Received 8 February 2022
Revised 31 March 2022
4 May 2022
Accepted 4 May 2022

Budget transparency and financial sustainability

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Abstract

Purpose – This study investigates the transparency of budgets by examining its relationship with financial sustainability, which is a central area of research in the public-sector context.

Design/methodology/approach – Referring to the public value framework, a large sample of 110 countries has been investigated, implementing econometric models where the dependent variable is the Open Budget Index (OBI), published by the International Budget Partnership (IBP), and the test variables are different indicators of financial sustainability.

Findings – The results that emerge from the analysis suggest that budget transparency could be positively associated with the financial sustainability of governments, beyond the traditional aims of enhancing citizens' trust and participation.

Originality/value – This research offers important insights for policy areas, suggesting that improving budget transparency could be beneficial for public administrations because of the positive association with financial sustainability.

Keywords Budget transparency, Financial sustainability, Solvency, Growth, Stability, Fairness

Paper type Research paper

1. Introduction

The 2008 global financial crisis and the current worldwide crisis due to COVID-19 have put great pressure on governments to boost economic recovery through new investments, while ensuring balanced budgets. This can affect the financial sustainability of the strategies and policies decided on by politicians, especially in the long run, due to the need to sustain well-being for future generations (Schick, 2005). This can also affect budget transparency, as it becomes important to clarify which public programs and policies governments have implemented or aim to implement.

Previous studies on transparency have primarily concentrated on two areas: accountability and participation, by adopting a "blinkered" vision. The current research agenda suggests taking a more comprehensive perspective (Michener, 2019), to enrich the discussion on the budget transparency discourse. Furthermore, Anessi-Pessina *et al.* (2016), in their literature review on public-sector budgeting, called for further research on the integration of budgeting and performance management, especially considering the allocation and the managerial functions of budgeting. Indeed, the analysis of the relationship between budget transparency and financial management has been less thoroughly investigated as previous studies have mainly concentrated on the effects of budget transparency on citizens'

Journal of Public Budgeting, Accounting & Financial Management
Vol. 34 No. 6, 2022
pp. 210-234
Emerald Publishing Limited
1096-3367
DOI 10.1108/JPBAFM-02-2022-0025

participation and trust. Therefore, this study intends to contribute to this debate by investigating if an association exists between budget transparency and financial sustainability, concentrating on the central government level. The focus on financial sustainability is motivated by the increasing relevance of this concept from both a theoretical and practical perspective (Caruana *et al.*, 2019).

A large sample of 110 countries is used for the analysis, implementing econometric models where the dependent variable is the Open Budget Index (OBI), published by the International Budget Partnership (IBP), and the test variables are different indicators of financial sustainability. The research hypothesis of the study and the related discussion of the results of the analysis are based on the public value framework (Bozeman, 2007), whose principles are believed to affect the budgeting process and its allocation, managerial and accountability functions (Douglas and Overmans, 2020).

This study contributes to the literature in several ways. First, it bridges two strands of literature, going a step beyond the classic approach, which traditionally links transparency to accountability and participation. Therefore, this study enriches the literature on the effects of budget transparency by examining its influence on financial sustainability, which is a less thoroughly investigated area. Second, it contributes to the literature concerning financial sustainability by capturing several dimensions of this complex, not easily operationalized concept. This research also offers important insights for policy areas, suggesting that improving budget transparency could be beneficial for public administrations because of the positive association with financial sustainability.

The paper begins by reviewing the literature on financial sustainability and budget transparency. The following section depicts the theoretical framework and develops the research hypothesis, while section four illustrates the research methodology (sample, model and variables). Section five presents the results, which are discussed in the final section, along with conclusive remarks and suggestions for future developments of the research.

2. Literature review

2.1 Financial sustainability

Financial sustainability is an emerging area of research, representing a key concept in the public-sector context (Caruana *et al.*, 2019). In the beginning, scholars mainly focused on the financial distress of public-sector entities, to reveal the possible causal factors of this situation (Groves and Valente, 2003; Kleine *et al.*, 2003; Carmeli, 2007; Jones and Walker, 2007; Zafra Gómez *et al.*, 2009; Cohen *et al.*, 2012). Other studies concentrated on how to improve the financial conditions of public administrations (Adams *et al.*, 2014; Drew and Dollery, 2014). More recent research has investigated the determinants of financial sustainability and the initiatives implemented by governments (Navarro-Galera *et al.*, 2016; Rodríguez-Bolívar *et al.*, 2014, 2016; Bisogno *et al.*, 2017).

One of the fil rouges which links these studies is that financial sustainability is a multifaceted concept, projected in a long-term perspective and based on several dimensions. IPSASB (2013) suggests considering service, revenue and debt dimensions, emphasizing the importance of preserving the entity's ability to maintain (or change) these dimensions while reducing its dependence on factors outside its influence. Therefore, the capacity to satisfy present and future obligations is only part of the issue. It is also necessary to consider the capability of governments to provide public services (IPSASB, 2013) which are assessed in both the short and long run. This means that the ability to manage the financial capacity of a public-sector entity should coincide with the ability to maintain an adequate level of services. Furthermore, the implementation of public programs and policies should guarantee intergenerational equity, ensuring the feasible provision of public services to both current and future generations, while securing the long-term financial sustainability of these

programs (Moldavanova, 2016; Caruana *et al.*, 2019). Accommodating these two issues could be complicated and generates potential conflicts between democratic accountability and financial sustainability (Justice and Miller, 2011).

The shift to a long-term perspective implies that the way public administrations think about financial sustainability is different. The central issue is not only current solvency but also the effects that programs and policies could have in the future, as they could affect the future capacity of the entity to create public values, interfere with economic growth, determine an increase in tax burdens, or transfer costs onto future generations. Accordingly, and to operationalize the concept, more than one dimension should be considered (Cuadrado-Ballesteros and Bisogno, 2019; Zafra-Gómez *et al.*, 2009).

Building on Schick (2005), this research uses four dimensions: solvency, growth, stability and fairness. The first dimension, solvency, refers to the ability of a public-sector entity to satisfy its financial obligations. Traditionally, solvency has been an issue for underdeveloped countries, which are often characterized by incurring high levels of debt to finance their expenditures. However, several developed and developing countries have also had solvency problems due to the 2008 global financial crisis and during the current COVID-19 crisis.

The second dimension, growth, refers to a fiscal policy which aims at sustaining economic growth. Generally, to sustain growth, governments should avoid budget imbalances while they maintain their debt below a specific level. In certain contexts, specific levels are defined by international organizations, and central governments are expected to comply with them. For example, in the European Union (EU) context, budget imbalances of member countries should be below 3% of the GDP, and gross debt should be below 60%. The basic idea supporting the growth dimension is that improving the economic condition of a country will guarantee higher tax revenues in the future because citizens and businesses will pay higher taxes on increased private income. This could pave the way for future budgetary maneuvers geared toward cutting taxes and/or increasing public investments to improve the well-being of future generations. This is the well-known Keynesian approach (Keynes, 1936), according to which deficits are considered suitable when the economic conditions of a country are adverse. One of the main implications is that budgets cannot be retained as a tool to manage short-term adjustments. They should be considered as part of a strategic plan to be managed in a pluri-annual horizon.

