The reporting of Adjusted EBITDA and stock Markets:
The Case of Canada and France

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Abstract

In this paper, we investigate whether adjusted EBITDA, a non-GAAP metric, provides market participants with relevant information as measured by a reduction in information asymmetry between managers and investors (share price volatility) and by its value relevance beyond the release of GAAP earnings. Toward that end, we compare firms from two countries with contrasting institutional regimes, Canada and France. Our analyses take into account the fact that firms self-select into disclosing non-GAAP information.

Our results show that Adjusted EBITDA reduces volatility both in Canada and in France, but in a similar fashion than components of GAAP earnings. We observe also that Adjusted EBITDA exhibits the same value relevance in Canada and France, but its impact seems greater than components of GAAP earnings. Canadian firms are much more likely to provide Adjusted EBITDA disclosure than French firms. In addition, CEO power as well as analysts and institutional investors’ monitoring reduce the likelihood of providing non-GAAP disclosure while free float and firm size affect it positively.

Key words: Adjusted EBITDA, non-GAAP, value relevance, voluntary disclosure.
1. **Introduction**

The purpose of this paper is to examine the disclosure and relevance of non-GAAP\(^1\) information released by publicly-listed firms in two contrasting institutional regimes, i.e., France and Canada. While both countries require firms to report according to International Financial Reporting Standards (IFRS), their institutional regimes differ on several dimensions such as legal origin, investor protection, regulatory oversight and market attributes. Among non-GAAP metrics, we choose to focus on the so-called Adjusted Earnings Before Interest, Taxes, Depreciation and Amortization (Adjusted EBITDA) as it is probably the most widely used.\(^2\)

We can observe the widespread reporting of non-GAAP metrics by publicly-traded firms, in their press releases, annual reports or other financial communications (e.g. conference calls) across all industries and in several countries. Numerous studies document the increasing use of non-GAAP metrics by European and North American firms (Black et al. 2018; Clinch et al. 2018; Jeanjean et al. 2018). For instance, Black et al. (2017, 2018) provide evidence that the proportion of S&P 500 firms relying on non-GAAP reporting has increased from 53% in 2009 to 71% in 2014. In a European context, all the 124 issuers studied by the European Securities and Markets Authority (ESMA) report at least one non-GAAP metric (ESMA, 2019).

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1 According to Goldschmidt (2013), non-GAAP reporting or information is a numerical measure of historical or future financial performance of an entity, its financial position or cash flows that excludes or includes GAAP numbers. There is a wide range of terms to name these indicators: street earnings, core earnings, adjusted earnings, etc.

2 Most firms report non-GAAP indicators relating to the level of performance, i.e. earnings measures. EBITDA (earnings before interests, taxes, depreciation and amortization) is a widely used non-GAAP metric, as are adjusted EBITDA, EBIT or adjusted EBIT (Earnings before interest and taxes) (PwC 2014). PwC (2019) reports that 97% of S&P 500 firms currently disclose non-GAAP performance measures. ESMA (2019) asserts that near of 55% of a sample of European firms used adjusted alternatives measures of performance such as adjusted EBITDA.
However, for investors and regulators, non-GAAP reporting does carry some risks, most notably as to whether it faithfully reflects a firm’s underlying performance (Sherman et Young (2017). For instance, between January 2013 and December 2015, LinkedIn reported net operating losses of $180 million in its audited financial statements prepared in accordance with U.S. Generally Accepted Accounting Principles (GAAP). However, the firm’s management wanted the financial analyst community to focus on a different set of numbers. More specifically, the firm reported a positive “adjusted EBITDA” for 2014 and 2015 of $1.37 billion. The gap between the GAAP and non-GAAP numbers is explained by removing depreciation and amortization charges, as well as the cost of stock-based compensation, from GAAP losses.

Such an example raises two questions. First, why are firms expanding the use of non-GAAP reporting? Demand from financial analysts and investors may underlie this trend: when looking for a summary assessment of corporate performance, they seem to be paying more attention to non-GAAP performance metrics than to standard GAAP earnings (Black et al. 2018). Second, does non-GAAP reporting provide relevant information to its target audience? In this regard, Sinnewe et al. (2017) argue that prior research indicates that non-GAAP metrics have a clear effect on investors’ decision-making. Supporting that view is the assertion by Jagannath and Koller (2013) that sophisticated investors and financial analysts prefer non-GAAP reporting as they consider GAAP earnings to have many shortcomings. Most notably, they want to be able to assess which earnings elements are likely to be recurring and which are likely to be nonrecurring (e.g., restructuring charges), an assessment that non-GAAP reporting facilitates.

Our analysis focuses on adjusted EBITDA because it clearly represents a voluntary disclosed item. Adjusted EBITDA goes a little further than just EBITDA, which can typically be easily inferred from regular financial statements: its calculation implies additional adjustments to
include or exclude effects that a firm’s management consider to be unrepresentative of their
gross cash generation capability (Vasconcelos de Andrade and Dal Ri Murcia, 2019). Hence,
adjusted EBITDA provides managers with considerable discretion because there are no
precarious deficiencies in the adjustments that can be added and deducted.

We choose to compare non-GAAP reporting between France and Canada. While both
countries have a common financial reporting framework relying on IFRS, they differ markedly in
terms of institutional regime. For instance, while Canada is a common law country, France
evolves within a code law context. In terms of investor protection, Canada is typically ranked
higher than France, with potential implications for stock markets’ informational properties (e.g.,
McLean, Zhang and Zhao, 2012). In addition, in terms of regulatory oversight of securities
markets, Canada adopts an ex-ante approach which focuses on compliance and market
enforcement while France prefers an ex-post approach based upon fines and penalties (Liu and
Magnan, 2012; Magnan, 2015, Cormier Guttierez and Magnan, 2020). Finally, France has a
tradition of using non-GAAP measures through the SIG table, which disaggregates net income
into several metrics, one of which is the EBITDA. Despite the application of IFRS since 2005,
the SIG table is still included in the French GAAP standard applicable to parent company
financial statements.

Relying on a sample of large firms from both countries, comparative analyses indicate that
non-GAAP reporting, as reflected by the disclosure of adjusted EBITDA is widespread in
Canada with 45% of firms reporting such a number. By contrast, only 17% of French firms
provide such disclosure. Regarding the decision to report adjusted EBITDA, a firm’s size, the

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3 Within Canada, the province of Québec is subject to code law. However, criminal law is under federal jurisdiction
and the country’s main stock exchange and its leading securities markets’ regulator are based in the province of
Ontario, which conforms to common law.

4 Soldes Intermediaires de Gestion which can be translated as Intermediate Managerial Totals.
extent of its free float and the fact it has a U.S. cross-listing positively appear to be critical
determinants for providing such disclosure. In contrast, analyst coverage, institutional ownership,
and CEO power appear to restrain a firm’s propensity to report adjusted EBITDA. Thus, while it
appears that market pressures play a role in the decision to report an adjusted EBITDA, some
internal governance realities are also at work.

