The real business effects of quarterly reporting

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ABSTRACT: This paper examines whether a higher reporting frequency has real business effects. Specifically, we examine whether mandated quarterly reporting has an effect on myopic management in terms of managers' willingness to use real activities manipulation (RAM). Recent studies discuss the cost and benefits of quarterly reporting. Advocates of a higher reporting frequency argue that it reduces information asymmetry and thereby increases capital market efficiency. However, reporting frequency might also have an effect on economic efficiency. We find that in years in which a firm just meets or beats past years' earnings or the zero earnings benchmark (suspect years), quarterly reporters exhibit higher RAM compared to semi-annual reporters. This effect is not only prevalent in suspect years, but also significantly depends upon the regulatory environment and both, firm as well as industry characteristics. We provide evidence that the effect is stronger in countries with a higher importance of equity markets and with a noisier financial reporting environment. In addition, firms with more short-term oriented investors, a lower level of monitoring by analysts and firms operating in higher competition industries exhibit higher real effects. We interpret these findings as evidence for managerial myopia as a consequence of higher mandated reporting frequency. Our findings are in line with the theoretical models and anecdotal and survey evidence presented in previous literature and contribute to the literature on the real effects of disclosure regulation.

Keywords: Mandatory disclosure, interim reporting, quarterly reporting, real business effects, real activities manipulation, management myopia

Data Availability: Data are available from public sources identified in the paper

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1. INTRODUCTION

This study investigates the real business effects of mandatory quarterly reporting. We test whether a higher mandated interim reporting frequency influences management decisions by inducing myopic behavior. We argue that shorter reporting cycles lead managers to deviate from normal operational practices because, e.g., in their attempt to meet or beat earnings benchmarks, they are tempted to more actively engage in activities manipulation than they otherwise would. This argument is in line with empirical evidence from the survey of Graham et al. (2005) among executives in the U.S., where 80% of CFOs admit they would decrease discretionary spending (e.g., R&D) given the pressure to meet quarterly earnings targets. Almost 40% would even provide incentives for customers to buy more products in the current period by, e.g., increasing discount levels. The authors argue that managers are willing to sacrifice long-term value in order not to fail meeting short-term expectations of analysts and investors. There is also ample anecdotal evidence which suggests that managers, when required to issue quarterly financial reports, are forced to make short-sighted business decisions to meet earnings targets, often at the expense of long-term value. The most prominent example is probably German car manufacturer Porsche, who's CEO refused to issue quarterly reports in 2003, claiming that it triggers short-sighted management decisions.[1]

As suggested by the evidence presented, we are particularly interested in the real effects of interim disclosure regulation. In order to test empirically whether reporting frequency leads to a deviation from normal operational practices, we need to compare quarterly reporters with companies that report semi-annually. As an additional analysis, we also test a setting where reporting frequency has changed recently and compare pre/post effects of the new regulation.[2]

[1] This resulted in the exclusion of the company from the German stock market index for mid-caps (M-DAX).
[2] Mandatory quarterly reporting was introduced in 1970 in the U.S. (Butler et al., 2007). We argue pre/post study in the U.S. would be subject to many deterring factors such as changes in the regulatory and disclosure

The European Union (EU) constitutes a natural laboratory to test for these differences between reporting frequency regimes. Primarily for historical reasons quarterly reporting is mandatory in 8 out of 15 countries and the remaining 7 countries only require semi-annual financial statements.[3] Reporting frequency aside, financial and disclosure regulation is strongly harmonized in the EU. Other settings do not offer such a variation in the frequency of reporting and other cross-country analyses could be biased by large differences in disclosure or reporting regulation, which are difficult to control for. In addition, the EU setting allows us to examine the impact of the informational environment on the real effects of quarterly reporting and to provide evidence on how this effect depends on different institutional environments (Christensen et al., 2010).

In order to measure real business effects, we rely on the previously established measures for real activities manipulation (RAM) defined as deviations from normal operational practices for the purpose of avoiding earnings surprises and other adverse effects such as, e.g., loss in reputation. Prior research (Dechow et al., 1998; Roychowdhury, 2006) uses abnormal cash flow from operations (*ACFO*), abnormal production cost (*APROD*), and abnormal discretionary expenses (*ADISC*) as measures of RAM. We derive a new comprehensive RAM measure (*TOTALRAM*), which combines all three abnormal variables to determine whether reporting frequency has an effect on aggregate RAM.

For our empirical study we hand-collected the regulatory requirements on interim disclosure in the EU-15 countries based on an extensive review of documents from the EU, national regulatory authorities, stock exchanges, and from interviews with financial analysts and stock market operators. We identify and eliminate voluntary quarterly reporters, i.e., quarterly reporters in semi-annual reporting regimes, due to potential endogeneity as they

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requirements of firms and management compensation structure over the last decades. Therefore, the relevance of the results in terms of implications for today's regulators might be limited. We therefore rely on a setup with a more recent reporting requirement modification, i.e. the mandatory introduction of interim management statements in the EU after 2007 (section 5).

[3] EU-15 refers to the 15 countries that were part of the EU before its enlargement in 2004. We focus on these countries as these are mature economies that have integrated capital markets and harmonized disclosure regulation for several years already. The 12 new member states are mostly transition economies and therefore less comparable.

self-select into the group of quarterly reporters. We use propensity-based score matching to ensure quarterly and semi-annual reporters are comparable, which results in a sample 3,366 firm-year observations from EU-15 countries. In a first set of tests, we use the suspect year concept introduced in prior research (Gunny, 2010) to ensure that we primarily analyze firm-years in which the likelihood of RAM is high. We carefully control for determinants of accounting earnings management (AEM) in our regressions to take into account the interrelation between RAM and AEM (Ewert and Wagenhofer, 2005). Further, we employ a large set of controls and include fixed country effects and error clustering by country to reduce a potential bias from cross-sectional differences between the countries.

We find that mandatory quarterly reporters generally exhibit higher levels of RAM compared to semi-annual reporters, in particular in suspect firm-years. We also document cross-sectional differences in the effect depending on both the regulatory environment as well as firm and industry characteristics. The effect is particularly strong in countries with high equity market importance, high earnings management scores and weak legal enforcement. Moreover, the effect is stronger for firms with short-term oriented investors, a lower level of monitoring by analysts as well as for firms in industries with a higher competition. Our findings suggest that mandated increased disclosure in the form of interim reporting frequency is associated with indirect costs in terms of RAM. Our findings are in line with predictions of the theoretical models from Stein (1989) and Gigler et al. (2009) and both, anecdotal as well as survey- and interview-based evidence.

We conduct extensive additional analyses to test the robustness of our findings. To confirm that our results are indeed linked to interim reporting, we estimate the effect of just meeting or beating earnings benchmarks of each of the individual quarters on RAM. We find that the effect is strongest in the first and weakest in the last quarter, indicating that managers use RAM in particular early in the year and are more concerned about the yearly rather than quarterly benchmarks towards the end of the year. Furthermore, we analyze the effect of the

EU Transparency Directive (TD) introducing the requirement for semi-annual reporters to disclose selected quarterly financial information in a pre-post treatment regression. Although slightly less significant, we find that RAM of semi-annual reporters increased after the mandatory introduction of interim management statements. We also run our main regressions using the individual RAM measures established by Roychowdhury (2006) and find that our hold for each of the individual measures.

Our study contributes to the literature in several ways. First, the findings contribute to the growing "real effects" literature by providing evidence on real business implications of mandatory quarterly reporting. Several studies document activities manipulation behavior under different suspect conditions and for particular regulatory changes but never in the context of disclosure frequency. For example, Roychowdhury (2006) shows that when companies are close to zero-earnings, they tend to deviate from normal operational practices by, e.g., price discounts and a reduction in discretionary expenses. Cohen and Zarowin (2010) show that RAM is also used at the time of seasoned equity offerings. Other studies have focused on the trade-off between RAM and AEM and the subsequent performance of companies using RAM. Cohen et al. (2008) show that RAM has been used more extensively compared to AEM after the introduction of Sarbanes-Oxley (SOX). Zang (2010) analyzes the trade-off between RAM and AEM and confirms previous findings of a substitution effect between the two (Ewert and Wagenhofer, 2005; Cohen et al., 2008). Gunny (2010) finds that, despite the costs involved in RAM, companies using more RAM exhibit better subsequent performance than comparable companies. We contribute to this literature as the first study to provide evidence on the real effects of interim reporting frequency. We also add to this literature by introducing a new aggregate RAM measure that combines all individual RAM measures and helps detecting RAM in general.[4] Second, we add to the literature of mandatory disclosure regulation by providing evidence on potential externalities and indirect costs of

[4] Previous studies have only combined two of the three measures (e.g., Cohen and Zarowin, 2010).

interim reporting frequency as one particular type of mandatory disclosure. Previous studies have focused on the economic consequences of other types of mandatory disclosure requirements such as SOX and the mandatory introduction of IFRS (Leuz and Wysocki, 2008). We also add to the literature by showing how these real effects of mandatory disclosure depend on regulatory, firm and industry characteristics. We provide evidence of cross-sectional differences in the magnitude of disclosure frequency-induced RAM. Our findings have implications for regulators and add to the ongoing debate on the optimal reporting frequency.

The remainder of our paper is organized as follows. Section 2 discusses the related literature and hypotheses. Section 3 presents the methodology and sample selection and descriptive statistics. Section 4 discusses the results of our empirical tests. Section 5 presents the results of additional and sensitivity analyses. Section 6 concludes.

2. RELATED LITERATURE AND HYPOTHESIS DEVELOPMENT

2.1. Economic effects of mandatory disclosure regulation

The objective of disclosure regulation is to mitigate information asymmetries and the adverse selection problem between suppliers and users of capital and thus facilitate efficient capital allocation (e.g., Watts and Zimmerman, 1986). For instance, major benefits of disclosure include higher liquidity, lower cost of capital and higher firm valuation (e.g., Verrechia, 2001; Shleifer and Wolfenzon, 2002). Firm-specific costs include direct costs such as collecting, preparing and disseminating the respective reports as well as indirect costs such as the release of proprietary information to the market, which might benefit competitors (e.g., Butler et al., 2007). In the absence of disclosure regulation, firms voluntarily disclose information as long as the corresponding benefits exceed the costs. A variety of studies has investigated the firm-specific effects of voluntary disclosure (in particular the corresponding capital market effects). For instance, Butler et al. (2007) show that the timeliness of earnings

increases for voluntary quarterly reporters in the U.S. before interim reporting became mandatory in 1970. Studies focusing on voluntary reporting, however, are not able provide insights into the overall desirability, economic efficiency and potential negative externalities of regulating these disclosures (Leuz and Wysocki, 2008). Therefore, market-wide benefits and costs of disclosure regulation have to be incorporated into the analysis, which might render a potential firm-specific disclosure equilibrium suboptimal. If these market-wide benefits exceed the costs, mandatory disclosure is economically desirable. Previous literature finds that mandatory disclosure is particularly beneficial in the case of positive externalities, potential cost savings (e.g., through scale and standardization), stricter sanctions and sanction enforcement as well as costs from fraud and agency conflicts that could be mitigated by disclosure (Leuz and Wysocki, 2008).[5] However, mandatory disclosure can also have negative externalities such as unexpected interactions with other (disclosure) mechanisms or institutional features and it can ultimately also impact real decisions made, e.g., by managers (Beyer et al., 2010). A large range of studies has investigated benefits and costs of mandatory disclosure regulation. The recent literature on the effect of the Sarbanes-Oxley Act or the mandatory IFRS introduction are only two examples (e.g., Zhang, 2007; Chhaochharia and Grinstein, 2007; Cohen at al., 2008; Daske et al., 2008). We contribute to this literature by providing further insights into potential externalities in the form of real effects of one particular type of mandatory disclosure, i.e., mandatory quarterly reporting.

2.2. Management myopia and earnings benchmarks

Stein (1989) proposes a managerial myopia theory, which predicts myopic management behavior by focusing on short-term actions to inflate earnings and to increase the stock price even in the face of a rational stock market. According to this theory, managers have incentives to overstate current period earnings at the expense of long-term earnings although investors

[5] The authors provide an extensive review and framework of the existing literature on disclosure, its cost and benefits as well as corresponding economic consequences.

anticipate this behavior and incorporate it into their expectations.[6] The model contradicts with the traditional agency-theoretic view that capital market pressure reduces information asymmetries between principal and agent and therefore helps aligning their interests (Jensen, 1986). Stein (1989) argues that managers tend to act myopically in their best interest to maximize stock prices. The empirical literature documents myopic behavior of managers, especially under certain conditions like pending stock issuances (Bhojraj and Libby, 2005), IPOs (Teoh et al., 1998), employment concerns (Fudenberg and Tirole, 1995) or compensation issues (Hall and Murphy, 2003), as well as in the presence of institutional investors (Bushee, 1998). Graham et al. (2005) document myopic behavior of managers to meet expectations of analysts and investors when disclosing financial reports. A significant part of previous literature has relied on the concept of meeting or beating earnings benchmarks to identify years in which myopic behavior is highly likely, so-called suspect years (e.g., Roychowdhury, 2006; Gunny, 2010; Zang, 2010). We contribute to this literature by testing if myopic behavior proxied by RAM is more prevalent if reporting frequency is higher.