The third dimension, stability, expresses the capacity of a public-sector entity to meet future obligations with existing tax burdens. Taxes can be considered as a cost paid by households and private-sector entities for receiving services by governments; these services, in turn, are expected to improve living standards. Therefore, governments should not concern themselves about the increase of taxes (due to spending pressures), as a concurrent increase in living standards is expected to occur. Indeed, according to Wagner's (1912) law, an exponential curve should illustrate the trend of the ratio between public expenditure and national income, and services provided by the government is supposed to have a demand elasticity greater than 1. However, further studies have documented that this law does not take into account appropriately the social cost of distortionary taxation (Florio and Colautti, 2005), namely that the excess burden of taxation can function as a constraint to the supply of public services. Furthermore, it should also be considered the effects of reduced trust in government performance (Schick, 2005) due to corruption, inefficiencies and opportunistic behavior (Bisogno and Cuadrado-Ballesteros, 2021), coupled with the increase—occurred in many countries—of the tax burden (at times almost reaching 50%). Consequently, an increase in the tax burden to cover future expenditures should not be taken-for-granted, especially when considering that levels of expenditure generally tend to increase as well. Therefore, financial sustainability could be compromised in the future, and governments are required to pursue tax stability and, in a broader perspective that also considers the growth dimension, to maintain control over the fiscal balance.

The fourth dimension, fairness, refers to the capacity of a public-sector entity to satisfy current obligations without shifting the cost onto future generations. Despite its apparent simplicity and linearity, fairness is a complex concept to operationalize and measure. Heller (2003) observed that there is no single or universally accepted definition of fairness, and its evaluations across generations by policymakers could be arduous. Accordingly, Schick (2005) suggested interpreting fairness as a sort of social contract across generations. He claimed that disproportionate distributions of tax burdens and expenditure benefits would not be sustainable in economic and political terms, since the predominant need for tax rate (which tends to discourage work, investments and savings) could set back the wellbeing of the country, and future taxpayers could insurge against what they may perceive as confiscatory tax rates (Schick, 2005).

This study uses budget balance, tax burden, public indebtedness and economic growth to represent the first three dimensions, that is, solvency, growth and stability. These are the most relevant and measurable indicators to be considered as proxies for financial sustainability when presenting a holistic picture of this multifaceted concept. Fairness is not directly represented because it is very complicated to operationalize (Heller, 2003). Nevertheless, the four dimensions of sustainability (solvency, growth, stability and fairness) overlap, so the four indicators used here indirectly refer to fairness as well.

2.2 Budget transparency

Transparency is a broad term which has been used to point out various aspects of governmental activities. Consequently, different frameworks have been used and a risk of overlapping could result. Following Cucciniello *et al.* (2017), two approaches can be identified. The first one is based on the availability of information, which, in turn, refers to different issues such as budgetary or political matters, administrative procedures (Meijer *et al.*, 2012; Pina *et al.*, 2010) and operational issues (Tejedo-Romero and Araújo, 2018).

The second approach relies on the flow of information (Hollyer *et al.*, 2011; Kaufmann and Bellver, 2005), which means focusing on the relationship between a public-sector entity and its stakeholders. Transparency can therefore be investigated through both a horizontal dimension (people outside the organization can observe what is going on inside it and vice versa: outward and inward transparency, respectively) and a vertical dimension (from subordinates to superiors or vice versa: upward and downward transparency, respectively) (Heald, 2006, 2012).

Retaining these frameworks as a reference, budget transparency can be defined as the disclosure of full fiscal information in a timely and systematic way (OECD, 2002). Previous literature (Premchand, 1993; Kopits and Craig, 1998) defined budget transparency as the public availability of information regarding governments' decision procedures and transactions, emphasizing that information must be reliable, timely, understandable and internationally comparable. These characteristics allow the observation of the ways in which public affairs are conducted (Heald, 2012), which enables citizens to correctly assess the financial performance of governments (Rodríguez-Bolivar *et al.*, 2007) and to observe the strategies and results of governments' decisions (Alt and Lassen, 2006a, b).

Outward transparency has been particularly emphasized, considering citizens as the primary audience for information provided by public-sector entities. This is particularly important in the case of budget transparency due to the key role played by the budget in framing citizens' relationships with these types of organizations. Indeed, among the different forms of transparency—namely, administrative, political and budgetary—most previous studies have investigated budgetary transparency (Cucciniello *et al.*, 2017), making it clear how governments intend to collect and spend money and how they plan to disclose this kind of information.

Outward transparency also considers the outcome of budget transparency, examining its effects on both citizens and governments. In the first case, budget transparency is believed to improve citizens' participation as well as their trust in government (Orosz, 2002; Justice and Dülger, 2009; Harrison and Sayogo, 2014; Ríos *et al.*, 2017). In the second case, the focus is on accountability, involving what Michener (2019, p. 139) calls a "fixation on the transparency-as-a-means-to-accountability-and-participation paradigm".

As a result, other areas of research have been less vigorously investigated, for instance, financial management. Spending, debt and deficits are standard outcomes examined in the wider literature on budget transparency, but the macro results are unconclusive (De Renzio and Wehner, 2017; Alt, 2019). Alt and Lassen (2006a, b) noted larger deficits and debt levels in low-transparency countries. Similarly, Benito and Bastida (2009) document that higher levels of budget transparency reduce the possibility for politicians to use fiscal deficits to pursue opportunistic objectives, consequently improving financial management; these studies, however, found no evidence on debt levels. Blume and Voigt (2013) find neither association between budget transparency and government spending in the 1990s, although Alt and Lowry (2010) noted that increased transparency led to greater fiscal scale in the USA.

In such a situation, Anessi-Pessina *et al.* (2016) suggest investigating the relationship between budgeting and performance management more deeply, especially considering the managerial and the allocation function of budgeting. Accordingly, budgeting should not be regarded as an internal matter. Following Reddick *et al.* (2017), budget transparency should be oriented toward the creation of public value, and governments are required to ensure a good level of financial sustainability of the policies to be implemented as expressed through the budget.

3. Theoretical framework and research hypothesis

This study refers to the public value framework to investigate the association between budget transparency and financial sustainability. Broadly speaking, the concept of public value is based on the rights and benefits citizens should (and should not) be entitled to, the obligations of citizens to society and the state, and the principles on which governments and policies should be based (Bozeman, 2007). It can be expressed by referring to governments' ability to meet the needs of citizens (Spano, 2009), meaning that public value relates to what is perceived as good for the public, which must be then reflected in governmental performance (Steccolini, 2019). Relying on the pragmatic conception of the public interest as developed by Dewey (1927), the public value concept has been interpreted as a concrete tool to move from deliberation to action (Bozeman, 2007), namely—in the case investigated here—from budget approval to budget execution and related controls. In this vein, political participation, accountability and transparency are retained to be fundamental pillars in the public value discourse. Indeed, as Douglas and Overmans (2020) point out, public value principles can affect the budgeting process and its allocation, managerial and accountability functions.

