FINANCIAL DECISIONS AND GROWTH OF THE FIRM UNDER HIGH AND LOW LEVELS OF INFORMATION ASYMMETRY

Tarek Ibrahim Eldomiaty, Panagiotis Andrikopoulos and Mina K. Bishara

ABSTRACT

Purpose: In reality, financial decisions are made under conditions of asymmetric information that results in either favorable or adverse selection. As far as financial decisions affect growth of the firm, the latter must also be affected by either favorable or adverse selection. Therefore, the core objective of this chapter is to examine the determinants of each financial decision and the effects on growth of the firm under conditions of information asymmetry.

Design/Methodology/Approach: This chapter uses data for the non-financial firms listed in S&P 500. The data cover quarterly periods from 1989 to 2014. The statistical tests include linearity, fixed, and random effects and normality. The generalized method of moments estimation method is employed in order to examine the relative significance and contribution of each financial decision on growth of the firm, respectively. Standard and proposed proxies of information asymmetry are discussed.

Findings: The results conclude that there is a variation in the impact of financial variables on growth of the firm at high and low levels of information asymmetry especially regarding investment and financing decisions. A similar picture emerges in the cases of firm size and industry effects. In addition, corporate dividend policy has a similar effect on firm growth across all asymmetric levels. These findings prove that information asymmetry plays a vital role in financial decisions and firm growth.
role in the relationship between corporate financial decisions and growth of the firm. Finally, the results contribute to the vast literature on the estimation of information asymmetry by demonstrating that the classical and standard proxies for information asymmetry are not consistent in terms of the ability to differentiate between favorable or adverse selection (which corresponds to low and high level of information asymmetry).

Originality/Value: This chapter contributes to the related literature in two ways. First, this chapter offers updated empirical evidence on the way that financing, investment, and dividends decisions are made under conditions of favorable and adverse selection. Other related studies deal with each decision separately. Second, the study offers new proxies for measuring information asymmetry in order to reach robust estimates of the effects of financial decisions on growth of the firm under conditions of agency problems.

Keywords: Financial decisions; information asymmetry; growth of the firm; S&P500; financing decisions; investment decisions; dividend decisions

JEL classifications: D82, D22.

1. INTRODUCTION

The agency problem has taken considerable attention of researchers from various disciplines including economics, management, and finance. One of the major causes of the disconnection between managers and shareholders is the existence of information asymmetry – where managers might intentionally or unintentionally disseminate incomplete information about various aspects of the business (Akerlof, 1970). Corporate finance decisions like capital structure decisions, taking on new investments, and dividend payout policies can act as such signals for market participants. Nonetheless, the presence of information asymmetry could disrupt the intended signal behind these decisions. Recent developments in the theories related to these decisions incorporated the effects of agency issues and information asymmetry (Li & Zhao, 2008; Morellec & Schürhoff, 2011) showing that these decisions could, in fact, be affected by the presence of information asymmetry. The argument of this chapter is that information asymmetry has a mediating role in explaining the relationship between dependent variable (firm growth) and independent variables (financial and non-financial decisions).

Most firms share similar goals, such as wealth maximization, profitability, and growth. This chapter focuses on one of these goals – firm growth – which is typically measured in terms of growth in sales, assets, employment, etc. (Delmar, Davidsson, & Gartner, 2003). According to Dobson (2004), growth should be the optimal goal of any firm as it benefits all stakeholders including managers and shareholders. Moreover, Geroski et al. (1997) found a significant positive impact of current growth rates on expectations of long-run profitability and
market value of the firm. This strengthens the propositions of Dobson (2004) that growth benefits stakeholders in general. The reason that firms should focus on growth rather than other proxies of performance such as share price stems from further practical consideration that share prices are highly volatile in the financial markets. Nevertheless, various firm events might severely affect prices in the short run despite the fact that the firm is performing well.

Prior literature has shown (Chen et al., 2010) that all three main financial decisions (investment, financing, and dividend decisions) do interact together and cannot be distinct or isolated from each other. Moreover, the three of them should contribute to firm growth, if properly used, or hinder growth if misused. A major factor that could affect the relationship between financial variables on one side and firm growth on the other side is the existence of information asymmetry as it might hinder the ability of firms to benefit from such determinants in a way that best serves the interests of its stakeholders.

Previous literature has examined several of the above relationships. For example, firm growth, its determinants, phases, and proxies are all examined extensively (Ardishvili, Cardozo, Harmon, & Vadakath, 1998; Coad & Guenther, 2013; Delmar et al., 2003; Hamilton, 2011). Financial decisions discussed above like capital structure, investment in long-term and current assets, and dividend policy are the core of research in finance and all of them are affected by information asymmetry. The latter, its proxies, and impact are examined ever since Akerlof (1970) presented the idea of asymmetric information. Prior literature suggests that investment, financing, and dividend decisions are all independently influenced by information asymmetry (Bolton, Chen, & Wang, 2011; Li & Zhao, 2008; Morellec & Schürhoff, 2011; Morellec, Valta, & Zhdanov, 2013). Nonetheless, research on how these decisions contribute to firm growth is rather scarce with only a handful of studies in the literature (Fama & French, 2002; Frank & Goyal, 2005).

1.1 Objectives of This Chapter

This chapter aims at fulfilling the objectives that follow.

1. Examine financing-specific determinants of growth of the firm at high and low levels of information asymmetry.
2. Examine investment-specific determinants of growth of the firm at high and low levels of information asymmetry.
3. Examine dividend-specific determinants of growth of the firm at high and low levels of information asymmetry.
4. Examine the validity of proposed proxies for measuring information asymmetry.

The rest of the chapter is organized as follows. Section 2 discusses the measures of growth of the firms as discussed in business and economic literature. Sections 3–5 discuss the effects of information asymmetry on financing, investment, and dividends decisions, respectively. Section 6 reviews the interaction between the
three financial decisions and growth of the firm. Section 7 develops the related hypotheses derived from related studies. Section 8 describes the data, statistical tests, estimation methods, and the new proxies for measuring information asymmetry. Section 9 discusses the results, and Section 10 concludes.

2. MEASURES OF GROWTH OF THE FIRM

Gibrat (1931) presented his theory *law of proportionate effect* which is academically referred to as Gibrat’s law. According to his observations, a firm’s expected growth rate is independent of its size; there is an equal probability of a proportionate change in size for all firms in a certain industry regardless of its size at the beginning of the examined period. Additionally, he explains the growth of firms on the basis of their history of multiplicative shocks, which might lead to infinite growth. Finally, Gibrat’s law assumes a lognormal distribution of firm size across industries.

Nonetheless, many limitations to Gibrat’s law were presented in the years that followed. Kalecki (1945) suggested that it is not reasonable to assume infinite variance in firm size; while, Chester (1979) refuted Gibrat’s law due to the existence of autocorrelation structure in the growth shocks. In a similar manner, Reichstein and Jensen (2005) observed that the annual growth rates are not normally distributed as Gibrat proposed; while, Bottazzi and Secchi (2006) rejected the law after analyzing growth of the firm and finding a negative relationship between variance in growth rates and firm size.

Storey (1994) came up with a classification of three groups of growth determinants; entrepreneur’s resources, features of the firm, and adapted strategy. The interaction of the three groups determines the speed of growth of the firm. Almus and Nerlinger (1999) stressed on the importance of external factors like wages or salaries’ range that might hinder the ability of firms to hire new skilled employees and negatively influence growth. Hoogstra and Dijk (2004) argue that factors that are related to the environment or location where the firm operates would affect its growth.

The dilemma of finding an appropriate measure for growth of the firm has been examined empirically by numerous scholars; Delmar (1997) and Ardishvili et al. (1998) came up with identical lists of commonly used growth indicators; growth in assets, sales, employability, market share, profit, and physical output. The usage of market share and physical output is not applicable because it can only be used within the same industry range; while, data about either of them can hardly be accessed according to Delmar et al. (2003). They also assert that using profit, although it is an important measure of success, is not reliable when compared to firm size because it is only evident over long-term horizons. The author suggests that profits are not applicable because they might vary according to variable corporate expenditures from one period to another; a low profit in a certain period relative to prior ones does not imply a negative growth rate for the firm.

The other three measures of growth of the firm, namely (i) sales, (ii) assets, and (iii) employment are used widely in empirical studies. Kirchhoff and Norton
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(1992) examined all three of them and found that they are interchangeable as they produced similar results over a seven-year period.

Growth of assets is considered by Hart (1995) as an appropriate measure for growth of the firm. He considers the firm as a group of tangible assets and property rights that are under the same ownership and control. Despite the fact that total assets are widely used as a growth indicator, it faces a severe drawback. Assets are not a reliable measure for all types of industries; for example, service companies do not rely on the number of assets they possess. Thus, the usage of assets, as Delmar et al. (2003) suggest, is related to the intensity of firm’s capital and the industry in which it operates. Thus, growth in assets is sensitive to changes over time.