2.3. Earnings management and interim disclosure frequency

Managerial myopia can lead to earnings management when managers use judgment and discretion in financial reporting to mislead stakeholders about the underlying economic performance (Healy and Whalen, 1999). Managers have at least two options to achieve this: They can either use accounting-based earnings management by accruals manipulation and classification shifting or they can use RAM defined as adapting their operational practices to influence short-term operating performance.

A variety of studies have shown that managers influence financial reporting through accounting discretion (commonly referred to as "earnings management") and classification

[6] Further important research on the prevalence and conditions of management myopia includes, e.g., Laffont and Tirole (1987), De Long et al. (1990), Sloan (1996), Bar-Gill and Bebchuk (2003) and Ellis (2004).

shifting (e.g., Jones, 1991; Dechow and Dichev, 2002; Kothari et al., 2005; McVay, 2006; Fan et al., 2010). Some of these studies focus on reporting frequency and quarterly reports. Degeorge et al. (1999) propose a quarterly earnings threshold hierarchy, i.e. managers seek to avoid quarterly losses or quarterly earnings decreases more than meeting or beating financial analysts' quarterly earnings forecasts. Brown and Caylor (2005) examine and find temporal changes in this hierarchy. Since the mid-1990s firms appear to focus more on avoiding quarterly earnings surprises due to the increased importance of analysts' forecasts. Das et al. (2009) document that patterns in quarterly earnings changes reflect accounting earnings management behavior. Companies that perform poorly in interim quarters try to increase earnings in the last quarter to reach earnings benchmarks and vice versa (earnings reversals).

A growing stream of the empirical literature also investigates managers' willingness to depart from normal operational practices ostensibly to achieve certain reporting goals. These practices include, for example, price discounts to increase short-term revenues, production increases to reduce average cost per unit, and the reduction of discretionary expenses to boost short-term profit (Roychowdhury, 2006).[7] He proposes three measures for RAM and finds evidence for abnormal levels of cash flow from operations, production cost and discretionary expenses triggered by managers trying to avoid reporting losses. Using similar measures, Cohen et al. (2008) find that in the post-Sarbanes-Oxley period, many firms switched from accrual-based to real activities manipulation methods. This is consistent with the model of Ewert and Wagenhofer (2005) who suggest that tighter accounting standards might increase the expected total cost of earnings management due to a switch from accounting to more costly real activities manipulation.

Our study focuses on RAM rather than AEM, since we investigate the real business effects of mandatory disclosure, particularly of higher reporting frequency. By doing so, we

[7] Previous research on real activities manipulation (RAM) focuses on opportunistic R&D expenditure reduction to meet earnings forecasts or avoid share price dilution (e.g., Bens et al., 2002; Dechow and Sloan, 1991). Other findings include the acceleration of sales and the delay of R&D and other discretionary expenses (e.g., Healy and Wahlen, 1999; Fudenberg and Tirole, 1995; Dichev and Skinner, 2002).

add to the existing literature on externalities of mandatory disclosure beyond capital market effects to provide evidence about real effects of disclosure regulation (Leuz and Wysocki, 2008).

2.4. Reporting frequency-induced real business effects

Gigler et al. (2009) propose a model to analyze the real effects of more frequent mandatory reporting in the presence of multiple market imperfections. They assume that managers cannot disclose credibly whether they are investing in short-term or long-term projects. While the short-term project generates stochastically higher cash-flows in the early periods and lower cash-flows in the later periods, the long-term project overall has a higher net present value. Given that the type of investment cannot be observed, impatient shareholders price firms based on observed current cash flows of the firm. In their attempt to prevent a reduction in stock price, managers therefore have to focus more on projects with higher immediate return, i.e., the short-term projects which overall have a lower net present value. Short-termism is therefore the optimal response of managers to the price pressure of capital markets. In such a setting, more frequent financial reports lead to more efficient market prices (i.e., prices better reflect the firm's underlying cash flows), but also induces managers to engage practices which overall may not be socially desirable. They conclude that more frequent disclosure could be associated with a trade-off between higher price efficiency and lower economic efficiency, because in anticipation of the required external financial reporting, managers adapt their business activities to meet short term rather than long-term objectives, which has strategic and economic consequences.

Archival studies investigating the real effects of mandatory disclosure frequency requirements are sparse. Experimental and survey evidence is in line with the implications derived from the model presented by Gigler et al. (2009). In an experimental study with experienced financial managers, Bhojraj and Libby (2005) investigate the investment preferences of managers and find that only if capital market pressure is high, an increase in

reporting frequency results in myopic management behavior. The survey study of Graham et al. (2005) comes up with similar results indicating that managers do adapt their operational practices given the pressure to meet quarterly earnings targets.

In line with the above evidence, we argue that increased managerial myopia and short-termism is a consequence of a higher disclosure frequency, in particular when capital market pressure is high. Specifically, we argue that mandatory quarterly reporting leads managers to deviate from normal operation practices measured by RAM. In line with previous research, the effect should be particularly present in suspect years, i.e., when managers attempt to meet or beat earnings forecasts. We conjecture that a higher frequency of reporting is associated with higher RAM.

H1a: Mandatory quarterly reporting is associated with higher real activities manipulation (RAM) compared to semi-annual reporting.

2.5. Cross-sectional differences of frequency-induced real activities manipulation

Prior theoretical work (e.g., Stein, 1989; Bar-Gill and Bebchuk, 2003) suggests that the degree of myopic behavior is influenced by the extent to which managers care about short-term price relative to long-term value. Leuz et al. (2003) present evidence on earnings management depending on the institutional setup. Based on prior research, we identify several incentive and monitoring mechanisms arising from institutional differences as well as industry differences and firm characteristics that might exacerbate or reduce the impact of quarterly reporting on RAM. At the institutional level, we hypothesize that the difference in RAM between quarterly reporters and semi-annual reporters is higher for economies in which capital markets are more important. This is in line with Stein (1989), who finds myopic behavior is particularly prevalent in the presence of capital market pressure. Gigler et al. (2009) argue that managerial myopia is present, when the information gap between the capital market and corporate managers is particularly large. They argue that this is the case if periodic accounting statements are noisy. We therefore test whether reporting frequency-

depended RAM is higher in institutional environments that provide more "noisy" accounting statement which we proxy by institutional environments that previous research has identified as exhibiting higher levels of AEM and with lower levels of enforcement. We test whether the effect is stronger in countries with higher earnings management scores and lower legal enforcement (Leuz et al., 2003). [8,9] This is in line with Bar-Gill and Bebchuk (2003) who argue that misreporting is particularly high in lax accounting and legal environments.

We also test three firm and industry specific factors that we expect to be significant drivers of reporting frequency-induced RAM. Gigler et al. (2009) model the net effect of increased reporting frequency as a function that depends on shareholder patience. They argue that if shareholders are sufficiently impatient, less frequent reporting dominates frequent reporting in terms of social welfare because more short-term projects with lower net present value executed. Although we do not test the effect of reporting frequency on social welfare, we want to test whether shareholder impatience indeed has an effect on the level of management short-termism measured by the level of RAM used. We therefore conjecture that firms with a higher proportion of short-term oriented investors should exhibit higher levels of RAM.[10] Similarly to the institutional environments that allow for higher earnings management (such as higher earnings management and lower legal enforcement), we expect that firms with lower monitoring by analysts exhibit higher frequency-dependent RAM. Yu (2008) shows that earnings management negatively depends on analyst following which he interprets as evidence in favor of the monitoring hypothesis of RAM. We argue that, as

[8] Similar to Leuz et al. (2003), we measure legal enforcement as the mean score across three legal variables used in La Porta et al. (1998): (1) the efficiency of the judicial system, (2) an assessment of rule of law, and (3) the corruption index.

[9] The expected effect on management myopia works against the substitutive effect of AEM and RAM described in, e.g., Ewert and Wagenhofer (2005). However, we control for this trade-off in all of our regressions by incorporating the majority of factors that previous research has identified in determining the level of RAM, such as the cost of RAM and the cost of AEM, e.g., by including the balance sheet constraint (Barton and Simko, 2002) and an indicator for auditor quality (Zang, 2010). We therefore conjecture that management myopia measured by increased RAM in higher reporting frequency regimes is higher in countries with higher earnings management scores and lower legal enforcement.

[10] Following Polk and Sapienza (2008), we proxy for shareholder short-termism by higher relative share turnover.

accounting quality decreases, the noise in the reported accounting information increases which in turn leads to more myopic decision making by managers (Gigler et al., 2009).[11] Finally, we also conjecture that reporting frequency-dependent RAM increases with industry competition because company performance can be better compared to external benchmarks such as the performance of peers. This increases the pressure on management to provide short-term results in line with competitors and therefore inflate earnings. We argue that the "Nash equilibrium outcome of a non-cooperative game between managers and the stock market" (Stein, 1989) is reached faster and management myopia is higher if competition is higher. The main reason is that manager's dominant strategy is to inflate earnings independent of what the competitors do: If competitors do not inflate earnings, managers have an advantage if they outperform their peers. However, if competitors do inflate their earnings, managers would fall behind competition by refraining from earnings inflation and therefore be punished. If competition and therefore comparability of results is lower, managers have more degrees of freedom in determining their strategy more independently of external benchmarks. The strength of this effect also depends on the individual company's position within a certain industry. We therefore control for a company's market share in all of our regressions. We correspondingly predict:

H2: Reporting frequency-induced RAM is higher in institutional environments with high importance of equity markets, high earnings management scores, low regulatory quality, short shareholder horizons, a low number of analysts that monitor managers as well as in industries with high competition.

[11] An alternative view is that a higher number of analysts creates additional pressure on managers to meet targets. These competing hypotheses concerning the role of financial analysts are examined by Yu (2008). He finds that the monitoring function of analysts outweighs the additional pressure argument. Our hypothesis follows his predictions.

3. METHODOLOGY, DATA, AND DESCRIPTIVE STATISTICS

3.1. Regulatory background

We exploit the institutional setting of the European Union to test our hypotheses. Europe constitutes a natural laboratory of our study because it has a high level of harmonization with respect to financial disclosure and reporting regulation while at the same time having countries with different reporting frequency regimes primarily for historical reasons.[12] Given the harmonized financial reporting environment in the EU, this setting allows for the isolation of the effect of interim reporting frequency. Table 1 gives an overview about the specific requirements in each EU-15 country, which we compiled from an extensive review of documents from the EU, national regulatory authorities, stock exchanges, and from interviews with financial analysts and stock market operators in the respective countries. In Finland, Greece, Italy, Portugal, and Spain, the regulatory authorities require listed firms to publish full quarterly financial reports. In Sweden, the stock market operator on both regulated stock markets requires full quarterly financial reports for all companies. In Austria and Germany, companies listed in specific stock market segments ("Prime Market" in Austria and "Prime Standard" in Germany) are also obliged to publish full quarterly reports. The remaining seven countries (Belgium, Denmark, France, UK, Ireland, Luxembourg, The Netherlands) do not mandate full quarterly reports or quarterly earnings announcements.

We classify companies into semi-annual reporters and quarterly reporters based on the corresponding Datastream/Worldscope item WC05200 ("earnings reporting frequency").[13]

[place Table 1 here]

[12] All publicly-traded companies have to report according to IFRS. Capital markets are highly integrated and there is a common supervisory body in addition to the national regulators.

[13] We perform sensitivity checks on the validity of the Datastream/Worldscope item. Changing the definition of quarterly reporters to those companies for which quarterly net earnings are actually available in Datastream/Worldscope does not affect our results.

3.2. Measuring real business effects

To test for real business effects of interim reporting frequency, we develop a combined real activities manipulation measure. We use the measures established in previous research (Dechow et al., 1998; Roychowdhury, 2006) to calculate specific components of RAM, i.e., abnormal cash flow from operations (*ACFO*), abnormal production costs (*APROD*) and abnormal discretionary expenses (*ADISC*). We derive normal levels of the corresponding measures based on industry-year regression using two-digit SIC codes (Roychowdhury, 2006). The residuals of these regressions represent the abnormal level of the measures. The intuition behind real activities manipulation and its calculation is well established in previous literature. We have compiled explanations and formulas for the generation of *ACFO*, *APROD* and *ADISC* in Appendix A.

A substantial number of studies has validated, combined and refined the measures (e.g., Zang, 2010; Cohen et al., 2008; Gunny, 2010, Cohen and Zarowin, 2010). We establish a new RAM measure that combines all individual RAM measures presented by Roychowdhury (2006). Previous studies have combined up to two of the individual RAM components (e.g., Cohen and Zarowin, 2010). In order to derive our combined RAM measure (*TOTALRAM*), we rely on the established RAM components, i.e., sales manipulation, overproduction and a reduction in discretionary expenses. *TOTALRAM* is defined as the sum of all individual RAM components:

$$TOTALRAM = SALESMANIP + APROD + ADISC \quad (1)$$

where all variables are defined in Appendix B.

While *APROD* and *ADISC* can be calculated directly and are not affected by other RAM activities, *SALESMANIP* needs to be calculated via *ACFO*, which consolidates the effect of sales manipulation, overproduction and a reduction in discretionary expenses. In line with Roychowdhury (2006), *ACFO* is defined as follows:

$$ACFO = SALESMANIP + APROD - ADISC \quad (2)$$

where all variables are defined in Appendix B.