The allocation function was usually conceived as the result of a political conflict, where different parties try to get as much money as possible. As a result, budgets tended to lose their connection with the objectives to be achieved (Rubin, 2010), which conversely are put at the heart of the budgeting process in the following (business-like) step, where budgets have been perceived as the result of a technocratic effort to associate spending and performance (Osborne and Gaebler, 1992). Under the public value framework, the allocation function is perceived as an attempt to go beyond the narrow aim of pursuing organizational objectives, to achieve collectively desired outcome, requiring more decision-making and more transparency (Douglas and Overmans, 2020).

The managerial function has traditionally received less attention (Schick, 2009), as budgets were managed through authorizing executive actors after formal approvals. Subsequently, the concept of performance budget was emphasized to underline the

importance of achieving output targets connected to the budget. The public value framework suggests adopting a broader perspective to involve more community actors (Posner *et al.*, 2009), which in its turn asks for more transparency in the management process (Douglas and Overmans, 2020).

The accountability function was initially based on formal checks to assess if money was spent correctly, namely in accordance with their dedicated line-items and following the prescribed procedures. Later on, according to the development of the managerial function, accountability started focusing on the outputs achieved, making it possible to discuss governments' performance and the value for money achieved. The public value framework tends to enrich further the accountability discourse (Gains and Stoker, 2009). Although this larger concept does not imply that a shared vision—regarding which values should be pursued—is automatically achieved (budgets remain based on political debates), a greater transparency level is required.

Transparency seems then to be the fil rouge that links the three budget functions, and scholars clearly state that transparency is "a condition for the creation of public value" (Douglas and Meijer, 2016, p. 941). Integrating public value into the budgeting process is believed to improve the transparency and clarity of the budget, facilitating balancing democratic requests with efficiency needs (Bracci *et al.*, 2019).

It is also worth observing that institutional and legal frameworks are implemented to reduce the propensity of politicians to partake in opportunistic activities (Cuadrado-Ballesteros *et al.*, 2019). Indeed, institutional expectations are assumed to be accommodated by public-sector organizations (Brandtner and Suárez, 2021), whose behaviors are responses to external pressure (DiMaggio and Powell, 1983; Meyer and Rowan, 1977; Powell and DiMaggio, 1991). In the same vein, politicians could be subjected to external pressure to disclose information, leading to the implementation of an open budget approach.

Following Barrett (2002), transparency is essential to ensure that public bodies are fully accountable. Therefore, being accountable and "opening" the budget could stimulate politicians to act in the interest of citizens by attempting to allocate public resources in the best possible way, which leads to better financial sustainability. In fact, gross disproportionate distribution of both tax burdens and expenditure benefits would not be acceptable, as they may lead to economic and political issues (Schick, 2005), as observed in Section 2.1. According to Reddick *et al.* (2017), budgeting and budget transparency should be oriented toward the creation of public value, preserving the well-being of both current and future generations through the financial sustainability of implemented policies.

A higher level of budget transparency should then reduce the propensity of politicians to use fiscal deficits and increase debt to pursue opportunistic goals (Benito and Bastida, 2009). Accordingly, the basic hypothesis this research intends to test is:

H1. A higher level of budget transparency is positively associated with the financial sustainability of governments.

4. Methods

4.1 Sample

The sample selection is determined by the availability of data about budget transparency, which have been retrieved from the IBP Website [1]. This is an independent non-profit organization, formerly a project of the Center on Budget and Policy Priorities. IBP works in collaboration with multiple actors (civil society, state actors, international institutions, and, most recently, the private sector) to empower citizens to participate in budgeting processes and to shape policies and practices that promote equity and justice on a sustainable basis (IBP, 2018).

IBP develops the Open Budget Survey to ranking a wide range of countries according to the amount and timeliness of budget information that governments make publicly available (De Renzio and Masud, 2011). This organization has published the results of the Open Budget Survey in the period 2006–2019, although with some gaps. Concretely, data are available for 2006, 2008, 2010, 2012, 2015, 2017 and 2019.

For this study, a sample of 110 countries has been chosen from which data regarding budget transparency are published on the Open Budget Surveys for 2008, 2010, 2012, 2015, 2017 and 2019 [2] (see Appendix). To deal with the gaps (2009, 2011, 2013, 2014, 2016 and 2018), there are two ways of working: firstly, scores may be interpolated for non-survey years, by using the mean value; secondly, the panel data may be considered unbalanced and using only the available information (Gelman and Hill, 2006). This issue is discussed in the next section.

Data concerning financial sustainability were obtained from the World Development Indicators (WDI) database, which is the primary World Bank collection of development indicators. These sustainability indicators refer to solvency, growth, tax stability and fairness, according to Schick (2005) and will be described in the following section. Given the sample of selected countries based on the available data on budget transparency, as many sustainability indicators as possible were selected from the data found in the World Bank database.

Furthermore, the results were controlled by other socioeconomic and political factors. The socioeconomic data were obtained from the WDI database; while data on political factors were obtained from the Database of Political Institutions (DPI), which presents institutional and electoral results data, such as measures of checks and balances, tenure and stability of the government, identification of party affiliation and ideology, and fragmentation of opposition and government parties in the legislature, among other factors (Cruz *et al.*, 2018).

4.2 Model and variables

This research uses the following model to test the relationship between budget transparency and financial sustainability:

$$\text{Sustainability}_{it} = \gamma + \lambda\,\text{Sustainability}_{it-1} + \alpha\,\text{OBI}_{it-1} + \beta\,\text{Controls}_{it} + \eta_i + \varepsilon_{it} \qquad (1)$$

In the model, i and t refer to each country and year, respectively; γ, λ, α and β are the parameters to be estimated; η_i refers to unobservable heterogeneity and ε_{it} is the classic disturbance term.

Sustainability refers to the financial sustainability of the central government, and it was operationalized by using four indicators, called Balance, Debt, Revenue and Growth. These indicators represent three of the four dimensions that contemporary literature employs to define sustainability (Schick, 2005), namely solvency, stability and growth, which focus on the ability of the government to pay its financial obligations as well as to meet its future obligations, maintaining control over the tax burdens and the fiscal balance while implementing fiscal policies that sustain economic growth. The fourth dimension, fairness (i.e. the capacity of governments to pay current obligations without shifting the cost to future generations), is complicated to operationalize, so it is not specifically represented here. However, as the four dimensions overlap, the four indicators used here (Balance, Debt, Revenue and Growth) indirectly refer to fairness as well. More explicitly:

(1) Fiscal balance (Balance) is calculated as central government revenue, minus expense and the net investment in nonfinancial assets, expressed as a percentage of the GDP. It represents two situations, namely, net lending (+) or net borrowing (−).