Our core findings rely on multivariate regression analyses. Overall, non-GAAP disclosure,
as proxied by reported adjusted EBITDA, appears to be more value relevant than GAAP reported
earnings in both Canada and in France. Our analyses take into account the fact that firms self-
select to disclose adjusted EBITDA. More specifically, reported adjusted EBITDA reduces share
price volatility and also shows the same value relevance in both countries. Moreover, non-GAAP
adjustments, i.e., the difference between adjusted EBITDA and reported GAAP earnings, are
associated with greater value relevance than reported GAAP earnings in both countries.

Our paper contributes to two stands of literature. On the one hand, there is scant research
on the interface between corporate governance, at both the country- and firm-specific levels, and
non-GAAP reporting. Our comparative analysis of France and Canada suggests that a country’s
institutional regime seems to matter in driving non-GAAP reporting, with French firms being
less likely than Canadian firms to report adjusted EBITDA. Moreover, within each country, we
show that some market and governance features matter in determining the decision to engage in
non-GAAP reporting. On the other hand, we bring additional insights onto the non-GAAP
reporting debate by showing that, irrespective of institutional regime, non-GAAP reporting
seems to offer capital markets with relevant information, as reflected in lower stock price
volatility and greater value relevance than GAAP-based numbers such as reported earnings.
The rest of the paper is organized as follows. We next present the background and research hypotheses. The method section follows. Then, results are presented and the last section provides a conclusion and a discussion of the potential results’ implications.

2. **Background and Research questions**

2.1 **Non-GAAP Reporting: Opportunistic and/or Useful?**

The decision to adjust GAAP measures is discretionary. Hence, managers may try to mislead investors by opportunistically excluding some negative events from income in order to artificially inflate investor expectations of future profitability. In addition, when making adjustments to create non-GAAP earnings, managers may reduce the usefulness, the comparability and the transparency of accounting information. However, managers can, and do, exert discretion in a wide range of reporting choices, financial or otherwise. For instance, while required, the level of details in a Management Discussion & Analysis (MD&A) is left to management’s judgment and there is a wide variability in the depth of the commentaries provided by firms even if they face the same regulatory requirement (e.g. Bochkay and Levine, 2019; Cole and Jones, 2015).

Young (2014) argues that managers provide non-GAAP information as a response to demands for customized performance reporting by market participants who do not find what they need in a one-size-fits-all GAAP or IFRS reporting environment. In assessing the state of extant research on the topic of non-GAAP disclosure, he concludes that informative reporting and opportunistic motives both seem to underlie its emergence and growth. Essentially, some researchers consider that managers opportunistically use adjusted earnings to change (or influence) investors’ perceptions while other authors show that non-GAAP measures are
informative for investment decision-making (Jeanjean et al. 2018). For instance, Hirshleifer and Teoh’s (2003) theoretical model provides for the possibility of both legitimate and opportunistic reporting motivations. In an early empirical study, (Bhattacharya et al. 2003) provide some support for both views and highlights the tension underlying the issue of non-GAAP reporting. On one hand, they find that pro forma numbers are more likely to show a profit than (audited) GAAP operating income figures, i.e., there is an appearance of a positive bias in the way non-GAAP numbers are measured and reported. On the other hand, they also provide evidence that analysts view pro forma earnings to be a better measure of a firm’s permanent earnings than GAAP operating earnings. On that basis, it is to be expected that further empirical evidence on the topic offers different and contrasting viewpoints. We next review such evidence.

2.1.1 Non-GAAP Reporting as Opportunistic

Several papers provide evidence that is consistent with the perspective that managers act in an opportunistic manner in their non-GAAP reporting. For instance, Webber et al. (2013) conclude that non-GAAP measures provide investors with an embellished picture of a firm’s performance. Examining the fourth quarter press releases of S&P 100 firms over the period 2005-2010, they find a strong increase in non-GAAP reporting, especially following the financial crisis of 2008. Many firms enhance their financial performance by releasing restated accounting earnings, which exclude restructuring charges, provisions (on tangible, financial assets and goodwill) and gains / losses on financial instruments and tangible assets.

Baumker et al. (2014) also show that there is an opportunistic component in non-GAAP reporting. Indeed, their study of 253 firm-quarters from the S&P 500 concludes that gains are less likely to be carved out of earnings when there are no concurrent transitory losses. Focusing
as well on the measurement of non-GAAP metrics, Doyle et al. (2013) show that managers’
opportunism can manifest itself in the way non-GAAP measures are defined. They find that
managers aim to meet or beat analyst expectations by defining non-GAAP in such a way that is
not fully anticipated by analysts. As a benchmark beating tool, non-GAAP reporting is used as a
substitute to accrual management. However, ultimately, it appears that investors discount
earnings surprises that result from exclusions from GAAP earnings.

The papers referred above examine the U.S. reporting context. In a study of French listed
firms, Aubert (2010) shows that non-GAAP metrics tend to misinform market participants by
providing them with unregulated information that cosmetically improves financial performance.
From 116 financial press releases issued by French listed firms on the NYSE-Euronext Paris
between 1996 and 2006, he finds that non-GAAP earnings are higher than GAAP (or IFRS)-
based earnings. 82% of non-GAAP measures are positive instead of negative compared to GAAP
earnings. He concludes that non-GAAP information tend to misinform market participants by
releasing unregulated information that cosmetically improves financial performance.

2.1.2 Non-GAAP Reporting as Informative

However, there is also extensive evidence that is consistent with the perspective that non-
GAAP reporting can be informative and reduce information asymmetry between insiders and
market participants. For example, Curtis et al. (2014) aim to identify the motivation of managers
to disclose non-GAAP measures, i.e., to inform or mislead. Examining 1,920 transitory gains
disclosed quarterly in 10Q/K filings from 2001 to 2009, they conclude that the most pervasive
motivation to disclose non-GAAP earnings in the presence of transitory gains is to inform
investors.
Managerial motivation to inform is consistent with findings reported by Huang et al. (2016). Overall, their findings point toward the disclosure of non-GAAP numbers improving the price discovery process in stock markets and reducing information asymmetry between insider and market participants. Hence, they find that managers are more likely to disclose a non-GAAP earnings figure if information asymmetry before an earnings announcement is high. Furthermore, the reduction in information asymmetry that follows an earnings announcement is greater if a non-GAAP earnings number is released alongside GAAP earnings. The greater the magnitude of the non-GAAP earnings adjustment, the larger the reduction in information asymmetry.