As established by Roychowdhury (2006), excessive discounts or more lenient credit terms and increases in COGS or inventory increase *ACFO*. As opposed to that, a reduction in discretionary expenses increases cash flows such that *ACFO* is biased downwards by *ADISC*. SALESMANIP can therefore be rewritten as follows:

$$SALESMANIP = ACFO - APROD + ADISC \quad (3)$$

where all variables are defined in Appendix B.

In order to calculate *TOTALRAM*, we combine equation (1) and (2):

$$TotalRAM = ACFO + 2*(ADISC) \quad (4)$$

where all variables are defined in Appendix B[14].

Previous research has combined two of the three individual measures presented by Roychowdhury (2006) (e.g., Cohen and Zarowin, 2010). This is the first paper that proposes a combined RAM measure of all individual RAM activities.

We use *TOTALRAM* throughout the paper for our main analyses. As additional sensitivity analysis, we also use the individual RAM measures to validate our results and determine the individual effect of each of the manipulation activities.

We calculate RAM on an annual level as it is commonly done in the literature. Moreover, interim financial data other than sales and net income is not available on Datastream/Worldscope. We therefore rely on the yearly RAM measure to identify differences between the two interim reporting frequency regimes. This should however not impede the robustness of our findings for two reasons: First, if RAM reverses during the year, using a yearly measure would work against our findings. Second, in section 5, we use suspect year definitions based on meeting or beating interim reporting targets to analyze patterns in quarterly and semi-annual RAM activity.

[14] ACFO and ADISC are each multiplied by a negative one so that higher values indicate more RAM

3.3. Research design

3.3.1. Selection and matching

In order to test if mandating quarterly reporting has real effects, we first need to identify and eliminate firms that would have adopted quarterly reporting also in the absence of the regulation. We therefore intend to create a group of "pure" mandatory reporters, those that would presumably not report quarterly if they did not have to. Therefore, we apply a probit model using a wide range of company and industry characteristics which is then estimated using the sample of voluntary quarterly reporters. Thereafter, we eliminate similar firms from our sample of mandatory reporters. The model includes a variety of key company characteristics that are likely to influence the company's choice to adopt quarterly reporting For example, we include size because bigger firms can more easily afford to collect the additional information and produce and disseminate the respective reports so the hurdle to adopt quarterly reporting is lower. A similar argumentation applies to the other variables included. The probit model is specified as follows:

$$\begin{aligned}\Pr obit(VOLADOPT) &= \alpha_0 + \alpha_1 SIZE + \alpha_2 LIQUID + \alpha_3 DIV + \alpha_4 CLHELD \\ &+ \alpha_5 FORSALES + \alpha_6 DELFORSALES + \alpha_7 OPCYC + \alpha_8 HERF \\ &+ \alpha_9 INDSIZE + \alpha_{10} TOPIND + \alpha_{11} ANFOL + \alpha_{12} INDEX \\ &+ \alpha_{13} LAGROA + \sum Fixedeffects + \varepsilon\end{aligned} \tag{5}$$

where all variables are defined in Appendix B.

After re-estimating the model with the mandatory firms, we identify firm-years in the mandatory sample that have a probability of voluntarily adopting quarterly reporting in excess of 50%. We exclude these from the sample. In addition, we also exclude all voluntary quarterly reporters from the sample, because of a potential self-selection bias and endogeneity concerns. Our final sample consists of firms that report semi-annually and "pure" mandatory reporters, i.e., those that would (most probably) report semi-annually in a voluntary environment.

An additional challenge of our setting is to account for potential structural differences in the characteristics of different companies across different countries. We use a propensity-based score matching to ensure that quarterly and semi-annual reporters are comparable. This is important because our main explanatory variable (*QR*) varies by country. Therefore, the matching needs to ensure that potential systematic differences of companies across countries are mitigated. We require firms to be from the same industry[15] and then match observations from the two reporting frequency regimes based on a propensity score using size and both, current liabilities and net income scaled by total assets (*SIZE, CL, NI)* as firm characteristics. We expect industries to vary significantly by country, so we only match firms from the same industry using a two-digit SIC-code classification. We also include our matching variables as controls in our main regressions.[16] We include firm size because firms from similar industries tend to vary significantly in size so systematic differences of firm size across countries could bias our results. We also match our firms by current liabilities, because Roychowdhury (2006) points out that suppliers and other stakeholders who provide financing (e.g., through trade payables) might be worried if the company fails to meet earnings benchmarks. Therefore, with higher *CL* a company is more likely to use RAM to just meet or beat these benchmarks.[17] We also include net income standardized by total assets, a measure that is similar to return on assets, to account for systematic differences in the profitability of the firms across countries (due to, e.g., differences in tax regulations) which might influence the propensity to use RAM. The corresponding propensity based sore matching model is specified as follows:

$$\Pr obit(QR)_{by\_ind} = \alpha_0 + \alpha_1 SIZE + \alpha_2 CL + \alpha_3 NI + \varepsilon \qquad (6)$$

where all variables are defined in Appendix B.

[15] Using a two-digit SIC code classification

[16] Cram et al. (2009) identify non-inclusion of the matching variables in the main regressions as one of the major fallacies when applying a matching procedure.

[17] Roychowdhury (2006) argues that if a firm's earnings fall below a certain threshold (suspect years), "the firm's ability to pay suppliers in time and its potential as a future buyer are in doubt. This leads suppliers to tighten terms of credit and other terms. Managers are more likely to worry about the negative reaction of suppliers if they have more trade credit and other short-term liabilities outstanding."

Based on this analysis, we exclude firm-year observations that do not have a comparable observation in the other reporting frequency regime. The resulting matched sample has the same amount of quarterly and semi-annual reporters per industry.

We address concerns about remaining country differences by including country fixed effects as well as standard errors clustered by country in all of our regressions (Christensen et al., 2010). Moreover, as all of our measures are constructed based on industry-year regressions, so industry and year fixed effects are also accounted for.

3.3.2. Suspect years

Previous research has extensively used the suspect year concept to identify years in which increased RAM is more likely than in others. Using suspect years for the analysis reduces potential correlated omitted variable bias because of focusing on firm-year observations when RAM is more likely. Most studies have relied on just meeting or beating earnings benchmarks in defining suspect years (e.g., Roychowdhury, 2006; Zang, 2010; Gunny, 2010). We follow Gunny (2010) and define suspect years as firm-year observations that just meet of beat past years' earnings or the zero earnings benchmark. We define observations as suspect years if either of the two following conditions holds: Firm-years in which a company’s net income before extraordinary items as percentage of lagged total assets is between 0 and 1% or firm-years in which the change in net income as percentage of lagged total assets is between 0 and 1% as suspect years (*SUSPECT*; Gunny, 2010).

In the RAM literature, activities manipulation is usually calculated based on annual figures similar to suspect years. This is also a valid measure in our context because RAM to meet or beat interim earnings benchmarks should be measurable using a yearly measure if it does not fully reverse. We argue that this is a conservative estimate of the total RAM throughout the year because of a potential RAM reversal that would work against our findings. RAM might reverse due to economic reasons (e.g., overproduction in one period might force managers to reduce production in the next period) or managers actively manage

activities to decrease to just meet or beat a benchmark in order not to raise future expectations too high.[18] We provide an additional analysis to better understand the effect that each of the interim quarters has on yearly RAM measured on a yearly basis in section 5. This provides us with the opportunity to disentangle potential RAM drivers more appropriately than just comparing annual suspect years with annual RAM levels. All suspect year definitions are summarized in Appendix B and descriptive statistics are provided in Table 4.

3.3.3. Regression setup

In order to test our first hypothesis, we run the following regression to compare quarterly and semi-annual reporters' RAM in suspect years:

$$TOTALRAM = \alpha_0 + \alpha_1 SUSPECT + \alpha_2 QR + \alpha_3 QR * SUSPECT + \sum Controls + \sum Fixedeffects + \varepsilon \quad (7)$$

where all variables are defined in Appendix B.

We also run additional regressions to test *SUSPECT* and *QR* individually using the same regression specifications (Model 1 and Model 2 in Table 5). Our hypothesis suggests that the partial *F*-test of quarterly reporters in suspect years is significant. We also expect a positive effect of *SUSPECT* and *QR* on RAM. If the effect that we are trying to show is also prevalent in non-suspect years, the interaction term might be positive or negative depending on how the size of the effect compares between suspect and non-suspect years. We are therefore indifferent about the sign of the interaction term.

In order to test our second hypothesis, we examine whether our results depend on institutional, firm and industry characteristics. This analysis is particularly important for at least two reasons. First, if the results differ as predicted in particular settings, this reduces concerns about omitted variables driving the results. Second, it is important to better

[18] Evidence on the effect of AEM reversals on current earnings management is limited in previous literature. Barber et al. (2011) show that the probability of achieving quarterly earnings benchmarks varies inversely with the speed of reversals and the magnitude last period AEM. To our knowledge, there are no studies that describe the effect of RAM reversals on the probability of meeting earnings targets. Similar to AEM, we assume that RAM reversals between quarters are a possible factor in determining the probability of meeting earnings benchmarks but if important at all, they would work against our findings.

understand the supporting factors and conditions of "real" effects of disclosure frequency to derive potential policy implications. We test hypothesis H2 using 6 different cross-sectional settings including institutional, firm and industry differences. We split our treatment group into two groups, above and below median, and test the individual effect of each of the two groups in a joint regression. Institutional characteristics that vary by country include importance of equity markets, the earnings management score and the legal enforcement (all Leuz et al., 2003). Firm-specific differences include below and above industry-year median relative share turnover (share turnover divided by market capitalization) as a proxy of investor horizon (Polk and Sapienza, 2008) and abnormal analyst following[19] as a measure of the monitoring level. We also test for cross-sectional differences between high and low concentration industries (proxied by a dummy variable indicating an Herfindahl index above and below the median across industries) to account for competitive pressure as a reason to increasingly use RAM. We use the following regression to test the hypothesis:

$$TOTALRAM = \alpha_0 + \alpha_1 QR * CROSS_1 + \alpha_2 QR * CROSS_0 + \sum Controls + \sum Fixedeffects + \varepsilon \quad (8)$$

where all variables are defined in Appendix B.

3.3.4. Control variables and fixed effects

We use a wide range of controls to mitigate omitted variable concerns and to account for other known RAM drivers. The controls can be classified broadly into four categories: company characteristics, capital market effects, industry characteristics and the level of accounting earnings management.

First, we include a range of company characteristics to further improve comparability, although the matching procedure as well as the elimination of cross-listed shares should already substantially reduce potential bias from structural differences between the companies.

[19] Based on regressing analyst following on size, book-to-market, market share and common shares outstanding by industry-year

SIZE (natural logarithm of total assets) is included because lager firms supposedly have more RAM, for instance because of their high visibility and the higher importance of earnings benchmarks. Firms with higher *CL* (defined as current liabilities divided by lagged total assets) are expected to have more RAM it is more important for these firms to show to suppliers and other providers of short-term capital that the company meets its earnings benchmarks (Roychowdhury, 2006). For *NI* (net income divided by lagged total assets), we expect a negative effect because firms with higher net income are less likely to engage in RAM. *CLHELD* (closely held shares[20]) is included to account for differences in governance that might explain the level of RAM. We expect RAM to be negatively correlated to the amount of shares closely held. We also include *MKTSHARE* (market share which equals company sales divided by total industry sales) as firms with higher market share are expected to have lower RAM because competition is lower and so is the pressure to meet or beat earnings benchmarks. Zang (2010) argues that for firms with higher market share, RAM is comparatively less costly, so we are indifferent about the sign.

Second, capital market controls include *SHARES* (common shares outstanding) to account for the capital market orientation of firms. A greater number of shares can imply higher RAM as more activity is needed to achieve a given per share earnings target. Alternatively, it can discourage managers to use RAM because a given target is more difficult to reach (Cohen and Zarowin, 2010). In addition, *ANFOL* (natural logarithm of one plus analyst following) is included because financial analysts are amongst the most important recipients of interim and annual financial statements. Analysts can fill one of two roles: They can either have a monitoring function reducing average RAM levels or they can exercise pressure on firms and thereby force managers to use more RAM. We follow Yu (2008) and expect the monitoring function to dominate.

[20] Defined as shares held by shares held by officers, directors and their immediate families, shares held in trust, shares of the company held by any other corporation, shares held by pension/benefit plans and shares held by individuals who hold 5% or more of the outstanding shares

Third, industry characteristics include an indicator variable for *LITIND* (high litigation industries)[21]. The effect is expected to be negative because firms are more likely to be sued for excessively using RAM, if detected. We also include *OPCYC* (a firms' operating cycle measured as average receivables over the last two years divided by sales plus average inventory over the last two years to COGS; Biddle et al., 2009). We expect it to be negative because a longer operating cycle leaves more flexibility to use accounting earnings management due to smaller accrual accounts and a shorter period for accruals to reverse and therefore requires less RAM (Zang, 2010).

