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IFN Working Paper No. 1259, 2018

# **Optimal vs Satisfactory Transparency: The Impact of Global Macroeconomic Fluctuations on Corporate Competitiveness**

Lars Oxelheim

# **Optimal vs satisfactory transparency: The impact of global macroeconomic fluctuations on corporate competitiveness**

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## **Abstract**

Being able to separate temporary global macroeconomic influences – caused by fluctuations in exchange rates, interest rates and inflation – from intrinsic performance – related to a superior product, production process or management - is crucial to the assessment of the development of a firm's competitiveness. Against that background, the paper analyzes institutions' role in making firms supply outside shareholders with relevant information corresponding to *satisfactory transparency* from the shareholder perspective. Based on a sample of the 100 largest public European firms it is found no firm provided information to the level deemed satisfactory by the outside shareholder. One explanation may be that *optimal transparency* for the firm does not equal satisfactory transparency for the outside shareholder. However, the implementation of IFRS/IAS 1 in the EU as of 2005, and a company's international cross-listing activities exhibit associations with better supply of information and a narrowing of the gap. Shareholders in the Anglo-Saxon corporate governance system are provided with more relevant information than those in other corporate governance systems. The paper adds to the literature on the role of institutions in international corporate governance, with the particular focus on information asymmetries in an international business context.

**Keywords:** macroeconomic fluctuations, intrinsic performance, international financial reporting standards, corporate information disclosure, optimal transparency, satisfactory transparency, corporate governance systems, international cross-listing.

**JEL:** F23, F37, G18, G32, G38, L25, M21, M41, M48

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**OPTIMAL VS SATISFACTORY TRANSPARENCY:  
THE IMPACT OF GLOBAL MACROECONOMIC FLUCTUATIONS ON  
CORPORATE COMPETITIVENESS**

## **1. Introduction**

To support most corporate decision-making, the decision-maker needs to understand what share of the profits (or corporate performance in general) reflects a superior product, production process and/or management (i.e. the intrinsic competitive edge of the firm) and what share reflects a temporary effect of macroeconomic variables, that is, exchange rates, interest rates and inflation rates. Knowledge about the development of the former share (intrinsic profits) is the basis for corporate decisions to invest/divest, increase wages, launch compensation programs for management, determine an adequate dividend, and hire and fire employees. This knowledge is also of importance to the decision-making of outside stakeholders. The data needed to measure and comprehend the share of profits generated by a beneficial macroeconomic development (tailwind) or reduced by an adverse macroeconomic development (headwind) are, however, seldom shared in an appropriate way with external stakeholders, and these stakeholders cannot compile this information themselves. The deviation of the firm's supply of information from what is seen as satisfactory by the stakeholder (from here on, the shareholder) is the focus of this paper. The paper addresses institutional factors influencing the gap between the information supplied by the firm and the information the shareholder needs to understand – as an input into his/her investment decision – how the intrinsic competitive edge of the firm has developed.

The paper recognizes the existence of an information asymmetry, which is also the building block of the concept of transparency (Forsssbaeck & Oxelheim, 2015). The asymmetry is between a sender (the firm) and a receiver (the stakeholders of the firm) of information. Optimal corporate supply of information (*optimal* transparency from the firm's perspective) is where the firm meets the shareholder's demand for information in the mutual interest of providing the firm with the best economic prospects. Included in the "mutual interest" is a risk premium charged as compensation by the outsider shareholder for having to accept a less than satisfactory information release (where *satisfactory* transparency means the threshold of information needed by the shareholder to comprehend the development of the intrinsic profits).<sup>1</sup>

In addition to firm-specific effects, unsatisfactory transparency may materialize at the societal level in a higher aggregate cost of capital (Forsssbaeck & Oxelheim, 2006; Lambert et al., 2007) that decreases investment rates and decelerates national economic growth. Hence, incentives do exist at a national or regional level to encourage firms to increase transparency to a satisfactory level in order to help outsider shareholders make proper judgments about corporate competitiveness, even if there may be proprietary costs involved (e.g., Dye, 1985; Leuz, 2004; Lang & Sul, 2014). In a policy context, this ambition may be achieved via the design of accounting rules and corporate governance standards.

The research question addressed in this paper concerns the role played by institutional forces in minimizing the gap between optimal and satisfactory transparency with respect to the effects

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<sup>1</sup> For instance, a firm may consider some information to be proprietary (e.g. Leuz & Verrecchia, 2000; Verrecchia, 2001; Berger & Hann, 2007; Lambert et al., 2007) and the option of not revealing it an expression of optimal transparency with the ambition to e.g. foster innovation and productivity (Bernstein, 2014). However, what is seen as optimal for the firm may be seen as unsatisfactory transparency by the shareholders, preventing them from understanding intrinsic performance. The shareholders will react to this by charging a risk premium for the deviation between optimal and satisfactory transparency that will increase the firm's cost of capital (e.g. Merton, 1987; Leuz & Verrecchia, 2000; Verrecchia, 2001; Lambert et al., 2007; Daske et al., 2008).

of macroeconomic fluctuations on corporate competitiveness. In determining the demand side of information and what is seen as “satisfactory” transparency by the shareholders, the analysis follows the approach<sup>2</sup> outlined in Oxelheim & Wihlborg (2008). In a normative way, their approach is used to identify the floor as regards the shareholders’ need for information to enable a filtering out of the effects of a macroeconomic tail- or headwind from reported profits with the aim of understanding the development of a firm’s competitiveness.

On the supply side of information, methods used to measure and report the effects of changes in the macroeconomic environment are, in the literature as well as in practice, found to be both puzzlingly partial and static in scope (Oxelheim, Wihlborg & Thorsheim, 2012). They are partial in the sense that deeply rooted theoretical relationships among exchange rates, interest rates and inflation rates are not fully captured. The interdependence between these variables is not accounted for, even though prior research has established that the different relevant macroeconomic variables (interest rate, exchange rate and inflation rates) are correlated (Forssbaeck & Oxelheim, 2003). Moreover, volume effects from changes in macroeconomic variables are ignored on the supply side of information, and so too are the effects of interest rate changes on the demand for a firm’s products and services, hence providing the shareholder with only a partial picture of the profit development (Oxelheim & Wihlborg, 2008).<sup>3</sup> Finally, a supply of information that will be seen as satisfactory from the shareholders’ point of view has to capture effects not explicitly visible from the existence of a particular foreign currency

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<sup>2</sup> It consists of three pillars: (1) fundamental analysis to identify the set of macroeconomic variables (within the categories of exchange rates, interest rates and inflation rates) with potential explanatory power for variations in corporate profits, (2) multivariate analysis to sort out which variables have high explanatory power and should be considered, and finally, (3) formulating a strategy to handle the effects of the macroeconomic variables found to have high explanatory power.

<sup>3</sup> It is hard to find any firm that is not impacted by what is happening on the global economic arena. However, the impact differs from firm to firm. Some firms may be exposed to a very small effect but the shareholders of these firms still need to be explicitly informed about the magnitude through the information supplied by the firm. A reluctance to provide information will cause the shareholder to charge a risk premium for not knowing the difference between pure reluctance and a small impact.

denomination in the books of the firm, and has to reflect that a firm may be outcompeted in its home market by a foreign competitor subsidized by the overvaluation of the firm's home currency.

For the supply side of information, three potential institutional sources of importance are considered. First, international institutional influences (here International Financial Reporting Standards; IFRS) are assumed to express themselves via the narrowing of the quantity and relevance of the supply of information to the demand deemed satisfactory by shareholders. The institutional pressure may, for instance, reduce the gap between the demand and supply of information by eliminating or reducing the information held back as part of the management's carrier signaling or efforts to boost compensation (Ferri & Maber, 2013). Second, accounting rules and national institutional pressure from the corporate governance system in the location in which a firm is headquartered and, third, the indirect international institutional pressure (or transmission of governance practice) via international cross-listing are expected to influence the gap between the information supplied by the firm and what is deemed satisfactory by the outside shareholder.

Based on a sample of the 100 largest public European firms (see appendix) for the period 2000-2009, the analysis points to a drift in the supply of information towards what is here claimed to be a satisfactory level of transparency. The result in terms of a diminishing transparency gap suggests that strengthened influence from institutional factors may substitute for mandatory rules, thereby allowing some firms to avoid big costs by forcing all firms to provide transparency that is satisfactory for the shareholder, though not optimal for the firm. However, the results also indicate that none of the 100 analyzed companies supplied information that would allow the outside shareholders to fully comprehend the development of intrinsic

performance and, hence, any potential change in competitiveness. The IAS1/IFRS, as of 2005 (with promulgation phase and implementation), with its recommendations regarding macroeconomic information, is found to have contributed towards narrowing the transparency gap. Such a contribution is also found for the Anglo-Saxon and Nordic corporate governance regimes, as well as for international cross-listing. Optimal transparency for a firm may well mean supplying a level and quality of information below that seen as representing satisfactory transparency. However, with *all* the studied firms supplying less information than seen as satisfactory, further support from institutional factors to narrow the transparency gap may be called for

This paper adds to the literature on the role of institutions in international corporate governance with a particular focus on information asymmetries and risk premia in the international business context. It provides a new angle on the stream of research that examines the supply of information in relation to corporate governance systems (Leuz et al., 2003; Ball et al., 2003; Daske et al., 2008). Further, as regards the role of international cross-listing in narrowing the transparency gap in the case of macroeconomic information, the findings add a new aspect to Khanna et al. (2004). In the very context of *optimal* and *satisfactory* transparency, the paper adds to the literature on voluntary disclosure (Leuz & Verrecchia, 2000), agency theory (Jensen & Meckling, 1976), the theory of proprietary costs (Dye, 1985; Ellis et al., 2012; Lang & Sul, 2014) and the disclosure of segment information (Berger & Hann, 2007).

The article is structured as follows. In Section 2, the theoretical frameworks and empirical evidence on transparency from market and firm perspectives are discussed, as well as the concept of optimal transparency. The hypotheses are also developed in this section. Section 3 highlights previous research on the supply of information regarding the macroeconomic impact



on the profits of a firm. Here, the development and implications of IFRS (in particular IAS 1) are discussed. In the next section, a comprehensive approach allowing firms to be transparent on the role of macroeconomic fluctuations, the Macroeconomic Uncertainty Strategy (MUST) model, is discussed. The MUST approach allows a firm to identify, measure, manage and report macroeconomic impacts on its profits. The model is used to show how macroeconomic information may be extracted to provide information seen as satisfactory by the external shareholder. In Section 5, the data, variables, methodology and descriptive results are presented, followed by the main results in Section 6 and conclusions in Section 7.