The last proxy for measuring growth of the firm, and most widely accepted according to Hoy, McDougall, and Dsouza (1992), and Ardishvili et al. (1998) is growth in sales or revenues. Numerous studies used growth in sales to measure growth of the firm; Barkham, Hanvey, and Hart (1995) argue that it is the favorite indicator even for entrepreneurs. Davidsson and Wiklund (2000) assert that growth in sales is a highly suitable indicator across various dimensions of firms. Flamholtz (1986) mentioned that growing demand is reflected by sales growth, thus, growth in sales is viewed as the natural choice for measuring growth.

3. FINANCING DECISIONS AND INFORMATION ASYMMETRY

Lemmon and Zender (2010) presented a study that was firm in supporting the pecking order hypothesis. They examined the impact of debt capacity on financing behavior and found that as long as firms have a capacity to issue more debt, the latter is preferred to equity issuance. Moreover, they reconcile the issuance of equity by small, high-growing firms with the pecking order propositions concluding that the pecking order gives a good description of the financing behavior for their sample. Leary and Roberts (2010) also supported pecking order but in a weaker manner as it only verified part of their sample of financing decisions. However, they mentioned that this little support is not driven by information asymmetry but rather by incentive conflicts.

Nevertheless, Morellec and Schurhoff (2010) examined investment and financing behavior under information asymmetry and demonstrated that the latter might not be translated into a hierarchy or a pecking order for financing instruments. This finding contradicts the pecking order hypothesis. Gao and Zhu (2012) examined the relation between capital structure, information asymmetry, and the cost of capital in different countries. They found that firms with more asymmetry of information tend to use more debt to finance investments but not long-term debt. This finding is less common in countries with more disclosure requirements. Depending more on debt financing is consistent with the findings of Brav (2009) who found that private companies in the UK rely heavily on debt financing and have higher leverage ratios than public firms. Both studies
supported the usage of debt over equity which supports, in part, the pecking order hypothesis.

Similarly, contradicting the pecking order theory, Fulghieri, Garcia, and Hackbarth (2016) presented their study wherein the title included Pecking (dis) order as they argued that equity financing dominates debt financing under information asymmetry. They proposed that firms prefer equity financing and then shifts toward debt as they mature. Moreover, firms having debt in their capital structure find issuing equity more attractive than issuing more debt. The conclusion of the study suggests that the relationship between asymmetric information and the financing instruments is weaker than previously believed. However, those findings are not empirically tested to validate this argument or refute it.

Some of the empirical studies examined financing decisions and firms’ growth are summarized in Frank and Goyal (2005). They concluded that the effect of agency costs on debt financing can be extended to further effects on firm’s future expansions and growth. This conclusion is further supported by the findings of some studies such as Long and Malitz (1985), Smith and Watts (1992), Barclay, Morellec, and Smith (2006), and Frank and Goyal (2004). These studies used the ratio of market-to-book value of assets as a measure of growth opportunities and found that, in general, market-to-book ratio is negatively related to leverage. Rajan and Zingales (1995) found that this negative relation exists in all G7 countries. Frank and Goyal (2005) and their supporting studies who are advocates of the trade-off hypothesis, conclude that the higher the debt levels the lower the growth opportunities of firms. Nonetheless, more recent empirical examinations by Lemmon and Zender (2010) could not find a definite association between financing decision and growth of the firm. Thus, they do not support the previous finding that lower leverage is associated with higher growth of the firm.

Frank and Goyal (2005) and their supporting studies that predict a negative relation between firm’s leverage level and growth opportunities advocates the trade-off theory which does not place much emphasis on agency considerations and information asymmetry as much as tax considerations and bankruptcy costs. The gap in literature on the research topic is clear in the assertion of Lemmon and Zender (2010) that future research should examine the interaction between financing and growth in assets. Thus, this research expands the work of Frank and Goyal (2005) which suggested that lower leverage level is associated with higher growth of the firm by including the impact of different levels of information asymmetry on the interaction between financing and growth of the firm.

4. INVESTMENT DECISIONS AND INFORMATION ASYMMETRY

Developments in the field of corporate investment by Brainard and Tobin (1968) and Tobin (1969) presented Tobin’s Q that is used to measure the ratio of market
value to book value of equity and liabilities on a firm level. The more relevant use of Tobin’s Q is its usage on aggregate level to measure the ratio between values in stock markets to corporate net worth. Companies with Q ratio greater than one have a market value greater than the value of their assets. Thus, they are encouraged to invest more in capital (long-term assets) to be fairly valued. Whereas companies with Q ratio lower than one are undervalued by the market as they have a market value less than their recorded assets.

Unlike both theories, the development of agency theory and corporate investment revealed different types of conflicts that arise between managers and principles that are directly linked to corporate investment decisions. Among these conflicts are the cases of over-investment and empire building, reputational problems, under-investment, and the tendency of managers to avoid involvement in risky investments or the so-called “quiet life” approach, and management’s over-confidence (Stein, 2003). All of these problems have different implications for corporate investment. For example, the first agency problem that arises between managers and shareholders is when managers overinvest in risky projects or investments with negative net present value to enlarge the assets under their discretion, or what is called empire building behavior. The preference of managers in running large companies for their own benefits would become problematic if managers spend all available funds on new investments regardless of their profitability (Baumol, 1959; Donaldson, 1984; Jensen, 1993; Williamson, 1964). Nevertheless, a negative relation between leverage and investment exists because debt payments will force managers to payout cash and decrease the cash available for over-investment (Jensen, 1986, 1993).

Among the recent studies that suggested the existence of a relationship between corporate investment and information signaling is Li (2011) that suggested that managerial investment decisions likely contain information about earnings quality. However, the information content or the signal effect of investment decisions is not as severe as in other financial decisions such as the dividend payout. His argument is based on the findings of Skinner and Soltes (2011) who examined the earnings quality based on dividend decisions and concluded that investment in capital and labor are less sensitive to information signaling than dividend decisions. This finding by Skinner and Soltes (2009) is in a similar vein with the suggestions of Lang and Litzenberger (1989) and Koch and Shenoy (1999) who found that dividend decisions have larger information signaling effect and agency costs for firms that overinvest, that is, those companies with a Tobin’s Q lower than one compared to those with a Tobin’s Q closer to one.

The problems associated with investment in long-term assets opened door for studies that examine investment in current assets as well such as Carpenter, Fazzari, and Petersen (1994) who examined investing in inventory; one of the current assets, and its impact on operations. Their findings match the propositions of Carole (1989). This implies that growth of the firm, in terms of sales, could be a direct result of investment in current assets rather than long-term assets. Thus, firms that invest more in current assets could have higher growth rates than those who invest less in current assets and keep accumulating long-term assets.
5. DIVIDEND DECISIONS AND INFORMATION ASYMMETRY

The dividend decision is directly linked to the financing decision discussed in the previous section (Easterbrook, 1984). That is, paying out dividend to shareholders decreases the amount of cash available for financing and vice versa. The relevance of dividend decision in evaluating share price or the value of the firm was examined throughout the years ever since Modigliani and Miller and Modigliani (1961) proposed the dividend irrelevance theory. Following the introduction of agency theory and the information asymmetry concepts in early 1970s, dividend models started to incorporate such fundamentals when examining the dividend behavior. Ross (1977) presented an early attempt to link information asymmetry with the dividend decision in inefficient markets. He argued that management could use the dividend policy to signal information to the less informed shareholders. For example, a higher payout ratio would signal higher anticipated profits. This good signal is reflected in higher share prices. Thus, Ross (1977) agrees with the bird-in-hand propositions that companies that pay more dividends are valued higher in the market. However, the difference between both theories is that bird-in-hand focuses on the preferences of investors in receiving cash on hand, while the Ross model focused on the role of information asymmetry and signaling effect.

Further developments in the theory tried to link the dividend policy to agency costs. Rozeff (1982) and Easterbrook (1984) presented two pioneering studies in the linkage between agency problem and dividend policy. Rozeff (1982) presented a model in which the payout ratio is a function of the fraction of equity held by insiders, firm’s past and expected growth, company’s beta coefficient, and the number of common stockholders. He suggested that the percentage of equity held by outsiders and the number of common stockholders are used as proxies to measure the agency costs. The larger the ownership base is, the more conflicts of interest would occur and higher agency costs would be incurred. Easterbrook (1984) presented new insight on how dividends could be used to reduce agency costs of managements’ behavior. He suggested that paying out more dividends to shareholders would reduce the funds available for managers. Thus, managers would regularly seek funds from financial markets where monitoring of managers' behavior is available at lower cost. Easterbrook asserted that this could be the reason why companies, in reality, keep paying dividends and raise funds from the market.

Among the studies that focused on dividend policy as a method of mitigating agency costs is Borokhovich, Brunarski, Harman, and Kehr (2005). They supported their argument using the finding of Dempsey and Laber (1992) who found dividend payout to be negatively related to the amount of insider stockholding and positively related to the number of common stockholders. Both insider stockholding and the number of shareholders were used in their study as proxies for agency costs. Similarly, Noronha, Shome, and Morgan (1996) who examined the relation between agency variables and payout ratios, found a positive relation for low growth firms among the payout ratio on the one hand, and the level of executive compensation and the presence of outside block holders on the other hand. The latter two are used as proxies for agency costs in this chapter.
Two agency models of dividend policy are outlined by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000); the outcome model and the substitute model. The outcome model of dividend behavior suggests that dividend payments are a direct result of shareholders’ pressure on the management to dissipate cash. Whereas the substitute model suggests that management distribute dividends to build a reputation for treatment of shareholders that would help in raising equity in the future.

