>
<td>-0.01</td>
<td>0.30</td>
<td>1.37</td>
<td>1.08</td>
</tr>
<tr>
<td>Stock market performance</td>
<td>-0.36</td>
<td>-0.71</td>
<td>-1.34</td>
<td>-1.22</td>
</tr>
<tr>
<td>Audit firm</td>
<td>0.38</td>
<td>0.23</td>
<td>1.19</td>
<td>1.32</td>
</tr>
<tr>
<td>Additional information</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 2007</td>
<td>0.63</td>
<td>0.65</td>
<td>-0.56</td>
<td>-0.73</td>
</tr>
<tr>
<td>Year 2008</td>
<td>0.24</td>
<td>0.15</td>
<td>-0.82</td>
<td>-1.19</td>
</tr>
<tr>
<td>Year 2009</td>
<td>0.41</td>
<td>0.15</td>
<td>-1.04</td>
<td>-1.24</td>
</tr>
<tr>
<td>Year 2010</td>
<td>0.46</td>
<td>0.11</td>
<td>-0.83</td>
<td>-0.93</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.77**</td>
<td>-2.75***</td>
<td>7.36***</td>
<td>7.57***</td>
</tr>
<tr>
<td>No. of observation</td>
<td>197</td>
<td>194</td>
<td>79</td>
<td>78</td>
</tr>
<tr>
<td>Mean VIF</td>
<td>1.75</td>
<td>1.71</td>
<td>1.87</td>
<td>1.91</td>
</tr>
<tr>
<td>Max VIF</td>
<td>2.55</td>
<td>2.61</td>
<td>2.92</td>
<td>3.17</td>
</tr>
<tr>
<td>Wald $z^2$</td>
<td>18.58***</td>
<td>18.20***</td>
<td>22.25**</td>
<td>23.71***</td>
</tr>
<tr>
<td>LR test ($z^2$)</td>
<td>213.83***</td>
<td>206.59***</td>
<td>65.95***</td>
<td>66.59***</td>
</tr>
</tbody>
</table>

Table IV. Relationship between bank's credit risk and credit risk graph usage and accuracy
5. Discussion and conclusions
This study has examined graphical risk reporting in European-listed commercial banks during 2006-2010. Previous research has assumed that banks have different graphical reporting practices from non-financial firms (e.g. Beattie and Jones, 1997). However, with very few exceptions (e.g. Lairdoo, 2016), there has been no empirical study on graphical reporting in banks. Our findings show that graphs portray risk-related information that is not merely replicative, but additional to that reported in narratives and tables in the risk report. In line with previous studies on risk narratives (e.g. Linsley et al., 2006; Oliveira et al., 2011a), the risk information portrayed is rarely forward-looking. The graphs generally also show a high level of accuracy. This finding is in line with the lack of deliberate obfuscation of bad risk found in annual reports' narratives (Linsley and Lawrence, 2007). Therefore, graphs could potentially be one of those “well-structured” formats that promote the usability of risk-related information (Ryan, 2012).

However, our study found selectivity in graph’s usage and, therefore, a lack of comparability across time. Banks tend to de-emphasise their level of credit risk by omitting graphs, when the risk level is higher. This finding is in line with the prior literature on the “abuse” of graphs in portraying financial performance (e.g. Beattie and Jones, 1992, 1999; Mather et al., 1996; Falschlunger et al., 2015) as well as in environmental and social performance (Jones, 2011; Cho et al., 2012).

Interestingly, we found banks are more likely to portray credit risk graphs accurately when they face a high, rather than a low, level of credit risk. This seems in contrast with the prior impression management literature, generally based on economics-based theories and mainly analysing non-financial companies (e.g. Mather et al., 1996; Beattie and Jones, 1999; Cho et al., 2012). Banks prefer to conceal their bad risk performance through selectivity rather than obfuscate it through an inaccurate use of graphs. Probably, due to the high level of public scrutiny high-risk banks face, an inaccurate graphical usage could be spotted and lead to negative external reactions. Therefore, the lack of evidence to support the so-called “obfuscation” hypothesis (Courts, 1998) is not necessarily in contrast with impression management, but might be attributed to its limited psychological validity (Merkel-Davies and Brennan, 2007). Individuals tend to have an omission bias, considering “wrongful” commissions morally worse than “wrongful” omissions (e.g. Spranca et al., 1991; Cushman et al., 2006). In a corporate reporting context, annual report’s preparers might (subconsciously or consciously) be aware of this cognitive bias and adopt an omission strategy, to avoid public negative reactions and to manage readers’ impressions. High risk banks appear to choose “wrongful” omissions (i.e. the selective omission of graphical information), but avoid “wrongful” commissions, (i.e. inaccurate graphical information), to potentially avoid the external concern and potential blame derived from an inaccurate misrepresentation. Thus, in contrast to prior studies analysing non-financial companies (e.g. Beattie and Jones, 1999; Falschlunger et al., 2015), impression management practices of omission (selectivity) and inaccurate wrongful commissions do not seem complementary.

As in any study, our study has some limitations. First, although credit risk is the main risk faced by commercial banks, there are potentially other banking risks (i.e. market and liquidity risks), which could affect graphical voluntary disclosure. Future studies could try to examine their influence on graphical reporting within risk reports. Second, our sample covered most of the major and important European commercial banks (Financial Stability Board, 2011), however future studies could explore graphical reporting by investment, savings and cooperative banks. Third, future studies could investigate whether narratives and other presentational formats (e.g. photos) substitute or complement risk graphs. Finally, more research into the usefulness and value relevance of graphical risk disclosure, from a user’s perspective, is welcomed. There are therefore promising opportunities for future research in this under-investigated area.
This study nonetheless provides valuable theoretical insights and has relevant practical implications. It points out the importance of including psychological perspectives on impression management literature in the corporate reporting context. Annual report readers need to be careful about subtle forms of impression management, such as the ones that exploit their cognitive biases. More specifically, analysts and investors should pay close attention when comparing the risk disclosure of banks with different levels of risks. Regulatory bodies should consider guidelines or checklists for neutral and comparable graphical disclosure, to prevent annual report preparers opportunistically exploiting the latitude in graphical voluntary disclosure choices. We also suggest professional bodies educate the main users of financial information (e.g. analysts) on the presence of potential cognitive biases within the decision-making. Education has been found useful in mitigating the decision-biasing effects of misleading graphs (Raschke and Steinbart, 2008) and we argue that it can be useful in making the user alert and aware of the omission bias. Finally, professional bodies can provide incentives (e.g. annual report awards) to annual reports’ preparers for neutral voluntary disclosures, as incentives might mitigate impression management practices.

