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Has the Transparency Directive benefited the United Kingdom?

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ABSTRACT

Post Brexit, this study contributes to assessing the efficacy of the European Union (EU) Transparency Directive (TPD) in attaining its regulator-specified goals for the United Kingdom (UK) capital market. During its adoption in 2004, the Commission of European Communities and the UK Government argued that TPD adoption should increase firms' financial reporting quality and investment efficiency while decreasing firms' cost of capital and information asymmetry. Using several alternative test variables in a sample of FTSE All-Share Index firms, I find evidence consistent with these four goals following TPD adoption. Additionally, I find that firms have lower cash holdings and higher dividend payouts following TPD adoption. Most of these trends do not reverse after the 2014 TPD amendment that abolished mandatory quarterly trading updates. This is the first study to examine the association between TPD adoption and firms' cost of capital, investment efficiency, cash holdings, and dividend payout. Collectively, my results suggest that the primary regulatory goals of the TPD are being attained in the UK. Therefore, a case can be made for the relevance of the TPD and the resulting Disclosure and Transparency Rules in UK post Brexit.

1. Introduction

Post Brexit, the United Kingdom (UK) is no longer governed by the laws passed by the European Union (EU) Parliament (Cirlig, 2020). Since the completion of the Brexit transition period on December 31, 2020, EU directives do not apply to the UK unless they are transposed into UK law (Larik, 2020). Therefore, going forward, it makes sense to assess the relevance of EU directives for the UK. As the UK economy recovers from the effects of the Covid-19 pandemic, the UK Government has taken the position that existing business regulations must not hamper economic progress (Thomas et al., 2021). Accordingly, it has proposed the "Brexit Freedoms Bill" which provides the government with 'fast-track' powers to reform regulations that originated from EU directives (Dooley, 2022; Fleming, 2022).

In this context, I investigate the efficacy of the EU Transparency Directive [Directive 2004/109/EC] (henceforth 'TPD') for the UK capital market. In particular, I assess whether the TPD has attained the specific goals established at the time of its adoption by the Commission of European Communities (EC) and the UK Government. In the UK, the TPD is implemented by the Financial Conduct Authority (FCA) via its Disclosure and Transparency Rules (DTR). If the goals of the TPD are attained in the UK capital market, then an argument can be made for the relevance of the resulting DTR rules post Brexit. If the goals of the TPD

are not attained, then the DTR rules may appear to be redundant.

The TPD is a financial reporting transparency regulation originally proposed by the EU in 2003 for firms in EU regulated markets, with a view to increasing investor protection and restoring public confidence in financial disclosures in the aftermath of the Enron scandal (Link, 2012; Schleicher & Walker, 2015). After consultation with several stakeholder groups, the EU formally adopted the TPD in December 2004, effective for all firms operating in the UK and EU capital markets from January 20, 2007 onwards (Scoville et al., 2007). At the time of its adoption, the EC articulated two specific goals in relation to the TPD: (a) to improve the quality of financial information disclosed to investors, creditors, and other market participants and (b) to lower market information asymmetry in order to increase investor protection (EC, 2001, 2003; Schleicher & Walker, 2015). Concurrently, the UK Government's Department for Business, Innovations and Skills characterized the EC's TPD goals as 'essential' for well-functioning capital markets. They further suggested that the TPD would benefit British firms and not just investors by: (a) lowering firms' costs of capital and (b) increasing firms' investment efficiency (Kay Review, 2012; Link, 2012; Schleicher & Walker, 2015).

Proponents of the TPD in the UK argued that several TPD mandates would contribute towards achieving its regulatory goals in the UK capital market (EC, 2001, 2003, 2004; Kay Review, 2012). First, the TPD

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provided new rules to ensure a more detailed and timely disclosure of half-yearly and annual reports. Among other things, the annual and half-yearly reports should now include a management statement that identifies the principal risks and uncertainties of the business and a responsibility statement to guarantee that they faithfully report all relevant economic events (Scoville et al., 2007). Second, the TPD required firms to provide two financial performance updates in a year – one for the first quarter and one for the third quarter – in a new disclosure known as the Interim Management Statement (IMS). Firms were also required to describe in an IMS any material ‘price-sensitive’ transactions and events that took place during these quarters and the future trading outlook (Deloitte & Touché, 2008; EC, 2003; Rahman, 2019). The introduction of the IMS increased the mandatory reporting frequency of most UK firms from two to four disclosures in a year (Link, 2012; Schleicher & Walker, 2015). Third, the TPD introduced a new liability regime for firms to compensate an investor who suffered a loss due to untrue or misleading information, or from material omissions in the financial disclosures. Fourth, shareholders were now required to notify changes to major shareholdings of UK firms within two trading days. This was an upgrade from the previous Companies Act, 1985 rules and introduced for the first time in the UK an objective knowledge test for shareholders (Scoville et al., 2007). The TPD is implemented in the UK by integrating its mandates with the existing Disclosure Rules to form the new DTR, effective for UK firms from 2007 onwards.

To examine whether the goals of the TPD are attained in the UK, I obtain a sample of FTSE All-Share Index non-financial firms for the years 1995 – 2019 and compare the levels of financial reporting quality, information asymmetry, cost of capital, and investment efficiency in the periods before and after TPD adoption. The result of this analysis constitute evidence on the efficacy of the DTR rules for the UK capital market. The multivariate analysis suggests that financial reporting quality and investment efficiency increase while the cost of capital and information asymmetry decrease in UK firms following TPD adoption. Additional analysis reveals that UK firms exhibit lower cash holdings and higher dividend payout after TPD adoption. These results are robust to alternative proxies and variable measurements.

Subsequently, I examine an amendment to the TPD in 2014 when the mandate to disclose IMSs was abolished. I find that the number of IMS disclosures significantly decreased following the amendment. However, my multivariate analysis reveals that the post TPD amendment period still exhibits higher levels of financial reporting quality and investment efficiency and lower levels of information asymmetry and cost of capital for UK firms than the pre TPD adoption period. Moreover, the post TPD amendment period does not indicate a decline in the UK financial information environment compared to the pre TPD amendment period.

Collectively, based on my results of comparing the periods: (i) before vs after TPD adoption, (ii) before vs after TPD amendment, and (iii) before TPD adoption vs after TPD amendment, I conclude that TPD adoption in the UK coincides with a period of greater investor protection and market efficiency, consistent with its original transparency goals. This trend of improved information environment does not reverse after abolishing the mandate to disclose IMSs. Therefore, I argue that the existing DTR rules are still fit for purpose post Brexit.

This study contributes to the literature by providing empirical evidence on the efficacy of the TPD in attaining the goals set during its adoption. Brexit provides a unique context where UK firms are no longer bound to follow EU directives. As such, regulations that originated from EU directives are now open for scrutiny to determine if they are still relevant for the UK. Although prior studies examine the capital market effects of TPD adoption (e.g., Christensen et al., 2016; Ernstberger et al., 2017; Link, 2012; Schleicher & Walker, 2015; Watanabe et al., 2019), they do not directly examine the specific TPD goals established by government regulators. This paper attempts to fill this void.

Another contribution of this paper is the use of several relevant test variables not used in prior research. For instance, this paper provides evidence that information asymmetry in UK firms decreases following

TPD adoption. Previous studies report that market liquidity (Christensen et al., 2016) and share price informativeness (Watanabe et al., 2019) increase in EU firms following TPD adoption. While these measures are linked to information asymmetry, this paper employs more direct measures of information asymmetry such as bid-ask spread and analyst forecast error. In addition, I estimate financial reporting quality using the first principal component of three separate discretionary accruals measures and find evidence that the financial reporting quality of UK firms improve after TPD adoption. This complements Ernstberger et al. (2017) who examine real activities manipulation in EU firms post TPD adoption.

To the best of my knowledge, this is also the first study to examine the association between TPD adoption and firms’ costs of capital. It uses separate measures for the cost of equity and the cost of debt to document that the weighted average cost of capital decreases in UK firms post TPD adoption. I believe this is also the first study to examine the association between TPD adoption and firms’ investment efficiency, cash holdings, and dividend payout. The evidence based on a broad set of financial performance metrics should assist UK policy makers in determining whether the existing DTR rules are fit for purpose. Relatedly, this paper contributes to the policy debate on the relevance of the TPD mandates in UK post Brexit.

The rest of the paper is organized as follows. Section 2 discusses the background of the TPD and develops the hypotheses. Section 3 outlines the sample selection procedure and the variable measurements. Section 4 reports the main empirical findings. Section 5 presents some additional results not hypothesized in Section 2. Section 6 discusses the policy significance of the findings and concludes.

2. Background and hypotheses

2.1. Background of the Transparency Directive

The aftermath of the Enron scandal was characterized by appeals from investors and the financial press to strengthen government monitoring and control of financial disclosures, in an effort to increase investor protection and restore investor confidence in securities markets (EC, 2004, 2011; Link, 2012). Regulators from both sides of the Atlantic responded to these pressures by proposing new transparency regulations. The United States (US) Congress initiated legislative dialogues and hearings that culminated in the Sarbanes-Oxley (S-Ox) Act of 2002. The EC organized two major consultation rounds in 2001 and 2002 with investors, creditors, analysts, trade unions, consumers, and other interest groups for a new transparency regulation to lower the investor information gap and improve efficiency in EU regulated markets (EC, 2001; Schleicher & Walker, 2015). They presented their initial proposals in 2003, and after further negotiations and modifications their proposals were adopted in December 2004 in what is now known as the Transparency Directive (TPD) (EC, 2003, 2004; Link, 2012; Watanabe et al., 2019).

The TPD was implemented in the UK by integrating new Financial Services Authority (FSA) transparency rules with the previous Disclosure Rules to form the new DTR. The DTR applies to all firms trading securities in UK regulated markets on or after January 20, 2007 (Scoville et al., 2007). According to the DTR, all firms were now required to disclose their audited annual reports and accounts within four months after their financial year-end. The annual reports were now required to include a management report that describes all principal risks and uncertainties of the business, and a responsibility statement that confirms that the financial statements provide a true and fair view of the firm’s economic events. In addition, the half-yearly report was now required to be disclosed within two months after the end of the six-monthly period. This ‘more stringent’ half-yearly disclosure must include a condensed set of financial statements and responsibility statements (EC, 2004). With regards to quarterly reporting, firms were now required to disclose two separate IMSs during the financial year, one for the first quarter and one

for the third quarter. An IMS was required to disclose, between weeks 10 and 20 of the half-year its quarter pertained to, any material events and transactions for the quarter and also to provide a general description of the firm's quarterly financial performance and position (Deloitte & Touché, 2008; EC, 2003; Link, 2012; Rahman, 2019).¹ The new DTR also established more objective rules for notifications of major shareholdings related to changes in capital, new obligations for firms to communicate updates to shareholders and the market, and additional rules for filing to the FSA (EC, 2004; Scoville et al., 2007).

During its original proposal, the EC (2001, 2003) argued that the TPD would ensure investor protection, harmonize disclosure transparency rules across the EU Member States, and bridge the financial reporting gap with US firms (Schleicher & Walker, 2015). Specifically, the EC (2003) stated two regulatory goals. First, they argued that the TPD rules ensure a more accurate and timely disclosure of annual reports, half-yearly reports, and IMSs. This should increase financial reporting quality for users and improve capital allocation. Second, they argued that the TPD rules are expected to reduce information asymmetry and create a more level-playing field between institutional and retail investors. At the time of adoption, the UK Government's Department for Business, Innovations and Skills endorsed these goals as desirable attributes of efficient markets. In addition, they argued that these expanded disclosure rules should increase investment efficiency and lower cost of capital for UK firms (Kay Review, 2012).

From its inception, critics of the TPD opposed the mandatory quarterly reporting regime, arguing that it increases administrative and other disclosure cost burdens on small and medium-sized firms (EC, 2010). As a result of sustained pressures, the EC amended the TPD in 2013 to make the disclosure of IMSs voluntary [Directive 2013/50/EU]. However, during the amendment process, the EC (2010, 2011) reiterated its objective of ensuring high-quality financial reporting and suggested that the amendment would not increase information asymmetry. Instead, it argued that firms would now be better able to avoid information overload and lower administrative costs if they decided for themselves whether to disclose IMSs (Schleicher & Walker, 2015). Individual EU Member States were allowed some flexibility in determining when these new rules were going to be implemented in their countries. Accordingly, the FCA updated its DTR rules to remove the mandatory requirement of IMSs for UK firms, effective November 7, 2014 (FCA, 2014).

