Environmental, Social and Governance Sustainability Disclosures: Evidence from EU and US

Zabihollah Rezaee*
Fogelman College of Business and Economics
Crews School of Accountancy
University of Memphis,
Memphis, Tennessee, 38152, USA
Zrezaee@memphis.edu

Saeid Homayoun
Faculty of Education and Economics,
University of Gävle, Gävle, Sweden
Saeid.Homayoun@hig.se

Ehsan Poursoleyman
Faculty of Economics and Management,
Urmia University, Urmia, Iran
E.Poursoleyman@urmia.ac.ir

***Corresponding Author**

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ABSTRACT

We examine whether higher levels of environmental, social, and governance (ESG) sustainability disclosures are attained under voluntary or mandatory disclosure regimes. We use the regulatory differences between the United States (US) and European Union (EU) settings, as firms in the US are currently disclosing ESG information on a voluntary basis, whereas their counterparts in the EU are required to disclose such information starting fiscal year 2017. Drawing on a sample of 2563 firm-year observations from the US and EU in a period from 2007-2019, we report three main findings: (1) for the full sample period, EU firms have an overall higher ESG disclosure relative to US firms; (2) EU firms outperform US firms under voluntary disclosure requirements (2007-2016); (3) after 2017, the ESG disclosure of EU firms further improves relative to US firms. Taken together, our results suggest that the 2017 adoption of disclosure guidelines in the EU is associated with improvements in EU firms' ESG disclosure. We contribute to the literature by examining ESG disclosure under voluntary and mandatory regimes and whether the EU disclosure guidance has influenced disclosure of non-financial ESG sustainability information. Our results are robust after performing additional analyses in addressing potential endogeneity concerns. Overall, our findings have policy, practical, and research implications, as they underscore the importance of more rigorous ESG sustainability disclosures.

Keywords: ESG sustainability disclosure, listed firms, CSR, disclosure guidance

JEL classification: E01, F18, F64, G28

1. **Introduction**

Corporate disclosure, in either mandatory or voluntary form, represents the backbone of financial markets worldwide. Recent years have marked a global move toward business sustainability in creating shared value for all firm stakeholders. Voluntary and mandatory disclosures of environmental, social, and governance (ESG) sustainability information are emerging as investors, particularly institutional investors, continue to demand more sustainability information (Wilcox, 2019). Anecdotal evidence indicates that investors have started to integrate non-financial ESG sustainability factors into their investment decisions (IRRCi, 2018; CFA Institute, 2018).[1] The 2020 United States Government Accountability Office (USGAO) report indicates that many investors seek ESG information to better understand risks that could affect financial performance (UCGAO, 2020). Prior research addresses the importance and relevance of sustainability disclosures (e.g., Ioannou and Serafeim, 2012 and 2019; Unerman and Chapman, 2014; O'Dwyer and Unerman, 2016; Ng and Rezaee, 2015 and 2020; Jain et al., 2016; Khan et al., 2016; Lopez-de-Silanes et al., 2019; Grewal et al., 2018 and 2020), suggesting that mandated ESG disclosure has a positive effect on ESG performance outcomes such as greenhouse gas emissions (Tomar, 2019), mine safety (Christensen et al., 2017), and pollutants (Chen et al., 2018). Motivated by prior research, we examine whether higher levels of ESG sustainability disclosure are attained under voluntary or mandatory disclosure regimes.

A related but different study by Ioannou and Serafeim (2019) also examines the consequences of mandatory corporate sustainability reporting using a different setting as explained in the following sections. To address our research, we utilize the regulatory differences between the United States (US) and European settings concerning ESG disclosure. Specifically, in the US, ESG disclosure is done voluntarily, whereas in 2017, it is mandatory for the European Union (EU) companies to disclose non-financial ESG sustainability information under the Directive 2014/95/EU (EU, 2014).[2] According to the EU Directive, transparency can be achieved

[1] Rezaee and Fogarty (2019) classify ESG sustainability factors into ESG sustainability performance, disclosure, and risk. ESG disclosure and ESG performance are different, as financial performance is different from financial disclosure; however, they are interrelated and positively correlated (Ng and Rezaee, 2015; Jain et al., 2016; Khan et al., 2016; Grewal et al., 2020). ESG disclosure scores measure the extent of disclosure that a firm provides on ESG topics (e.g., how many environmental topics a company covers in its sustainability report), whereas ESG performance scores focus on outcomes (e.g., actual levels of greenhouse gas emissions). In this study, we focus on ESG sustainability disclosure and consequently refer to ESG scores throughout the text as ESG disclosure.