Acknowledgement
The authors thank the Editor, Dr Julia Mundy, for her advice in dealing with the reviewers’ comments and the authors also thank the two reviewers for their helpful and constructive suggestions. Andrea Melis acknowledges the financial support of Fondazione di Sardegna. The authors are also very grateful to Credito Valtellinese, Aareal Bank and Barclays, which gave the authors the permissions to reproduce the original graphs. Michael Jones acknowledges the support of the University of Cagliari (UNICA), Visiting Professor Programme.

Notes
1. The graphical accuracy index is composed of three items for pie charts, a minimum of seven and a maximum of eight items for column, bar and line graphs.
2. In both our dependent variables we used a natural logarithm’s transformation to make their potentially skewed distribution more normal.

References

Baum, C.F. (2006), An Introduction to Modern Econometrics Using Stata, Stata Press, College Station, TX.


About the authors
Michael Jones has an MSc Degree from Magdalen College Oxford and is a qualified Chartered Accountant. He is currently a Professor of Financial Reporting at the Bristol University. He was formally a Professor at Cardiff Business School and was an ex-Editor of the British Accounting Review and currently serves on five editorial boards. He has organised the Financial Reporting and Business Communication Conference for 22 years. His main interests are biodiversity reporting, financial reporting, history of accounting and impression management. Michael Jones is the corresponding author and can be contacted at: michaeljohn.jones@bristol.ac.uk

Andrea Melis is a Professor of Corporate Governance and Reporting at the University of Cagliari, Italy. He received a PhD Degree in Accounting and Business Administration from the University of Roma TRE. His main research interests are in corporate reporting and corporate governance. He is the Screening Editor of Corporate Governance: An International Review and an Editorial Board Member of Accounting and Business Research, Corporate Ownership and Control and the Journal of Management and Governance.

Silvia Gaia is a Lecturer in Accounting at the Essex Business School, University of Essex. She graduated with a PhD Degree from the University of Roma TRE, Italy and worked as a Lecturer in Accounting at the University of Cagliari, Italy. She was a Visiting Scholar at the University of Birmingham, UK and a Research Assistant at HEC Montréal (Canada). Silvia’s research interests mainly relate to corporate governance, financial and social-environmental reporting.

Simone Aresu is an Assistant Professor of Accounting at the University of Cagliari and has been a Research Trainee at HEC Montreal. His current research focuses on voluntary disclosure and, in particular, impression management techniques within annual reports; social-environmental reporting and corporate governance.
Explaining implementation difficulties associated with activity-based costing through system uses

Elodie Allain and Claude Laurin
Department of Accounting Studies, HEC Montréal, Montreal, Canada

Abstract
Purpose – The purpose of this paper is to explore how and why the uses (enabling or controlling) of an activity-based costing system could cause difficulties in implementing such a cost system.

Design/methodology/approach – The authors conducted a case study in a French insurance company. Three successive research periods were undertaken: from March to August 2005, between October 2008 and June 2009, and in 2012. In total, 51 interviews were conducted during these periods. Other useful information was also collected through conversations, observation, and through the consultation of internal documents.

Findings – The results show that designing a cost system aimed at being simultaneously used in controlling and enabling ways can generate important difficulties. Furthermore, the results show that attempting to get around these difficulties could result in investing significant amounts of resources with no guarantee of success.

Research limitations/implications – Beyond the difficulties of extending the scope of application of case studies, the study was conducted in an organization involved in the insurance industry which could further limit its general applicability.

Practical implications – Based on the experience at Rassura, the authors argue that managers should be aware that designing and implementing a cost system that can simultaneously be used in both controlling and enabling ways is a very difficult, if not an insurmountable challenge.

Originality/value – The results highlight that one important characteristic of a cost system, how it is used, could explain, at least partially, implementation difficulties related to technical challenges, resistance to change and lack of resources.

Keywords Implementation, Activity-based costing, Cost systems, Enabling/controlling, Uses of controls

1. Introduction
Since its emergence in the mid-1980s, activity-based costing (ABC) has been the subject of numerous scientific publications. Academics, professional associations and consultants have fostered the spread of ABC in professional circles (Jones and Dugdale, 2002; Alcouffe et al., 2008). Although the number of articles published has declined over the past 20 years (Bjornenak and Mitchell, 2002), an entire chapter is often devoted to ABC in the management accounting textbooks that have been published in recent years (Atkinson et al., 2012; Horngren et al., 2012; Boisvert et al., 2011; Burns et al., 2013). Thus, there still appears to be a widely accepted need for a sophisticated costing method, such as ABC, and the management accounting context still seems to be favorable to its widespread use.

But, despite this widespread acceptance, a number of studies, most of them based on surveys, have reported that numerous difficulties stand in the way of the adoption of the ABC system (Anderson, 1995; Innes and Mitchell, 1995; Shields, 1995; Gosselin and Ouellet, 1999; Innes et al., 2000; Bescos et al., 2002). Among the various reasons supporting such a claim, the most often cited is the resistance to change. Malmi (1997) argues that such resistance can have political or cultural origins, or is caused by a perceived lack of relevance. However, there are also other reasons mentioned in the literature, such as, a lack of support.

The authors thank Suzanne Rivard, Sophie Tessier and two anonymous reviewers for their helpful comments and suggestions.
from senior management, or, the fact that ABC implementation can drain an organization’s resources. Furthermore, the technical difficulties associated with cost system modeling are also mentioned. Although these difficulties are known and can be anticipated, the literature concerned with the success of ABC implementation still presents, at best, mixed results (Gosselin, 2007). A broad understanding of the origin of the difficulties arising during ABC implementation seems to be lacking within the cost system literature.

In order to explain these difficulties, we follow several authors (Malmi and Brown, 2008; Zimmerman, 2013; Chenhall, 2003) in considering that a cost system can be seen as a component of the overall management control system (MCS) package. Therefore, the issues associated with the underlying use (enabling/controlling) of a MCS package component is relevant, especially if one considers the dysfunctional consequences of an inappropriate use (Mundy, 2010).

In this paper, we argue that issues related to the uses of a cost system, could contribute to the literature dealing with cost system implementation difficulties (Malmi, 1997; Major and Hopper, 2005; De La Villarmois and Levant, 2011). To address these issues, we consider the dual use of ABC (enabling and controlling) and the impact of this duality on the implementation difficulties. We do this through a longitudinal case study which provides a chronological account of the ABC implementation process and the difficulties caused by this duality. To our knowledge, difficulties arising from such duality have not been analyzed before in the cost system literature.

Our analysis of the implementation process suggest that whether a cost system is expected to be used in a controlling or in an enabling way needs to be considered at the implementation stage of a new cost system. Indeed, a good number of studies focus on implementation difficulties without considering the use (enabling or controlling) of the cost system. For example, Anderson (1995) and Shields (1995) focus only on the implementation process. Other studies focus on the users’ perception of the implementation process (Malmi, 1997; Major and Hopper, 2005; Norris and Innes, 2002). De La Villarmois and Levant (2011) analyze simultaneously the implementation process and the purposes of a cost system in order to understand the success, or otherwise, of the implementation. However, to the best of our knowledge, research linking the implementation difficulties associated to uses of an ABC cost system (enabling or controlling) is scarce.

