



Why choosing IFRS? Benefits of voluntary adoption by European private companies

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ABSTRACT

In 2005, International Financial Reporting Standards (IFRS) have been legally adopted by listed firms to facilitate the harmonization of accounting practices. However, IFRS remain an option for non-listed firms in some countries. We investigate whether European privately held firms can raise more debt when they voluntarily report their consolidated financial information according to IFRS rather than local accounting rules. Using fixed effects regressions on 8391 firms in 22 European Union (EU) countries from 2005–2018, we document that IFRS adoption leads to more private debt issue for non-listed firms. This accounting option could be particularly useful for opaque firms or firms located in common law countries. Our results contribute to the debate on European accounting policy for non-listed firms.

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1. Introduction

The choice of accounting practice is crucial for firms, because it can affect their business and financing policies. Companies that are expanding their operations across borders may opt for international accounting standards to achieve comparability, whereas companies that issue equity on foreign stock exchanges may opt for local accounting practices to meet listing requirements.

International Financial Reporting Standards (IFRS) have been legally adopted since 2005 in more than 130 countries, to facilitate the harmonization and development of financial markets. In the European Union (EU), IFRS are mandatory for the consolidated accounts of listed entities; they are optional for non-listed firms (Brébisson and Alphonse, 2018). In the majority of EU member states, non-listed companies can opt to produce their consolidated financial statements in IFRS to satisfy either shareholders' or creditors' needs, following the IFRS Conceptual Framework (International Accounting Standards Board [IASB, 2010]). Literature that studies the consequences of mandatory IFRS adoption by listed firms highlights significant benefits for firms. It documents

positive and significant capital market reactions to the implementation of IFRS, this reaction depending on the enforcement regime (Armstrong et al., 2010; Li, 2010; Byard et al., 2011; Brüggemann et al., 2013; De George et al., 2016).

However, literature remains relatively scarce with regard to privately held groups, highlighting for example an improvement in accounting quality for voluntary or early adopters, that is, entities that anticipate the application of future rules (Christensen et al., 2015).

In this study, we investigate private firms' benefits when using IFRS. On the one hand, these standards may be required by investors, either for valuation purposes in the context of Initial Public Offerings (IPOs) or private-equity issues. On the other hand, lenders may request these standards for contracting reasons (i.e., to provide debt).

Although literature has studied listed firms' voluntarily anticipation of the mandatory use of IFRS, it is not clear about why non-listed entities might opt for IFRS. Accordingly, we focus on non-listed companies opting for IFRS in their financial reporting to explore the standards' consequences on firms' access to debt. Our intuition is that IFRS can help private firms to reduce their natural opacity, and thus increase the debt access. We examine debt ratios of privately held companies located in Europe from 2005–2018. Using a fixed effects regression on panel data, we show that levels of debt weight in capital structures increase when firms

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use IFRS instead of local Generally Accepted Accounting Principles (GAAP). The results suggest that IFRS facilitate credit access for non-listed firms, especially firms in weak informational environments, and firms that are younger, smaller and less tangible, hence more opaque. Our results are robust to different specifications, as well as to the use of matching methodology.

This article contributes to existing literature on the impact of IFRS adoption on firms' access to funds. In addition to the large amount of literature dedicated to the impact of IFRS adoption on capital markets, there is a growing stream of literature that seeks to understand the standards' impacts on the credit market. Ball et al. (2008) claim that the selection of accounting standards is influenced more by credit market expectations than capital market expectations. Florou and Kosi (2015) study whether IFRS facilitate debt access to listed entities; they find that such entities are more likely to issue public debt than private debt. de Lima et al. (2018) also work on the credit market; they conclude that firms using IFRS have better access to debt, but they focus on Brazil, where IFRS are mandatory. By studying the credit market rather than the capital market, we add to the debate on the general impact of IFRS adoption. Moreover, debt financing is one of the major sources of funds for companies.

Our analysis also adds to the debate on firms' motivations to change their accounting standards. Most accounting research assesses the impact of IFRS on firms' communication and valuation, cost of capital, loan contracts, and relationships with investors, in a context of mandatory adoption (Wu and Zhang, 2014; Florou et al., 2017). We complement these insights by considering the case of private companies in Europe as a unique setting of non-mandated firms that opt for IFRS. These firms may be less constrained in terms of communication, because they have the freedom to publish their financial information in either local or international sets of accounts. By describing the benefits of using IFRS for private companies, we can improve understanding of the role of accounting standards and contribute to the debate on the objectives of financial information.

Finally, working on private entities adopting IFRS, we add to regulatory debates at both the European and national levels. After the adoption of IFRS by listed companies, the EU debated whether to adopt the IFRS for Small- and Medium-sized Enterprises (SMEs) and for other entities. The EU finally adopted the 34th Directive in 2013, establishing a list of common accounting principles to support the harmonization of local rules (André, 2017). However, non-listed companies can still choose whether to adopt the full IFRS set of standards. Therefore, the reasons for their choices must be clarified to provide accounting authorities at both at the European and national levels with a clear framework to design future accounting regulations.

The remainder of this article is organized as follows: Section 2 reviews literature; Section 3 presents our hypothesis, data and methodology; Section 4 develops our results and our robustness tests while Section 5 concludes.

2. Literature Review

2.1. IFRS mandatory adoption: objective and impact for listed firms

In Europe, Regulation (EC) No 1606/2002 mandates listed groups to publish their consolidated accounts in IFRS. Each member state is free to expand the use of IFRS to other types of entities. Multiple countries have given private groups the option to choose between local GAAP and IFRS for their consolidated reporting. This reform is part of a movement to adopt international standards for some or all entities in more than 130 countries. The common

objective of adopting countries is to reduce information asymmetries between issuers and funds providers, through both improved reporting quality and enhanced comparability between issuers, in particular for cross-country operations.¹ El-Gazzar et al. (1999) investigate the objectives of firms that voluntarily adopt International Accounting Standards (IAS); they argue that implementing IAS not only enhances cross-border trade and financing but also provides creditors with a better understanding of foreign firms' credit risks. Their conclusions emphasize the importance of clarifying and harmonizing firms' accounting disclosure policies to increase transparency, decrease financial reporting opacity, and support firms' activities. Bushman and Smith (2001) argue that the opacity surrounding financial accounting information affects firms' cost of equity. When the accounting information is of better quality, it reduces the information asymmetry between firms' managers and investors leading to a lower cost of equity (Bhattacharya et al., 2003) or a better access to debt (Berger and Udell, 1995). Beneish et al. (2015) show that IFRS adoption improves the quality of financial reporting more than the comparability in equity and bond markets. However, the quality of financial reporting relies on managers' reporting incentives and accounting enforcement, which may differ from one country to another (Christensen et al., 2007; Barth et al., 2008; Fox et al., 2013). For example, Jeanjean and Stolowy (2008) show that the pervasiveness of earnings management has not declined in Australia and in the United Kingdom; in France, it actually increased during the first year of IFRS adoption. Christensen et al. (2015) run a single-country analysis to evaluate the impact of IFRS adoption on accounting quality changes; they focus on Germany, where IFRS were allowed for listed firms and were common before becoming compulsory. The authors show that firms with close relationships with their lenders have less incentives to adopt more comprehensive sets of rules. Berger and Udell (1995) show that even if a long-term relationship helps mitigating the opacity that may exist between a borrower and a bank, this information asymmetry issue does not fully disappear and the borrower may still have an incentive to provide the bank with financial statements of good accounting quality. Although literature provides evidence that IFRS adoption improves the quality of reporting mainly for companies with specific incentives (Daske et al., 2013) or in effective legal environments (Christensen et al., 2013), some studies show the opposite. de Lima et al. (2018) analyze the case of Brazil; they emphasize that the impact of IFRS is all the more important there, because the country suffers low levels of law enforcement and credit protection. Overall, literature emphasizes the impact of individual and institutional incentives on the benefit for companies using IFRS (Ball et al., 2000).

Furthermore, previous studies document positive and significant capital market reactions to the implementation of IFRS and find that enforcement regimes have a strong influence (Li, 2010; Brüggemann et al., 2013). Armstrong et al. (2010) run an event study of European stock exchanges between 2002 and 2005; they find a significant and positive market reaction to events that encourage the implementation of IFRS. However, they mitigate their conclusions by highlighting a negative market reaction for firms located in countries with low investor protection. This result reflects investors' concerns about the enforcement of IFRS. Byard et al. (2011) investigate the effect of IFRS use on analysts' forecasts more precisely; they show evidence of a decrease in forecasting errors following the adoption of IFRS, especially if firms are located in countries with strong enforcement regimes. Bilinski, Lyssimachou, and Walker (2013) confirm these results. Moreover,

¹ De George et al. (2016) provide an extensive literature on the objectives, the effects on corporate decision making, and different research designs surrounding IFRS adoption.

DeFond et al. (2011) argue that IFRS significantly improve comparability by reducing information acquisition costs for global investors and result in larger cross-border investments. Thus, empirical studies indicate positive relationships among IFRS implementation, performance and efficiency of capital markets, and growth in foreign investment (Beuselinck et al., 2009; Barth et al., 2014).

