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The Impact of Performance Reporting on Investment Behavior: Evidence from Disclosure Reform in the UK

ABSTRACT

I examine the real effects of a disclosure mandate that, with the aim of enhancing performance reporting, requires a subset of London Stock Exchange firms to describe operational and strategic aspects of value creation, such as business operations and strategies, in their annual reports. Using an instrumented difference-in-differences design, I find that compliance with this initiative, evidenced by more disclosures of performance measures and commentaries relating to business operations and strategies, promotes intangible investments. My analysis of external and internal control systems suggests that enhanced performance reporting promotes investments because it attracts long-term investors and reduces CEO pay sensitivity to earnings performance.

I. INTRODUCTION

Researchers and practitioners have criticized traditional earnings-focused performance reporting for placing insufficient emphasis on long-term value creation and fueling myopia among managers and investors (Stein 1989; Fuller and Jensen 2010; Kay 2012; Lev and Gu 2016). In response, accounting standard setters and practitioners are increasingly urging firms to explain how their business activities and strategies, including innovation, supply chain relationships, human resource management, operations, and marketing, contribute to long-term value creation (Lev 2001; FRC 2010; IIRC 2013; SEC 2016). For instance, the International Accounting Standards Board (IASB 2010) has issued a Practice Statement Management Commentary encouraging firms to complement their financial information by describing managerial objectives and strategies for long-term success. Similarly, the International Integrated Reporting Council's (IIRC 2013) Integrated Reporting Framework requires firms to explain their long-term value creation by incorporating information on their strategy, governance, and other aspects of business activities alongside financial information.

While regulators and practitioners are increasingly encouraging firms to describe their business activities and strategies, in the belief that such disclosures encourage managers to look beyond earnings and make decisions for the long term (FRC 2010; European Commission 2017; PwC 2006), little is known about their real effects. Extant research focuses mainly on the capital-market effects of such disclosures, such as market responses to business strategy disclosures and improved forecast quality (Whittington, Yakis-Douglas, and Ahn 2016; Athanasakou, El-Haj, Rayson, Walker, and Young 2019). Thus, evidence is lacking on the real effects of mandates requiring firms to report long-term aspects of value creation (Barth, Cahan, Chen, and Venter 2020). In a notable exception, Barth et al. (2017) exploit the Johannesburg Stock Exchange's requirement for integrated reports to produce preliminary evidence of a negative association between integrated reporting quality and investment inefficiency.

Building on Barth et al. (2017), this study exploits a UK regulatory development that mandates commentary on strategy and value creation in the annual reports of a subset of firms listed on the London Stock Exchange (LSE). In response to concerns about excessive emphasis on earnings results and insufficient discussion of the process of long-term value creation, in 2010 the Financial Reporting Council (FRC) revised the UK Corporate Governance Code (FRC 2010) and required managers to explain in their annual reports how their business operations and strategies deliver value over the longer term. Examples include descriptions of strategies and objectives in the context of business operations, such as main products, services, markets, customers, employees, suppliers, production, distribution, and tangible and intangible resources. This reporting mandate took effect for fiscal years beginning on or after June 29, 2010 and applied to the LSE's Main Market (MM), its primary listing for established firms that meet strict regulatory requirements. My tests examine changes in the performance reporting and investment

behavior of LSE MM firms in response to this reporting requirement, with control firms from LSE's Alternative Investment Market (AIM), which features less stringent reporting regulations for less established firms.¹

To examine the effects of the UK Corporate Governance Code (2010), I first define the term “enhanced performance reporting” (EPR). This refers to quantitative and qualitative information describing the *process* of value creation, as opposed to information centering on the *results* of value creation, such as earnings and its variants. Examples of EPR include disclosures relating to customers (e.g., customer satisfaction, customer base), human resources (e.g., employee training, employee retention), production (e.g., product quality, volume), innovation (e.g., R&D, exploration), product markets (e.g., market share, competition), strategic partnerships (e.g., joint ventures, affiliate agreements), and other information describing the value-creation process.

I construct two empirical measures of EPR in annual report performance commentaries. The first captures the incidence of performance metrics evaluating operational and strategic aspects of value creation. I manually collect performance measures presented in key performance-focused sections of annual reports, and then calculate the ratio of EPR metrics to total metrics disclosed. EPR metrics include indicators of business activities and strategies for value creation, including customer satisfaction, market share, number of shops, employee retention, product quality, and number of patents, rather than traditional measures centering on short-term results such as operating profit, profit before tax, earnings per share, and operating cash flow. My second proxy captures qualitative aspects of EPR. Having identified latent themes

¹ The systematic difference between MM and AIM may confound the treatment effects estimation. In the subsection entitled ‘Limitations of the UK Corporate Governance Code (2010) as a Research Setting’ in Section III, I discuss these potential confounding effects and outline my tests to mitigate these concerns.

in the UK annual report corpus through topic modeling (Blei, Ng, and Jordan 2003), I use the proportion of topics relating to business operations and strategies as my second proxy for the strength of EPR.

I examine the impact of the UK Corporate Governance Code 2010 on investment decisions using an instrumented difference-in-differences (DiD) method (Hudson, Hull, and Liebersohn 2017), which takes an instrumental variables (IV) estimation approach to estimate the effects on investments of increasing EPR by one percentage point. I find a 10.1 (4.0) percentage point increase in metric-based (topic-based) EPR among MM firms relative to AIM firms following the introduction of the reporting mandate. The second-stage result indicates that a one percentage point increase in metric-based (topic-based) EPR promotes total investment as a proportion of assets by 0.6 (1.5) percent.

Next, I explore mechanisms through which EPR promotes investment. I propose two non-mutually exclusive channels: an external investor-related channel and an internal compensation-related channel. The external channel reflects the potential benefits of more long-term dialogue between management and investors. Serafeim (2015) documents that long-term-oriented reporting is positively associated with the proportion of long-term investors, while Bushee (1998) finds that managers exhibit a lower tendency for investment myopia in the presence of long-term institutional investors. Calculating long-term institutional ownership following Bushee and Noe (2000), I find that growth in EPR leads to an increase in the proportion of long-term investors, and that this growth promotes investment spending among MM firms relative to AIM firms. My results support the view that EPR promotes investment spending by attracting investors who prioritize and encourage a longer-term focus.

The internal control channel reflects the enhanced monitoring effects of EPR. As firms

expect and experience increased monitoring of long-term value creation by investors following the introduction of the reporting mandate, I predict that they will align internal control system features, such as executive compensation, with EPR. For example, an increase in EPR for financial reporting purposes may lead firms to replace some short-run earnings-focused metrics with EPR-related measures in their executive compensation plans. Consistent with this view, I document that a growth in EPR precedes a decrease in the sensitivity of CEO pay to earnings, which in turn promotes investment.

I implement a series of additional tests to evaluate the robustness of my results and conclusions. First, while my results suggest that the regulatory push for EPR encourages managers to make longer-term decisions, the resulting increase in investment may represent overinvestment. I explore this possibility by examining a subsample of firms with a high probability of overinvestment. I find that the treatment effects are insignificant among this subsample, suggesting that the rise in investment spending in the main analysis is unlikely to represent overinvestment. Second, I test for confounding effects from other provisions of the UK Corporate Governance Code 2010, such as annual re-election of executive directors and triennial evaluation of board effectiveness, which apply to a subset of large MM firms and may affect investment decisions. My results are robust to excluding these firms. Third, I control confounding effects that may arise from the heterogeneity between MM and AIM firms. For example, events like the financial crisis may influence financing and investing opportunities for both MM and AIM. However, MM firms may rebound more quickly than AIM firms, possibly confounding the treatment effects of the reporting mandate. Such confounding effects may violate the parallel trend assumption of DiD research design. To address this concern, I control for financial constraints and adopt DiD using an alternative control group and a matched-sample

DiD. I also analyze counterfactual treatment effects to examine the validity of the parallel trend assumption. My results are robust to these tests.

Despite the additional tests, drawing inferences from my findings requires careful consideration of caveats. First, while the parallel trend test and alternative DiD specifications aim to address confounding effects from the heterogeneity between the two groups, they may not eliminate all potential biases. Second, the results are potentially susceptible to confounding effects arising from unidentified concurrent events that may influence MM and AIM differently. Third, I use a small sample due to the manual data collection process and validity checking of unique words for textual analysis. Therefore, my sample may not be fully representative of the population. However, this focused sample facilitates the examination of the path from a regulatory change through disclosure outcomes to economic consequences.

My study contributes to extant research in several ways. First, it answers Leuz and Wysocki's (2016) call for research on the real effects of reporting mandates, particularly in novel settings outside the US. The real effects evidence also contributes to the literature on non-traditional disclosures that emphasizes long-term value and strategies to address managerial myopia (Athanasakou et al. 2019; Krehmeyer, Orsagh, and Schacht 2006; FRC 2010; European Commission 2017; IIRC 2013; SEC 2016). Extant studies of the effects of disclosing information on long-term value creation focus mainly on capital-market effects, leaving the real effects of such disclosures largely unexplored (Barth et al. 2020). The real effects evidence is important, as regulators and reporting practitioners introduce such mandates in the belief that disclosures emphasizing long-term aspects of value creation enhance firms' long-term decision making (FRC 2010; European Commission 2017; PwC 2006). Barth et al. (2017) provide preliminary evidence of real effects, using the integrated reporting requirement in South Africa. However,

they have 290 firm-years, and causality is difficult to establish in their setting because their observations are limited to the post-mandate period with no counterfactual. As I use a larger sample and explore a UK institutional setting that allows a DiD identification strategy, my study has broader generalizability.

Second, my study also speaks to the issue of the myopic effects of financial reporting. Frequent performance reporting is often considered to cause managerial myopia (Fuller and Jensen 2010; Kraft, Vashishtha, and Venkatachalam 2018). This issue is subject to ongoing debate, with the SEC (2016) seeking public comments on the idea of reducing the burden of quarterly reporting, and recent research providing mixed results on the effects of reporting frequency (Nallareddy, Pozen, and Rajgopal 2017; Kajüter, Klassmann, and Nienhaus 2019; Arif and De George 2020). Although my study does not directly address the issue of reporting frequency, it offers the new perspective that disclosures focusing on process aspects of value creation may curb myopic behaviors and catalyze firm-level discussion of sustainable value creation.

I also provide empirical evidence that mandatory disclosure of long-term value creation mitigates the market friction documented by Gigler, Kanodia, Sapiro, and Venugopalan (2014). They identify that when managerial interests are aligned with those of myopic current shareholders, managers are encouraged to make myopic decisions to achieve quick returns at the expense of future shareholders' value. Short-term managerial incentives deter voluntary disclosure of long-term value creation and pose a risk of adverse selection. Thus, mandatory disclosure of information on long-term value creation may play a role in addressing this friction. I suggest that mandating disclosure of information on long-term value, when followed by enhanced monitoring and internal control, helps to promote long-term behavior, particularly by

firms suffering from the friction documented by Gigler et al. (2014).