We found several explanations as to why the uses of the cost system have not been considered in previous studies on ABC system implementation. First, the versatility of ABC is often seen as one of the important advantages of the method. The various studies investigating the reasons for adopting ABC (Innes and Mitchell, 1995; Ness and Cucuzza, 1995; Gosselin and Ouellet, 1999; Innes et al., 2000; Cotton et al., 2003) established that the adopting organizations had many expectations for the system. The fact that, as a sophisticated method, ABC necessarily satisfies multiple purposes so that it can be used in different ways could be taken for granted. Second, using one cost system for many purposes is seen as a way of overcoming implementation difficulties. For example, it is perceived as a way of maximizing relevance, so that, using ABC for many purposes may help to overcome resistance (Anderson, 1995; Malmi, 1997; Major and Hopper, 2005). Furthermore, a cost system that contributes to both accounting and managerial objectives potentially generates benefits that outweigh the substantial implementation cost (Zimmerman, 2013). Finally, implementing a cost system that serves a variety of purposes, including both accounting and managerial purposes, addresses the need to produce uniform, consistent information throughout an organization. Therefore, it is argued that the consistency resulting from using a single, multi-purposes system prevents the confusion that arises when different systems report different figures for the same cost object (Zimmerman, 2013; Anderson, 1995).

Even if there might be benefits associated with a multi-purposes cost system, there could also be drawbacks depending on the use (enabling or controlling) of the cost system which can increase implementation difficulties and that are unaccounted for in the literature.
Thus, we explore how the uses of a cost system could become problematic for its implementation. More specifically, we analyze how a cost system primarily designed to be used in a controlling way can fail to satisfy users who need enabling cost information. To analyze this question, a longitudinal case study was carried out within a French insurance company between 2005 and 2012. Such an extensive field study allowed us to investigate how the users reacted to the promises, as well as to the actual outcomes, of the implementation of a cost system designed for different uses.

Our results show that designing a cost system aimed at being simultaneously used in controlling and enabling ways can generate important difficulties. Using the cost system in a controlling way is not compatible with the flexibility and the internal and global transparency required to use a cost system in an enabling way. Therefore, when the emphasis is placed on the controlling use, the cost system fails to provide information needed to be used in an enabling way for operational decision-making. In the end, failing to design a cost system that can be used in an enabling way create resistance on the part of the users, mostly managers, who were expecting to use the system in an enabling way. Furthermore, our results show that attempting to get around these difficulties could result in investing significant amounts of resources with no guarantee of success.

The remainder of this paper is organized as follows: the next section reviews the literature dealing with the controlling vs enabling dichotomy and the uses of cost system, including the literature on ABC systems. Section 3 describes the research methodology, and Section 4 provides a case description. The results are discussed in Section 5. In our conclusion, we include a discussion of the limitations of our approach, and we propose avenues for future research.

2. Literature review
2.1 Uses of a cost system
As is the case for other control tools that are part of the MCS package, a cost system can be used in different ways. More precisely, a cost system can be used in a controlling or an enabling way. "Controlling use aims to mitigate problems of information asymmetry, whereas enabling use seeks to reduce uncertainty and improve decision-making (Sprinkle, 2003)" (Mundy, 2010).

Historically, cost systems were developed mainly to produce information to meet the needs of financial reporting requirements (Bouquin, 1997; Gervais, 2009). In this context, the objective of the regulator is to reduce information asymmetry between organizations and their stakeholders. Therefore, a cost system designed to meet such purposes is logically designed to be used in a controlling way. But, as management control evolved in the twentieth century, new cost systems, such as ABC, were developed. Cooper and Kaplan (1988) present ABC as a tool that helps "managers make better decisions about product design, pricing, marketing, and mix, and encourages continual operating improvements." Such an evolution supported the notion that a cost system could also be used in an enabling way, i.e. when "organizations attempt to design and operate formal systems that support users" (Ahrens and Chapman, 2004).

In order to be used in an enabling way, the design of a specific control should respect four important principles (Adler and Borys, 1996; Ahrens and Chapman, 2004). The first principle is "repair," meaning that the control can be improved, and that employees should be allowed to propose improvements. Applied to a cost system, this first principle means that employees should be able to propose changes (e.g. proposing new cost drivers) in order to improve the cost system's design. Such improvements could become opportunities to make better decisions related to cost management. Second, internal transparency is another important principle for an enabling control. A cost system designed with internal transparency allows employees to understand how the costs are modeled in their unit.
Third, global transparency allows employees to have a broader view of the cost system. To insure global transparency, the cost system’s design should be shared across the organization. Finally, the system needs to be flexible. “Flexible systems encourage users to modify the interface and add functionality to suit their specific work demands” (Adler and Borys, 1996). A flexible cost system provides cost information that is relevant for decision-making in various contexts.

Hence, if the literature shows that traditional cost systems were designed mostly to be used in a controlling way, it also shows that new approaches to costing, such as ABC systems, have been developed to be used in an enabling way, in order to support decision-making.

2.2 Underlying uses of the cost system in the ABC literature
Interestingly, the literature more specifically concerned with cost systems per se, argues indirectly that ABC systems are often implemented on the basis that they can simultaneously be used in controlling and enabling ways. ABC was introduced primarily to support corporate strategy (Cooper and Kaplan, 1988), including strategic decisions such as price and product mix, new product/service design, and the strategic management of various resources (Innes et al., 2000; Bescos et al., 2002; Innes and Mitchell, 1995; Shank, 2006; Swenson, 1995). Furthermore, the literature also reports situations where ABC supports operational decisions. For example, ABC has been used to reduce costs in operational departments (Anderson and Young, 1999; Swenson, 1995; Bhimani and Pigott, 1992). Surveys also confirmed that ABC serves short-term output management and can serve to improve the quality of service (Innes et al., 2000; Bescos et al., 2002; Innes and Mitchell, 1995). Hence, the early literature on ABC argues that this costing method takes an enabling role by allowing managers to be creative in their search for business opportunities (Tessier and Otley, 2012). But ABC is also used as a tool that, as is the case with traditional cost accounting systems, serve to model costs, value inventories, and feed financial statements (Innes et al., 2000; Bescos et al., 2002; Innes and Mitchell, 1995). These last potential purposes are more associated with a controlling rather than an enabling use.