Growing literature also investigates IFRS consequences for debt markets.² Naranjo et al. (2014) find that, for listed companies, IFRS mandatory adoption leads to a better access to public sources of funds (Downes et al., 2018), but Florou and Kosi (2015) add that it is not associated with private debt markets or more competitive costs of debt. In line with these conclusions, Kim et al. (2011) confirm a positive relationship between IFRS use and loan amounts and a negative relationship with interest rate levels. Accordingly, borrowers who adopt IFRS enhance their abilities to raise debt at lower costs. In contrast, Chen et al. (2015) provide evidence of an increase in syndicated loan costs and a decrease in maturity for borrowers using IFRS, depending on how lenders assess the level of quality of IFRS versus local GAAP. Moreover, de Lima et al. (2018) focus on the credit market in Brazil, where IFRS became mandatory; they conclude that firms using IFRS have better access to debt only if they seriously and honestly implement the new accounting standards. According to the authors, the impact of IFRS is even more important when countries have weak legal enforcement or lack credit protection. Therefore, accounting standards act as a signal for issuers (Spence, 1973).

2.2. Impact of IFRS non-mandatory adoption

Beyond the mandatory adoption of IFRS, which has been widely studied, non-listed groups' benefits of choosing international standards remain unclear. Literature provides insights on the voluntary adoption of IFRS by listed groups before the standards became mandatory (Francis et al., 2008; Christensen et al., 2015). Christensen et al. (2015) focus on Germany, where from 1998 to 2005—when international standards became mandatory—listed firms were given a choice to adopt IFRS. The authors find there was a significant improvement in reporting quality, that is, lower earnings management, better loss recognition, and increased value relevance for voluntary adopters. Bassemir (2018) explores the reasons that German private firms opted for IFRS, starting when IFRS were not yet mandatory for listed firms and even before European countries voted for IFRS (in 2002). His results suggest that opting firms have important financing needs and international activities. They also show that benefits of using IFRS are not identically distributed across private companies, and that some companies can benefit more than others (also supported by Daske et al., 2013). Bassemir and Novotny-Farkas (2018) use a similar sample of German private firms to understand the benefit of using IFRS by private companies. They show that the use of IFRS allows companies to improve their earnings quality, both in terms of quantity and level of detail disclosure. These results are all the more important as the firm is young, therefore more opaque, and needs to signal. Hence the benefit is more important when the firm needs more transparency.

The underlying hypothesis about voluntary IFRS adoption by listed firms is that the standards increase transparency and allow companies to signal their quality. Listed entities communicate to

a large number of investors who then value their investments and compare them with the values of other issuers. Chan et al. (2013) highlight significant improvement in credit ratings after the adoption of IFRS. The signaling hypothesis (Spence, 1973) is critical here, because the market is highly competitive. However, Nobes (2010, 218) warns that in the case of privately held entities “there is no public to signal to. The providers of finance to such a company (e.g., family members and bankers) are likely to be better informed than the public about the affairs of their company, and so it will be less worthwhile to try to signal higher quality to them”. Accordingly, Chen et al. (2013) emphasize the importance of accounting information quality with regard to the financing decisions of firms; they argue that companies with low accounting credibility, proxied by the number of accounting restatements, rely more on debt than equity as a result of higher information asymmetry problems. Hence, asymmetry seems to be less of an issue for debtholders who can obtain the necessary information through private channels. However, in the case of bank debt this result should be put into perspective. Indeed, access to private information is expensive for the bank and for the company, it requires a lot of time (López-Espinosa et al., 2017). Thus, if we suppose that the company goes to see a new banking partner, the latter does not yet have access to this private information, and the asymmetry of information is therefore very important. However, if the firm decides to go see its historical banking partner, Berger and Udell (1995) show that even if a long relationship allows banks to have access to more private information, a residual information asymmetry remains, hence it is still necessary to find some ways to reduce this asymmetry. As such, IFRS can be used by private companies to signal to their financial partners.

Moreover, using IFRS can also allow private companies to have access to specific debt market, such as syndicated loan. The international syndicated loan market amounts to one-third of international financing, which also includes commercial papers, bonds, and stocks (Gadanecz, 2004). Balsmeier and Vanhaverbeke (2018) observe that private firms that opt for IFRS are more likely to attract debt from foreign banks, inducing the increased comparability of IFRS information.

Hope et al. (2011) also show that firms with greater financial reporting credibility have better access to external finance, especially when they are located in countries with low levels of creditor protection.

Finally, high-quality financial reporting contributes to reduce information asymmetry, hence leading to better credit terms (Berger and Udell, 1995).

Therefore, accounting standards could help firms reduce their opacity, particularly when their legal or informational environments are not helpful; such assistance is especially important for non-listed or SMEs (Belletante and Levratto, 1995; Jappelli and Pagano, 2002; Jappelli et al., 2005; Haselmann and Wachtel, 2010).

2.3. Contribution to literature

We seek to contribute to the debate about the benefits that firms have when they use IFRS, even if they are not forced to do so. More precisely, we investigate whether publishing information using IFRS provides private groups with more access to debt. By studying the debt market instead of the capital market, we add to the debate on the general impact of IFRS adoption, because creditors and shareholders may differ in their needs and uses of financial information. Moreover, debt financing is one of the major sources of funds for companies, and plays a crucial role in accounting standards selection (Ball et al., 2008).

Moreover, if a lot of papers already exist about IFRS adoption and possible benefits, for private or public firms, these papers mainly focus on ex-ante expectations of IFRS adoption. To the best of our

² On the one hand, accounting helps reduce information asymmetry between lenders and borrowers by providing lenders with information about managers' private and forward-looking information, enabling them to price debt correctly (valuation role). On the other hand, accounting supplies timely, auditable performance measures of borrowers' creditworthiness that can be used in efficient contracts such as debt covenants (contracting role) with firms (De George et al., 2016).

knowledge, this paper provides one of the first evidence of ex-post benefits of IFRS adoption by private companies.

This paper also contributes to the debate on the legal harmonisation of accounting practices. By demonstrating the benefits of this adoption, we show the interest for the regulator to harmonize accounting standards.

Finally, this paper also contributes to the literature about debt access for private companies. Indeed, debt is the main source of financing for private companies. Thus, understanding the determinants of debt remains an important issue.

3. Hypotheses, data, and methodology

3.1. Hypotheses

The theory describing how the adoption of new accounting standards such as IFRS affects the debt access of private firms, yields three key hypotheses.

First, as seen previously, on the one side IFRS seem to allow firms to reduce their opacity. On the other side, private companies are opaque firms, and need to reduce this opacity to have a better access to debt. Hence, IFRS can be a tool to help private companies to reduce their opacity and allow them to have a better access to debt. This leads to our first hypothesis:

H1. Private companies adopting voluntarily IFRS have a better debt access.

Second, some papers prove that the benefit of transparency is not the same depending on the country or firm characteristics. Indeed, we can suppose that firms in a country that favours access to credit or firms already transparent have less benefits from adopting IFRS. This leads to our second set of hypotheses:

H2. Benefits of using IFRS are less important for firms located in a country that favours access to credit.

H3. Benefits of using IFRS are less important for firms less opaque.

3.2. Data

We use the Orbis database for our empirical analysis. Our initial sample is composed of active European non-listed or delisted groups since 2005 that produce consolidated accounts. We remove firms that have turned back to local GAAP after a period of IFRS publications as per the risk of error. To allow comparability, we retain only large firms that pass two of the following thresholds at least twice over the 2005–2018 period: (1) total assets equal to or more than EUR 20 million, (2) turnover equal to or more than EUR 10 million, and (3) number of employees equal to or more than 150.

Because we focus on non-mandatory IFRS adoption, we exclude groups from member states in which IFRS were not allowed for non-listed companies and countries in which IFRS were mandatory for consolidated accounts of non-listed groups (i.e., Cyprus, Bulgaria, Slovakia and Czech Republic). The only country in which IFRS were not allowed in consolidated accounts was Croatia, and for only a part of non-listed companies. Because we cannot control whether the Croatian firms were allowed to use IFRS, we keep these firms.³

We remove all firms in which the last owners were private equity or venture capitalist actors, hedge funds, pension funds, or trustees. This step allows us to exclude the potential influence of specific shareholders on choice of standards and concentrate

Table 1

Observations by Country. This table contains the number of firm-year observations by country and by accounting practice, over the 2005–2018 period.

| Country | Local | IFRS | Total |
|----------------|--------|------|--------|
| Austria | 508 | 90 | 598 |
| Belgium | 1710 | 45 | 1755 |
| Croatia | 2 | 0 | 2 |
| Denmark | 625 | 7 | 632 |
| Finland | 1381 | 0 | 1381 |
| France | 161 | 58 | 219 |
| Germany | 6639 | 300 | 6939 |
| Greece | 236 | 130 | 366 |
| Hungary | 144 | 0 | 144 |
| Ireland | 430 | 28 | 458 |
| Italy | 5514 | 453 | 5967 |
| Latvia | 45 | 0 | 45 |
| Lithuania | 125 | 0 | 125 |
| Luxembourg | 29 | 16 | 45 |
| Malta | 66 | 6 | 72 |
| Netherlands | 2348 | 0 | 2348 |
| Poland | 527 | 18 | 545 |
| Portugal | 5 | 519 | 524 |
| Romania | 2 | 0 | 2 |
| Spain | 4832 | 15 | 4847 |
| Sweden | 6390 | 0 | 6390 |
| United Kingdom | 6934 | 236 | 7170 |
| Total | 38,653 | 1921 | 40,574 |

on links with debt (Bassemir and Novotny-Farkas, 2018). Moreover, some companies may be subsidiaries. Hence, their accounting choice may be influenced by the parent company. However, as we cannot control directly for this factor, we limit our analysis to the Global Ultimate Owner (GUO), i.e. an entity at the top of the corporate ownership structure.⁴

Finally, we remove Finance, Insurance, Real Estate (FIRE) and public or governmental entities because of their specificities; we also remove all observations that have missing information over the 2005–2018 period.