2.2. Research on the Transparency Directive

Several studies examine the effect of TPD adoption and the resulting changes to interim reporting frequency in European capital markets. In response to the EC's (2010) proposal to abolish mandatory IMSs, Link (2012) examines the effect of TPD adoption on the interim reporting frequency of EU-15 countries.² Link argues that voluntary interim reporting choices are driven by firm, industry, and country characteristics. Link concludes that although in the short-term firms seem reluctant to change the reporting frequency, in the long-term abolishing the IMS may lead to a reduction of quarterly reporting in several EU countries.

Subsequently, Schleicher and Walker (2015) examine the informativeness of UK IMSs. They find that the third-quarter IMSs, but not the first-quarter IMSs, are aligned with incremental abnormal market returns and trading volume. They suggest that the withdrawal of IMSs may result in a loss of at least 'some' incremental information from the

¹ TPD proponents originally argued that the IMS mandate would reduce the information gap between US firms, which are required to publish full quarterly reports, and firms in EU Member States with varying levels of interim reporting, including several countries (such as the UK) with no quarterly reporting mandates pre-TPD adoption (European Commission, 2003; Schleicher & Walker, 2015).

² EU-15 refers to the first 15 EU Member States.

market.

Christensen et al. (2016) examine the efficacy of the TPD by measuring changes in the market liquidity post TPD adoption. They argue that securities regulation is frequently justified by the expected changes in market liquidity, which is linked to the information gap and adverse selection in the market. They examine a cross-country sample of firms from 26 EU Member States with staggered TPD introduction. This approach allows them to examine differences in regulatory implementation in different countries. They find that market liquidity increases post TPD adoption, although the effects are more pronounced in countries with stronger regulatory enforcement.

Ernstberger et al. (2017) investigate how mandatory IMS disclosure affects earnings management in the context of interim reporting in EU-15 countries. They document an increase in real-activities manipulation in firms that switched from semi-annual to quarterly reporting. They also find that reporting frequency induced real-activities manipulation is first followed by a temporary increase and then by a decline in firm operating performance.

Rahman (2019) examines the tone of UK IMS narratives and finds that the third-quarter IMS abnormal tone is predictive of future earnings, while the first-quarter IMS abnormal tone represents noise. Rahman also reports a stronger alignment of abnormal market returns with the abnormal tone of third-quarter IMSs than first-quarter IMSs.

Watanabe et al. (2019) examine changes in share price informativeness in 25 EU Member States after TPD adoption. They find that share price synchronicity decreases in EU capital markets following TPD adoption, consistent with greater amount of firm-specific information represented in share prices. Consistent with Christensen et al. (2016), they find that this effect is more pronounced in countries with stronger regulatory enforcement. Subsequently, they compare the last two years of the mandatory IMS regime with the first two years after mandatory IMS abolishment and report that share price synchronicity increases in the latter period.

Overall, I draw two conclusions from these studies. First, TPD adoption coincides with a period of improved financial reporting environment in EU-regulated markets, particularly in countries with strong regulatory enforcement. Second, the third-quarter IMS contains more incremental firm-fundamental information than the first-quarter IMS.

While the aforementioned studies examine how the TPD affects the EU capital markets, they do not directly evaluate the specific goals established for it by the EC. They also do not examine the goals adopted concurrently by the UK Government for the UK capital market. Since its formation on April 1, 2013, the FCA has been responsible for the implementation and oversight of these DTR rules, which includes the TPD. Concurrently, the UK's Financial Reporting Council (FRC) regulates the auditors, accountants, and actuaries in the UK with a view to improving the transparency of financial reports. Post Brexit, as the UK Government seeks to evaluate and reform EU-era regulations, I examine the extent to which the goals of the TPD are attained in the UK capital market.

2.3. Hypothesis development

2.3.1. TPD and financial reporting quality

The first goal of the TPD is to improve the quality of financial information disclosed to market participants, with a view to improving market efficiency (EC, 2001, 2003). Firms disclose financial reports to communicate their financial performance to outsiders (Dechow et al., 2010). Greater transparency in financial reporting is expected to improve its quality. High-quality financial reports disseminate decision-useful information to the market by providing relevant, reliable, and verifiable information that represents a true and fair view of the firm-fundamentals (Beatty et al., 2010; Iatridis, 2011). High-quality information improves capital allocation by allowing investors to make sound buy, hold, or sell decisions, and by allowing creditors to make sound lending decisions (Beatty et al., 2010; Dechow et al., 2010; EC, 2003).

Consistent with this argument, prior research, often in US contexts, suggests that financial reporting quality increases after the adoption of transparency regulations. This includes the S-Ox Act (Chang et al., 2009; Cohen et al., 2008; Lobo & Zhou, 2006), Regulation Fair Disclosure (FD) of 2000 (Heflin et al., 2003) and Statement of Financial Accounting Standards (SFAS) no. 131 (Cho, 2015). However, in addition to contextual differences with these US regulations, the TPD provides greater discretion to managers in terms of the line-item(s) to be disclosed, particularly for quarterly reports (Link, 2012).

If the TPD mandates allow firms to provide more accurate and timely financial reports, as argued by the EC (2003), it is plausible that financial reporting quality increases post-adoption, as such attributes increase the decision-usefulness of financial reports (Dechow et al., 2010). Arguably, certain TPD mandates are expected to affect the financial reporting quality of UK firms. First, the mandate to report financial performance in the first and third quarters increased the financial reporting frequency of UK firms from two to four disclosures in a year. Increased reporting frequency enables a timelier release of firm-fundamental information, thus, increasing the decision-usefulness of reported numbers. In this connection, Schleicher and Walker (2015) report that following TPD adoption 90 % (45 %) of UK firms provide a quarterly update of their sales (earnings), while 83 % of UK firms provide a quarterly update of their financial position (balance sheet). However, increased reporting frequency may also increase managerial short-termism, thus undermining financial reporting quality. For instance, Ernstberger et al. (2017) find that real-activities manipulation increases in EU firms after the interim reporting frequency is increased from semi-annual to quarterly.

Second, a new liability regime introduced together with the TPD now requires firms to compensate an investor who has suffered a loss as a result of untrue or misleading statements, or due to omission of material price-sensitive information from the financial disclosures (Scoville et al., 2007). Coupled with the mandate to enclose a responsibility statement with half-yearly and annual reports, this liability regime is an upgrade in scope from prior UK disclosure rules and is expected to lower the incidence of inaccurate reporting. Given that these mandates are likely to be associated with the financial reporting quality of UK firms, I develop my first (non-directional) hypothesis:

H1. Financial reporting quality in UK firms changes following the adoption of the TPD.

2.3.2. TPD and information asymmetry

The second goal of the TPD is to reduce market information asymmetry in order to improve investor protection (EC, 2001, 2003). Information asymmetry is the difference in material knowledge between the seller and the buyer at the time a securities transaction takes place (Akerlof, 1970). Increased information asymmetry hinders efficient market functioning by distorting the balance of power between transacting parties (Healy & Palepu, 2001). Prior research in US contexts suggests that a reduction in information asymmetry typically occurs after adopting transparency regulations, including the S-Ox Act (Akhigbe et al., 2010; Chowdhury et al., 2016; Zhang, 2007) and Regulation FD (Bushee et al., 2004; Eleswarapu et al., 2004). In EU contexts, prior research shows that market liquidity increases (Christensen et al., 2016) and share price synchronicity decreases (Watanabe et al., 2019) post TPD adoption, both of which are consistent with an improvement in the overall information environment.

The EC (2003) argued that TPD adoption should lower information asymmetry and improve capital allocation decisions. Arguably, certain TPD mandates are likely to affect the information asymmetry between institutional and retail investors in the UK capital market. First, the mandate to report all material transactions and events additionally in the first and third quarter IMSs rather than in only half-yearly and annual reports is expected to lower the investor information gap for most UK firms (Schleicher & Walker, 2015). Further, firms are not required to produce quantitative financial statements or extracts from

them in their IMSs as long as a narrative description of the financial performance for the quarter is provided. This allows firms to report their financial performance entirely in narratives devoid of the reporting constraints of quantitative statements, thereby lowering the information processing costs of retail investors. This argument is supported by the evidence in Rahman (2019) who find the tone of UK IMS narratives to be positively aligned with year-end earnings and cash flows, and in Schleicher and Walker (2015) who document incremental share price and trading volume reactions around third-quarter IMS announcement dates in the UK.

Second, investors trading shares of UK firms in UK-regulated markets are now required to notify the issuer of major changes to their shareholdings (3 % or more of the issuer's shares) within two trading days (Scoville et al., 2007). For non-UK firms whose shares are traded in a UK-regulated market, the timing for this notification is now four trading days. For the first time in the UK, this new TPD rule introduces a new objective knowledge test that replaced the old Companies Act, 1985 rules which only required such notifications to be made within a 'relevant time' (Companies Act, 1985). This is likely to lower the investor information gap by lowering the information acquisition activities of retail investors. Nevertheless, in line with Ernstberger et al. (2017), the mandate to increase the financial reporting frequency may motivate managers to increase real activities manipulation. As investors differ in their ability to process earnings-related information, increased real activities manipulation is expected to result in differentially informed investors, thereby increasing information asymmetry (Abad et al., 2018). Consequently, I develop my second (non-directional) hypothesis:

H2. Information asymmetry in UK firms changes following the adoption of the TPD.

2.3.3. TPD and cost of capital

The UK Government argues that adopting the TPD should lower firms' costs of capital (Kay Review, 2012). Capital providers are expected to demand higher returns when presented with uncertain or ambiguous information, as such information is perceived to be less decision-useful (Chang et al., 2009). In contrast, the costs of obtaining both equity and debt capital are expected to be lower when firms provide more transparent and decision-useful financial reports (Botosan & Plumlee, 2002; Draske, 2006; Lambert et al., 2007). Consistent with this argument, prior research typically finds a reduction in the cost of capital after the adoption of the S-Ox Act (Amir et al., 2009; Andrade et al., 2014; Chang et al., 2009; Stephen & Jong, 2012) and Regulation FD (Chen, Dhaliwal, & Xie, 2010). In contrast, Gomes et al (2007) find a moderate increase in the cost of capital for small firms following the adoption of Regulation FD. The results are more pronounced if small firms provide complex communications or experience loss of analyst following.³

If the TPD increases transparency in financial reporting, then the earnings number is expected to capture better the changes in a firm's economic value. In such cases, capital providers do not need to engage in private information acquisition activities, lowering their costs of capital allocation decisions (Chang et al., 2009; Chen et al., 2010). At least three new TPD mandates are likely to lower the information acquisition costs for UK capital providers: (a) to provide more timely notifications of changes in major shareholder ownership, (b) to compensate investors adversely affected by reporting inaccuracies, and (c) to provide narrative updates of financial performance and financial position in the first and third quarter IMSs. In addition, the mandate to increase the financial reporting frequency of UK firms is expected to lower the information acquisition costs of capital providers by enabling more timely release of the firm-fundamentals. However, the pressures of meeting short-term profit targets in response to higher reporting frequency may also

³ Gomes et al. (2007) interpret this finding as evidence of unintended regulatory consequences for small firms.

motivate firms to increase real activities manipulation (Ernstberger et al., 2017), which is likely to increase cost of capital (Kim & Sohn, 2013). Given this, I develop my third (non-directional) hypothesis:

H3. Cost of capital in UK firms changes following the adoption of the TPD.