2.3 Inconsistencies when a cost system is simultaneously used in controlling and enabling ways
Without specifically addressing the controlling vs enabling dichotomy, the cost system and the information technology (IT) literature discuss the difficulties that arise when a cost system designed to be used in a controlling way is used to support decision-making. For example, Bromwich and Hong (2000) explain that British Telecom has two cost systems. One serves for regulated pricing, and as a result, it is designed to meet regulatory requirements. However, this system produces distorted costs, so the organization uses a second cost system to support decision-making. For British Telecom, certain choices, such as selecting the nature of cost objects, or establishing the boundaries of the cost system, must be made to meet regulatory constraints. These choices do not seem to be suitable to adequately support decision-making. Major and Hopper (2005) also report that the level of detail required to support operational decision-making is inconsistent with the punctuality required to satisfy regulatory needs. In these two cases, it appears that cost systems designed to meet regulatory requirements, and therefore, used in a controlling way, lack the flexibility needed to be used in an enabling way for decision-making.

The cost system literature also reports difficulties when an organization uses a cost system in a controlling way in order to generate operational improvement. In Hoozée and Bruggeman (2010), cost systems (Time-Driven ABC) are implemented in different divisions in order to generate operational improvements. However, operational improvements were reported only when the cost system was used in an enabling way. In several divisions, the system design was based on dialogue and employee participation to guarantee internal transparency.
Furthermore, employees can “repair” the cost equations when needed. In a division where the system was used in a controlling way, and designed without participation and dialogue, the system was not transparent and employees could not repair it, thus, no operational improvement was reported.

The IT literature also describes how designing a cost system in order to favor controlling use over enabling use causes resistance. In her study of the implementation of a Financial Information System (FIS), Markus (1983) shows that a system aimed at satisfying the needs of both divisional and corporate accountants caused substantial resistance. Such resistance came from divisional accountants who wished to use the system for managerial decision-making whereas corporate accountants were focusing on external reporting purposes of the system and designed the FIS in such a way that it implied a gain of power relative to divisional accountants. Such situation generates resistances from divisions.

To conclude, if the literature clearly establishes that control tools can be used in enabling or controlling ways, it also demonstrates that designing a control tool, such as a cost system, that can simultaneously be used in both ways, is difficult. In that context, implementers’ most common responses to user resistance, such as inaction, acknowledgment, rectification and dissuasion (Rivard and Lapointe, 2012), could be insufficient.

3. Research methodology
Our research is aimed at identifying how and why the uses (enabling or controlling) of an ABC system could cause difficulties in implementing such a cost system. A case study facilitates a more direct, detailed investigation at the level required for a better understanding of the implementation of cost systems (Innes and Mitchell, 1995; Dugdale and Jones, 1997). The case study was conducted in a French insurance company, Rassura[1], between 2005 and 2012. The cost system in this company had undergone many developments, since its initial implementation in 1994 and today it is based on an ABC model.

Three successive research periods were undertaken: from March to August 2005, between October 2008 and June 2009, and in 2012. The last period focused specifically on the nature and the reasons for the modifications that had been carried out, and on the system’s capacity to provide the desired information. Interviewees were questioned about the purposes that the system was supposed to meet, and those that were actually met, as well as, about the requirements considered important to fulfill the purposes[2]. Other relevant information was also collected through interviews, conversations, observation and the consultation of internal documents (see Table AI). Most of our time in the company was spent in the accounting and control division. We were also able to attend meetings and presentations regarding ABC in various divisions. In total, 51 interviews were conducted during these periods. The 19 interviews conducted during the second and third periods (see Table AII) were all recorded. They were conducted in French, the mother tongue of the interviewees. The interviews were transcribed, and the transcriptions were not translated into English until their inclusion in the final version of the paper in order to guarantee the quality and consistency of the information. These interviews were with people involved in system implementation and system development projects, people who had produced studies based on the costs output by the system, and people who had used the information produced by these studies. Furthermore, we had spontaneous informal discussions with various employees that were not recorded, but, notes were taken immediately afterwards.

As a complement to this information, various internal documents were consulted, such as the minutes of meetings, descriptions of projects involving the development of the system, the stored presentations regarding ABC, as well as, files on processes, activities and drivers, and various other internal productions.
The information taken from various sources was brought together, cross-checked and
triangulated in order to improve the case study’s validity and reliability (Yin, 2003).
The results and the discussion we propose are the result of an iterative process of checking
the data collected against the literature.

4. Case description

4.1 Strategy and regulatory context

Rassura is a French insurance company[3]. Its initial strategy was what Porter (1985) refers
to as a “focus strategy.” It targets a particular group of customers. Although the attachment
to this target group still remains today, over the past few years the company has widened
its scope, moving toward a “differentiation strategy.” The company’s self-proclaimed
competitive advantage since the creation of the business, is its service quality, providing an
extended level of risk coverage, and paying special attention to the demands of its
customers. It can be assumed that this strategy orients the use that the company makes of
costs: “adopting a differentiation strategy does not allow a company to neglect costs; but
they cease to be its main strategic objective” (Porter, 1985).

French insurance companies operate in a highly regulated market. They are required to
produce their financial statements in compliance with the “Plan comptable des assurances”
(accounting plan for insurance companies). In addition, they must comply with the
obligations laid down by the Autorité de Contrôle Prudentiel et de Résolution (ACPR), a body
that supervises banking and insurance organizations. To meet these purposes, the data
produced by cost systems are used.

4.2 A historical account of cost system development at Rassura

Rassura’s first cost system appeared in the 1980s and was based on the “homogeneous
sections” method[4]. In 1994, the use of concepts taken from ABC (particularly the notion of
activities) was looked at carefully, with the aim of identifying what “business” customers
really cost. The motivation for this was the suspicion that business customers were being
subsidized by “individual” customers. From 1996 to 1998, the practical applications
resulting from the study carried out in 1994 were extended across the entire company.
The information produced at that time served as a basis for the company’s pricing policy
and for the production of financial statements in line with the specific requirements of the
accounting plan for insurance companies. Starting in 2000, activities throughout the entire
organization were listed and the “construction of a real ABC model” was initiated
(source: internal document).

From 2003 to 2007, the company moved into a phase of “industrialization of ABC”
(source: internal document). The new system replaced the old and Rassura changed over to a
new accounting software. The move to ABC as the sole cost system was explained by the
desire to increase the effectiveness of the information produced:

And it was when we had deployed ABC which was running in parallel to some degree […]
we thought […] that we would have to bite the bullet and try to increase productivity […] so we no
longer do anything other than ABC (Interviewee 1).

The multiple purposes for the single system can also be justified by the desire to produce
uniform and consistent information:

We had two different systems, so we had two different results and we had trouble explaining why
there were discrepancies between one system and the other; questions kept coming back – that took
more time than the analysis […] We didn’t spend time analyzing the results themselves; we had to
analyze the discrepancies (Interviewee 1)[5].