Manos (2002) examines the dividend behavior of companies in the Indian stock exchange. His analysis revealed that government ownership, debt, growth opportunities, and insider ownership have a negative impact on dividend payout. However, institutional, foreign, and dispersed ownership have a positive impact on payout ratios. The findings of the relation between dividend and the agency proxies; insider, institutional, and dispersed ownership support the findings of Rozeff (1982) and Easterbrook (1984) in the assertion that dividend policy is affected by agency variables. Nikolov and Whited (2009) examined the relation between agency costs and cash holding decisions. They used three agency costs variables; bonuses for managers that are based on profits, limited ownership of managers, and preference of managers for size of the firm. Their analysis indicated that companies with low institutional ownership hold the same amounts of cash like companies with high institutional ownership.

Studies that examined dividend policy and growth of the firm focused on the impact of growth of the firm on dividend policy, not the opposite. For example, Amidu and Abor (2006) found a negative association between sales growth and dividend policy. Similarly, findings of Lloyd, Jahera, and Page (1985) and Collins, Saxena, and Wansley (1996) are consistent with this view as they report a negative relationship between historical growth in sales and dividend payout ratio (DPR). The literature recognizes the relation between dividend behavior and growth of the firm using historical growth. Moreover, the effect of agency costs on the relationship between dividend policy and growth of the firm is examined by Rozeff (1982) and Bartram et al. (2012) who report a negative relationship between dividend payout and growth of the firm. However, both suggested increasing payout ratios to decrease agency costs. The evidence that historical growth of the firm and dividend policy are related and that agency costs affect this relation (Amidu & Abor, 2006; Borokhovich et al., 2005; Skinner & Soltes, 2011) suggest that the dividend policy may contribute to growth of the firm. This contribution differs according to the level of agency conflicts on firm level or/and country protection level (Bartram et al., 2012; La Porta et al., 2000).

6. INTERACTION OF INVESTMENT, FINANCING, DIVIDEND DECISIONS AND GROWTH OF THE FIRM

In reality, the three financial decisions are interrelated. Some studies presented a relationship between each two of the three decisions while other studies combined all three of them. Chen et al. (2010) presented the relationship between each two of the three decisions; investment and dividend, dividend and financing, and investment and financing. This proves that the three decisions are not separate
from each other. Yet, Chen et al. (2010) did not consider the role of this interaction in helping/hindering growth of the firm or in mitigating agency conflicts.

Dividend policy and firm investment are related empirically (Chen et al., 2010). Therefore, companies that rely more on internal financing tend to have lower payout ratios when they have profitable investments. This implies that a relationship exists between dividend policy and corporate investments. Moreover, financing decision is not distinct from this relationship because companies that regularly pay dividends will have to rely on external financing; new equity or debt issues to finance their investments. This explains why a direct link exists between financing decisions, or the capital structure in general, and dividend policy. Companies that have high payout ratios will have limited internal funds to finance new investments and vice versa.

Similarly, a relationship exists between corporate investment and financing decisions. Firms should invest as long as its cost of capital is reasonable, or what is known as capital budgeting decision (Myers, 1974). Prior studies examined whether companies should rely on risky debt to finance new investments or rely only on low-risk financing instruments (Chambers, Harris, & Pringle 1982; Rendleman, 1978). Moreover, the optimal capital structure and the acceptable level of risk for financing new investments has been a considerable research area in the finance literature (see e.g., Miller, 1991). Recent studies went further to suggest that not only the financing decision affects investment strategy but even the type of debt financing affects the investment decision. By differentiating between financing investments using US bank loans or bond data, Morellec et al. (2013) find strongly supporting evidence for this proposition.

Other than the above relationships between each two of the three decisions, some studies examined the interaction between the three decisions. A close study that examined the interaction between the three decisions and the amount of information available is Koch and Shenoy (1999). These findings suggest an impact on dividend and financing policies on investment decisions. It also implies that this interaction could differ according to the amount of information available. Similarly, Bolton et al. (2011) propose a model that combines corporate investment, financing decisions, and risk management for firms suffering from liquidity problems. Their findings support the existence of a relationship between investment and financing policies for such firms because the relation between investment and liquidity is found to differ according to the source of financing. The latter is affected by the DPR as mentioned before. Thus, the study suggests that the relationship between the three decisions and how they interact together to affect growth of the firm could differ according to the level of information asymmetry or agency conflicts in general.

Two close studies to this research are Lang, Ofek, and Stulz (1996) and Brush, Bromiley, and Hendrickx (2000). Those two studies are close in a sense that they examined growth of the firm taking into consideration the investment and financing decisions or growth of the firm when accounting for agency conflicts. Lang et al. (1996) suggest that a negative relation exists between leverage and growth of the firm for firms with low Q ratios. Nevertheless, this negative relation does not exist for firms with high Q ratios. Therefore, this finding supports the argument that leverage level, the financing decision, and investment opportunities do
interact to affect growth of the firm. Brush et al. (2000) investigate the profitability of firms having free cash flow from sales growth at different monitoring levels; different levels of agency conflicts. Brush et al. (2000) argue that management’s stock ownership and governance mechanisms affect sales growth support the argument that agency conflicts do have an impact on growth of the firm.

Combining the findings of Lang et al. (1996) and Brush et al. (2000) with the above evidence that the three corporate finance decisions (financing, dividend, and investment) do interact together, we can conclude that each of the three decisions is affected by agency problems and information asymmetry. Moreover, growth of the firm is affected by the level of corporate governance; and it is a direct result of decisions taken within any firm. Thus, a relationship between financing, dividend, and investment decisions and growth of the firm exists and this relationship might differ according to the level of agency conflicts, corporate governance, and information asymmetry. An identified gap in the existing literature is how these three decisions contribute to growth of the firm at each level of information asymmetry which is the main objective of this chapter.

7. HYPOTHESES DEVELOPMENT

Financing decision is found to be affected by agency problems due to possible conflicts between shareholders and management and/or due to the signal conveyed to the market from the issuance of debt or equity (Jensen, 1986; Klein et al., 2002; Myers & Majluf, 1984). Frank and Goyal (2005) argue that the relationship between debt financing and growth of the firm is negative. They further advocate the trade-off theory which does not place much emphasis on agency considerations and information asymmetry as much as tax considerations and bankruptcy costs. The gap in the related literature is cleared out by Lemmon and Zender (2010) who concluded that future research should examine the interaction between financing and growth in assets.

The assertions of Frank and Goyal (2005) could hold for companies facing low or middle level of information asymmetry where the latter has less impact on operating performance and earnings. However, it might not be the case for firms facing high level of information asymmetry. Using equity financing for firms with high information asymmetry might hinder the ability of such companies to raise capital from stockholders or at least would increase their cost of capital as investors will require extra return to invest in such companies.

Testable hypotheses can be derived based on the above propositions.

\[ H1. \] A negative relationship exists between equity financing and growth of the firm at high level of information asymmetry.

\[ H2. \] A positive relationship exists between equity financing and growth of the firm at low level of information asymmetry.

Another testable hypothesis could be developed from the relationship between dividend policy, information asymmetry, and growth of the firm. Empirical studies
suggest that dividend payouts do signal firm performance to the market. 
Rozef
d (1982) and Bartram et al. (2012) both suggest a negative relationship between dividend payout and growth of the firm. However, both suggest increasing payout ratios to decrease agency costs. The evidence that historical growth of the firm and dividend policy are related and that agency costs affect this relation (Amidu & Abor, 2006; Borokhovich et al., 2005; Skinner & Soltes, 2011) suggest that the dividend policy may contribute to growth of the firm. This contribution varies according to the level of agency conflicts on firm level or/and country protection level (Bartram et al., 2012; La Porta et al., 2000). Therefore, companies that suffer from high level of information asymmetry should pay more dividends to signal their performance to the market. This type of signaling would enable easy access to sources of financing and might stimulate future growth. Nevertheless, companies that have low information asymmetry problems do not have to pay that much dividend to signal their performance because investors already know well about the company’s performance. Two testable hypotheses to examine this relationship could be drawn as follows.

**H3.** A positive relationship exists between dividend payouts and growth of the firm at high level of information asymmetry.

**H4.** A negative relationship exists between dividend payouts and growth of the firm at low level of information asymmetry.