Fourth, we account for a potential trade-off between accounting earnings management and RAM which is an important determinant of the RAM level (e.g., Ewert and Wagenhofer, 2005). Building upon previous research (Barton and Simko, 2002; Zang, 2010; Cohen and Zarowin, 2010), we include *NOA* (standardized net operating assets, i.e., shareholders equity less cash and marketable securities plus total debt at the beginning of the year, divided by lagged total assets). This is a proxy for a firm's balance sheet constraint to use accounting earnings management based upon its previous accounting choices. We expect a higher value of *NOA* to be positively correlated with RAM, as firms are willing to use more RAM if they are constrained in their opportunity to use accounting earnings management. We also include *BIG4*, i.e., an indicator variable that is one if the firm's auditor is a BIG4 auditor. (Zang, 2010; Cohen and Zarowin, 2010). We are indifferent about the sign because BIG4 can either force the company to reduce accounting earnings management and thereby have a positive effect on RAM. Alternatively, BIG4 could also have a negative effect on overall earnings management (accounting and RAM) due to higher level and quality of monitoring of earnings management activities.

We include fixed effects and standard error clusters in our regressions, unless otherwise indicated. As our main explanatory variable (*QR*) varies on country level, we use country

[21] Following Cohen and Zarowin (2010), we define *LITIND* as dummy variable equal to one if a firm's SIC code is 2833–2836, 8731–8734, 7371–7379, 3570–3577, 3600–3674 and zero otherwise

fixed effects and standard errors clustered by country to account for country differences following Christensen et al. (2010). As *TOTALRAM* is measured by industry-year, fixed industry and year effects are also accounted for. Despite including these fixed effects, we cannot completely rule out potential correlated omitted variable bias. In section 5, we therefore run an additional test using a pre-/post-treatment setup of a disclosure shock that primarily affects semi-annual reporters (Transparency Directive) as sensitivity.

3.4. Sample selection

We collect a sample of all shares covered by Datastream/Worldscope and I/B/E/S in EU-15 countries between January 2005 and December 2009, also including shares that were delisted during the period in order to avoid survivorship bias.[22] To ensure a common financial reporting and disclosure setup, we do not use data prior to January 2005, as IFRS were not mandatory before that date and national reporting standards might deter our results significantly. We require that firms have data on total assets for at least two consecutive years from 2004 until 2009, distinct fiscal year end information and unique ISIN identifiers. This results in a starting sample of 14,813 firm-year observations from 2005 to 2009.

In deriving our final sample, we first exclude financial firms (SIC 6000-6999), firms from highly regulated industries (SIC 4400-4999), public administrative firms (SIC > 9000) and firm-years in financial distress (common equity < 0). Next, we drop all firms that are cross-listed in the U.S. and are therefore subject to SEC quarterly reporting requirements. We also delete all quarterly reporters in voluntary reporting regimes as well as obvious data errors such as non-quarterly observations in mandatory countries. Thereafter, we drop firms from the mandatory sample that would be likely voluntarily adopters in a voluntary regime ("non-pure" mandatory firms) to generate a sample of "pure" mandatory adopters, i.e., those firms that are really affected by disclosure regulation. In addition, we drop all voluntary reporters,

[22] Datastream/Worldscope is widely used in international studies. In their paper on the "effects of database choice on international accounting research", Lara et al. (2006) list 33 key research papers for international accounting, of which 15 use Datastream or Worldscope.

since we focus on the effect of mandatory quarterly reporting only. Finally, when matching pure mandatory reporters and semi-annual reporters by industry based on size, current liabilities and net income, we need to further restrict our sample to 3,366 firm-year observations for our empirical analyses.

In order to mitigate the influence of outliers all continuous variables are winsorized at the 1% and 99% level.[23] The sample selection process is summarized in Table 2.

[place Table 2 here]

Table 3 gives an overview of quarterly and semi-annual observations in our sample by country (Panel A) and by type of suspect year (Panel B). After the matching, our sample is equally split between quarterly and semi-annual reporters with 3,366 observations in total (Panel A). Due to the exclusion of voluntary adopters, Austria and Germany are the only two remaining countries with both quarterly and semi-annual observations due to the specific listing requirements of the stock exchange segments (Prime Market in Austria, Prime Standard in Germany).

Panel B illustrates the distribution of suspect years by type. Our sample comprises of 295 firm-years of semi-annual reporters and 265 firm-years of quarterly reporters, according to the definition of meeting or beating the yearly earnings benchmark (*SUSPECT*). With respect to interim suspect years, semi-annual reporters meet or beat earnings benchmarks in the first (second) half-year in 198 (120) firm-years. Quarterly reporters meet or beat the first, second, third and fourth quarter earnings benchmark in 225, 136, 189 and 87 firm-years, respectively. SUSPECT is constructed according to the definition of Gunny (2010), i.e., firm-year observations that just meet of beat past years' earnings or the zero earnings benchmark. The interim suspect years are accordingly constructed based on quarterly and semi-annual earnings benchmarks.

[23] Following Biddle et al. (2009), we winsorize by year.

[place Table 3 here]

3.5. Descriptive statistics

Table 4 provides the descriptive statistics as well as correlation coefficients for the continuous variables. Panel A summarizes the results. Dividing *TOTALRAM* into quarterly and semi-annual reporters reveals that quarterly reporters have a higher average of *TOTALRAM* compared to semi-annual reporters (0.02 compared to 0.00). Similarly, the average of SUSPECT is also above the average (0.04).[24] As far as the interim suspect years are concerned, the average decreases from 0.1 for SUSPECT_Q1 to 0.01 for SUSPECT_Q4

Panel B presents Pearson correlations for the measure and continuous control variables used in the regression models. The only variable that exhibits substantial correlation with other variables is *SIZE*. Since *SIZE* is probably amongst the economically most relevant controls, however, we keep it in the sample alongside the other controls. All correlation coefficients of control variables with *TOTALRAM* have the predicted sign.

[place Table 4 here]

4. MAIN RESULTS

4.1. Reporting frequency-induced real business effects

Table 5 presents the results of testing hypothesis H1, which predicts that quarterly reporters exhibiting higher RAM levels in suspect years compared to semi-annual reporters. Model 3 is calculated based on equation (7). We find that the experimental variables, *QR* as well as *SUSPECT*, have a significantly positive effect on *TOTALRAM* (*t*-statistic of 4.30 and 2.33, respectively). The interaction term *QR*SUSPECT* is negative and insignificant. In a

[24] By definition, the overall average of *TOTALRAM* should be close to zero because it comprises residuals. In our case, the average is slightly above 0 (0.01) because the matching is done subsequently to the abnormal calculation, and therefore, some semi-annual reporters (presumably with negative residuals) are taken out of the sample because they cannot be matched with a corresponding quarterly reporter.

joint test, we find supporting evidence for hypothesis H1 that quarterly reporters exhibit higher RAM compared to semi-annual reporters in suspect years (*F*-statistic of 14.23).

The sign and significance of *SUSPECT* is in line with expectations and previous literature (e.g., Gunny, 2010), i.e., RAM is higher in suspect years. Although we do not predict the sign and significance of quarterly reporting in non-suspect years (*QR*), we interpret our findings as evidence for a general effect of quarterly reporting on RAM, which is not restricted to suspect years. We analyze this effect in more detail in our cross-sectional regressions in hypothesis H2.

As a sensitivity, we also run regressions testing *SUSPECT* and *QR* individually (model 1 and model 2). We find that both variables are also positive and significant in these regressions t-statistic of 2.57 and 4.73 for *SUSPECT* and *QR*, respectively).

In all three regressions, we control for all other factors discussed in section 3. We find the expected signs for the coefficients of our controls. We also include country fixed effects and cluster the standard errors by country. The adjusted R^2 of the three models is similar ranging from 5.4% to 5.5% and the sample size is 3,366 firm-year observations.

[place Table 5 here]

4.2. Cross-sectional differences of frequency-induced real activities manipulation

The results of cross-sectional differences in the investigated effect of quarterly reporting on RAM are presented in Table 6. The regressions are based on equation (8) and separate the effect of quarterly reporting into two groups of the respective cross-sectional variable (e.g., "high" and "low" importance of capital markets). We test three institutional measures on country level and two firm and one industry characteristic that vary on firm and industry level, respectively.

For each of the cross-sectional regressions, we first test whether the overall effect of quarterly reporting on RAM is significant, which it should be in all regressions based on our

findings from hypothesis H1. We find that quarterly reporting in general is significant in all regressions. Thereafter, we test whether the effect differs cross-sectionally.

With respect to the institutional differences, we find that countries with a higher importance of with equity markets (Leuz et al., 2003) exhibit a significantly higher effect of quarterly reporting on RAM (the coefficients on *EQUMKT_HIGH* and *EQUMKT_LOW* are 0.13 and 0.07, respectively). The *F*-statistic of the corresponding test is 7.16. In line with expectations, higher capital market importance seems to create stronger incentives for managers to engage in RAM, in particular for quarterly reporters. We also find that quarterly reporting has a higher effect on RAM if the earnings management score of the respective country is high. *EMS_HIGH* has a coefficient of 0.14 versus 0.08 of *EMS_LOW*. The corresponding *F*-statistic is 4.2 and the test is significant at the 5% level in a one-sided test. Similarly, reporting frequency-dependent real business effects are higher when legal enforcement is low. *LEGALENF_HIGH* has a coefficient of 0.08 and *LEGALENF_LOW* has a coefficient of 0.13. The one-sided *F*-test (*F*-statistic of 6.59) for differences between the two groups is significant at the 5% level. We interpret these cross-sectional differences as evidence for the influence of the institutional environment on the investigated effect. Even though quarterly reporting is significant in general, the effect is particularly strong if equity markets are important which also renders quarterly reports more important. Further, we find that the effect is stronger in countries with higher earnings management scores and lower legal enforcement.

Concerning the cross-sectional differences that vary on firm and industry level, we find that a higher short-term orientation of investors (using share turnover over market capitalization as a proxy) has a positive effect on frequency-induced RAM. Firm-year observations with above industry-year median relative share turnover (*SHORTTERM_HIGH*) have a coefficient of 0.13 compared to 0.07 on *SHORTTERM_LOW*. The corresponding *F*-statistic is 3.79 with a one-sided *p*-value of 0.04. We interpret this finding as evidence for

managers following investor short-term orientation by focusing more on short-term results and therefore applying more RAM. Moreover, we find that higher abnormal analyst following (using the residuals of a regression of analyst following on size by industry-year) leads to a lower effect of quarterly reporting-dependent RAM, even though the absolute difference between the coefficients is not particularly strong. *ANFOL_HIGH* has a coefficient of 0.07 versus 0.09 for *ANFOL_LOW*. The corresponding *F*-statistic is 2.65 with a one-sided *p*-value of 0.06. This finding is interpreted as evidence for the monitoring role of analysts advocated by Yu (2008). We also find that the RAM of quarterly reporters is higher in industries with higher levels of competition, which indicates that comparability amongst competitors, competitive pressure and other factors drive managers to more aggressively steer their business towards short-term results. For firm-year observations in industries with above median Herfindahl index, we find a coefficient of 0.04 on *INDCONC_HIGH* versus 0.12 in industries with below median Herfindahl index (*INDCONC_LOW)*. The resulting *F*-statistic is 5.49 with a one-sided *p*-value of 0.02.

The adjusted R^2 of all cross-sectional regressions ranges from 8.2 to 8.8%. We use the same regression setup and the same set of control variables as in Table 5. All sign of the control variables are according to expectations.

Overall we conclude that there are indeed significant cross-sectional differences in the effect of quarterly reporting on RAM. These findings are important for better understanding how quarterly reporting affects RAM. While the overall effect is prevalent in all settings, it seems to be particularly strong in countries with high equity market importance, high earnings management scores, low legal enforcement as well as when a company has more short-term oriented investors, low analyst following is low or operates in an industry with higher competition. The effect is strongest for high competition industries (where *INDCONC_LOW* is three times as high as *INDCONC_HIGH).* Correspondingly, the effect is least strong for analyst following.

[place Table 6 here]

5. ADDITIONAL AND SENSITIVITY ANALYSES

In order to test the validity of our results, we perform various additional analyses. We first analyze the effect of meeting or beating interim results on RAM. This analysis helps to disaggregate the different drivers of RAM, which is measured on a yearly basis. Second, we use a change in the interim disclosure requirements of publicly listed companies in the EU to exploit a pre-post setup of increased disclosure frequency. Third, we test all the individual components of our combined RAM measure separately to validate the meaningfulness of the joint proxy. Finally, we provide specification tests for our models.

5.1. The effect of interim suspect years on *TOTALRAM*

In section 4, we have analyzed the effect of suspect years defined as meeting or beating yearly earnings benchmarks on RAM similarly measured on a yearly basis. We have argued that quarterly reporters manage interim and yearly earnings using RAM more extensively compared to semi-annual reporters and that this effect is captured in the yearly RAM measure if RAM used to manage interim results does not or not fully reverse. To test whether this assumption is valid, we decompose the effect into the contribution of each of the individual interim results next to the yearly result. The distribution of interim suspect years across quarters (Table 3) reveals that the first quarter (Q1, all other quarters name similarly) has the highest number of observations, while Q2 and Q4 have the lowest number of observations. This indicates that managers less often meet and beat earnings benchmarks in these quarters. If our hypothesis H1 holds also for interim suspect years, we should be able to find that RAM used to meet or beat Q1 benchmarks plus Q2 benchmarks compared to RAM used to meet or beat HY1 benchmarks is significantly higher. The same should hold for the second half of the year. As an additional test, we therefore include interim suspect years into our regression for each of the interim reporting dates. We run the following regression:

$$TOTALRAM = \alpha_0 + \alpha_1 SUSPECT + \alpha_2 QR + \alpha_3 SUSPECT * QR + \alpha_4 SUSPECT\_Q1 + \alpha_5 SUSPECT\_Q2 + \alpha_6 SUSPECT\_Q3 + \alpha_7 SUSPECT\_Q4 + \alpha_8 SUSPECT\_HY1 + \alpha_9 SUSPECT\_HY2 + \sum Controls + \sum Fixedeffects + \varepsilon \quad (9)$$

where all variables are defined in Appendix B.