Figure 1 illustrates the steps in the evolution of the cost system.
4.3 Objectives set and the system initially built (step from 2003 to 2007)

The deployment of the ABC system at Rassura was intended to “improve help given to managers by providing better knowledge of costs; deploy a company-wide tool to replace a multitude of division-based supervisory activities; meet the requirements of the ACPR and of auditors, with the goal of improving control over the development of overhead costs” (source: internal document). Expectations of the system were high, diverse and similar to those identified in the literature. The system not only aimed at providing information to support operational and strategic decisions, but also at allowing the control of financial results by external authorities. The cost system should finally encounter different purposes, including some associated with a controlling use (produce financial statements, cost of training and other regulatory needs) and others associated with an enabling use (support operational needs, customer pricing, invoicing for partner, invoicing for subsidiaries).

To achieve these purposes, the system was set up with a number of models (allocation of the costs of activities to various cost objects) based around a common core of activity-based costs (see Table AIII). A total of 400 activities were listed and grouped into a hundred or so processes. This choice was based on a desire to conduct cost studies of all types but also to have a sufficient level of detail to guarantee the reliability of data (internal document):

The objective was to be able to conduct any type of cost study. So that was the […] guiding principle. In other words, that system made it possible to carry out all cost studies […] It was a case of, could we not use ABC for purposes beyond regulatory products and studies and use it to meet needs that were more operational in nature? (Interviewee 1).

The system was therefore intended to be used simultaneously in controlling and enabling ways.

The time that employees spend on various activities is the main resource driver, since personnel is the biggest expense item. A number of activity drivers were selected, including composite drivers (Balakrishnan et al., 2011)[6]. The system is complex (proliferation of models) and sophisticated (Abernethy et al., 2001), and this is reflected in the cost of implementing the system. Taking into account the costs of people involved in the project, software, modifications to information systems, and consultants’ fees, the ABC system adds up to an investment of several million euros.

4.4 Difficulties encountered and changes to the system (since 2008)

From the initial design phases through to data production, Rassura came up against various difficulties. At points where many companies decided to abandon ABC (Kaplan and Anderson, 2004), Rassura made changes to its system in an attempt to overcome the constraints that had been identified.

4.4.1 Initial difficulties and the first minor modifications. Even before the information produced by the system could be used, Rassura encountered technical difficulties with cost modeling using ABC. Defining activities and the choice of drivers posed substantial challenges. The difficulty of defining activities could be explained by the need to achieve a
meaningful level of detail (number of activities) for management at the operational level. The cost system needed to be flexible and to take an enabling role to support operational decision-making. A person involved in these phases stated that it was not possible to aggregate activities because the various divisions wanted a detailed level of activities for operational management needs. This person also reported that people in the organization’s various divisions were not particularly committed and proposed mostly volume drivers. The problems of modeling could have been exacerbated by the limitations of information systems: many people reported that no information was available for various drivers that were clearly relevant. Information processing in the cost calculation software also had limitations:

[...] the problems we had initially were that calculation times were huge: we began a calculation in the morning and didn’t get the result until the evening (Interviewee 2).

Modifications were quickly made to the system. These changes addressed a number of problems at the same time and led to a simplification of the system. In 2009 and 2010, the list of activities was revised and the process of gathering information on resource drivers was modified. The number of activities fell from 400 to 100 and the cost of collecting data were reduced. These changes were aimed at curbing maintenance costs which, as the literature mentions, can be substantial (Pizzini, 2006).

Although important, these initial changes were in fact minor and did not address all the difficulties encountered, such as the lack of relevance for some purposes. One of those interviewed stressed that the revision of the list of activities did not help his division, adding that:

Changes were made to activities, but actually this was at the request of the accounting and control division. This means that an accounting and control need was met, but in my group, all four managers no longer wish to take part in this kind of thing because they feel they will never get any benefit from it (Interviewee 11).

Using the system for reporting purposes, and so, in a controlling way, prevailed over using the system in an enabling way for decision-making.

4.4.2 “ABC Evolve”: a major system overhaul. “ABC Evolve” is a major project that was launched in 2011 (and scheduled for completion in 2014) aimed at overhauling the cost system in greater depth. The changes are aimed at overcoming various persistent difficulties: reducing maintenance costs, reviewing the parameters that cast doubt on the reliability of the information produced, homogenizing production and achieving consistency, speeding up the production of information and the legibility of the information produced, and meeting purposes other than those of accounting (operational needs and head office analysis needs).

On top of the usual problems generated by modeling and the significant cost of the system, came the difficulties of satisfying the requirements (legibility, accuracy, production speed of the information, etc.) to meet the various purposes.

Although the ABC Evolve project was launched in response to these difficulties, its implementation was influenced by the environment. Increasing competition (banks moving into the insurance industry, the internet) caused management to stress the need to control the growth of overhead costs, which, at Rassura were rising significantly.

Thus, the project obtained the support of senior management, confirming that long-term support from top management is necessary for ABC to survive (Gosselin, 2007). Clearly, such support is conditional on obtaining information that will meet purposes other than those of regulatory reporting:

[...] after all, the costs for the company are not negligible. So, if these costs are agreed to at a particular time, it is because something enables the funds to be released. [...] ABC Evolve is clearly
a need for the divisions [...]. So there was clearly support from various divisions for the project. If it had been only the accounting and control division for purely regulatory reporting needs, the company might not have allocated all these funds to the project (Interviewee 8).

Lastly, ABC Evolve had formal objectives (in order of presentation – source: internal document): (1) improved source data (modeling); (2) meet better the regulatory requirements; (3) review the architecture of models; (4) increase knowledge on margins per contract and; (5) meet other study and management needs. ABC Evolve still proposes a cost system for both controlling use (meet better the regulatory requirements) and enabling use (meet other study and management needs). The initial phases of the project, in process during 2012, were designed to meet the first two objectives. It was decided that the production of costing information desired by operational and strategic management would be dealt with in subsequent phases (objectives 3 to 5).

The above historical account of cost system development reveals that since the first development of the ABC system, Rassura seems to have encountered most of the difficulties identified in the literature. Attempts to improve the cost system are still on going.

5. Discussion

5.1 How attempting to use a cost system simultaneously in controlling and enabling ways affect its implementation

The above historical account shows that attempting to use a cost system simultaneously in controlling and enabling ways challenges the implementation process in many ways. At Rassura, the principles of flexibility as well as the internal and global transparency required to use a cost system in an enabling way are not respected. To illustrate the consequences of this, we re-analyze the sequence of events.

As Ahrens and Chapman (2004) argue, flexibility is required to allow enabling use of a MCS. However, our analysis shows that meeting regulatory requirements prevails over flexibility. On the one hand, information must be produced in a timely manner in order to meet regulatory requirements but supporting operational decision-making requires detailed information, which causes a slowdown. The necessary compromise may come at the expense of the quality of information produced:

You cannot mix fine detail and macro [...] either the macro will suffer because it takes an insane amount of time to calculate and then we get massive amounts of detail and can distinguish nothing, or the very fine detail – in the end we won’t be able to do it because we will be far too macro. In either case you penalize one or the other at some point. And then it becomes very complicated for each individual to find their way around (Interviewee 2).