Investment decisions have the most direct relationship with growth of the firm, especially when measured in terms of growth in assets. However, investment decisions face various forms of agency conflicts as above discussed. These forms are over- and under-investment, over-confidence, short-termism, and career concerns (Stein, 2003). The agency problems are mainly related to firms that have Q ratios that are lower than or deviate from one (Koch & Shenoy, 1999). In this case, further investment in long-term assets might be a result of one of these agency conflicts. Thus, investment in long-term assets might imply higher growth in terms of assets. However, it might not imply higher growth in terms of sales, profitability, and market share. Carole (1989) suggests that companies tend to invest in current assets after they acquire the necessary long-term assets and use such investment to grow their sales and profits. Thus, it could be predicted that for companies facing high level of information asymmetry and more investment-related agency conflicts, investment in current assets could stimulate growth. Nevertheless, investment in long-term assets would hinder growth of the firm except when measuring growth of the firm in terms of growth in assets. More specifically, Carpenter et al. (1994) suggested investment in inventory in particular. Three testable hypotheses could be drawn as follows.

**H5.** A negative relationship exists between investments in fixed assets and growth of the firm at high level of information asymmetry.

**H6.** A positive relationship exists between investments in current assets and growth of the firm at high level of information asymmetry.
H7. A positive relationship exists between investments in inventory and growth of the firm at high level of information asymmetry.

7.1. Proposed Proxy Measures of Information Asymmetry

The literature cites that the agency problem between corporate managers and investors is associated with information asymmetry. The outcome of the problem of information asymmetry is an adverse selection. Accordingly, the trade spread is commonly used to measure the asymmetry between investors’ price expectations (Glosten & Harris, 1988; George et al., 1991; Huang & Stoll, 1997; Lin et al., 1995; Madhavan et al., 1997). The common and major critics to traded spread are the econometric problems associated with times series and price dependency that renders the trade spread biased. In this regard, the authors propose proxies of information asymmetry that incorporate corporate data and recognize the possibility of adverse selection directly. These proxies are as follows:

1) The sensitivity of stock returns to expected return on equity (ROE). In this case, beta algorithm can be utilized operationally. The negative beta refers to adverse selection and positive beta refers to favorable selection. This proxy is in line with the prior studies in the field such as Krishnaswami and Subramaniam (1999) and the other studies that they followed like Christie (1987) and Dierkens (1991). The rational of this proxy is that positive betas indicate that the investors are able to expect the firm’s ROE and the stock prices are associated with changes in ROE positively. The negative betas indicate that the investors’ reaction, in terms of stock price changes, goes against the expected ROE which is viewed as an adverse selection.

2) The probability of adverse election using the Black–Scholes option pricing model (probability of occurrence $N(d_2)$ is the cumulative standard normal density function). The $N(d_2) = 0$ refers to favorable selection and $N(d_2) \geq 0$ refers to adverse selection, thus the existence of agency problems. Black and Scholes (1972, 1973) option pricing model offer a stochastic method for calculating the expected value of an option when the inputs (current stock price and strike price) are expected as well. The standard linear stochastic Black–Scholes model is as follows:

\[
\text{Call price} = S \times N(d_1) - X \times e^{R_f \times (T-t)} \times N(d_2)
\]

\[
d_1 = \frac{\ln \left( \frac{S}{X} \right) + \left( R_f + 0.5 \sigma^2 \right) \times (T - t)}{\sigma \times \sqrt{T-t}}
\]

\[
d_2 = \frac{\ln \left( \frac{S}{X} \right) + \left( R_f - 0.5 \sigma^2 \right) \times (T - t)}{\sigma \times \sqrt{T-t}}
\]

\[
d_2 = d_1 - \sigma \times \sqrt{T-t}
\]
where \( S \) = current stock price, \( X \) = strike price, \( T-t \) = time to maturity, \( R_f \) = risk-free rate of interest, \( N(.) \) is the cumulative standard normal density function.

The rationale of using Black–Scholes model in the context of this thesis is that the expected stock return and ROE are subject to stochastic processes. Therefore, the option pricing model can be adapted as follows:

\[
\text{Intrinsic Return} = E(\text{ROE}_{t}) \times N(d_1) - R_t \times e^{R_f \times (T-t)} \times N(d_2)
\]

This equation shows that the information asymmetry between financial managers and the investors creates a disconnection between stock returns and firm’s profitability. The former might be far higher or lower than the latter. In this case, the favorable selection of a stock occurs when the stock return equal or less than firm’s expected profitability. Since investors are expecting future price, the stock return is associated with a probability of occurrence. Therefore, the probability of default (PD) = \( 1 - E(\text{ROE}_{t}) \). In this case, the PD is associated with an adverse selection. The probability of occurrence \( N(d_2) \) calculates as follows.

\[
d_2 = \frac{\frac{E(\text{ROE}_{t}) - R_t}{R_t} + (R_f - 0.5\sigma^2) \times (T-t)}{\sigma \times \sqrt{T-t}}
\]

The probability of occurrence \( N(d_2) \) is the cumulative standard normal density function.

These equations offer two advantages. The first advantage is that they allow for price correction when the stock return goes higher or lower than the firm profitability. The second advantage is that they guarantee the investors an expected return \( E(\text{ROE}_{t}) \) when prices do not change (return = zero).

3) The distinction of Q ratio either higher or lower than one. The lower the Q ratio, the severer the information asymmetry problem between management and market participants. This is mainly due to under-investment behavior of management (Koch & Shenoy, 1999; Stein, 2003). The calculation of Q ratios in this chapter follows the approximate calculation of Q developed by Chung and Stephen (1994) who used available balance sheet items to calculate Q ratios and successfully tested it empirically against values calculated using the Lindenberg and Ross (1981) who employed a more sophisticated approach. Chung–Pruitt (C-P) Q ratio is calculated as follows:

\[
\text{Chung-Pruitt Q} = \text{MV (CS)} + \text{BV (PS)} + \text{BV (LTD)} + \text{BV (INV)} + \text{BV (CL)} - \text{BV (CA) / BV (TA)}
\]

8. DATA, STATISTICAL TESTS, AND ESTIMATION METHODS

The sample firms in this chapter include the non-financial S&P 500 firms. The data include the annual financial statements and stock prices that cover the
Financial Decisions and Growth of the Firm

Data used are cross-sectional, time-series (Panel data) and are unbalanced due to the variability in listing date for each company and the availability of its data items (Table 1).
8.1. Statistical Tests and Estimation Methods

Standard statistical tests for cross-sectional time-series data are employed. Hausman specification test (Hausman, 1978; Hausman & Taylor, 1981) shows that the random effect exists. The issue of linearity versus non-linearity is addressed and examined as well using regression equation specification error test (RESET) (Ramsey, 1969; Sapra, 2005; Thursby, 1979; Thursby & Schmidt, 1977; Wooldridge, 2006). The results show that the data converge to non-linear form and the proper adjustment is made accordingly. The normality of the data is examined using Anderson and Darling test (1952, 1954). The results show that data are not normally distributed. Accordingly, Van der Waerden method (1927, 1930, 1931) is used to convert data into normal score.

9. RESULTS AND DISCUSSION

This section includes four groups of results, where each group is divided into two subgroups that are concerned with the two outcomes of information asymmetry: favorable and adverse selection. The results of the first group are reported in Table 2 includes the financing determinants of growth of the firm. The results of the second group are reported in Table 3 includes the investment determinants of growth of the firm. The results of the third group are reported in Table 4 includes the dividend determinants the firm’s growth. The results of the fourth group are reported in Table 4, including the financing, investment and dividend determinants of the firm’s growth.

The favorable selection models represent the cases that firms face a low level of information asymmetry, while the adverse selection models represent otherwise.

Table 2 shows the association between financing decisions and growth of firm at both favorable and adverse selection cases.