2.3.4. TPD and investment efficiency

The UK Government also argues that firms' investment efficiency should increase post TPD adoption (Kay Review, 2012). In theory, investment efficiency occurs when the marginal benefits of firms' investments are equal to the marginal costs, and there is no over-production or under-production (Biddle et al., 2009; Hayashi, 1982). Therefore, managers are expected to continue financing investment projects until the marginal benefits and marginal costs are equal (Benlemlih & Bitar, 2018). Capital market frictions, such as high information asymmetry and low financial reporting quality, may prevent firms from accurately assessing the profitability of projects and hinder investment efficiency (Biddle et al., 2009; Gomariz & Ballesta, 2014). Given that higher quality financial reporting also improves internal monitoring decisions, it is likely to make managers more accountable, thereby reducing investment inefficiency. Greater reporting transparency is also likely to provide managers with more reliable numbers in order to better assess the profitability of projects (Gomariz & Ballesta, 2014). Prior research indicates that the adoption of the S-Ox Act is aligned with increased investment efficiency in US firms (Cheng et al., 2013). Similarly, I argue that the TPD mandates to increase the timeliness, detail, and accuracy of financial performance updates in the UK are expected to increase their usefulness in internal monitoring and decision making. As such, these mandates are expected to increase the level of investment efficiency. In contrast, increased real activities manipulation in response to the mandate to increase financial reporting frequency (Ernstberger et al., 2017) is expected to reduce financial reporting quality and increase information asymmetry, thereby reducing investment efficiency (Biddle et al., 2009; Gomariz & Ballesta, 2014). Therefore, I develop my fourth (non-directional) hypothesis:

H4. Investment efficiency in UK firms changes following the adoption of the TPD.

3. Research design

3.1. Sample selection

To examine the efficacy of the TPD for UK firms, I obtain from *DataStream* the list of FTSE All-Share Index constituents of non-financial firms over 1995–2019. The TPD takes effect for all firms with year-ends on or after January 20, 2007. The sample period covers about 12 years in the pre-TPD adoption period (1995–2006) and about 13 years in the post-TPD adoption period (2007–2019), including most of 2007, the year of adoption. Considering that the number of FTSE All-Share Index constituents have moderately decreased over these years, my chosen sample period should yield a relatively close number of pre-and post TPD adoption firm-year observations for empirical analysis. Financial firms are not included in my sample to avoid inconsistencies in variable measurement. This is because financial firms are subject to different reporting requirements than non-financial firms, including the reporting of asset line-items and income streams (Schleicher & Walker, 2015). My sampling procedure yields an initial tally of 6345 firm-year observations from 381 unique firms. From this tally, I first exclude all US cross-listed

firms, as such firms are not subject to all of the TPD's interim reporting requirements.⁴ I then exclude all firm-years that do not have a complete set of matching variable information in *DataStream*. My final sample consists of 5575 firm-year observations from 326 unique firms.

3.2. Variable measurements

3.2.1. Measuring financial reporting quality

I measure financial reporting quality by applying principal component analysis on three separate discretionary accruals measures, consistent with prior literature (Beatty et al., 2010; Bharath et al., 2008; Chen et al., 2017). Discretionary accruals provide accountants with the ability to transfer unrealized non-obligatory expenses between periods, thereby allowing them to portray an earnings figure that is consistent with their objectives (DeAngelo, 1986; Healy, 1985; Sloan, 1996). Thus, higher levels of discretionary accruals imply lower financial reporting quality. Discretionary accruals are a good proxy of financial reporting quality for my study because the TPD rules allow managers full discretion in determining which financial statement line-item(s) should be disclosed in the first and third quarters (Link, 2012; Schleicher & Walker, 2015). The TPD rules also allow managers to choose whether to report numbers or to simply provide a narrative description of the line-item (Rahman, 2019). Therefore, the TPD appears to provide firms with considerable opportunities to manipulate earnings by switching discretionary expenses across periods.

Following Bharath et al. (2008), I first calculate three alternative measures of discretionary accruals: (i) $FRQ[1]$ is the absolute value of discretionary accruals as per Dechow and Dichev (2002), multiplied by -1 , (ii) $FRQ[2]$ is the absolute value of discretionary accruals as per Teoh et al. (1998), multiplied by -1 , and (iii) $FRQ[3]$ is the absolute value of discretionary accruals as per Dechow et al. (1995), multiplied by -1 . I multiply $FRQ[1]$, $FRQ[2]$, and $FRQ[3]$ with -1 to ensure that higher values imply higher financial reporting quality. Finally, I develop my measure of financial reporting quality, FRQ , as the first principal component of $FRQ[1]$, $FRQ[2]$, and $FRQ[3]$.

3.2.2. Measuring information asymmetry

I proxy for information asymmetry by using two alternative measures – bid-ask spread and analyst forecast error. Bid-ask spread is a widely used measure of information asymmetry as it represents the difference in information between the buyer and the seller in a securities transaction (Akerlof, 1970; Healy & Palepu, 2001). Analyst forecast error measures the accuracy of analyst predictions of firm performance (Horton et al., 2013). The wider the margin of the bid-ask spread or the analyst forecast error, the higher the market information asymmetry (Chowdhury et al., 2016; Gomariz & Ballesta, 2014; Zhang, 2007).

Consistent with Chen et al. (2017), the bid-ask spread, $SPREAD[1]$, is the average difference between the daily ask price and the daily bid price over the year. To use an alternative measure, I develop a small variation from the bid-ask spread measure used in Chen et al. (2017), $SPREAD[2]$, defined as the median difference between the daily ask price and the daily bid price over the year. Following Hughes et al. (2008), I measure analyst forecast error, $AFE[1]$, as the difference between actual yearly earnings and median consensus yearly earnings forecast, scaled by share price at the start of the year. As an alternative measure, I develop a variation of the analyst forecast error measure used in Hughes et al. (2008), $AFE[2]$, defined as the difference between actual yearly earnings and the last available analyst forecast earnings, scaled by the share price at the start of the year. My two measures for bid-ask

⁴ Specifically, the TPD exempts firms cross-listed in the US from disclosing IMSs in the first and third quarters since they disclose quarterly reports. Quarterly reports are significantly more extensive disclosures than IMSs since they contain income statements, balance sheets, cash flow statements, statement of changes in equity, and other quantitative financial statements.

Table 1
Descriptive statistics of variables.

Variables	Mean	Standard Deviation	1st Percentile	1st Quartile	Median	3rd Quartile	99th Percentile
TPD	0.520	0.500	0.000	0.000	1.000	1.000	1.000
FRQ	-0.238	8.035	-0.928	-0.103	-0.044	-0.024	-0.010
SPREAD[1]	0.337	0.457	0.000	0.046	0.188	0.409	2.000
SPREAD[2]	0.318	0.445	0.000	0.042	0.175	0.381	2.000
AFE[1]	0.081	1.327	0.000	0.007	0.038	0.069	0.440
AFE[2]	0.064	0.359	0.000	0.015	0.045	0.073	0.322
EQCOST	0.058	0.138	0.000	0.019	0.042	0.069	0.310
TOBINSQ	0.914	2.594	0.000	0.098	0.690	0.984	5.566
DBCOST	0.041	1.566	-1.051	-0.001	0.045	0.084	1.063
BDYIELD	0.032	1.396	-0.742	0.000	0.014	0.072	0.871
WACC	0.051	0.067	0.000	0.016	0.046	0.068	0.231
INV[1]	0.163	10.28	-0.359	-0.001	0.000	0.051	1.143
INV[2]	11.63	112.0	-13.13	0.371	1.125	6.878	130.5
INVEFF[1]	-0.134	9.153	-0.788	-0.118	-0.114	-0.086	-0.001
INVEFF[2]	-1.604	15.57	-18.71	-0.822	-0.295	-0.009	0.000
IFRS	0.615	0.487	0.000	0.000	1.000	1.000	1.000
SIZE	13.38	1.936	9.491	12.10	13.09	14.38	19.55
LEV	0.178	1.626	0.000	0.010	0.089	0.243	0.756
LOSS	0.124	0.330	0.000	0.000	0.000	0.000	1.000
RET	0.205	7.438	-1.000	-0.098	0.000	0.227	1.892
STDRET	0.615	7.413	0.000	0.154	0.291	0.487	2.814
EARN	0.039	0.191	-0.459	0.011	0.042	0.087	0.303
CHEARN	0.372	39.59	-15.73	-0.543	-0.063	0.208	19.49
STDEARN	0.058	0.155	0.001	0.008	0.023	0.061	0.470
MTB	0.020	0.703	-0.010	0.000	0.001	0.003	0.044
CFO	0.067	0.158	-0.178	0.012	0.052	0.114	0.345
TANG	0.227	0.279	0.000	0.001	0.097	0.367	0.959
CASHDIV	0.667	0.471	0.000	0.000	1.000	1.000	1.000
LIQ	0.754	1.637	0.000	0.237	0.461	0.852	4.592
DBTA	0.224	1.823	0.000	0.039	0.144	0.286	0.823
ENFORCE	0.052	0.137	0.000	0.004	0.020	0.057	0.446
AUDFEE	5.632	3.349	0.000	4.612	6.388	7.831	12.04
EULISTING	0.370	0.483	0.000	0.000	0.000	1.000	1.000
LOGPRICE	4.740	2.201	0.000	4.252	5.260	6.100	8.336
LOGTRVOL	9.004	5.079	0.000	8.416	10.73	12.45	15.78
CASH[1]	0.062	0.101	0.000	0.001	0.024	0.076	0.486
CASH[2]	0.077	0.107	0.000	0.012	0.040	0.098	0.519
DIVPAY[1]	0.182	1.019	0.000	0.014	0.058	0.148	1.596
DIVPAY[2]	0.147	0.953	0.000	0.010	0.033	0.120	1.463
CAPEX	0.157	8.819	-0.867	-0.010	0.004	0.100	1.204
R&D	0.009	0.043	0.000	0.000	0.000	0.000	0.178
DACC	-0.034	3.916	-0.752	-0.025	0.003	0.062	0.812
SALES	9.522	5.575	0.000	7.639	11.50	13.49	17.53
CHSALES	0.340	11.85	-1.968	-0.019	0.004	0.140	4.224
STDEBT	0.299	0.359	0.000	0.001	0.130	0.500	1.000
STDCF0	0.033	0.082	0.000	0.003	0.015	0.038	0.266
STDSALES	0.128	0.276	0.000	0.006	0.040	0.118	1.349

Number of Firm-Year Observations = 5575 (all variables)

Notes: This table reports the descriptive statistics of all variables over the period 1995 to 2019. All variables are defined in Appendix.

spread (analyst forecast error) are consistent with one another and can be interpreted similarly, as lower values imply lower information asymmetry. Although several different proxies of information asymmetry are used in the literature (Abad et al., 2018), these measures are simple, intuitive, and easy to compute and administer.

3.2.3. Measuring cost of capital

To proxy for cost of capital, I first measure cost of equity and cost of debt, and then use them to estimate the weighted average cost of capital. Using the dividend capitalization model (Skantz & Marchesini, 1992), the cost of equity, *EQCOST*, is the annual growth rate of dividend payment, adjusted for share price. The cost of debt, *DBCOST*, is the interest expense times (1 – effective tax rate), divided by total debt (Baule, 2019; Leland, 1994). The weighted average cost of capital, *WACC*, is the proportion of equity and debt in the capital structure, multiplied by *EQCOST* and *DBCOST*, respectively. For all of these measures, lower values imply a lower cost of capital.

To examine the generalizability of my findings, I use alternative measures for the cost of debt and equity capital. As an alternative to the cost of equity, consistent with Callen (1988), I measure *TOBINSQ* as the

sum of market value of equity and book value of debt, divided by book value of total assets. As an alternative measure of the cost of debt, consistent with Leland (1994), I measure bond yield, *BDYIELD*, as the interest expense charged for the year divided by total debt.

3.2.4. Measuring investment efficiency

Investment efficiency exists when the actual level of investment is equal to the optimal level of investment (Gomariz & Ballesta, 2014). Firms that invest above (below) their optimal level overinvest (underinvest). Consistent with prior research (Biddle et al., 2009; Gomariz & Ballesta, 2014), I develop the following model(s) that estimates the optimal level of efficiency, based on the level of sales growth:

$$INV[1]_{it} (or INV[2]_{it}) = \alpha + \beta_1 CHSALES_{it-1} + \epsilon_{it} \quad (1)$$

In Eq. (1), *INV[1]* is the actual investment, measured as the net increase in property, plant, and equipment and intangible assets scaled by lagged total assets. Alternatively, I denote actual investment by *INV[2]*, measured as the net book value of property, plant, and equipment and intangible assets scaled by lagged total assets. *CHSALES* is the lagged annual change in sales revenue. Investment inefficiency is estimated by

Table 2
Summary of key variables before and after the adoption of the Transparency Directive.