On the other hand, information must be accurate in order to meet regulatory requirements but supporting operational decision-making do not require the same degree of accuracy:

When we do regulatory reporting work, clearly we must be accurate, we must identify the impacts, the regulations at issue. When we do economic work we don’t have that dimension: Everything economic must be much more “macro” (Interviewee 5).

Besides failing to provide information needed for operational decision-making, this quest for high degree accuracy could affect the internal transparency of the information. One employee summed it up:

Legibility, knowing how the cost of acquisition is made up, is as important as reliability, because if operational users cannot find their bearings inside the cost you calculate, they’ll tell you that your cost [is not reliable]. While your cost may be as accurate as possible, as highly calibrated as possible, the fact that it is [incomprehensible] to the operational user will cause them to say [...] I can’t understand anything, it’s of no use to me (Interviewee 5).
In terms of transparency, users of cost information at Rassura tend to agree that transparency is required to use the cost system both in controlling and enabling ways:

[regarding disclosure of information to supervisory authorities] “We are obliged to answer their questions. The more legible the system, the less difficulty you have in answering them” (Interviewee 5).

[regarding the management of activities] “I think that legibility is important […] These days, you don’t know what the costs of acquiring contracts are made up of. It’s something that we cannot grasp because there are many drivers [whose origin we don’t understand] […] this is partly why we are doing the overhaul, to have some control over this object. So, yes, the need for legibility is important” (Interviewee 6).

However, our case analysis tends to show that modifications carried out as part of the ABC Evolve project succeeded in meeting the global transparency requirement desired by supervisory authorities, but the system remained a “black box” for operational departments. Such lack of global transparency had a negative impact on operational decision-making:

The big handicap that I see today is that it’s a big black box and even when we receive final costings, we cannot make sense of them. There are costs, we don’t know what is inside them, and we are unable to drill down […] there are things that are re-invoiced internally by […] drivers that we do not understand […] because of that, we make very little use of what is being done today (Interviewee 11).

Moreover, fulfilling the need for transparency for controlling use by supervisory authorities appeared to hinder actual transparency. Successive modifications should have increased transparency but the lack of stability of the information produced by these changes blurred the information obtained:

The fact is that we […] always tend to want to develop our models, i.e. refine the allocation, because we find that it is too simplified – and sometimes too complex […] we end up with changes that we don’t necessarily understand completely and which are entirely connected with the configuration of the model […] and that, for me, represents a real difficulty in using the system and in understanding for the divisions, who at some point must manage their activities and take decisions (Interviewee 8).

Facing a situation where purposes have to be prioritized, Rassura had to make choices. As is the case in other organizations (Major and Hopper, 2005; Anderson, 1995; Bromwich and Hong, 2000; Rossing and Rohde, 2010), the main function of Rassura’s cost system is to meet regulatory reporting purposes, which favors using the cost system in a controlling way. And when the system evolves, these purposes are seen as a priority. Modifications carried out in the initial phases of the ABC Evolve project fostered regulatory reporting purposes. Our results support the idea that “when compromises have to be made, the demands of the financial reporting function (inventory valuation) invariably triumph” (Kaplan, 1988).

As a result, the current ABC system does not provide the required information for operational decision-making:

We respond to studies which are above all […] focused on regulatory reporting needs or economic management needs. We have few specific models for the divisions, and that is why we need […] the ABC Evolve project (Interviewee 1).

The priority given to regulatory reporting is problematic for enabling use. An ABC system that primarily meets external reporting purposes is likely to provide unsatisfactory responses to internal demands (Anderson, 1995; Malmi, 1997; Major and Hopper, 2005).

5.2 Unexpected effect of multiple uses on implementation difficulties
5.2.1 Increased resistance to change. In order to limit resistance, the relevance of the information produced by a new cost system appears to be a key concept (Malmi, 1997;
Major and Hopper, 2005). At first glance, implementing a system to satisfy different purposes could increase information relevance for specific users.

At Rassura, the implementation of the first version of ABC did not elicit any particular resistance, several people expecting relevant information from the system for their needs. A number of purposes, which were originally considered, were nevertheless not served. Regardless of the division they belonged to, interviewees generally agreed that the system met regulatory reporting purposes. But managers outside the accounting and control division were not satisfied with the information produced by the system, which still failed to serve operational purposes (Malmi, 1997; Major and Hopper, 2005) and which did not allow the system to be used in an enabling way:

Today, our system is not set up to be able to serve operational staff properly (Interviewee 7).

Developing management assistance [...] is something we would very much like to have, but to which we have no access at present (Interviewee 11).

The lack of relevance of information for managers finally caused dissatisfaction with the ABC Evolve project. The results thus highlight an ambivalence which is not discussed in the literature: in order to limit resistance to the system, the temptation may be to seek to meet the needs of the various users who will have to feed it. But, in doing so, there is a risk that modeling will be made more complex with no guarantee that these needs will be satisfied. A further risk is that the quality of information required to satisfy various purposes could be reduced. For example, the estimates of time drivers may be biased:

[Speaking of the director of a division] he only gives the times [...] once per year. It’s clear that he has been giving me the same ones for the past 5 years. Because he doesn’t see the point of it, he has no results; it is not useful for him (Interviewee 11).

Our analysis shows that failing to design a cost system that can be used in an enabling way, in the end, create resistance that should have been reduced through the multiple uses of the information generated by the ABC system. In this context, the rectification of the system, which is one of the common response to resistance (Rivard and Lapointe, 2012), would not reduce the resistance if controlling use of the system remains prevalent.

5.2.2 Increased the cost/reduced the benefit. Devoting sufficient resources to an ABC system appears to be essential, since, the literature highlights many situations where the sheer amount of resources required to implement and maintain an ABC system caused it to be abandoned in a number of organizations (Shields, 1995; Kaplan and Anderson, 2004). Under these circumstances, implementing a multiple purposes system could be seen as an approach that aims at maximizing the benefit generated by a cost system and justify the substantial investment. At Rassura, the multiple purposes that arose from the information produced by the ABC system are supported by the argument that having such a system results in a favorable cost/benefit ratio.

As the original system could not satisfy all users, Rassura allowed operational managers to conceive their own specific cost models using the common core system as a base (see Section 4.3). The proliferation of such models, labeled “dedicated models,” were seen as a way to fulfill specific needs:

That is part of the reason why we are now going for dedicated models [...] Because integrating their needs into our model [...] nobody gets what they want (Interviewee 2).