## **2. Theory and hypotheses**

Both theoretical and empirical research make a distinction between firm-specific motives for transparency and motives in an overall market perspective. From an individual firm's perspective, optimal transparency corresponds to the "degree of supply of information" that yields the greatest net benefits, that is, maximizes firm value. However, individual firms may not account for all costs, which on an aggregate market level can lead to suboptimal outcomes and a transparency encompassing new forms of information.

### *2.1 Market-related effects of the corporate supply of information*

The effects of the supply of information may go beyond the effects on a specific firm and appear as a market-related effect, influencing competitors as well as other firms, industries or the entire economy of a region or country. When information is revealed, for example regarding consumer trends or detailed performance per business sector, other firms can benefit from reduced information asymmetries. This is an example of an externality that has been examined theoretically, with a suggested link between liquidity and information, as well as between the aggregate cost of capital and the supply of information (Dye, 1990; Admati & Pfleiderer, 2000;

Lambert et al., 2007). The external effects of financial reporting have also been recognized in the empirical literature; Foster (1981) shows that earnings announcements supply investors with information about other firms in the industry. However, externalities work both ways and Sadka (2006) demonstrates that misreporting has spillover effects onto incumbents in the same industry, which indicates not only the importance of having adequate reporting rules in place but also the value of an institutional infrastructure to enforce these properly.

## *2.2 Firm-specific effects of the supply of information*

Theoretical research mainly focuses on liquidity and cost of capital in examining the effects of the corporate supply of information (Forsbaeck & Oxelheim, 2006). If financial reporting is inadequate then market liquidity should be reduced due to information asymmetry and adverse selection, and investors will demand higher returns on their investments. The effect on liquidity stemming from the supply of information is well documented in the empirical research. Leuz & Verrecchia (2000) show that firms voluntarily changing from German GAAP to IAS (or US GAAP) have larger trading volumes and smaller bid-ask spreads (see also Welker, 1995; Healy et al., 1999). This also includes an effect of an early commitment to more transparency, and supports the theoretical arguments in Verrecchia (2001), who argues that an increase in corporate information supply may alleviate liquidity issues and increase firm value.

In addition to an indirect link between cost of capital and liquidity, Lambert et al. (2007) show a direct link between the cost of capital and the supply of information, by examining estimation risk in a theoretical model. They find that the supply of firm-specific information affects the assessed cash-flow covariance between firms; hence, there is a non-diversifiable cost-of-capital effect. They also show that the supply of information affects real decisions and future expected cash flows. The presence of information asymmetries and adverse selection affect capital

allocation decisions through the cost of capital (see also Myers & Majluf, 1984; Baiman & Verrecchia, 1996). Due to a higher cost of capital, investment opportunities may be foregone. Empirical research supports the theory on this matter. Frankel et al. (1995) find a positive relationship between external financing and the supply of information.<sup>4</sup> A study investigating the cost of capital in an IFRS environment (mandatory disclosure, as compared to recommendations only) is provided by Daske et al. (2008). They find a decrease in the cost of capital as a result of the implementation of IFRS, when they include early adopters. The outcomes of other studies on the adoption of plain recommendations are less conclusive regarding the link between the corporate supply of information and the cost of capital (e.g., Botosan, 1997; Botosan & Plumlee, 2002; Cuijpers & Buijink, 2005; Daske, 2006; Banghøj & Plenborg, 2008; Hussainey & Walker, 2009; Lang & Maffett, 2011). The inconclusiveness may be explained by a vague definition of the demand for relevant information.

There are costs attached to the supply of information and they can be divided into direct and indirect costs. The components that make up the direct costs are rather easy to identify, but hard to estimate. Examples of typical direct costs are labor costs, rents and costs of information systems. The most evident indirect cost is the risk of revealing proprietary information that competitors will be able to use to their advantage (Verrecchia, 2001). Leuz (2004), for example, studies a sample of German firms and finds that the probability of information disclosure is lower when a firm's market segment has higher profitability. Hence, proprietary costs seem to be present. Differences in proprietary costs are, in Oxelheim (2003), expected to appear as a difference in the supply of information between companies with homogeneous and companies with heterogeneous products. However, the study finds no significant differences of that kind.

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<sup>4</sup> See also Ozkan et al (2012) reporting higher earnings quality and greater earnings comparability brought by the mandatory adoption of IFRS.

### *2.3 Optimal transparency*

A high level of transparency is not synonymous with publishing as much information as possible, but rather with presenting fair and useful information that assists outsiders with making well-informed forecasts of future performance and the sustainability of competitiveness. In other words, there is a “satisfactory” demand for information from outside shareholders that companies must consider in their supply of information. Drowning outsiders in information is more confusing than helpful and firms must be heedful of the fact that additional information is not the same as enhanced information quality (Morris & Shin, 2002; Forssbaeck & Oxelheim, 2015). Producing and supplying information comes at a cost to the firm, and a cost of digestion for the shareholder must also be considered in determining what can be labeled optimal transparency. The trade-off between the costs and benefits of the supply of information builds on three strands of literature: agency theory (Jensen & Meckling, 1976), the theory of proprietary costs (see, e.g., Dye, 1985; Ellis et al., 2012; Lang & Sul, 2014) and the disclosure of segment information (Berger & Hann, 2007).

In addition to the risk of supplying too much information, a central aspect that may make the transparency deviate from the satisfactory level without being optimal for the firm is found in the CEO’s own incentive structure. From his or her point of view, there may be good reasons to hold back detailed macroeconomic-related information from the public, while this information may be a vital component from an investor’s point of view. For example, Chiu et al. (2016) report a large part of CEO compensation to be attributed to macroeconomic fluctuations, which implicitly suggests that managers are compensated for performance beyond their control. Without an adequate supply of information regarding the role played by macroeconomic variables in profit development, CEOs will – in a setting of asymmetric

remuneration systems – be tempted for personal reasons to have more open macroeconomic exposure than is optimal for the firm. The lack of disclosure will pave the way for moral hazard and excessive risk taking. Since the management controls the information supply, it is important to analyze – as is done in this study – the role institutional pressure on the firm has in increasing the quality of macroeconomic information disclosed, so as to protect shareholder.

#### *2.4 Institutional influences on the transparency gap – the hypotheses*

The implementation of IFRS as of 2005 for public European firms was an attempt to increase transparency but in a voluntary way, as a mere recommendation regarding the information to be supplied on the role of the macroeconomic impact on performance.<sup>5</sup> The analysis here includes this dimension as the first institutional influence on the transparency gap, though the results of previous studies covering the adoption of recommended reporting rules and the effects of the supply of information are not uniform (e.g., Leuz & Verrecchia, 2000; Cuijpers & Buijink, 2005; Daske, 2006, Kim et al., 2011). During the period of study, IAS 1 – which outlines standards for presenting financial statements – was modified several times (Gray & Kang, 2015), and this is considered in the analysis.

However, to what extent is a set of uniform reporting standards – when adopted in a voluntary fashion in several different countries with distinguishing characteristics – enough to achieve high-quality macroeconomic disclosure? There are reasons to believe that recommendations on disclosure requirements are not going to improve the information quality unless the compliance is monitored and enforcement regimes are at work (Elliott, Krische & Peecher, 2010). The fact

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<sup>5</sup> The way voluntary reporting (in this paper regarding the effects of macroeconomic factors) should be implemented changed between IAS 1 (1997 rev.) and IFRS (2005). IAS 1 (1997 rev.) contained the following formulation as part of Paragraph 8 under the heading “Components of Financial Statements”: *Enterprises are encouraged* to present, outside of the financial statements. IFRS (2005) conveyed the very same message but did phrase the voluntary character differently by using *firms can* instead of *enterprises are encouraged*. See also Section 4.

that IFRS is a principles-based framework, and includes room for interpretation, strengthens the importance of supporting institutions and other corporate governance mechanisms in upholding the quality of reporting (Verrecchia, 2001; Brüggemann, Hitz & Sellhorn, 2013). The two additional institutional dimensions considered in the analysis may be seen as complementary to the relative success of the IFRS recommendations.

The point of departure for the first hypothesis tested is that the recommendation<sup>6</sup> of IAS 1 (1997) via IFRS (2005) – to firms to disclose the magnitude of the effects of volatile macro-prices (exchange rates, interest rates and inflation rates) in their external reporting in one way or another – should have contributed to improved quality of information on the impact of firm-specific macroeconomic factors on profits (see, e.g., Verrecchia, 2001; Brüggemann et al., 2013 on voluntary disclosure). From a longitudinal perspective, early adoption indicates a commitment to an increased supply of relevant information and a narrowing to the level of satisfactory transparency for the shareholder (in line with findings from Leuz & Verrecchia, 2000). Hence, the first hypothesis tested is:

*Hypothesis 1:* There is a positive relationship between the developments of the IAS/IFRS recommendations and the supply of information on the macroeconomic impact on the profits of the firm.

However, accounting standards are not independent of other factors, and should be understood as one of several determinants of optimal transparency. Although the implementation of IFRS has harmonized reporting standards across Europe, other crucial determinants of the supply of information remain country-specific, and may be distinguished as institutional (see, e.g., Jaggy

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<sup>6</sup> In fact, “encouragement” in IAS (1997) or the even weaker alternative “firms can” in IFRS (2005) in accordance with footnote 4.

& Low, 2000; Hope, 2003; Bushman & Piotroski, 2006). As a second institutional influence on the transparency gap, the role of a country's corporate governance system is included, as a proxy for an additional domestic institutional pressure, as it has been shown to be positively related to the information supply in prior studies in other areas (e.g., Forker, 1992; Jaggi & Low, 2000; Eng & Mak, 2003; Hope, 2003; Ding et al., 2007).

The development of institutions, laws, regulations and markets over time have formed two main corporate governance systems, the Anglo-Saxon and the Germanic system. The Anglo-Saxon system is characterized by dispersed ownership, separation between ownership and control, minority shareholder protection, and an equity market having a central function. The Germanic governance system, on the other hand, is distinguished by ownership concentration, weak minority shareholder protection, and control usually exercised by blockholders. In between these two paradigms is the Nordic corporate governance model, which is internationally oriented, with high levels of IPO and M&A activity and a civil law system characterized by higher shareholder protection than is found in other civil law countries (La Porta et al., 1997, 1998; Pagano & Volpin, 2005).