[2] Similar to other regulatory initiatives in Europe (e.g., corporate governance), the Directive 2014/95/EU requires firms to "comply or explain."

through better disclosure practices, which leads to more sustainable firm policies. While the EU Directive intends to incentivize more structured and comparable ESG reporting, the early evidence suggests that the market anticipates increased costs of compliance associated with the EU Directive (Grewal et al., 2018). Companies worldwide have developed reporting strategies according to different country characteristics (Matten and Moon, 2008; Lopez-de-Silanes et al., 2019) and made voluntary disclosures years before this regulatory development (Jackson et al., 2020).[3] Additionally, it is unclear what are the incremental benefits associated with the formal implementation of guidelines for ESG reporting because the effect of changes in reporting standards is likely to be significant only when accompanied by changes in enforcement (Christensen, Hail, and Leuz, 2013; Barth and Israeli, 2013). Thus, whether and the extent to which ESG disclosure regulators attain their objectives is an empirical question that we aim to answer in this study.

A stream of prior studies reports that US firms have higher innate incentives to perform better in terms of sustainability reporting than their counterparts worldwide (Maignan and Ralston, 2002; Brammer and Pavelin, 2005). Another stream of research shows that the difference in ESG sustainability disclosure between the US and other countries (e.g., European, Asian, Latin American, and African) has significantly decreased as non-US firms start to adopt rigorous ESG reporting practices (Chappie and Moon, 2005; Puppim de Oliveira and Vargas, 2005; Visser, Middleton and Mclntosh, 2005). Thus, under voluntary reporting regimes, a clear differentiation between the ESG disclosures of EU and US firms is not obvious. Nonetheless, it is possible that EU firms, in compliance with the EU Directive, improve their ESG disclosures compared to US firms. Alternatively, an ineffective EU Directive would lead to an insignificant change between the ESG disclosure of EU firms relative to their US counterparts. Thus, it is unclear, *ex-ante*, whether US firms have higher, similar, or lower ESG disclosure levels than EU firms under either the voluntary or mandatory regime. These possibilities introduce tension in our main research question of, "Do US firms show similar ESG disclosure levels compared to EU firms in the pre- and post-EU Directive?" In line with this argument, we construct two hypotheses. In the voluntary reporting period, we posit that US firms are likely to have similar levels of ESG

[3] Specifically, voluntary disclosure often takes the form of corporate responsibility reports and responses to surveys or data requests. The fourth generation (G4) of GRI's Guidelines covers economic, governance, social, and environmental disclosure (GRI, 2013). The SASB (2013) suggests that sustainability disclosures be made as a complete set in the Management's Discussion and Analysis of Financial Condition and Results of Operations.

disclosure relative to their EU counterparts. Furthermore, we expect that EU firms increase their ESG disclosure in the post-adoption period (after 2017) and, therefore, expand the difference relative to US firms.

To test our hypotheses, we draw on a complete sample of 2,563 firm-year observations from both US and EU listed companies from 2007-2019. We construct non-financial ESG disclosures relying on the ASSET4 database of the Thomson Reuters' ESG Research Data as an important source of reliable firm-level ESG measures (Ioannou and Serafeim, 2012; Rees and Rodionova, 2015). To gauge the effect of multiple disclosure requirement regimes, we hypothesize and perform five sets of tests as depicted in Figure 1 and explained in detail in Section 3. First, we assess the differences in ESG sustainability disclosure between the US and EU listed firms for the entire period of our sample (2007-2019).[4] We find that US firms have a significantly lower ESG disclosure relative to their European counterparts. Moreover, we find that the effect is driven by environmental and social scores but not governance score. One possible explanation is that corporate governance measures after the Sarbanes-Oxley Act of 2002 were significantly strengthened in the US (Rezaee and Fogarty, 2019).