Using dedicated models certainly has a positive impact on the overall flexibility of cost system. However, if using dedicated models increases flexibility, they also generate additional costs:

But we are seeing that there will be a large number of models, and this will after all necessitate an investment in terms of maintenance costs (Interviewee 1).
[regarding former dedicated models] “[…] we had [various dedicated models] that were of little use – say three models needing to be maintained for nothing. And what’s more, when you have three models to maintain, things take longer, meaning that closing accounts takes longer, you need people to manage them […] everything takes longer” (Interviewee 3).

Furthermore, the added flexibility of dedicated models does not appear sufficient to allow an enabling use of the cost system. In fact, it appears to be difficult to take into account all the requirements due to the limitations of the common core of the model on which the dedicated models are based. For example, the existence of the common core limits the possibility of modifying the boundaries of any given cost domain and the drivers selected in the dedicated models. In this particular instance, producing uniform information (constraint of consistency) conflicts with producing flexible information that can support decision-making:

We had a lot of discussion on that very subject – what working hypotheses should be used […] so that we could have a single model that could respond to both calculations […] so, there has to be reprocessing at some point, which we would rule out because […] the objective is to have consistency (Interviewee 1).

As a result, because the dedicated models are not flexible enough to satisfy the needs of divisional managers, divisions have started to create their own tools. One employee from the accounting and control division stated that while information pertaining to costs regarding customer, age, seniority, segment (requested by the marketing department) may be useful, the system is not designed to provide it. One interviewee explains:

We have, and we are in the process of building, tools suitable for managing our activity because we see that the accounting modeling that is necessary for management results is not suitable for management activities (Interviewee 6).

The above analysis shows that if a cost system primarily designed to be used in a controlling way, attempting to adapt the system to allow for an enabling use of the cost information requires a significant amount of additional resources. Hence, simultaneously using a cost system in controlling and enabling ways does not necessarily improve the cost/benefit ratio. It also shows that even with a flexible ABC system, using the cost system in controlling and enabling ways while maintaining cost information consistency appears to be impossible.

5.3 Epilogue: seeking enabling and controlling uses can explain the mitigated success of an ABC system

Our results show that implementing an ABC system for multiple purposes could become problematic because different purposes call for different, and sometimes incompatible uses. More specifically, our results illustrate that cost systems characteristics required to meet regulatory needs (using the cost system in a controlling way) are different from those required to support decision-making (using the cost system in an enabling way). Also, because regulatory needs are usually prioritized, these needs are likely to prevail over those of decision-makers, such that even a sophisticated cost system such as an ABC system ends up failing to provide cost information which adequately enable managers to better master their work tasks (Jordan and Messner, 2012). Attempts made at simultaneously using the cost system in controlling and enabling ways seem to generate more difficulties in the implementation of the ABC than it generates advantages.

Whereas Markus (1983) shows that designing the cost system in order to favor controlling use over enabling use caused a power struggle which exacerbated the tensions and aggravated the resistance problem, our results give another reading. In fact, power
struggles do not seem to be an issue at Rassura. We found other reasons explaining why using the cost system in an enabling way is difficult. First, the system is not flexible enough, such that the information provided to decision-makers misses crucial details. Second, the scope of the system is set to satisfy regulatory needs, while decision-making would require a system with a narrower scope. Finally, transparency is also weak. Division managers argue that the cost information is not legible. In the long run, there are risks to not only failing to meet all the purposes that the system was originally intended for, but also, to thwarting the advantages of having multiple-purposes system in the first place. A parallel can there be drawn between Markus (1983) study and ours. On the one hand, multiple purposes should reduce resistance, because many users can then expect benefits from the system. But on the other hand, because the system does not deliver on its many promises, especially, in our case, the promises made to the divisional managers it ends up increasing resistance. Hence, implementing a single multiple-purposes cost system, which is supposed to maximize benefits, ends up generating inefficiencies that cost more than the expected benefits. In the end, it seems to be impossible to use the cost system simultaneously in controlling and enabling ways.

6. Conclusion

Our field study reveals that focusing on the intended uses of an ABC system is useful to illustrate the difficulties associated with the implementation of the system itself. Our analysis reveals that attempting to simultaneously use a cost system in controlling and enabling ways can generate serious difficulties. Furthermore, in the long run, failure to deliver on the enabling dimension of the cost system generates significant cost and resistance that could, in turn, eliminate the expected benefits of the cost system, and even result in a negative perception of the system on the part of decision makers.

Our results contribute to the literature on ABC. They highlight that one important characteristic of a cost system, how it is used, could explain, at least partially, implementation difficulties related to technical challenges, resistance to change and lack of resources. ABC systems are often perceived as tools that, once implemented, can indeed simultaneously be used in controlling and enabling ways. However, when the cost system has to be used in an enabling way to support decision-making, attempts aimed at enhancing the flexibility of the system could generate technical difficulties. Furthermore, resistance to change can arise when users realize that it is not possible to use the system in an enabling way. In the end, even investing a significant amount of resources is not sufficient to satisfy the needs of decision makers who seek to use the cost system in an enabling way.

Our observations of ABC implementation also have practical implications. Based on the experience at Rassura, we argue that managers should be aware that designing and implementing a cost system that can simultaneously be used in both controlling and enabling ways is a very difficult, if not an insurmountable challenge. This situation could explain why activity-based management (ABM) has not been widely diffused. As a matter of fact, firms that attempt to ultimately implement ABM are implicitly seeking to use their costs systems in an enabling way. But as our results show, the gap which needs to be filled when trying to evolve from an ABC system used in a controlling way to the implementation of an ABM system aimed at supporting decision-making seems to be very large. Such an attempt is likely to require a large amount of resources, with no guarantee of success.

Despite being carried out over a relatively long period of time, our case study is, however, not free from limitations. Beyond the difficulties of extending the scope of application of case studies, our study was conducted in an organization involved in the insurance industry, where financial reporting is severely regulated. This could further limit the general applicability. Nonetheless, our results highlight the importance of considering the uses in assessing cost system implementation. Focusing on the potential uses of costing tools rather
than on their inherent virtues could facilitate a more harmonious process involved in the adoption of cost systems.

To carry on analyses of cost systems around uses of information, several interesting questions could be addressed: under which condition could an important control tool such as a cost system be used in both controlling and enabling ways? To what extent should the intended uses influence the choice of a system? How does power struggles inside the organization interplay with the uses of the cost system? We suggest future research is required to address these questions.

Notes
1. The name has been altered at the request of the company.
2. The interview protocol is available upon request to the authors.
3. For reasons of confidentiality, the information provided is left intentionally general.
4. Method of indirect cost allocation recommended by the French accounting plan developed by Rimailho and Cegos during the 1930s (Bouquin, 1997). Management accounting in its social context: Rimailho revisited (Bouquin, 1997). In practice, the systems covered by this epithet resemble traditional cost systems using multiple cost centres to allocate indirect costs (Gervais, 2009).
5. The concern for consistency is not, however, shared by everyone in the organization. One interviewee commented: “I produce the figure for accounting, and after that I take the liberty of breaking costs down differently, using different keys or perhaps not, because there may be some that are very relevant and I don’t need to change anything. And, in making that adjustment, I move from the accounting field to the economic field” (Interviewee 5).
6. For example, the costs of the “customer acquisition” process are allocated to products based on the number of new customers recorded, broken down by product, proportionately with the number of policies taken out by new customers for each product.