Prior studies have shown a distinct connection between the legal and institutional environment, and the quality of information supplied (e.g., Forker, 1992; La Porta et al., 1998; Eng & Mak, 2003; Ding et al., 2007). La Porta et al. (1998), for example, show that common law countries have stronger legal protection for investors, while Leuz et al. (2003) show that enforcement and investor protection laws are important in the quest for quality of supply of information. Ball et al. (2003) strengthen this theory by showing that such quality is dependent on the institutional environment. Daske et al. (2008) find that capital-market-related benefits are only evident in countries with strong institutional environments. Differences in enforcement, types of law

systems and institutional environments are found significant between the Anglo-Saxon, Germanic and Nordic systems (La Porta et al., 1998; Leuz et al., 2003; Ball et al., 2003; Daske et al., 2008).

IFRS is principles-based, with responsibility transferred onto the legal system and supporting institutions that have the role of enforcing the standards (Ball, 2006). This emphasizes the importance of complementary elements in determining the quality of the supply of information. The “strength” of a corporate governance system is, therefore, determined by the degree of legal protection and the efficiency of institutional supervising and enforcement. According to this definition, the Anglo-Saxon system is the strongest and the Germanic system the weakest, with the Nordic system in the middle. This argumentation leads to the second hypothesis regarding macroeconomic information disclosure:

*Hypothesis 2:* There is a positive relationship between the strength of a corporate governance system and the supply of information on the macroeconomic impact on the profits of the firm.

As the third potential institutional influence on the supply of relevant information regarding the macroeconomic impact on the profits of the firm, the transmission of international institutional pressure is studied, as proxied by international cross-listing activities. A presence in foreign capital markets, by means of listing, exposes a firm to different types of corporate governance systems and international information environments, which may affect the information supply and narrow the transparency gap (Kihlstrom, 1974; Lang, Lins & Miller, 2003; Lang, Smith Raedy & Wilson, 2006). The marginal cost of providing the extra information encouraged by



greater capital market pressures should be negligible, and hence result in greater information supply overall (see Cooke, 1991; Hossain & Adams, 1995).

Besides the enforcement dimension to which strong corporate governance systems give rise, an additional source of pressure can be imposed by capital markets in general. Information considered as less relevant in one market may be regarded as a “must” in another, causing spillover effects. An important vehicle for such spillovers from different corporate governance systems is international cross-listing, which is synonymous with increased monitoring that may reduce agency costs by alleviating contracting conflicts (Fama & Jensen, 1983). As a result, cross-listing has a complementary effect on the propensity to supply relevant information (Baker et al., 2002; Lang et al., 2003; Lang et al., 2006). Empirical evidence supports this notion. Meek & Gray (1989), for example, find that continental European firms listed on the London Stock Exchange (LSE) supply more information than is required by the LSE. Khanna et al. (2004) show a positive relationship between cross-listing and information supply by analyzing interactions between a group of firms and the US capital markets. The arguments discussed above lead to the third hypothesis to be tested:

*Hypothesis 3:* There is a positive relationship between international cross-listing and the supply of relevant information regarding the macroeconomic impact on the profits of the firm.

### **3. Prior studies of the supply of information regarding the macroeconomic impact on corporate performance**

The relevant macroeconomic environment of the firm may be formulated in many ways. The guiding principle is to find macroeconomic variables that influence the corporate performance

and which are easy to measure and more or less instantaneously observable. Deviations from International Fisher Parity and Purchasing Power Parity generate excess profit and losses. Based on these two relationships, and with the requirement of ease of measurement without any delay, the macroeconomic influences can be measured as channeled through fluctuations in exchange rates, interest rates and inflation. The corporate supply of information on the role played by these three variables has – as reflected in the accounting research and discussed below – changed over time.

Ever since Bretton Woods collapsed in 1973, researchers have elaborated on different ways of reflecting changes in the macroeconomic environment through accounting practices. In the 1970s, increasing *exchange rate* volatility initiated a debate on how such fluctuations could be disclosed in financial reporting. The debate was primarily concerned with two aspects: (1) methods of evaluating foreign assets and liabilities and (2) methods that could be applied when consolidating company accounts. In the 1990s, the focus was directed towards financial assets and reporting techniques (e.g., SFAS No. 132, IAS 32 and IAS 39). Overall, accounting rules have focused on nominal exchange rate changes and how assets, liabilities and cash flows are converted efficiently. Questions over the effects of fluctuations in real exchange rates, and in particular how they affect competitiveness, are still open research issues in 2017.

Research on *inflation* has been approached from two angles in the accounting literature. The first line of research, which was influential in the 1970s, examines the effects of inflation within a country (e.g., Ijiri, 1976; Staubus, 1976; Vickrey, 1976). One of the issues studied is whether to use the general price level or specific price levels (e.g., Rosenfeld, 1972; Sterling, 1975). Furthermore, the choice over whether to use price index and current cost accounting has attracted attention (Bromwich, 1975; Staubus, 1975). The second line of research focuses on

the inflationary aspect of foreign investments, and inflation differentials between countries. These studies are primarily based on Purchasing Power Parity and aim to determine whether accounting standards capture differences in inflation (e.g., Aliber & Stickney, 1975; Beaver & Wolfson, 1982). Accounting research has, over time, had a focus on inflation, but the role relative cross-border price changes play in competitiveness is still an open research issue in 2017.

*Interest rate* fluctuations can be divided into two broad tracks. The first approach deals with the translation of foreign liabilities (Oxelheim, 1983). The second track examines the accounting of financial instruments (see IAS 39). Typically, the accounting of interest rate risk is only concerned with financial instruments and firms, and not performance, in other words, commercial exposure. For many firms, especially those selling luxury products, the interest rate effect on the commercial side is a substantial determinant of performance (Oxelheim et al., 2011). This commercial effect is still not recognized in accounting research as of 2017.

In addition to the three macro-price variables mentioned above, *political risk* deserves attention. This is seen as the risk of an altered relationship between the macro-price variables, for instance, in terms of a new exchange rate regime. The effects of political risk and how it should be managed within financial accounting is still an open issue. Some studies examine, for example, sudden price changes and subsequent accounting measures (e.g., Watts & Zimmerman, 1986; Han & Wang, 1998). Although studies show that accounting rules are vehicles for managing political risk in creative ways, little has been done in accounting as regards the supply of information on the link between political risk and corporate performance.

To summarize, the findings of prior research in the field of requirements on the supply of information as regards the effects of macroeconomic fluctuations (in exchange rates, interest rates and inflation rates, as well as of political risks) on corporate performance and competitiveness, lack consensus and require further elaboration.

#### **4. IAS 1: Implications for optimal transparency**

International regulatory bodies and institutions encourage the disclosure of decision-relevant information. Here, IAS 1, Presentation of Financial Statements, is the main standard of interest. It has been revised several times in the last 20 years so as to achieve greater transparency. Significant changes of interest to this study took place on 1 July 1998, 1 January 2005 and 1 January 2009. After 20 years of “silence” concerning IAS 1, which was first introduced as IAS 5 in 1977, the changes initiated in 1997, which came into effect on 1 July 1998, represented a step in the right direction towards increased macroeconomic transparency. The substance of the 1997 revision is relevant to observations between 2000 and 2003. Below, the content of Paragraph 8 IAS 1 (1998) is given as a basis for its inclusion in the analysis:

Enterprises are encouraged to present, outside of the financial statements, a financial review by management which describes and explains the main features of the enterprise’s financial performance and financial position and the principal uncertainties it faces. Such a report may include a review of:

- i. the main factors and influences determining performance, including changes in the environment in which the enterprise operates, the enterprise’s response to those changes and their main effect, and the enterprise’s policy for investment to maintain and enhance performance, including its dividend policy;

- ii. the enterprise's sources of funding, the policy on gearing and its risk management policies; and
- iii. the strength and resources of the enterprise whose value is not reflected in the balance sheet under International Accounting Standards.

This paragraph made an advance in information disclosure compared to its predecessors. Overall, IFRS (and in particular IAS 1) is a loose standard that is open to interpretation and, thus, expected to yield different levels of reporting quality in dissimilar settings. For example, the term "environment" can be assigned different meanings. Given that the macroeconomy has a major impact on firm performance, this is equated with the term environment. Factors and influences are interpreted to mean the macroeconomic variables that affect a firm's performance in its product, service and financial markets. Hence, under IAS 1 one can expect a specification of the macroeconomic variables as well as of how they influence the firm. The exposure of a firm can be presented in many ways but it is here argued that the most convenient measures are sensitivity coefficients.

The term "risk management" is mentioned in part (ii) of the above paragraph. This will lead to an expected specification of the risks that are being managed, the effects of these risks, the strategic considerations being made now and potential future strategic changes. Moreover, a breakdown of the types of instruments used to manage these risks and the net exposure would be anticipated. IAS 1 (1998) did not, however, require uniformity or any quantitative measures of risk exposures.

To sum up, IAS 1 (1998) encouraged companies to present an analysis of the "environment" affecting their performance but there were no formal quantitative requirements. Companies

could get away with sweeping comments that had no real value for outsiders. Oxelheim (2003) examines macroeconomic transparency in the global automotive and paper industries as expressed by IAS 1 (1998) and concludes that the macroeconomic disclosure is not of a satisfactory quality. As a result, an outsider shareholder/investor would not be able to determine intrinsic performance based on the information available in the annual reports and would have to charge a risk premium as compensation for investing in such firms with unsatisfactory disclosure.

IAS 1 (2005), like IAS 1 (1998), only provides recommendations. Compared to Paragraph 8 IAS 1 (1998), companies are no longer explicitly “encouraged”. Instead, Paragraph 9 IAS 1 (2005)<sup>7</sup> indistinctly points out that some companies present the type of information discussed above. However, Paragraph 116 was added to the standard. This specifies that firms must communicate details of major assumptions made about the future, and explain sources of uncertainty that may be relevant to the assets and liabilities. Paragraphs 117-124 provide further guidance, but also some exemptions. Paragraph 120 is the most important supplement to have been added at this time, specifying that the information requirements in Paragraph 116 should be presented in such a way that an outsider would be able to understand the management’s assessment of the future, in particular any information concerning sources of uncertainty and their potential impact. However, the contribution made by these additions is vague due to Paragraph 121, which dilutes the information requirements by not explicitly requiring budget information or forecasts.