Variables	Before TPD (TPD = 0) (Number of Observations = 2676)			After TPD (TPD = 1) (Number of Observations = 2899)			T-Test (Mean)
	Mean	Standard Deviation	Median	Mean	Standard Deviation	Median	p-value
FRQ	-0.402	11.593	-0.036	-0.086	0.211	-0.049	0.018
SPREAD[1]	0.368	0.539	0.172	0.308	0.315	0.178	0.000
SPREAD[2]	0.393	0.557	0.195	0.249	0.332	0.190	0.000
AFE[1]	0.040	0.195	0.024	0.119	1.830	0.049	0.000
AFE[2]	0.072	0.191	0.002	0.056	1.827	0.002	0.030
EQCOST	0.051	0.082	0.040	0.065	0.174	0.043	0.000
TOBINSQ	0.956	2.928	0.673	0.876	2.243	0.708	0.055
DBCOST	0.063	1.803	0.008	0.021	1.130	0.007	0.091
BDYIELD	0.050	1.800	0.002	0.016	0.868	0.020	0.133
WACC	0.054	0.077	0.051	0.048	0.055	0.043	0.000
INVEFF[1]	-0.210	12.86	-0.151	-0.064	5.889	-0.050	0.173
INVEFF[2]	-2.440	18.41	-0.316	-0.832	10.95	-0.248	0.000

Notes: This table reports the summary statistics of the key variables before (TPD = 0) and after (TPD = 1) the adoption of the Transparency Directive. P-values of the t-test for the difference between the means of TPD = 0 and TPD = 1 groups. All variables are defined in Appendix.

Table 3
Transparency Directive and financial reporting quality.

Variables	(1) FRQ _{ij}
INTERCEPT _{ij}	-1.0629
TPD _{ij}	0.1171***
IFRS _{ij}	0.7432
SIZE _{ij}	0.0120
LEV _{ij}	0.1383
LOSS _{ij}	0.8548**
RET _{ij}	0.0067***
STDRET _{ij}	-0.0083*
EARN _{ij}	3.0038**
CHEARN _{ij}	0.0018
STDEARN _{ij}	0.1034
MTB _{ij}	-0.9943**
CFO _{ij}	6.8453*
TANG _{ij}	-0.7654
CASHDIV _{ij}	-0.4233
LIQ _{ij}	0.0105
DBTA _{ij}	-0.3559**
ENFORCE _{ij}	-0.0551
AUDFEE _{ij}	-0.0388
EULISTING _{ij}	0.0192
INDUSTRY FE	YES
YEAR FE	YES
F-STAT	50.60***
ADJ. R-SQ	0.2993
Number of Firm-Year Observations	5575

Notes: This table reports regressions of financial reporting quality on Transparency Directive over the period 1995 – 2019. P-values are based on robust standard errors clustered two-way at the firm-level and year-level. ***, **, and * indicate two-tailed significance at the 1%, 5%, and 10% level. respectively. All variables are defined in Appendix.

the deviation from optimal investment, i.e. the error term ϵ . A positive (negative) residual implies overinvestment (underinvestment). Consistent with Gomirez and Ballesta (2014), investment efficiency, *INVEFF* [1] (or *INVEFF*[2]) is the absolute value of the residual term ϵ , multiplied by -1, so that higher values implies higher investment efficiency.

3.2.5. Defining TPD and international financial reporting standards (IFRS) adoption

I define the post-TPD adoption firm-year observations by the indicator variable *TPD*, coded 1 if the financial year-end is on or after January 20, 2007, and 0 otherwise. I control for financial reporting standards by using the indicator variable *IFRS* coded 1 if *DataStream* identifies the accounting standards as IFRS, and 0 otherwise. While the UK adopted IFRS in 2005 along with other EU Member States, I argue my

Table 4
Transparency Directive and information asymmetry.

Variables	(1) SPREAD [1] _{ij}	(2) SPREAD [2] _{ij}	(3) AFE[1] _{ij}	(4) AFE[2] _{ij}
INTERCEPT _{ij}	0.3010***	-0.3074***	0.0106***	0.0222***
TPD _{ij}	-0.0491***	-0.0383**	-0.0026**	-0.0038**
IFRS _{ij}	-0.0231	-0.0189	-0.0052***	-0.0130***
SIZE _{ij}	-0.0068***	-0.0063***	-0.0001	0.0001
LEV _{ij}	-0.0023	-0.0009	0.0000	0.0005
LOSS _{ij}	0.1406***	0.1450***	0.0031**	0.0057**
EARN _{ij}	0.0888**	0.1205**	-0.0005	0.0036
CHEARN _{ij}	0.0001	-0.0001	0.0001	0.0001
STDEARN _{ij}	0.2704***	0.2372***	0.0147*	0.0365**
MTB _{ij}	0.1475	0.1587	0.0136***	0.0414
ENFORCE _{ij}	-0.0010	0.0007	0.0004	-0.0001
AUDFEE _{ij}	-0.0061**	-0.0053*	-0.0003*	-0.0011***
EULISTING _{ij}	0.0269	0.0286	0.0001	0.0005
RET _{ij}	0.0013***	0.0018**		
STDRET _{ij}	-0.0000	0.0001		
LOGPRICE _{ij}	-0.0072*	-0.0122***		
LOGTRVOL _{ij}	0.0115***	0.0095***		
INDUSTRY FE	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES
F-STAT	76.93***	71.44***	8.54***	4.93***
ADJ. R-SQ	0.3800	0.3625	0.0525	0.0281
Firm-Year	5575	5575	5575	5575
Observations				

Notes: This table reports regressions of bid-ask spread and analyst forecast errors on Transparency Directive over the period 1995 – 2019. P-values are based on robust standard errors clustered two-way at the firm-level and year-level. ***, **, and * indicate two-tailed significance at the 1%, 5%, and 10% level. respectively. All variables are defined in Appendix.

approach to variable definition is more reliable, considering ‘teething’ issues related to compliance in the early years.⁵

3.2.6. Measuring regulatory enforcement

I develop a firm-specific measure of regulatory enforcement, *ENFORCE*, by dividing the number of regulatory supervisors in the UK in a year by a firm’s level of operating activities in that year. The number of supervisory staff is the total number of employees working in FRC (years 1995 – 2019) and FCA (years 2013 – 2019). The firm’s operating activities is measured by the absolute yearly change in operating expenses. This is because firms with more changes to their operating activities are likely to be more difficult to supervise. As a second enforcement metric, I

⁵ My definitions of *TPD* and *IFRS* also helps to avoid potential issues of linear combinations between these two variables in regression estimations.

capture the quality of external audit, *AUDFEE*, measured as the natural log of audit fees. To represent UK firms cross-listed in EU-regulated markets, I develop *EULISTING*, an indicator variable coded 1 if the firm operates in EU-regulated stock exchanges, and 0 otherwise. All other variables used are defined in the Appendix. These variables are based on annual data unless otherwise specified.

4. Results

4.1. Descriptive statistics

Table 1 reports the descriptive statistics of the variables used. The *TPD* observations in the sample are almost evenly divided, with 52 % (2676 firm-years) in the post-adoption period and 48 % (2899 firm-years) in the pre-adoption period. By construction, all values of financial reporting quality (*FRQ*) are less than or equal to 0. Consistent with prior research (Beatty et al., 2010; Bharath et al., 2008; Chen et al., 2017), the mean of *FRQ* is lower than the median, implying left-skewness in distribution. This suggests that while most firms disclose financial reports of comparable quality, a small proportion disclose substantially lower quality financial reports. All four information asymmetry variables (*SPREAD[1]*, *SPREAD[2]*, *AFE[1]*, *AFE[2]*) are right-skewed, implying that the means are greater than the median, consistent with Chowdhury et al. (2016). It suggests that information asymmetry is substantially higher in a small proportion of firms than the rest of the sample. The mean *EQCOST* is higher than the mean *DBCOST*, consistent with the argument that debt financing is cheaper than equity financing. All values of the investment efficiency measures (*INVEFF[1]* and *INVEFF[2]*) are below 0 by construction, and both are left-skewed. With regards to the other variables, 61.5 % of the sample follow IFRS for financial reporting. Similarly, 12.4 % of the sample firm-years report a loss (*LOSS*) and 66.7 % pay cash dividends (*CASHDIV*), while 37 % are cross-listed in EU markets (*EULISTING*). These findings are consistent with research on FTSE All-Share Index firms during similar time periods (e.g. Rahman, 2019; Schleicher & Walker, 2015). The other variables appear to be consistent with extant research (Bharath et al., 2008; Chen et al., 2017).

Table 2 reports the summary statistics of the key variables, divided into pre-adoption (*TPD* = 0) and post-adoption (*TPD* = 1) periods. For each variable, p-values of the t-tests for the differences in sample means between the two periods are reported. The mean of financial reporting quality (*FRQ*) is higher in the post-adoption period while the means of most information asymmetry measures (*SPREAD[1]*, *SPREAD[2]*, and *AFE[2]*) are lower in the post-adoption period. The means of *TOBINSQ*, *DBCOST*, and *WACC* are also lower in the post-adoption period. These results provide some preliminary evidence in support of H1, H2, and H3. The remaining results of this univariate analysis are more mixed. For instance, the results for the mean of *BDYIELD* are not significant while the means of *AFE[1]* and *EQCOST* are significantly higher in the post-adoption period. Similarly, while the evidence on the mean of *INVEFF[1]* is not significant, the mean of *INVEFF[2]* is significantly higher in the post-adoption period, which is consistent with H4.

4.2. Test of H1

H1 predicts that the financial reporting quality in UK firms changes following *TPD* adoption. To test H1, I use multivariate regression(s) of financial reporting quality (*FRQ*) on *TPD* in Eq. (2) as follows⁶:

$$\begin{aligned} FRQ_{it} = & \alpha + \beta_1 TPD_{it} + \beta_2 IFRS_{it} + \beta_3 SIZE_{it} + \beta_4 LEV_{it} + \beta_5 LOSS_{it} \\ & + \beta_6 RET_{it} + \beta_7 STDRET_{it} + \beta_8 EARN_{it} + \beta_9 CHEARN_{it} \\ & + \beta_{10} STDEARN_{it} + \beta_{11} MTB_{it} + \beta_{12} CFO_{it} + \beta_{13} TANG_{it} \\ & + \beta_{14} CASHDIV_{it} + \beta_{15} LIQ_{it} + \beta_{16} DBTA_{it} \\ & + \beta_{17} ENFORCE_{it} + \beta_{18} AUDFEE_{it} + \beta_{19} EULISTING_{it} \\ & + INDUSTRYFE + YEARFE + \varepsilon_{it} \end{aligned} \quad (2)$$

Eq. (2) includes controls for IFRS adoption, *IFRS*, and several determinants of financial reporting quality based on prior research (Bharath et al., 2008; Iatridis, 2011).⁷ The main variable of interest in these models is *TPD*. For H1 to hold, the coefficient of *TPD* in Eq. (2) should be either positive or negative, and significant.

Table 3 reports the results of Eq. (2). The coefficient of *TPD* in the *FRQ* model is positive and statistically significant at the 1 % level. This is consistent with H1 and suggests that the financial reporting quality of UK firms increases following *TPD* adoption.

With regards to the control variables, financial reporting quality is positively associated with buy-and-hold returns (*RET*), annual earnings (*EARN*), loss firms (*LOSS*), and cash flows (*CFO*). Similarly, financial reporting quality is negatively associated with market-to-book value (*MTB*), the variability of returns (*STDRET*), and debt-to-asset ratio (*DBTA*). These results are consistent with prior research (Bharath et al., 2008; Bhattacharya et al., 2013; Chang et al., 2008; Iatridis, 2011).

For robustness, I re-estimate the regression in Eq. (2) but exclude the *IFRS* dummy variable, and then alternatively exclude the variables *ENFORCE*, *AUDFEE*, and *EULISTING*. In all cases, these untabulated results find that the *TPD* coefficient remains positive ($p < 0.01$). This affirms H1. Taking together the results of Table 3 and robustness tests, I conclude that financial reporting quality in UK firms increases following *TPD* adoption.