References


Appendix

<table>
<thead>
<tr>
<th>Year</th>
<th>Types of data</th>
</tr>
</thead>
<tbody>
<tr>
<td>March to August 2005</td>
<td>Observations: conducted in the accounting and control division. The advantage was internal validity, due to the proximity of sources. It was possible for us to meet directly with those concerned. 11 non-directed interviews (not recorded): with people in the accounting and control division who were conducting studies based on information produced by the system, or who were tasked with gathering information on the “time” resource driver. 21 semi-directed focused interviews (not recorded): with people in the various divisions of the company, 10 people whose job it was to ensure that timesheets (principal resource driver in the company) were filled out, and 11 people who filled them out. Internal documents: documents related to the use made of time records collected in the divisions (particularly to populate the ABC system).</td>
</tr>
<tr>
<td>Occasionally between 2008 and June 2009</td>
<td>Observations: conducted in the accounting and control division, but also, in an agency and a call centre. 8 semi-directed interviews (recorded): with people who produced studies based on the costs output by the ABC system, and with people who used these studies to meet various management needs. Internal documents: documents concerning the use made of information produced by the ABC system, its architecture, processes, activities, and drivers.</td>
</tr>
<tr>
<td>June 2012</td>
<td>11 semi-directed interviews (recorded): with people involved in projects to develop the system, users (and potential users) of the information for accounting, operational and strategic purposes. Internal documents: on needs and changes made to the system between 2009 and 2012.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Length of interview</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 h 50 m</td>
<td>May 12</td>
</tr>
<tr>
<td>2</td>
<td>0 h 50 m</td>
<td>May 12</td>
</tr>
<tr>
<td>3</td>
<td>0 h 40 m</td>
<td>May 12</td>
</tr>
<tr>
<td>4</td>
<td>1 h 09 m</td>
<td>May 12</td>
</tr>
<tr>
<td>5</td>
<td>0 h 45 m</td>
<td>May 12</td>
</tr>
<tr>
<td>6</td>
<td>0 h 51 m</td>
<td>May 12</td>
</tr>
<tr>
<td>7</td>
<td>0 h 20 m</td>
<td>May 12</td>
</tr>
<tr>
<td>8</td>
<td>0 h 42 m</td>
<td>May 12</td>
</tr>
<tr>
<td>9</td>
<td>0 h 51 m</td>
<td>May 12</td>
</tr>
<tr>
<td>10</td>
<td>0 h 36 m</td>
<td>May 12</td>
</tr>
<tr>
<td>11</td>
<td>0 h 13 m</td>
<td>May 12</td>
</tr>
</tbody>
</table>

Note: For reasons of confidentiality, the function of the interviewees is not provided.

Table AI. Information gathering in the case study

Table AII. Interview list (June 2012)
Table All.  
Models comprised in Rassura’s 2005 ABC system

<table>
<thead>
<tr>
<th>Model</th>
<th>Cost object</th>
<th>Purposes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Products, contracts, business partners</td>
<td>Regulatory needs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pricing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Invoicing for subsidiaries</td>
</tr>
<tr>
<td>2</td>
<td>Destinations (regulatory request)</td>
<td>Regulatory needs</td>
</tr>
<tr>
<td>3</td>
<td>Divisions</td>
<td>Occasional operational needs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cost of training (Regulatory need)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Invoicing for subsidiaries and partner</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Regulatory needs</td>
</tr>
</tbody>
</table>

Corresponding author
Elodie Allain can be contacted at: elodie.allain@hec.ca
**Emerald** is excited to announce a recent partnership with **Peerwith**, a platform that provides authors with a variety of services.

The Emerald Peerwith site can be found here: [https://authorservices.emeraldpublishing.com/](https://authorservices.emeraldpublishing.com/)

Peerwith connects academics seeking support for their work with a relevant expert to get their research submission-ready. Peerwith experts can help with the following: language editing, copy editing, scientific editing, translation services, statistical support, funding application support, visuals, video, publication support, literature search, peer review and indexing services. Authors post their assignments on the Peerwith site, experts provide a quote, and the fee and conditions are then agreed upon directly between the author and the expert.

While we are not, of course, guaranteeing publication upon use of Peerwith, we hope that being able to direct academics to this resource either before submission or during the peer review process will help authors further improve the quality of their papers and increase their chances of positive reviews and acceptance.

Academics with relevant expertise can sign up as an expert on the Peerwith system here: [https://www.peerwith.com/services/offer](https://www.peerwith.com/services/offer)
Backfiles Collections

Preserving over 100 years of management research online

A lifetime investment for your institution, Emerald Backfiles will significantly enhance your library’s offering by providing access to over 125,000 articles from more than 260 journals dating back to 1898.

Visit emeraldinsight.com

Get Backfiles Collections for your library

Recommend Backfiles to your librarian today.
Find out more: emeraldpublishing.com/backfilescollections
Volume 19 Number 1 2018

Journal of Applied Accounting Research

Number 1
1 Editorial advisory board
2 Earnings quality across different reporting regimes: listed, large private, medium-sized, small and micro companies in the UK
Siming Liu and Len Skerratt
20 Corporate boards, ownership structures and corporate disclosures: evidence from a developing country
Abdalrhman Alnabsha, Hussein A. Abdou, Collins G. Ntim and Ahmed A. Elamer
42 The role of intangible assets and liabilities in firm performance: empirical evidence
Abdifatah Ahmed Haji and Nazli Anum Mohd Ghazali
60 IFRS and value relevance: a comparison approach before and after IFRS conversion in the European countries
Ahmed Kouki
81 Assessing and ranking the financial risk of municipal governments: the case of Pennsylvania
John M. Trussel and Patricia A. Patrick
102 Exploring forward-looking information in integrated reporting: a multi-dimensional analysis
Elisa Menicucci
122 Exposing organizational tensions with a non-traditional budgeting system
Nicolas Berland, Emer Curtis and Samuel Sponem
141 Management control system and strategy: the transforming role of implementation
Graziano Coller, Maria Laura Frigotto and Ericka Costa
161 Does graphical reporting improve risk disclosure? Evidence from European banks
Michael Jones, Andrea Melis, Silvia Gaia and Simone Aresu
181 Explaining implementation difficulties associated with activity-based costing through system uses
Elodie Allain and Claude Laurin

www.emeraldinsight.com/loi/jaar