Table 7 presents the results of our analysis. We find that both *SUSPECT* and *QR* are significant similar to the results in Table 5. The interaction term is also negative and insignificant as before. The coefficients on *SUSPECT_Q1* and *SUSPECT_Q3* are positive, significant and relatively high (0.08 and 0.06, respectively). The coefficient on *SUSPECT_Q2* is positive, insignificant and relatively low (0.01) and the coefficient on *SUSPECT_Q4* is negative and insignificant (-0.03). The partial *F*-tests show that quarterly reporters indeed use much more RAM when meeting or beating earnings targets when comparing Q1 and Q2 with HY2 (*F*-statistic of 15.00). The same result holds for the second half-year (*F*-statistic of 10.48). We interpret these findings as evidence for RAM differences between quarterly and half-yearly reporters, which seem hold not only when managing towards yearly benchmarks but also interim benchmarks.[25] In a set of more stringent tests, we compare the RAM effect of managing only one quarter with one half-year. We find that each of the individual quarters exhibits a stronger effect on RAM than the respective half-year (except for Q4 vs. H2, which is insignificant).[26] When analyzing the individual coefficients of these partial *F*-tests, it is interesting to note that the size of the coefficients is highest in Q1 (0.13) and Q3 (0.07) compared -0.13 in Q4. Q1 seems to be associated with the highest level of RAM compared to semi-annual reporters, which might be explained by the fact that most of the time, Q1 results are published before the annual shareholder meetings so managers are particularly eager to meet this benchmark. As opposed to that, managers of quarterly reporters seem to use the lowest amount of RAM in Q4 (there is no significant difference between quarterly and semi-annual reporters and the individual coefficients are insignificant) which might be explained by

[25] Our findings can also be interpreted as evidence against the competing hypothesis that when meeting or beating quarterly benchmarks, quarterly reporters just use half of the RAM that semi-annual reporters use.
[26] We compare Q1 with H1, Q2 with H1, Q3 with H2 and Q4 with H4.

managers focusing on the yearly rather than the quarterly benchmark. This evidence suggests that quarterly reporters use significantly more RAM to meet or beat interim targets compared to semi-annual reporters whenever they just meet or beat a benchmark.

[place Table 7 here]

5.2. Pre-/Post effect of the Transparency Directive on *TOTALRAM*

We perform a pre-/post-design for the adoption of a recent EU Directive, the Transparency Directive (TD), in order to analyze reporting frequency induces real business effects before and after the adoption of the Directive. The TD aims at enhancing the level of information to investors, setting minimum standards to the disclosure requirements for publicly-traded companies in the Member States, and improving the dissemination of information about issuers. After opposition from several member states (e.g., UK, Netherlands, Austria and Denmark), the European Commission gave up on its original plans to introduce mandatory quarterly reporting for all companies to increase transparency towards investors and analysts. However, the Directive requires all companies in member states to publish "Interim Management Statements" (IMS) after the first and third quarter of the financial year. While IMS do not include a full set of financial statements, the TD requires all listed companies on regulated markets to provide “an explanation of material events and transactions that have taken place during the relevant period and their impact on the financial position of the issuer and its controlled undertakings, and a general description of the financial position and performance of the issuer and its controlled undertakings during the relevant period”.[27]

We argue that the level of information and disclosure provided in particular by semi-annual reporters has increased after the adoption of the TD. Companies that already issue full quarterly financial statements are not affected by the introduction of IMS as their disclosure

[27] Directive 2004/109/EC of the European Parliament and of the Council of 15 December 2004. Official Journal of the European Union. L390/38. retrieved from http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:390:0038:0057:EN:PDF

levels go well beyond what is required by IMS. This setup allows us to perform a pre- vs. post-adoption analysis, which controls for potential weaknesses in the cross-sectional analyses because the same firms belong to the pre- and post-treatment group such that they act as their own controls.

Officially, the TD had to be adopted no later than 2007, yet the date for transforming the Directive into national law varied considerably by the different Member States. We rely on previous research and use the transformation dates compiled by Christensen et al. (2010).

According to our hypothesis, the difference in RAM between the two groups should be lower after the introduction of the TD because semi-annual reporters have to disclose some quarterly information, which should increase management's tendency to use RAM.

We estimate the following regression:

$$TOTALRAM = \alpha_0 + \alpha_1 TD + \alpha_2 HY + \alpha_3 QR * HY + \sum Controls + \sum Fixedeffects + \varepsilon \quad (10)$$

where all variables are defined in Appendix B.

We summarize the corresponding results in Table 8. We choose three different models to test the effect of the TD that vary only in the set of controls. In all three models we find that both the TD and semi-annual reporting is associated with lower RAM (depending on the model, *TD* is significant at the 10% and 1% significance level, *HY* is significant at the 1% level in all regressions). The TD has accordingly had a negative effect on RAM. We also find that semi-annual reporters have lower RAM compared to our new benchmark group, quarterly reporters, similar to all previous analyses. We are, however, particularly interested whether the joint effect is also significant. A positive interaction term can be interpreted as reduction in the difference in RAM between semi-annual and quarterly reporters as a consequence to the adoption of the TD similar to difference-in-difference analysis. We expect a positive interaction term, because we expect managers to be using more RAM because of the obligation to release at least basic quarterly financials. Using our standard set of controls, the interaction term is insignificant (*t*-statistic of 1.52). One potential reason for this result is that

required increased disclosure is too small and leaves too much discretion to the manager to have an effect on RAM. Alternatively, we might not be able to see the effect because it is small and the other indicator and control variables do not perfectly separate the individual effects and therefore absorb part what we are looking for. Given our pre-/post-setup where firms act as their own controls, reducing the number of controls does not necessarily harm the validity of the results. In model 2, we take out *BIG4* and *LITIND*, the two indicator control variables.[28] We find that the interaction term becomes significant (*t*-statistic of 2.00). The coefficient *TD*HY* is 0.02 which, compared to -0.08 for *HY*, is evidence for TD reducing the RAM gap between reporting frequency regimes but not closing it. This is in line with expectations because IMS only provide a limited amount of financials and managers some discretion in determining what information to disclose. It is therefore unlikely that managers exhibit similar levels of myopic behavior as quarterly reporters. In model 3, we take out all but some basic controls and the results remain stable (*t*-statistic of 2.08).

Given the insignificant interaction term in model 1, we interpret these findings with care. However, we believe they provide at least some additional evidence in favor of our hypothesis H1 in a completely independent setting using a change of legislation. While this setting better accounts for potential correlated omitted variable bias than the previous analyses, there are two potential weaknesses of the analysis. First, the TD does not exclusively deal with interim statement regulation, so other aspects of the Directive could also drive the results. Second, as RAM is measured on a yearly basis, it is hard to test for the hypothesized effect given that the implementation dates vary during the year. We therefore exclude the year in which the Directive became effective.

[place Table 8 here]

5.3. The effect of QR on the individual RAM measures

[28] One alternative argument would be that the previously significant *BIG4* now leads to omitted variable bias. However, the coefficient on the interaction term, which is opposite to what we would expect given that *BIG4* has a negative effect on RAM.

We also perform a sensitivity test for validity of our *TOTALRAM* measure. Since we build this measure based on the commonly used RAM measures, i.e. abnormal cash flow from operations (*ACFO*), abnormal production costs (*APROD*), and abnormal discretionary expenses (*ADISC*), we also test these measures individually. The calculation of the abnormal measures is in line with Roychowdhury (2006) and detailed in Appendix A.

Table 9 summarizes the regression results. The regression setup is the same as in Table 5, i.e., we use *SUSPECT* as dependent variable, include the same controls as well as country fixed effects and clustered standard errors by country.

We find that also the individual measures yield similar results as the *TOTALRAM* measure. All coefficients for suspect years and quarterly reporting have the expected positive sign and are significant with the exception of *SUSPECT* for *APROD* with a *p*-value of 0.16. Similar to Table 5, all interaction terms (*SUSPECT*QR*) are insignificant. All controls have the expected signs (except for *SIZE* in the *ACFO* regression). The main test, the partial *F*-test of the joint effect of suspect years and quarterly reporting exhibits significantly higher RAM, with a partial *F*-statistics of 33.73 (*ACFO*), 3.38 (*APROD*) and 2.53 (*ADISC*) such a one-sided test is significant at the 1%, 5% and 10% level, respectively. The corresponding adjusted R^2 for *ACFO* (30.1%), *APROD* (13.8%) and *ADSIC* (6.4%) is higher than for *TOTALRAM* in Table 5, which indicates that part of the explanatory power of the model is lost by combining the measures. Summarizing, we conclude that our inferences on RAM in suspect years are also confirmed by using the individual RAM measures. We also interpret these results as evidence for the validity of the joint measure as it leads to similar results.

[place Table 9 here]

5.4. Specification tests

In order to further test the overall robustness of our inferences we perform a set of untabulated specification tests, in which we analyze the sensitivity of our results to the matching procedure as well as different sample periods.

One of the research design innovations in our study is the sample selection and matching procedure, in which we first correct the mandatory quarterly reporters by those firms that have a high likelihood of voluntarily adopting quarterly reporting and second match the semi-annual reporters to these "pure mandatory" adopters by industry according to size, leverage and relative net income.

If we do not take out the non-pure mandatory adopters, i.e., firms in mandatory regimes with characteristics comparable to voluntary adopters in voluntary regimes, we end up with a matched sample of 3,526 observations. The majority of the results remain similar but the effect of *QR* on RAM is weaker (e.g., 0.05 instead of 0.08 model 2 in Table 5). Similarly, the statistical significance of some of the cross-sectional in Table 6 analyses decreases (e.g., *ANFOL_HIGH* and *INDCONC_HIGH* are insignificant). All controls have the expected sign. The results support the hypothesis that voluntary quarterly reporters less strongly affected by the requirement to report quarterly because they would have reported quarterly anyways. The additional disclosure requirement therefore not the same effect on managers than when they are obliged to deviate from their optimal disclosure frequency[29].

To test the effect of the voluntary adopters in general, we refrain from dropping any voluntary adopters from the sample and run all of our regressions using the full sample of quarterly reporters. The resulting matched sample has 3,996 observations. We assume that potential endogeneity issues are (at least partly) resolved by the matching procedure, which should reduce at least some of the structural differences between voluntary quarterly reporters and semi-annual reporters. As expected, the significance of *QR* is strongly reduced. *QR* becomes insignificant in all of the regression under hypothesis H1. In the regressions under H2, *QR* remains significant in the most RAM responsive institutional environments (*EQUMKT_HIGH, EMS_HIGH* and *LEGALENF_LOW*). Again, voluntary reporters seem to be much less affected by frequency-induced RAM. This finding is in line with the above

[29] The competing hypothesis that voluntary reporters should behave similarly to quarterly reporters because of the commitment involved in the choice of reporting frequency seems to be less relevant in this context.

evidence of leaving the non-pure mandatory reporters in the sample. Taken together, we interpret these findings as evidence against the argument, which states that the supposedly strong commitment to a higher level of reporting frequency leads voluntary reporters to behave similarly than mandatory reporters.[30]

We also test the sensitivity of our results towards the matching. We keep firm size as the most important characteristic in the equation. In addition to current liabilities and profitability, growth (defined as the percentage change in sales between two years) might also be an important cross-country difference between companies, which determines their managers' propensity to use RAM. For example, a dynamically growing firm in constant need of refinancing to continue its growth path might be much more willing to use RAM to meet earnings benchmarks than a more mature firm from the same industry. Correspondingly, we run all of our regressions with a propensity matching by industry using size and growth. The results are very similar with the ones from Table 5 and Table 9. In Table 5, all coefficients of *SUSPECT* and *QR* are significant (except for *SUSPECT* in model 3) and all of the coefficients are positive as before. The partial *F*-test in model 3 in Table 5 has a *F*-statistic of 5.86 and is significant at the 5% level. The cross-sectional regressions in Table 6 are very similar except for abnormal analyst following where the partial *F*-test does not reveal any significant differences between above and below median analyst following anymore.

In another test, we split our regressions into two sub-periods, i.e., the period before (2005-2007) and after (2007-2009) the adoption of the Transparency Directive (*TD*) by the EU[31]. As a consequence, the number of observations in the regressions decreases to 2,186 firm-years (2005-2007) and 1,806 firm-years (2007-2009). In line with our results on the impact of the TD on the semi-annual adopters as part of the additional analyses, we document quarterly reporting is associated with more RAM also in the two sub-periods, but that this

[30] Switching back to semi-annual reporting is difficult because investors and analysts are now expecting more frequent reporting.
[31] Christensen et al. (2010) argue that the transposition date of the TD into national law differs between the countries. In the pre-/post analysis, we have therefore use the country-specific dates.

effect is more strongly pronounced in the pre-TD adoption period (e.g., *QR* in model 2 in Table 5 has a coefficient of 0.12 in the pre-adoption period rather than the rather than 0.09 in the post adoption period). We conclude that in the period following the TD, the RAM difference between quarterly and semi-annual reporters has decreased because semi-annual reporters have to issue interim management statements every quarter.