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<sup>7</sup> A revised version of IAS 1 became effective on 1 January 2009; however, the additions were minor. Paragraph 8 (1998) and Paragraph 9 (2005) became Paragraph 13, while 116, 120 and 121 (2005) correspond to 125, 129 and 130 (2009). In a small change, new rules regarding risk management activities were introduced in IFRS 7 (referred to in Paragraph 114 IAS 1 (2009)).

IFRS 7, *Financial Instruments: Disclosure*, which came into effect on 1 January 2007, relates to macroeconomic information disclosure but *not* in the context of the firm's overall performance and competitiveness. The standard requires that firms disclose information concerning market risks related to financial instruments (as do IAS 32 and IAS 39). IFRS 7 demands that firms explicitly present both qualitative and quantitative information regarding any exposures to market risks arising from financial instruments, as well as how these risks occur and how they are managed. IFRS 7 furthermore requires that companies report sensitivity coefficients.

What the outside stakeholders demand in order to be able to evaluate the actual development of profits as well as future prospects is information – content and format – that fits into an analysis of What-If scenarios. However, these requirements are not fully captured by the recommendations in IFRS; for example, volume effects from interest rate fluctuations are neglected and the extent to which an exchange rate appreciation can undermine competitiveness by “subsidizing” foreign competitors and thus bring the quantities down is not covered. Most importantly, the developments to IAS 1 and the supporting standards do not make the disclosure of *quantitative* measures of macroeconomic vulnerability an issue. The IFRS may mean one step forward, and a complement to the other two institutional forces under investigation here, regarding the propensity to supply the kind of information the outside shareholder needs.

## **5. “Satisfactory” transparency of macroeconomic effects as seen by the outside shareholder**

A matter of great concern is what is deemed by outsider shareholders as “satisfactory” disclosure of a macroeconomic impact. The discrepancy between “satisfactory” and “optimal” may then be explained by the net cost to the firm of revealing sensitive information on

competitiveness that is exploitable by competitors, on the one hand, and the effect of the risk premium charged by outsider shareholders for being kept uninformed, on the other. The MUST-analysis (as developed by Oxelheim & Wihlborg, 2008, as a management device) is chosen to facilitate interpretations and to characterize what is “satisfactory” macroeconomic information. The framework divides profit (or performance in general) into two components – intrinsic and macroeconomic. In the next section, it is described how the MUST framework can be utilized to produce adequate macroeconomic information and to act as a platform for identifying the information that should be seen as “satisfactory” by external shareholders if communicated.

### *5.1 The components of the MUST analysis*

The MUST framework includes three steps in the process of filtering out the component of performance that is attributable to temporary macroeconomic effects. The first step is to identify macroeconomic variables with potentially explanatory value. Oxelheim and Wihlborg (2008) argue that asking a series of questions aimed at identifying the most central variables is a viable approach: (1) Where does the firm produce? (2) From where does it purchase inputs? (3) Which are the main markets in terms of selling? (4) Who are its competitors? (5) Where do the competitors produce? (6) Where do the competitors purchase their inputs? (7) Which are the competitors’ main markets in terms of selling? (8) In which currencies are the company’s liabilities and assets denominated?

The fundamental analysis will result in a number of exchange rates, interest rates and inflation rates with potential economic explanatory power. As the second step, the list of variables is narrowed down through a backward stepwise regression that retains the variables that explain the majority of the variance in the profit. The backward stepwise regression will yield the



relevant quantitative exposure measures, taking into account the interrelations between the price variables.<sup>8</sup>

The third step regards the choice by firms to adopt exposure strategies as a response to the knowledge about the impact of macroeconomic variables on profit. This step makes it hard for outsider shareholders to estimate the sensitivity coefficients themselves. To do this or to fully comprehend the impact of macroeconomic fluctuations in a particular period, he or she would need to know whether the management had undertaken any operations (e.g. hedging) that might have changed the underlying sensitivity.

The information generated by these three steps allows the firm to provide the outside stakeholder with a satisfactory macroeconomic picture, in line with the example of a fictitious company presented in Table 1.

#### Insert Table 1

Assume that the fictitious company is a Swiss-based company exporting to the US, with a Japanese competitor in that market. Following application of the first two pillars of the MUST analysis (fundamental analysis and multivariate empirical analysis), the result regarding what is deemed relevant satisfactory information can be found in Table 1. The table shows that the company expects a four-percentage-point depreciation of the Swiss franc (expressed as more Swiss franc on a US dollar), with a positive sensitivity coefficient revealing that a depreciation

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<sup>8</sup> Using multiple regressions can introduce problems, however. A key argument is that the relationship between the variables may not be linear. An example would be the exercising of real options, such as relocating production or changing suppliers, which introduce non-linear relationships. However, Capel (1997) shows that the cost of exercising such options, at least in the medium term, would be too large and thus the assumption of linearity is acceptable. Another argument against using them is a potential lack of a series of data long enough to be used in the analysis. In this case, analogies to other similar firms would have to be used until enough data existed.

of the Swiss franc would benefit the firm in its export efforts<sup>9</sup>. The table further reveals (through a negative sensitivity coefficient) that the assumed interest rate increase in the US market may absorb demand, and the producer price increase in Japan will (through a positive sensitivity coefficient) be to the advantage of the Swiss firm in its competition with its Japanese competitor. The table indicates that the firm can expect a macroeconomic tailwind amounting to five percentage points (the sum of the three macroeconomic effects in the table) of the expected performance improvement. What remains after the seasonal effect and the expected macroeconomic impact have been deducted from the forecast is the firm's assumption regarding a four-percentage-point profit increase due to organic growth. Even without a profit forecast by the firm, the approach is valid to the external shareholder as a tool in his/her *ex-post* analysis or in the search for answers to what-if scenario questions.

### 5.2 Supply of information

If a company uses the MUST analysis in its internal work, it requires no extra effort to supply the information to outside shareholders. If it passes on the sensitivity coefficients given by the multivariate analysis together with the assumptions about macroeconomic development, via its external reporting (i.e. as exemplified in Table 1), then it will be possible for the shareholders to construct their own scenarios, filter out the macroeconomic impact on performance and comprehend the effect of the macroeconomic variables.<sup>10</sup>

## 6. Data, variables, methodology and descriptives

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<sup>9</sup> It also captures that a depreciation of the Swiss franc would make it harder for foreign competitors to compete with the focal firm in its home market.

<sup>10</sup> To perform an *ex-post* analysis of actual profits during a period, the external shareholder also needs to know what influences (strategic or tactical) the management has exerted on the original sensitivity of the profits to the macroeconomic variables by, for example, undertaking hedging operations during the period.

In this section, the methodology is presented under three subheadings. Firstly, the data and variables used to analyze determinants of the supply of macroeconomic information are presented. Secondly, descriptive statistics on the dependent and independent variables are provided. Lastly, the multivariate model is specified.

### *6.1 Data*

The sample consists of the 100 largest public non-financial European firms (based on market capitalization measured at the beginning of the period) between 2000 and 2009<sup>11</sup>. The 100 largest public non-financial firms are chosen as these firms are financially unconstrained, which eliminates the argument that the information is too costly to produce (Oxelheim et al., 2011). These firms do also have a long enough history to make it possible for them to undertake a MUST analysis. The sample is dispersed over a wide range of industries and countries; the distribution is presented in Appendix 1. The firms are studied at four points in time – 2000, 2003, 2006 and 2009 – giving a total of 400 firm-year observations. The logic behind the choice of years is based on a desire to study the development of the information supply after the decision was made to implement IFRS, before the actual implementation and after the implementation, as well as capturing voluntary incentives.<sup>12</sup>

### *6.2 Dependent variables*

There is a high congruence between the output of the MUST analysis and the demand for information as expressed by IFRS (2005). The dependent variables used in the regressions, as well as to analyze the development of the supplied information, are deduced from the MUST

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<sup>11</sup> All 100 companies chosen at the beginning of the period are present for the entire period under investigation.

<sup>12</sup> In the multivariate analysis, 22 observations are excluded due to missing data, solely related to missing observations on foreign sales. The missing observations seem – after close investigation – to be random and should not bias the results.

analysis and measure macroeconomic information quality. Following the rationale of the framework, four information categories are distinguished, which are also the building blocks of what is deemed by the outsider shareholder to be a satisfactory information supply<sup>13</sup>: *macroeconomic variables*, *impact*, *strategies* and *total* (the aggregate construct for the analysis). *Macroeconomic variables* refers to the supply of information about which macroeconomic variables are relevant for the individual firm. *Impact* refers to the magnitude of the macroeconomic exposures, that is, the sensitivity coefficients. *Strategies* refers to the risk management strategies affecting the sensitivity to the macroeconomic variables. In addition to the three information categories, *total* is analyzed as a fourth dependent variable in order to highlight the overall quality of disclosure in a joint measure. It is the equally weighted average of the three other categories. Although the analysis is focused on *total*, all four dependent variables are included in the analysis in order to control for potential weighting problems that may arise.

The macroeconomic information provided in each observation is collected from annual reports and graded from 1 to 4. Information included should be given *directly* by the CEO, in the text or notes, and require no further processing or need for the reader to combine sources. The definitions for each grading are based on the discussion of IAS 1 in Section 3, and the MUST analysis. Admittedly, the classification involves some element of discretion. The first and second grades are non-quantitative, while the third and fourth are of a quantitative character:

- *Non-quantitative response 1*: No specification of macroeconomic variables, the magnitude of their influence, or strategies for managing them.
- *Non-quantitative response 2*: The variables, the magnitude of their influence and the strategies are given in general terms but without detailed specification. Typical

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<sup>13</sup> See also Table 1.

explanations are “the gross margin has been negatively affected by exchange rate fluctuations” or “favorable interest rates have influenced the net income positively”.