Using Orbis, we collect basic financial information on firms' consolidated balance sheets and income statements. The database also provides the standards used by the firms (i.e., IFRS or local GAAP). Our final sample consists of 8391 firms from 2005–2018, for a total number of 40,574 observations dispatched over 22 European countries (see Table 1 for the country distribution of our sample).

3.3. Methodology

Our model investigates whether the application of IFRS is a significant determinant of the firm's debt access. We build our database using panel data and run the following model using the firm and year fixed effects estimation approach:

$$\begin{aligned} Debt/Asset_{i,t} = & \alpha + \beta * IFRS_{i,t} + \sum_k \gamma_k * (firm\ char.)_{i,t-1,k} \\ & + \sum_g \delta_g * (country\ char.)_{i,t,g} + \theta * firm - FE_i \\ & + \vartheta * year - FE_t + \varepsilon_{i,t}. \end{aligned} \quad (1)$$

To analyze the impact of IFRS adoption we use $IFRS_{i,t}$, a dummy equal to 1 if the accounts are in IFRS in year t for firm i , and 0 if the accounts are in local GAAP. These data are available directly from the Orbis database (for descriptions of all variables, see Table A1).

³ In a robustness test, we excluded Croatian firms, and our results remained highly similar; see Section 3.3.2.

⁴ To control for this selection criteria, we run our empirical estimations on the full sample, i.e. not restricted to the GUO only. Our results remain highly similar and are available upon request.

Table 2
Descriptive Statistics.

| | Full Sample | | Mean Difference Test | | |
|--------------------------------|-------------|-----------|----------------------|--------|------------|
| | Mean | Std. Dev. | Local | IFRS | Difference |
| Accounting Variable | | | | | |
| IFRS | 0.047 | 0.212 | 0 | 1 | |
| Dependent Variables | | | | | |
| Debt / Asset | 0.178 | 0.236 | 0.176 | 0.229 | −0.054*** |
| Log(Debt) | 8.871 | 2.583 | 8.809 | 10.122 | −1.313*** |
| Control Variables | | | | | |
| <i>Firm Characteristics</i> | | | | | |
| ROA | 0.037 | 0.173 | 0.038 | 0.019 | 0.019*** |
| Tangibility | 0.452 | 0.232 | 0.449 | 0.505 | −0.056*** |
| Size | 11.455 | 1.395 | 11.411 | 12.340 | −0.929*** |
| Age | 31.416 | 29.749 | 31.567 | 28.366 | 3.201*** |
| O-score | −3.102 | 1.553 | −3.140 | −2.355 | −0.784*** |
| Sales Growth | 0.059 | 0.262 | 0.059 | 0.044 | 0.016* |
| BIG4 | 0.182 | 0.386 | 0.174 | 0.334 | −0.160*** |
| <i>Country Characteristics</i> | | | | | |
| Rule of Law | 1.444 | 0.559 | 1.460 | 1.115 | 0.346*** |
| Civil Law | 0.810 | 0.392 | 0.808 | 0.859 | −0.052*** |
| Information Index | 6.894 | 1.130 | 6.882 | 7.143 | −0.262*** |
| Credit Bureau Coverage (CBC) | 78.143 | 37.221 | 78.871 | 63.496 | 15.375*** |
| Credit Registry Coverage (CRC) | 20.012 | 30.612 | 19.004 | 40.304 | −21.301*** |
| Observations | 40,574 | | 38,667 | 1907 | |

This table contains descriptive statistics for our dependent variables Debt/Asset, our Accounting Practice variable (IFRS) and our control variables related to firm and country characteristics. The first two columns display the summary statistics for our full sample; columns (3) and (4) display the summary statistics for respectively firms which are in Local GAAP and firms in IFRS. Our last column displays the mean test by accounting practice with * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

Our dependent variable, $Debt/Asset_{i,t}$, represents the ratio of private debt on total asset for firm i at time t .

As control variables and in line with prior studies (Florou and Kosi, 2015; Florou et al., 2017) we control for firm characteristics. We measure observable firm characteristics such as size (through total assets), age, profitability (using Return On Assets [ROA]), and growth through sales variation. Because opacity is an important determinant of non-listed firms' access to credit (Berger and Udell, 1998), we control for firms' opacity using tangibility (i.e. Fixed Assets on Total Assets). For information about risks, as in Florou and Kosi (2015), we use firms' O-Score (Ohlson, 1980), which measures distress risk; the higher the score, the higher the risk. We take all control variables with one lag to avoid endogeneity.

We also control for country characteristics, because literature shows the impacts of legal procedures (Wu and Zhang, 2014) and informational environment (Jappelli and Pagano, 2002) on use of debt and, potentially, on IFRS adoption. We control for the legal system with a dummy equal to 1 if a firm's country is based on *Civil Law*, and we use yearly measures of law enforcement through the *Rule of Law* index. Finally, we proxy the informational environment for creditors through a measure of *Information Index*. All country measures come from the WorldBank Doing Business database.⁵

Finally, as explained by De George et al. (2016, 68), "there are no clear prescriptions for many of the econometric choices involved in IFRS studies". That is, there are no theoretical frameworks with regard to the use of fixed effects and clustered standard errors. Thus, because we use panel data, we control for firm and year fixed effects in our main estimation. However, to test the sensitivity of our results, we also make estimations using several

alternative fixed effects and clustered standard errors, according to literature. In particular, as per the change in accounting standards, the variables used in the model may vary, partly due to the accounting rules. For instance, some items booked in equity in local GAAP may be treated as debt in IFRS. The tangibility measure may also differ between local and international standards. In addition, EU member states' accounting standards have changed over the 2005–2018 period converging more or less towards IFRS. As these accounting differences vary across countries and time and are unobservable at the firm level, we address this issue using specifications with time, country and industry fixed effects and with firm and year fixed effects using country clustered standard errors.

3.4. Summary statistics

Table 2 displays the descriptive statistics of our sample and the results of a mean difference test by accounting practice for all independent variables. Only 4.7 percent of our sample use IFRS (1907 observations). The debt variable shows that companies have, on average, about 18 percent private debt in their capital structures. Notably, on average, companies that adopt IFRS have 5.4 percent more debt in their capital structures than companies in local GAAP (they have, respectively, 22.9 percent and 17.6 percent of debt on asset). This first result seems in line with our prediction that IFRS allow firms to have access to more debt.

Table 2 also highlights significant differences for all control variables, except sales growth, when we compare firms using IFRS to firms using local accounting practices. Our findings seem in line with previous literature (Affes and Callimaci, 2007; André et al., 2012; Erkens, 2016): Firms that adopt IFRS standards are bigger, riskier, less performant, and more tangible than firms that use local GAAP; they also are more likely to have a "BIG 4" auditor on their audit team. The only surprising result relates to age: We expected older firms to be more likely to adopt IFRS more than younger firms, but our univariate analysis shows the opposite result, which may be related to risk (i.e., perhaps younger firms use IFRS to send a signal) (Table 3).

⁵ We are aware that variables such as the *Civil Law* or the *Rule of Law* presents some limitations in the literature (Djankov et al., 2007; Graff, 2008). Hence, we also run our main estimations using alternative legal measures such as the LLSV (La Porta et al., 1998), the legal efficiency (Djankov et al., 2007) or a more granular type of law variable (French, German, Nordic Civil Laws vs Common Law) (Bradford et al., 2020) or the legal procedure from DoingBusiness. Our results remain strictly identical and available upon request. We thank an anonymous referee for making this suggestion.