Second, we examine the differences between the US and EU firms' ESG disclosures under voluntary disclosure initiatives (only in the pre-adoption period, 2007-2017). We do this to investigate the inherent differences between the two settings under the same voluntary initiatives. Our results suggest that in the pre-adoption period US firms exhibit significantly lower ESG sustainability disclosures than their counterparts in the EU. We document that the effect is mainly driven by relative differences in social and environmental scores. One possible explanation for these results is that US regulations are aimed at corporate governance effectiveness (e.g., SOX Act of 2002) whereas EU regulations are more focused on social and environmental dimensions of sustainability, as explained in Section 2.

Third, we examine the relative effect of the switch from voluntary to mandatory ESG sustainability disclosures (the adoption effect). The results of our difference-in-difference (DID) test suggest that the difference in ESG disclosure between US and EU firms increase for all dimensions subsequent to the adoption

[4] We realize that the US is a one-country setting while the EU is a multiple-country setting, and thus, the difference between the US and EU could be driven by the variations within the EU. We control for firm-specific and country-specific factors to mitigate the ESG disclosure variations within the EU.

of the disclosure requirements. Taken together, our results suggest that the disclosure requirements adopted in the EU have had a positive effect on the ESG disclosure of EU-listed firms.

[Insert Figure (1) Here]

Our study differs from Ioannou and Serafeim (2019), contributes to the literature on non-financial ESG disclosure, and provides policy, research, and practical implications in several ways. First, our setting is different from that of Ioannou and Serafeim (2019) as they examine the consequences of mandatory corporate sustainability reporting by using data from countries that mandated ESG disclosure (e.g., China, Denmark, Malaysia, and South Africa) . Furthermore, Ioannou and Serafeim (2019) use data spanning the period of 2005-2012 prior to the move toward mandatory ESG disclosure (e.g., GRI, 2018), whereas we examine ESG disclosure under both voluntary and mandatory regimes in more recent years, as ESG sustainability reporting has recently gained attention and significantly advanced (Rezaee and Fogarty, 2019; GRI, 2018; KPMG, 2017). We examine differences in the US and EU settings, where EU firms are required to disclose ESG information starting in fiscal year 2017, whereas US companies are not. One would expect that the business environment and culture in the EU are more similar to the US than Asian counties studied by Ioannou and Serafeim (2019), and thus, the results could be different.

Second, our results regarding the value-relevance of ESG sustainability disclosure support a move toward mandatory ESG disclosure in the context of integrated sustainability reporting promoted by international organizations (Global Reporting Initiative, International Integrated Reporting Council). The International Financial Reporting Standards (IFRS) is currently considering achieving further global consistency and reducing complexity in sustainability reporting by providing more uniform ESG disclosures (IFRS, 2020). Third, our findings are relevant to current debates among global policymakers, regulators, standard setters, the business community, and the accounting profession in improving the quantity and quality of ESG sustainability disclosure by standardizing voluntary or mandatory reporting on ESG sustainability information (Rezaee and Fogarty, 2019). Results support the recently proposed rules for public comment by the Department of Labor (DOL) that would regulate ESG investments by enabling fiduciaries of private-sector retirement plans to consider investments based on ESG factors of performance, disclosure, and risk (DOL, 2020).

Fourth, our results support current initiatives that have been taken by global regulators and stock exchanges (EU, 2014; HKEx, 2015) in recommending and/or requiring listed companies to disclose their ESG

sustainability information to portray an accurate and comprehensive corporate reporting (Rezaee and Fogarty, 2019). Institutional investors and asset managers do indeed use ESG disclosures in their investment decisions and portfolio performance assessments (Rezaee and Fogarty, 2019). Our results support recent initiatives by global regulators (EU and SEC) in requiring the use of ESG risks and opportunities in investment decisions and proper disclosure. Finally, this study contributes to the extant literature on corporate social responsibility (CSR) and ESG sustainability (e.g., Huang and Watson, 2015; Rezaee, 2016; Grewal et al., 2018) and the value-relevance of ESG/CSR disclosure (Friedman and Heinle, 2016).