- *Quantitative response 1*: The disclosure of some, but not all, information about the most significant macroeconomic variables, the magnitude of their influence, and the appropriate strategies for managing these variables. This sort of response is a step in the right direction. However, if only one coefficient is given, then the variable should be estimated by taking into account its relationship to other relevant variables that are not given. Moreover, if there is more than one relevant (unreported) variable, then the information provided under this alternative is insufficient as a basis for filtering out the noise of historical profits and assessing the true performance prospects of the company.
- *Quantitative response 2*: The most satisfactory response is a complete specification of significant macroeconomic variables, the sensitivity coefficients for these variables estimated using a multivariate framework, and the strategies for managing fluctuations in these variables in the past and in the future. This type of information release is congruent with the information output of a MUST analysis.<sup>14</sup>

### 6.3 Explanatory variables

To test the hypotheses formed in Section 2, three explanatory variables are used. The institutional factors that, according to the hypotheses, may affect the firm in its supply of information regarding the macroeconomic influences on its profits are the *development of IFRS* (Hypothesis 1), *corporate governance systems* (Hypothesis 2) and *international cross-listing* (Hypothesis 3).

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<sup>14</sup> An information supply similar to that given in the example in Table 1.

The development of IFRS as regards recommendations about macroeconomic information disclosure is captured by dummy variables. The implementation occurred in January 2005. 2000 is used as the base case and dummies are used to catch the effects of different stages: the effect of 2003 (recommendation decided upon), 2006 (recommendation implemented) and 2009 (recommendation refined). By using three dummy variables instead of one, the “early adopters” are captured as well (Brüggeman et al., 2013). The coefficients of the dummies that represent the time period after the introduction of IFRS, 2006 and 2009, are expected to be significantly positive, and those from before the implementation, 2000 and 2003, to be insignificant.

In accordance with the second hypothesis and the discussion of Section 2.4, the Anglo-Saxon governance system is expected to have the greatest impact, and the Germanic system the least impact, on disclosure quality. Two dummy variables are used to capture the effect of the corporate governance system. The dummy variables are based on the location of a firm’s headquarters (see Appendix 1). In the first dummy variable, Anglo-Saxon governance systems (*ANG*) are assigned a 1 and others a 0. In the second, Nordic governance systems (*NOR*) are assigned a 1 and others a 0. The Germanic governance system (*GER*) is the base case in the regression.

The third explanatory variable, international cross-listing, is measured as the total number of stock exchanges on which a company’s shares are listed, and is collected from Osiris (CAP)<sup>15</sup>. Prior studies have found the quality of the supply of information to be positively related to cross-listing activities (see Meek & Gray, 1989; Khanna et al., 2004). These findings are here (in accordance with Hypothesis 3) extended to the case of the corporate supply of

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<sup>15</sup> Due to data availability problems, figures from 2010 are used under the assumption that the variable is rather rigid and this proxy well reflects the entire period.

macroeconomic information, from the perspective of what is deemed by the outside shareholder as satisfactory in terms of allowing him/her to comprehend the development of corporate competitiveness.

#### *6.4 Control variables*

A set of firm-specific control variables are included, comprising variables commonly used in prior studies and well-anchored in the traditional corporate finance and accounting literature as capturing known firm characteristics that affect corporate information supply: product type, size, leverage, foreign sales, profitability, capital intensity and stock turnover. Yearly dummy variables are used to capture the time-series effects. All control variables are taken from Thomson Reuters Datastream.

In previous empirical studies, several firm-specific determinants have been investigated in relation to information disclosure practices (e.g., Depoers, 2000; Eng & Mak, 2003; Leuz, 2004). An important aspect of a firm's strategy, and in particular of information disclosure, is the type of product. In the analysis, a separation between homogeneous and heterogeneous products is undertaken, though Oxelheim (2003) finds no significant difference in propensity to report between the two groups. However, the propensity may have changed, and firms with more differentiated products (e.g. media, retail and capital goods) may be more prone to supply information regarding their macroeconomic environment, since they can pass on the costs, while firms with homogeneous products (e.g. oil and gas, materials and utilities) cannot do this to the same extent. A dummy variable (*PROD*) is included for the type of product a firm markets: 1 stands for heterogeneous products and 0 for homogeneous. A positive coefficient is expected.

Firm size (*SIZE*) is a commonly used variable when studying corporate disclosure, and a positive relationship between firm size and corporate disclosure is usually found (see Hossain et al., 1995; Depoers, 2000; Leuz, 2004). Producing information is costly in terms of direct costs, and large firms are better equipped than small firms to bear these costs. Furthermore, large firms generally have greater analyst coverage, attract highly skilled employees and have access to more sophisticated information systems. Prior studies covering information disclosure have not focused on macroeconomic information and there is reason to believe that this relationship will be of even greater importance in this context. Oxelheim et al. (2012) show that producing the information needed to pursue a macroeconomic risk management strategy may call for fairly proficient information systems. Thus, a positive coefficient is expected. The natural logarithm of total assets is used as a proxy for size.

The agency theory provides an explicit link between corporate disclosure and the amount of debt present in the capital structure (Jensen & Meckling, 1976). The higher the leverage (*LEV*), the greater is the need for monitoring in order to alleviate potential agency costs. It is often hypothesized that disclosure of voluntary information increases the monitoring of a firm (Leftwich et al., 1981). However, previous studies have not found conclusive evidence of a relationship between leverage and the voluntary supply of information (e.g., Raffournier, 1995; Depoers, 2000). Since macroeconomic exposures tend to be volatile and directly affect the ability to service debt obligations, a positive relationship is expected between leverage and macroeconomic information disclosure. Total debt scaled by total assets is used to measure leverage.

A domestic firm has fewer incentives to supply wide-ranging macroeconomic information, even if exposure to macroeconomic fluctuations is still apparent. However, when operating in



several geographical markets, as measured by greater foreign sales for example, the macroeconomic exposure as well as the information requirements will increase. Raffournier (1995) shows, by studying the Swiss market, that the extent of internationalization – measured as exports over total sales – is positively related to information disclosure. Cooke (1989, 1992) supports this hypothesis with evidence from Sweden and Japan – two markets with highly internationalized firms. Foreign sales are here measured as a percentage of total sales (*FORS*) and expected to be positively related to the supply of macroeconomic information.

Singhvi & Desai (1971) argue that managers are more prone to divulge information when profitability is high, as they want to emphasize their proficiency and justify their remuneration. Weak profitability is associated with less disclosure, they say, as managers will want to hide the reasons for it. However, they find weak evidence for their hypothesis (see also Cowen et al., 1987). Hence, previous empirical results are not conclusive regarding this variable. In dealing with macroeconomic information disclosure, it is also argued that profitability should be negatively related to disclosure. Previous studies show that macroeconomic fluctuations make up a large portion of CEO compensation (Chiu et al., 2016). Therefore, from a macroeconomic information disclosure point of view, firms are expected to be less prone to reveal this information when profitability is high as they may want to conceal the role of pure luck. Profitability (*PROF*) is measured as the return on assets.

Capital intensity (*CAP\_IN*) is frequently used as a proxy for entry barriers. A firm operating in a protected environment should be more inclined to provide the capital markets with macroeconomic information (Darrough & Stoughton, 1990). Clarkson et al. (1994) strengthen this hypothesis with empirical results. They distinguish between financing (valuation) and product market effects (proprietary costs), and show that the probability that firms with good

(bad) information will disclose that information decreases (increase) with low entry barriers. The net of property, plant and equipment (PP&E) scaled by total assets is used to capture the effect of entry barriers and a positive relationship is expected.

The last firm-specific control variable included in the analysis is a proxy for the benefits to the capital markets of providing voluntary information (Scott, 1994). Stock turnover (*TURN*), measured as total trading scaled by outstanding shares, is used in the analysis and a positive coefficient is expected. Table 2 lists all variables, along with their expected signs and a short explanation of each.

Insert Table 2

### *6.5 Methodology*

To test the impact of reporting practices, governance systems and capital markets on information disclosure, along with the firm-specific control variables, a logistic regression is used, where the dependent variable takes the value 1 if the firm is graded 3 or higher (in terms of the information it provides) and 0 otherwise. A random effects model is not supported by the Hausman test and a fixed effect model eliminates the explanatory variables. Therefore, a pooled logistic regression model is used where time-series effects are controlled for by the inclusion of year dummies. The model is robust to other specifications and using an ordered logistic regression provided qualitatively similar results. In the next section, detailed diagnostics on the regression models are provided. All four information categories (dependent variables) are tested: macroeconomic variables, impact, strategies and total. The following multivariate logistic model is estimated:

$$\text{Disclosure} = \beta_0 + \beta_1 2003 + \beta_1 2006 + \beta_1 2009 + \beta_2 \text{ANG} + \beta_3 \text{NOR} + \beta_4 \text{CAP} + \beta_5 \text{PROD} + \beta_6 \text{SIZE} \\ + \beta_7 \text{LEV} + \beta_8 \text{FORS} + \beta_9 \text{PROF} + \beta_{10} \text{CAP\_IN} + \beta_{11} \text{TURN} + \varepsilon \quad (1)$$

where Disclosure = macroeconomic variables, impact, strategies, or total, respectively.

### 6.6 Descriptive statistics

Since the dependent variables in this study are cumbersome to construct, an exhaustive descriptive analysis of them is presented before the empirics of the independent variables are shown. Table 3 shows the absolute number of firms graded 3 or higher for each type of dependent variable.

#### Insert Table 3

The most striking finding is that no firm qualifies for a Category 4 grading. Despite this, the trend in the quality of information supplied is positive for *macroeconomic variables* and *strategies* across the whole period, although the quality of *total* and *impact* decreased after 2006. Many firms have a 3 for *macroeconomic variables* and *strategies* in 2009, 96 percent and 80 percent, respectively, which is a clear improvement over 2000, when the corresponding figures were 61 percent and 37 percent. Only a moderate number of firms disclose any *impact* quantitatively though, just 35 percent in 2009, although that is up on the 16 percent that did so in 2000. This can partly be explained by the fact that no quantitative analysis (except for the weak requirements of IFRS 7) is required by IAS 1. The low number of firms graded 3 across all categories (the *total* measure) is, nonetheless, remarkable. In 2009 only 30 percent of the firms had an average of 3. Again, this is up on the 2000 figure of 11 percent. Despite these gradual improvements, on average it is still difficult, and in most cases impossible, for an outsider shareholder to understand the link between reported profits for a period and the

influence of macroeconomic fluctuations during the same period (Category 4), due to an unsatisfactory supply of information from the firm.