(A) The results in the case of favorable selection

The results show that when firms face low information asymmetry, the three models are consistent in the impact of change in debt ratio (Delta DR), while the debt ratio itself (DR) shows less consistent results. The finding that Delta DR is always significant has a positive impact on sales growth is crucial to this chapter. It supports previous findings by Dann et al. (1991), Hertzel and Jain (1991), Lie and McConnell (1998), and Nohel and Tarhan (1998) that leverage-increasing transactions have positive impact on operating performance. Moreover, this finding supports the pecking order theory (Myers & Majluf, 1984) that favors financing new investments using debt rather than equity after consuming internal sources of funding. The DR had a significant negative impact on growth of the firms in the three models. This finding is important as it implies that existing capital structures of the firms should not rely heavily on debt as it hinders growth. This aligns with previous assertions by Frank and Goyal (2005) that there is a negative
### Table 2. The Association Between Financing Decisions and Growth of the Firm.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Beta ROE</th>
<th>PD ROE</th>
<th>Q Ratio</th>
<th>Beta ROE</th>
<th>Q Ratio</th>
<th>PD ROE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.006</td>
<td>−0.008</td>
<td>0.006</td>
<td>0.001</td>
<td>−0.007</td>
<td></td>
</tr>
<tr>
<td>Debt-equity</td>
<td>−0.029</td>
<td>−0.019</td>
<td>−0.01</td>
<td>0.048</td>
<td>0.097***</td>
<td></td>
</tr>
<tr>
<td>Debt ratio</td>
<td>−0.045*</td>
<td>−0.007</td>
<td>−0.068***</td>
<td>0.143***</td>
<td>−0.185***</td>
<td></td>
</tr>
<tr>
<td>Delta debt ratio</td>
<td>0.059***</td>
<td>0.053***</td>
<td>0.045***</td>
<td>0.052</td>
<td>0.074***</td>
<td></td>
</tr>
<tr>
<td>Non-debt tax</td>
<td>−0.037</td>
<td>−0.051*</td>
<td>−0.131***</td>
<td>0.029</td>
<td>−0.012</td>
<td></td>
</tr>
<tr>
<td>Delta non-debt</td>
<td>0.048</td>
<td>−0.078</td>
<td>0.217*</td>
<td>−0.03</td>
<td>−0.230*</td>
<td></td>
</tr>
<tr>
<td>Effective corporate tax rate</td>
<td>0.012</td>
<td>0.004</td>
<td>0.01</td>
<td>−0.033</td>
<td>0.037*</td>
<td></td>
</tr>
<tr>
<td>Business risk</td>
<td>−0.04***</td>
<td>−0.006</td>
<td>0.006</td>
<td>−0.125***</td>
<td>−0.108***</td>
<td></td>
</tr>
<tr>
<td>Operating income-to-sales</td>
<td>−0.06***</td>
<td>−0.029</td>
<td>−0.107***</td>
<td>−0.021</td>
<td>−0.262***</td>
<td></td>
</tr>
<tr>
<td>Operating income-to-assets</td>
<td>0.139***</td>
<td>0.234***</td>
<td>0.138***</td>
<td>0.158***</td>
<td>0.229***</td>
<td></td>
</tr>
<tr>
<td>Probability of default</td>
<td>−0.08***</td>
<td>−0.095***</td>
<td>−0.135***</td>
<td>−0.115***</td>
<td>−0.096***</td>
<td></td>
</tr>
<tr>
<td>Industry 1</td>
<td>0.201</td>
<td>0.099</td>
<td>−0.157</td>
<td>0.144</td>
<td>−0.121</td>
<td></td>
</tr>
<tr>
<td>Industry 2</td>
<td>0.238</td>
<td>0.138</td>
<td>−0.268</td>
<td>0.099</td>
<td>0.138</td>
<td></td>
</tr>
<tr>
<td>Industry 4</td>
<td>−0.378**</td>
<td>−0.373***</td>
<td>−0.761***</td>
<td>0.025</td>
<td>−0.19</td>
<td></td>
</tr>
<tr>
<td>Industry 5</td>
<td>−0.023</td>
<td>−0.038</td>
<td>−0.363</td>
<td>0.033</td>
<td>−0.123</td>
<td></td>
</tr>
<tr>
<td>Industry 6</td>
<td>−0.034</td>
<td>−0.16</td>
<td>−0.278</td>
<td>−0.175</td>
<td>−0.308**</td>
<td></td>
</tr>
<tr>
<td>Industry 7</td>
<td>0.096</td>
<td>−0.113</td>
<td>−0.535***</td>
<td>0.111</td>
<td>−0.164</td>
<td></td>
</tr>
<tr>
<td>Industry 8</td>
<td>0.121</td>
<td>0.105</td>
<td>−0.350**</td>
<td>0.099</td>
<td>−0.267*</td>
<td></td>
</tr>
<tr>
<td>Industry 9</td>
<td>−0.446**</td>
<td>−0.004</td>
<td>−0.491**</td>
<td>−0.278</td>
<td>−0.450**</td>
<td></td>
</tr>
<tr>
<td>Total assets small</td>
<td>0.058</td>
<td>0.202***</td>
<td>0.220***</td>
<td>0.265***</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Total assets medium</td>
<td>−0.029</td>
<td>0.134***</td>
<td>0.06</td>
<td>0.127***</td>
<td>−0.169***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2,607</td>
<td>1,573</td>
<td>2,209</td>
<td>1,202</td>
<td>1,612</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.092</td>
<td>0.132</td>
<td>0.044</td>
<td>0.081</td>
<td>0.107</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.355</td>
<td>1.282</td>
<td>1.311</td>
<td>1.32</td>
<td>1.361</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.21</td>
<td>0.23</td>
<td>0.25</td>
<td>0.27</td>
<td>0.22</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.032****</td>
<td>2.963***</td>
<td>2.931****</td>
<td>2.884****</td>
<td>2.898****</td>
<td></td>
</tr>
</tbody>
</table>

The variance inflation factor (VIF) is used for testing the existence of multicollinearity. The variables under consideration are associated with VIF score <5. Variables’ endogeneity is examined using Hausman specification test (Hausman, 1978). The results show that all the variables are endogenous except for the change in non-debt tax shield, DeltaND. Thus, instrumental variable (IV) is employed through the use of the generalized method of moments (GMM).

***D-W test significant at 5% two-sided level of significance.

**Significant at the level 1%.

*Significant at the level 10%.
relation between debt and firm growth. It is also in line with the findings of Fulghieri et al. (2016) that firms prefer equity financing and then shifts toward debt as they mature. This verifies that Delta DR had a significant positive impact on growth while the DR has a negative impact. The positive and significant coefficient of operating income to assets indicates a logical outcome as the increase in growth of sales (growth of the firm) results in an increase in operating income. The same is true, although in opposite direction, in the case of PD. The negative coefficient indicates that a decline in firm’s growth of sales takes the firm close to bankruptcy. As for the dummy variables for industry and size, the only consistent significant impact is for the information technology industry (IND 4) while the effect of size varies across models. For the PD model, the coefficient of size is significant in the cases of small and medium-size firms while for the Q model it is significant only for small-size firms.

(B) The results in the case of adverse selection

When firms are facing high level of information asymmetry, only two models are presented. The third model (Beta ROE model) had too few observations to fit in a generalized method of moments (GMM) model that uses instrumental variables. As for the other two models, inconsistent results are obtained. In the case of Q ratio model, only DR is significant among the variables that measure financing decisions while in the PD model, all three measures of financing decisions are significant. These conflicting results prove that firms facing high level of information asymmetry grow in different ways and that investors might face lots of uncertainties. For example, the DR has a positive impact on firm growth in the Q model and a negative impact on the PD model. Moreover, the Delta DR has a positive impact on the PD model, consistent with the favorable models, while it is insignificant in the Q model. Finally, the Debt-to-Equity (DE) ratio is positively significant for the PD model and insignificant for the Q model. The results are somewhat similar to what Noe and Rebello (1996) proposed regarding capital structure under information asymmetry. They suggest that shareholders would prefer debt financing to benefit from their control over earnings and the cash that management captures. However, introducing information asymmetry to this equation might change the preferences of both managers and shareholders. On one hand, the latter would base their preference for either debt or equity on the trade-off between costs of payments to management and costs of adverse selection. Thus, shareholders might prefer equity financing if the costs of adverse selection are greater than costs of cash paid to managerial staff. On the other hand, managers would prefer debt financing if the costs of adverse selection are high even at the expense of their benefit. Given managerial control over firms, managers would prefer relying on higher debt financing as it conveys favorable information to the market. This argument shows the reason that DE and DR ratios result in different outcomes under adverse selection models. The coefficient of PD in adverse selection models offers an extended contribution. This finding also shows the uncertainties
that are associated with financing firms in the presence of severe information problems. Still, the operating income to assets and PD are significant while industry effects are mostly insignificant. As for the size effect, the relationship is significant for medium-sized firms and for small firms in the Q model only. The variations in size effect among the five models (the three favorable and the two adverse ones) show that those firms grow in different patterns. The finding that large firms are not affected by these relationships might be due to their level of maturity and stable income streams that allow them to rely less on external financing. Regarding measures of capital structure, the coefficients of \( DE \) ratio and \( DR \) show that a positive association exists between debt financing and growth of the firm. These results are opposite to those reported by Frank and Goyal (2005). Nevertheless, it is obvious that debt financing adjusts from negative in the previous period to positive in the current period. This argument is supported by the negative coefficient of the Delta DR. These results can be interpreted that if firms are expecting growth in sales, debt financing increases. The negative coefficient of effective corporate tax rate offers extended support to the above-mentioned argument. That is, the increases in debt financing result in decreases in taxable income (due to increases in interest expenses), thus effective tax rate.

Table 3 shows the association between investment decisions and growth of the firm at both favorable and adverse selection cases.

(A) The results in the case of favorable selection
The results show that the Q ratio model is the most relevant measure for information asymmetry especially in the case of investment decisions as it shows whether the firm is under- or over-investing. In addition, the problems associated with investment decisions are related much, to managerial behavior than asymmetry of information. Li (2011) suggests that the information content (or signaling effect) of investment decisions is not as severe as in other financial decisions such as dividend payout. His argument is based on the findings of Skinner and Soltes (2011) who examine the earnings quality based on dividend decisions and conclude that investment in capital and labor are less sensitive to information signaling than dividend decisions. Results obtained from the various models are discussed in the following paragraphs.