II. RELATED LITERATURE

Although periodic performance reporting centers on measures of financial performance in general, and accounting earnings in particular, theory and evidence highlight the limitations of devoting excessive attention to earnings in performance measurement and business valuation (Tasker 1998; Lev and Zarowin 1999; Graham, Harvey, and Rajgopal 2005). Research demonstrates that earnings alone convey insufficient information about value creation in the long term (Lev and Gu 2016). Valuation theory highlights the importance of information other than earnings in forecasting future performance and estimating value (Ohlson 1995). Ball and Shivakumar (2008) show that earnings has relatively low surprise content because it is primarily backward-looking, while others suggest that reported earnings blur value creation in R&D-intensive firms (Tasker 1998; Lev and Zarowin 1999; Merkley 2014).

Given the limitations of earnings, and backward-looking accounting measures more generally, Kaplan and Norton (1996) argue that the financial performance measures of management control systems should be supplemented with leading indicators of operational and strategic success. For example, information on customers, operations, employees, and innovation provides useful insights into long-term value creation (Nagar and Rajan 2001; Merkley 2014). Accordingly, regulators and policymakers encourage firms to discuss their business operations and strategies for delivering value over the long term, in the belief that such disclosures not only provide useful information to investors, but also promote managers' longer-term view (FRC 2010; European Commission 2017; PwC 2006; Krehmeyer et al. 2006; IIRC 2013). For example, the Financial Accounting Standards Board's (2001) guideline is that firms should describe their businesses and use metrics for operational and strategic evaluation; the CFA Institute

(Krehmeyer et al. 2006) stresses the importance of augmenting financial measures with strategic information; and the SEC (2016) raises questions about enhancing the management discussion and analysis (MD&A) section to include detailed strategy information. In Europe, the IASB's (2010) Practice Statement on Management Commentary urges firms to outline their long-term managerial objectives and strategies, and the International Integrated Reporting Council's (IIRC 2013) Integrated Reporting Framework mandates firms to clarify how their strategies, governance, and management aspects generate long-term value. Similarly, the European Commission (2017) offers corporate reporting guidelines, recommending that firms disclose key performance indicators for assessing strategic success.

Supporting regulators and reporting practitioners, disclosure research demonstrates the usefulness and effects of operational and strategic information on capital markets (Athanasakou et al. 2019; Whittington et al. 2016) but leaves the impacts on managerial decision making underexplored. In a notable exception, Barth et al. (2017) present preliminary evidence by leveraging the Johannesburg Stock Exchange's (JSE) requirement for integrated reports. Using a proprietary measure, they report a negative correlation between JSE firms' integrated reporting quality (IRQ) and investment inefficiency. Building on Barth et al. (2017), I examine the real consequences of mandating strategy disclosure and explore potential mechanisms.

III. INSTITUTIONAL BACKGROUND

UK Corporate Governance Code

The Financial Reporting Council (FRC) and the UK parliament's House of Commons Treasury Committee identified a notable gap in UK performance reporting: that most firms failed to describe their long-term value delivery (FRC 2010, para. 30). Consequently, in the 2010 revision of the UK Corporate Governance Code, the FRC added a provision mandating firms to

detail in their annual reports their strategies for generating long-term value. Paragraph C.1.2. specifically required directors to explain the company’s basis for long-term value generation (the business model) and strategy for achieving its goals. In addition, the revision included the term “long-term” in the first principle concerning the board’s duty to “ensure the (long-term) success of the company” (para. A.1). The FRC recommended that firms adhere to a best-practice reporting framework to aid investors’ assessments of long-term value creation, involving descriptions of strategies and objectives in the context of business operations, and covering their main products, services, markets, customers, employees, suppliers, production, distribution, and tangible and intangible resources (ASB 2006).

The new reporting mandate took effect for reporting periods beginning on or after June 29, 2010 and applied to LSE MM firms on a “comply or explain” basis.² Although non-compliance is an option, several factors make this mandate a de facto regulation. First, the UK Disclosure and Transparency Rule requires firms to identify explicitly in their governance statements which provision(s) of the UK Corporate Governance Code they depart from and their reasons for doing so (DTR 7.2.3).³ Second, under the new reporting mandate, regulatory bodies and reporting practitioners monitor disclosures of business operations and strategies. The Financial Reporting Review Panel, a subsidiary group of the FRC charged with investigating non-compliance with financial reporting requirements and enforcing the regulatory framework, conducted inquiries into strategy reporting (FRC 2011). The FRC also established a Financial Reporting Lab in 2011, with the priority of helping firms to provide relevant information on their

² Note that a sharp treatment (i.e., 100 percent compliance) is not a necessary condition for estimation of treatment effects. In order to examine the treatment effects for compliers, I estimate the local average treatment effect (LATE) using an IV estimation method (Imbens and Angrist 1994).

³ In a manual check of my sample firms’ governance statements, I find no case of non-compliance with provision C.1.2. Consistent with this manual check, my empirical test confirms a sharp increase in EPR following the reporting mandate.

business models and strategy (FRC 2011). Finally, financial services firms have reviewed annual reports and evaluated the quality of disclosures relating to strategic goals and long-term success (PwC 2012; Deloitte 2013).

Appendix B presents an excerpt of the strategy disclosure from the 2011 annual report of Optos, a UK retinal imaging device company. The company provides a summary of its long-term vision and three key strategic objectives as expanding customer segments, leveraging sales channels, and growing global reach. The company also provides performance indicators for measuring operational and strategic success, including total devices installed, average number of devices per rental site, revenue by sales type, and revenue by geographical segment. The firm then describes its actual performance in 2011 and its targets for 2012 with clear descriptions of market and industry. This summary page is followed by a 6-page report that comprehensively describes the details of each strategic goal.⁴ While some firms may have provided this type of information prior to the implementation of the reporting mandate, the reporting mandate is expected to have encouraged further disclosures of business models and strategies, particularly among MM firms that previously disclosed relatively little.

Expected Impact of Enhanced Performance Reporting

Although regulators and practitioners believe that explicitly discussing long-term value creation helps managers to look beyond earnings and deliver value over the long term, skeptics cite cheap talk (Forsythe, Lundholm, and Rietz 1999) as a reason why EPR may not affect decision-making behavior. Management may exploit cheap talk (Forsythe et al. 1999) because information on long-term value creation is inherently vague and difficult to verify. Despite this

⁴ Optos discusses its strategies and long-term value creation in a standalone section, although the Corporate Governance Code (2010) does not specify a format for EPR disclosures. Firms may alternatively describe their strategies within existing sections of their annual reports, such as the chairman's letter, the CEO's review, and the financial review, in order to make strategic information the backbone of the annual report.

concern, the 2010 reporting mandate is expected to have had significant effects, as the impacts of regulations and policies hinge crucially on regulators' implementation and enforcement efforts (Christensen, Hail, and Leuz 2016). As described in the previous section, the FRC maintained its follow-up on strategy reporting following the introduction of the revised code, as evidenced by the Financial Reporting Review Panel's reviews of annual reports. The FRC's Financial Reporting Lab also pushed firms to tell their stories of value creation beyond generic statements.

The FRC's implementation effort may facilitate two non-mutually exclusive channels through which EPR influences investment decisions. The first is the external channel, which reflects the potential benefits of enhanced interaction between management and investors. Serafeim (2015) highlights that the long-term-oriented view of integrated reporting attracts long-term investors seeking information crucial to forecasting companies' long-term prospects, and firms providing such information signal their ability to generate long-term value. If this effect extends to performance reporting, an increase in EPR may help to attract long-term investors. Since long-term investors exert less pressure on management to boost short-term earnings performance (Bushee 1998), attracting them may reduce managerial incentives to prioritize short-term gains over long-term investments, thereby promoting a culture of sustained investment spending.

The FRC's monitoring activities for implementation of the Code and the change in the investor base (i.e., external channel) may also open up an internal control channel, further promoting corporate investment. For instance, firms seek to align executive compensation with EPR disclosures. The FRC's consultation on the draft version of the Code contemplated the possibility of asking firms to explicitly describe links between remuneration and long-term success (paragraph 38, FRC2010b). While the final version of the Code (2010) does not require

firms to demonstrate alignment between EPR and remuneration, firms may predict and experience increased expectations of alignment between strategy and compensation by both regulators and investors. Therefore, EPR may promote adoption of longer-term measures. For instance, Taylor Wimpey PLC adopted profit before tax, TSR, and EPS for CEO pay in 2008, and in 2013 added measures such as order book, energy reduction, and customer service. This change in remuneration compensation reduces reliance on short-term earnings in determining CEO pay, and lower pay sensitivity to earnings may promote corporate investments.⁵

Limitations of the UK Corporate Governance Code (2010) as a Research Setting

The UK Corporate Governance Code (2010) has several limitations as a research setting. First, the 2007–2008 financial crisis pre-dated the reporting mandate. The crisis may have influenced how firms discuss their performance, as poorly performing firms may place greater emphasis on a positive outlook and forward-looking information to distract attention from their poor results (Schleicher and Walker 2010). If the crisis promoted discussion of strategy and long-term value during the pre-treatment years (2008–2010), there will have been less room for improvements to strategy disclosures, reducing the power of the test. The crisis may also have restricted financing opportunities and triggered a decline in corporate investments, creating a bias that blurs the investment-promoting effects of the reporting mandate. However, my research mitigates these concerns in the following ways. First, my sample excludes financial firms, which were severely impacted by the crisis. Second, the DiD research design mitigates the confounding effects of macro factors, such as the financial crisis, that affected both MM and AIM firms.

Nevertheless, the crisis may have generated time-varying confounding factors, such as

⁵ The two channels may impact on each other. However, I do not test for dynamic interactions between them, as disentangling their effects is beyond my analytical focus on explaining how EPR catalyzes sustainable investments.

time-varying opportunities for capital raise and investment owing to systematic differences between MM and AIM. The LSE established AIM to help firms needing public capital but not meeting MM requirements to access capital at reduced cost by easing the listing and reporting requirements. For example, AIM does not require a prior trading record or minimum market capitalization for listing. AIM firms are subject to light-touch regulations under the LSE's "AIM rules for companies." They are also exempt from the UK authorities' stringent listing and disclosure rules; instead, nominated advisors registered with the LSE apply relaxed disclosure and governance requirements (Gerakos, Lang, and Maffett 2013).⁶ As the heterogeneity in the two groups may confound my results and inferences, it is essential to examine parallel trends and control for different characteristics of the two groups. Section V addresses these concerns through tests of parallel trends, a matched-sample DiD, and an alternative control group.

IV. RESEARCH DESIGN AND RESULTS

Measurement of Enhanced Performance Reporting

The primary variable of interest in my empirical tests is the extent of EPR. I use two measurement approaches: performance metric-based EPR (*MEPR*) and topic-based EPR (*TEPR*). These capture the proportion of quantitative and qualitative information, respectively, relating to EPR. I construct these two measures because firms use both quantitative metrics and qualitative commentaries to provide information on their value-creation process.⁷

To capture quantitative aspects of EPR, I manually collect all performance measures appearing in the highlights and chair's letter sections of annual reports, which contain the most

⁶ See Gerakos et al. (2013, Appendix A) for details of the regulatory structure of AIM.