Taking advantage of a unique institutional feature of U.K. capital markets, Charitou et al. (2018) reexamine the issues as to why firms disclose non-GAAP information and if such disclosure is consistent with either opportunism or informativeness. In short, U.K. firms can disclose non-GAAP earnings on the face of the income statement prepared in accordance with GAAP (IFRS). Relying on a sample of 1227 hand-collected firm-year observations from 2006 to 2013, they show that firms with better governance and a weaker financial performance are more likely to disclose non-GAAP earnings. Moreover, they also find that such disclosure translates into increased levels of market liquidity, taking into account the self-selection bias, a result that is consistent with non-GAAP earnings reducing information asymmetry in the market.

Further research shows that the informativeness of non-GAAP numbers is likely to be grounded, among other things, into their usefulness as a predictor of future performance. In this regard, Sinnewe et al. (2017) find evidence to suggest that non-IFRS earnings contain important information on future cash flow predictability that may be useful for investors.

2.1.3 The Informativeness of Non-GAAP Reporting: Some Caveats
Nevertheless, the informativeness of non-GAAP numbers is conditional upon market features such investor sophistication as well as a country’s institutional regime and its regulatory oversight. In his review of prior evidence, Young (2014) points out that the release of non-GAAP earnings can induce mispricing, particularly among unsophisticated investor groups. Moreover, transparency-oriented regulations and governance mechanisms typically imply higher quality disclosures and less mispricing. However, he does point that the foundation of informative non-GAAP reporting is an effective and robust GAAP reporting system.

That market features underlie the informativeness of non-GAAP reporting is highlighted by several studies that rely on non-U.S. data. Focusing on a sample of large European industrial firms, Guillamon-Saorin et al. (2017) show that non-GAAP measures provide relevant information to capital markets as captured by stock market reactions to earnings disclosures. However, their evidence also suggests that investors need to be alert. For instance, non-GAAP adjustments tend to persist for a longer period when they are accompanied by higher levels of impression management. Such a finding suggests that managers may be attempting to distort users’ perceptions when non-GAAP adjustments are of lower quality. Market reaction tests suggest that investors are able to see through managers’ intentions and discount non-GAAP information that is accompanied by high impression management. The detection of managers’ opportunistic behavior is conditional upon the level of sophistication of investors in the stock market in which the firm is listed.

Venter et al. (2014) study the value relevance of a non-GAAP measure (headline earnings) relative to GAAP earnings in South Africa where there is a mandatory requirement to report both measures. Their results show that non-GAAP earnings reported under a mandatory regime have higher value relevance than GAAP earnings. Thus, the disaggregation of these items is useful to
investors in a setting where managerial motivations are minimized. Focusing on New Zealand listed firms, Rainsbury et al. (2015) show that management is motivated to use non-GAAP earnings to provide a more favorable impression of their firm’s profitability. However, across firms, these non-GAAP earnings provide a better predictor of future earnings and are more value-relevant than GAAP earnings.

Clinch et al. (2018) also provide some indirect evidence that the usefulness of non-GAAP performance measures is conditional upon the institutional context the information is provided. Focusing on eight IFRS-adopting countries, they show that the disclosure of non-GAAP earnings provides value relevant information for firms that combine such disclosure with a GAAP-derived operating earnings measures such as EBIT or EBITDA but not for firms that solely provide earnings as per IFRS. Underlying that finding is the evidence that adjusting items are not value relevant for firms that provide both a non-GAAP earnings number and an IFRS-based operating earnings number in their financial statements, thus justifying management’s decision to exclude them in the non-GAAP number. Their findings indicate that the quality of reconciliations between GAAP and non-GAAP numbers drives how investors view non-GAAP information, an issue that is likely to be dependent upon the quality of regulatory oversight and investor sophistication.

There is limited evidence regarding the relation between corporate governance and non-GAAP earnings reporting. Overall, it appears that corporate governance does relate with the quality of published financial information. For example, Cormier et al. (2011) find that governance, as measured by director independence, does reduce the extent of managerial discretion in non-GAAP measures reported by Canadian flow-through entities. It is interesting to note that all entities in that group did release non-GAAP earnings metrics. Frankel et al. (2011)
examine 4,246 U.S. firms between 1995 and 2005. They observe that firms with more independent boards tend to use fewer adjustments and exclusions in determining their non-GAAP measures than other firms. They conclude that board independence is positively associated with the quality of non-GAAP reporting. Similarly, Jennings and Marques (2011) show that before Regulation G, investors were misled by non-GAAP information for firms with weak governance. Following the enactment of Regulation G by the SEC in 2002, there is no evidence of such behavior. Their results show the importance of firm-level corporate governance in ensuring quality non-GAAP reporting, even in a context of strong country-level governance.

Isidro and Marques (2013) focus on 318 large firms belonging to 20 European countries in 2003-2005. They show that the majority of these firms release non-GAAP measures, with 80% of the financial results’ press releases containing at least one non-GAAP measure related to earnings. They document a positive relation between the propensity to disclose non-GAAP and the use of contracts that link director compensation to stock market performance. The existence of such contracts seems to induce some opportunism in non-GAAP reporting. However, they also show that the presence of a competent board of directors does reduce the propensity to disseminate non-GAAP information for opportunistic purposes. There does not appear to be any significant change in non-GAAP reporting in 2005, which is the IFRS transition year.

Finally, Bansal et al. (2013) show that managers whose compensation is more sensitive to the volatility of stock prices tend to disseminate more information about non-GAAP results. However, they also show that managers use these non-GAAP measures less opportunistically.

Overall, we can conclude that the quality of a firm’s corporate governance associates with both the quantity and the quality of non-GAAP reporting.
2.2 Regulatory Frameworks for non-GAAP Disclosure

Our paper focuses on a widely-used non-GAAP metric, adjusted EBITDA. The calculation of adjusted EBITDA considers elements (i.e. adjustments) that firms deem to be unrepresentative of their gross cash generation (Vasconcelos de Andrade and Dal Ri Murcia, 2019). Such a process leaves managers considerable room for discretion because there are no specifications as to the underlying quality and reliability of the adjustments that can be added and deducted. Thus the definition given by European Federation of Financial Analysts Societies (EFFAS, 2016) is as follows: EBITA (Reported) +/- Non Recurrent Expenses (Income). In such cases, comparability and consistency remain an issue, and would perhaps require statements from management explaining how the metrics were calculated and how they compare with those used in previous years.

Faced with the issues of their measurement and proliferation, some countries have attempted to regulate non-GAAP disclosure. In the U.S., the Sarbanes-Oxley Act (2002) (SOX) requires public companies' disclosure or release of certain financial information that is calculated and presented on the basis of methodologies other than in accordance with GAAP. SOX adopts a new disclosure regulation, Regulation G, which requires public companies that disclose or release such non-GAAP financial measures to include, in that disclosure or release, a presentation of the most directly comparable GAAP financial measure and a reconciliation of the disclosed non-GAAP financial measure to the most directly comparable GAAP financial
measure. Black et al. (2017) suggest that the requirements imposed by SOX and Regulation G have to some extent, accomplished their intended purpose with respect to non-GAAP reporting. Specifically, their evidence suggests that aggressive non-GAAP reporting has generally decreased in the post-SOX period.