The results of the three models in case of favorable selection show that firms experience low information asymmetry and do not suffer from under-investment problems (in the Q model). This consistent result is related to the ratio of fixed assets to total assets (FATA) that is insignificant in the three models. The ratio of current assets-to-fixed assets (CAFA) is only significant in the Q model, and similarly, the change in inventory level (LNINV) is significant only in the Q model. The coefficient of CAFA has a negative impact on firm growth while inventory level had a positive impact. The latter finding is consistent with suggestions of Carpenter et al. (1994) that firms should invest in inventory to promote growth. Moreover, the results
### Table 3. The Association Between Investment Decisions and Growth of the Firm.

<table>
<thead>
<tr>
<th>Variables Dependent</th>
<th>Proxies of Information Asymmetry (Favorable Selection)</th>
<th>Proxies of Information Asymmetry (Adverse Selection)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Growth of Sales</td>
<td>Growth of Sales</td>
</tr>
<tr>
<td>Beta ROE</td>
<td>PD ROE</td>
<td>Q Ratio</td>
</tr>
<tr>
<td>Constant</td>
<td>0.007</td>
<td>0.023</td>
</tr>
<tr>
<td>Fixed assets-to-total assets</td>
<td>0.01</td>
<td>-0.025</td>
</tr>
<tr>
<td>Non-debt tax shield</td>
<td>0.004</td>
<td>-0.089***</td>
</tr>
<tr>
<td>Delta non-debt</td>
<td>-0.322*</td>
<td>0.122*</td>
</tr>
<tr>
<td>Effective corporate tax rate</td>
<td>0.025</td>
<td>0.008</td>
</tr>
<tr>
<td>Bankruptcy risk</td>
<td>0.017</td>
<td>-0.034</td>
</tr>
<tr>
<td>Operating income-to-sales</td>
<td>-0.072**</td>
<td>-0.061**</td>
</tr>
<tr>
<td>Operating income-to-assets</td>
<td>0.161***</td>
<td>0.227***</td>
</tr>
<tr>
<td>Current assets-to-fixed assets</td>
<td>-0.169</td>
<td>-0.045</td>
</tr>
<tr>
<td>Change in inventory</td>
<td>0.039</td>
<td>0.038</td>
</tr>
<tr>
<td>Probability of default</td>
<td>-0.148***</td>
<td>-0.120***</td>
</tr>
<tr>
<td>Industry 1</td>
<td>0.516***</td>
<td>-0.134</td>
</tr>
<tr>
<td>Industry 2</td>
<td>0.607***</td>
<td>-0.034</td>
</tr>
<tr>
<td>Industry 4</td>
<td>-0.1</td>
<td>-0.617**</td>
</tr>
<tr>
<td>Industry 5</td>
<td>0.278</td>
<td>-0.272</td>
</tr>
<tr>
<td>Industry 6</td>
<td>0.263</td>
<td>-0.353</td>
</tr>
<tr>
<td>Industry 7</td>
<td>0.306</td>
<td>-0.334</td>
</tr>
<tr>
<td>Industry 8</td>
<td>0.498***</td>
<td>-0.162</td>
</tr>
<tr>
<td>Industry 9</td>
<td>-0.086</td>
<td>-0.222</td>
</tr>
<tr>
<td>Small-size firms</td>
<td>0.151**</td>
<td>0.336***</td>
</tr>
<tr>
<td>Medium-size firms</td>
<td>0.008</td>
<td>0.192***</td>
</tr>
<tr>
<td>J-statistic</td>
<td>2.522</td>
<td>1.575</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.008</td>
<td>0.122</td>
</tr>
<tr>
<td>SE</td>
<td>1.422</td>
<td>1.297</td>
</tr>
<tr>
<td>P-VAL</td>
<td>0.29</td>
<td>0.24</td>
</tr>
<tr>
<td>D-W test</td>
<td>2.996***</td>
<td>2.925***</td>
</tr>
</tbody>
</table>

The VIF is used for testing the existence of multicollinearity. The variables under consideration are associated with VIF score <5. Variables’ endogeneity is examined using Hausman specification test (Hausman, 1978). The results show that all the variables are endogenous except for the change in non-debt tax shield, DeltaND. Thus, IV is employed through the use of the generalized method of moments (GMM).

****D-W test significant at 5% two-sided level of significance.
***Significant at the level 1%.
**Significant at the level 5%.
*Significant at the level 10%.
are consistent with the theory of Carole (1989) that firms tend to invest in current assets after acquiring necessary long-term assets and use such investment to increase sales. Nevertheless, the coefficient of FATA is consistently insignificant, indicating that the amount of fixed assets does not matter when it comes to promoting growth in sales for firms that already have sufficient assets to function well (i.e., for firms that acquired the necessary long-term assets, with Q above one).

The results show also that industry and size effects are significant across all firms and models. The size effect is particularly significant in small-size firms in the three models and in medium-size firms in two of the three models. Other significant variables that contribute to or hinder growth are operating income to sales, operating income to assets, and PD. These variables indicate that when firms are facing low information asymmetry, the growth of the firms is reflected in an increasing operating income and decreasing PD.

(B) The results in the case of adverse selection
The results show that the PD ROE model and Q model are the only two valid models. The adverse selection is associated with high level of information asymmetry that may result in under-investment problems. The results reported in Table 3 vary significantly which is strengthening the argument that firms suffering from high levels of information asymmetry grow in different ways. However, the assumption is that the PD ROE model focuses on firms that face information problems whereas the Q model focuses on firms suffering from managerial-related considerations.

In the PD ROE model, FATA is associated with a significant and positive impact on growth of the firm, which suggests that firms increase investment in fixed assets in order to increase sales revenues. However, the CAFA and the change in inventory are insignificant statistically. This result is opposite to what Carole (1989) and Carpenter et al. (1994) suggest regarding the increases in investment in current assets and inventory rather than long-term assets. The negative coefficient of non-debt tax shield and change in non-debt tax shield indicate that the high level of information asymmetry results in inconsistency between growth of sales and investment in fixed asset. The latter is planned at a long-range while growth of sales fluctuates. It is obvious that firms benefit from tax savings, growth of sales falls. This argument is confirmed by the positive and significant coefficient of effective tax rate. That is, firms are treated at the same tax bracket, but tax benefits vary. The coefficients of bankruptcy risk and operating income to sales, operating income to assets, and PD are consistent with other studies in the literature and quite expected as well. The high level of information asymmetry results in a negative association between growth of sales and these variables. As for the industry and size effects, the relationship is only significant for medium-size firms and for four industries.

As far as the Q model is quite relevant in the case of investment decision and information asymmetry, different results are reported. The CAFA and LNINV are significant, yet have opposite signs when compared with
favorable Q model. The CAFA has a positive impact on growth of the firm, while the change in inventory has a negative impact. The finding that investing in current assets is better for firms that face high information asymmetry is consistent with Carole (1989). This is supported by the implication that these firms suffer from under-investment problems, meaning that an investment in current assets is needed to address the issues hindering growth. However, the negative impact of inventory, although opposite to theory of Carpenter et al. (1994), implies that accumulating inventory for firms that already suffer from under-investment problems hinders their abilities to grow.

It is worth noting that the Q model shows no impact of size and industry types, while other variables are mostly in line with the PD ROE model. Unlike favorable models, the adverse selection models place much emphasis on sources of risk such as bankruptcy risk and PD which indicate that firms suffering from information asymmetry problems or under-investment could still grow by focusing on the “whole picture” and try to mitigate sources of risk.

Table 4 shows the association between dividend decisions and growth of the firm at both favorable and adverse selection cases.

(A) The results in the case of favorable selection

Table 4 shows the association between dividend policy and growth of the firm. The results for all the models show that the determinants of dividend policy (DPR and dividend yield (DY)) have the same sign, significance level, and even very close coefficients. The coefficients in the favorable models show a significant positive contribution of DPR and a significant negative contribution of DY to growth of the firm. This finding is in contrast with suggestions of Rozeff (1982) and Bartram, Brown, How, and Verhoeven (2012). However, both suggest an increase in payout ratios to decrease agency costs. In addition, this finding aligns with other studies that suggest that increasing dividend payments signal higher earnings for the firm (Balachandran & Nguyen, 2004; Beer, 1993; Brook et al. 1998). These studies support Bhattacharya (1979) and Miller and Rock (1985) models that suggest that firms signal their superior operating performance through increases in dividends. Moreover, these results support previous findings by Skinner and Soltes (2011) who examine the relation between dividend policy and quality of firms’ earnings. The findings of this chapter indicate that dividend-paying firms have more persistent earnings than firms that do not pay dividends frequently.

The effects of the other variables match the favorable models in the financing and investment decisions to a significant extent. The size effect varies from one model to another, contradicting the findings of Lloyd et al. (1985) who examined the role of size in the payout policy and found significant relation between the payout ratios and firm size. As for the industry effect, the relationship is significant for most of the industries yet the three models
Table 4. The Association Between Dividend Decisions and Growth of the Firm.