Table 3
Correlation Matrix.

| | IFRS | Debt / Asset | Log(Debt) | LROA | L.Tangibility | L.Size | L.Age | L.O-score | Sales Growth | BIG4 | Rule of Law | Civil Law | Information Index | CBC | CRC |
|-------------------|-----------|--------------|-----------|-----------|---------------|-----------|-----------|-----------|--------------|-----------|-------------|-----------|-------------------|-----------|-------|
| IFRS | 1.000 | | | | | | | | | | | | | | |
| Debt / Asset | 0.048*** | 1.000 | | | | | | | | | | | | | |
| Log(Debt) | 0.108*** | 0.430*** | 1.000 | | | | | | | | | | | | |
| LROA | -0.012** | -0.084*** | -0.033*** | 1.000 | | | | | | | | | | | |
| L.Tangibility | 0.048*** | 0.284*** | 0.312*** | -0.080*** | 1.000 | | | | | | | | | | |
| L.Size | 0.144*** | 0.083*** | 0.580*** | -0.008* | 0.197*** | 1.000 | | | | | | | | | |
| L.Age | -0.023*** | -0.068*** | 0.027*** | -0.018*** | 0.021*** | 0.089*** | 1.000 | | | | | | | | |
| L.O-score | 0.111*** | 0.328*** | 0.409*** | -0.133*** | 0.105*** | 0.341*** | -0.066*** | 1.000 | | | | | | | |
| Sales Growth | -0.013** | -0.005 | 0.033*** | -0.004 | -0.008* | 0.000 | -0.036*** | 0.002 | 1.000 | | | | | | |
| BIG4 | 0.088*** | 0.061*** | 0.153*** | 0.032*** | 0.056*** | 0.237*** | 0.034*** | 0.089*** | -0.014*** | 1.000 | | | | | |
| Rule of Law | -0.131*** | 0.096*** | -0.016** | 0.055*** | 0.107*** | -0.057*** | -0.010* | -0.084*** | 0.038*** | 0.084*** | 1.000 | | | | |
| Civil Law | 0.028*** | -0.002 | 0.265*** | -0.030** | -0.074*** | 0.373*** | 0.082*** | 0.134*** | -0.015*** | 0.043*** | -0.241*** | 1.000 | | | |
| Information Index | 0.049*** | -0.050** | -0.160*** | 0.017*** | 0.005 | -0.247*** | 0.135*** | -0.118** | -0.035*** | 0.042*** | -0.174*** | -0.436*** | 1.000 | | |
| CBC | -0.088*** | -0.008 | -0.022*** | 0.022*** | -0.012** | -0.007 | 0.061*** | 0.096*** | 0.020*** | -0.086*** | 0.114*** | -0.272*** | 0.287*** | 1.000 | |
| CRC | 0.148*** | -0.021*** | 0.002 | -0.048*** | -0.050*** | -0.018*** | -0.078*** | -0.041*** | -0.024*** | 0.040*** | -0.493*** | 0.223*** | -0.173*** | -0.720*** | 1.000 |

4. Results

4.1. Main results

Table 4 presents the results of our main estimation model. Our objective is to determine whether firms that adopt IFRS voluntarily issue more debt than other firms. Model (1), the main estimation, includes firm and year fixed effects. Model (2) replicates the main estimation with standard errors clustered by country.⁶ In Models (3)–(10), the estimates include different combinations of year, country, and industry fixed effects. Across specifications, IFRS is positively and significantly associated with *Debt/Asset* ratio: Firms that use IFRS tend to increase the share of debt in their capital structure significantly. Firms that use IFRS have, on average, 3.8 percent to 6.3 percent more debt than firms that use local GAAP. Hence, our first hypothesis H1 is true, and, in line with de Lima et al. (2018), we argue that the adoption of international accounting standards supports firms' access to the debt market.

With regard to the control variables, the models show that *Debt/Asset* ratio is negatively associated with performance. Firms with high performance may have alternative sources of funds. In line with the pecking order theory (Frank and Goyal, 2003), *Tangibility* has a positive and significant impact on the *Debt/Asset* ratio, such that it is negatively correlated with information asymmetry. Surprisingly, size and age have negative and significant relationships with *Debt/Asset* ratio. We suggest that bigger or older firms may have a relatively lower propensity to borrow because of their equity levels. Furthermore, compared with smaller companies, larger and older companies may have several alternative sources of funds and be less dependent on debt. The O-Score is positively associated with the *Debt/Asset* ratio, so firms that present higher risks appear more leveraged. Finally, *Sales Growth* is negatively correlated with *Debt/Asset* ratio; more leveraged structures are concentrated on firms with low sales growth rates.

4.2. Benefits of voluntarily IFRS adoption: country and firm characteristics

In this section, we answer to our second set of hypotheses. As a reminder, we expect that private firms voluntarily adopting IFRS have less benefits in terms of debt access if (1) they are in a country that favours debt access (in terms of legal enforcement, informational environment or financial systems structure) – H2 –, and (2) they are already relatively transparent – H3.

4.3. Interactions of country characteristics

We first analyze the country informational environment. In the main estimation, we use *Information Index* to control for the global informational environment. This measure includes not only the presence of a credit bureau/registry but also its availability and accessibility. By focusing on level of information asymmetry in the market, we test our hypothesis that the informational environment can play on opacity, so on IFRS benefits. In environments with low information asymmetry, the benefit of adopting IFRS can be lower than in countries with high information asymmetry. Jappelli and Pagano (2002) prove that the larger the number of credit bureaus or credit registries, the lower the information asymmetry on the credit market; credit bureaus or registries help reduce information asymmetry between borrowers and lenders. Accordingly, we ask whether firms in countries with numerous credit bureaus or registries benefit less than other firms from IFRS adoption. To answer

⁶ We also estimate our model using industry and firm clusters, and the results remain the same. These results are available on request.

Table 4
Main Estimations.

| | Main estimation | Sensitivity analysis | | | | | | | | |
|------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | (1) Debt / Asset | (2) Debt / Asset | (3) Debt / Asset | (4) Debt / Asset | (5) Debt / Asset | (6) Debt / Asset | (7) Debt / Asset | (8) Debt / Asset | (9) Debt / Asset | (10) Debt / Asset |
| IFRS | 0.063*** (0.011) | 0.063*** (0.020) | 0.046*** (0.007) | 0.046*** (0.007) | 0.046*** (0.008) | 0.044*** (0.007) | 0.045*** (0.008) | 0.045*** (0.008) | 0.045*** (0.007) | 0.038*** (0.008) |
| L.ROA | −0.190*** (0.011) | −0.190 (0.138) | −0.045*** (0.006) | −0.045*** (0.006) | −0.048*** (0.006) | −0.045*** (0.006) | −0.050*** (0.006) | −0.048*** (0.006) | −0.045*** (0.006) | −0.051*** (0.006) |
| L.Tangibility | 0.079*** (0.011) | 0.079 (0.053) | 0.202*** (0.007) | 0.202*** (0.007) | 0.201*** (0.007) | 0.207*** (0.007) | 0.205*** (0.007) | 0.203*** (0.007) | 0.209*** (0.007) | 0.213*** (0.008) |
| L.Size | −0.014*** (0.004) | −0.014 (0.015) | −0.010*** (0.001) | −0.009*** (0.001) | −0.008*** (0.001) | −0.011*** (0.001) | −0.007*** (0.002) | −0.006*** (0.002) | −0.010*** (0.001) | −0.008*** (0.002) |
| L.Age | −0.002*** (0.000) | −0.002 (0.002) | −0.000*** (0.000) | −0.000*** (0.000) | −0.001*** (0.000) | −0.000*** (0.000) | −0.000*** (0.000) | −0.000*** (0.000) | −0.000*** (0.000) | −0.000*** (0.000) |
| L.O-score | 0.016*** (0.001) | 0.016*** (0.005) | 0.034*** (0.001) | 0.034*** (0.001) | 0.035*** (0.001) | 0.033*** (0.001) | 0.034*** (0.001) | 0.035*** (0.001) | 0.033*** (0.001) | 0.034*** (0.001) |
| Sales Growth | −0.008*** (0.003) | −0.008* (0.004) | −0.006** (0.002) | −0.007*** (0.003) | −0.006** (0.002) | −0.006** (0.002) | −0.007*** (0.003) | −0.006** (0.003) | −0.007** (0.003) | −0.006** (0.003) |
| Rule of Law | −0.003 (0.009) | −0.003 (0.016) | 0.039*** (0.004) | 0.038*** (0.004) | 0.012 (0.009) | 0.036*** (0.004) | −0.010 (0.010) | −0.084 (1546.078) | 0.034*** (0.004) | −1.630 (7.266) |
| Civil Law | | | 0.022*** (0.006) | 0.017*** (0.006) | −0.030 (0.039) | 0.011* (0.006) | −0.005 (0.039) | 0.024 (1301.812) | 0.005 (0.006) | −4.118 (15.921) |
| Information Index | | | 0.004* (0.002) | 0.004* (0.002) | 0.119*** (0.008) | 0.004** (0.002) | 0.118*** (0.008) | 0.150 (20.881) | 0.003 (0.002) | −1.140 (4.708) |
| Firm FE | Yes | Yes | | | | | | | | |
| Year FE | Yes | Yes | | Yes | | | Yes | | | |
| Country FE | | | | | Yes | | Yes | | | |
| Industry FE | | | | | | Yes | Yes | | | |
| Country x Year FE | | | | | | | | Yes | | |
| Industry x Year FE | | | | | | | | | Yes | |
| Industry x Country x Year FE | | | | | | | | | | Yes |
| Cluster by country | | Yes | | | | | | | | |
| Constant | 0.430*** (0.041) | 0.430*** (0.144) | 0.213*** (0.026) | 0.222*** (0.027) | −0.280*** (0.060) | 0.214*** (0.031) | −0.269*** (0.062) | −0.362 (1525.120) | 0.242*** (0.062) | 12.343 (49.566) |
| R ² | 0.048 | 0.048 | 0.185 | 0.186 | 0.205 | 0.191 | 0.211 | 0.205 | 0.193 | 0.244 |
| N | 40,574 | 40,574 | 40,574 | 40,574 | 40,574 | 40,574 | 40,574 | 40,574 | 40,574 | 40,574 |

These regressions show the impact of the accounting practice IFRS on the quantity of Private Debt using Debt/Asset. We control for firm characteristics (lagged values) and country characteristics. Model (1) is our main estimation, controlling for firm and year fixed effects. Models (2) to (10) correspond to sensitivity analysis: in model (2) standard errors are clustered by country, in models (3) to (10) we control for various fixed effects: year, country and/or industry. The regressions are robust to heteroscedasticity. * p < 0.10, ** p < 0.05, and *** p < 0.01 (standard errors are indicated in brackets).