(2) Short-term debt (Debt) is a percentage of the total external debt of the central government. This is a proxy for solvency problems since the greater use of short-term debt implies having a greater amount of resources available in the short term to be able to face the volume of debt that matures in less than a year.

(3) Tax burden (Revenue) is represented by the ratio of central government revenue (excluding grants) to GDP, which will have to increase to finance commitments that will come due in the future. Revenue is cash receipts from taxes, social contributions and other revenue such as fines, fees, rent and income from property or sales.

(4) Economic development (Growth) is one of the main objectives of governments, but it should be sustainable, which means that governments should manage their finances prudently to assure future growth and well-being. Fiscal imbalance diminishes future growth, so economic growth could be used as a proxy for financial sustainability. Concretely, the GDP per capita growth is used here.

OBI represents the level of budget transparency of central government, by using the OBI published by the IBP. This index takes values between 0 and 100, from the lowest to the highest level of transparency. The scoring criteria is based on 92 questions that assess the amount and timeliness of budget information that governments make publicly available in eight key budget documents that every country should publish (De Renzio and Masud, 2011): Pre-Budget Statement, Executive's Budget Proposal, Enacted Budget, Citizens Budget, In-Year Report on financial situation, Mid-Year Review of financial situation, Year-End Report on financial situation and Audit Report. Additionally, as OBI has year gaps, the variable OBI_mean was created to fill the gaps and then being able to use a full dataset without missing values in the main indicator, that is OBI. Despite there are several techniques for this issue, the most traditional and classical method (Gelman and Hill, 2006) was used here, and each missing OBI value was replaced with the mean of the observed values [3] for that variable.

It must be considered that OBI has undergone adjustments in the survey questionnaire over time, especially in 2017, when the definition of "public availability" of documents changed to consider technological developments over the past decade. From 2017, only those budget documents that are posted on a relevant government website in a timely manner are now considered publicly available (IBP, 2017), while documents that were published in hard copy only in a timely manner were considered available in prior rounds. Nevertheless, for most countries included in the survey, that change had no effect on their 2017 scores or on the 2015–2017 comparisons (IBP, 2017).

Controls is the vector of the control variables, which represent different socioeconomic and political factors that affect levels of financial sustainability (Bisogno *et al.*, 2017). Socioeconomic characteristics refer to the whole economy, and political factors refer to the central government. Concretely, the number of inhabitants (Population), unemployment rate (Unemployment), natural resource wealth (Nat_resources), the level of freedom of the press (Media_free), government ideology (Left), the government fragmentation and political competition (Fragmentation and Votes), the electoral and pre-electoral moment (Elections) and the legal origin of company laws or commercial codes (Origin). Table 1 shows the definition and source of each variable.

4.3 Technique of analysis

Initially, the fixed- or random-effects (FE or RE) estimators could be used to estimate parameters γ, λ, α and β in the model. However, the two estimators require homoscedasticity and no serial correlated errors. So, these conditions were firstly tested by using the Breusch–Pagan test and the Wooldridge test, respectively. The p-values obtained are lower than 0.05,

Variable	Description	Source
Balance	Net lending (+)/ net borrowing (−) (% of GDP) Revenues minus expenses, minus net investments in nonfinancial assets	World Development Indicators (WDI) – World Bank Open Data
Debt	Short-term debt (% of total external debt) Debt having an original maturity of one year or less and interest in arrears on long-term debt. Total external debt is debt owed to non-residents repayable in currency, goods, or services	World Development Indicators (WDI) – World Bank Open Data
Revenue	Revenue, excluding grants (% of GDP) Cash receipts from taxes, social contributions and other revenues such as fines, fees, rent and income from property or sales. Grants are excluded here	World Development Indicators (WDI) – World Bank Open Data
Growth	GDP per capita growth (annual %). GDP per capita is the gross domestic product divided by midyear population. Data are in constant 2010 US dollars	World Development Indicators (WDI) – World Bank Open Data
OBI	Open Budget Index (0 = low to 100 = high) The Index assigns countries covered by the Open Budget Survey a transparency score on a 100-point scale using a subset of questions that assess the amount and timeliness of budget information that governments make publicly available in 8 budget documents in accordance with international good practice standards	International Budget Partnership (IBP)
Population	Total population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship	World Development Indicators (WDI) – World Bank Open Data
Unemployment	Unemployment, total (% of total labor force) Share of the labor force that is without work but available and seeking employment	World Development Indicators (WDI) – World Bank Open Data
Nat_resources	Total natural resources rents (% of GDP) Total natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents and forest rents	World Development Indicators (WDI) – World Bank Open Data
Media_free	Press Freedom index measures the amount of freedom journalists and the media have in each country. With the exception of the year 2012, the index ranges between 0 (total press freedom) and 100 (no press freedom). However, for the 2012 data scale was changed, so that negative values can be and indeed are assigned to countries with more press freedom. We have decided to leave the data as is	Quality of Government Dataset (QoG)
Left	Dummy variable that takes the value 1 is the government is defined as communist, socialist, social democratic, or left-wing; and 0 otherwise	Database of Political Institutions (DPI)
Elections	Dummy variable that takes the value 1 if there was an executive election in this year and the year prior to an election; and 0 otherwise	Database of Political Institutions (DPI)
Fragmentation	The probability that two deputies picked at random from among the government parties will be of different parties	Database of Political Institutions (DPI)
Votes	Vote share of all government parties	Database of Political Institutions (DPI)
Origin	Dummy variable that takes the value 1 for common-law countries; and 0 otherwise	Database of Political Institutions (DPI)

Table 1.
Description of variables

which means that the null hypotheses of homoscedastic errors, and no serially correlated errors must be rejected. Thus, neither FE nor RE estimators are appropriate in this case.

In addition, endogeneity problems also appear in the model for three reasons (Wooldridge, 2010): (1) the use of proxy variables to represent concepts that are difficult to represent because they are not directly observed, such as OBI; (2) results could be controlled by additional variables (e.g. inflation, population density, dependency ratio, immigration, education level, quality of life, etc.) but have been omitted due to multicollinearity problems with other control variables, especially with OBI (Alcaide Muñoz *et al.*, 2017); and (3) there is reverse causality because it may be that fiscal situation impacts on transparency, for governments will be more transparent when fiscal outcomes are better. Furthermore, the model is autoregressive, so endogeneity is obviously a problem in this case.

Endogeneity should be addressed, by using instrumental variables (IV) methods, but, in the presence of heteroscedasticity (which is the case in this dataset), the conventional IV estimator is consistent but inefficient (Baum *et al.*, 2003). So, the model was estimated using the Generalized Method of Moment (GMM) of Arellano and Bover (1995), which uses the lagged values of endogenous and predetermined variables as instruments to correct endogeneity. It has been demonstrated that these instruments are uncorrelated with the error term (Arellano and Bond, 1991), and they usually contain better information on the current value of the variable than outside instruments.