6. CONCLUSION

We investigate the real business effects of increased mandated reporting frequency using a sample of 15 EU countries. We find that mandatory quarterly reporting is associated with higher real activities manipulation (RAM) compared to semi-annual reporting in years when managers try to meet or beat earnings benchmarks. The effect varies cross-sectionally according to institutional, industry and firm-specific characteristics. RAM is particularly pronounced when equity markets are important, earnings management scores are high and the legal enforcement is low. Moreover, RAM is higher if the shareholder horizon is more short-term, monitoring by analysts is low and industry competition is high. We argue that these effects are due to increased pressure on managers to meet or beat earnings benchmarks in ever shorter time intervals and with favourable cross-sectional characteristics that create incentives or opportunities for managers to use more RAM. We account for country, industry and year fixed effects as well as standard errors clustered by country. Our findings are also robust to a range of sensitivity analyses.

The underlying setting in our study is unique because all included countries exhibit a common minimum regulatory and institutional base that minimizes deterring effects usually present in cross-country studies in international accounting. As the reporting regulation between countries only differs in few respects, the most important of which is reporting frequency, the sample setup allows to reasonably isolate the frequency-related effect on our dependent variable real activities manipulation.

The paper contributes to the literature on mandatory reporting presenting evidence on potential externalities of mandatory disclosure. It also contributes to the "real effects" literature as suggested by Beyer et al. (2010) and the non-U.S. focused international accounting literature as suggested by Leuz and Wysocki (2008). We also present a new aggregate RAM measure that combines all individual RAM measures and thereby helps identifying manipulation in general.

The results provide empirical evidence in line with interview-based evidence (Graham et al., 2005) as well as concerns of many practitioners who claim that mandatory quarterly reporting might lead managers to focus on short-term goals by adversely impacting real business decisions. Further, our findings are in line with the prediction from the theoretical model of Gigler et al. (2009). We conclude that the regulatory debate on interim financial disclosure thus has to consider these impacts on economic efficiency instead of focusing on information efficiency arguments only. Regulators need to be aware of potential externalities and country differences in particular when dealing with settings that seem to be most susceptible to externalities because they provide higher opportunities or incentives for managers to use more RAM (e.g., when equity market importance is high). Our analysis does, however, not permit us to draw conclusions on the overall desirability of mandatory versus voluntary reporting regimes. Several undisputed benefits of increased disclosure such as higher transparency towards shareholders and analysts and a reduction in information asymmetry that are not considered in our study have to be balanced against the presented indirect costs. This could be an area of potential future research.

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Appendix A

Roychowdhury (2006) presents three measures to proxy for real activities manipulation (RAM), *ACFO*, *APROD* and *ADISC*. While *ACFO* consolidates the effect of different earnings manipulation activities like *sales manipulation*, *overproduction* and reduction of *discretionary expenses*, *APROD* accounts for *overproduction* and *ADISC* for an *abnormal reduction in discretionary expenses*.

Following Roychowdhury (2006), *sales manipulation* is defined as the acceleration of current period sales through price discounts and more lenient credit terms. Price discounts are often used to pull part of next-period sales into the current period to temporarily boost (absolute) earnings. As a percentage of sales, however, *ACFO* will decline due to declining margins as a consequence of price discounts. A second option to boost current period sales is offering more lenient credit terms. Many manufacturing companies (e.g., automotive manufacturers) offer lower interest rates towards the end of the fiscal year for financing their products. This is similar to price discounts and leads to reduced cash flow at given sales levels. As a result of sales manipulation, we expect current period *ACFO* to be negative.

We define *overproduction* as managers' tendency to increase production above the necessary level to reduce cost of goods sold (COGS) per unit by spreading fixed cost over a larger number of units (under the assumption that the increase in marginal cost does not offset this effect). However, the firm incurs additional production and holding costs that are not matched with corresponding sales.[32] This results in higher production costs and we expect abnormally high production cost for a given level of sales. This has a negative effect on cash flow from operations at given sales levels.

We define *discretionary expenses* as the sum of R&D, advertising, and SG&A expenses. In order to increase earnings, managers can reduce discretionary expenses because a reduction does not immediately affect sales. If managers decrease discretionary expenses to meet earnings targets, they will experience abnormally high earnings in the current period. We therefore expect abnormally low discretionary expenses for a given level of sales. This, in turn, increases cash flow from operations.

To estimate the "normal levels" of the dependent variables, we run the following cross-sectional regressions for every industry and year. In line with Roychowdhury (2006), we require at least 15 firm-year observations per 2-digit SIC industry classification group for each measure:[33]

$$\frac{CFO_{it}}{TA_{i,t-1}} = a_0 + a_1 \frac{1}{TA_{i,t-1}} + a_2 \frac{SALES_{it}}{TA_{i,t-1}} + a_3 \frac{\Delta SALES_{it}}{TA_{i,t-1}} + \varepsilon_{it} \qquad \text{(A.1)}$$

where all variables are defined in Appendix B.[34] *ACFO* is defined as the actual cash flow from operations minus the "normal" cash flow from operations calculated using the estimated coefficients above. The residuals of equations A.1-A.3 are used as dependent variables in the regression models discussed in section 3.

Production costs are defined as the sum of cost of goods sold (COGS) and change in inventory in the respective year. Following Roychowdhury (2006) and Cohen et al. (2008), we calculate normal production cost using the following regression:

$$\frac{\Pr od_{it}}{TA_{i,t-1}} = a_0 + a_1 \frac{1}{TA_{i,t-1}} + a_2 \frac{Sales_{it}}{TA_{i,t-1}} + a_2 \frac{\Delta Sales_{it}}{TA_{i,t-1}} + a_3 \frac{\Delta Sales_{i,t-1}}{TA_{i,t-1}} + \varepsilon_{it} \qquad \text{(A.2)}$$

[32] As stated by Roychowdhury (2006), managers only raise production if the benefits from decreasing average COGS are higher than the additional holding costs incurred in the respective period.

[33] We also perform a sensitivity test using 30 firm-year observations per industry and a one-digit SIC code. Our results are robust for this specification.

[34] In accordance with Roychowdhury (2006), we employ not only a scaled intercept when estimating non-discretionary accruals (as is general convention in the literature), but also an unscaled intercept to ensure that the mean abnormal value for every industry year is zero.

where all variables are defined in Appendix B.

Discretionary expenses include SG&A, R&D and advertising expenses. As advertising expenses are not available for European companies on Datatastream/Worldscope, we calculate the measure using SG&A and R&D figures only. In line with Roychowdhury (2006), we calculate discretionary expenses as long as SG&A is available. If R&D is not available, it is set to zero. We model the normal level of discretionary expenses as follows:

$$\frac{DISC_{it}}{TA_{i,t-1}} = a_0 + a_1 \frac{1}{TA_{i,t-1}} + a_2 \frac{Sales_{i,t-1}}{TA_{i,t-1}} + \varepsilon_{it} \qquad \text{(A.3)}$$

where all variables are defined in Appendix B.

We multiply *ACFO* and *ADISC* by minus one such that higher numbers signify more RAM (Cohen and Zarowin, 2010).

Appendix B: Definition of Variables

Variable	Definition (with Datastream/Worldscope data items)
Dependent variable	
TOTALRAM	Total real activities manipulation, calculated based on equation (4).
ACFO	Abnormal cash flow from operations, calculated based on equation (A.1).
APROD	Abnormal production cost, calculated based on equation (A.2).
ADISC	Abnormal discretionary expenses, calculated based on equation (A.3).
Experimental variables	
QR / HY	Quarterly reporting (QR) and semi-annual reporting (HY): Indicator variables with QR=1 for quarterly reporters and QR=0 for semi-annual reporters, derived from the earnings reporting frequency (WC05200). HY = 1 if QR = 0
TD	Transparency Directive: Indicator variable with TD=1 for all firm-years after a country has adopted the Transparency Directive and TD=0 for all firm-years before the adoption (year of adoption excluded), based on data collected by Christensen et al. (2010).
SUSPECT	Suspect years based on yearly earnings benchmark: SUSPECT=1 if yearly standardized net income before extraordinary items (wc01551/lagged wc02999) is greater than zero and smaller than 0.01 or yearly standardized delta net income greater than zero and smaller than 0.01. Otherwise, SUSPECT=0
SUSPECT_Q1	Suspect years based on first quarter interim earnings benchmark (only if QR=1): SUSPECT_Q1=1 if interim standardized net income before extraordinary items (wc01551/lagged wc02999) in the first quarter is greater than zero and smaller than 0.0025 or standardized delta net income compared to last years first quarter is greater than zero and smaller than 0.0025. All firm-years for which SUSPECT=1 are excluded.
SUSPECT_Q2	Suspect years based on second quarter interim earnings benchmark: Same as SUSPECT_Q1, but for the second quarter interim result
SUSPECT_Q3	Suspect years based on third quarter interim earnings benchmark: Same as SUSPECT_Q1, but for the third quarter interim result
SUSPECT_Q4	Suspect years based on fourth quarter interim earnings benchmark: Same as SUSPECT_Q1, but for the fourth quarter interim result
SUSPECT_HY1	Suspect years based on first half-year interim earnings benchmark (only if QR=0): SUSPECT_HY1=1 if interim standardized net income before extraordinary items (wc01551/lagged wc02999) in the half-year is greater than zero and smaller than 0.005 or standardized delta net income compared to last years first half-year is greater than zero and smaller than 0.005. All firm-years for which SUSPECT=1 are excluded.
SUSPECT_HY2	Suspect years based on second half-year interim earnings benchmark: Same as SUSPECT_HY1, but for the second half-year interim result
$CROSS_1$	Cross-sectional indicator variables taking a value of 1 if EQTMKT_HIGH or EMS_HIGH or LEGALENF_LOW or SHORTTERM_HIGH or ANFOL_LOW or INDCONC_HIGH depending on the regression
$CROSS_0$	Cross-sectional indicator variables taking a value of 1 if EQTMKT_LOW or EMS_LOW or LEGALENF_HIGH or SHORTTERM_LOW or ANFOL_HIGH or INDCONC_LOW depending on the regression
EQTMKT_HIGH / EQTMKT_LOW	Importance of equity markets from Leuz et al. (2003): EQTMKT_HIGH = 1 if country has above median score of all quarterly reporting countries, 0 otherwise; EQTMKT_LOW = 1 if EQTMKT_HIGH = 0
EMS_HIGH / EMS_LOW	Earnings management score from Leuz et al. (2003): EMS_HIGH = 1 if country has above median score of all quarterly reporting countries, 0 otherwise; EMS_LOW = 1 if EMS_HIGH = 0
LEGALENF_HIGH / LEGALENF_LOW	Legal enforcement from Leuz et al. (2003): LEGALENF_HIGH = 1 if country has above median score of all quarterly reporting countries, 0 otherwise; LEGALENF_LOW = 1 if LEGALENF_HIGH = 0
SHORTTERM_HIGH / SHORTTERM_LOW	Shareholder horizon proxied by stock turnover (VO / (NOSH*MVE)) from Polk and Sapienza (2008): SHORTTERM_HIGH = 1 if firm-year value is above industry-year median, 0 otherwise; SHORTTERM_LOW = 1 of SHORTTERM_HIGH = 0
ANFOL_HIGH / ANFOL_LOW	Abnormal analyst following: ANFOL_HIGH = 1 if abnormal number of analysts is above industry-year median (residuals from the regression of number of analysts following (I/B/E/S) on SIZE); 0 otherwise; ANFOL_LOW = 1 if ANFOL_HIGH = 0
INDCONC_HIGH / INDCONC_LOW	Industry competition proxied by the Herfindahl index (HERF): INDCONC_HIGH = 1 if HERF value of industry is above median, 0 otherwise, INDCONC_LOW = 1 if INDCONC_HIGH = 0

Continued on next page

Appendix B: Definition of Variables (ctd.)