4.3. Test of H2

H2 predicts that information asymmetry in UK firms changes following *TPD* adoption. To test H2, I first develop in Eq. (3a) regression (s) of the bid-ask spread proxies (*SPREAD[1]* and *SPREAD[2]*) on *TPD*. I then develop in Eq. (3b) regression(s) of analyst forecast error proxies (*AFE[1]* and *AFE[2]*) on *TPD*. Eq. (3a) and (3b) are as follows:

$$\begin{aligned} SPREAD[1]_{it} (or SPREAD[2]_{it}) = & \alpha + \beta_1 TPD_{it} + \beta_2 IFRS_{it} + \beta_3 SIZE_{it} \\ & + \beta_4 LEV_{it} + \beta_5 LOSS_{it} + \beta_6 EARN_{it} \\ & + \beta_7 CHEARN_{it} + \beta_8 STDEARN_{it} \\ & + \beta_9 MTB_{it} + \beta_{10} RET_{it} + \beta_{11} STDRET_{it} \\ & + \beta_{12} LOGPRICE_{it} + \beta_{13} LOGTRVOL_{it} \\ & + \beta_{14} ENFORCE_{it} + \beta_{15} AUDFEE_{it} \\ & + \beta_{16} EULISTING_{it} + INDUSTRYFE \\ & + YEARFE + \varepsilon_{it} \end{aligned} \quad (3a)$$

$$\begin{aligned} AFE[1]_{it} (or AFE[2]_{it}) = & \alpha + \beta_1 TPD_{it} + \beta_2 IFRS_{it} + \beta_3 SIZE_{it} + \beta_4 LEV_{it} \\ & + \beta_5 LOSS_{it} + \beta_6 EARN_{it} + \beta_7 CHEARN_{it} \\ & + \beta_8 STDEARN_{it} + \beta_9 MTB_{it} + \beta_{10} ENFORCE_{it} \\ & + \beta_{11} AUDFEE_{it} + \beta_{12} EULISTING_{it} \\ & + INDUSTRYFE + YEARFE + \varepsilon_{it} \end{aligned} \quad (3b)$$

The difference between Eq. (3a) and (3b) is that the former additionally controls for annual buy-and-hold return (*RET*), return volatility (*STDRET*), and securities trading (*LOGPRICE* and *LOGTRVOL*). The

⁶ Consistent with H1, my research design examines the association between *TPD* adoption and financial reporting quality by comparing the observations in the periods before and after *TPD* adoption, without directly considering firm-level compliance of the *TPD* mandates. I follow a similar research design for testing H2 to H4 and in the supplementary regression analyses in Section 5.2.2.

⁷ I do not claim a direct causal link between the regressand and regressors in this study. Consistent with my hypotheses, the regression models are designed only to test associations between the regressand and regressors.

variables in the models are based on prior literature (Chen et al., 2017; Chowdhury et al., 2016; Gomariz & Ballesta, 2014; Horton et al., 2013; Zhang, 2007). For H2 to hold, the coefficient of *TPD* in Eq. (3) should be either positive or negative, and significant.

Columns (1) and (2) of Table 4 report the results of Eq. (3a) for *SPREAD[1]* and *SPREAD[2]* respectively. Columns (3) and (4) of Table 4 report the results of Eq. (3b) for *AFE[1]* and *AFE[2]* respectively. In Column (1), the coefficient of *TPD* is negative and statistically significant at the 1 % level. Similarly, across Columns (2) to (4), the coefficients of *TPD* are negative and statistically significant at the 5 % level. These results are consistent with H2 and suggest that information asymmetry in UK firms decreases following *TPD* adoption.

In Columns (3) and (4), the coefficients of *IFRS* are negative. This implies that analyst forecast error is lower following the adoption of *IFRS*. I also find that information asymmetry is negatively aligned with *SIZE* and external audit quality (*AUDFEE*), but positively aligned with *EARN* and earnings volatility (*STDEARN*) in at least two of the four columns. In Columns (1) and (2), I find that the bid-ask spread is positively associated with *RET* and *LOGTRVOL* but negatively associated with *LOGPRICE*. These findings are generally supportive of prior literature (Chowdhury et al., 2016; Gomariz & Ballesta, 2014; Horton et al., 2013; Hughes et al., 2008).

Untabulated robustness test results suggest that if the *IFRS* dummy and alternatively the variables *ENFORCE*, *AUDFEE*, and *EULISTING* are excluded from the regressions in Eq. (3), the *TPD* coefficients remain negative in all four cases ($p < 0.05$). This is consistent with H2. Taking together the results of Table 4 and robustness tests, I conclude that the information asymmetry in UK firms decreases following *TPD* adoption.

4.4. Test of H3

H3 predicts that the cost of capital in UK firms changes following *TPD* adoption. To test H3, I develop regressions of cost of capital measures (*EQCOST*, *TOBINSQ*, *DBCOST*, *BDYIELD*, and *WACC*) on *TPD* in Eq. (4) as follows:

$$EQCOST_{it} \text{ (or } TOBINSQ_{it} \text{ or } DBCOST_{it} \text{ or } BDYIELD_{it} \text{ or } WACC_{it}) \\ = \alpha + \beta_1 TPD_{it} + \beta_2 IFRS_{it} + \beta_3 SIZE_{it} + \beta_4 LEV_{it} + \beta_5 LOSS_{it} \\ + \beta_6 RET_{it} + \beta_7 STDRET_{it} + \beta_8 EARN_{it} + \beta_9 CHEARN_{it} \\ + \beta_{10} STDEARN_{it} + \beta_{11} MTB_{it} + \beta_{12} CFO_{it} + \beta_{13} TANG_{it} \\ + \beta_{14} CASHDIV_{it} + \beta_{15} ENFORCE_{it} + \beta_{16} AUDFEE_{it} \\ + \beta_{17} EULISTING_{it} + INDUSTRYFE + YEARFE + \varepsilon_{it} \quad (4)$$

The control variables in Eq. (4) are based on prior literature (Andradre et al., 2014; Chang et al., 2009; Draske, 2006; Hail & Leuz, 2006; Lambert et al., 2007; Leland, 1994). For H3 to hold, the coefficient of *TPD* in Eq. (4) needs to be either positive or negative, and significant.

Table 5 reports the results of Eq. (4). I present the regression results for *EQCOST*, *TOBINSQ*, *DBCOST*, *BDYIELD*, and *WACC* in Columns (1), (2), (3), (4), and (5) of Table 5, respectively. In Columns (1), (2), (3), and (5), I find that the *TPD* coefficients are negative and statistically significant at the 1 % level. Similarly, in Column (4), I find that the *TPD* coefficient is negative and statistically significant at the 5 % level. These results are consistent with H3 and suggest that the cost of capital in UK firms decreases following *TPD* adoption.

In all five models, the coefficients of *IFRS* are negative, which suggests that the adoption of *IFRS* is also associated with lower cost of capital. With regards to the control variables, *SIZE* is positively associated with *BDYIELD* and *WACC*. Further, *STDEARN* is positively aligned with *EQCOST*, *TOBINSQ*, and *WACC*, *LOSS* is positively aligned with *EQCOST* and *WACC*, while *AUDFEE* is negatively aligned with all cost of capital measures except *DBCOST*. My findings are typically consistent with prior literature (Botosan & Plumlee, 2002; Easton, 2004; Horton et al., 2013).

For robustness, I repeat the regressions in Eq. (4) but exclude the *IFRS* dummy, and alternatively exclude the variables *ENFORCE*, *AUDFEE*, and *EULISTING*. In affirmation with H3, in these untabulated results I continue to find that the *TPD* coefficient is negative in all five models ($p < 0.05$). Taking together the results of Table 5 and robustness tests, I conclude that the cost of capital in UK firms decreases following *TPD* adoption.

Table 5
Transparency Directive and cost of capital.

Variables	(1) EQCOST _{ij}	(2) TOBINSQ _{ij}	(3) DBCOST _{ij}	(4) BDYIELD _{ij}	(5) WACC _{ij}
<i>INTERCEPT_{ij}</i>	0.0805***	1.5670***	0.0542*	0.0587***	0.0574***
<i>TPD_{ij}</i>	-0.0208***	-0.2995***	-0.0162***	-0.0052**	-0.0302***
<i>IFRS_{ij}</i>	-0.0396***	-0.4626*	-0.0228*	-0.0293**	-0.0365***
<i>SIZE_{ij}</i>	0.0058	0.1097	0.0071	0.0027*	0.0038***
<i>LEV_{ij}</i>	-0.0003	0.0557	-0.0098	-0.0000	-0.0009
<i>LOSS_{ij}</i>	0.0204***	-0.1015	-0.0258	0.0044	0.0187***
<i>RET_{ij}</i>	-0.0001***	0.0023	0.0000	-0.0000	-0.0001***
<i>STDRET_{ij}</i>	-0.0000	0.0230***	0.0005**	0.0000	0.0000
<i>EARN_{ij}</i>	-0.0037	1.0116***	-0.0511	-0.0022	-0.0046
<i>CHEARN_{ij}</i>	0.0001	0.0002	-0.0000	-0.0000	0.0001
<i>STDEARN_{ij}</i>	0.0708***	2.1362***	-0.0022	-0.0116	0.0564***
<i>MTB_{ij}</i>	0.0634	3.6544**	0.0244	-0.0021	0.0647
<i>CFO_{ij}</i>	0.0178	0.2538	-0.3627*	-0.0231	0.0187
<i>TANG_{ij}</i>	-0.0063**	-0.2163***	0.0409**	0.0239**	-0.0095***
<i>CASHDIV_{ij}</i>	-0.0082	-0.0109	-0.0122	0.0037	-0.0083**
<i>ENFORCE_{ij}</i>	-0.0003	0.2216	0.0027	-0.0001	-0.0007
<i>AUDFEE_{ij}</i>	-0.0020***	-0.2210*	-0.0061	-0.0061***	-0.0023***
<i>EULISTING_{ij}</i>	0.0056	0.0191	0.0062	-0.0006	0.0043
<i>INDUSTRYFE</i>	YES	YES	YES	YES	YES
<i>YEARFE</i>	YES	YES	YES	YES	YES
F-STAT	22.33***	60.47***	37.19***	2.07***	29.54***
ADJ. R-SQ	0.1497	0.3292	0.2300	0.0088	0.1906
Firm-Year Observations	5575	5575	5575	5575	5575

Notes: This table reports regressions of cost of equity, cost of debt, and weighted average cost of capital on Transparency Directive over the period 1995 – 2019. P-values are based on robust standard errors clustered two-way at the firm-level and year-level. ***, **, and * indicate two-tailed significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix.

4.5. Test of H4

H4 predicts that investment efficiency in UK firms changes following TPD adoption. To test H4, I devise regressions of investment efficiency metrics (*INVEFF[1]* and *INVEFF[2]*) on *TPD* in Eq. (5). For completeness, I also examine the level of capital investment (*INV[1]* and *INV[2]*) in addition to the level of investment efficiency after TPD adoption. Eq. (5) is presented as follows:

$$\begin{aligned}
 INV[1]_{it}(\text{or}INV[2]_{it}\text{or}INVEFF[1]_{it}\text{or}INVEFF[2]_{it}) = & \alpha + \beta_1 TPD_{it} + \beta_2 IFRS_{it} + \beta_3 FRQ_{it} + \beta_4 SALES_{it} + \beta_5 STDEBT_{it} + \beta_6 TANG_{it} + \beta_7 STDSALES_{it} \\
 & + \beta_8 TOBINSQ_{it} + \beta_9 CFO_{it} + \beta_{10} STDCFO_{it} + \beta_{11} SIZE_{it} + \beta_{12} MTB_{it} + \beta_{13} LOSS_{it} + \beta_{14} ENFORCE_{it} \\
 & + \beta_{15} AUDFEE_{it} + \beta_{16} EULISTING_{it} + INDUSTRYFE + YEARFE + \epsilon_{it}
 \end{aligned}
 \tag{5}$$

The control variables in Eq. (5) are based on prior literature (Biddle et al., 2009; Gomariz & Ballesta, 2014). For H4 to hold, the coefficient of *TPD* in the *INVEFF[1]* and *INVEFF[2]* models in Eq. (5) should be either positive or negative, and significant.