⁷ UK annual reports broadly consist of a narrative element at the front followed by financial statements. The narrative element is not standardized, but typically includes sections such as highlights, chairman's letter, financial review, and risk management. I focus on the highlights and chairman's letter sections to develop *MEPR* because these provide the highest-profile discussions and reflect managerial perspectives and horizons on value creation.

prominent discussions of periodic performance. I then split the collected measures into EPR and Other categories, and calculate the proportion of EPR measures reflecting operational and strategic aspects of value creation (i.e., the value-creation process).⁸

For the classification of performance measures, I adjust the standard dichotomy between financial and non-financial measures. Although non-financial measures, such as customer satisfaction scores, product quality, and new patents, more obviously fit with the idea of EPR, some financial measures also align naturally with EPR. For example, R&D expenditure, employee training costs, and sales from new brands also describe what firms do to generate value. Therefore, I first split the measures into financial and non-financial categories, and then, alongside non-financial measures, reclassify financial measures closely related to strategies and business models. Based on the FRC's (2010) and ASB's (2006) reporting guidance, I reclassify financial numbers associated with strategies and business activities, such as products and services (e.g., product development cost), employees (e.g., training costs, revenue per employee), operations and production (e.g., agent cost per call, cost per barrel, quality control cost), market and customers (e.g., core market sales, advertising costs), tangible and intangible resources (e.g., acquisition of plants, IT development costs), suppliers and distribution (e.g., supplier acquisition costs, online distribution fees), and community (e.g., contribution to local communities).⁹ Using this classification, I construct metric-based EPR (*MEPR*), calculated as the ratio of the number of EPR measures to the number of all measures.

To measure the relative weight attached to EPR information in performance narratives, I

⁸ I do not use a top-down approach, such as curating a list of performance measures and then searching for these in text. Rather, because EPR measures tend to be firm-specific (e.g., number of eye exams, mystery shopper scores), I use the bottom-up approach of reading each annual report and collecting every measure.

⁹ To test robustness, I generate an alternative measure of EPR following the traditional classification of financial versus non-financial measures, and treat only non-financial measures as EPR. Details are provided in Section VI.

use Latent Dirichlet Allocation (LDA), which is a computational linguistic method to identify lists of words that frequently co-occur in a large corpus (Blei et al. 2003). As co-occurring words are semantically coherent, I assign a label (topic name) to each word group. I then split the identified topics into two broad categories: EPR and Other. The EPR category contains topics covering business operations and strategic aspects (e.g., customers, production, marketing, business model, strategy). The Other category includes topics centering on earnings performance and financial statement items (e.g., balance sheet items, earnings performance) and topics not closely related to value creation (e.g., directors' biographies, annual general meeting). The identified topics and frequent words in each topic are listed in Appendix C. For each annual report, I calculate the proportion of EPR-related topics (*TEPR*) as my second proxy for EPR.¹⁰

For the textual analysis, I create a corpus by aggregating text prior to financial statements in the annual reports of all firms listed on the LSE in the sample period 2008–2013, to ensure sufficient data for machine learning. The corpus includes 9,333 annual reports from 1,848 unique firms. Appendix D provides details of the text pre-processing and LDA parameters.

Sample and Data

As shown in Panel A of Table 1, the sample period is 2008–2013 to allow comparison of disclosures and investments before and after revision of the Corporate Governance Code.¹¹ I exclude firms in the financial and utility sectors, which have idiosyncratic reporting environments. I also exclude firms with missing data in the sample period to generate a balanced panel to support symmetric DiD. The symmetric approach mitigates biases arising from non-

¹⁰ An alternative approach to measuring EPR is a dictionary-based keyword search. However, developing a comprehensive dictionary of business models and strategy risks overlooking important keywords.

¹¹ I convert calendar year to fiscal year and include fixed effects based on fiscal year.

random sample attrition.¹² I randomly select 100 LSE MM firms from the available sample, with the balance drawn from AIM-listed firms.

Financial variables are collected from Thomson Reuters Datastream. I construct EPR metrics using annual reports sourced from Perfect Information, converted to text using El-Haj, Alves, Rayson, Walker, and Young's (2020) method. I analyze the external channel of long-term investors using Bushee and Noe's (2000) classification of institutional investment styles. Institutional investors' quarterly investment portfolio data are obtained from Thomson Reuters Eikon.¹³ For the internal channel test, I obtain CEO compensation data from BoardEx. Panel B of Table 1 provides descriptive statistics for the dependent, independent, and control variables for the full, MM, and AIM samples (see Appendix A for definitions). Panel C of Table 1 shows that MM and AIM firms differ particularly in *SIZE*, *AGE*, and *EBIT*. This systematic difference raises a concern about the previously mentioned critical assumption of parallel trends. Section V addresses this concern.

Validation of EPR Measurement

To validate the measures of EPR (*MEPR* and *TEPR*), I examine whether the determinants of EPR and the association between EPR and one-year ahead earnings ($EBIT_{t+1}$) make economic sense. Panel A of Table 2 shows that younger firms and loss-making firms are more likely to discuss EPR because they are yet to make profits or seek to distract attention from poor performance. EPR is lower among highly leveraged firms, as they must focus on their ability to

¹² For example, if poorly performing firms cut investment spending and are delisted, the mean of investment spending in the post-treatment period increases without any treatment. Similarly, the incidence of IPOs during the sample period creates bias in investment spending in the post-treatment period.

¹³ I download quarterly portfolio of individual funds that have ever held a non-zero share in my sample firms. I apply Bush and Noe (2000) approach to classify funds into transient, quasi-indexer, or dedicated investors. Then, I calculate ownership by dedicated investors and quasi-indexers, as these are long-term investors, evidenced by low portfolio turnover.

make payments in the near term. In column 2, the positive association between Q and $TEPR$ suggests that firms with more investment opportunities emphasize long-term aspects using qualitative EPR information. The positive (negative) coefficient of $SIZE$ for $MEPR$ ($TEPR$) implies that small firms are more likely to use qualitative descriptions of the long term, while large firms use performance metrics to evaluate their long-term success. I also test the association between EPR and near-term earnings performance measured by one-year ahead $EBIT$. Panel B shows that EPR has a weakly negative association with one-year ahead $EBIT$, consistent with the notion that EPR indicates long-term value creation and may reduce near-term performance due to investments for the future.

Standard Difference-in-Differences

I use a standard DiD design to obtain preliminary evidence. My research exploits the institutional setting of the Corporate Governance Code (2010), which applies to MM firms but not to their AIM counterparts. I use tangible investments ($TGBLINV$), intangible investments ($INTGBLINV$), and the sum of the two ($TOTALINV$) to measure investment activities. $TGBLINV$ includes investments in property, plant, and equipment, and $INTGBLINV$ is the sum of R&D expenditure and changes in net intangible assets, which include capitalized R&D, patents and brands, licenses, computer software, and other intangible assets. Following Edmans, Fang, and Lewellen (2017), I set missing R&D values to zero. The variable of interest is an indicator of the post-treatment period for MM firms ($POSTMAIN$). Combined with firm fixed effects and year fixed effects, the post-treatment indicator allows standard DiD identification. As firms in my sample do not change industry over time, firm fixed effects also control for industry fixed effects. In addition, I include fiscal-year fixed effects to control for year-level factors common to all firms. The control variables (X) include lagged variables for firm size ($SIZE$), investment

opportunity proxied by Tobin's Q (Q), cash ($CASH$), leverage (LEV), loss ($LOSS$), firm age (AGE), earnings performance ($EBIT$), and capital raise ($RAISE$).

$$INV_{it} = \alpha_1 POSTMAIN_{it-1} + \omega' X_{it-1} + FIRM_FE + YEAR_FE + c + \varepsilon_{it} \quad (1)$$

Table 3 reports the results of the standard DiD estimating equation (1) based on OLS regression. To address heteroskedasticity, I use robust standard errors clustered at the firm level. In columns (1) and (3), the coefficient of $POSTMAIN$ is positive and significant. This implies a significant increase in intangible investments ($INTGBLINV$) and total investments ($TOTALINV$) among MM firms compared with AIM firms. The estimated treatment effect on intangible investments is 0.056, which is 33 percent of one standard deviation of $INTGBLINV$. For an MM firm with $INTGBLINV$ of 0.39, which is the mean for MM, the treatment effects imply an increase in $INTGBLINV$ from 0.039 to 0.095. This increase corresponds with an increase from the 68th to the 79th percentile in $INTGBLINV$ distribution. On the other hand, the estimated treatment effect of the reporting mandate on tangible investments is not significant. This is unsurprising. Managerial myopia manifests in underinvestment in intangible capital because capital expenditure has less impact than R&D on earnings (Lundstrum 2002). In addition, cuts in tangible investments are more clearly visible to investors (Stein 1989).

Instrumented Difference-in-Differences

The standard DiD analysis shows a significant association between the reporting mandate and investment spending, but does not examine whether the effects involve a significant increase in EPR. I employ instrumented DiD to demonstrate the effects through changes in disclosures (Hudson et al. 2017). This method estimates the effects on investments of increasing EPR by one percentage point. This is useful in my research setting, as some MM firms may substantially enhance their performance reporting while others barely change. To implement this approach, I

estimate the following equation system using equation-by-equation 2SLS.¹⁴

$$EPR_{it-1} = \beta_1 POSTMAIN_{it-1} + \omega' X_{it-1} + FIRM_FE + YEAR_FE + c + \varepsilon_{it} \quad (2)$$

$$INV_t = \beta_2 EPR_{it-1} + \omega' X_{it-1} + FIRM_FE + YEAR_FE + c + \varepsilon_{it} \quad (3)$$

Equation (2) tests whether the reporting mandate promotes EPR (*MEPR*, *TEPR*).

Equation (3) tests whether the EPR explained by the reporting mandate in the first-stage regression is associated with future investment spending (*INTNGBLINV*, *TNGBLINV*, *TOTALINV*). Instrumented DiD rescales the average treatment effects of standard DiD by the level of compliance, measured by the incremental increase in EPR among MM firms relative to AIM firms.¹⁵ Following rescaling, the coefficient of the second-stage regression (β_2) is the treatment effect of the reporting mandate on investment when the incremental increase in EPR is 100 percent. Therefore, β_2 multiplied by 0.01 is the estimated treatment effect of the reporting mandate on investment spending when EPR increases by one percentage point.

Column 1 of Panels A (*MEPR*) and B (*TEPR*) of Table 4 report a significant and positive coefficient for *POSTMAIN*. The estimated effects are increases of 10.1 and 4.0 percent in *MEPR* and *TEPR*, respectively.¹⁶ This implies that since the introduction of the reporting mandate, compared with AIM firms, MM firms provide more quantitative (performance indicators) and qualitative (management commentaries) information that reflects operational and strategic

¹⁴ The system of equations (2) and (3) produces a breakdown of treatment effects for equation (1). It is equivalent to equation (1), as substituting EPR in equation (3) with equation (2) yields equation (1). The multiplication of β_1 and β_2 equals α_1 . Therefore, the instrumented DiD research design reveals how the regulatory change influences corporate investment through changes in disclosure.

¹⁵ $\beta_2 = \frac{E[INV_{post} - INV_{pre} | MAIN=1] - E[INV_{post} - INV_{pre} | MAIN=0]}{E[EPR_{post} - EPR_{pre} | MAIN=1] - E[EPR_{post} - EPR_{pre} | MAIN=0]}$. The numerator (denominator) is the average treatment effect of standard DiD showing an incremental increase in investments (EPR). This estimator is a generalized version of the local average treatment effect (LATE).