#### Insert Table 4

In Table 4 the changes that occurred between the years of observation (as well as across the entire period) are presented, for the four measures of the supply of macroeconomic information (that is, the dependent variables). The results show that 35 firms improved their supply of information on *macroeconomic variables* between 2000 and 2009. The high degree of disclosure regarding these variables is unlikely to be due entirely to IAS 1 since, at the beginning of the period, as many as 61 firms were already reporting these variables (Category 3 or higher). However, it is imperative to stress that the information reported to outsiders is still only partial and therefore not “satisfactory” according to what is deemed so by the definition gleaned from the MUST analysis. No firms present the methodology used to calculate the variables and therefore it is difficult to know whether exposures such as those that have emerged from competitors’ strategies, for example, are accounted for. The explanatory value of the variables presented in the external reporting must be questioned when there is no specification of the methodology used.

As regards *impact*, the overall development between 2000 and 2009 is positive: 23 firms improved their transparency. However, four firms actually worsened their reporting practices over the period and the number of firms supplying information on the *impact* actually decreased between 2006 and 2009. One potential reason for the downward shift in this particular information category between 2006 and 2009 is that IFRS 7 was implemented during this period. While the supply of information has been enhanced in some respects due to IFRS 7

(requiring a sensitivity analysis of how market risks impact financial derivatives), the new standard may, from the perspective adopted here, in fact have increased the transparency gap. The downgrading of firms in 2009 therefore seems to be mainly due to them changing from the partial sensitivity coefficients to those required by IFRS 7, namely effects concerning financial instruments.

It seems that, in general, firms are more reluctant to share information on how big the effects from macroeconomic fluctuations are, than they are with the other information categories. The weak disclosure of *impact* is in line with Oxelheim (2003), who emphasizes that the *impact* measure is the weakest link in the chain. A potential explanation might be that this is due to opportunistic behavior among insiders. Chiu et al. (2016) find persuasive evidence that the size of compensation and macroeconomic randomness are closely related, which may influence the willingness to explicitly provide measures of this kind, especially since the sensitivity coefficients are central in filtering out macroeconomic distortions from performance.

A total of 46 firms improved their supply of information on risk management *strategies* and 3 worsened theirs. Some of the improvements in accounting standards made during 2000-2009, such as IFRS 7, are related to either risk management or the instruments utilized in risk management strategies. Thus, this information category has been affected positively by IFRS 7 and the effects cannot be attributed entirely to IAS 1. However, an accurate supply of information on risk management *strategies* and *macroeconomic variables* is not of great value if the *impact* (sensitivity coefficients to macroeconomic variables) is not reported. It is crucial for the outside shareholder to be able to assess the net macroeconomic effect on profits from the macroeconomic variables, which is not possible unless all of the information categories are reported.

The last information category, *total*, represents the proportion of firms that actually report to at least the Category 3 standard across all information categories. Overall, 23 companies improved their information disclosure between 2000 and 2009, while 4 worsened theirs. A McNemar test of whether the improvements from Categories 1 and 2 to Category 3 are significant between 2000/2009, 2000/2003, 2003/2006 and 2006/2009 is presented in Table 5. The accumulated change in reporting quality over 2000-2009 is statistically significant at the 1 percent level. Moreover, the analysis shows that the changes between 2000/2003 and between 2003/2006 regarding the information categories, including *total*, are all significant. The only changes that are not statistically significant are those that occurred between 2006 and 2009 regarding *impact*, *strategies* and *total*. Hence, the bulk of the significant changes took place before 2006.

Insert Table 5

Table 6 presents descriptive statistics for the independent variables, divided into explanatory and control variables (excluding the time dummy variables). As can be seen, 17 percent of the sample consists of firms under Anglo-Saxon, 17 percent under Nordic and the residual 66 percent under Germanic corporate governance systems. The firms are, on average, listed on nine stock exchanges. Further, the firms typically have heterogeneous products and are of a similar size. They are, on average, lightly leveraged and highly internationalized (based on foreign sales over total sales). The profitability is near the long-term average and capital intensity is rather low for many of the firms. The stock turnover is dispersed, with a large standard deviation.

Insert Table 6

## 7. Empirical results

### 7.1 Bivariate analysis

The correlation matrix in Table 7 indicates there are no multicollinearity problems in the specification and a majority of correlations between the dependent and explanatory variables have the expected signs. In addition, a variance inflation factor (VIF) test on the independent variables indicates there are no multicollinearity problems. All variables have VIFs below 2<sup>16</sup>.

Insert Table 7

### 7.2 Multivariate analysis

Table 8 presents the logistic regression models 1-4, where the dependent variables are respectively the three information categories – *macroeconomic variables*, *impact* and *strategy* – and *total* (the equally weighted average of the other three). The analysis below refers to the *total* disclosure measure unless otherwise indicated.

Insert Table 8

The three explanatory variables – IFRS development, corporate governance systems and international cross-listing – are all found statistically significant with the predicted signs. Hence, all three null hypotheses stating no relationship can be rejected. Significant statistical support is found for a positive influence from all three explanatory institutional variables on the

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<sup>16</sup> Though this test is commonly used, there is still a debate about what is a proper critical value to use. However, recommendations in the literature fluctuate between 4 and 10. Hence, regardless of which of these values were used, the reported values would indicate no problem of multicollinearity.

propensity of the firm to supply information on the impact of macroeconomic fluctuations on corporate performance, of the kind demanded by the outsider shareholder.

Divergent patterns are found regarding the role of IFRS development (2003 DUMMY, 2006 DUMMY, 2009 DUMMY) on the quality of macroeconomic information supplied. For all three individual levels, a gradual upgrading as a result of the IFRS is found, whereas for the *total* quality there is no significant effect until 2009. One interpretation of this is that it takes time, when companies have degrees of freedom in their disclosure practice, to have the three quality elements match each other in a consistent way, leading to higher *total* information quality. The IFRS time dummies point to a positive trend in the quality of the disclosed information. Caution is advocated in the interpretation of the role of IFRS, since this may simply reflect a *general* trend towards increased transparency (Forssbaeck & Oxelheim, 2015).

The Anglo-Saxon dummy is robust for all four dependent variables, and indicates that firms in market-driven governance systems are more likely to disclose a higher quality of macroeconomic information of the kind demanded by outside shareholders in countries adopting an Anglo-Saxon corporate governance regime. The dummy variable representing the Nordic corporate governance regime is significant in all models except the first (when *macroeconomic variables* is the dependent variable), which is a fairly consistent pattern. The weakest system in terms of the supply to outside shareholders of relevant information on macroeconomic influences on profits is, in accordance with the discussion in Section 2, the Germanic system (the base case in the regression). The results indicate that IFRS in its current form of vague recommendations is benefitting from reinforcing structures, allowing satisfactory levels of macroeconomic information to be supplied, which corroborates the ideas of Ball (2006). This adds a previously unexplored dimension – a macroeconomic dimension – to the



research on recommended or voluntary supply of information (Ball et al., 2003; Leuz et al., 2003; Daske et al., 2008; Brüggeman et al., 2013).

For the third explanatory variable – international cross-listing (CAP) – a significantly positive relationship with the quality of macroeconomic information supplied is found. In Table 8, the variable is significant at the 1 percent level, and firms driven by cross-border capital market requirements are more prone to supplying macroeconomic information. Meek & Gray (1989) and Khanna *et al.* (2004) found cross-listing to be positively related to the supply of information and, again, the current results add a macroeconomic angle to this stream of research.

When it comes to the control variables, only two variables are found to have a significant impact on the propensity to disclose macroeconomic information (as measured by the dependent variable *total*): leverage (LEV) and capital intensity (CAP\_IN). In contrast to Raffournier (1995) and Leuz (2004), leverage is found to be statistically significantly and positively related to the propensity to disclose information. This seems very logical given that providing voluntary information increases the monitoring of a firm (Leftwich et al., 1981). Given the major impact of macroeconomic fluctuations on net income, voluntary information supply of this kind should reduce the uncertainty for creditors. A high proportion of debt in the capital structure yields a higher financial risk and means that a relatively greater proportion of gross profits must be used to service the interest payments.<sup>17</sup>

Capital intensity (CAP\_IN) is statistically significantly but negatively related to the propensity to supply macroeconomic information. This result is counter to the expectations derived from

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<sup>17</sup> It is important to note, though, that creditors are a part of the capital markets and the variable also captures this aspect.

the model of Darrough & Stoughton (1990) and the empirical results from Clarkson, Kao & Richardson (1994). It suggests that the probability of supplying relevant macroeconomic information is higher when the threat of entry is high than when the threat is low. This may reflect that firms in a protected environment supply information in order to maximize valuation, since product market concerns are less of an issue. It can also be argued that, when the macroeconomy affects a firm positively, there are managerial incentives to conceal the positive effects. Hence, a firm in a low-competition environment has no incentives to supply macroeconomic information since, in this case, the managers' incentives to keep potential entrants in the dark win out.

## **8. Conclusions**

The concept of transparency has attracted interest in the research literature for only a few decades (Forssbaeck & Oxelheim, 2006). The focus has been on the supply of information, with the implicit assumption that more information means a higher level of transparency. More recent research has stressed that more information also means higher processing costs for both sender and receiver, thereby acknowledging the importance of identifying what is seen as relevant information by the receiver (Forssbaeck & Oxelheim, 2015). This paper emphasizes the demand side of information in terms of satisfactory transparency, and analyzes how the supply side meets the demand in order to eliminate an existing information asymmetry.

The point of departure is the demand from the outsider shareholder for information that will help him or her to comprehend how profits have actually developed, i.e. after temporary effects from the macroeconomic environment of the firm have been filtered out. The globalization of firms' commercial and financial operations, in combination with increased financial market integration, should have increased shareholders' need for information on these variables.

However, this is neither reflected in the research nor in the real world, where most companies still (as a best case) only supply the result of a static comparison between the value based on exchange rates at the start of the period, and the value based on those at the end of the period. The research question of this paper has been to analyze and conclude to what extent domestic (via the corporate governance system and accounting rules of the country where the firm is headquartered) and international (transmitted via cross-listing) institutional forces may put pressure on an individual firm to supply more relevant information and thereby come closer to what is deemed “satisfactory” transparency by the shareholder, with a resulting reduction in any potential information asymmetry.