Table 6 reports the results of Eq. (5). I present the regression results for *INV[1]*, *INV[2]*, *INVEFF[1]*, and *INVEFF[2]* in Columns (1), (2), (3), and (4) of Table 6, respectively. In Columns (1) and (2), the *TPD* coefficient is positive for *INV[1]* ($p < 0.10$) and *INV[2]* ($p < 0.05$), respectively. This suggests that the level of capital investments in UK is higher after TPD adoption. In Columns (3) and (4), the *TPD* coefficients for *INVEFF[1]* and *INVEFF[2]* are both positive and statistically significant at the 5% level. This is consistent with H4 and suggest that investment

Table 6
Transparency Directive, capital investments and investment efficiency.

Variables	(1) INV[1] _{ij}	(2) INV[2] _{ij}	(3) INVEFF [1] _{ij}	(4) INVEFF [2] _{ij}
<i>INTERCEPT_{ij}</i>	0.2460**	0.6031***	-5.7911***	-5.4324***
<i>TPD_{ij}</i>	0.1546*	0.1289**	0.6442**	0.5814**
<i>IFRS_{ij}</i>	-0.0093	-0.0531	2.0981**	2.0994**
<i>FRQ_{ij}</i>	0.0030	0.0013	0.1560*	0.1208
<i>SALES_{ij}</i>	-0.5700***	-0.6792***	-1.0601	-1.0423
<i>STDEBT_{ij}</i>	-0.1502***	0.0329	-1.1753	-1.1464
<i>TANG_{ij}</i>	1.2770***	1.8678***	-3.7796*	-3.8060
<i>STDSALES_{ij}</i>	0.0066	0.1713***	-3.5872***	-3.6588***
<i>TOBINSQ_{ij}</i>	-0.0157	-0.0055	-1.6386*	-1.9026*
<i>CFO_{ij}</i>	-0.3582	-0.3335**	3.7037*	3.8853**
<i>STDCFO_{ij}</i>	-0.3192	-0.4245**	9.8879***	9.9908***
<i>SIZE_{ij}</i>	0.6071***	0.6352***	1.1587	1.1124
<i>MTB_{ij}</i>	0.1730*	0.0287	2.1776	3.0356
<i>LOSS_{ij}</i>	0.0017	-0.0457	0.0487	0.2332
<i>ENFORCE_{ij}</i>	0.0040	0.0022	0.3244	0.3843
<i>AUDFEE_{ij}</i>	-0.0110	-0.0214	-0.0111	0.0285
<i>EULISTING_{ij}</i>	-0.0974	-0.0577	-0.5158	-0.5104
<i>INDUSTRY FE</i>	YES	YES	YES	YES
<i>YEAR FE</i>	YES	YES	YES	YES
<i>F-STAT</i>	72.35***	155.25***	47.40***	42.76***
<i>ADJ. R-SQ</i>	0.3655	0.5752	0.2725	0.2521
<i>Firm-Year</i>	5575	5575	5575	5575
<i>Observations</i>				

Notes: This table reports regressions of capital investments and investment efficiency on Transparency Directive over the period 1995 – 2019P-values are based on robust standard errors clustered two-way at the firm-level and year-level. ***, **, and * indicate two-tailed significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix.

efficiency in UK firms increases after TPD adoption. Taking the results of Columns (1) to (4) together, it appears that after TPD adoption, UK firms have increased both the extent and efficiency of investments.

I also find that the *IFRS* coefficient is positive in the *INVEFF[1]* and *INVEFF[2]* models, implying that investment efficiency is also higher post IFRS adoption. Among the control variables, *TANG* and *SIZE* are positively associated while sales revenue (*SALES*) is negatively associated with both investment level measures. *TANG* is also negatively

associated with *INVEFF[1]*. Both investment efficiency measures are positively associated with the variability of cash flow (*STDCFO*) but negatively associated with the variability of sales (*STDSALES*).

For robustness, I repeat the regressions in Eq. (5) without the *IFRS* dummy and then alternatively without the variables *ENFORCE*, *AUDFEE*, and *EULISTING*. In the untabulated results, I find that both capital investment measures are still positively aligned with TPD adoption ($p < 0.10$). In addition, I continue to find that both measures of investment efficiency are higher post TPD adoption ($p < 0.05$), consistent with H4. Taking together the results of Table 6 and robustness tests, I conclude that investment efficiency in UK firms increases following TPD adoption.

5. Additional analysis

5.1. TPD adoption, cash holdings and dividend payout

The findings in Section 4 suggest that the UK information environment experienced a material improvement following TPD adoption, consistent with the EC’s transparency goals. With higher financial reporting quality and lower information asymmetry, firms are better able to acquire cheap sources of financing. If financing is readily available, firms have little incentive to hoard cash for future projects. In such cases, firms often lower their cash holdings and increase dividend payouts (Dittmar & Mahrt-Smith, 2007; Hasan & Habib, 2020). This is expected to improve investor protection, a primary motive of transparency regulations (EC, 2003, 2011; Link, 2012). First, dividend payments are part of the real returns received by investors. It provides them with a periodic source of income, often with tax advantages, thereby motivating them to re-invest. Second, decreasing cash holdings lowers managerial control over discretionary spending to pursue their own objectives, and thereby avoids potential agency conflicts (Hasan & Habib, 2020; Jensen, 1986).

In light of the above arguments, I now examine if the levels of firms’ cash holdings and dividend payouts changed after TPD adoption. This should provide additional evidence on the efficacy of the TPD in ensuring investor protection. I use two measures of cash holdings: (a) *CASH[1]* is cash and marketable securities divided by lagged total assets, and (b) *CASH[2]* is cash and marketable securities divided by lagged sales revenue. I also use two measures to proxy dividend payout: (a) *DIVPAY[1]* is dividend paid divided by total equity, and (b) *DIVPAY[2]* is dividend paid divided by total assets. I develop in Eq. (6a) regressions of cash holdings on *TPD*, and in Eq. (6b) regressions of dividend payouts on *TPD*. The variables for these models are based on extant literature (Gomariz & Ballesta, 2014; Hasan & Habib, 2020).

$$\begin{aligned}
\text{CASH}[1]_{it}(\text{orCASH}[2]_{it}) = & \alpha + \beta_1 \text{TPD}_{it} + \beta_2 \text{IFRS}_{it} + \beta_3 \text{SIZE}_{it} + \beta_4 \text{LEV}_{it} \\
& + \beta_5 \text{LOSS}_{it} + \beta_6 \text{RET}_{it} + \beta_7 \text{EARN}_{it} + \beta_8 \text{MTB}_{it} \\
& + \beta_9 \text{CFO}_{it} + \beta_{10} \text{CAPEX}_{it} + \beta_{11} \text{R\&D}_{it} + \beta_{12} \text{DACC}_{it} \\
& + \beta_{13} \text{CASHDIV}_{it} + \beta_{14} \text{ENFORCE}_{it} \\
& + \beta_{15} \text{AUDFEE}_{it} + \beta_{16} \text{EULISTING}_{it} \\
& + \text{INDUSTRYFE} + \text{YEARFE} + \varepsilon_{it}
\end{aligned}
\tag{6a}$$

$$\begin{aligned}
\text{DIVPAY}[1]_{it}(\text{orDIVPAY}[2]_{it}) = & \alpha + \beta_1 \text{TPD}_{it} + \beta_2 \text{IFRS}_{it} + \beta_3 \text{SIZE}_{it} + \beta_4 \text{LEV}_{it} \\
& + \beta_5 \text{LOSS}_{it} + \beta_6 \text{RET}_{it} + \beta_7 \text{EARN}_{it} \\
& + \beta_8 \text{MTB}_{it} + \beta_9 \text{CFO}_{it} + \beta_{10} \text{CAPEX}_{it} \\
& + \beta_{11} \text{R\&D}_{it} + \beta_{12} \text{DACC}_{it} + \beta_{13} \text{CASH}[1]_{it} \\
& + \beta_{14} \text{STDRET}_{it} + \beta_{15} \text{ENFORCE}_{it} \\
& + \beta_{16} \text{AUDFEE}_{it} + \beta_{17} \text{EULISTING}_{it} \\
& + \text{INDUSTRYFE} + \text{YEARFE} + \varepsilon_{it}
\end{aligned}
\tag{6b}$$

Columns (1) and (2) of Table 7 report the results of Eq. (6a) for CASH[1] and CASH[2], respectively. Columns (3) and (4) of Table 7 report the results of Eq. (6b) for DIVPAY[1] and DIVPAY[2], respectively. Overall, these results are consistent with the notion of improved investor protection in the UK capital market after TPD adoption. Specifically, the TPD coefficients in Columns (1) and (2) are negative ($p < 0.01$), suggesting that firms exhibit lower cash holdings following TPD adoption. In addition, the TPD coefficients in Columns (3) and (4) are positive ($p < 0.01$), suggesting that firms have greater dividend payouts following TPD adoption.

Similarly, the IFRS coefficients are negative in Columns (1) and (2) but positive in Columns (3) and (4), consistent with improved investor protection after IFRS adoption. With respect to the control variables, in both CASH[1] and CASH[2] models, the coefficients of MTB are positive while the coefficients of CASHDIV are negative. In both DIVPAY[1] and

Table 7
Transparency Directive, cash holdings, and dividend payout.

	(1)	(2)	(3)	(4)
Variables	CASH[1] _{ij}	CASH[2] _{ij}	DIVPAY [1] _{ij}	DIVPAY [2] _{ij}
INTERCEPT _{ij}	0.1087***	0.2303***	-0.2087***	-0.2736***
TPD _{ij}	-0.0170***	-0.0618***	0.1084***	0.1649***
IFRS _{ij}	-0.0440**	-0.0743*	0.1518**	0.1467**
SIZE _{ij}	0.0016	0.0014	0.0160***	0.0143***
LEV _{ij}	0.0005	-0.0111	-0.0001	0.0000
LOSS _{ij}	0.0164**	0.0255	-0.0559***	-0.0882***
RET _{ij}	0.0001***	0.0003	-0.0001	0.0001**
EARN _{ij}	0.0077	0.2332	0.0940*	0.0757*
MTB _{ij}	0.1027**	0.0665**	-0.1366*	-0.1362**
CFO _{ij}	0.0980**	-0.3990**	0.1897**	0.1663**
CAPEX _{ij}	-0.0035	0.0455**	-0.0268**	-0.0236**
R&D _{ij}	0.2143***	-0.0030	0.2341***	0.2326***
DACC _{ij}	-0.0026***	-0.0025	-0.0035**	-0.0030**
CASHDIV _{ij}	-0.0163***	-0.1074**		
ENFORCE _{ij}	-0.0019*	-0.0011	-0.0156	-0.0077
AUDFEE _{ij}	-0.0005	0.0048	0.0146**	0.0170**
EULISTING _{ij}	0.0005	0.0256	0.0336	-0.0577*
CASH[1] _{ij}			-0.1509**	-0.0979*
STDRET _{ij}			-0.0003*	-0.0003*
INDUSTRY FE	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES
F-STAT	19.43***	3.81***	27.22***	30.62***
ADJ. R-SQ	0.1295	0.0222	0.1779	0.1964
Firm-Year	5575	5575	5575	5575
Observations				

Notes: This table reports regressions of cash holdings and dividend payout on Transparency Directive over the period 1995–2019P-values are based on robust standard errors clustered two-way at the firm-level and year-level. ***, **, and * indicate two-tailed significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Appendix.

DIVPAY[2] models, SIZE, EARN, CFO, and AUDFEE exhibit positive coefficients, but MTB, capital expenditure (CAPEX), and accruals management (DACC) exhibit negative coefficients.

5.2. Examining the changes post TPD amendment

I now turn my focus on the TPD amendment of 2013 which led the FCA to abolish the mandatory IMS requirement for UK firms from 2014 onwards. During the consultation process of this amendment, the EC (2011) argued that making the disclosure of IMSs voluntary for firms would not hamper investor protection, but instead would further improve market efficiency. Consistent with this view, Ernstberger et al. (2017) suggest that increased financial reporting frequency induced by mandatory IMS disclosures is expected to exacerbate managerial pressures for meeting short-term profit targets, increasing their motives for earnings management. Arguably, this problem can be alleviated by abolishing the mandate to disclose IMSs. However, other studies suggest that abolishing mandatory IMSs may not completely remove them from the market. For instance, Link (2012) argues that firms in well-developed EU capital markets (such as the UK) are unlikely to fully withdraw the IMS because both managers and investors find it useful. Consistent with this assertion, Schleicher and Walker (2015) and Rahman (2019) report that most FTSE All-Share Index constituents continue to disclose IMSs voluntarily after the TPD amendment. Proponents of mandatory quarterly reporting also argue that withdrawing IMSs may increase information asymmetry in the market. In this connection, Watanabe et al. (2019) find that the share prices become less informative about firms after TPD amendment.