¹⁶ Although the dependent variables vary between zero and one, I do not use a fractional logit model. A non-linear first-stage model increases the risk of misspecification and inconsistent estimation, whereas a linear first-stage model generates consistent results (Angrist and Krueger 2001).

aspects of value creation.¹⁷ The second-stage regressions in columns (2) to (4) of Panels A and B show positive and significant treatment effects of an increase in EPR on *INTNGBLINV* and *TOTALINV*. As β_2 in equation (3) is the estimated treatment effect of the reporting mandate on investment for a 100 percent increase in EPR, the estimated effects of a one percentage point increase in *MEPR* (*TEPR*) on *INTGBLINV*, *TGBLINV*, and *TOTALINV* are 0.6 (1.4), 0.03 (0.07), and 0.6 (1.5) percent, respectively. These results imply that the effects on investment spending are stronger among firms with higher increases in EPR.

External Monitoring Channel

In this section, I examine mechanisms underlying the relationship between EPR and investment. The first is an external control channel. Previous research suggests that long-term-oriented reporting attracts long-term investors, and thus makes managers less likely to take myopic decisions (Bushee 1998; Serafeim 2015). I operationalize this notion to examine whether EPR attracts long-term investors, and whether an increase in long-term investors promotes investment. For this test, I follow Bushee and Noe's (2000) method to split institutional investors into three groups: dedicated investors, quasi-indexers, and transient investors. Dedicated investors and quasi-indexers are characterized by long-term holdings; therefore, I use the proportion of shares owned by these two groups to measure long-term investors (*LTINV*). Equations (4) to (6) test the effects of the reporting mandate on investment decisions through the

¹⁷ I examine the mean frequency of EPR metrics in performance reporting for MM and AIM firms pre- and post-mandate. In the pre-mandate period, the mean EPR metrics for MM and AIM are 2.64 and 1.62, respectively. Following the mandate, mean values increase to 6.34 for MM and 2.79 for AIM. While the frequency of EPR metrics increases for both, MM shows a more notable increase of 3.7 EPR metrics compared to 1.15 for AIM. The incremental increase implies significant compliance with the reporting mandate, providing evidence of a notable treatment effect. In an untabulated regression analysis using the number of EPR metrics, I find that the results presented in Table 4 are robust.

external investor-related channel.¹⁸ I perform equation-by-equation 2SLS to estimate the system of equations (4) to (6).¹⁹

$$EPR_{it-1} = \gamma_1 POSTMAIN_{it-1} + \omega'X_{it-1} + FIRM_FE + YEAR_FE + c + \varepsilon_{it} \quad (4)$$

$$LTINV_{it-1} = \gamma_2 EPR_{it-1} + \omega'X_{it-1} + FIRM_FE + YEAR_FE + c + \varepsilon_{it} \quad (5)$$

$$INV_{it} = \gamma_3 LTINV_{it-1} + \omega'X_{it-1} + FIRM_FE + YEAR_FE + c + \varepsilon_{it} \quad (6)$$

Panels A and B of Table 5 report the results of external channel analysis using *MEPR* and *TEPR*, respectively. Both panels show positive and significant associations between *POSTMAIN* and *EPR* (column 1), *EPR* and *LTINV* (column 2), *LTINV* and *INTGBLINV* (column 3), and *LTINV* and *TOTALINV* (column 5). The average treatment effect of the Corporate Governance Code on *MEPR* is 0.101, which matches the result of the first-stage regression (Table 4). The estimated effect of the reporting mandate on the proportion of long-term investors among MM firms with average compliance levels is 0.072 (0.101*0.717).²⁰ The estimated effect of *LTINV* on *INTGBLINV* among MM firms is 0.056 (0.101*0.717*0.775). However, the effects on *TGBLINV* are insignificant. These results suggest that the reporting mandate promotes *EPR* among MM firms, that the increase in *EPR* attracts long-term investors, and that long-term investors promote intangible investments. The external channel does not have a significant effect on tangible investments.

¹⁸ Just as equations (2) and (3) produce a breakdown of treatment effects for equation (1), equations (5) and (6) are used to obtain a breakdown of effects for equation (3), revealing how disclosures impact on long-term investors, and how a change in investors affects investments.

¹⁹ I do not apply 3SLS estimation for two reasons. First, the endogenous variables are determined sequentially in the system of equations (4) to (6), rendering the system recursive. This allows efficient estimation using the equation-by-equation approach (Seneta 2006). Second, the assumption of homoskedasticity in standard errors, a prerequisite for the efficiency of 3SLS (Wooldridge 2010), is unrealistic in the accounting and finance domain.

²⁰ Untabulated analysis reveals that both MM and AIM experience an increase in ownership by long-term investors, with MM experiencing a 4.06 percentage point and AIM a 0.37 percentage point increase. Conversely, ownership by short-term investors decreases by 1.48 percentage points for MM and by 0.36 percentage points for AIM. It appears that more investors adopt long-term investment strategies, rather than long-term investors shifting their investments from AIM to MM firms.

Internal Control Channel

The other channel relates to internal incentives. As firms predict and experience enhanced investor monitoring of long-term value creation following the EPR mandate, they are likely to align their executive compensation systems with EPR disclosures. For example, to encourage management to make longer-term decisions, they rely less on short-term earnings performance for executive compensation. In analyzing the internal channel, I measure pay sensitivity to earnings (*PSE*). I regress total CEO compensation (*COMP*) on total shareholder return (*TSR*) and earnings performance (*REBIT*) to examine associations between compensation and market and accounting performance. I add two interaction terms (*MEPR*×*REBIT* and *MEPR*×*TSR*) to examine the effects of EPR on associations between CEO pay and accounting and market performance.

$$COMP_{it} = \beta_1 TSR_{it} + \beta_2 MEPR_{it} * TSR_{it} + \beta_3 REBIT_{it} + \beta_4 MEPR_{it} * REBIT_{it} + CEO_FE + YEAR_FE + \varepsilon_{it} \quad (7)$$

Table 6 reports the results. As shown in column 1, CEO pay (*COMP*) is positively associated with total shareholder return (*TSR*). In column 2, the positive coefficient of the interaction term between *EPR* and *TSR* (*TSR*×*MEPR*) suggests that the positive association between *TSR* and CEO pay is stronger among firms with higher EPR. This implies that firms with higher EPR use more forward-looking information for CEO pay. In column 3, CEO pay is positively associated with earnings performance. However, this association is weaker among firms with high levels of EPR ($\beta_4 < 0$). This implies that such firms rely less on short-term earnings performance in determining CEO pay. I calculate pay sensitivity to earnings (*PSE*) as $\hat{\beta}_3 + \hat{\beta}_4 MEPR$.

For analysis of the internal channel, I test whether the reporting mandate reduces reliance

on earnings to determine CEO pay (equation 8), and whether the reduction in pay sensitivity to earnings performance (*PSE*) promotes investments (equation 9). Unlike the analysis of the external monitoring channel, this equation system does not include a regression of *EPR* on *POSTMAIN*, as *PSE* is a function of *EPR*. Equation (8) combines two steps: the effects of the reporting mandate on *EPR*, and the effects of *EPR* on pay sensitivity to earnings.

$$PSE_{it-1} = \delta_1 POSTMAIN_{it-1} + \omega' X_{it-1} + FIRM_FE + YEAR_FE + c \quad (8)$$

$$INV_{it} = \delta_2 PSE_{it-1} + \omega' X_{it-1} + FIRM_FE + YEAR_FE + c \quad (9)$$

In column 1 of Table 7, the reporting mandate is negatively associated with pay sensitivity to earnings performance. The estimated average treatment effect of the reporting mandate on *PSE* is -0.125. This suggests that the Corporate Governance Code encourages MM firms to rely less on short-term earnings performance in determining CEO pay, as they align their internal control systems with *EPR*. In column 2, the coefficients of *PSE* are negative and significant. The estimated average treatment effect of the reporting mandate on intangible investments is 0.056 (-0.125*-0.449). These results suggest that the reporting mandate reduces the sensitivity of CEO pay to earnings performance, and that this promotes intangible investments.

V. VALIDITY OF IDENTIFICATION STRATEGY

Addressing Heterogeneity between MM and AIM

Panel B of Table 1 suggests notable differences between MM and AIM in terms of firm characteristics including size, age, and earnings performance. Such differences may introduce time-varying factors that confound the effects of the 2010 reporting mandate. For instance, events like the financial crisis may influence both MM and AIM. However, MM firms may rebound more quickly than AIM firms, possibly owing to their more resilient credit lines and

unobservable factors that influence the two groups differently over time.

To control for such confounding factors arising from heterogeneity between the two groups, I estimate matched-sample DiD using coarsened exact matching (CEM).²¹ This eliminates observations outside the two groups' common support of covariate distributions, and generates weightings that balance the covariates of the remaining observations. Panel A of Table 8 reports mean values for the covariates by group before and after matching. Although the matching procedure drops observations, the distribution of covariates is more balanced after matching. For instance, firm size in the two groups becomes similar after matching, as CEM chooses relatively large AIM firms and relatively small MM firms. Panel B reports the results of DiD regression analysis before and after applying CEM weightings. The results without CEM weightings in columns (1) to (3) are significant, consistent with the results in Table 3. With the CEM weightings (columns (4) to (6)), I observe a slight decrease in the estimated treatment effects on *INTGBLINV* and *TOTALINV*, but an increase in the estimated treatment effect on *TGBLINV*. This implies that potential self-selection in unobservable variables is unlikely to explain the significant results in the main analysis. I further use the matched samples consistently throughout all the tables in the main analysis, including external and internal channel analyses. Untabulated results confirm the robustness of my findings.

As an additional test to address the concern for heterogeneity, I create alternative treatment and control groups within MM firms, rather than using AIM firms as a control.

²¹ I do not use the entropy balancing algorithm as it struggles to identify reliable weights in my sample. This suggests substantial heterogeneity between MM and AIM, evidenced by limited distributional overlaps in at least one covariate (McMullin and Schonberger 2022). I therefore use CEM, which eliminates observations lacking appropriate counterfactuals (Iacus, King, and Porro 2012). However, a disadvantage is the potential for a significant reduction in the number of observations. In addition, the CEM sample may not fully represent the population of each group. For example, CEM may select large and financially more established AIM firms, making them more comparable with MM firms, but the selected AIM firms may not be representative of the entire AIM category. Nevertheless, the CEM method serves a valuable purpose by addressing heterogeneity concerns.

Following Byard, Li, and Yu's (2011) approach of using voluntary adopters prior to the introduction of reporting regulations as a control group, I select MM firms with lower (higher) levels of EPR in the pre-treatment period as a treatment (control) group. I calculate the mean of EPR in the pre-treatment period and use the median value of EPR to split MM firms into two groups. Untabulated results confirm the robustness of my findings.

Mapping Counterfactual Treatment Effects

Inferences from the DiD approach also rely on a critical assumption that trends in the investments and EPR of MM and AIM firms would be parallel in the absence of the reporting mandate. However, this assumption may not hold owing to the systematic differences between MM and AIM mentioned in the third part of Section III. Therefore, I examine whether the two groups' investment and EPR trends are parallel in the pre-treatment period. Following Pischke (2005), I map counterfactual treatment effects over the sample period, using the difference between the two groups' investments in the last year of the pre-treatment period (fiscal year-end 2010) as a benchmark. I replace the single post-treatment variable (*POSTTRT*) with multiple interactions between the treatment group indicator and year indicators in the regression model. I exclude the indicator for the last year of the pre-treatment period for use as a benchmark. If the parallel trend assumption holds, treatment effects in the pre-treatment period will be zero. In Figure 1, the circle points indicate the estimated counterfactual treatment effects, which reflect deviation of MM from AIM after controlling for the pre-existing difference in the benchmark year. The estimated counterfactual treatment effects on *TNGBLINV*, *INTNGBLINV*, *TOTALINV*, *TEPR*, and *MEPR* are all insignificant in the pre-treatment period. This test supports the assumption of parallel trends in investments and EPR disclosures. The estimated effects in the post-treatment period confirm significant treatment effects on each variable. The effects on

investments are relatively weak in the first year of treatment, which implies delayed effects of EPR on investment spending.