Canadian regulations are somewhat similar to those promulgated in the U.S. The Canadian Securities Administrators Staff Notice 52-306 (2018) explicitly states that: “In order to ensure that a non-GAAP financial measure does not mislead investors, an issuer should clearly define the measure and explain its relevance. As well, an issuer should present the measure on a consistent basis from period to period or explain any changes. Specifically, an issuer should provide a clear quantitative reconciliation from the non-GAAP financial measure to the most directly comparable measure calculated in accordance with the issuer's GAAP and presented in its financial statements, referencing to the reconciliation when the non-GAAP financial measure first appears in the document, or in the case of content on a website, in a manner that meets this objective.” Hence, Canadian regulations clearly require firms that provide non-GAAP disclosure to reconcile the non-GAAP number to a GAAP number, which is typically reported net earnings.

The IASB’s position on non-GAAP indicators is ambiguous. For example, its Chairman, Hans Hoogervorst, has repeatedly denounced that non-GAAP measures are not transparent and misleading for investors (Hoogervorst, 2015, 2016). However, IAS 1 §85 (revised version 2018) allows “An entity shall present additional line items (including by disaggregating the line items listed in paragraph 82), headings and subtotals in the statement(s) presenting profit or loss and other comprehensive income when such presentation is relevant to an understanding of the entity’s financial performance”. This can be explained by the IASB’s desire to recapture non-GAAP. To achieve this goal, the IASB has launched two projects, in 2019 on Primary Financial
Statements and on Management Commentary, to improve the structure and the communication effectiveness of financial statements and to harmonize management reporting. Hoogervorst (2019) asserts that the future income statement will present new subtotal like Operating Profit and Profit before Financing and Tax (which is close to EBITDA). This new subtotal is to be called Management Performance Measures.

In Europe, in 2005 the Committee of European Securities Regulators (CESR), the predecessor of the European Securities and Markets Authority (ESMA), issued a set of recommendations for the disclosure of non-GAAP measures, suggesting that firms which choose to disclose these measures do it “in a way that is appropriate and useful for investors’ decision-making.” In 2009, the European Financial Reporting Advisory Group (EFRAG) notes that non-GAAP figures referred to by the same name are “calculated differently by different companies” and that in many cases firms do not provide a reconciliation to GAAP information. In 2015 ESMA published its Final Guidelines on Alternative Performance Measures, for listed issuers, with the objective of encouraging “European issuers to publish transparent, unbiased and comparable information on their financial performance in order to provide users a comprehensive understanding of their performance” (press release, ESMA, 2015). ESMA has issued guidance aimed at harmonizing published non-GAAP measures.

With respect to France, the securities markets’ regulator, l’Autorité des Marchés Financiers (AMF), applies all the ESMA guidelines on alternative performance indicators (ESMA 2015). When an issuer decides to include non-GAAP measures in a prospectus, the principle of comprehensibility requires that these figures be defined, clearly named and reconciled with the financial statements, and that their relevance and reliability be explained (AMF, 2015).
Overall, it does appear that Canada and France offer regulatory frameworks that are quite similar with respect to the disclosure of non-GAAP information while the United States is more demanding.

2.3 Research Questions

Prior research indicates that non-GAAP reporting takes place in a context in which GAAP reporting does not leave much room for discretion (Isidro and Marques 2015, Young 2014). Managers view non-GAAP reporting either as a tool to convey additional information that is not adequately reflected in GAAP earnings or as an opportunity to deflect attention from unfavourable underlying earnings performance. If non-GAAP reporting is used strategically by managers, then we expect investors to use such information and to revisit their appreciation of underlying GAAP earnings. In other words, relevant and credible non-GAAP reporting is likely to enhance markets’ appreciation of GAAP earnings. Alternatively, if non-GAAP reporting is viewed as deceptive by investors, then it is not expected to affect their appreciation of underlying earnings. In light of the contrasting viewpoints that prevail with respect to the motive and effect of non-GAAP disclosure, we frame our core investigation in terms of a non-directional research question:

Research Question 1:
Do non-GAAP earnings, as proxied by adjusted EBITDA, differ from GAAP earnings in terms of providing market participants with relevant information?
We investigate that question in two national contexts with contrasting institutional regimes, i.e., France and Canada. For the purpose of the study, we define institutional regime as encompassing a country’s legal origin, the level of investor protection it offers, regulatory oversight and market attributes. Prior research does suggest that France and Canada differ on most of these dimensions. First, in terms of legal origin, France is a code law country while Canada is within the common law tradition.5 The implications for the relevance of GAAP and non-GAAP information are twofold. There is some evidence that firms evolving in code law countries (vs. common law countries) provide less voluntary disclosure as insiders strive to retain their informational advantage over external parties (e.g. LaPorta, Lopez-de-Silanes and Shleifer, 2008; Hope, 2003). Hence, on that basis, we should expect less widespread use of voluntary non-GAAP disclosure in France. In terms of value relevance, there is also evidence that financial disclosure exhibits greater relevance in firms that emanate from common law countries (e.g., Wang and Yu, 2015). However, by definition, non-GAAP disclosure is made beyond GAAP financial statements. In addition, the fact that such disclosure is likely to be less widespread in code law countries may lead it to be more valuable to investors. Hence, we do not have a clear expectation in terms of comparative value relevance.

Second, in terms of investor protection, there is substantial prior evidence to suggest that code law countries offer less investor protection than common law countries (La Porta et al., 2008), with implications in terms of corporate valuation (e.g. La Porta, Lopez-de-Silanes, Shleifer and Vishny, 2002; Giannetti and Koskinen, 2010). Moreover, a lesser level of investor protection has negative implications for the value relevance of financial disclosure (e.g. Cahan, 2012).

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5 Within Canada, the province of Québec has a legal system that is based on code law. However, Canada’s only stock exchange is based in Toronto in the province of Ontario, which has a common law tradition. Moreover, most Canadian firms are registered and/or headquartered in the provinces that have a common law system. Finally, criminal law is within federal jurisdiction and follow the common law tradition.
Emanuel and Sun, 2009; DeFond, Hung and Trezevant, 2007; Siekkinen, 2016). From that perspective, it is thus expected that non-GAAP disclosure arising from GAAP-based financial reporting that is less value relevant would also be less value relevant, which would be consistent with prior evidence (e.g. Leuz, 2010).

Third, regulatory oversight differs significantly between France and Canada. France market regulator tends to put the emphasis on ex post enforcement through fines and penalties and on prescribing specific disclosures. Canada’s market regulators (or securities commissions) exhibit an ex-ante focus and put pressures on firms to comply with existing laws and regulations (e.g. Djankov, La Porta, Lopez-de-Silanes and Shleifer, 2008; Liu and Magnan, 2011; Magnan, 2015). Hence, it is expected that Canada’s markets will tolerate much more diversity in disclosure, as long as it is within the framework of existing laws and regulations. However, how investors will view voluntary disclosure in that context relative to a less open context is an empirical question.