The remainder of this paper is structured as follows: Section 2 presents sustainability initiatives and regulatory background in the US and EU. Section 3 discusses related literature and hypothesis development. Section 4 describes the research method, including sample selection, variable construction, and methodology. Section 5 presents the baseline results, and Section 6 presents additional tests and their results. The final section concludes the paper.

2. **Sustainability Initiatives and Regulatory Background**

An emerging trend in the business and academic communities is that conventional financial reports do not portray a complete and comprehensive picture of a company's financial health, sustainability, and risk factors, and thus, corporate reporting should reflect both financial economic sustainability performance (ESP) and non-financial ESG sustainability performance (Wilcox, 2019; Rezaee and Fogarty, 2019). Sustainability initiatives are designed to maximize corporate social benefits while minimizing the conflicts between corporations, society, and the environment caused by differences between private and social costs and benefits and to align corporate goals with those of society. Nonetheless, the proper measurement, as well as accurate and reliable disclosure of sustainability performance, and effective assessment of sustainability risks remain major challenges for organizations of different types and sizes, mostly because of inadequate disclosure guidelines (Rezaee and Fogarty, 2019). Several organizations worldwide, including the Global Reporting Initiative (GRI), International Integrated Reporting Council (IIRC), and Sustainability Accounting Standards Board (SASB) have issued guidelines regarding voluntary disclosure of sustainability information. These guidelines have been considered by over 15,000 public companies in producing stand-alone integrated sustainability reports (Rezaee and Fogarty, 2019). The Delaware Certification of Adoption of Transparency and Sustainability Standards Act

(the "Act") was signed into law on June 27, 2018, enabling Delaware-governed entities to voluntarily disclose their commitment to CSR and sustainability (Delaware's Act 2018). The Business Roundtable (BRT), in August 2019, announced the adoption of a new Statement on the Purpose of a Corporation, signed by 181 high-profile chief executive officers (CEOs), which promotes the move toward ESG sustainability performance and disclosure (BRT, 2019).

Responding to the worldwide move toward structured disclosure guidelines, regulators in the EU have made important steps toward increasing the completeness and comparability of listed firms' ESG disclosures. Specifically, on October 22, 2014, The European Commission adopted Directive 2014/95/EU, which stipulates that starting from fiscal year 2017, EU companies must provide disclosures of non-financial ESG sustainability information. Companies and their stakeholders, including investors and society at large, are expected to benefit from this increased transparency of non-financial ESG sustainability information. The EU Directive provides non-binding guidelines in facilitating the disclosure of non-financial information by large public companies—firms with over 500 employees and yearly sales of over 40 million EUR or net income of over 20 million EUR (EU Directive 2014/95/EU; Grewal et al., 2018). The new regulation also provides large companies significant flexibility to disclose non-financial information either as a separate report or an integrated report along with financial information (EU, 2014). It is possible that different implementation approaches chosen by the various EU countries could determine how the implementation of mandated ESG disclosure affects ESG disclosure levels, ESG disclosure quality (comparability and credibility), and the value-relevance of ESG information (GRI, 2018). For example, while some EU countries require sustainability disclosure in annual financial reports, others allow disclosures to be made in standalone sustainability reports, and certain EU countries could require more extensive auditor involvement (e.g., Belgium, Denmark, and France). We control for country-specific variables including implementation methods in our analyses.

To further improve ESG disclosure, on November 27, 2019, the European Parliament and the Council of the European Union passed disclosure regulations relevant to ESG information for the financial sector (EDR, 2019). The recent European regulations on ESG disclosures will take effect on March 10, 2021, and are intended to enhance the transparency of ESG disclosures and integrate them into investment decisions and recommendations (EDR, 2019). Overall, the new requirements are comprehensive and are likely to encourage corporate best practices that would ultimately incentivize adopting firms to increase their ESG sustainability

disclosure. Regulators in the UK and the EU have recently proposed additional ESG disclosures to promote sustainable economic activity. For example, the UK's Financial Conduct Authority (FCA) published a consultation paper in March 2020 proposing that certain U.K firms make climate change disclosures (UK/FCA, 2020).