VI. ADDITIONAL ANALYSES

Overinvestment

Increased investment does not imply better decision making if it leads to overinvestment. As a robustness test, I examine whether the effects of the 2010 reporting mandate on investments are significant among firms with a higher likelihood of overinvesting. Following previous research, I identify firms with high cash and low Tobin's Q as those likely to overinvest (Cheng, Dhaliwal, and Zhang 2013; Chen, Xie, and Zhang 2017), and test the effects on this group. I generate two decile ranks of cash balance and negative Tobin's Q, and take the average of the two. Firms above the top 33 (or 50) percent of this score are considered to be overinvestment candidates. Untabulated results show insignificant treatment effects on the investment spending of overinvestment-likely firms. This suggests that the effects of the reporting mandate on investments estimated in the main analysis do not represent overinvestment.

Earnings Management

My primary results indicate that the disclosure mandate may promote long-term thinking and curb myopic decision making owing to improvements in external monitoring and internal control. To gain further insight into changes in managerial myopia around the disclosure mandate, I examine managers' behavior relating to traditional earnings-focused performance reporting, and particularly earnings management around the disclosure mandate. I use three measures of earnings management: meeting or beating analysts' forecasts by three percent or less (*MB*), discretionary accruals (*DA*) as implemented in Kothari, Leone, and Wasley (2005), and real-earnings management (*RM*) as implemented in Cohen and Zarowin (2010). Untabulated

results show that the reporting mandate reduces accruals management and real-earnings management. These results support regulators' belief that discussing strategies for long-term value creation is an effective way to encourage long-term thinking and curb myopia.

Rationale for Reporting Mandate

As firms may benefit from voluntary disclosures of strategic information (Merkley 2014; Whittington et al. 2016), identifying market friction is important to justify the reporting mandate. Gigler et al. (2014) show that future shareholders risk making adverse selections when managerial incentives are aligned with those of current shareholders. Under such circumstances, current shareholders and managers prefer to generate quick returns at the expense of future shareholder value. Moreover, short-term-oriented managerial incentives deter voluntary disclosures of long-term value creation. Therefore, mandated EPR may help to mitigate the friction. This suggests that the effects are more significant among firms with this friction. Untabulated results show that the effects of the reporting mandate on investments are driven by firms experiencing greater reductions in market friction (greater reductions in transient investors and pay sensitivity to earnings) following the introduction of the reporting mandate.

Impact of the 2008 Financial Crisis

My sample period covers the period following the 2008 financial crisis. The crisis may have generated a bias blurring the investment-promoting effects of the reporting mandate, as it restricted financing opportunities and led to a declining trend in corporate investments. The DiD research design mitigates these confounding effects because the crisis affected both MM and AIM. Nevertheless, it is essential to address a remaining concern about the differing effects of the 2008 financial crisis on MM and AIM. For example, the crisis may have had more impact on the financial constraints of AIM than MM firms. Therefore, I conduct a subsample analysis

controlling for financial constraints. Following Rajan and Zingales (1998), I measure firm-level financial constraints as of 2008, and define firms in the top tercile of the RZ measure as financially constrained. Untabulated results of DiD analysis using the sample of unconstrained firms show similar estimated treatment effects. This analysis indicates that cross-sectional variation in the effects of the reporting mandate based on financial constraints is insignificant.

Other Provisions of the Corporate Governance Code

The 2008 financial crisis may have affected the governance of larger firms more significantly than other firms, as high-profile firms have greater social and economic impacts. Consistent with this notion, the Corporate Governance Code 2010 points to governance failures during the financial crisis. In addition to the reporting requirement relating to business models and strategy, it includes two governance-related requirements that apply exclusively to FTSE 350 firms, which are a subset of large MM firms. The additional requirements are annual re-election of directors (provision B.6.2) and triennial evaluation of board effectiveness (provision B.7.1). As these may improve corporate governance and affect managerial decision making, I split MM firms into two groups (FTSE 350 and non-FTSE 350) and compare the treatment effects of the two samples. Untabulated results show that the treatment effects are greater on non-FTSE 350 firms than on FTSE 350 firms.

Missing R&D

The reporting mandate may induce MM firms that did not previously disclose their R&D expenditure to start doing so. As I replace missing R&D with zero, the significant increase in intangible investments after the reporting mandate may be driven by firms starting to disclose their R&D expenditure only after the mandate. To rule out this alternative explanation, I test the effects of the reporting mandate on investments in intangible assets, which must be disclosed. I

also test the effects of the reporting mandate by excluding firms that never disclosed their investments in the pre-treatment period. Untabulated results, which exclude six MM and nine AIM non-disclosing firms, confirm that the treatment effects are robust. Therefore, the results in the main analysis are unlikely to be driven by firms starting to disclose investment information only after the introduction of the reporting mandate.

Alternative Measure of EPR

Since the EPR classification involves a level of subjectivity, I examine the robustness of the test results to various topic and performance metric classifications. Three independent readers evaluated the topics and metrics in my sample, identifying items they found to be ambiguous in terms of EPR classification. I then defined two alternative *MEPR* measures and two alternative *TEPR* measures, reclassifying these ambiguous items based on the readers' alternative classifications, to test the robustness of my results.

For the alternative *MEPR* measures, I reclassify two sets of ambiguous performance metrics. The first set of metrics with which the reviewers did not fully agree includes specific types of financial measures, such as new brand sales, sales per employee, and R&D expenditure. While I consider these metrics to be EPR because they naturally align with the idea of EPR (i.e., operational and strategic aspects of value creation), they are closely related to current earnings results. Therefore, I generate an alternative *MEPR* proxy that computes the proportion of non-financial performance measures following the standard financial versus non-financial dichotomy. The other set of debatable measures is CSR-related metrics. Although CSR is value-relevant in the long run (Clarkson, Fang, Li, and Richardson 2013; Jain, Jain, and Rezaee 2016), it is often remote from firms' main business operations and strategies. Therefore, I generate an alternative *MEPR* proxy that excludes measures such as carbon emissions, water usage, employee diversity,

and other CSR-related factors from EPR. Untabulated results confirm that my inference is robust to alternative definitions of *MEPR*.

I follow a similar approach to construct two alternative *TEPR* measures. The first excludes the “Health, Safety, Environment” topic from the main *TEPR* measure for the aforementioned reason. The other proxy is the proportion of the “Strategy” topic. As *TEPR* in the main analysis includes industry-specific topics, such as oil and gas, mining, and healthcare, the analysis is potentially subject to industry biases. Therefore, I calculate the proportion of the “Strategy” topic as an alternative *TEPR* measure because, relative to other topics, it contains keywords describing strategies in general, rather than industry-specific keywords. Using these alternative EPR measures, I conduct the instrumented DiD test. Untabulated results show that the significance levels of the coefficients of the two alternative *TEPR* measures remain similar to those in Table 4.

VII. CONCLUSION

This research examines whether requiring firms to articulate their approach to long-term value creation promotes corporate investments. Using the research setting of the UK’s Corporate Governance Code 2010, I document that this reporting mandate induces firms to adopt EPR, evidenced by more performance measures and narratives relating to business operations and strategies in annual reports. My channel analysis suggests that greater focus on operational and strategic aspects of value creation in performance reporting promotes intangible investments, since EPR attracts long-term investors and reduces pay sensitivity to short-term earnings.

The results are subject to important limitations. First, this study relies on an assumption of parallel trends between AIM and MM. Although I test the validity of this assumption using counterfactual treatment effects, these may not rule out all confounding effects arising from

heterogeneity between the two groups. Second, while I attempt to control for the confounding effects of other economic events, such as the financial crisis and other provisions of the Corporate Governance Code, I cannot definitively rule out all confounding factors generated by unidentified events. Third, I use a relatively small sample owing to the manual data collection process and validity checking of unique words for textual analysis. Therefore, my sample may be unrepresentative of the population. However, this narrow focus allows the examination of the path from a regulatory change through disclosure outcomes to economic outcomes. Lastly, this study does not directly address the question of whether promoting investment leads to better long-term performance. Testing long-term performance may introduce confounding events and give rise to intractable endogeneity issues. Instead, through a subsample analysis, I show that the additional investment is unlikely to represent overinvestment.

Despite these limitations, my study extends current understanding of the effects of disclosing operational and strategic information. Regulators and practitioners promote EPR in the belief that it supports internal decisions (IIRC 2013; FRC 2010; European Commission 2017). However, evidence supporting the real effects and the channels through which they operate is lacking from the literature (Leuz and Wysocki 2016; Barth et al. 2020). I use a disclosure innovation in the UK to produce novel evidence of the link between external reporting systems and internal incentive systems. This evidence responds to Leuz and Wysocki's (2016) appeal for further research on disclosure in countries outside the US, nontraditional disclosure, and the real effects of reporting mandates. My work also contributes to the literature on managerial myopia. In a departure from recent studies producing mixed results on the effects of reporting frequency (Nallareddy et al. 2017; Kajüter et al. 2019; Fu et al. 2020; Arif and De George 2020), my paper offers a new perspective in showing that disclosures focusing on

process aspects of value creation may curb myopic behaviors and catalyze sustainable value creation. Overall, my evidence provides useful insights for practitioners and regulators.