<table>
<thead>
<tr>
<th>Variables Dependent</th>
<th>Proxies of Information Asymmetry (Favorable Selection)</th>
<th>Proxies of Information Asymmetry (Adverse Selection)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Growth of Sales</td>
<td>Growth of Sales</td>
</tr>
<tr>
<td>Beta ROE</td>
<td>PD ROE</td>
<td>Q Ratio</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.002</td>
<td>-0.007</td>
</tr>
<tr>
<td>Non-debt tax shield</td>
<td>-0.027</td>
<td>-0.097***</td>
</tr>
<tr>
<td>Delta non-debt</td>
<td>0.04</td>
<td>0.011</td>
</tr>
<tr>
<td>Effective corporate tax rate</td>
<td>-0.009</td>
<td>-0.018</td>
</tr>
<tr>
<td>Bankruptcy risk</td>
<td>-0.059***</td>
<td>-0.024</td>
</tr>
<tr>
<td>Operating income to sales</td>
<td>-0.048*</td>
<td>-0.049**</td>
</tr>
<tr>
<td>Operating income to assets</td>
<td>0.132***</td>
<td>0.225***</td>
</tr>
<tr>
<td>Dividend payout ratio</td>
<td>0.202***</td>
<td>0.124</td>
</tr>
<tr>
<td>Dividend yield</td>
<td>-0.455***</td>
<td>-0.380***</td>
</tr>
<tr>
<td>Probability of default</td>
<td>-0.096***</td>
<td>-0.080***</td>
</tr>
<tr>
<td>Industry 1</td>
<td>0.186</td>
<td>-0.253***</td>
</tr>
<tr>
<td>Industry 2</td>
<td>0.137</td>
<td>-0.211***</td>
</tr>
<tr>
<td>Industry 4</td>
<td>-0.469**</td>
<td>-0.460***</td>
</tr>
<tr>
<td>Industry 5</td>
<td>0.301</td>
<td>-0.068</td>
</tr>
<tr>
<td>Industry 6</td>
<td>-0.043</td>
<td>-0.315***</td>
</tr>
<tr>
<td>Industry 7</td>
<td>0.074</td>
<td>-0.312***</td>
</tr>
<tr>
<td>Industry 8</td>
<td>0.098</td>
<td>-0.230***</td>
</tr>
<tr>
<td>Industry 9</td>
<td>-0.488*</td>
<td>-0.235***</td>
</tr>
<tr>
<td>Small-size firms</td>
<td>-0.024</td>
<td>0.103***</td>
</tr>
<tr>
<td>Medium-size firms</td>
<td>-0.099***</td>
<td>0.064***</td>
</tr>
<tr>
<td>N</td>
<td>2.607</td>
<td>1.571</td>
</tr>
<tr>
<td>J-statistic</td>
<td>20.495</td>
<td>23.296</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.137</td>
<td>0.185</td>
</tr>
<tr>
<td>SE</td>
<td>1.324</td>
<td>1.239</td>
</tr>
<tr>
<td>P-VAL</td>
<td>0.24</td>
<td>0.22</td>
</tr>
<tr>
<td>D-W test</td>
<td>3.041****</td>
<td>2.939***</td>
</tr>
</tbody>
</table>

The VIF is used for testing the existence of multicollinearity. The variables under consideration are associated with VIF score <5. Variables endogeneity is examined using Hausman specification test (Hausman, 1978). The results show that all the variables are endogenous except for the change in non-debt tax shield, DeltaND. Thus, IV is employed through the use of the GMM.

****D-W test significant at 5% two-sided level of significance.
***Significant at the level 1%.
**Significant at the level 5%.
*Significant at the level 10%.
yield similar results for two industries: information technology and energy. In both industries, the effect is negative which is due to the fact that both industries require large expenditures on R&D and large capital investments. Therefore, investors in these industries prefer less payout and more retention for financing future expansions. Other variables such as operating income to sales, operating income to assets, and PD are significant for the three models and show similar results to those of favorable models for financing and investment decisions.

(B) The results in the case of adverse selection
In general, the results in the adverse and favorable selection models yield similar results. That is, DPR has a significant positive effect and the DY has a significant negative effect on growth of the firm. The difference is only in other variables such as bankruptcy risk that is significant in the adverse selection models. A similar result is reported in the financing and investment decisions. The consistent impacts of dividends prove that firms care most about dividend payments to signal their performance to investors. These results are consistent with previous studies such as Beer (1993), Brook et al. (1998), and Balachandran and Nguyen (2004) who support the signaling hypothesis, while these results oppose other studies such as Yoon and Starks (1995), Bernhardt et al. (2005), and Brav, Graham, Harvey, and Michaely (2005) that rejected this hypothesis.

The most important finding in these models is that dividend decisions do not differ in terms of their impact on growth of the firm whether firms are facing high or low information asymmetry. This result contradicts other studies such as Nam et al. (2004), Chetty and Saez (2006), and Brown et al. (2007). In addition, the close results obtained from both adverse and favorable models defies the propositions of Rozeff (1982), Easterbrook (1984), and Borokhovich et al. (2005) that paying out more dividends reduces agency conflicts either by increasing monitoring by financial markets or by decreasing the cash on hand available for management that might be subject to misuse. However, these results align with their propositions that the payout of increasing dividends can be beneficial, not for agency considerations, but rather to promote firm growth. This finding shows that firms, regardless of their level of information asymmetry, focus on their dividend policy as it is monitored closely by market participants.

Finally, the results in these models support the early attempt by Ross (1977) to link information asymmetry with the dividend decision in inefficient markets. He argues that management could use the dividend policy to signal information to the less informed shareholders. For example, a higher payout ratio would signal higher anticipated profits. However, the results in this chapter show that even the firms with low information asymmetry follow the same policy of signaling their performance through dividend payments. This finding provides support to the traditional “Bird-in-Hand” theory that investors prefer to receive dividends rather than wait for future benefits. Surprisingly, paying out more in dividends contributes to firm growth rather than hinders
its ability to invest the cash in alternative investments. However, this could also be explained by the fact that firms that grow in terms of sales, in most cases, are likely to have higher profits, thus are able to pay more dividends.

Table 5 shows the association between the three financial decisions and growth of the firm at both favorable and adverse selection cases. The importance of this relationship is derived from previous studies that suggest significant relationships between each two or more such as Koch and Shenoy (1999), Chen et al. (2010), Bolton et al. (2011), and Morellec et al. (2014). To the best of the authors’ knowledge, none of the previous studies examined the combined effect of the three financial decisions growth of the firm under high and low levels of information asymmetry.

(A) The results in the case of favorable selection
Table 5 shows the aggregate effects of the three main financial decisions on growth of the firm. In the case of favorable selection (low information asymmetry), the results show that most variables are consistent across the three models. That is, firms that suffer from low information asymmetry grow in a structured and consistent manner. The variables that are consistent in terms of coefficient sign and significance are DELTADR, operating income to assets (OIA), DPR, DY, change in inventory (LNINVEN), and PD. The change in debt level (DELTADR) is positively associated with growth of the firm which suggests the financing of new investments using debt. The DPR has a positive effect as well which suggests an increase in payout ratios, hence firms depend proportionally on debt financing and a less on internal financing. Moreover, the LNINVEN has a positive effect which suggests that an investment boosts growth in sales. The positive coefficient of OIA is quite indicative and supports the above-mentioned results regarding the proportional dependence on debt financing. That is, an increase in OIA enables firms to cover the financing costs associated with debt financing that is mainly used for boosting growth in sales. The negative coefficient of PD is also quite logic. This result adds to the relevancy of growth in sales as a measure of growth of the firm. The relationship was significant for every industry and for both small and medium-sized firms in at least two of the three models.