The potential information asymmetry may have many explanations, such as (1) avoiding a supply of information that may reach competitors, leading to a negative impact on the firm’s own competitiveness and thereby creating a visible gap between a satisfactory level of transparency for the shareholder and optimal transparency for the firm, (2) ignorance as a result of inferior integration between economics and business education at the university level, (3) resignation by management and a feeling that it is too complicated, (4) moral hazard and management’s interest in using this kind of information to its own advantage, and (5) the effects being imagined to be too small. The first explanation may be valid in the context of finding an optimal transparency for the firm, whereby it avoids releasing information that may cost it more than what the shareholders will charge for not getting it. The remaining four explanations may have some explanatory value at the firm level, motivating this study of the degree to which institutional factors may influence a firm’s propensity to supply high-quality macroeconomic information of a kind deemed satisfactory by the outside shareholder, in that it enables him or her to calculate the prospects of the firm under different scenarios.

Based on a sample of the 100 largest public European firms from 2000 to 2009, a positive trend is found as regards an increased supply of relevant information, i.e. a narrowing of the transparency gap. Despite this positive trend in the quality of the supply of information, none of the 100 firms supplied information that could be graded as “satisfactory” from the shareholders’ perspective, which would require a specification of the most important macroeconomic variables, vulnerability coefficients estimated from a multivariate framework using these variables, and given as sensitivity coefficients, and the risk management strategies used to handle the exposures. The classification is normative, containing some elements of discretion, but even so the result sends a signal that institutional improvements may be called for.

The institutional factors – IFRS development, the corporate governance system and international cross-listing – are all found, as hypothesized, to be positively linked to the narrowing of the transparency gap. The propensity to supply information deemed satisfactory by outside shareholders is found to be highest among firms in countries with the Anglo-Saxon corporate governance regime, followed by firms in the Nordic-regime countries. As hypothesized, the highest transparency gap as regards the impact on corporate profits from macroeconomic variables is found for firms in the Germanic corporate governance system. The IFRS recommendations seem to benefit from this supporting institutional mechanism. This adds a new angle to the stream of research examining the supply of information in relation to corporate governance systems (Leuz et al., 2003; Ball et al., 2003; Daske et al., 2008). Further, the strong evidence that international cross-listing is narrowing the transparency gap in the case of macroeconomic information, adds another aspect to the findings of Khanna et al. (2004). This effect is further strengthened by the statistically significant positive relationship between leverage and the supply of information.

If outsider shareholders cannot determine intrinsic performance, firms will experience a higher cost of capital, as theoretically established by Lambert et al. (2007) and in an IFRS context indirectly by Daske et al. (2008). The fact that all firms investigated fall below the “satisfactory” level may indicate a less than optimal aggregate transparency and that improvements remain to be made. From a national economic growth perspective an “excessive” transparency gap may, from a long-term perspective, lead to lower prosperity through a higher cost of capital and decreasing investment rates. From a government point of view, it may be tempting to impose rules to make the supply of “satisfactory” information (with quantitative measures in line with Table 1) mandatory. However, this could also hit those firms that – due to the risk of revealing information that may harm their competitiveness – find the cost of this harm to exceed the cost (increased risk premium) charged by the outside shareholder for not getting the information. In other words, it will also hit the firm that has a well-motivated gap between its optimal transparency and the outside shareholders’ satisfactory transparency. The indirect influence from supporting institutional factors reported here may do some of the work and thereby help avoid the need to make the “satisfactory” information release mandatory.

Further research should be devoted to the role played by the five different explanations (presented earlier in this section) for management’s choice not to supply information deemed important to outside shareholders for their investment decisions, and how the cost of capital of the firm is impacted by such a choice. In the empirical analysis of this paper, the timing of the introduction of IFRS played a role in the choice of the period investigated. Further research should – with relevance for the policy-making process – analyze whether institutions also have an influence on the firm’s propensity to meet the demand for information from outside

shareholders, of the same kind and magnitude as reported here, in a period of financial crisis, such as the period after the Lehman crisis of 2008.

**Appendix 1**  
Industry Distribution

<i>Industry</i>	<i>Number of Firms</i>	<i>Percentage of Sample</i>
Aerospace and Defense	4	4
Business Services and Supplies	1	1
Capital Goods	9	9
Chemicals	3	3
Conglomerates	4	4
Construction	7	7
Consumer Durables	6	6
Drugs and Biotechnology	5	5
Food, Drink and Tobacco	9	9
Food Markets	4	4
Household and Personal Products	4	4
Materials	3	2
Media	4	4
Oil and Gas Operations	9	9
Retailing	3	3
Software and Services	1	1
Telecommunications Services	9	9
Transportation	6	6
Utilities	9	9
Total	100	100

*Notes:* This table presents the industry distribution for the sample.

**Appendix 1 (cont'd)**

## Geographical Distribution

	<i>Country</i>	<i>Company</i>	<i>CG regime</i>
1	Netherlands	Royal Dutch Shell	G
2	United Kingdom	BP	A
3	France	Total	G
4	Spain	Telefónica	G
5	Germany	E.ON	G
6	Germany	DaimlerChrysler	G
7	Switzerland	Nestlé	G
8	France	France Telecom	G
9	France	Sanofi-aventis	G
10	Germany	RWE Group	G
11	Switzerland	Roche Holding	G
12	Norway	Statoil Group	N
13	Germany	Deutsche Post	G
14	Italy	Telecom Italia	G
15	United Kingdom/Netherlands	Unilever	A
16	Germany	BASF	G
17	Italy	ENEL	G
18	France	Carrefour Group	G
19	Spain	Repsol-YPF	G
20	France	Renault	G
21	Netherlands	Royal Philips Electronics	G
22	Germany	BMW-Bayerische Motor	G
23	United Kingdom	Tesco	A
24	United Kingdom	AstraZeneca	A
25	France	Vivendi	G
26	Denmark	Möller-Maersk	N
27	United Kingdom	BT Group	A
28	Netherlands	EADS	G
29	Italy	Fiat Group	G
30	Norway	Norsk Hydro	N



31	Germany	ThyssenKrupp Group	G
32	France	Saint-Gobain	G
33	Sweden	Volvo Group	N
34	United Kingdom	BAE Systems	A
35	Netherlands	Schlumberger	G
36	Spain	Iberdrola	G
37	Belgium	InBev	G
38	United Kingdom	Diageo	A
39	Switzerland	ABB	G
40	Sweden	TeliaSonera Group	N
41	Norway	Telenor	N
42	France	Groupe Danone	G
43	France	Veolia Environnement	G
44	Spain	Grupo Ferrovial	G
45	Ireland	CRH	A
46	France	Schneider Electric	G
47	Germany	Metro AG	G
48	Switzerland	Holcim	G
49	Germany	EnBW-Energie Baden	G
50	Portugal	EDP-Energias de Portugal	G
51	France	Christian Dior	G
52	Germany	SAP	G
53	United Kingdom	Rolls-Royce Group	A
54	Austria	OMV Group	G
55	France	PPR	G
56	Germany	Henkel Group	G
57	Germany	Continental	G
58	United Kingdom	Wolseley	A
59	United Kingdom	WPP	A
60	Spain	Gas Natural SDG	G
61	Spain	Cepsa	G
62	United Kingdom/Netherlands	Reed Elsevier	A
63	United Kingdom	Vodafone	A

64	France	Michelin Group	G
65	Finland	Stora Enso	N
66	Spain	Acciona	G
67	Finland	Fortum	N
68	France	Pernod Ricard	G
69	Sweden	Ericsson	N
70	United Kingdom	British Airways	A
71	Sweden	SCA-Svenska Cellulosa	N
72	Germany	Deutsche Lufthansa	G
73	Germany	MAN	G
74	Portugal	Portugal Telecom	G
75	United Kingdom	Imperial Tobacco Group	A
76	Germany	Siemens	G
77	Netherlands	Heineken Holding	G
78	United Kingdom	Marks & Spencer	A
79	Belgium	Solvay Group	G
80	Spain	Sacyr Vallehermoso	G
81	Norway	Orkla	N
82	Switzerland	Adecco	G
83	Germany	Bayer	G
84	Sweden	Sandvik	N
85	Sweden	Scania	N
86	Italy	Finmeccanica	G
87	Switzerland	Swisscom	G
88	Germany	Merck	G
89	Germany	Linde	G
90	Finland	UPM-Kymmene	N
91	Sweden	Atlas Copco	N
92	Netherlands	TNT	G
93	Sweden	H&M Hennes & Mauritz	N
94	Switzerland	Richemont	G
95	United Kingdom	Pearson	A
96	Netherlands	Ahold	G

97	Denmark	Novo Nordisk	N
98	Hungary	MOL	G
99	Germany	HeidelbergCement	G
100	Spain	Abertis	G

A = Anglo-Saxon corporate governance regime

G = Germanic (or continental European) corporate governance regime

N= Nordic corporate governance regime

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Table 1  
 Example of information deemed satisfactory by external shareholders

*Basic information:* The firm forecasts profit to change from this quarter to the next by 12%. Seasonal pattern indicates a 3-percentage-point improvement to be expected this quarter. No hedging activities are undertaken in the period.

Macroeconomic variables	Assumptions underlying the forecast (%)	Sensitivity coefficients from the MUST-analysis (%)	Macroeconomic influence
CHF/USD	4	2	8
US short-term interest rate	2	-3	-6
Japanese producer price inflation	1	3	3

Table 2  
Summary of variables, expected signs and definitions

<i>Variable<sup>a</sup></i>	<i>Sign</i>	<i>Definition</i>
<i>Dependent Variables</i>		
Macroeconomic Variables	+	The supply of information graded 1 to 4
Impact	+	The supply of information graded 1 to 4
Strategies	+	The supply of information graded 1 to 4
Total	+	The equally weighted average of the above 3
<i>Explanatory Variables</i>		
Anglo-Saxon System (ANG)	+	1 for Anglo-Saxon, 0 otherwise
Nordic System (NOR)	+	1 for Nordic, 0 otherwise
International Cross-listing (CAP)	+	Number of international markets where stock is listed
<i>Control Variables</i>		
Product Type (PROD)	+	1 for heterogeneous, 0 for homogeneous
Firm Size (SIZE)	+	Natural logarithm of total assets
Leverage (LEV)	+	Total debt to total assets
Foreign Sales (FORS)	+	Foreign sales to total sales
Profitability (PROF)	-	Return on assets
Capital Intensity (CAP_IN)	+	PP&E to total assets
Stock Turnover (TURN)	+	Trading volume to outstanding shares
Year Dummies (2003, 2006 and 2009)	-/+	1 for 2003, 2006 and 2009, 0 otherwise

*Notes:* This table presents the variables, their expected effects on the supply of information and their definitions.