The International Financial Reporting Standards (IFRS) Foundation's consultation on establishing a global non-financial ESG reporting framework has highlighted the need for global sustainability reporting standards and received strong support from investors, the corporate sector, the accounting professionals, policymakers, regulators, and central banks (IFRS, 2020). These sustainability disclosure initiatives, whether mandatory or voluntary, are intended to reflect the financial, social, and environmental impacts of a company's business operation and, thus, provide relevant and reliable financial and non-financial information for all stakeholders including investors. There are debates among policymakers and scholars that international accounting standard-setters such as the Financial Accounting Standards Board (FASB) and International Accounting Standards Board (IASB) should issue accounting standards for proper disclosure of ESG sustainability information (Barker and Eccles, 2018; Wilcox, 2019). Our study contributes to these practical and policy debates by addressing voluntary and mandatory ESG disclosure regimes.

3. **Literature Review and Hypothesis Development**

3.1. ***Prior Research***

Several lines of research address the importance of either mandatory or voluntary ESG sustainability disclosures and their relationship with financial and market performance. A stream of research examines the value-relevance of ESG sustainability disclosure. Voluntary disclosures of ESG and the value relevance of such disclosures are intended to lend more credibility and supplement mandatory reported financial information. Voluntary ESG disclosures should also improve the precision of the performance signal and, thus, result in more informationally efficient stock prices (Healy, Hutton, and Palepu, 1999; Gelb and Zarowin, 2002; Lundholm and Myers, 2002; Ettredge et al., 2005). Lee, Walker and Zeng (2017) find that state subsidies have a significant impact on corporate social responsibility (CSR) voluntary disclosure, particularly when subsidies are granted through non-tax based compared with tax-based channels. Eng and Mak (2003) find that lower managerial ownership and

material government ownership are linked to increased voluntary disclosure whereas an increase in outside directors is negatively associated with corporate voluntary disclosure.

Focusing primarily on ESG disclosure, another stream of research addresses whether firms that disclose ESG sustainability information have experienced lower cost of capital (Dhaliwal et al., 2011 and 2012; Ng and Rezaee, 2015), are less likely to engage in earnings management (Kim et al., 2012; Rezaee and Tuo, 2017) and experience lower cost of debt (Ghoul et al., 2011; Ye and Zhang, 2011). Sustainability reporting is voluntary, and thus, it is possible that the decision to disclose is related to the current earnings quality and future earnings prospects (Lys, Naughton, and Wang 2015, in the case of CSR disclosure). Grewal, Riedl, and Serafeim (2018) find an overall negative market reaction (-0.79%) to mandatory non-financial ESG disclosure across all firms with a less negative impact for firms with higher predictive ESG factors of performance and disclosure. Recently, Grewal, Hauptmann, and Serafeim (2020) report a positive relationship between a firm's voluntary SASB-related sustainability disclosures and stock price informativeness, and this association is stronger for firms with higher exposure to sustainability issues, greater institutional and socially responsible investment fund ownership, poorer sustainability ratings, and financial analyst coverage. Peter and Romi (2013) document that voluntary disclosure incentives affect compliance with mandatory environmental disclosures in the sense that firms are more likely to provide sanction (mandatory) disclosures if they operate in environmentally sensitive industries and are voluntarily participating in a supplemental environmental project.