However, this approach may lead to a proliferation of instruments. A higher number of instruments increases the efficiency of the estimator (Arellano and Bond, 1991); however, if the number of instruments is excessively high (overidentification), this can negatively affect the consistency of the estimates and the reliability of the specification tests (Bontempi and Mammi, 2015). Accordingly, instrument validity is tested with the Hansen test, under the null hypothesis that "the over-identifying restrictions are valid". In addition, this estimator requires the condition of no correlation in the error term (Cameron and Trivedi, 2009). To check this condition, we use the Arellano-Bond test for AR(2) of first differences, under the null hypothesis of "no serial correlation between the error terms". The results of these tests are shown at the bottom of the table of results.

5. Results

5.1 Descriptive analysis

Table 2 illustrates the descriptive statistics for all the variables used in this study. The mean value of Balance suggests a situation of fiscal deficit, on average, although there are huge differences in the sample: Timor-Leste shows the maximum values until 2014, but it also shows the minimum value (−52.52%) in 2016. The mean value of Debt suggests that short-term debt is about 13% of the total external debt, on average. This value rises to 84.37% in Timor-Leste in 2012, while other countries show a percentage near 0, like Burkina Faso, Lesotho, Liberia, Nigeria and Senegal.

Revenue is about 26.4% of the GDP, on average. Timor-Leste had the highest level (341.52% in 2012), and Myanmar showed the lowest value (26.40% in 2018). The last proxy for financial sustainability considered in this study is the GDP (per capita) growth, which is 1.91%, on average. The country in the sample with the lowest GDP growth is South Sudan (−47.59% in 2012), while Afghanistan shows the highest growth rate (18.52% in 2009).

Regarding the budget transparency indicator (OBI), the mean value is 43.18 in a range of 0–100, suggesting that, in general, sample countries show a low level of budget transparency. The variable OBI_mean, which was artificially created by assigning the mean value to between the years prior and after each gap, shows similar descriptive statistics to OBI. New Zealand has the best situation (OBI = 93 in 2012), while some countries show the lowest value (OBI = 0), like Chad, Equatorial Guinea, Qatar and Sudan. In general, levels of budget

Variable	Mean	Std. Dev	Min	Max
Balance	−1.4239	14.6691	−52.52	236.56
Debt	12.9905	12.2267	0	84.37
Revenue	26.4075	21.3014	6.68	341.52
Growth	1.9108	3.9943	−47.59	18.52
OBI	43.1826	23.7822	0	93
OBI_mean	43.2108	23.3738	0	93
Population	59,800,000	180,000,000	171,120	1,400,000,000
Unemployment	7.2517	5.3760	0.11	28.47
Media_free	33.4623	18.0728	−10	136
Nat_resources	8.4259	10.6699	0	62.73
Left	0.5464	0.4983	0	1
Elections	0.2721	0.4522	0	2
Fragmentation	0.2183	0.2645	0	0.9125
Votes	26.1191	29.5115	0	100.01
Origin	0.3222	0.4675	0	1

Table 2.
Descriptive statistics

transparency improved since 2008, as Figure 1 illustrates, although the overall score lowered in 2017 because some countries saw their ratings reduced, such as Venezuela, Yemen, Niger and Lesotho; OBI value of these countries fell to 0 in 2017. In 2019, the OBI value increased again, especially in some countries, like Vietnam and Zimbabwe, where the OBI increase more than 100% between 2017 and 2019.

Finally, Table 2 also shows the descriptive statistics of the rest of the control variables and Table 3 shows the bivariate correlations between the explanatory variables used in this study. In general, independent/control variables are not strongly correlated, i.e. in descriptive terms most of the correlation coefficients are less than 0.5, which is the accepted threshold for multicollinearity problems (Wooldridge, 2010). Nevertheless, two variables seem to be problematic, with correlations close to 0.5; Media_free and Nat_resources are highly correlated with OBI. In such a situation, the Variance Inflation Factors (VIF) [4] are calculated, being lower than 5 in all cases (the highest VIF is 2.65). So, it can be concluded that there are not multicollinearity problems.

5.2 Exploratory analysis

Table 4 exhibits the empirical results of the model. Each equation shows the association between OBI and each dependent variable that represents the financial sustainability of government: Balance, Debt, Revenue and Growth. The *p*-values of Arellano-Bond test for AR(2) and Hansen test do not allow rejecting the null hypothesis of "no serial correlation between the error terms" and "the over-identifying restrictions are valid". Therefore, instruments are valid to control endogeneity, although results should not be interpreted in terms of a strict causal link, but they illustrate the relationship between budget transparency and financial sustainability.

In every equation, the first-order lag of the dependent variable can be observed, since the model is autoregressive (i.e. the response variable in the previous period is a predictor). This lag is statistically relevant in all the equations, being positive in all the cases, except in the case of Growth since its coefficient is negative.

OBI is statistically relevant in all the equations. In the first one, the coefficient is positive, meaning that budget transparency is positively associated with the fiscal balance (in other words, it is negatively associated with the deficits). In the second equation, OBI has a negative coefficient, indicating that the higher the level of budget transparency, the lower the level of public indebtedness. These two results suggest that budget transparency could be a good