Table 5
Regressions with Informational Environment Interaction.

| | (1) Debt / Asset | (2) Debt / Asset |
|--------------------------------|----------------------|----------------------|
| IFRS | −0.011 (0.027) | 0.064*** (0.010) |
| Credit Bureau Coverage (CBC) | −0.005*** (0) | |
| IFRS x CBC | 0.001** (0.000) | |
| Credit Registry Coverage (CRC) | | 0.107*** (0.007) |
| IFRS x CRC | | −0.001*** (0.000) |
| L.ROA | −0.049*** (0.006) | −0.049*** (0.006) |
| L.Tangibility | 0.201*** (0.007) | 0.201*** (0.007) |
| L.Size | −0.006*** (0.002) | −0.006*** (0.002) |
| L.Age | −0.000*** (0.000) | −0.000*** (0.000) |
| L.O-score | 0.035*** (0.001) | 0.035*** (0.001) |
| Sales Growth | −0.007*** (0.003) | −0.007*** (0.003) |
| Rule of Law | −0.011 (0.010) | −0.011 (0.010) |
| Civil Law | 0.487*** (0.050) | 5.828*** (0.396) |
| Year FE | Yes | Yes |
| Country FE | Yes | Yes |
| Constant | 0.344*** (0.044) | −5.502*** (0.400) |
| R ² | 0.206 | 0.206 |
| N | 40,574 | 40,574 |

These regressions show the impact of the accounting practice IFRS_{it,j} on the Debt/Asset_{it,j} ratio. We control for firm lag characteristics and country characteristics. We add interaction variables to each of our informational characteristics to better understand the specific impact of IFRS according to Credit Bureau Coverage index (column 1) and Credit Registry Coverage index (column 2). Models control for year and country fixed effects. The regressions are robust to heteroscedasticity. * p < 0.10, ** p < 0.05, and *** p < 0.01 (standard errors are indicated in brackets).

this question, we interact our IFRS variable with *Credit Bureau Coverage* (Table 5, Column 1) and *Credit Registry Coverage* (Column 2). The interaction of *IFRS* × *Credit Registry Coverage* is negative and significant. That is, the higher the percentage of companies registered in public registries, the less IFRS improve debt access, so the less the benefit from IFRS use. This finding is in line with our intuition that IFRS and the informational environment play the same role in reducing information asymmetry. Surprisingly, the interaction term *IFRS* × *Credit Bureau Coverage* is positive, so the higher the percentage of companies registered in a private register, the more IFRS improve debt access.

Next, Wu and Zhang (2014) and Karahan et al. (2016) explain that countries under common law, such as the United Kingdom, have stronger investor protections and higher disclosure levels for financial information than countries under civil law. Accordingly, our results could be driven by the legal environment. To test this hypothesis, we interact our IFRS variable with two legal variables: *Rule of Law* and *Civil Law* (Table 6). Regardless of the specification, our IFRS measure is always positive and significant. With regard to our interaction variable, only *IFRS* × *Civil Law* is negative and significant. Therefore, when firms adopt IFRS and are in countries with civil law (e.g., France, Belgium), their access to credit improves (i.e., the sum of both coefficients remains positive and significant), which it does to a lesser extent when they are in common law countries. Arguably, in civil law countries, the distance between accounting practices—that is, between local accounting rules and IFRS—may be greater (Ding et al., 2005, 2007).

Table 6
Regressions with Legal Environment Interaction.

| | (1) Debt / Asset | (2) Debt / Asset |
|--------------------|----------------------|----------------------|
| IFRS | 0.026* (0.016) | 0.119*** (0.013) |
| Rule of Law | −0.012 (0.010) | −0.012 (0.010) |
| IFRS x Rule of Law | 0.018 (0.012) | |
| Civil Law | −0.013 (0.039) | −0.010 (0.039) |
| IFRS x Civil Law | | −0.111*** (0.017) |
| L.ROA | −0.049*** (0.006) | −0.049*** (0.006) |
| L.Tangibility | 0.201*** (0.007) | 0.201*** (0.007) |
| L.Size | −0.006*** (0.002) | −0.006*** (0.002) |
| L.Age | −0.000*** (0.000) | −0.000*** (0.000) |
| L.O-score | 0.035*** (0.001) | 0.035*** (0.001) |
| Sales Growth | −0.007*** (0.003) | −0.006** (0.003) |
| Information Index | 0.118*** (0.008) | 0.122*** (0.008) |
| Year FE | Yes | Yes |
| Country FE | Yes | Yes |
| Constant | −0.245*** (0.061) | −0.272*** (0.060) |
| R ² | 0.205 | 0.209 |
| N | 40,574 | 40,574 |

These regressions show the impact of the accounting practice IFRS_{it,j} on the Debt/Asset_{it,j} ratio. We control for firm lag characteristics and country characteristics. We add interaction variables to each of our legal characteristics to better understand the specific impact of IFRS according to Rule of Law index (1) and Civil Law countries (2). Models control for year and country fixed effects. The regressions are robust to heteroscedasticity. * p < 0.10, ** p < 0.05, and *** p < 0.01 (standard errors are indicated in brackets).

Finally, we also consider the impact of bank-based vs. market-based financial systems. Although many countries in Europe have a bank-based financial system, some stand out with very deep capital markets, such as the United Kingdom. This divergence can lead to a different impact of IFRS adoption by companies. To control for this characteristic, we construct a dummy variable *Market-Based* equal to one if the country has a market-based system, and zero otherwise (Levine, 2002). Table 7 displays our results. The results show that private firms in market-based countries have a smaller level of debt, whatever their accounting standards. However, the use of IFRS mitigates this conclusion as the interaction of *IFRS* × *Market-Based* is positive and significant. Companies in a country with deep capital markets that use IFRS have a higher debt. This result goes in line with our conclusions, i.e., the use of IFRS tends to facilitate more debt access to companies located in market-oriented countries, where credit may be more difficult to get.⁷

Hence, these results tend to partially support H2: benefits of using IFRS are less important when the informational environment is strong, so when it helps to reduce the opacity; in civil law countries; and in bank-based countries.

4.4. Interactions of firm characteristics

In this section, we interact our IFRS variable with several firm characteristics to determine whether firm characteristics can drive the benefits of using IFRS. Although IFRS allow firms to reduce

⁷ We thank an anonymous referee for this suggested development of our analysis.

Table 7
Regression with Market-Based Country Characteristics.

| | (1) Debt / Asset |
|---------------------|----------------------|
| IFRS | 0.013 (0.010) |
| Market-Based | −0.244*** (0.017) |
| IFRS * Market-Based | 0.115*** (0.017) |
| L.ROA | −0.065*** (0.006) |
| L.Age | −0.000*** (0.000) |
| L.O-Score | 0.036*** (0.001) |
| L.Size | 0.002 (0.002) |
| Sales Growth | −0.005** (0.003) |
| Rule of Law | −0.020** (0.010) |
| Year FE | Yes |
| Country FE | Yes |
| Constant | 0.574*** (0.031) |
| R ² | 0.150 |
| N | 40,574 |

This regression shows the impact of the accounting practice IFRS_{i,t} on the Debt/Asset_{i,t} ratio. We control for firm lag characteristics and country characteristics. We add interaction variable for the Market-Based country characteristic. Model controls for firm and year fixed effects. The regression is robust to heteroscedasticity. * p < 0.10, ** p < 0.05, and *** p < 0.01 (standard errors are indicated in brackets).

their opacity, some firms—such as those that are not naturally opaque—will have less advantage than others in using the standards. Table 8 shows the interactions of our IFRS variable with various proxies of firm opacity: tangibility (high tangibility leads to low opacity, Column 1), size (small firms are more opaque than large firms, Column 2), age (young firms are more opaque than older firms, Column 3), and risk (higher opacity leads to higher risk, Column 4). With regard to tangibility (Column 1), the interaction of *IFRS* × *Tangibility* is negative and significant. That is, highly tangible firms (i.e., less opaque) that use IFRS have lower debt. This result confirms our intuition that IFRS are being used to reduce opacity, because firms that are not opaque benefit less than opaque firms from using IFRS.