Finally, in terms of market attributes, France and Canada also exhibit notable differences. Canada is close to the United States, the world’s largest stock market and possibly one the most dynamic with respect to disclosure as firms seek to raise capital in the most efficient way (Leuz, 2010). In the United States, almost all publicly-traded firms disclose some form of non-GAAP performance metric (PWC, 2019). Since several Canadian firms are cross-listed in the United States and/or seek capital in the United States, U.S. investors’ demands for non-GAAP information are likely to transpire across the border. U.S. based investors are also present in France but mostly in the very large firms comprising the CAC 40 index, thus leaving the rest of the market less open to U.S. investors’ pressures. Some prior research also suggests that there seems to be greater market enforcement in Canada than in France (Cormier et al., 2020), with
institutional investors playing a much larger role, especially in terms of demands for disclosure. Hence, our second research question, which is also framed in a non-directional way:

**Research Question 2:**

Does a firm’s home country (i.e. France or Canada) institutional regime affect the relevance of GAAP and non-GAAP earnings for markets participants?

### 3. Methodology

#### 3.1 Empirical Models

We aim to investigate if and how the disclosure of adjusted EBITDA is relevant for stock market participants via its impact on information asymmetry and on the firm’s stock market value. We study adjusted EBITDA because we consider that it better represents a voluntary disclosed item than EBITDA. For example, the Bloomberg database publishes a computed EBITDA based on the mandatory reported income statement for almost all firms covered in the database. However, for adjusted EBIDA, the number contained in Bloomberg is based on a “reported” number. Hence compared to EBITDA, adjusted EBITDA allows to assess the reporting strategy of the firm. The definition of adjusted EBITDA given by EFFAS (2016) is as follows: EBITA (Reported)\(^6\) +/- Non Recurrent Expenses (Income).

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\(^6\) EBITDA is defined as operating result after non-recurring operating items (e.g. restructuring costs, start-up costs, etc.), before Depreciation, Amortisation & Write Downs, before Interest (also on pension provision for Germany), Associates & Tax.
The decision by a firm to disclose adjusted EBITDA is not random and gives rise to a potential self-selection bias. Therefore, we rely on Heckman's selection model with a two-step selection. In a first stage regression, we model the likelihood by a firm to disclose or not Adjusted EBITDA. Then, in a second stage, we assess the relation between Adjusted EBITDA and share price volatility, our proxy for information asymmetry, as well as share price value, to infer the value relevance of the disclosed number.

We examine if the disclosure of Adjusted EBITDA by a firm provides relevant information to market participants. Toward that end, we consider if such disclosure 1) affects the level of information asymmetry between insiders and investors and if it 2) is value relevant. We measure information asymmetry as share price volatility, a widely used proxy (e.g. Billings et al., 2015; Fu et al., 2012; Leuz and Verrecchia, 2000; Leuz, 2003). Prior work by Feltham and Ohlson (1995) and Amir et Lev (1996) inspire our value relevance model. Such a model maps a firm’s book value and earnings into its stock market valuation. Based on Matsumura et al. (2014) who suggest that unscaled market value of equity estimates generally perform better than scaled market value models, we do not scale market value, adjusted EBITDA and other measures.

The resulting empirical models are the following:

First stage

Adjusted EBITDA disclosure \((1/0)_{it} = \beta_0 + \beta_1 \text{DiffEBITDA}_{it} + \beta_1 \text{US Cross-Listing}_{it} + \beta_2 \text{CEO power}_{it} + \beta_2 \text{Governance score}_{it} + \beta_2 \text{CEO female}_{it} + \beta_4 \text{Firm size}_{it} + \beta_5 \text{Free float}_{it} + \beta_6 \text{Free float institutional}_{it} + \beta_7 \text{Analyst coverage}_{it} + \text{Year} + \text{Country} + \epsilon_{it}\)

Variables’ definitions are as follows. Adjusted EBITDA disclosure: dummy variable that takes a value of one (1) if a firm discloses an Adjusted EBITDA number, zero (0) otherwise;
DiffEBITDA: Earnings minus EBITDA scaled by total assets; US Cross-Listing; dummy variable that takes a value of one (1) if the firm is listed to a US stock market, zero (0) otherwise; Firm size: Natural log of total assets; Free float: percentage of free float ownership, i.e., ownership by shareholders than by blockholders; Free float institutional: Percentage of free float held by institutional investors; Analyst coverage: Number of analysts following a firm. The three governance variables (CEO Power, Governance score, CEO female) represent three (3) factors that arise from a factor analysis on six CEO attributes as well as Governance disclosure scores available in Bloomberg. We use 0.35 as the cut-off for component matrix coefficients. Four variables load on the first factor called CEO power: Duality, CEO tenure, CEO female, CEO age. The second factor relates to governance disclosure score and the third factor to the CEO being a woman. We use those three as independent variables in our empirical models.

Second stage

Share price volatility_{it} = \beta_0 + \beta_1 \text{Adjusted EBITDA}_{it} + \beta_2 \text{DiffAdjustedEBITDA}_{it} + \beta_3 \text{Adjusted EBITDA}_{it} \ast \text{France}_{it} + \beta_4 \text{DiffAdjustedEBITDA}_{it} \ast \text{France}_{it} + \beta_5 \text{France}_{it} + \beta_6 \text{Firm size}_{it} + \beta_7 \text{Beta}_{it} + \beta_8 \text{Ln volume}_{it} + \beta_9 \text{Year}_{it} + \varepsilon_{it}

or,

\text{Market value of equity}_{it} = \beta_0 + \beta_1 \text{Equity}_{it} + \beta_2 \text{Adjusted EBITDA}_{it} + \beta_3 \text{Diff Adjusted EBITDA}_{it} + \beta_4 \text{Adjusted EBITDA}_{it} \ast \text{France}_{it} + \beta_5 \text{Diff Adjusted EBITDA}_{it} \ast \text{France}_{it} + \beta_6 \text{France}_{it} + \beta_7 \text{Year}_{it} + \varepsilon_{it}
where $i$ is a specific firm, $t$ the year and $\varepsilon$ an error term.

Variables’ definitions are as follows. Share price volatility: natural log of share price volatility using daily returns for a given year; Market value of equity: share price times number of shares outstanding at year-end balance sheet; AdjustedEBITDA: actual adjusted EBITDA number disclosed in Bloomberg; Diff Adjusted EBITDA: Earnings as per the financial statements less Adjusted EBITDA; Firm Size: Natural log of year-end total assets; BETA: Systematic risk; Trading Volume: Natural log of annual trading volume; COE power, Governance score, CEO female: From a factor analysis (Table 3); France: dummy variable taking a value of one (1) if the firm is headquartered in France, zero (0) if in Canada.