Table 3  
Number of Firms Graded 3 (or Higher) in 2000, 2003, 2006 and 2009

<i>Information Type</i>	<i>2000</i>	<i>2003</i>	<i>2006</i>	<i>2009</i>
Macroeconomic Variables	61	75	88	96
Impact	16	28	36	35
Strategies	37	54	78	80
Total	11	23	33	30

*Notes:* This table compares the dependent variables and how the supply of macroeconomic information has developed in the time period 2000-2009. Only firms graded 3 or higher for the relevant information type in a given year are included (out of 100 observations per year). The quality of the supply of information is evaluated by grading the three types of information (collected from the annual reports) from 1 to 4. These types are the supply of information on the relevant macroeconomic variables, the impact of these variables and how risk management strategies affect the exposure. Total is calculated as the equally weighted average of the three information types.

Table 4

Number of changes between 2000/2009, 2000/2003, 2003/2006 and 2006/2009

<i>Information Type</i>	<i>Status</i>	<i>2000/2009</i>	<i>2000/2003</i>	<i>2003/2006</i>	<i>2006/2009</i>
Macroeconomic Variables	Improved	35	19	15	8
	Worsened	0	5	2	0
	Stayed $\geq 3$	61	56	73	88
	Stayed $< 3$	4	20	10	4
Impact	Improved	23	14	12	4
	Worsened	4	2	4	5
	Stayed $\geq 3$	12	14	24	31
	Stayed $< 3$	61	70	60	60
Strategies	Improved	46	20	25	3
	Worsened	3	3	1	1
	Stayed $\geq 3$	34	34	53	77
	Stayed $< 3$	17	43	21	19
Total	Improved	23	14	13	2
	Worsened	4	2	3	5
	Stayed $\geq 3$	7	9	20	28
	Stayed $< 3$	66	75	64	65

*Notes:* This table compares the dependent variables and how the supply of macroeconomic information has developed in the time period 2000-2009, as well as in various sub-periods. The quality of the supply is evaluated by grading the three types of information (collected from the annual reports) from 1 to 4. The information types are the supply of information on the relevant macroeconomic variables, the impact of these variables and how risk management strategies affect the exposure. Total is calculated as the equally weighted average of these three. A firm is given the status "Improved" if the supply of information went from below 3 to 3 or higher between the given years and vice versa for "Worsened". "Stayed  $\geq 3$ " indicates that the firm remained at a high level of disclosure and vice versa for "Stayed  $< 3$ ".



Table 5  
McNemar test of asymmetries

<i>Category changes</i>	<i>Variables</i>	<i>Impact</i>	<i>Strategies</i>	<i>Total</i>
Change 00/09	35.00***	13.37***	37.73***	13.37***
Change 00/03	8.17***	9.00***	12.57***	9.00***
Change 03/06	9.94***	4.00*	22.15***	6.25**
Change 06/09	8.00***	0.11	1.00	1.28

*Notes:* This table shows the Stuart-Maxwell statistics and the statistical significance in the form of a McNemar test for improvements from Categories 1 and 2 to Category 3 in 2000-2009, as well as in sub-periods. The quality of the supply of information is evaluated by grading three information categories (collected from annual reports) from 1 to 4: information on the relevant macroeconomic variables, the impact of these variables and how risk management strategies affect the exposure. Total is calculated as the equally weighted average of the three. Significance levels: \*\*\*=0.01, \*\*=0.05, \*=0.10.

Table 6  
Descriptive statistics for independent variables

<i>Independent Variables</i>	<i>Mean</i>	<i>Median</i>	<i>Max</i>	<i>Min</i>	<i>Std. Dev.</i>
<i>Explanatory Variables</i>					
Anglo-Saxon System (ANG)	0.18	0.00	1.00	0.00	0.37
Nordic System (NOR)	0.17	0.00	1.00	0.00	0.38
International Cross-listing (CAP)	9.17	10.00	14.00	1.00	2.71
<i>Control Variables</i>					
Product Type (PROD)	0.80	1.00	1.00	0.00	0.40
Firm Size (SIZE)	7.35	7.33	8.38	6.04	0.43
Leverage (LEV)	0.28	0.27	1.23	0.00	0.15
Foreign Sales (FORS)	0.60	0.62	0.99	0.00	0.28
Profitability (PROF)	0.07	0.06	0.32	-0.16	0.06
Capital Intensity (CAP_IN)	0.32	0.31	0.83	0.00	0.18
Stock Turnover (TURN)	0.97	0.85	14.17	0.00	1.12

*Notes:* This table shows descriptive statistics for the independent variables. See Table 2 for definitions of the variables.

Table 7 Pearson correlation matrix and VIF test

<i>Variables</i>	<i>VAR</i>	<i>IMP</i>	<i>STR</i>	<i>TOT</i>	<i>ANG</i>	<i>NOR</i>	<i>CAP</i>	<i>PROD</i>	<i>SIZE</i>	<i>LEV</i>	<i>FORS</i>	<i>PROF</i>	<i>CAP_IN</i>	<i>TURN</i>
VAR	1													
IMP	0.249***	1												
STR	0.552***	0.29***	1											
TOT	0.283***	0.89***	0.44***	1										
ANG	0.193***	0.01	0.08	-0.02	1									
NOR	0.06	0.26***	0.11**	0.29***	-0.21***	1								
CAP	-0.11**	0.07	0.09*	0.04	-0.35***	-0.07	1							
PROD	0.13*	0.01	0.04	0.02	0.16***	-0.04	0.04	1						
SIZE	-0.05	0.08	0.12**	0.07	-0.05	-0.26***	0.44***	-0.19***	1					
LEV	-0.01	0.01	0.02	-0.03	-0.01	-0.12**	-0.04	0.08	0.13**	1				
FORS	0.22***	0.14***	0.19***	0.19***	0.03	0.14***	0.04	0.20***	0.05	-0.14***	1			
PROF	-0.02	0.03	0.03	0.02	0.08	0.13***	-0.04	0.03	-0.37***	-0.22***	0.02	1		
CAP_IN	-0.13**	0.03	-0.17***	-0.03	-0.07	0.17***	-0.02	-0.46***	-0.03	0.18***	-0.39***	-0.02	1	
TURN	-0.03	-0.02	0.05	-0.03	-0.10**	-0.07	0.03	-0.07	-0.03	-0.04	0.01	0.05	-0.01	1
<i>VIF test</i>	-	-	-	-	1.39	1.25	1.72	1.57	1.77	1.14	1.26	1.14	1.62	1.04

*Notes:* This table presents two-tailed Pearson correlation coefficients for the dependent and independent variables. The quality of the supply of information (macroeconomic variables, impact and strategies – represented by VAR, IMP and STR in the table) is constructed by grading three information categories (collected from annual reports) from 1 to 4: information on the relevant macroeconomic variables, the impact of these variables and how risk management strategies affect the exposure. Total (TOT) is calculated as the equally weighted average of the three. Firms with a grading greater than or equal to 3 are assigned 1, others are assigned 0. See Table 2 for definitions of the independent variables. Significance levels: \*\*\*=0.01, \*\*=0.05, \*=0.10. The variance inflation factor (VIF), as an indicator of multicollinearity, is provided for the independent variables.

Table 8  
Logistic regressions with year dummies

<i>Independent Variables</i>	<i>(1) Macro-economic variables</i>	<i>(2) Impact</i>	<i>(3) Strategies</i>	<i>(4) Total</i>
Constant	7.69** (2.10)	-8.06*** (-2.59)	-1.22 (-0.41)	0.76 (0.22)
Product Type (PROD)	-0.31 (-0.68)	0.10 (0.26)	-0.80** (-2.04)	-0.24 (-0.58)
Size (SIZE)	-1.15** (-2.22)	0.54 (1.30)	-0.14 (-0.33)	-0.28 (-0.60)
Leverage (LEV)	0.90 (0.74)	0.71 (0.80)	2.03** (2.06)	2.01* (1.69)
Foreign Sales (FORS)	2.43*** (3.54)	0.77 (1.54)	0.89* (1.68)	0.30 (0.50)
Profitability (PROF)	-4.04 (-1.26)	3.13 (1.28)	1.15 (0.45)	4.71 (1.46)
Capital Intensity (CAP_IN)	-1.56 (-1.36)	0.14 (0.16)	-3.14*** (-3.47)	-2.42** (-2.36)
Stock Turnover (TURN)	-0.05 (-0.37)	0.00 (0.02)	0.15 (1.04)	0.23 (1.31)
Anglo-Saxon System (ANG)	2.97*** (3.52)	0.72* (1.87)	1.47*** (3.49)	0.97** (2.06)
Nordic System (NOR)	0.78 (1.64)	1.84*** (5.20)	1.40*** (3.67)	0.80* (1.84)
International Cross-listing (CAP)	0.03 (0.37)	0.10 (1.52)	0.17*** (2.82)	0.19*** (2.98)
2003 Dummy (2003)	0.79** (2.17)	0.82** (2.14)	0.83** (2.55)	0.48 (1.33)
2006 Dummy (2006)	1.84*** (4.34)	1.11*** (2.97)	1.97*** (5.41)	0.63 (1.63)
2009 Dummy (2009)	2.85*** (4.81)	1.06*** (2.77)	2.03*** (5.45)	1.34*** (3.04)
Number of observations	378	378	378	378
LR chi2(11)	87.10	52.44	92.74	34.72
Probability > chi2	0.00	0.00	0.00	0.00
Pseudo R2	0.23	0.11	0.19	0.10
Log Likelihood	-141.94	-205.19	-202.79	-165.23
Linktest (Probability)	0.66	0.71	0.30	0.16
Goodness-of-fit (Pearson)	0.10	0.32	0.28	0.68
Goodness-of-fit (HosmerLemeshow)	0.27	0.92	0.29	0.54

*Notes:* The dependent variables (macroeconomic variables, impact and strategy) in the table are the measures of quality/quantity of the supply of macroeconomic information (top row) collected from annual reports and graded from 1 to 4. The measures relate to the supply of information on the relevant macroeconomic variables, the impact of these variables and how risk management strategies affect the exposure. A firm with a grading greater than or equal to 3 is assigned 1, others are assigned 0. The last dependent variable, *total*, is calculated as the

equally weighted average of the other three. Again, firms are assigned 1 if the average is greater than or equal to 3. See Table 2 for definitions of the variables. Significance levels: \*\*\*=0.01, \*\*=0.05, \*=0.10.