With regard to size (Column 2), the larger the size of firms that adopt IFRS, the smaller their benefits of using IFRS in terms of access to debt. Being small may decrease the number of potential sources of funds, mainly as a result of opacity. Therefore, small companies have a greater incentive than large companies to use IFRS, because they know they will benefit more. Accordingly, small firms may have the same incentive as high-risk firms (previously mentioned) to use IFRS to attract new lenders—and to benefit from better access to the debt market. In contrast, there may be no significant change in the capital structures of large firms even if they borrow more. With regard to age (Column 3), the interaction term is not significant.

Finally, with regard to risk (Column 4), we find that the higher the risk supported by firms that adopt IFRS, the greater their access to debt. We can analyze this result through signaling theory: Firms with higher O-Scores represent higher levels of risk and may suffer from lack of funding sources. Therefore, despite the burden and complexity of changing their accounting standards, these high-risk firms may have an incentive to adopt IFRS to become more transparent and have better access to the debt market. Thus, except for age, all our variables are in line with our initial intuition: The most opaque firms benefit more than the least opaque firms from the use of IFRS in their access to debt. So these results fully support H3: ben-

Table 8
Regression with Firm Characteristics Interactions.

| | (1) Debt / Asset | (2) Debt / Asset | (3) Debt / Asset | (4) Debt / Asset |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| IFRS | 0.138*** (0.020) | 0.613*** (0.078) | 0.080*** (0.015) | 0.087*** (0.014) |
| L.ROA | −0.190*** (0.011) | −0.188*** (0.011) | −0.189*** (0.011) | −0.189*** (0.011) |
| L.Tangibility | 0.086*** (0.011) | 0.078*** (0.011) | 0.079*** (0.011) | 0.079*** (0.011) |
| IFRS x L.Tangibility | −0.149*** (0.034) | | | |
| L.Size | −0.014*** (0.004) | −0.011*** (0.004) | −0.014*** (0.004) | −0.014*** (0.004) |
| IFRS x L.Size | | −0.044*** (0.006) | | |
| L.Age | −0.002*** (0.000) | −0.002*** (0.000) | −0.002*** (0.000) | −0.002*** (0.000) |
| IFRS x L.Age | | | −0.001 (0.000) | |
| L.O-score | 0.016*** (0.001) | 0.016*** (0.001) | 0.016*** (0.001) | 0.015*** (0.001) |
| IFRS x L.O-score | | | | 0.013*** (0.004) |
| Sales Growth | −0.008*** (0.003) | −0.008*** (0.003) | −0.008*** (0.003) | −0.008*** (0.003) |
| Rule of Law | −0.004 (0.009) | −0.003 (0.009) | −0.003 (0.009) | −0.003 (0.009) |
| Firm FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Constant | 0.426*** (0.041) | 0.406*** (0.041) | 0.429*** (0.041) | 0.427*** (0.041) |
| R ² | 0.046 | 0.046 | 0.048 | 0.048 |
| N | 40,574 | 40,574 | 40,574 | 40,574 |

These regressions show the impact of the accounting practice IFRS_{i,t} on the Debt/Asset_{i,t} ratio. We control for firm lag characteristics and country characteristics. We add interaction variables to each of our firm characteristics to better understand the specific impact of IFRS according to lag values of Tangibility (1), Size (2), Age (3) and O-Score (4). Models control for firm and year fixed effects. The regressions are robust to heteroscedasticity. * p < 0.10, ** p < 0.05, and *** p < 0.01 (standard errors are indicated in brackets).

efits of using IFRS are less important when firms are less opaque. This conclusion is interesting when considering the descriptive statistics that highlight a higher propensity to use IFRS when firms are more tangible. As such, our results underline that IFRS are not used in an optimal way by firms. We would have expected opaque, i.e. less tangible, firms to use more IFRS than others as they benefit more from it.

4.5. Robustness tests

4.5.1. Alternative measure of debt

In this section, we test an alternative measure of debt: the natural logarithm of the amount of debt. We follow the previous methodology, controlling for the same variables and testing several potential fixed effects and clusters. Table 9 displays the results for this alternative measure of debt. Regardless of the specification, the coefficient of the IFRS variable is always positive and significant. This finding indicates that firms using IFRS have higher debt values than others, in support of our main results.

4.5.2. Alternative samples

We are aware that our results could also be driven by our sample. Accordingly, we control for the potential biases using alternative samples (Table 10).

First, as previously explained, though we know that IFRS are not allowed for a group of non-listed companies in Croatia, we cannot know whether other firms in our sample are allowed or not to adopt the international standards. Because we retain these observations in the main estimation, Column 1 displays our results for a sample

Table 9
Robustness Tests – Alternative Measure of Debt Issue.

| | Main estimation | Sensitivity analysis | | | | | | | | |
|------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | (1) Log(Debt) | (2) Log(Debt) | (3) Log(Debt) | (4) Log(Debt) | (5) Log(Debt) | (6) Log(Debt) | (7) Log(Debt) | (8) Log(Debt) | (9) Log(Debt) | (10) Log(Debt) |
| IFRS | 0.803*** (0.128) | 0.803*** (0.250) | 0.459*** (0.081) | 0.477*** (0.080) | 0.505*** (0.091) | 0.446*** (0.081) | 0.499*** (0.090) | 0.485*** (0.090) | 0.450*** (0.079) | 0.361*** (0.091) |
| L.ROA | 0.389*** (0.130) | 0.389** (0.154) | 0.325*** (0.068) | 0.314*** (0.067) | 0.297*** (0.067) | 0.317*** (0.067) | 0.275*** (0.065) | 0.284*** (0.065) | 0.295*** (0.066) | 0.236*** (0.063) |
| L.Tangibility | 1.572*** (0.126) | 1.572*** (0.271) | 2.328*** (0.078) | 2.338*** (0.077) | 2.318*** (0.077) | 2.441*** (0.083) | 2.412*** (0.081) | 2.330*** (0.075) | 2.453*** (0.081) | 2.496*** (0.081) |
| L.Size | 0.799*** (0.041) | 0.799*** (0.059) | 0.756*** (0.017) | 0.788*** (0.017) | 0.778*** (0.017) | 0.750*** (0.017) | 0.809*** (0.018) | 0.817*** (0.017) | 0.779*** (0.016) | 0.805*** (0.017) |
| L.Age | −0.062*** (0.004) | −0.062*** (0.012) | −0.004*** (0.001) | −0.002*** (0.001) | −0.004*** (0.001) | −0.003*** (0.001) | −0.002*** (0.001) | −0.002*** (0.001) | −0.001 (0.001) | −0.002*** (0.001) |
| L.O-score | 0.177*** (0.015) | 0.177*** (0.011) | 0.303*** (0.011) | 0.294*** (0.011) | 0.312*** (0.011) | 0.295*** (0.011) | 0.298*** (0.011) | 0.313*** (0.010) | 0.290*** (0.011) | 0.310*** (0.011) |
| Sales Growth | 0.235*** (0.029) | 0.235*** (0.065) | 0.253*** (0.028) | 0.248*** (0.029) | 0.258*** (0.028) | 0.250*** (0.028) | 0.249*** (0.028) | 0.249*** (0.029) | 0.247*** (0.029) | 0.258*** (0.030) |
| Rule of Law | −0.048 (0.101) | −0.048 (0.255) | 0.139*** (0.041) | 0.100** (0.041) | 0.217** (0.097) | 0.135*** (0.041) | −0.143 (0.113) | −0.788 (1.311) | 0.084** (0.041) | −9.133 (82.157) |
| Civil Law | | | 0.966*** (0.069) | 0.827*** (0.069) | −0.879** (0.441) | 0.877*** (0.072) | −0.594 (0.433) | −0.442 (1.892) | 0.730*** (0.070) | −21.667 (180.009) |
| Information Index | | | 0.150*** (0.023) | 0.134*** (0.023) | 1.013*** (0.090) | 0.161*** (0.024) | 1.032*** (0.088) | 1.118** (0.487) | 0.143*** (0.023) | −6.530 (53.229) |
| Firm FE | Yes | Yes | | | | | | | | |
| Year FE | Yes | Yes | | Yes | | | Yes | | | |
| Country FE | | | | | Yes | | Yes | | | |
| Industry FE | | | | | | Yes | Yes | | | |
| Country x Year FE | | | | | | | | Yes | | |
| Industry x Year FE | | | | | | | | | Yes | |
| Industry x Country x Year FE | | | | | | | | | | Yes |
| Cluster by country | | Yes | | | | | | | | |
| Constant | 1.459*** (0.471) | 1.459** (0.640) | −2.096*** (0.294) | −1.759*** (0.298) | −5.103*** (0.677) | −1.964*** (0.347) | −4.672*** (0.693) | −5.032 (3.384) | −1.907*** (0.696) | 66.891 (560.420) |
| R ² | 0.141 | 0.141 | 0.429 | 0.428 | 0.441 | 0.434 | 0.445 | 0.444 | 0.434 | 0.483 |
| N | 40,574 | 40,574 | 40,574 | 40,574 | 40,574 | 40,574 | 40,574 | 40,574 | 40,574 | 40,574 |

These regressions show the impact of the accounting practice IFRS on the quantity of Private Debt using an alternative measure, Log(Debt). We control for firm characteristics (lagged values) and country characteristics. Model (1) is our main estimation, controlling for firm and year fixed effects. Models (2) to (10) correspond to sensitivity analysis: in model (2) standard errors are clustered by country, in models (3) to (10) we control for various fixed effects: year, country, and/or industry. The regressions are robust to heteroscedasticity. * p < 0.10, ** p < 0.05, and *** p < 0.01 (standard errors are indicated in brackets).