3.2 Sample

The sample comprises 241 Canadian firms composing the S&P/TSX Index of the Toronto stock exchange for 2016 and 2017, for a potential number of 482 firm-year observations and 120 French firms composing SBF120 Index for a potential number of 240 firm-year observations for a total of 361 firms (712 firm-year observations). Out of this initial sample of 712 firm-year observations, because of missing data (especially governance data), we end up with 630 firm-year observations for the first stage regression (decision to report or not Adjusted EBITDA). The second stage regressions focus on firms that report adjusted EBITDA. We rely on 225 firm-year observations with reported adjusted EBITDA, of which 187 are from Canada and 38 from France. This represents 45.4% of observations in Canada ($187 / 412 = 45.4\%$) and 17.4% in France ($38 / 218 = 17.4\%$). These numbers are comparable to prior evidence about the prevalence of adjusted EBITDA in both Canada (Scilipoti and Georgopoulos, 2016) and France (Jeanjean et al., 2018). Numbers are in millions of euros. The data is collected from Bloomberg.
database.

4. Results

4.1 Descriptive statistics

Table 1 provides some descriptive statistics about sample firms’ financial and governance variables, for the full sample and for the Canadian and French subsamples. 187 firm-year observations disclose Adjusted EBITDA within the Canadian firms’ subsample (45% of Canada’s total observations) while the comparable number within the French firms’ subsample is 38 firm-year observations (17% of France’s total observations). Hence, a priori, Canadian firms are three times more likely to disclose Adjusted EBITDA than French firms. On average, for firms disclosing it, Adjusted EBITDA represents 12.3% of total assets, with scant difference between Canadian (12.6%) and French firms (11.2%). There are notable differences between the Canadian and French firms’ subsamples. Among governance variables, the governance score is higher in France (62) than in Canada (55). Chair-CEO duality is much higher in France (50%) than in Canada (14.7%). CEO-Founders are much more likely in Canada (10.4%) than in France (3.8%). French firms in our sample are much larger than sample Canadian firms, as reflected in several variables (market capitalization, book value of equity, total assets) and followed by more analysts (18 vs. 13, on average). A significant difference relates to the proportion of Canadian sample firms that are U.S. cross-listed (95%), while the proportion is only 3% for French firms.

Concerning the characteristics of firms that elect to report an adjusted EBITDA number, they are much smaller in both Canada and France in terms of market capitalization, book value or total assets.
Table 2 provides the results of the principal components analysis performed on all governance-related variables: Chair-CEO duality, CEO tenure, CEO founder, CEO female, CEO on the board, CEO age and governance score. Essentially, three factors emerge. The first factor captures an underlying construct which we label CEO power, the second reflects the governance score (mostly board-related variables) and the third, the fact the CEO is a woman.

4.2 **Multivariate Analyses – Impact of non-GAAP Disclosure**

4.2.1 **Information Asymmetry**

Table 3 reports regression results with a Heckman selection model (two-step estimates) on the relationship between Adjusted EBITDA and information asymmetry, as measured by share price volatility. The top panel reflects the second step estimation of the relation between the disclosure of Adjusted EBITDA and share price volatility while the bottom panel presents the first step estimation of the determinants of providing Adjusted EBITDA.

Focusing on the second step estimation in the top panel, the coefficient on Adjusted EBITDA is negatively related to share price volatility (-1.355; p < 0.002). In other words, for firms disclosing Adjusted EBITDA, the greater that number, the lower the level of share price volatility. This coefficient captures the impact for Canadian firms. We do not observe a difference for French firms since the coefficient on the interaction term adjusted EBITDA*France is not significant (-1.653; p < 0.295). Hence, the impact of Adjusted EBITDA on information asymmetry is similar in both countries.
The coefficient on Diff Adjusted EBITDA captures the effect on share price volatility of the information contained on the difference between GAAP earnings and Adjusted EBITDA, i.e., GAAP-based items that are removed from GAAP earnings by management to arrive at Adjusted EBITDA. The coefficient on that variable is negative and significant (-1.293; p < 0.002). Since that variable is negative, that implies that, for Canadian firms, the adjustments toward Adjusted EBITDA are associated with higher share price volatility. A similar situation prevails among French firms since the coefficient for the interaction term is not statistically significant (-1.215; p < 0.374). The coefficients on Adjusted EBITDA and Diff Adjusted EBITDA are not statistically different (F test = 0.01, p < 0.94), thus suggesting that the non-GAAP measure (Adjusted EBITDA) does not have a greater impact on information asymmetry than the GAAP measure (Diff Adjusted EBITDA).

Looking at the bottom panel of Table 3, we can see that firms disclosing Adjusted EBITDA typically exhibit a lower Diff EBITDA (i.e. difference between GAAP earnings and EBITDA), have a powerful CEO, are larger in size, have a larger free float, have a lower institutional free float, are less followed by analysts and are located in France. Hence, for firms with greater monitoring from institutional investors and analysts, there is a lower likelihood of disclosing non-GAAP information, potentially an outcome of these stakeholders’ ability to gather information from alternative sources.

Hence, for information asymmetry, reflecting on the two research questions underlying our study, we can conclude that 1) non-GAAP disclosure, as proxied by Adjusted EBITDA, is associated with lower share price volatility but to an extent that is similar to GAAP earnings, as proxied by Diff Adjusted EBITDA and, 2) there are no differences between the Canadian and French firms’ subsamples in this regard.
4.2.2 Value Relevance

Table 4 reports a regression results with Heckman selection model (two-step estimates) on the relationship between Adjusted EBITDA and stock market valuation. Focusing on the top panel, Adjusted EBITDA is value relevant with a coefficient of 7.535 (p < 0.000). The coefficient on Diff Adjusted EBITDA is positive and significant (3.919; p < 0.000). Since that variable is negative, it implies that these items are value relevant but are associated with lower values. Moreover, the coefficient for Diff Adjusted EBITDA is lower than the one for Adjusted EBITDA, suggesting that the non-GAAP measure has a greater impact on market pricing than the GAAP measure. The difference of coefficients on Adjusted EBITDA and Diff Adjusted EBITDA is statistically significant (F = 86.23, p < 0.000). Hence, with respect to our first research question, for value relevance results, we can conclude that non-GAAP earnings, as proxied by Adjusted EBITDA, differ from GAAP earnings in terms of providing market participants with relevant information. That differential is consistent with GAAP adjustments being perceived as transitory or non-permanent and, thus, less likely to have a long-lasting impact on firm valuation.