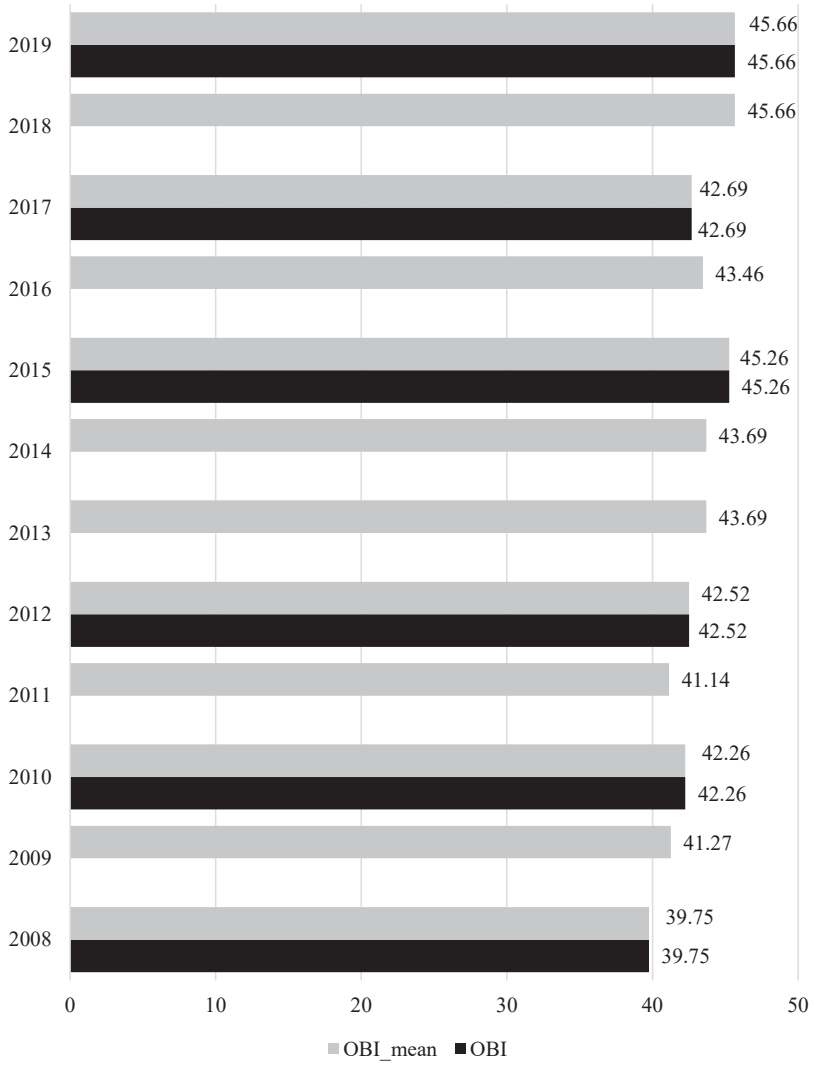

Figure 1.
OBI evolution (2008–2019)

tool to improve government solvency by reducing fiscal deficits and decreasing the use of short-term debt.

In equation (3) (Table 4), OBI is positively linked with Revenue, which means that a higher degree of open budget is associated with (and can, therefore, contribute to explain) a higher level of public revenue. Budget transparency could be a strategy to demonstrate the use of resources that are provided by citizens (through taxes, fees, social contributions, etc.). This legitimizes governments to increase fiscal pressure if the use of these resources is accountable and transparent.

Finally, the last equation shows a positive relationship between OBI and Growth. Accordingly, it could be ascertained that budget transparency is positively associated with the national economic growth, meaning that governments are managing their finances

Table 3.
Bivariate correlations

	OBI	OBI_mean	Population	Unemployment	Media_free	Nat_resources	Left	Elections	Fragmentation	Votes	Origin
OBI	1										
OBI_mean	1***	1									
Population	0.1401***	0.1432***	1								
Unemployment	0.1272**	0.141***	−0.195***	1							
Media_free	−0.4953***	−0.4988***	0.3024***	−0.1396***	1						
Nat_resources	−0.4122***	−0.4109***	−0.0824**	−0.1476***	0.2883***	1					
Left	−0.1521*	−0.1594***	0.0613	−0.0117	0.0697†	0.1881***	1				
Elections	0.0732	0.0068	−0.03	−0.0008	−0.0163	0.0263	0.013	1			
Fragmentation	0.1716***	0.1643***	0.0308	−0.0475	−0.1479***	−0.0214	−0.0805†	−0.0352	1		
Votes	0.1582***	0.171***	−0.1182***	0.1501***	−0.1352***	−0.1085***	0.013	0.0093	−0.0531†	1	
Origin	0.1148*	0.1162***	0.0605*	0.0286	−0.0571†	0.0342	−0.0156	−0.0759*	−0.1702***	−0.1356***	1

Note(s): ***$p < 0.001$; **$p < 0.1$; *$p < 0.05$; †$p < 0.10$

Table 4.
Effect of *OBI* on financial indicators

	Eq (1) Balance		Eq (2) Debt		Eq (3) Revenue		Eq (4) Growth	
	Coef	Std. Err	Coef	Std. Err	Coef	Std. Err	Coef	Std. Err
$Balance_{t-1}$	0.1644***	0.0284						
$Debt_{t-1}$			0.5696***	0.0213				
$Revenue_{t-1}$					0.6802***	0.0477		
$Growth_{t-1}$							−0.2660***	0.0488
OBI_{t-1}	0.1051***	0.0114	−0.0486*	0.0229	0.2206***	0.0340	0.0377*	0.0183
$Population_t$	−4.5725***	1.0215	2.2402†	1.1590	−1.1136	1.2849	4.0113**	1.1718
$Unemployment_t$	−0.2213*	0.0851	0.4628***	0.0698	0.0275	0.1395	−0.6056***	0.0926
$Media\_free_t$	0.1683***	0.0212	0.1489**	0.0484	−0.0510	0.0299	−0.1445***	0.0176
$Nat\_resources_t$	0.1469***	0.0183	−0.1472†	0.0816	0.1217*	0.0499	0.0849*	0.0402
$Left_t$	0.7797**	0.2040	2.9345**	0.8311	1.2735**	0.3889	0.1905	0.3000
$Elections_t$	−0.8131*	0.2987	0.9556	0.8716	−0.0318	0.3722	−0.0642	0.3531
$Fragmentation_t$	0.9560	1.3078	2.2699	2.6799	2.0930	1.7544	4.8176*	2.1933
$Votes_t$	0.0418***	0.0090	−0.0214†	0.0115	0.0367	0.0226	−0.0003	0.0193
$Origin_t$	0.0483	0.6342	−2.2630†	1.2394	−2.6865**	0.7918	−2.0549†	1.0755
Constant	2.0159**	0.7005	−1.7259*	0.7835	3.0957	9.2276	−2.1021*	0.8381
Arellano-Bond test for AR(2)	$Pr > z = 0.531$		$Pr > z = 0.693$		$Pr > z = 0.347$		$Pr > z = 0.426$	
Hansen test	$Pr > \chi^2 = 0.263$		$Pr > \chi^2 = 0.430$		$Pr > \chi^2 = 0.344$		$Pr > \chi^2 = 0.468$	
Observations	113		121		125		161	
Num. instruments	37		39		37		39	

Note(s): ***$p < 0.001$; **$p < 0.1$; *$p < 0.05$; †$p < 0.10$
Arellano-Bond test for AR(2) of first differences. The null hypothesis is "no serial correlation between the error terms"
Hansen test of overidentifying restrictions. The null hypothesis is "the over-identifying restrictions are valid"

prudently because, if they did not, growth would not be sustainable in the long run. Findings arising from the four explanatory variables are in accordance with the proposed hypothesis, indicating that budget transparency is positively connected with financial sustainability.

Table 4 also includes the coefficients of the control variables.

Regarding socioeconomic variables, Population and Unemployment are negatively related with financial sustainability because they impact negatively on Balance and positively on Debt and Growth. The variable press freedom is positively associated with Balance and Debt but negatively with Growth. Considering that Media_free ranges between 0 (total press freedom) and 100 (no press freedom), the negative links with the former variables suggest that countries with lower levels of press freedom show higher levels of deficits and higher levels of indebtedness. Furthermore, the negative link between Media_free and Growth suggests that press freedom positively contributes to economic growth, since the press may reduce the gap between the government and the general public due to the information flow, thereby helping in the implementation of policies effectively and more efficiently (Alam and Ali Shah, 2013). So, we may conclude that press freedom is positively associated with the financial sustainability. In addition, Nat_resources variable is positively associated with Balance, Revenue and Growth and negatively with Debt. Therefore, it could be presumed that financial sustainability would be better in countries with larger rents from natural resources, even though in the long run, they might be vulnerable to depletion.