(B) The results in the case of adverse selection
In case firms face a high level of information asymmetry (Q ratio is lower than one), the number of variables are significant such as DR, DELTADR, DPR, DY, bankruptcy risk (BR), effective corporate tax rate (ECTR), OIA, CAFA, and PD. The finding that DR and CAFA have negative coefficients suggests that firms that suffer from high level of information asymmetry grow in a different manner. The excessive use of debt financing can affect growth of the firm negatively. The investment in current assets can either hinder or enable growth. When current assets are associated with increasing inventory, it hinders growth (PD model). Whereas, current assets contribute positively when there is no significant impact on inventory (Q model).
Table 5. The Combined Effects of Financing, Investment, and Dividends Decisions on Growth of the Firm.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Proxies of Information Asymmetry (Favorable Selection)</th>
<th>Proxies of Information Asymmetry (Adverse Selection)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sales Growth</td>
<td>Sales Growth</td>
</tr>
<tr>
<td></td>
<td>Beta ROE      PD ROE   Q Ratio</td>
<td>PD ROE      Q Ratio</td>
</tr>
<tr>
<td>Constant</td>
<td>–0.002        0.009   −0.012</td>
<td>–0.003      0.018</td>
</tr>
<tr>
<td>Debt-to-equity</td>
<td>−0.059***     0.024   −0.034**</td>
<td>0.034       0.017</td>
</tr>
<tr>
<td>Debt ratio</td>
<td>0.009         −0.022  −0.051***</td>
<td>−0.069*     0.169***</td>
</tr>
<tr>
<td>Delta debt ratio</td>
<td>0.044***      0.070*** 0.084***</td>
<td>0.042*     0.058**</td>
</tr>
<tr>
<td>Fixed assets-to-total assets</td>
<td>−0.018        0.01    −0.126**</td>
<td>−0.039      0.057*</td>
</tr>
<tr>
<td>Non-debt tax shield</td>
<td>–0.01         −0.122*** −0.198***</td>
<td>−0.354***   −0.139</td>
</tr>
<tr>
<td>Delta non-debt</td>
<td>−0.109        0.170** 0.302**</td>
<td>0.031**     −0.037**</td>
</tr>
<tr>
<td>Effective corporate tax rate</td>
<td>−0.021        −0.021  −0.039*</td>
<td>−0.115***   −0.117***</td>
</tr>
<tr>
<td>Bankruptcy risk</td>
<td>−0.024        −0.016  0.021</td>
<td>−0.258***   −0.006</td>
</tr>
<tr>
<td>Operating income to sales</td>
<td>−0.034        −0.009  −0.113***</td>
<td>0.235***    0.187***</td>
</tr>
<tr>
<td>Operating income to assets</td>
<td>0.119***      0.194*** 0.251***</td>
<td>0.223***    0.250***</td>
</tr>
<tr>
<td>Dividend payout ratio</td>
<td>0.187***      0.148*** 0.249***</td>
<td>−0.484***   −0.401***</td>
</tr>
<tr>
<td>Dividend yield</td>
<td>−0.429***     −0.433*** 0.614***</td>
<td>0.017       0.102</td>
</tr>
<tr>
<td>Current assets to fixed assets</td>
<td>−0.07         –        −0.205***</td>
<td>−0.131***   0.174***</td>
</tr>
<tr>
<td>Change in inventory</td>
<td>0.071***      0.064*** 0.075***</td>
<td>0.034**     −0.032</td>
</tr>
<tr>
<td>Probability of default</td>
<td>−0.089***     −0.116*** −0.239***</td>
<td>−0.077***   −0.087***</td>
</tr>
<tr>
<td>Industry 1</td>
<td>0.285         −0.332*** −0.617***</td>
<td>−0.387***   0.194</td>
</tr>
<tr>
<td>Industry 2</td>
<td>0.247         −0.326*** −0.712***</td>
<td>−0.184      0.049</td>
</tr>
<tr>
<td>Industry 4</td>
<td>−0.424**      −0.527*** −1.033***</td>
<td>−0.424***   −0.064</td>
</tr>
<tr>
<td>Industry 5</td>
<td>0.410**       −0.174** 0.133</td>
<td>−0.136      0.449***</td>
</tr>
<tr>
<td>Industry 6</td>
<td>0.078         −0.344*** −0.710***</td>
<td>−0.562***   −0.191</td>
</tr>
<tr>
<td>Industry 7</td>
<td>0.131         −0.433*** −0.860***</td>
<td>−0.390***   0.388***</td>
</tr>
<tr>
<td>Industry 8</td>
<td>0.232         −0.316*** −0.790***</td>
<td>−0.537***   0.126</td>
</tr>
<tr>
<td>Industry 9</td>
<td>−0.350*       −0.300*** −0.936***</td>
<td>−0.924***   −0.109</td>
</tr>
<tr>
<td>Small-size firms</td>
<td>0.083         0.194*** 0.193***</td>
<td>0.037      −0.018</td>
</tr>
<tr>
<td>Medium-size firms</td>
<td>−0.012        0.136*** 0.076**</td>
<td>−0.146***   0.002</td>
</tr>
<tr>
<td>N</td>
<td>2.521         1.657    2.201</td>
<td>1.611      1.113</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.139         0.173    0.064</td>
<td>0.101      0.152</td>
</tr>
<tr>
<td>SE</td>
<td>1.327         1.236    1.28</td>
<td>1.356      1.279</td>
</tr>
<tr>
<td>P-VAL</td>
<td>0.29          0.28    0.25</td>
<td>0.39        0.28</td>
</tr>
<tr>
<td>D-W test</td>
<td>3.016***      2.925*** 2.919***</td>
<td>2.933***    2.883***</td>
</tr>
</tbody>
</table>

The VIF is used for testing the existence of multicollinearity. The variables under consideration are associated with VIF score <5. Variables endogeneity is examined using Hausman specification test (Hausman, 1978). The results show that all the variables are endogenous except for the change in non-debt tax shield, DeltaND. Thus, IV is employed through the use of the GMM. In the case of adverse selection, the Beta ROE model excluded all variables.

****D-W test significant at 5% two-sided level of significance.

***Significant at the level 1%.

**Significant at the level 5%.

*Significant at the level 10%.
Bankruptcy risk affects growth negatively for both models suggesting that firms should try to reduce or mitigate this risk. While the results for dividend payout and operating income-to-assets are similar to the favorable models (i.e., contribute to firm growth positively), other variables like DE and FATA are insignificant in both models while the change in inventory had a significant impact for the PD model only. As for the size and industry dummies, the coefficients are insignificant for small firms while significant only for medium-size firms in the PD model. The industry effect is significant in at least one model or two models except for one industry: healthcare (IND2). Yet, industry effect has opposite effect in one of the industries; consumer staples (IND7) suggesting, again, different patterns of growth for firms facing high level of information asymmetry.

10. CONCLUSION

Overall, the findings of this chapter suggest that firms can adjust financial policies in order to adhere to the level of information asymmetry. In terms of information asymmetry, the overall conclusions in this chapter can be outlined as follows.

10.1. The Case of High Information Asymmetry

Firms that suffer from high level of information asymmetry should be more transparent in communicating prospects of investments and financing in order to make sure that effective signals are sent to market participants.

In terms of financing, the results show that firms facing high level of information asymmetry grow in different ways and that investors might face uncertainties when they invest in these firms as well. Given managerial control over firms, managers would prefer relying on relatively high debt financing as it conveys favorable information to the market. Consequently, shareholders might prefer equity financing if the costs of adverse selection are greater than costs of cash paid to managerial staff. Managers would also prefer debt financing if the costs of adverse selection are high even at the expense of their benefits. Nevertheless, it is obvious that managers are not able to limit debt financing as far as PD is still significantly affecting growth of the firms negatively. The results of size effects vary across models indicating that firms grow in different patterns. Nevertheless, the finding that large firms are not affected by these relationships might be due to their level of maturity and stability of income streams that allow firms to rely less on external financing.

In terms of investments, high information asymmetry leads firms’ investments in an opposite direction than in case of low information asymmetry. That is, firms increase investment in fixed assets in order to increase sales revenues although the results show an inconsistency between growth of sales and investment in fixed asset.

In terms of dividends, firms tend to mitigate the effects of adverse selection by paying out dividends. A plausible interpretation that firm growth, in terms of growth of sales, results in high profits that enable firms to pay dividends in order to ensure stability in the capital market.
10.2. The Case of Low Information Asymmetry

In terms of financing, the results offer updates to the Pecking Order theory of capital structure that when subject to low information asymmetry; firms finance new investments using debt rather than equity after consuming internal sources of funding. Nevertheless, the excessive use of debt hinders growth, which requires that firms must monitor the association between debt financing and growth of firms. The objective is to slow down debt financing as growth of sales starts decreasing. The effects of firm size and types of industry matter. That is, the effects of information asymmetry are associated negatively with small-size firms and positively with large-size firms. In addition, information asymmetry is observed in the industries that are associated with large technological movements.

In terms of investments, low information asymmetry has significant impacts on scale and types of investments. Firms do not suffer from under-investment problems and tend to invest in current assets after acquiring necessary long-term assets. This results in an increasing operating income and decreasing PD. The results show also that industry and size effects are significant across all firms and models.

In terms of dividend decisions, the results offer an extended assurance to previous findings in the literature that firms signal superior operating performance through increases in dividends. Furthermore, an extended assurance of this finding is that dividend-paying firms have more persistent earnings than firms that do not pay dividends frequently. This result can also be considered a reflection of investors’ attitudes that favor “Birds in Hand.”

In general, as long as firms’ financial decisions are interrelated and generic, the collective effects of information asymmetry on growth of the firm show that firms that experience low level of information asymmetry, growth of the firm is a function of financing new investments using debt, increasing dividend payout ratio, and investing more in inventory rather than fixed assets or other current assets. On the other hand, firms that suffer from high level of information asymmetry grow in a different manner. Nevertheless, firms that suffer from low information asymmetry grow in a structured and consistent manner that is characterized by the relative use of debt financing, higher dividends payouts, improvement in inventory levels and operating income. When firms are subject to high information asymmetry, excessive debt financing and inventory affect growth of the firm negatively. The concern about growth of the firm is significant for medium-size firms only.

The most important finding in these models is that dividend decisions do not differ in terms of their impact on growth of the firm whether firms are facing high or low information asymmetry. This finding shows that firms, regardless of their level of information asymmetry, focus on their dividend policy as it is monitored closely by market participants. Surprisingly, paying out more in dividends contributes to firm growth rather than hinders its ability to invest the cash in alternative investments.
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