Again, we do not observe a difference for French firms since the coefficient on the interaction term Adjusted EBITDA*France is not significant (-1.473; p < 0.285). We observe the same result for Diff Adjusted EBITDA*France (0.913; p < 0.598). The fact that the impact of Adjusted EBITDA on the stock market valuation is significant for both Canadian and French firms suggests that a country’s institutional regime does not affect the value relevance of non-GAAP disclosure (research question 2).
Additional analyses (untabulated) indicate that adjusted EBITDA is a better predictor of a firm’s future cash flow from operations than either EBITDA or net earnings.

5. Conclusion

In this paper, we investigate whether adjusted EBITDA, a well-known non-GAAP measure, helps reducing information asymmetry between managers and market participants beyond GAAP earnings, and whether it enhances the value relevance beyond of earnings.

Specifically, we investigate two research questions about adjusted EBITDA: 1) do non-GAAP earnings, as proxied by Adjusted EBITDA, differ from GAAP earnings in terms of providing market participants with relevant information? 2) does a firm’s home country (i.e. France or Canada) institutional regime affect the relevance of GAAP and non-GAAP earnings for markets participants? For the purpose of this paper, we deem that a particular disclosure provides market participants with relevant information if it reduces information asymmetry, as proxied by share price volatility, and relates with a firm’s stock market value, reflecting value relevance.

Overall, our findings show that non-GAAP disclosure, as proxied by reported Adjusted EBITDA, is associated with lower share price volatility and is value relevant. In terms of its impact on information asymmetry, non-GAAP numbers and GAAP numbers appear to exhibit similar properties. However, non-GAAP earnings, as proxied by Adjusted EBITDA, appear to be more value relevant than GAAP reported earnings. There are no differences between Canada and France with respect to these findings. Our analyses take into account the fact that firms self-select to disclose adjusted EBITDA.
We observe that French firms are much less likely than Canadian firms to report an adjusted EBITDA number. Regarding the determinants of the decision to report adjusted EBITDA, free float, and firm size are positively related to the decision of reporting while analyst coverage, institutional ownership, and CEO power restrain the propensity to report our non-GAAP measure.

Our results are subject to some caveats. First, we conduct our analyses in only two countries, Canada and France, which may limit results generalizability. However, both countries exhibit unique and differentiated features that do connect them to other sets of countries. Second, we focus solely on Adjusted EBITDA as our non-GAAP measure. Firms do disclose other metrics such as Adjusted EBIT or Adjusted Earnings. However, evidence does suggest that Adjusted EBITDA is the most commonly disclosed non-GAAP metric and thus worthy of further investigation. Third, the decision to disclose Adjusted EBITDA, or any other non-GAAP measure for that matter, is not random and may reflect self-selection. We address this issue by conducting a Heckman two-stage procedure.

Our results do carry some implications for regulators and market participants. First, it does appear that non-GAAP disclosure is deemed informative and value relevant by market participants, thus suggesting that its disclosure has merit that regulators should recognize. Moreover, market participants do seem to be able to differentiate GAAP and non-GAAP numbers. Second, while Canada’s and France’s institutional regimes do not seem to affect the way market participants interpret and value non-GAAP disclosure, they appear to matter in a significant way in the decision by a firm to release non-GAAP numbers. The difference in disclosure frequencies between the two countries does warrant further investigation. Third, firm-specific features such as CEO power and institutional investors’ and analysts’ oversight appear
to reduce the likelihood of non-GAAP disclosure. In light of such disclosure informativeness, the influence of these factors warrants further analysis.

Table 1

Descriptive statistics - Means

<table>
<thead>
<tr>
<th></th>
<th>Total sample</th>
<th>Canada</th>
<th>France</th>
<th>Total</th>
<th>Reporting adjusted EBITDA</th>
<th>Not reporting adjusted EBITDA</th>
<th>Total</th>
<th>Reporting adjusted EBITDA</th>
<th>Not reporting adjusted EBITDA</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm-year observations</td>
<td>630</td>
<td>187</td>
<td>225</td>
<td>412</td>
<td>38</td>
<td>180</td>
<td>61.884</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Governance score</td>
<td>57.521</td>
<td>54.963</td>
<td>55.623</td>
<td>55.348</td>
<td>59.912</td>
<td>62.293</td>
<td>61.884</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duality</td>
<td>0.265</td>
<td>0.144</td>
<td>0.150</td>
<td>0.147</td>
<td>0.368</td>
<td>0.527</td>
<td>0.500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEO tenure (years)</td>
<td>7.405</td>
<td>7.096</td>
<td>7.419</td>
<td>7.284</td>
<td>4.973</td>
<td>8.155</td>
<td>7.325</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEO founder</td>
<td>0.093</td>
<td>0.095</td>
<td>0.111</td>
<td>0.104</td>
<td>0</td>
<td>0.084</td>
<td>0.038</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEO female</td>
<td>0.035</td>
<td>0.015</td>
<td>0.032</td>
<td>0.025</td>
<td>0.079</td>
<td>0.050</td>
<td>0.054</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>CEO on the board</td>
<td>0.887</td>
<td>0.930</td>
<td>0.939</td>
<td>0.935</td>
<td>0.711</td>
<td>0.807</td>
<td>0.792</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEO age</td>
<td>56.180</td>
<td>55.497</td>
<td>56.037</td>
<td>55.809</td>
<td>54.729</td>
<td>57.305</td>
<td>56.902</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beta</td>
<td>1.951</td>
<td>2.020</td>
<td>1.231</td>
<td>1.695</td>
<td>2.544</td>
<td>2.044</td>
<td>2.468</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>US Cross-Listing</td>
<td>0.643</td>
<td>0.955</td>
<td>0.939</td>
<td>0.946</td>
<td>0.105</td>
<td>0.020</td>
<td>0.033</td>
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<tr>
<td>Share price volatility</td>
<td>31.346</td>
<td>30.295</td>
<td>53.344</td>
<td>33.239</td>
<td>27.145</td>
<td>27.619</td>
<td>27.546</td>
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<tr>
<td>Trading volume</td>
<td>3.448</td>
<td>2.838</td>
<td>4.408</td>
<td>3.7408</td>
<td>2.018</td>
<td>2.978</td>
<td>2.82108</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobin</td>
<td>1.705</td>
<td>1.831</td>
<td>1.648</td>
<td>1.725</td>
<td>1.577</td>
<td>1.682</td>
<td>1.665</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Book value of equity</td>
<td>5 426</td>
<td>2 220</td>
<td>4 379</td>
<td>3 400</td>
<td>5 759</td>
<td>10 184</td>
<td></td>
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<tr>
<td>Total asset</td>
<td>44 404</td>
<td>7 174</td>
<td>41 101</td>
<td>27 382</td>
<td>17 327</td>
<td>78 584</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Free Float (%)</td>
<td>81.725</td>
<td>90.278</td>
<td>87.969</td>
<td>88.937</td>
<td>72.225</td>
<td>66.303</td>
<td></td>
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<tr>
<td>Free Float Institutional (%)</td>
<td>54.360</td>
<td>54.566</td>
<td>56.028</td>
<td>55.413</td>
<td>51.960</td>
<td>52.310</td>
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<tr>
<td>Adjusted EBITDA</td>
<td>0.123</td>
<td>0.126</td>
<td></td>
<td></td>
<td>0.112</td>
<td></td>
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<tr>
<td>Diff Adjusted EBITDA</td>
<td>-0.088</td>
<td>-0.089</td>
<td></td>
<td></td>
<td>-0.082</td>
<td></td>
<td></td>
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</tbody>
</table>
Table 2