5.2.1. IMS disclosure level before and after TPD amendment

Section 4 compares the market-level impact before and after TPD adoption without explicitly considering firm-level compliance with the TPD rules. To supplement this analysis, I first assess the number of firms that complied with the IMS mandate in the pre-amendment period and then compare it to the number of firms that voluntarily disclosed an IMS in the post-amendment period. The TPD amendment came into effect from November 7, 2014 onwards. My post TPD adoption sample of 2899 firm-year observations consists of 1558 observations before that date (pre-amendment period) and 1341 observations after that date (post amendment period). Using the Filings Expert database, I obtain firm-specific regulatory filings archives that matches with 1471 of my 1558 firm-years in the pre-amendment period. I now count the number of IMSs available in the Filings Expert database which correspond to this 1471 firm-years. I identify an IMS using a two-step approach. In the first step, I classify a disclosure as an IMS if it is titled: 'Interim Management Statement'. In the second step, I classify any trading update for the first and third quarters as an IMS if they contain the information firms are required to provide in an IMS, namely a description of the firm's quarterly financial performance, financial position, and trading outlook.⁸ In total, I find 1451 first-quarter IMSs and 1398 third-quarter IMSs that correspond to the 1471 firm-years in the pre-amendment period. This implies that, on average, 99 % (95 %) of firms complied with the IMS mandate in the first (third) quarter.⁹

I then estimate the number of voluntary IMS disclosers in the post amendment period. In the Filings Expert database, I obtain company filings that matches with 1268 of my 1341 firm-years in the post-amendment period. During this period, I find a total of 1006 first-quarter IMSs and 346 third-quarter IMSs that correspond to the 1268

⁸ The second identifier is important because from its inception, some firms have referred to the IMS as simply a 'trading update'.

⁹ The level of IMS disclosure is lower in 2007 than in the subsequent years. This supports the findings of Deloitte and Touché's (2008) survey and Schleicher and Walker (2010), who attribute this to compliance-related 'teething' issues in the first year of IMS implementation.

firm-years. This implies that, on average, 79 % (27 %) of firms voluntarily disclosed an IMS in the first (third) quarter. A comparison of the level of IMS disclosure between the pre-amendment and post-amendment periods suggest that IMS disclosure in both the first and third quarters is considerably lower in the post-amendment period. In particular, IMS disclosure declines by 20 % in the first quarter and 68 % in the third quarter in the post-amendment period. On average, about 21 % of firms do not disclose an IMS in either of the quarters.

Finally, I ascertain the nature of firms that are most likely to voluntarily disclose an IMS to date. For this, I select 2019 – the final year of my sample. I find in the *Filings Expert* database matching records for 243 firms in 2019. I first categorize these firms by their size index (FTSE 350 or FTSE Small-Cap) and then count the number of firms that disclosed an IMS. Consistent with the [EC \(2011\)](#), my results suggest that small firms are more likely to withdraw their IMSs in a voluntary reporting regime. Specifically, I find that 94 % (33 %) of FTSE 350 (Small-Cap) Index firms disclose at least one IMS and 72 % (15 %) disclose both IMSs in 2019. I observe that the first-quarter IMS is often disclosed as a combined AGM Trading Statement while the third-quarter IMS is typically disclosed as a stand-alone trading update. Overall, I conclude that while the majority of UK firms continue to disclose one IMS voluntarily during the year (typically in the first quarter), only about one-third of UK firms continue to disclose both IMSs. If IMSs contain incremental value-relevant information, then the withdrawal of a significant number of IMSs are expected to, at least in part, deteriorate the UK information environment after the amendment. Given this, the next section examines potential changes in the UK information environment post TPD amendment.

5.2.2. Examining the efficacy of the TPD amendment

I now examine the efficacy of the TPD amendment for the UK. The results in [Tables 2 through 7](#) suggest that since the adoption of TPD in 2007, the UK capital market experienced an overall improvement in the information environment. Arguably, abolishing mandatory IMSs suggests that regulators may be prepared to trade off some improvement in the information environment to attain their amendment goals, such as a lower cost burdens for firms. However, their decision to retain most of the TPD rules suggests that regulators are also unlikely to allow the information environment to deteriorate beyond the pre-adoption level. Given this, a fair test of whether the amendment has adversely affected its transparency goals is to compare the observations in the post-amendment period with the pre-adoption period. If the post-amendment period still represents a better information environment than the pre-adoption period, then a case can be made for the efficacy of the modified DTR rules post amendment. To examine this, I exclude from my sample all firm-year observations after TPD adoption and before TPD amendment. This leaves me with a total of 4017 firm-year observations for analysis, consisting of 2676 observations in the pre-adoption period and 1341 observations in the post-amendment period.

I now re-estimate the full regression models in [Eqs. \(2\) through \(6b\)](#) using this sample of 4017 observations. [Table 8](#) reports the summaries of these regression estimates. Column (1) of [Table 8](#) reports the *TPD* coefficient for each regression model. This coefficient now represents the association between the TPD (in the post-amendment period) and the dependent variable of the model. Columns (2) and (3) of [Table 8](#) report the F-statistics and the adjusted R-Squared for each regression model. Column (4) of [Table 8](#) identifies the relevant regression model while Column (5) of [Table 8](#) indicates whether the dependent variable of the model is significantly higher or lower in the post-amendment period. All other variables in [Eqs. \(2\) through \(6b\)](#) are included in their respective regression models but are untabulated in [Table 8](#) for brevity. Overall, the results in [Table 8](#) are consistent with my main results in [Tables 3 through 7](#). In particular, the positive *TPD* coefficients in Column (1) suggest that financial reporting quality (*FRQ*), investment efficiency (*INVEFF[1]*, *INVEFF[2]*), and dividend payout (*DIVPAY[1]*, *DIVPAY[2]*) are higher in the post-amendment period than in the pre-adoption period. Similarly,

Table 8

Transparency Directive: Summaries of regressions comparing pre-adoption and post-amendment periods.

Dependent Variable	(1) TPD _{ij}	(2) F-STAT	(3) ADJ. R-SQ.	(4) MODEL	(5) POST AMEND
<i>FRQ_{ij}</i>	0.1424***	44.12***	0.3058	Eq. (2)	Higher
<i>SPREAD[1]_{ij}</i>	-0.0469**	78.86***	0.4179	Eq. (3a)	Lower
<i>SPREAD[2]_{ij}</i>	-0.0319*	71.17***	0.3928	Eq. (3a)	Lower
<i>AFE[1]_{ij}</i>	-0.0028***	9.52***	0.0655	Eq. (3b)	Lower
<i>AFE[2]_{ij}</i>	-0.0020*	4.57***	0.0285	Eq. (3b)	Lower
<i>EQCOST_{it}</i>	-0.0112***	18.91***	0.1450	Eq. (4)	Lower
<i>TOBINSQ_{it}</i>	-0.1998***	53.27***	0.3311	Eq. (4)	Lower
<i>DBCOST_{it}</i>	-0.0096***	105.22***	0.4967	Eq. (4)	Lower
<i>BDYIELD_{it}</i>	0.0022	7.67**	0.0594	Eq. (4)	Inconclusive
<i>WACC_{it}</i>	-0.0208***	28.29***	0.2053	Eq. (4)	Lower
<i>INV[1]_{ij}</i>	0.1537*	68.21***	0.3826	Eq. (5)	Higher
<i>INV[2]_{ij}</i>	0.1393**	126.14***	0.5646	Eq. (5)	Higher
<i>INVEFF[1]_{ij}</i>	0.5727**	41.91***	0.2739	Eq. (5)	Higher
<i>INVEFF[2]_{ij}</i>	0.4515**	46.51***	0.2956	Eq. (5)	Higher
<i>CASH[1]_{ij}</i>	-0.0101*	20.63***	0.1532	Eq. (6a)	Lower
<i>CASH[2]_{ij}</i>	-0.0341**	11.56***	0.0887	Eq. (6a)	Lower
<i>DIVPAY[1]_{ij}</i>	0.0985***	25.52***	0.1884	Eq. (6b)	Higher
<i>DIVPAY[2]_{ij}</i>	0.1377***	28.27***	0.2052	Eq. (6b)	Higher
Total Firm-Year Observations = 4017 (all regressions)					

Notes: This table reports the summaries of 18 regression models for 4017 firm-year observations, with 2676 observations in the pre-TPD adoption period and 1341 observations in the post-TPD amendment period. TPD: Value of TPD coefficient in the regression model. P-values of the TPD coefficient are based on robust standard errors clustered two-way at the firm-level and year-level. ***, **, and * indicate two-tailed significance at the 1%, 5%, and 10% level, respectively. POST AMEND: reports whether the TPD coefficient is higher or lower in the post-amendment period than the pre-adoption period. All variables are defined in Appendix.

the negative *TPD* coefficients in Column (1) indicate that information asymmetry (*SPREAD[1]*, *SPREAD[2]*), cost of capital (*EQCOST*, *TOBINSQ*, *DBCOST*, *WACC*), and cash holdings (*CASH[1]*, *CASH[2]*) are lower in the post-amendment period than in the pre-adoption period. In total, the *TPD* coefficients in 17 of the 18 regression models in [Table 8](#) produce a result that is qualitatively similar to the corresponding regressions in [Tables 3 through 7](#). This suggests that the UK information environment in the post-amendment period is better than the pre-adoption period. Hence arguably, amending the TPD has not hampered its original transparency goals in the UK capital market.

Finally, I compare the UK financial information environment in the post-amendment period with the pre-amendment period. If the information environment either improves or remains unchanged after the amendment, then a case can be made for the relevance of the existing DTR rules. This will also support my findings in [Table 8](#). However, if the information environment significantly deteriorates after the amendment, then UK regulators may find the pre-amendment TPD (and the original DTR rules with mandatory IMSs) to be more useful. To examine this, I now repeat the full model regressions in [Eqs. \(2\) through \(6b\)](#) on my post TPD adoption sample (2899 firm-year observations) to compare the pre-amendment period (1558 observations) with the post-amendment period (1341 observations). I make one minor modification in these regression models by replacing the variable *TPD* with *POST*, which represents the post-amendment period. *POST* is an indicator variable coded 1 if the financial year-end is on or after November 7, 2014, and 0 otherwise.

Table 9

Transparency Directive: summaries of regressions comparing pre-amendment and post-amendment periods of TPD adoption.

	(1)	(2)	(3)	(4)	(5)
Dependent Variables	POST _{ij}	F-STAT	ADJ. R-SQ.	MODEL	POST AMEND
FRQ _{ij}	0.0067**	15.51***	0.1528	Eq. (2)	Higher
SPREAD[1] _{ij}	-0.1112**	34.19***	0.2493	Eq. (3a)	Lower
SPREAD[2] _{ij}	-0.1004**	33.37***	0.2447	Eq. (3a)	Lower
AFE[1] _{ij}	0.0020	10.28***	0.0741	Eq. (3b)	Inconclusive
AFE[2] _{ij}	0.0067*	7.26***	0.0513	Eq. (3b)	Higher
EQCOST _{it}	-0.0213*	38.69***	0.2807	Eq. (4)	Lower
TOBINSQ _{it}	0.2111**	101.28***	0.5093	Eq. (4)	Higher
DBCOST _{it}	-0.0236	7.35***	0.0617	Eq. (4)	Inconclusive
BDYIELD _{it}	-0.0241	1.45*	0.0047	Eq. (4)	Inconclusive
WACC _{it}	-0.0239*	50.73***	0.3398	Eq. (4)	Lower
INV[1] _{ij}	0.0706	38.45***	0.2726	Eq. (5)	Inconclusive
INV[2] _{ij}	0.0879	95.92***	0.5066	Eq. (5)	Inconclusive
INVEFF[1] _{ij}	0.0005	37.60***	0.2681	Eq. (5)	Inconclusive
INVEFF[2] _{ij}	-0.0125	31.14***	0.2317	Eq. (5)	Inconclusive
CASH[1] _{ij}	-0.0081*	16.00***	0.1305	Eq. (6a)	Lower
CASH[2] _{ij}	-0.0816**	8.80***	0.0724	Eq. (6a)	Lower
DIVPAY[1] _{ij}	0.1477***	28.29***	0.2203	Eq. (6b)	Higher
DIVPAY[2] _{ij}	0.1788***	31.65***	0.2409	Eq. (6b)	Higher
Total Firm-Year Observations = 2899 (all regressions)					

Notes: This table reports the summaries of 18 regression models for 2899 firm-year observations of post-TPD adoption period, with 1558 observations in the pre-TPD amendment period and 1341 observations in the post-TPD amendment period. POST: Value of POST coefficient in the regression model. P-values of the POST coefficient are based on robust standard errors clustered two-way at the firm-level and year-level. ***, **, and * indicate two-tailed significance at the 1%, 5%, and 10% level, respectively. POST AMEND: reports whether the POST coefficient is higher or lower in the post-amendment period than the pre-amendment period. All variables are defined in Appendix.