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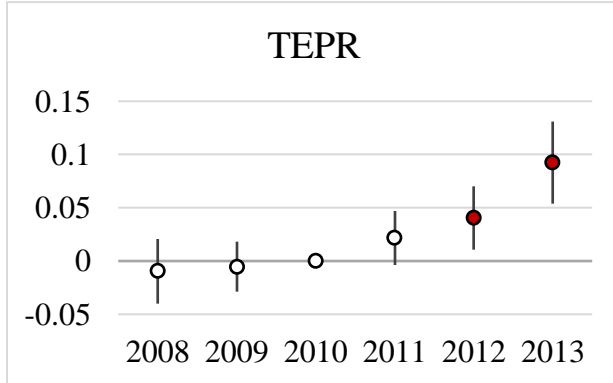
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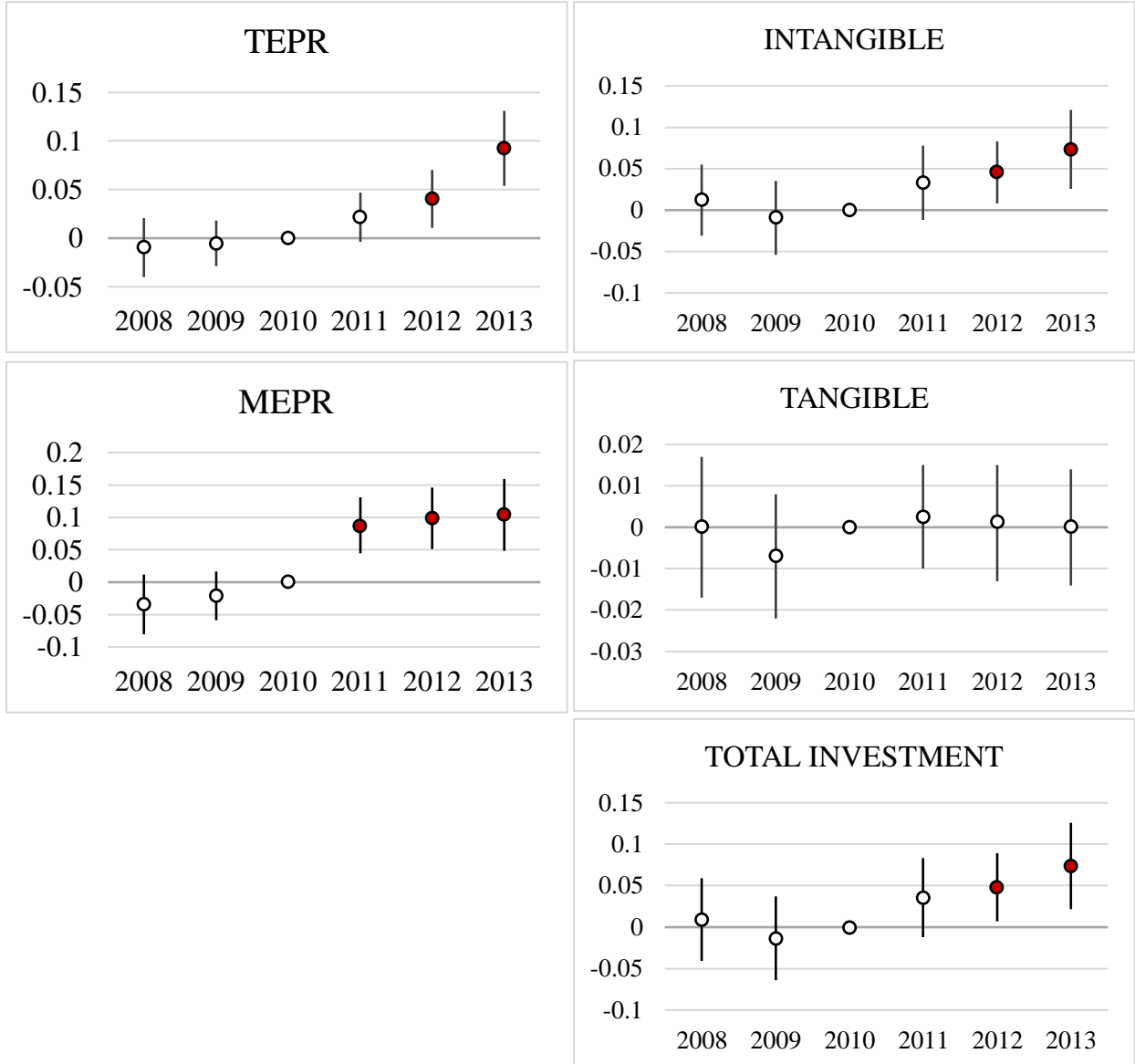
FIGURES AND TABLES

Figure 1. Parallel Trends Test

Panel A. EPR Variables



Panel B. Investment Variables



This figure reports the results of a parallel trends test, mapping counterfactual treatment effects over the sample period. I replace the single post-treatment indicator of standard DiD with year-treatment indicators, while excluding the benchmark year 2010, which is the last year of the pre-treatment period. The estimated effects of year 2010 are constrained to zero. Dot points are the estimated treatment effect of each year, colored red if significant. The vertical lines are two-tailed 90% confidence intervals for the estimated treatment effects.

TABLE 1
Sample Selection and Descriptive Statistics

Panel A. Sample Selection

	Firms	Firm-years
Observations for the sample period, fiscal years 2008 to 2013	2,055	8,555
(-) Missing variables	(583)	(2,226)
(-) Unbalanced panel	(649)	(1,591)
(-) Random sampling	(623)	(3,538)
Observations for tests	200	1,200

Panel B. Descriptive Statistics

	N	5%	25%	Mean	Med	75%	95%	SD
<i>INTGBLINV</i>	1,200	-0.055	0.000	0.057	0.009	0.059	0.360	0.167
<i>TGBLINV</i>	1,200	0.000	0.009	0.045	0.024	0.055	0.167	0.061
<i>TOTALINV</i>	1,200	-0.029	0.018	0.104	0.057	0.136	0.446	0.183
<i>MEPR</i>	1,200	0.000	0.083	0.242	0.200	0.364	0.620	0.214
<i>TEPR</i>	1,200	0.424	0.591	0.693	0.689	0.807	0.956	0.157
<i>LTINV</i>	1,200	0.011	0.165	0.416	0.410	0.663	0.849	0.274
<i>PSE</i>	1,200	0.129	0.353	0.462	0.504	0.604	0.676	0.188
<i>SIZE</i>	1,200	7.885	9.976	11.814	11.814	13.579	16.211	2.462
<i>Q</i>	1,200	0.558	1.054	2.687	1.687	2.842	7.357	3.733
<i>LEV</i>	1,200	0.000	0.002	0.180	0.131	0.270	0.561	0.208
<i>CASH</i>	1,200	0.005	0.034	0.143	0.077	0.180	0.517	0.170
<i>LOSS</i>	1,200	0.000	0.000	0.270	0.000	1.000	1.000	0.444
<i>AGE</i>	1,200	3.000	6.000	12.037	12.000	18.000	22.000	6.542
<i>RAISE</i>	1,200	0.000	0.000	0.691	1.000	1.000	1.000	0.462
<i>EBIT</i>	1,200	-0.548	-0.017	-0.004	0.074	0.127	0.243	0.313

Panel C. Descriptive Statistics by Sample

	MM				AIM			
	N	Mean	Med	SD	N	Mean	Med	SD
<i>INTGBLINV</i>	600	0.039	0.006	0.110	600	0.075	0.014	0.208
<i>TGBLINV</i>	600	0.051	0.033	0.055	600	0.039	0.015	0.067
<i>TOTALINV</i>	600	0.091	0.060	0.121	600	0.117	0.051	0.228
<i>MEPR</i>	600	0.261	0.245	0.176	600	0.223	0.167	0.246
<i>TEPR</i>	600	0.640	0.646	0.126	600	0.746	0.760	0.167
<i>LTINV</i>	600	0.594	0.640	0.214	600	0.237	0.190	0.202
<i>PSE</i>	600	0.440	0.461	0.159	600	0.485	0.533	0.212
<i>SIZE</i>	600	13.757	13.569	1.545	600	9.871	9.976	1.476
<i>Q</i>	600	2.229	1.841	1.681	600	3.146	1.543	4.965
<i>LEV</i>	600	0.223	0.200	0.187	600	0.138	0.039	0.219
<i>CASH</i>	600	0.086	0.059	0.089	600	0.199	0.131	0.208
<i>LOSS</i>	600	0.083	0.000	0.277	600	0.457	0.000	0.499
<i>AGE</i>	600	15.202	17.000	6.267	600	8.872	7.500	5.131
<i>RAISE</i>	600	0.747	1.000	0.435	600	0.635	1.000	0.482
<i>EBIT</i>	600	0.104	0.100	0.086	600	-0.113	0.018	0.407

This table provides summary statistics for the main and control variables in the multivariate analysis. Continuous variables are winsorized at the 1% and 99% levels. Definitions of all variables are given in Appendix A.

TABLE 2
Validity of EPR

Panel A. Determinants of EPR

	<i>MEPR</i> (1)	<i>TEPR</i> (2)
<i>Q</i>	0.003 (0.849)	0.005 ** (2.475)
<i>SIZE</i>	0.029 *** (4.916)	-0.010 ** (-2.418)
<i>LEV</i>	-0.121 *** (-2.688)	-0.075 * (-1.942)
<i>CASH</i>	-0.031 (-0.515)	0.065 (1.762)
<i>LOSS</i>	0.122 *** (4.556)	0.049 ** (2.590)
<i>AGE</i>	-0.003 (-1.439)	-0.003 ** (-2.383)
<i>RAISE</i>	0.007 (0.420)	-0.008 (-0.658)
<i>EBIT</i>	-0.008 (-0.227)	0.009 (0.311)
Observations	1,200	1,200
Adjusted R ²	0.096	0.180

Panel B. EPR and Near-Term Performance

	<i>EBIT_{t+1}</i> (1)	<i>EBIT_{t+1}</i> (2)
<i>MEPR</i>	-0.021 (-0.305)	
<i>TEPR</i>		-0.121 * (-1.693)
<i>Q</i>	-0.007 (-1.268)	-0.006 (-1.128)
<i>SIZE</i>	0.028 *** (4.247)	0.026 *** (3.659)
<i>LEV</i>	-0.175 (-1.418)	-0.181 (-1.472)
<i>CASH</i>	-0.369 *** (-2.789)	-0.359 *** (-2.732)
<i>LOSS</i>	-0.225 (-6.079)	-0.222 (-6.857)
<i>AGE</i>	0.002 (1.622)	0.002 (1.464)
<i>RAISE</i>	-0.061 *** (-2.601)	-0.061 ** (-2.671)
Observations	1,200	1,200
Adjusted R ²	0.337	0.339

This table reports analysis of the determinants of *MEPR* and *TEPR* and the association between EPR and near-term earnings performance (*EBIT_{t+1}*). All regressions include the following variables: *SIZE*, *LEV*, *CASH*, *LOSS*, *Q*, *AGE*, and *RAISE*. Z-statistics, shown in parentheses, are based on robust standard errors clustered at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

TABLE 3
Standard Difference-in-Differences

	<i>INTGBLINV</i>	<i>TGBLINV</i>	<i>TOTALINV</i>
	(1)	(2)	(3)
<i>POSTMAIN</i>	0.056 *** (3.592)	0.003 (0.442)	0.060 *** (3.464)
<i>Q</i>	0.007 (1.610)	0.001 (1.146)	0.010 * (1.899)
<i>SIZE</i>	-0.073 *** (-3.624)	-0.010 ** (-1.964)	-0.094 *** (-4.186)
<i>LEV</i>	-0.020 (-0.270)	-0.030 (-1.470)	-0.050 (-0.591)
<i>CASH</i>	0.029 (0.428)	0.022 (1.266)	0.025 (0.341)
<i>LOSS</i>	-0.027 (-1.285)	0.005 (0.723)	-0.024 (-0.996)
<i>AGE</i>	-0.009 (-1.423)	-0.016 *** (-3.744)	-0.025 *** (-4.167)
<i>RAISE</i>	0.021 ** (2.036)	0.013 *** (2.652)	0.032 ** (2.369)
<i>EBIT</i>	-0.107 * (-1.869)	-0.004 (-0.251)	-0.113 * (-1.673)
<i>Intercept</i>	1.036 *** (5.434)	0.216 *** (4.033)	1.354 *** (6.320)
Firm Fix	YES	YES	YES
Year Fix	YES	YES	YES
Observations	1,200	1,200	1,200
Adjusted R ²	0.389	0.566	0.397