Control variables	
SIZE	Size, defined as natural logarithm of total assets (WC02999)
LEV	Accounting leverage, calculated as total current liabilities (WC03101), divided by total assets (WC02999)
NI	Standardized net income, defined as net income available to common equity (WC01751), divided by lagged total assets (WC02999)
CLHELD	Ownership structure, defined as percentage of closely held shares (WC08021).
SHARES	Common shares outstanding (WC05301).
ANFOL	Natural logarithm of one plus analyst following. Analyst following is the total number of estimates in the mean associated with the FY1 forecast (N1NE, I/B/E/S).
MKTSHARE	Market share which equals company SALES divided by total industry SALES.
LITIND	High litigation industries, with SIC in [2833:2836, 8731:8734, 7371:7379, 3570:3577, 3600:3674].
OPCYC	Operating cycle, calculated as receivables (WC02051) divided by sales (WC01001) plus inventory (WC02101) divided by COGS (WC01051), both divided by 360
NOA	Balance sheet constraint, calculated as net operating assets divided by SALES at the beginning of the year. Net operating assets is calculated as common equity (wc03501) minus cash & cash equivalents (wc02001) plus the sum of short-term liabilities (wc03051) and long-term debt (wc03251).
BIG4	Big 4 auditor, with value of 1 if auditor of the year is Deloitte, Ernst&Young, KPMG, PWC using data from Amadeus (Bureau van Dijk).
FIXEDEFFECTS	Country fixed effects included in regression
Other variables	
BTM	Book-to-market value of equity, calculated as common equity (WC03501), divided by market value of equity (MVE)
CFO	Standardized cash flow from operations (CFO), defined as CFO (WC04860), divided by lagged total assets (WC02999)
CONST	Constant, defined as 1 over lagged total assets (WC02999)
DELFORSALES	Delta foreign sales in percent (WC08721).
DISC	Discretionary expenses, calculated as the sum of R&D (WC01201) and SG&A (WC01101) expenses, divided by lagged total assets (WC02999).
DIV	Dummy for dividends, with value of 1 for firm-years in which cash dividends were paid (WC04551) in previous year
FORSALES	Foreign sales in percent of overall sales (WC08731).
HERF	Industry concentration (Herfindahl Index), calculated as sum of squared market shares (based on annual sales) in the firm's industry sector (defined by 2-digit SIC code) per year
INDEX	Dummy for index membership, with value of 1 for firms that are members of stock indexes (WC05661)
INDSIZE	Natural logarithm of sum of SALES per industry.
LAGROA	Return on assets lagged by 1 year
MVE	Market value of equity, calculated as number of shares outstanding (nosh) times share price at fiscal year end (WC05001)
PROD	Standardized production cost, calculated as cost of goods sold (WC01051) plus change in inventory (WC02101), divided by lagged total assets (WC02999)
ROA	Return on assets (WC08326)
SALES	Standardized sales, defined as total sales (WC01001), divided by lagged total assets (WC02999)
TA	Total assets (WC02999)
TOPIND	Dummy for top industry quartile, with value of 1 if firm-year in top quartile of operating income (WC01250) divided by sales (WC01001)
VOLADOPT	Probability of voluntarily adopting quarterly reporting
VOL	Volume traded (VO)

Table 1: Quarterly Reporting Environment in EU-15 Countries

Country	Quarterly Reporting Mandatory?	Quarterly Reporting Rules	Regulator	Stock Market
Austria (AT)	Yes (A)	Austrian stock market (Wiener Börse) requires firms listed in "Prime Market" segment to publish full Quarterly Reports (in acc. with IAS 34)	Finanzmarktaufsicht (FMA)	Wiener Börse
Belgium (BE)	No	Listed firms are not required to publish quarterly earnings	Commission Bancaire, Financière et des Assurances (CBFA)	Euronext Brussels
Denmark (DK)	No	Listed firms are not required to publish quarterly earnings (However, before Copenhagen Stock Exchange was taken over first by OMX in 2005 and then later by NASDAQ in 2008, firms were incentivized by the stock exchange to publish quarterly reports; this leads to a still high QR practice in Denmark today)	Finanstilsynet (Danish FSA)	NASDAQ OMX Copenhagen
Finland (FI)	Yes (B)	The Finish Securities Market Act still requires listed companies to present interim results for the first three, six and nine months of the financial period (chapter 2, section 5); there are only very limited exceptions	Finanssivalvonta (FIVA)	NASDAQ OMX Helsinki
France (FR)	No	Listed firms are not required to publish quarterly earnings (However, the French Monetary and Financial Code requires listed firms to publish quarterly net sales by subsidiaries)	Autorité des Marchés Financiers (AMF)	Euronext Paris
Germany (DE)	Yes (A)	German stock market operator Deutsche Börse requires firms listed in "Prime Standard" segment to publish full Quarterly Reports (in acc. with IAS 34)	Bundesanstalt für Finanzdienst-leistungsaufsicht (BaFin)	Frankfurter Wertpapierbörse
Great Britain (GB)	No	Listed firms are not required to publish quarterly earnings	Financial Services Authority (FSA)	NYSE Euronext London
Greece (GR)	Yes (B)	Greek regulation authority (HCMC) principally requires all listed firms to publish quarterly reports (with limited exceptions)	Hellenic Capital Market Commission (HCMC)	Athens Exchange Securities Market
Ireland (IE)	No	Listed firms are not required to publish quarterly earnings	Irish Financial Services Regulatory Authority (IFSRA)	Irish Stock Exchange
Italy (IT)	Yes (B)	Italian regulation authority (CONSOB) principally requires all listed firms to publish quarterly reports (with limited exceptions)	Commissione Nazionale per le Società e la Borsa (CONSOB)	Borsa Italiana
Luxembourg (LU)	No	Listed firms are not required to publish quarterly earnings	Commission de Surveillance du Secteur Financier (CSSF)	Bourse de Luxembourg
The Netherlands (NL)	No	Listed firms are not required to publish quarterly earnings	Autoriteit Financiële Markten (AFM)	Euronext Amsterdam
Portugal (PT)	Yes (B)	Portuguese regulation authority (CMVM) principally requires all listed firms to either publish full quarterly reports (in acc. with IAS 34) or specific quarterly financials (including quarterly earnings)	Comissão do Mercado de Valores Mobiliários (CMVM)	Euronext Lisbon
Spain (ES)	Yes (B)	Spanish regulation authority (CNMV) principally requires all listed firms to publish specific quarterly financials (including quarterly earnings)	Comisión Nacional del Mercado de Valores (CNMV)	Bolsa de Madrid
Sweden (SE)	Yes (C)	Under the listing rules for the two regulated markets in Sweden, listed firms are required to publish full quarterly reports (in acc. with IAS 34)	Finansinspektionen (Swedish FSA)	NASDAQ OMX Stockholm

This tables presents the different quarterly reporting regulation by country in the EU-15 countries. Yes (A) indicates required by stock exchange segment, Yes (B) indicated required by regulator, and Yes (C) indicates required by stock exchange.

Table 2: Sample composition

Step		Firm-years
Starting sample: EU-15 regulated markets, 2005-2009		**14,813**
Deleting financial firms (SIC 6000-6999)	./.	2,819
Deleting firms from highly regulated industries (SIC 4400-4999)	./.	1,249
Deleting pubic administrative firms (SIC > 9000)	./.	14
Deleting firm-years in distress (Common Equity < 0)	./.	308
		10,423
Deleting firms cross-listed in the U.S.	./.	830
Deleting VOL firms listed on MAND exchanges	./.	63
Deleting non-quarterly obs. in MAND countries	./.	118
		9,412
Deleting "non-pure" MAND firms	./.	255
Deleting VOL firms	./.	816
Deleting firm-years with missing data	./.	3,187
Deleting non-matched firms	./.	1,788
Final sample		**3,366**

This tables presents the sample composition process. We use a sample of EU-15 firms listed on regulated markets from 2005-2009.

Table 3: Sample overview

Panel A: Distribution by country

Country	QR	HY	Total
Austria (AT)	44	0	44
Belgium (BE)	0	100	100
Denmark (DK)	0	23	23
Finland (FI)	253	0	253
France (FR)	0	613	613
Germany (DE)	447	92	539
Great Britain (GB)	0	732	732
Greece (GR)	103	0	103
Ireland (IE)	0	25	25
Italy (IT)	347	0	347
Luxembourg (LU)	0	0	0
The Netherlands (NL)	0	98	98
Portugal (PT)	50	0	50
Spain (ES)	204	0	204
Sweden (SE)	235	0	235
Total	1,683	1,683	3,366

Panel B: Distribution by suspect observations

	Suspect		Non-Suspect		
Suspect definitions	HY	QR	HY	QR	Total
Yearly data					
SUSPECT	295	265	1,388	1,418	3,366
Interim data					
SUSPECT_Q1	0	225	1,388	1,193	2,806
SUSPECT_Q2 / SUSPECT_HY1	198	136	1,190	1,282	2,806
SUSPECT_Q3	0	189	1,388	1,229	2,806
SUSPECT_Q4 / SUSPECT_HY2	120	87	1,268	1,331	2,806

This table presents a overview of the sample by country (Panel A) and by different suspect year definitions (Panel B). Variable definitions are in the Appendix.

Table 4: Descriptive statistics and correlations for continuous variables

Panel A: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	1%	25%	Median	75%	99%
TOTALRAM	3,336	0.011	0.356	-1.219	-0.089	0.012	0.158	0.770
If QR= 1	1,683	0.019	0.374	-1.239	-0.102	0.018	0.199	0.845
If QR= 0	1,683	0.003	0.338	-1.181	-0.076	0.008	0.120	0.700
If SUSPECT = 1	560	0.041	0.296	-0.899	-0.057	0.018	0.152	0.797
If SUSPECT_Q1 = 1	225	0.097	0.276	-0.535	-0.042	0.053	0.232	0.798
If SUSPECT_Q2 = 1	136	0.041	0.329	-1.108	-0.061	0.020	0.203	0.864
If SUSPECT_Q3 = 1	189	0.068	0.283	-0.629	-0.052	0.034	0.190	0.918
If SUSPECT_Q4 = 1	87	0.010	0.303	-1.193	-0.098	0.013	0.125	0.821
If SUSPECT_H1 = 1	198	0.004	0.265	-1.052	-0.064	-0.004	0.089	0.812
If SUSPECT_H2 = 1	120	0.048	0.243	-0.602	-0.061	-0.002	0.156	0.708
SIZE	3,366	12.6	1.4	9.5	11.6	12.5	13.5	16.9
LEV	3,366	0.370	0.161	0.081	0.251	0.352	0.467	0.794
NI	3,366	0.040	0.110	-0.343	0.008	0.046	0.087	0.318
CLHELD	3,366	42.2	25.2	0	21	43	61	96
SHARES	3,366	93,429	184,638	562	10,788	33,887	99,382	889,065
ANFOL	3,366	1.161	0.868	0.000	0.693	1.099	1.792	2.944
MKTSHARE	3,366	0.013	0.039	0.000	0.001	0.003	0.010	0.182
OPCYC	3,366	163.7	199.5	14.5	92.0	133.2	187.1	732.3
NOA	3,366	0.67	2.06	-0.12	0.30	0.49	0.77	3.09

Panel B: Pearson Correlations Matrix

Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
TOTALRAM	(1)	1								
SIZE	(2)	0.021	1							
LEV	(3)	0.058	-0.003	1						
NI	(4)	-0.171	0.189	-0.097	1					
CLHELD	(5)	-0.013	-0.128	0.103	-0.044	1				
SHARES	(6)	-0.004	0.339	-0.074	-0.006	-0.261	1			
ANFOL	(7)	-0.050	0.550	-0.052	0.171	-0.211	0.211	1		
MKTSHARE	(8)	0.002	0.454	0.005	0.049	-0.062	0.153	0.245	1	
OPCYC	(9)	-0.002	-0.028	-0.041	-0.124	0.041	0.029	-0.043	-0.054	1
NOA	(10)	0.018	0.005	-0.156	-0.072	0.030	0.032	-0.035	-0.014	0.117

This table presents descriptive statistics (Panel A) as well as Pearson correlation coefficients (Panel B) for continuous variables. Variable definitions are in the Appendix. All continuous variables are winsorized at 1st and 99th percentile.

Table 5: Regression of QR and different Suspect Years on Total RAM

Experimental Variables		Exp.Sgn.	[Model 1]	[Model 2]	[Model 3]
SUSPECT		+	0.023 **		0.027 **
			(2.57)		(2.33)
QR	(1)	+		0.078 ***	0.079 ***
				(4.73)	(4.30)
SUSPECT * QR	(2)	+/-			-0.009
					(-0.39)
Partial F-test					
QR effect in Suspect Year: (1) + (2)		+			0.070 ***
					[14.23]
Control Variables					
SIZE		+	0.044 ***	0.046 ***	0.046 ***
			(3.57)	(3.51)	(3.41)
LEV		+	0.077 *	0.076 *	0.076 *
			(2.16)	(2.14)	(2.12)
NI		-	-0.554 ***	-0.558 ***	-0.560 ***
			(-3.37)	(-3.31)	(-3.32)
CLHELD		-	-0.001 **	-0.001 **	-0.001 **
			(-2.94)	(-2.96)	(-3.02)
SHARES		+/-	0.000	0.000	0.000
			(-0.86)	(-0.86)	(-0.86)
ANFOL		-	-0.049 ***	-0.053 ***	-0.053 ***
			(-3.60)	(-3.45)	(-3.40)
MKTSHARE		+/-	-0.156	-0.160	-0.159
			(-1.22)	(-1.26)	(-1.24)
LITIND		+/-	-0.007	-0.007	-0.007
			(-0.16)	(-0.16)	(-0.16)
OPCYC		-	0.000	0.000	0.000
			(-0.95)	(-0.96)	(-0.95)
NOA		+	0.002	0.002	0.001
			(0.86)	(0.93)	(0.81)
BIG4		+/-	-0.055 ***	-0.055 ***	-0.054 ***
			(-4.92)	(-4.98)	(-4.87)
CONST		+/-	-0.408 **	-0.471 **	-0.466 **
			(-2.88)	(-3.00)	(-2.92)
Country Fixed Effects			yes	yes	yes
Country SE clustering			yes	yes	yes
Number of observations			3,366	3,366	3,366
Adjusted R^2			5.4%	5.4%	5.5%

This table presents results from regression analyses examining the effect of QR and different Suspect Years on Total RAM. The estimation is a fixed-effects panel regression with clustered standard errors. It is of the following form:

$$TOTALRAM = \alpha_0 + \alpha_1 SUSPECT + \alpha_2 QR + \alpha_3 QR * SUSPECT + \sum Controls + \sum Fixedeffec\ ts + \varepsilon$$

Model 1 refers to a regression only including SUSPECT, model 2 refers to a regression only including QR and model 3 includes both explanatories and an interaction term. Variable definitions are in the Appendix. All variables are winsorized at 1st and 99th percentile. Numbers reported are regression coefficients with t-statistics in (parantheses) and F-statistics in [brackets]. *, **, *** indicates significance at the 0.10, 0.05 and 0.01 levels, respectively, using a two-tailed (t-statistics) and one-tailed (F-statistics) test.