Table 10
Robustness Tests – Alternative Samples.

| | (1) Excl. Croatia Debt / Asset | (2) Excl. UK Debt / Asset | (3) Excl. Portugal Debt / Asset | (4) Excl. Doubt practice Debt / Asset | (5) Excl. Invariant practice Debt / Asset | (6) Excl. Doubt & Invariant Debt / Asset |
|----------------|--------------------------------------|---------------------------------|---------------------------------------|---|---|--|
| IFRS | 0.063*** (0.011) | 0.040*** (0.015) | 0.064*** (0.011) | 0.064*** (0.012) | 0.064*** (0.012) | 0.065*** (0.013) |
| L.ROA | −0.190*** (0.011) | −0.174*** (0.013) | −0.190*** (0.011) | −0.203*** (0.012) | −0.271*** (0.015) | −0.304*** (0.017) |
| L.Tangibility | 0.079*** (0.011) | 0.060*** (0.012) | 0.078*** (0.011) | 0.066*** (0.012) | 0.040*** (0.014) | 0.012 (0.017) |
| L.Size | −0.014*** (0.004) | −0.016*** (0.004) | −0.013*** (0.004) | −0.019*** (0.004) | −0.024*** (0.005) | −0.036*** (0.006) |
| L.Age | −0.002*** (0.000) | −0.002*** (0.000) | −0.002*** (0.000) | −0.002*** (0.000) | −0.001** (0.000) | −0.001 (0.001) |
| L.O-score | 0.016*** (0.001) | 0.018*** (0.001) | 0.016*** (0.001) | 0.015*** (0.001) | 0.014*** (0.002) | 0.013*** (0.002) |
| Sales Growth | −0.008*** (0.003) | −0.005** (0.003) | −0.008*** (0.003) | −0.010*** (0.003) | −0.009*** (0.003) | −0.013*** (0.004) |
| Rule of Law | −0.003 (0.009) | −0.017* (0.010) | −0.003 (0.009) | −0.005 (0.010) | 0.009 (0.010) | 0.004 (0.012) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Constant | 0.430*** (0.041) | 0.477*** (0.046) | 0.428*** (0.041) | 0.498*** (0.046) | 0.496*** (0.053) | 0.630*** (0.062) |
| R ² | 0.048 | 0.036 | 0.047 | 0.038 | 0.031 | 0.015 |
| N | 40,572 | 33,404 | 40,050 | 35,095 | 30,137 | 24,658 |

These regressions show the impact of the accounting practice IFRS_{i,t} on the Debt/Asset_{i,t} ratio on alternative samples. These analyses are based on our main estimation, controlling for firm lag characteristics, country characteristics that vary over time and firm and year fixed effects. The regressions are robust to heteroscedasticity. * p < 0.10, ** p < 0.05, and *** p < 0.01 (standard errors are indicated in brackets).

that excludes Croatian firms; it shows that our results remain the same.

Second, bias could arise from the United Kingdom, which represents approximately one-third of our sample. To verify that our results are not driven by a single country, we run our estimation on a sample that excludes the United Kingdom (Column 2). We observe similar results.

Third, a bias could arise from the quality of the data. André (2017) highlights some potential mistakes in the Orbis accounting practice variable. He cites the example of Portugal, where the number of IFRS firms seems too high. To manage this potential quality problem, we first test our estimation on a sample that excludes Portugal (André clearly identifies this country, Column 3). Next, we exclude countries with less than 5 percent of IFRS firms (we refer to *Doubt Practice*, Column 4).⁸ Finally, we use a sample that excludes invariant countries, in which firms use only one set of standards (*Invariant Practice*, Columns 5 and 6, together with *Doubt Practice*). The results remain consistent, no matter which sample we use.

4.5.3. Self-selection bias

As explained by De George et al. (2016) self-selection bias can be an issue in studies of voluntary adoption. For their own reasons, companies might decide not to adopt IFRS, which would bias the results. To control for this potential bias, we follow Leuz and Verrecchia (2000) and use Heckmann (1979) estimation approach. This approach is based on two stages: In the first step, we use a probit model to estimate the probability that a firm will adopt IFRS; we then compute the inverse Mills ratio, which allows us to control for self-selection bias,⁹ and include it in our second step, which corresponds to our main equation.

In the first step, we model the probability that a firm will adopt IFRS using the same model as Leuz and Verrecchia (2000) and Daske (2006). As independent variables, we use the natural logarithm of total assets, tangibility (also referred to by some authors as capital intensity) and ROA, as proxies for firm size, financing needs, and performance. Leuz (2003) shows that the first two variables relate positively to the adoption of IFRS, whereas the results on performance are mixed. We also control whether the firm is in a common law country, where it is easier to adopt IFRS, because there is less distance from local accounting standards. Finally, we control for the presence of a BIG4 auditor on the firm's audit team, because that auditor may support IFRS implementation (André et al., 2012).

Table 11 displays the results for the Heckman estimation. In the first step (Column 1), use of IFRS is positively related to firm size and financing needs (in line with Leuz, 2004); and IFRS adoption is positively related to the presence of a BIG4 on a firm's audit team. In the second step (Column 2), our IFRS variable remains positive and significant, even after controlling for the inverse Mills ratio. This ratio is negative and significant, confirming that negative selection has occurred. Without this correction, the estimate coefficient of IFRS would have been a downward-biased estimate.¹⁰

4.5.4. Instrumental variable

Following previous literature (e.g., Leuz and Verrecchia, 2000; Van Tendeloo and Vanstraelen, 2005), we are aware that our results could be biased by (unobservable) variables that affect both IFRS

Table 11
Robustness Tests – Self-Selection Bias.

| | (1) First Stage IFRS | (2) Second Stage Debt / Asset |
|-----------------------|----------------------------|-------------------------------------|
| ROA | −0.373*** (0.083) | |
| Tangibility | 0.189*** (0.008) | |
| Size | 0.236*** (0.046) | |
| BIG4 | 0.220*** (0.025) | |
| Civil Law | 0.010 (0.031) | |
| IFRS | | 0.048*** (0.012) |
| L.ROA | | −0.240*** (0.013) |
| L.Tangibility | | 0.024* (0.013) |
| L.Size | | −0.054*** (0.005) |
| L.Age | | −0.003*** (0.000) |
| L.O-score | | 0.016*** (0.001) |
| Sales Growth | | −0.011*** (0.003) |
| Rule of Law | | −0.001 (0.010) |
| λ | | −0.321*** (0.016) |
| Firm FE | | Yes |
| Year FE | | Yes |
| Constant | −4.014*** (0.087) | 1.614*** (0.076) |
| R ² | | 0.062 |
| Pseudo R ² | 0.062 | |
| N | 42,766 | 33,559 |

These regressions show the impact of the accounting practice IFRS_{it} on the Debt/Asset_{it} ratio controlling for self-selection bias using the Inverse Mills ratio. Column 1 corresponds to the first stage of our Heckman model, where we model the probability that a firm adopts IFRS standards. Column 2 corresponds to the second stage of our Heckman model where we include in our main estimation the Heckman λ. The regressions are robust to heteroscedasticity. * p < 0.10, ** p < 0.05, and *** p < 0.01 (standard errors are indicated in brackets).

Table 12
Robustness Tests – Propensity Score Matching.

| | Debt / Asset |
|----------------|--------------------|
| Local vs. IFRS | 0.036*** (9.76) |
| Observations | 40,570 |

This table displays result for our propensity score matching analysis. In the analysis, we match our sample based on the year, the ROA, the Tangibility, the Size, the Age, the O-Score, the Sales Growth, the Country, the Rule of Law, the Information Index, the Civil Law and the Industry. * p < 0.10, ** p < 0.05, and *** p < 0.01 (standard errors are indicated in brackets).

and debt access, leading to a bias such as simultaneous causality. For example, firms that know they will have difficulty accessing new debt (e.g., due to their opacity) could decide to adopt IFRS to facilitate debt access. Therefore, our IFRS variable could be endogenous. To solve this problem, we use an Instrumental Variable (IV) regression, following the methodology of Larcker and Rusticus (2010), who explain that it is important to address the endogeneity problem before implementing the IV regression and to ensure that all tests assess model quality. The authors also note the difficulty of finding a valid instrument.