This table reports analysis of the effect of the Corporate Governance Code (2010) on intangible investments (*INTGBLINV*), tangible investments (*TGBLINV*), and the sum of tangible and intangible investments (*TOTALINV*). *POSTMAIN* is an interaction between an indicator for the post-treatment period (*POST*) and an indicator for the treatment group (*MAIN*). All regressions include the following control variables: *SIZE*, *LEV*, *CASH*, *LOSS*, *Q*, *AGE*, *RAISE*, and *EBIT*. Z-statistics, shown in parentheses, are based on robust standard errors clustered at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

TABLE 4
Instrumented Difference-in-Differences

<i>Panel A. Effects of the Code on MEPR (1st Stage) and Investments (2nd Stage)</i>				
Stage	1st <i>MEPR</i> (1)	2nd <i>INTGBLINV</i> (2)	2nd <i>TGBLINV</i> (3)	2nd <i>TOTALINV</i> (4)
<i>POSTMAIN</i>	0.101 *** (5.653)			
<i>MEPR</i>		0.555 *** (3.134)	0.028 (0.445)	0.597 *** (3.088)
Control	YES	YES	YES	YES
Firm Fix	YES	YES	YES	YES
Year Fix	YES	YES	YES	YES
Observations	1,200	1,200	1,200	1,200
Adjusted R ²	0.634			
Chi ²		176.177	54.409	151.523
P > Chi ²		0.000	0.000	0.000
<i>Panel B. Effects of the Code on TEPR (1st Stage) and Investments (2nd Stage)</i>				
Stage	1st <i>TEPR</i> (1)	2nd <i>INTGBLINV</i> (2)	2nd <i>TGBLINV</i> (3)	2nd <i>TOTALINV</i> (4)
<i>POSTMAIN</i>	0.040 *** (3.015)			
<i>TEPR</i>		1.406 ** (2.349)	0.070 (0.440)	1.511 ** (3.134)
Control	YES	YES	YES	YES
Firm Fix	YES	YES	YES	YES
Year Fix	YES	YES	YES	YES
Observations	1,200	1,200	1,200	1,200
Adjusted R ²	0.758			
Chi ²		165.683	54.210	141.488
P > Chi ²		0.000	0.000	0.000

This table reports analysis of the effect of the Corporate Governance Code (2010) on investments in tangible and intangible capital (*INTGBLINV*, *TGBLINV*, and *TOTALINV*) through enhanced performance reporting. Panel A (B) shows the effects of the reporting mandate on *MEPR* (*TEPR*) and the effects of EPR on investments. *POSTMAIN* is an interaction between an indicator for the post-treatment period (*POST*) and an indicator for the treatment group (*MAIN*). *MEPR* is the proportion of performance measures other than earnings and variants of earnings. *TEPR* is the proportion of themes in annual reports that describe operational and strategic aspects of value creation. All regressions include the following control variables: *SIZE*, *LEV*, *CASH*, *LOSS*, *Q*, *EBIT*, *AGE*, and *RAISE*. Z-statistics, shown in parentheses, are based on robust standard errors clustered at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

TABLE 5
External Channel Analysis

<i>Panel A. Effects of the Code on Investor Pool and Investments (MEPR)</i>					
Stage	1st <i>MEPR</i> (1)	2nd <i>LTINV</i> (2)	3rd <i>INTGBLINV</i> (3)	3rd <i>TGBLINV</i> (4)	3rd <i>TOTALINV</i> (5)
<i>POSTMAIN</i>	0.101 *** (5.653)				
<i>MEPR</i>		0.717 *** (3.702)			
<i>LTINV</i>			0.775 *** (2.940)	0.039 (0.442)	0.832 *** (2.887)
Control	YES	YES	YES	YES	YES
Firm Fix	YES	YES	YES	YES	YES
Year Fix	YES	YES	YES	YES	YES
Observations	1,200	1,200	1,200	1,200	1,200
Adjusted R ²	0.634				
Chi ²		225.099	155.843	192.004	174.962
P > Chi ²		0.000	0.000	0.000	0.000
<i>Panel B. Effects of the Code on Investor Pool and Investments (TEPR)</i>					
Stage	1st <i>TEPR</i> (1)	2nd <i>LTINV</i> (2)	3rd <i>INTGBLINV</i> (3)	3rd <i>TGBLINV</i> (4)	3rd <i>TOTALINV</i> (5)
<i>POSTMAIN</i>	0.040 *** (3.015)				
<i>TEPR</i>		1.815 *** (2.613)			
<i>LTINV</i>			0.775 *** (2.940)	0.039 (0.442)	0.832 *** (2.887)
Control	YES	YES	YES	YES	YES
Firm Fix	YES	YES	YES	YES	YES
Year Fix	YES	YES	YES	YES	YES
Observations	1,200	1,200	1,200	1,200	1,200
Adjusted R ²	0.758				
Chi ²		95.073	155.843	192.004	174.962
P > Chi ²		0.000	0.000	0.000	0.000

This table reports analysis of the effect of the Corporate Governance Code (2010) on investments in tangible and intangible capital (*INTGBLINV*, *TGBLINV*, and *TOTALINV*) through external monitoring of investors (*LTINV*). Panel A (B) shows the effects of the reporting mandate on *MEPR* (*TEPR*), the effects of the increase in *MEPR* (*TEPR*) on the proportion of long-term investors *LTINV*, and the effects of the increase in long-term investors on investments. *POSTMAIN* is an interaction between an indicator for the post-treatment period (*POST*) and an indicator for the treatment group (*MAIN*). *MEPR* is the proportion of performance measures other than earnings and variants of earnings. *TEPR* is the proportion of themes in annual reports that describe operational and strategic aspects of value creation. *LTINV* represents the proportion of quasi-indexers and dedicated investors based on Bushee and Noe's (2000) investment-style classification. All regressions include the following control variables: *SIZE*, *LEV*, *CASH*, *LOSS*, *Q*, *AGE*, *EBIT*, and *RAISE*. Z-statistics, shown in parentheses, are based on robust standard errors clustered at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

TABLE 6
Pay Sensitivity to Earnings (PSE)

	<i>COMP</i>				
	(1)	(2)	(3)	(4)	(5)
<i>TSR</i>	0.148 *** (3.510)	0.046 (0.817)			0.039 (0.700)
<i>TSR*MEPR</i>		0.407 * (1.775)			0.416 * (1.676)
<i>REBIT</i> (β_3)			0.003 * (1.701)	0.008 *** (2.779)	0.008 *** (2.787)
<i>REBIT*MEPR</i> (β_4)				-0.013 *** (-2.641)	-0.012 *** (-2.605)
<i>MEPR</i>		-0.305 (-1.151)		-0.159 (-0.608)	-0.186 (-0.714)
Control	YES	YES	YES	YES	YES
CEO Fix	YES	YES	YES	YES	YES
Year Fix	YES	YES	YES	YES	YES
Observations	1,200	1,200	1,200	1,200	1,200
Adjusted R ²	0.828	0.829	0.828	0.829	0.831

This table reports analysis of pay sensitivity to earnings performance. The outcome variable is the natural log of CEO compensation (*COMP*). *TSR* is the one-year shareholder return, and *REBIT* is raw earnings before interest and tax divided by 1,000. *TSR* and *EBIT* are interacted with *MEPR*. This analysis includes CEO fixed effects, rather than firm-fixed effects. All regressions include the following control variables: *SIZE*, *LEV*, and *LOSS*. Z-statistics, shown in parentheses, are based on robust standard errors clustered at the CEO level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

TABLE 7
Internal Channel Analysis

Stage	1st <i>PSE</i> (1)	2nd <i>INTGBLINV</i> (2)	2nd <i>TGBLINV</i> (3)	2nd <i>TOTALINV</i> (4)
<i>POSTMAIN</i>	-0.125*** (-5.653)			
<i>PSE</i>		-0.449*** (-3.134)	-0.022 (-0.445)	-0.482*** (-3.088)
Control	YES	YES	YES	YES
Firm Fix	YES	YES	YES	YES
Year Fix	YES	YES	YES	YES
Observations	1,200	1,200	1,200	1,200
Adjusted R ²	0.634			
Chi ²		163.167	55.587	157.021
P > Chi ²		0.000	0.000	0.000

This table reports analysis of the effects of the Corporate Governance Code (2010) on pay sensitivity to earnings (*PSE*) and subsequent effects on tangible and intangible investments (*INTGBLINV*, *TGBLINV* and *TOTALINV*). *PSE* is calculated as $\beta_3 + \beta_4$ *EPR* from Table 6. As *PSE* reflects *EPR*, this analysis does not include a regression for the effect of the reporting mandate on *EPR*. All regressions include the following control variables: *SIZE*, *LEV*, *CASH*, *LOSS*, *Q*, *AGE*, *EBIT*, and *RAISE*. Z-statistics, shown in parentheses, are based on robust standard errors clustered at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

TABLE 8
Matching Analysis

Panel A. Covariate Balance Before and After Matching

	Before Matching			After Matching		
	MM (1)	AIM (2)	Difference (3)	MM (4)	AIM (5)	Difference (6)
<i>SIZE</i>	13.741	9.801	3.940***	12.830	11.669	1.161
<i>Q</i>	2.266	3.165	-0.899***	1.938	1.806	0.132
<i>LEV</i>	0.241	0.153	0.089***	0.165	0.169	-0.005
<i>CASH</i>	0.092	0.200	-0.108***	0.101	0.104	-0.003
<i>LOSS</i>	0.097	0.467	-0.370***	0.133	0.170	-0.037
<i>AGE</i>	14.723	8.371	6.352***	12.350	11.730	0.620
<i>RAISE</i>	0.763	0.607	0.157***	0.783	0.545	0.239
<i>EBIT</i>	0.105	-0.126	0.231***	0.079	0.053	0.025
Observations	600	600		120	156	

Panel B. Matched Sample DiD

	Without CEM weightings			With CEM weightings		
	<i>INTGBLINV</i> (1)	<i>TGBLINV</i> (2)	<i>TOTALINV</i> (3)	<i>INTGBLINV</i> (4)	<i>TGBLINV</i> (5)	<i>TOTALINV</i> (6)
<i>POSTMAIN</i>	0.095*** (3.233)	0.001 (0.085)	0.093*** (3.244)	0.091* (1.880)	0.011 (1.194)	0.097** (2.208)
Control	YES	YES	YES	YES	YES	YES
Firm Fix	YES	YES	YES	YES	YES	YES
Year Fix	YES	YES	YES	YES	YES	YES
Observations	276	276	276	276	276	276
Adjusted R ²	0.173	0.139	0.191	0.218	0.289	0.264

This table reports the results of a matching analysis. Panel A reports the covariate balance between MM and AIM before and after coarsened exact matching, which eliminates observations outside the common support of the two groups' covariate distribution, and calculates weightings that balance the covariates of the remaining observations. Panel B reports the effect of the Corporate Governance Code (2010) on *INTGBLINV*, *TGBLINV*, and *TOTALINV* using standard DiD regression. *POSTMAIN* is an interaction between an indicator for the post-treatment period (*POST*) and an indicator for the treatment group (*MAIN*). All regressions include the following control variables: *SIZE*, *LEV*, *CASH*, *LOSS*, *Q*, *AGE*, *EBIT*, and *RAISE*. Z-statistics, shown in parentheses, are based on robust standard errors clustered at the firm level. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