Table 6: Regression of Cross-sectional differences in Suspect Firm-Years on Total RAM

			Institutional diff.			Industry and firm-level diff.		
Experimental variables:		Exp.Sgn.	Importance of equity market [EQUMKT] ($CROSS_1$=High)	Earnings Mgmt Score [EMS] ($CROSS_1$=High)	Legal enforcement [LEGALENF] ($CROSS_1$=Low)	Shareholder horizon [SHORTTERM] ($CROSS_1$=High)	Monitoring by analysts [ANFOL] ($CROSS_1$=Low)	Industry concentration [INDCONC] ($CROSS_1$=Low)
QR * $CROSS_1$	(1)	+	0.129 ***	0.139 ***	0.130 ***	0.134 ***	0.091 ***	0.116 ***
			(9.17)	(4.20)	(8.89)	(3.41)	(5.52)	(4.66)
QR * $CROSS_0$	(2)	+	0.074 ***	0.078 ***	0.077 ***	0.068 ***	0.057 **	0.042 *
			(6.77)	(4.70)	(4.80)	(4.43)	(2.56)	(1.94)
Partial F-tests								
Overall SUSPECT * QR Effect: (1) + (2)		+	0.203 ***	0.217 ***	0.207 ***	0.202 ***	0.148 ***	0.158 ***
			[117.09]	[25.55]	[83.74]	[16.99]	[19.73]	[20.74]
Cross-sect. Difference: (1) - (2)		+	0.054 ***	0.062 **	0.053 **	0.067 **	0.034 *	0.073 **
			[10.47]	[4.20]	[6.59]	[3.79]	[2.65]	[5.49]
Control Variables			yes	yes	yes	yes	yes	yes
Country Fixed Effects			yes	yes	yes	yes	yes	yes
Country SE clustering			yes	yes	yes	yes	yes	yes
Number of observations			3,366	3,366	3,366	3,366	3,366	3,366
Adjusted R^2			8.3%	8.3%	8.3%	8.7%	8.4%	8.8%

This table presents results from regression analyses examining the joint effect of cross-sectional differences in suspect firm-years on Total RAM. The estimation is a fixed-effects panel regression with clustered standard errors. It is of the following form:

$$TOTALRAM = \alpha_0 + \alpha_1 QR * CROSS_1 + \alpha_2 QR * CROSS_0 + \sum Controls + \sum Fixedeffects + \varepsilon$$

QR*$CROSS_1$ is denominated *EQUMKT_HIGH, EMS_HIGH, LEGALENF_LOW, SHORTTERM_HIGH, ANFOL_LOW* and *INDCONC_LOW* in the text for the respective cross-sectional differences. QR*$CROSS_0$ is denominated *EQUMKT_LOW, EMS_LOW, LEGALENF_HIGH, SHORTTERM_LOW, ANFOL_HIGH* and *INDCONC_HIGH* in the text for the respective cross-sectional differences. We use the same set of standard control variables as in table 5. Variable definitions are in the Appendix. All variables are winsorized at 1st and 99th percentile. Amounts reported are regression coefficients with t-statistics in (parantheses) and F-statistics in [brackets]. *, **, *** indicates significance at the 0.10, 0.05 and 0.01 levels, respectively, using a two-tailed (t-statistics) and one-tailed (F-statistics) test.

Table 7: Regression of QR and different Suspect Years combinations on Total RAM

Experimental Variables		Exp.Sgn.	Coefficients (with t-stats.)	*Control Variables*		
SUSPECT	(1)	+	0.034 **	SIZE	+	0.044 ***
			(2.24)			(3.35)
QR	(2)	+	0.068 ***	LEV	+	0.075 *
			(3.26)			(2.02)
SUSPECT * QR		+/-	-0.001	NI	-	-0.563 ***
			(-0.03)			(-3.35)
SUSPECT_Q1	(3)	+	0.076 ***	CLHELD	-	-0.001 ***
			(3.23)			(-3.06)
SUSPECT_Q2	(4)	+	0.012	SHARES	+/-	0.000
			(0.49)			(-0.83)
SUSPECT_Q3	(5)	+	0.058 *	ANFOL	-	-0.051 ***
			(2.15)			(-3.35)
SUSPECT_Q4	(6)	+	-0.028	MKTSHARE	+/-	-0.153
			(-1.27)			(-1.15)
SUSPECT_HY1	(7)	+	0.012	LITIND	+/-	-0.007
			(0.81)			(-0.17)
SUSPECT_HY2	(8)	+	0.053	OPCYC	-	0.000
			(1.13)			(-0.93)
Partial F-tests				NOA	+	0.001
QR effect in SUSPECT: (1) + (2)		+	0.067 ***			(0.82)
			[13.49]	BIG4	+/-	-0.055 ***
QR effect in SUSPECT_Q1: (2) + (3)		+	0.132 ***			(-4.78)
			[24.28]	CONST	+/-	-0.450 **
QR effect in SUSPECT_Q2: (2) + (4)		+	0.068 **			(-2.82)
			[6.30]			
QR effect in SUSPECT_Q3: (2) + (5)		+	0.073 *			
			[2.68]	Country Fixed Effects		yes
QR effect in SUSPECT_Q4: (2) + (6)		+	-0.013	Country SE clustering		yes
			[0.11]			
QR effect in SUSPECT_HY1: (2) + (7)		+	0.212 ***	Number of observations		3,366
			[15.00]	Adjusted R^2		5.9%
QR effect in SUSPECT_HY2: (2) + (8)		+	0.113 ***			
			[10.48]			

This table presents results from regression analyses examining the effect of QR and different Suspect Year combinations between Yearly SY and Inteirm SYs on Total RAM. The estimation is a fixed-effects panel regression with clustered standard errors. It is of the following form:

$$TOTALRAM = \alpha_0 + \alpha_1 SUSPECT + \alpha_2 QR + \alpha_3 SUSPECT * QR + \alpha_4 SUSPECT\_Q1 + \alpha_5 SUSPECT\_Q2$$
$$+ \alpha_6 SUSPECT\_Q3 + \alpha_7 SUSPECT\_Q4 + \alpha_8 SUSPECT\_HY1 + \alpha_9 SUSPECT\_HY2 + \sum Controls + \sum Fixedeffects + \varepsilon$$

Variable definitions are in the Appendix. All variables are winsorized at 1st and 99th percentile. Amounts reported are regression coefficients with t-statistics in (parantheses) and F-statistics in [brackets]. *, **, *** indicates significance at the 0.10, 0.05 and 0.01 levels, respectively, using a two-tailed (t-statistics) and one-tailed (F-statistics) test.

Table 8: Pre-/Post Regressions for Transparency Directive on Total RAM in Suspect Years

Experimental Variables	Exp.Sgn.	[Model 1]	[Model 2]	[Model 3]
TD	-	-0.022 *	-0.031 ***	-0.048 ***
		(-1.81)	(-3.11)	(-4.52)
HY	-	-0.086 ***	-0.089 ***	-0.053 ***
		(-4.55)	(-4.44)	(-4.56)
TD * HY	+	0.019	0.023 *	0.028 *
		(1.52)	(2.00)	(2.08)
Control Variables				
SIZE	+	0.046 ***	0.047 ***	0.026 **
		(3.49)	(3.38)	(2.45)
LEV	+	0.076 *	0.075 *	0.085 **
		(2.11)	(2.08)	(2.62)
NI	-	-0.565 ***	-0.563 ***	-0.582 ***
		(-3.33)	(-3.26)	(-3.83)
CLHELD	-	-0.001 **	-0.001 **	
		(-2.89)	(-2.39)	
SHARES	+/-	0.000	0.000	
		(-0.86)	(-0.88)	
ANFOL	-	-0.052 ***	-0.054 ***	
		(-3.36)	(-3.45)	
MKTSHARE	+/-	-0.165	-0.167	
		(-1.31)	(-1.24)	
LITIND	+/-	-0.007		
		(-0.17)		
OPCYC	-	0.000	0.000	
		(-0.96)	(-0.83)	
NOA	+	0.002	0.002	
		(0.96)	(1.08)	
BIG4	+/-	-0.052 ***		
		(-4.05)		
CONST	+/-	-0.385 **	-0.409 **	-0.282 *
		(-2.71)	(-2.44)	(-2.03)
Country Fixed Effects		yes	yes	yes
Country SE clustering		yes	yes	yes
Firm/year SE clustering		no	no	no
Number of observations		3,366	3,366	3,366
Adjusted R^2		5.5%	5.2%	3.8%

This table presents results from regression analyses examining the Pre-/Post effect of the Transparency Directive (TD) on TOTALRAM. The estimation is a fixed-effects panel regression with clustered standard errors. It is of the following form:

$$TOTALRAM = \alpha_0 + \alpha_1 TD + \alpha_2 HY + \alpha_3 QR * HY + \sum Controls + \sum Fixedeffec\ ts + \varepsilon$$

Model 1 inlcudes all control variables, model 2 and 3 include reduced sets of controls. Variable definitions are in the Appendix. All variables are winsorized at 1st and 99th percentile. Numbers reported are regression coefficients with t-statistics in (parantheses) and F-statistics in [brackets]. *, **, *** indicates significance at the 0.10, 0.05 and 0.01 levels, respectively, using a two-tailed (t-statistics) and one-tailed (F-statistics) test.

Table 9: Regression of QR and Suspect Years on ACFO, APROD and ADISC

Experimental Variables		Exp.Sgn.	ACFO	APROD	ADISC
Suspect Year [SUSPECT_Y]		+	0.011 ***	0.015	0.023 **
			(3.64)	(1.48)	(2.35)
QR	(1)	+	0.034 ***	0.020 **	0.042 **
			(8.46)	(2.19)	(2.74)
Suspecy Year * QR	(2)	+/-	-0.009	0.007	-0.004
			(-1.21)	(0.37)	(-0.23)
Partial F-test					
QR effect in Suspect Year: (1) + (2)		+	0.026 ***	0.027 **	0.038 *
			[33.73]	[3.38]	[2.53]
Control Variables					
SIZE		+	-0.004 *	0.011	0.045 ***
			(-1.93)	(0.85)	(4.48)
LEV		+	0.062 ***	0.163 ***	0.043
			(4.67)	(5.77)	(1.13)
NI		-	-0.521 ***	-0.517 ***	-0.009
			(-16.05)	(-12.63)	(-0.07)
CLHELD		-	0.000	-0.001	-0.001 *
			(-0.56)	(-1.40)	(-1.95)
SHARES		+/-	0.000	0.000	0.000
			(0.68)	(0.73)	(-1.62)
ANFOL		-	-0.009 **	-0.041 ***	-0.039 ***
			(-2.83)	(-4.65)	(-3.70)
MKTSHARE		+/-	0.137 *	-0.286 **	-0.235
			(2.09)	(-2.40)	(-1.52)
LITIND		+/-	-0.001	-0.015	-0.009
			(-0.19)	(-0.88)	(-0.30)
OPCYC		-	0.000 *	0.000 *	0.000
			(1.81)	(-1.79)	(-1.32)
NOA		+	-0.001	0.001 **	0.028 ***
			(-0.96)	(2.36)	(3.73)
BIG4		+/-	-0.011 *	-0.023 ***	-0.038 **
			(-1.96)	(-3.88)	(-2.68)
CONST		+/-	0.028	-0.110	-0.502 ***
			(1.49)	(-0.73)	(-4.01)
Country Fixed Effects			yes	yes	yes
Country SE clustering			yes	yes	yes
Number of observations			3,366	3,066	1,978
Adjusted R^2			30.1%	13.8%	6.4%

This table presents results from regression analyses examining the effect of QR and Suspect Years on ACFO, APROD and ADISC. The estimation is a fixed-effects panel regression with clustered standard errors. It is of the following form (DEPVAR represents thedependent variables ACFO, APROD and ADISC:

$$DEPVAR = \alpha_0 + \alpha_1 SUSPECT + \alpha_2 QR + \alpha_3 QR * SUSPECT + \sum Controls + \sum Fixedeffec\ ts + \varepsilon$$

Variable definitions are in the Appendix. All variables are winsorized at 1st and 99th percentile. Numbers reported are regression coefficients with t-statistics in (parantheses) and F-statistics in [brackets]. *, **, *** indicates significance at the 0.10, 0.05 and 0.01 levels, respectively, using a two-tailed (t-statistics) and one-tailed (F-statistics) test.