Regarding political factors, ideology is statistically relevant in the second and third equations. Concretely, the coefficients of Left are positive, indicating that left-wing governments tend to use more debt and taxes than other governments, probably because they are more oriented toward providing services through public resources. This could explain the positive link with Balance, suggesting a better financial position of countries governed by left-wing parties. The electoral moment is statistically relevant in equation (1) and coefficient is negative, suggesting that deficits are more probable when an election is close to be held. Government fragmentation and political competition are not so relevant. Fragmentation is positively associated with the economic growth; and Votes is positively associated with Balance; but they are not statistically relevant in the rest of equations.

Table 5 exhibits the empirical results of the model by using OBI_mean as independent variable. This allows to increase the number of observations because OBI has no missing values, so the sample covers the whole period (2008–2019) without gaps. The results are like those obtained previously in Table 4: OBI is positively associated with Balance, Revenue and Growth, but it is negatively related with the level of short-term debt.

6. Discussion and conclusive remarks

The results that emerge from the analysis suggest that budget transparency is positively associated with the financial sustainability of governments. Therefore, illustrating how governments intend to both collect and spend resources in a transparent way is pivotal to their relationship with citizens, according to the outward perspective (Cucciniello *et al.*, 2017; Heald, 2006, 2012). Our findings are consistent with those of Benito and Bastida (2009), whose study evidenced that higher levels of budget transparency may reduce the possibility for politicians to use fiscal deficits to achieve opportunistic objectives. This also emphasizes how important it is investigating budgeting and its transparency in connection with the sustainability of governmental policies. Budgets cannot be hidden away in an ivory tower, as they play a central role in creating value for citizens (Reddick *et al.*, 2017).

Integrating public value into the budgeting process emphasizes the importance of budgets' transparency, helping to balance democratic requests with efficiency needs (Bracci *et al.*, 2019). From a theoretical perspective, therefore, this research merges two streams of public administration literature. It enriches the literature concerning budget transparency, as

	Eq (1) Balance		Eq (2) Debt		Eq (3) Revenue		Eq (4) Growth	
	Coef	Std. Err	Coef	Std. Err	Coef	Std. Err	Coef	Std. Err
$Balance_{t-1}$	0.0931**	0.0288						
$Debt_{t-1}$			0.5742***	0.0330				
$Revenue_{t-11}$					0.5730***	0.0455		
$Growth_{t-1}$							−0.0096	0.0265
OBI_{t-1}	0.1189***	0.0175	−0.1500**	0.0412	0.1565***	0.0232	0.2104***	0.0335
$Population_t$	−2.5280*	1.1906	1.1945	1.7420	−1.2425	1.0828	3.5281†	2.0444
$Unemployment_t$	−0.2267**	0.0611	0.5682**	0.1768	0.4029***	0.0904	−0.4652***	0.1028
$Media\_free_t$	0.1170***	0.0157	0.0727***	0.0180	0.0128*	0.0054	−0.0150	0.0172
$Nat\_resources_t$	0.1102***	0.0270	−0.0333	0.0757	−0.0405	0.0450	0.3948***	0.0484
$Left_t$	1.1999***	0.2409	3.4876**	1.1887	−0.0444	0.3220	−0.1803	0.4815
$Elections_t$	−1.1027***	0.1590	0.2832	0.4174	−1.0627***	0.1759	−0.3177	0.2675
$Fragmentation_t$	5.7279**	1.7505	4.9847	4.7840	0.2777	1.2795	4.2155†	2.4158
$Votes_t$	0.0252**	0.0088	−0.0633*	0.0253	0.0348*	0.0169	−0.0116	0.0173
$Origin_t$	−0.3885	0.5766	−1.7416	1.1156	−2.6105***	0.5063	−4.4996***	1.0465
Constant	5.2925	8.2370	−3.5920	13.6376	7.9143	7.6693	−3.1542*	1.5230
Arellano-Bond test for AR(2)	$Pr > z = 0.345$		$Pr > z = 0.432$		$Pr > z = 0.150$		$Pr > z = 0.111$	
Hansen test	$Pr > \chi^2 = 0.445$		$Pr > \chi^2 = 0.537$		$Pr > \chi^2 = 0.353$		$Pr > \chi^2 = 0.134$	
Observations	270		274		294		374	
Num. instruments	40		32		40		40	

Note(s): ***$p < 0.001$; **$p < 0.1$; *$p < 0.05$; †$p < 0.10$
Arellano-Bond test for AR(2) of first differences. The null hypothesis is "no serial correlation between the error terms"
Hansen test of overidentifying restrictions. The null hypothesis is "the over-identifying restrictions are valid"

Table 5.
Effect of OBI_mean on financial indicators

it proposes a broader approach, going a step beyond the classic perspective that connects transparency with accountability and participation (Michener, 2019). Interpreted in light of the public value framework, the budget allocation function suggests going beyond narrow organizational goals to pursue collectively desired outcome, to be expressed through the budget. Similarly, the managerial budget function asks for more transparency in the management process. Public values, affecting the budgeting process and its functions (Douglas and Overmans, 2020), are expected to be reflected in governmental performance (Steccolini, 2019). Accordingly—and adhering to the call by Anessi-Pessina *et al.* (2016) to examine the relationship between budgeting and performance management in greater depth—this study explored the association between budget transparency and financial sustainability by considering different dimensions, also proposing a comparative approach by investigating a large sample consisting of both developed and developing countries.

This study also has practical implications. While implementing reforms to embrace the "openness" movement aimed at improving budget transparency levels, politicians and managers should consider not only the effects on citizens' trust and participation. They should also pay attention to the link that budget transparency can have on the financial sustainability of governments. Therefore, this study contributes to the growing literature on governmental transparency (Cucciniello *et al.*, 2017) by illustrating that improving transparency levels could be beneficial for public administrations. This is an important insight for policy areas, which suggests that improving transparency is not (only) a window-dressing policy, but it is also related to financial sustainability.

There are three reasons to advise caution in drawing firm conclusions from our findings. First, the relationship between budget transparency and financial sustainability should not be interpreted in terms of a strict causal relationship, as it expresses more an association. Second, financial sustainability is a complex concept which is not easy to observe directly, and it can be operationalized by using different indicators (Zafra-Gómez *et al.*, 2009). Therefore, future research could investigate the effects of budget transparency on financial sustainability by utilizing different approaches. Third, we have indicated previously that OBI has undergone adjustments in the survey questionnaire over time, especially in 2017. Since that year, only those budget documents that are posted on a relevant government website in a timely manner are considered "publicly available" (IBP, 2017). Nevertheless, for most countries included in the survey, that change has no effect on their 2017 scores or on the 2015–2017 comparisons (IBP, 2017). So, findings that arise from this study are consistent, although this adjustment in the methodology should be considered by readers. Fourth, the sample includes developing as well as developed and transition economies. Although the effects due to different economic development is implicitly captured by variables included in our model (e.g. Growth), it could be interesting to investigate in future research whether the association between budget transparency and financial sustainability differs because of the different development stage of each country.