APPENDIX A
DEFINITIONS OF VARIABLES

Variable	Definition
Investments	
<i>INTGBLINV</i>	Sum of R&D expenditure and change in net intangible assets, including capitalized R&D costs, patents and brands, licenses, computer software, and other intangible assets, scaled by lagged total assets
<i>TGBLINV</i>	Investment in property, plant, and equipment, scaled by lagged total assets
<i>TOTALINV</i>	Sum of <i>INTGBLINV</i> and <i>TGBLINV</i>
Enhanced Performance Reporting	
<i>MEPR</i>	Measure of enhanced performance reporting, calculated as the number of non-financial measures, financial ratios, investments, and granular financial measures, divided by the number of all performance measures
<i>TEPR</i>	Measure of enhanced performance reporting, calculated as the proportion of topics relevant to business operations and strategy as opposed to earnings results (see Appendix C for topic word lists)
Treatment Variable	
<i>POST</i>	An indicator variable that equals one if the fiscal year begins on or after June 29, 2010
<i>MAIN</i>	An indicator variable that equals one if the firm is in the Main Market of the London Stock Exchange (LSE)
<i>POSTMAIN</i>	An interaction term between <i>POST</i> and <i>MAIN</i>
Additional Variables for External Channel Analysis	
<i>LTINV</i>	Institutional ownership by quasi-indexers and dedicated investors, based on Bushee and Noe's (2000) approach. Four measures of portfolio turnover and four measures of institutional investors' ownership are reduced to two factors (factor analysis), and institution-years are split into one of three groups (transient investor, quasi-indexer, and dedicated investor) based on the two factors (three-mean cluster analysis).
Additional Variables for Internal Channel Analysis	
<i>COMP</i>	Total CEO compensation from BoardEx. In the case of co-CEOs, the highest compensation is used.
<i>TSR</i>	One-year shareholder returns, assuming reinvestment of dividends within the window from the previous to current fiscal year-ends
<i>REBIT</i>	Earnings before interest and taxes divided by 1,000
<i>PSE</i>	Pay sensitivity to earnings, calculated as $\beta_3 + \beta_4$ <i>MEPR</i> of regression results from column (5) of Table 6
Control Variables	
<i>SIZE</i>	Natural logarithm of total assets
<i>Q</i>	Tobin's Q as (market value of equity + total debt) / total assets
<i>LEV</i>	Ratio of total debt to total assets
<i>CASH</i>	Cash and cash equivalents, scaled by total assets
<i>LOSS</i>	An indicator of loss
<i>AGE</i>	Firm's age, approximated by the number of years listed on the LSE
<i>EBIT</i>	Earnings before interest and taxes divided by total assets
<i>RAISE</i>	An indicator of equity issue

APPENDIX B EXAMPLE OF EPR

The following narrative is a summary of business strategy from the 2011 annual report of Optos, a medical technology company engaged in the design, development, manufacturing, and marketing of retinal imaging devices.

Business review: Operating review

Delivering our strategy

Optos has a clear vision: to be the retina company

Overview

Business review

Governance

Financial statements

Strategic aims	How we measure it	What happened in 2011	2012 objectives	Strategic context
<p>Expand customer segments</p> <p>through keeping a clear focus on the needs of our optometry customers, delivering the products our ophthalmology customers require, and continuing to deliver compelling clinical evidence</p>	Total installed base for core imaging device	<ul style="list-style-type: none"> Installed base increased by 5% to 4240 Launched Optos Ophthalmology Built specialist North America Vit-Ret team Increased ophthalmology customer base to >400 	<ul style="list-style-type: none"> Maximise the benefits of the Opto Global acquisition Effectively integrate the OCT and ultrasound business: <ul style="list-style-type: none"> maintain sales through distributors; maximise sales in direct markets; deliver Falcon 1 and 2 before end 2012; and deliver integrated device allowing OCT scanning in the widefield. 	<p>Marketplace and industry overview</p> <p>The importance of eyecare increases daily. Somewhere in the world, someone goes blind every five seconds and a child goes blind every minute. Worldwide it is estimated that 7 million people lose their vision every year and that 180 million people are blind or visually impaired. Rates of vision loss are expected to double by 2020 unless prevention efforts are intensified.</p> <p>Leading causes of vision loss include cataracts, glaucoma and age related macular degeneration ("AMD"). AMD is the leading cause of blindness in people over the age of 55. Diabetic retinopathy is the leading cause of preventable blindness in the world.</p> <p>The economic and social impact of loss of sight is significant, the global cost of vision loss is estimated to be nearly \$3tn yearly.</p> <p>Optometrists offer primary specialist care for eyes, generally treating healthy patients, checking for eye disease and managing certain diseases. Much of the optometrists' income is patient pay, although some reimbursement is available for certain disease treatments and through some eyecare insurance products. Ophthalmologists provide secondary and tertiary care for eyes, generally treating patients with disease, with much of their patients gaining insurance or health system reimbursement for the treatments offered.</p> <p>Whilst the economic climate internationally is unstable, within Optos' markets and sectors eyecare specialists remain attractive customers. Reimbursement rates will always come under pressure and Optos intends to respond by delivering increasingly useful services and improved product pricing where possible.</p>
<p>Leverage our sales channels</p> <p>by adding additional products and business models, and ensuring our sales force understands the clinical needs of our customers and provides them with the best service and support</p>	Average number of monthly optomaps * per rental site Revenue by type	<ul style="list-style-type: none"> Average optomaps per rental site up 2 to 112 Outright device sales increased by \$29.5m to \$37.6m 200Tx and OptosAdvance launched Opto Global and OPKO acquisitions brought additional products Significant numbers of clinical studies and papers completed 	<ul style="list-style-type: none"> Deliver Daytona on schedule and maximise sales: <ul style="list-style-type: none"> Phase 1 (0-9 months): launch in US, Canada, Germany, UK, Scandinavia, Benelux, Spain, Switzerland, Austria; Phase 2 (9-18 months): launch in Australia, India, South Africa, Turkey, other EU countries, Middle East; and Phase 3 (18+ months): launch Japan, China, Korea, Brazil, rest of world. 	
<p>Grow our global reach</p> <p>through actively seeking opportunities to establish distribution and direct channels in other important global markets</p>	Revenue by geographic segment	<ul style="list-style-type: none"> International sales increased by 103% to \$26.2m Distributor network enhanced both directly and through Opto Global and OPKO acquisitions Direct sales presence expanded into new territories including Benelux and Australia 	<ul style="list-style-type: none"> Continue with the strategy of global expansion by "filling the cube": <ul style="list-style-type: none"> exploit existing sales channels and products and expand in core markets; further penetrate ophthalmology; and extend our geographic reach. 	

\$810m

current value of the marketplace in which Optos competes

\$1,097m

projected growth of marketplace by 2016

APPENDIX C
20 TOPICS FROM LATENT DIRICHLET ALLOCATION

EPR?	Broad	Topic	Word list
0	Financial	Borrowing	net interest cash rate debt capital risk credit tax facilities assets facility currency finance rates exchange foreign borrowings
		Accounting	accordance information law accounting responsible reasonable prepare position applicable adopted auditors preparing
		Financial Performance	profit revenue increased growth costs net increase adjusted underlying sales tax margin total earnings cash revenues items
		Financial Statement	cash tax assets costs net income loss value interest total period shares profit expenses impairment balance operations equity
	Governance	Executive Compensation	remuneration shares salary awards bonus options period pension award plan policy total non-executive scheme committee
		Director	chairman non-executive appointed joined finance experience member officer senior board held president managing prior
		Board	board chairman governance non-executive meetings shareholders independent committee meeting remuneration senior
		Audit	internal audit external control committee auditors risk controls effectiveness reviewed risks reporting system auditor
		Annual General Meeting	shares ordinary capital meeting general shareholders information issued held interests set rights details resolution
		Risk	risk risks impact operations principal ensure future changes uncertainties activities products economic potential ability
1	Business Operations & Strategy	HSE	employees safety environmental health training local people emissions responsibility work environment waste energy
		Healthcare	products product clinical research sales patients pharmaceutical treatment technology healthcare drug medical phase disease
		Mining	production mining gold exploration project mine ore coal projects resource operations drilling resources copper grade total
		Oil & Gas	oil gas production exploration drilling field reserves interest wells licence seismic area potential programme offshore boe
		Marketing	sales stores retail customers brand store brands products product growth food customer distribution range total consumer
		Production	products product sales customers production manufacturing markets demand technology supply energy global equipment
		Progress	strong progress increase future period growth increased position trading results investment sales shareholders pleased
		Strategy	growth strategy strategic markets focus global value people strong customers deliver opportunities businesses investment
		Contract	services contract contracts service construction project projects revenue sector support work division clients provide public
		Technology	services customers revenue software products technology mobile online data customer digital media solutions network

APPENDIX D

APPLICATION OF LATENT DIRICHLET ALLOCATION

Creating a Corpus

For the textual analysis, I create a corpus by aggregating the annual reports of all firms listed on the London Stock Exchange in the sample period 2008–2013 to obtain sufficient data for machine learning and avoid overfitting. The corpus includes 10,573 annual reports from 1,838 unique firms.

Text Pre-Processing

The extracted text must be processed to allow textual analysis. First, I remove stop words such as function words and pronouns (and, as, it, be, have, do, that, etc.) as they provide little informational content. So as not to delete keywords relating to business models or strategy, I adjust the LM-stopword list for the words *need*, *new*, *novel*, *right*, and *value*. I exclude numbers, dates, special characters, and personal names, as they do not generate meaningful topics. However, I do not stem words, as stemming restricts the model from exploiting subtle differences in word senses generated by word inflections (e.g., market and marketing; developing and developed). As words that are too frequent or too infrequent are not useful for identifying topics (Dyer, Lang, and Stice-Lawrence 2017), I delete the 30 most frequent words and words that do not occur in at least 100 annual reports.

Implementation of LDA

I use the Mallet software to implement collapsed Gibbs sampling for LDA training, with 1,000 sampling iterations, and optimize the parameter alpha (document-topic distribution) and beta (topic-word distribution) every 10 iterations. One important choice in LDA is the number of topics to identify. Setting the number too low forces the model to combine distinct themes into a single topic, whereas setting it too high may produce topics that are too granular to interpret.

Although previous accounting research applying LDA uses perplexity to decide the number, the perplexity score approach often produces less interpretable results (Chang, Gerrish, Wang, Boyd-Graber, and Blei 2009). I use two alternative methods to decide the number of topics: a word intrusion task (Chang et al. 2009) and coherence scores (Newman, Noh, Talley, Karimi, and Baldwin 2010).

The word intrusion task examines whether word lists generated by topic modeling agree with human judgements. For each topic, I keep the top five words, and include an intruder word that is less likely to appear in the topic but likely to appear among the top 10 words in any of the other topics. I then ask three independent readers with expertise in accounting and finance to perform the word intrusion tasks for models with 20, 30, 40, 50, and 60 topics. The accuracy of their answers is maximized at 20 topics.

I also test the coherence scores, which evaluate semantic relationships between topic words, by testing the co-occurrence of word pairs in external corpora such as *The New York Times* and Wikipedia. Consistent with the word intrusion task, the coherence score is maximized at 20 topics. I therefore choose 20 topics for the main analysis. As a robustness check, I also use 40 and 60 topics to create alternative measures of *TEPR*. Untabulated results are robust to alternative measurement.