As an instrument, we use the presence of a BIG 4 auditor on a firm's audit team; both Affes and Callimaci (2007) and André et al.

⁸ We also test alternative thresholds (1%, 3% and 10%) and results remain highly similar and available upon request.

⁹ The Mills ratio is calculated as follows: $\lambda(\cdot) = \frac{\phi(\cdot)}{\Phi(\cdot)}$, where $\phi(\cdot)$ is the standard normal density function, and $\Phi(\cdot)$ is the standard normal cumulative distribution function of the linear prediction of our dependent variable.

¹⁰ For a fuller explanation of how to interpret the Mills ratio, see Kai and Prabhala (2007).

(2012) show that the presence of a BIG4 auditor is linked directly to IFRS adoption. Moreover, in our sample, BIG4 presence is significantly and highly correlated with IFRS adoption but is not linked directly to debt level (i.e., the correlation between BIG4 and our dependent variable is close to 0).¹¹ Thus we use a probit model, because IFRS is a dummy, to run the following estimation:

$$IFRS_{i,t} = \pi_0 + \pi_1 * BIG4_{i,t} + \pi_2 * \text{Control} + \varepsilon_{i,t}. \quad (2)$$

where $IFRS_{i,t}$ is our potential endogenous variable, $BIG4_{i,t}$ is our instrumental variable, and **Control** is a vector containing all control variables from our main estimation.

After the estimation, we run the Hausman specification test to determine whether IFRS and *Debt/Asset* are endogenous. If the result of the test is (not) significant, both variables are (not) endogenous, and the best model is IV (Ordinary Least Squares [OLS]) regression (Maddala, 1986). In our case, the *p*-value of the Hausman test is equal to 0.6066, such that our main estimation does not suffer from endogeneity bias caused by omitted variables (Van Tendeloo and Vanstraelen, 2005). Therefore, the best model is simple OLS rather than IV regression.

4.5.5. Propensity score matching

In our main model, we run a fixed effects regression to assess the impact of adopting IFRS on the debt-to-asset ratio or debt level in private companies, controlling for firm and country characteristics. However, even if fixed effects allow us to control for multiple characteristics, because of data limitations we cannot control directly for the characteristics of the project financed with new loans. One solution to this problem of missing data is to apply a propensity score matching method (Ioannidou and Ongena, 2010).

The aim of this technique is to gather companies that share similar characteristics (e.g., size, industry) and regress the dependent variable (i.e., *Debt/Asset*) on a treatment dummy (i.e., equal to 1 if a firm applies IFRS). Thus the dummy is the only remaining difference between two groups of similar companies, assumed to share the same investment opportunities.

Following the methodology of Shipman et al. (2017) and in line with previous literature (Florou and Kosi, 2015; Florou et al., 2017), we match firms based on all previous variables used in our model—country, sector, size, ROA, tangibility, risk score, sales growth, year, country characteristics (e.g., rule of law), credit bureau coverage, and type of law—to match firms according to common characteristics that explain level of private debt. We use a logistic propensity score treatment model. Each individual is matched with another individual from the other treatment level using the closest neighbor technic. To avoid “poor” matches we impose a caliper distance equal to 0.10.¹² Table 12 displays the results for the propensity score matching analysis for the *Debt/Asset* variable. Firms that use IFRS have higher debt-to-asset ratios than firms that use local GAAP.

5. Discussion and conclusion

Our paper appraises the impact of voluntary adoption of IFRS on debt level. We postulate that IFRS help firms access debt

by reducing their opacity. To test this assertion, we estimate a panel data regression on a sample of 8391 European private firms between 2005 and 2018. The findings show that IFRS voluntary adoption for non-listed groups is positively associated with debt-to-asset ratio and that choice of IFRS is all the more beneficial for firms that need to reduce information asymmetry related to country conditions or their own opacity. Private firms, which are globally more opaque, may opt for IFRS to signal their quality.

Strong informational environments appear to affect the benefits of firms that adopt IFRS. With regard to legal environment, IFRS adoption tends to be more beneficial in common law countries than civil law countries, because the distance between local GAAP and IFRS in the latter is greater and may limit the reduction of information asymmetry.

Firm characteristics also affect the benefits from using IFRS. In particular, riskier, smaller, or less tangible firms benefit more than others from adopting IFRS. Our idea is that IFRS help them more to reduce their opacity than firms relatively more transparent.

Our results are stable over various fixed effects and cluster specifications. They are robust to alternative variable and samples, self-selection, and endogeneity tests. They are also confirmed by propensity score matching.

Nevertheless, our work has some limitations; at this stage, our debt measures are only proxies for debt access. The intuition relies on the assumption that increasing debt access involves a higher debt level for the company. One possible extension of our paper would be to use granular data on new debt issues by companies. Having access to this type of information would allow identifying the specific changes in debt access following the adoption of new accounting principles such as IFRS. In addition, another extension of our analysis would be to distinguish firms with respect to their business, as some may rely more on debt than others, or may provide more collateral to potential lenders. Moreover, in spite of our controls, there are questions about the Orbis database itself, with regard to the variable related to accounting practice (André, 2017).

However, our results are robust and coherent enough to allow us to propose that private entities using IFRS voluntarily have a better access to debt. These results contribute to the debate on the role of accounting standards and support the IASB's initiative to include creditors within the main targets of financial information; after all, bankers also are investors. Our results also provide some guidance for the regulator. Harmonizing the accounting practices at the international level enhances credit access for private companies, including SMEs. Hence, it would be interesting for policymakers to investigate further this issue. Nevertheless, IFRS adoption is costly and it can be complicated for regulators to compel all firms to switch to IFRS. Hence, our results also show that regulators can alternatively play on the informational environment to help private companies get debt.

Finally, there are other possible benefits for entities to opt for IFRS: Both managers and specific shareholders may require these standards for stewardship reasons. These motivations could be analyzed through further studies.

CRediT authorship contribution statement

Jérémie Bertrand: Conceptualization, Methodology, Formal analysis, Writing - review & editing. **Hélène de Brebisson:** Conceptualization, Investigation, Methodology, Writing - review & editing. **Aurore Burietz:** Conceptualization, Methodology, Writing - original draft, Writing - review & editing.

¹¹ Pittman and Fortin (2004) argue that working with one of the Big auditors allows young firms to reduce their opacity leading to a decrease in their cost of debt. However, the authors show that this impact decreases over time and is lower for older firms, as well as for firms with a larger private history. As such, in our analysis focused on debt amounts, provided by banks that benefit from private information to relatively mature firms (31 year-old on average), we consider that the impact of retaining a BIG 4 on debt cost is negligible.

¹² We also test alternative caliper distances (0.01 and 0.03, as commonly seen in the accounting literature) and results remain the same. They are available upon request.

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Appendix A

Table A1
Variables Definition.

| Variables | Definition |
|--------------------------------|---|
| Dependent Variable | |
| Debt / Asset | Ratio of Long Term Debt divided by Total Asset |
| Log(Debt) | Natural log of debt (in dollar) |
| Independent Variables | |
| Accounting Variable | |
| IFRS | 1 if the firm uses IFRS as accounting standards, 0 (Local GAAP) otherwise |
| Control Variables | |
| Firm Characteristics | |
| ROA | Ratio of net income divided by total assets |
| Tangibility | Net property, plant, and equipment divided by total assets |
| Size | Natural log of total assets (in dollar) |
| Age | Firm age (in year) |
| O-score | Ohlson's (1980) measure of default risk, computed as $O = -1.32 + 0.407 * (\text{natural log of total assets}_t) + 6.03 * (\text{total liabilities}_t / \text{total assets}_t) - 1.43 * (\text{working capital}_t / \text{total assets}_t) + 0.076 * (\text{current liabilities}_t / \text{current assets}_t) - 1.72 * (1 \text{ if total liabilities} > \text{total assets and } 0 \text{ otherwise}) - 0.521 * ((\text{net income}_t - \text{net income}_{t-1}) / ((\text{net income}_t) + \text{net income}_{t-1}))$ |
| Sales Growth | The difference between the natural log of sales at time t and $t-1$ |
| BIG4 | 1 if the firm has at least one of the Big4 (i.e. KPMG, PwC, Deloitte or EY) in its auditor group, 0 otherwise |
| Country Characteristics | |
| Rule of Law | Index that measures the extent to which agents have confidence in and abide by the rules of society. These include perceptions of the incidence of both violent and non-violent crimes, the effectiveness and predictability of the judiciary, and the enforceability of contracts. |
| Civil Law | 1 if the firm is located in a civil law country, 0 (common law) otherwise. |
| Information Index | The depth of credit information index measures the coverage, scope and accessibility of credit information available through credit reporting service providers such as credit bureaux or credit registries. The index is ranged from 0 to 8. Average value by country between 2008 and 2018. |
| Credit Bureau Coverage | Number of individuals and firms listed in a credit private bureau's database (expressed as a percentage of the adult population). Average value by country between 2008 and 2018. |
| Credit Registry Coverage | Number of individuals and firms listed in a credit public registry's database (expressed as a percentage of the adult population). Average value by country between 2008 and 2018. |

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