Furthermore, a promising future research area could consist of investigating the effects of budget transparency on internal organizational routines and decision-making processes. Then, it could be interesting to investigate these effects by considering the viewpoint of politicians and managers, using a case-study approach based on interviews and questionnaires.

Notes

1. https://www.internationalbudget.org.
2. Although there are also data in 2006, the number of countries is reduced in comparison with the rest of years. OBI covers 59 countries in 2006; 84 countries in 2008; 94 countries in 2010; 100 countries in 2012; 102 countries in 2015; 115 in 2017; and 117 in 2019.

3. OBI 2009 is the mean value between OBI 2008 and OBI 2010; OBI 2011 is the mean value between OBI 2010 and OBI 2012; OBI 2013 is the mean value between OBI 2012 and OBI 2015 because OBI 2014 is not available; OBI 2014 is the mean value between OBI 2012 and OBI 2015 because OBI 2013 is not available; OBI 2016 is the mean value between OBI 2015 and OBI 2017; OBI 2018 is the mean value between OBI 2017 and OBI 2019.
4. VIF values range from 1 upwards, showing that the percentage of the variance is inflated for each coefficient because it is correlated with other predictors, causing multicollinearity. In general, VIF values higher than 5 suggest the existence of high correlations between predictors and then multicollinearity problems. The VIF values results are not shown here, but they are available under request.

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(The Appendix follows overleaf)

Appendix

Country	OBI 2008	OBI 2010	OBI 2012	OBI 2015	OBI 2017	OBI 2019
1. Afghanistan	x	x	x	x	x	x
2. Albania	x	x	x	x	x	x
3. Algeria	x	x	x	x	x	x
4. Angola	x	x	x	x	x	x
5. Argentina	x	x	x	x	x	x
6. Australia					x	x
7. Azerbaijan	x	x	x	x	x	x
8. Bangladesh	x	x	x	x	x	x
9. Benin			x	x	x	x
10. Bolivia	x	x	x	x	x	x
11. Bosnia and Herzegovina	x	x	x	x	x	x
12. Botswana	x	x	x	x	x	x
13. Brazil	x	x	x	x	x	x
14. Bulgaria	x	x	x	x	x	x
15. Burkina Faso	x	x	x	x	x	x
16. Burundi					x	x
17. Cambodia	x	x	x	x	x	x
18. Cameroon	x	x	x	x	x	x
19. Canada					x	x
20. Chad	x	x	x	x	x	x
21. Chile		x	x	x	x	x
22. China	x	x	x	x	x	x
23. Colombia	x	x	x	x	x	x
24. Comoros					x	x
25. Congo Democratic Republic	x	x	x	x	x	x
26. Costa Rica	x	x	x	x	x	x
27. Cote d'Ivoire					x	x
28. Croatia	x	x	x	x	x	x
29. Czech Republic	x	x	x	x	x	x
30. Dominican Republic	x	x	x	x	x	x
31. Ecuador	x	x	x	x	x	x
32. Egypt	x	x	x	x	x	x
33. El Salvador	x	x	x	x	x	x
34. Equatorial Guinea	x	x	x	x	x	x
35. Fiji	x	x	x	x	x	x
36. France	x	x	x	x	x	x
37. Georgia	x	x	x	x	x	x
38. Germany	x	x	x	x	x	x
39. Ghana	x	x	x	x	x	x
40. Guatemala	x	x	x	x	x	x
41. Honduras	x	x	x	x	x	x
42. Hungary				x	x	x
43. India	x	x	x	x	x	x
44. Indonesia	x	x	x	x	x	x
45. Iraq		x	x	x	x	x
46. Italy		x	x	x	x	x
47. Japan					x	x

Table A1.
Sample countries

(*continued*)

Country	OBI 2008	OBI 2010	OBI 2012	OBI 2015	OBI 2017	OBI 2019
48. Jordan	x	x	x	x	x	x
49. Kazakhstan	x	x	x	x	x	x
50. Kenya	x	x	x	x	x	x
51. Kyrgyzstan	x	x	x	x	x	x
52. Lebanon	x	x	x	x	x	x
53. Lesotho					x	x
54. Liberia	x	x	x	x	x	x
55. Madagascar					x	x
56. Malawi	x	x	x	x	x	x
57. Malaysia	x	x	x	x	x	x
58. Mali		x	x	x	x	x
59. Mexico	x	x	x	x	x	x
60. Moldova					x	x
61. Mongolia	x	x	x	x	x	x
62. Morocco	x	x	x	x	x	x
63. Mozambique		x	x	x	x	x
64. Myanmar			x	x	x	x
65. Namibia	x	x	x	x	x	x
66. Nepal	x	x	x	x	x	x
67. New Zealand	x	x	x	x	x	x
68. Nicaragua	x	x	x	x	x	x
69. Niger	x	x	x	x	x	x
70. Nigeria	x	x	x	x	x	x
71. Norway	x	x	x	x	x	x
72. Pakistan	x	x	x	x	x	x
73. Papua New Guinea	x	x	x	x	x	x
74. Paraguay					x	x
75. Peru	x	x	x	x	x	x
76. Philippines	x	x	x	x	x	x
77. Poland	x	x	x	x	x	x
78. Portugal		x	x	x	x	x
79. Qatar			x	x	x	x
80. Romania	x	x	x	x	x	x
81. Russia	x	x	x	x	x	x
82. Rwanda	x	x	x	x	x	x
83. Sao Tome and Principe				x	x	x
84. Saudi Arabia	x	x	x	x	x	x
85. Senegal	x	x	x	x	x	x
86. Serbia	x	x	x	x	x	x
87. Sierra Leone			x	x	x	x
88. Slovakia		x	x	x	x	x
89. Slovenia	x	x	x	x	x	x
90. South Africa	x	x	x	x	x	x
91. South Sudan					x	x
92. Spain		x	x	x	x	x
93. Sri Lanka	x	x	x	x	x	x
94. Sudan	x		x	x	x	x
95. Sweden	x	x	x	x	x	x
96. Tajikistan			x	x	x	x
97. Thailand	x	x	x	x	x	x
98. Timor-Leste		x	x	x	x	x
99. Trinidad and Tobago	x	x	x	x	x	x
100. Tunisia			x	x	x	x

(*continued*)

Table A1.

Table A1.

Country	OBI 2008	OBI 2010	OBI 2012	OBI 2015	OBI 2017	OBI 2019
101. Turkey	x	x	x	x	x	x
102. Uganda	x	x	x	x	x	x
103. UK	x	x	x	x	x	x
104. Ukraine	x	x	x	x	x	x
105. USA	x	x	x	x	x	x
106. Venezuela	x	x	x	x	x	x
107. Vietnam	x	x	x	x	x	x
108. Yemen	x	x	x	x	x	x
109. Zambia	x	x	x	x	x	x
110. Zimbabwe			x	x	x	x

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