Principal component factor analysis

Attributes of the Chief executive officer

<table>
<thead>
<tr>
<th>N : 695</th>
<th>Factor</th>
<th>Eigenvalue</th>
<th>Variance explained (%)</th>
<th>Cumulative variance explained (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Factor 1</td>
<td>1.820</td>
<td>0.260</td>
<td>0.260</td>
</tr>
<tr>
<td>2</td>
<td>Factor 2</td>
<td>1.094</td>
<td>0.156</td>
<td>0.416</td>
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<tr>
<td>3</td>
<td>Factor 3</td>
<td>1.035</td>
<td>0.148</td>
<td>0.564</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>CEO power</th>
<th>Governance score</th>
<th>CEO female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duality</td>
<td>0.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEO tenure (years)</td>
<td>0.61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEO founder</td>
<td>0.47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEO female</td>
<td></td>
<td>0.86</td>
<td></td>
</tr>
<tr>
<td>CEO on the board</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEO age</td>
<td>0.44</td>
<td></td>
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<tr>
<td>Governance score</td>
<td></td>
<td>0.76</td>
<td></td>
</tr>
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</table>
Table 3

Heckman selection model with sample selection (two-step estimates) on the relationship between adjusted EBITDA and information asymmetry

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Expected Sign</th>
<th>Coefficient</th>
<th>Z test</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share price volatility</td>
<td>N: 217</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted EBITDA</td>
<td>+/-</td>
<td>-1.370</td>
<td>-2.88</td>
<td>0.002</td>
</tr>
<tr>
<td>Diff Adjusted EBITDA</td>
<td>+/-</td>
<td>-1.332</td>
<td>-3.13</td>
<td>0.001</td>
</tr>
<tr>
<td>Adjusted EBITDA*France</td>
<td>+/-</td>
<td>-1.702</td>
<td>-1.09</td>
<td>0.274</td>
</tr>
<tr>
<td>Diff Adjusted EBITDA*France</td>
<td>+/-</td>
<td>-1.340</td>
<td>-0.99</td>
<td>0.322</td>
</tr>
<tr>
<td>France</td>
<td>+/-</td>
<td>0.086</td>
<td>0.45</td>
<td>0.655</td>
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<tr>
<td>Firm size</td>
<td>-</td>
<td>-0.182</td>
<td>-7.53</td>
<td>0.000</td>
</tr>
<tr>
<td>Beta</td>
<td>+</td>
<td>0.012</td>
<td>2.53</td>
<td>0.006</td>
</tr>
<tr>
<td>Trading volume</td>
<td>+</td>
<td>0.167</td>
<td>6.13</td>
<td>0.000</td>
</tr>
<tr>
<td>Year-specific dummy</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Dependent variable: Adjusted EBITDA 1/0 | N: 622 | | | |
| Diff EBITDA | - | -2.815 | -2.30 | 0.011 |
| US Cross-listing | + | 0.163 | 0.60 | 0.274 |
| CEO power (F1) | +/- | -0.110 | -2.53 | 0.012 |
| Governance score (F2) | +/- | 0.097 | 1.49 | 0.136 |
| CEO female (F3) | +/- | -0.050 | -0.86 | 0.389 |
| Firm size | + | 0.093 | 1.80 | 0.035 |
| Free float | + | 0.007 | 2.37 | 0.009 |
| Free float institutional | - | -0.005 | -1.98 | 0.024 |
| Analyst coverage | - | -0.036 | -3.17 | 0.001 |
| France | +/- | -0.509 | -1.79 | 0.036 |
| Year-specific dummy | Yes | | | |
| Mills-Lambda | Yes | 1.73 | 0.084 |

Wald test 160.1 (0.000)

*One-tailed if there is a predicted sign. Two-tailed otherwise.
Table 4
Heckman selection model with sample selection (two-step estimates) on the relationship between Adjusted EBITDA and stock market valuation

<table>
<thead>
<tr>
<th>Dependent variable: Market value of equity</th>
<th>Expected Sign</th>
<th>Coefficient</th>
<th>Z test</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity</td>
<td>+</td>
<td>0.563</td>
<td>4.43</td>
<td>0.000</td>
</tr>
<tr>
<td>Adjusted EBITDA</td>
<td>+/-</td>
<td>7.535</td>
<td>12.32</td>
<td>0.000</td>
</tr>
<tr>
<td>Diff Adjusted EBITDA</td>
<td>+/-</td>
<td>3.919</td>
<td>6.16</td>
<td>0.000</td>
</tr>
<tr>
<td>Adjusted EBITDA*France</td>
<td>+/-</td>
<td>-1.473</td>
<td>-1.07</td>
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<td>Diff Adjusted EBITDA*France</td>
<td>+/-</td>
<td>0.913</td>
<td>0.53</td>
<td>0.598</td>
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<tr>
<td>France</td>
<td>+/-</td>
<td>232.83</td>
<td>0.15</td>
<td>0.884</td>
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<tr>
<td>Year-specific dummy</td>
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<table>
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<tr>
<th>Dependent variable: Adjusted EBITDA 1/0</th>
<th>Expected Sign</th>
<th>Coefficient</th>
<th>Z test</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diff EBITDAaas</td>
<td>-</td>
<td>-2.727</td>
<td>-2.26</td>
<td>0.012</td>
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<tr>
<td>US Cross-listing</td>
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<td>0.153</td>
<td>0.57</td>
<td>0.286</td>
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<tr>
<td>CEO power (F1)</td>
<td>+/-</td>
<td>-0.102</td>
<td>-2.39</td>
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<tr>
<td>Governance score (F2)</td>
<td>+/-</td>
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<td>0.62</td>
<td>0.536</td>
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<tr>
<td>CEO female (F3)</td>
<td>+/-</td>
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<td>-0.73</td>
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<tr>
<td>Firm size</td>
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<td>2.50</td>
<td>0.006</td>
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<tr>
<td>Free float institutional</td>
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<td>Analyst coverage</td>
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<td>France</td>
<td>+/-</td>
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</table>

| Mills-Lambda                             |               |             |        |         |
| Wald test                                | 1278          | 1.14        | 0.256  |
| P Value                                  | (0.000)       |             |        |         |

*One-tailed if there is a predicted sign. Two-tailed otherwise.


EFFAS. (2016). *Definition guide.*