The results of these regressions are summarized in Table 9. Column (1) of Table 9 reports the POST coefficient for each regression model. Columns (2) through (5) of Table 9 are similar to Table 8. All other variables in Eqs. (2) through (6b) are included in the respective regression models but are untabulated in Table 9 for brevity. In Column (1), FRQ is higher in the post-amendment period ($p < 0.05$), suggesting that financial reporting quality continues to increase post amendment. With regards to information asymmetry, I find that both measures of bid-ask spread (SPREAD[1] and SPREAD[2]) are lower in the post-amendment period ($p < 0.01$). However, the results for analyst-forecast error are more mixed. Specifically, the result for AFE[1] is not significant while AFE[2] is higher in the post-amendment period ($p < 0.10$). With regards to my cost of capital measures, EQCOST and WACC are both lower in the post-amendment period ($p < 0.10$). However, TOBINSQ is higher ($p < 0.05$) post-amendment while the results for both cost of debt measures (DBCOST and BDYIELD) are not significant. The results for both investment efficiency measures (INVEFF[1] and INVEFF[2]) are also not significant. Cash holdings (CASH[1] and CASH[2]) continue to decrease ($p < 0.10$) while dividend payout (DIVPAY[1] and DIVPAY[2]) continues to increase ($p < 0.01$) following the amendment. In total, out of the 18 regression models in Table 9, the TPD coefficients in 9 models suggest an improvement in the information environment post-amendment while the TPD coefficients in another 7 models are inconclusive (not significant), both supporting a case for the existing DTR rules. The TPD coefficients in only 2 of the 18 regressions (AFE[2], TOBINSQ) suggest that the pre-amendment information environment

was better. Arguably, these results strengthen my earlier findings of Table 8 and support a case for the post-amendment DTR rules to continue post Brexit.¹⁰

6. Discussion and conclusions

The end of the Brexit transition period on December 31, 2020 coincided with the height of the Covid-19 pandemic that resulted in significant restrictions on normal business activities. As the UK economy recovers from the Covid-19 pandemic, the UK Government proposed the ‘Brexit Freedoms Bill’ to make it easier to reform EU-era regulations (Dooley, 2022; Fleming, 2022). In this context, I examine the extent to which the TPD induced DTR rules have attained their regulatory goals in the UK. I find that financial reporting quality and investment efficiency increases while information asymmetry and cost of capital decreases in UK firms after TPD adoption. These results are consistent with the goals established by the EC in 2004 and concurrently endorsed by the UK Government. In supplementary analysis, I find that cash holdings decreases while dividend payout increases in UK firms post TPD adoption. These trends do not seem to reverse after the TPD was amended in 2014, consistent with its long-term efficacy for the UK capital market. As such, my results provide support for the existing DTR rules to continue post Brexit.

Nevertheless, the aforementioned results should be interpreted with a few caveats. First, my research design limits the sample to UK firms only. Hence, these results may not be applicable to other EU countries. This contrasts with Christensen et al. (2016) who examine several countries with staggered TPD introduction. Second, related to the previous caveat and consistent with my regression models, I do not claim direct causality between TPD adoption in the UK and changes in the levels of financial reporting quality, cost of capital, information asymmetry, and investment efficiency. Instead, I only argue that these capital market changes take place following TPD adoption. Third, my post TPD amendment period analysis complements Watanabe et al. (2019)’s findings implying lower share price informativeness in the first two years post-amendment. In this regard, my results do not provide evidence of a systematic change in information asymmetry post-amendment. Arguably, several key aspects of my research design may be attributed for this, including differences in the test variables, research settings (single vs multiple country setting with varying interim reporting requirements), and comparing different pre and post amendment periods. Finally, my empirical analysis does not explicitly examine firm-level compliance with the TPD mandates, but instead compares the overall information environment in the periods before and after TPD adoption (and amendment). Further analysis may be necessary to investigate firm-specific differences in TPD compliance, including why a large number of firms withdrew IMSs post amendment.

The chief criticism of the TPD is that its implementation increases the cost burdens for firms (EC, 2003, 2011). This includes disclosure and other administrative costs, the costs of revealing proprietary information to the market, and the costs of managerial short-termism (Link, 2012). In essence, this argument led to the abolishment of mandatory quarterly reporting (EC, 2011). In the absence of the TPD post Brexit, the existing DTR rules are operating without a functional legislative backup. However, my results do not imply that the UK Government should either transpose the TPD into UK law or re-instate the pre-amendment DTR rules. Specifically, if the TPD goals are attained by retaining the existing DTR rules in place, then one might argue it is not necessary to transpose

¹⁰ A caveat to interpreting the results in Table 9 is that the descriptive evidence in Section 5.2.1 suggests a sharp decline in the level of IMS disclosure post amendment, particularly in the third quarter. Therefore, it is difficult to postulate whether the inferences made from the results in Table 9 are applicable for a scenario where all (or most) firms continue to disclose two IMSs voluntarily in a year.

the TPD into UK law. Related to this, I make some observations on the prospect of quarterly reporting in UK. On the one hand, advocates for tighter regulatory control may call for making the IMS mandatory again. The IMS prescribed in the original TPD was a compromise solution between a fully-fledged US-style quarterly report and no quarterly reporting at all (Schleicher & Walker, 2015). It relieved firms from the burden of disclosing complete financial statements and allowed firms some flexibility in the content and timing of disclosure while providing users with decision-useful information. Thus arguably, the IMS retains much of the benefits of quarterly statements while limiting its costs. On the other hand, a major concern of limited government advocates is that increasing reporting mandates imposes additional compliance costs on business providers. In the aftermath of the Covid-19 pandemic, this viewpoint also appears to align with the UK Government's position that excessive business regulations must not hamper economic recovery (Fleming, 2022; Thomas et al., 2021). Given that at least some firms seem to benefit from not disclosing IMSs (arguably, save costs) while the majority of firms disclose one IMS voluntarily in the year, it may make sense not to mandate IMS disclosures.

The departure of the UK from the EU heightens the policy relevance of examining the efficacy of other EU directives, including financial reporting regulations in the UK that originate from the Accounting Directive, the Market Abuse Directive, and the Prospectus Directive. The current study may also be replicated in other EU contexts. For instance, it is interesting to examine the impact of the TPD on cost of capital and

investment efficiency in EU Member States with weaker regulatory enforcement, or with code law practices. Studies can also seek to estimate the real costs of regulatory compliance for firms. Additional research can examine changes in narratives and other lexical features of financial reports before and after TPD adoption. Future studies can also provide cross-country comparisons on the effects of TPD with more extensive transparency legislations, such as the S-Ox Act or Regulation FD.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

All data used in this study are publicly available from the sources identified in the paper.

Appendix. . Variable definitions

Variable	Definition
TPD	Indicator variable for Transparency Directive coded 1 if the financial year-end is on or after January 20, 2007, and 0 otherwise.
FRQ	The first principal component of $FRQ[1]$, $FRQ[2]$ and $FRQ[3]$. $FRQ[1]$ is measured as the absolute value of discretionary accruals computed as per Dechow and Dichev (2002), multiplied by -1 . $FRQ[2]$ is measured as the absolute value of discretionary accruals computed as per Teoh et al. (1998), multiplied by -1 . $FRQ[3]$ is measured as the absolute value of discretionary accruals computed as per Dechow et al. (1995), multiplied by -1 .
SPREAD[1]	The average difference between the daily ask price and the daily bid price over the year.
SPREAD[2]	The median difference between the daily ask price and the daily bid price over the year.
AFE[1]	The difference between actual annual earnings and median consensus yearly earnings forecast, scaled by share price at the start of the year.
AFE[2]	The difference between actual annual earnings and the last available yearly earnings forecast, scaled by share price at the start of the year.
EQCOST	Cost of equity based on the dividend capitalization model, the growth rate of dividend payment, divided by the share price.
TOBINSQ	The sum of market value of equity and book value of debt, divided by book value of total assets.
DBCOST	Interest expense multiplied by $(1 - \text{effective tax rate})$, divided by total debt. Effective tax rate is approximated by the annual tax expenses divided by pre-tax income.
BDYIELD	Interest expense for the year divided by total debt.
WACC	The weighted average cost of capital based on the proportion of equity and debt in the capital structure, multiplied by EQCOST and DBCOST respectively.
INV[1]	Net increase in property, plant and equipment and intangible assets scaled by lagged total assets.
INV[2]	Net book value of property, plant and equipment and intangible assets scaled by lagged total assets.
INVEFF[1]	Absolute value of the residual of regressing $INV[1]$ on lagged annual sales growth, multiplied by -1 .
INVEFF[2]	Absolute value of the residual of regressing $INV[2]$ on lagged annual sales growth, multiplied by -1 .
IFRS	Indicator variable for accounting standards coded 1 if the financial statements were prepared following IFRS, and 0 otherwise.
SIZE	Natural logarithm of total assets.
LEV	Long-term debt divided by total assets.
LOSS	Indicator variable coded 1 if the net income is negative, and 0 otherwise.
RET	Annual buy-and-hold raw returns.
STDRET	Standard deviation of RET over the previous four years.
EARN	Net income before extraordinary items, divided by lagged total assets.
CHEARN	Annual change in net income before extraordinary items, divided by lagged total assets.
STDEARN	Standard deviation of EARN over the previous four years.
MTB	Market value of equity divided by book value of equity.
CFO	Operating cash flow divided by lagged total assets.
TANG	Property, plant, and equipment divided by lagged total assets.
CASHDIV	Indicator variable coded 1 if the firm pays cash dividends, and 0 otherwise.
LIQ	Total volume of shares divided by the number of shares outstanding.
DBTA	Total debt divided by total assets.
ENFORCE	Total number of employees working in Financial Reporting Council (FRC) and Financial Conduct Authority (FCA) in a year, divided by the absolute yearly change in operating expenses of the firm.
AUDFEE	Natural logarithm of audit fees.
EULISTING	Indicator variable coded 1 if the firm is listed in an EU regulated stock exchange, and 0 otherwise.
LOGPRICE	Natural logarithm of the share price at the financial year-end date.
LOGTRVOL	Natural logarithm of the share trading volume at the financial year-end date.
CASH[1]	Cash and marketable securities divided by lagged total assets.
CASH[2]	Cash and marketable securities divided by lagged total sales revenue.

(continued on next page)

(continued)

DIVPAY[1]	Dividend paid divided by total equity.
DIVPAY[2]	Dividend paid divided by total assets.
CAPEX	Net increase in property, plant and equipment during the year scaled by lagged total assets.
R&D	Research and development expenses divided by lagged total sales.
SALES	Natural logarithm of sales revenue.
CHSALES	Sales growth, measured as the annual change in sales revenue.
STDEBT	Standard deviation of DBTA over the previous four years.
STDCFO	Standard deviation of CFO over the previous four years.
STDSALES	Standard deviation of SALES over the previous four years.
INDUSTRY	Industry Fixed Effects includes eight ICB classification 1/0 indicator variables, omitting 'Oil and Gas'.
FE	Year Fixed Effects includes 24 1/0 indicator variables for each year in sample, omitting the year 1995.
YEAR FE	

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