Ioannou and Serafeim (2019) examine the consequences of mandatory corporate sustainability reporting by investigating four countries that mandated ESG disclosure (China, Denmark, Malaysia, and South Africa) and find that, relative to US companies that were not affected by ESG disclosure requirements and to the pre-regulation period when disclosure is voluntary, firms in these four countries increased ESG disclosure levels following the regulations. Ioannou and Serafeim (2019) further document that firms affected by disclosure mandates voluntarily adopted assurance and reporting guidelines and the increases in ESG disclosure resulting from the regulations are associated with increases in firm value as measured by Tobin's Q. In summary, sustainability-related studies provide evidence of a positive association between ESG sustainability disclosure and cost of capital, quality of reported earnings, market performance, and, thus, firm value. Therefore, sustainability reporting firms are under closer scrutiny and more pressure from their socially responsible and environmentally conscientious investors to focus on long-term impacts of climate change and environmental

innovations and, thus, provide disincentives and fewer opportunities for short-termism. Firms that disclose sustainability information tend to focus on long-term sustainable economic performance. Our study contributes to the literature on business sustainability by investigating whether better ESG sustainability disclosure is attained under a voluntary regime than mandatory compliance.

3.2. ***Hypothesis Development***

The theoretical intuition for our prediction of higher ESG disclosure under regulatory requirements than voluntary compliance follows the signaling theory. Hummel and Schlick (2016) find that firms with superior ESG sustainability performance choose high-quality sustainability disclosures to signal their superior ESG sustainability performance consistent with signaling/voluntary disclosure theory. Conversely, firms with poor ESG sustainability performance exhibit low-quality sustainability disclosure to protect their legitimacy according to legitimacy theory (Rezaee and Tuo, 2017). Other studies (Lys et al., 2015; Jain et al., 2016) report that firms may commit to good CSR and disclose ESG information in the current period when they anticipate stronger future financial performance.

We argue that ESG sustainability disclosures can improve the firm's communication and reporting with all inside and outside stakeholders and shareholders. First, ESG sustainability disclosures can improve transparency, which in turn enables more effective monitoring of management to act in the best interest of all stakeholders (e.g., Healy, Hutton, and Palepu, 1999; Jensen, 2001; Rezaee, 2016). Second, increased ESG sustainability disclosure can enable stakeholders (e.g., institutional investors, analysts, creditors, government, suppliers, society) to develop their own independent and informed views on firms' sustainable performance in all areas of economic, environmental, social, ethical, and governance activities. Third, a focus on sustainability disclosure encourages management to pursue firm value maximization that benefits all stakeholders (Jensen, 2001; Rezaee, 2016; Rezaee and Fogarty, 2019). More transparent sustainability disclosures on long-term economic and ESG performance create opportunities to identify and correct operational inefficiencies, reputational and financial risks that would improve economic performance.

We examine differences in the ESG disclosure of US and EU firms under both voluntary and mandatory reporting regimes. We conduct our analyses in three stages. First, we examine ESG sustainability disclosure for the entire 2007-2019 sample period to determine the overall differences in ESG sustainability disclosure scores

between US and EU firms regardless of the impacts of voluntary or mandatory disclosure initiatives. This analysis provides us with overall differences in ESG disclosures in two different settings (US and EU) affected by cultural, regulatory, and political environment regardless of mandatory or voluntary regime. Second, we investigate ESG disclosure scores of US firms compared to EU firms under the same voluntary regime for the pre- and post-2017 regulatory adoption to determine whether other factors (cultural economic, and social environmental) affect the level of ESG disclosure. Finally, we examine the differences in ESG disclosure levels of US firms and EU firms under the two separate voluntary and mandatory regimes to determine the incremental impact of the ESG mandatory disclosure adoption for EU firms compared to the US.

Regarding the overall comparison between US and EU firms' ESG disclosures, we consider the voluntary incentives of US firms to explicitly develop and articulate sustainability best practices (Matten and Moon, 2008). Moreover, the evidence in previous comparative studies suggests that the US firms have higher innate incentives to perform better in terms of sustainability reporting (Maignan and Ralston, 2002; Brammer and Pavelin, 2005). Given the long-lasting tradition and development of homogeneous best sustainability disclosure practices, one expects that the European firms are likely to have an overall higher ESG disclosure when compared with similar US companies. This comparison is important because the perception is that EU firms are more focused on achieving the interests of all stakeholders under the stakeholder primacy concept, whereas US firms are still pursuing the goal of maximizing shareholder wealth under the shareholder primacy concept (Rezaee and Fogarty, 2019). However, *ex ante,* it is not clear whether EU firms exhibit higher ESG disclosure than their US counterparts under either the voluntary or mandatory regime or combined regimes. Therefore, we focus our comparative analysis under voluntary and mandatory reporting regimes (Figure 1) on both the composite ESG disclosure and on its three components of environmental (E), social (S), and governance (G) as stated in the following hypothesis:

Hypothesis 1: ***In general, firms in EU exhibit higher levels of ESG disclosures relative to their counterparts in US.***

Under the voluntary regime, firms might increase their ESG sustainability disclosures to signal their superior sustainability performance and, regardless of region (e.g., US or EU), to show that they are, "good corporate citizens." Further, when developing our separate expectations for the voluntary and mandatory

disclosure requirements, we consider that differences are likely to be similar under the voluntary regime. Nonetheless, due to the relative lack of awareness and well-developed ESG tools under the voluntary reporting regime, it is likely that the difference between US and European firms is insignificant. As before, we focus our comparative analysis under the voluntary regime on both the composite ESG disclosure and on its three components. Prior studies (e.g., Maignan and Ralston, 2002; Brammer and Pavelin, 2005) find that US firms have higher incentives to voluntarily disclose their ESG information than their counterparts worldwide. Other studies (e.g., Chappie and Moon, 2005; Puppim de Oliveira and Vargas, 2005; Visser, Middleton and Mclntosh, 2005) report that the difference in ESG sustainability disclosure between the US and other countries (e.g., European, Asian, Latin American, African) has significantly decreased as non-US firms start to adopt rigorous ESG reporting practices. Thus, under voluntary reporting regimes, a clear differentiation between the ESG disclosures of EU and US firms is not obvious even though anecdotal and empirical evidence suggests higher ESG for EU firms. We, therefore, formulate the following hypothesis:

Hypothesis 2: Firms in EU exhibit higher levels of ESG disclosures relative to their counterparts in US under a voluntary regime.

Next, we investigate the incremental impact of the disclosure regulation adoption on the possible differences in ESG disclosure between US and European firms. The literature describes instances when non-US firms made significant progress in developing their ESG reporting (Chappie and Moon, 2005; Puppim de Oliveira and Vargas, 2005; Visser, Middleton and Mclntosh, 2005), which likely led to an improvement in their ESG disclosures compared to those of US firms. This hypothesis is driven from Ioannou and Serafeim (2019)'s study using the EU setting and the various implementation tactics adopted by EU countries. Due to increased awareness and standardized ESG tools that the EU regulation adoption is likely to bring, we expect an incrementally higher post-adoption ESG disclosure for the EU firms relative to US firms. Alternatively, while we cannot rule out potential increases in ESG disclosure under the post-2017 mandatory reporting regime, we expect that the sustainability disclosure of EU firms will still be higher than that of EU firms. These possibilities introduce tension into our hypotheses, as stated as follows:

Hypothesis 3: Firms in EU exhibit higher levels of ESG disclosures relative to US firms under a mandatory regime.

Hypothesis 4: Mandatory disclosure has had a positive effect on the level ESG disclosures in EU firms.

Hypothesis 5: The superiority of ESG disclosure in EU corporations relative to US firms is greater under a mandatory regime as compared to a voluntary regime.

4. Research Method

4.1. *Sample Selection*

To construct our sample, we use (1) all European public companies that are required to disclose their ESG sustainability starting with the financial year of 2017 and (2) a comparable sample of public companies in the US that disclose their ESG sustainability information on a voluntary basis. We draw on multiple data sources for obtaining different types of information. Our starting point is all listed firms with available information in the Thomson Reuters' ASSET4 database.[5] Specifically, we require that all firms have a stand-alone sustainability report. ASSET4 provides readily available disclosure scores on three fronts: environmental, social, and governance.[6] Further, to obtain financial information regarding EU and US firms, we use Datastream, the World Bank, and KOF Swiss Economic Institute.

Our sample consists of 2,563 firm-year observations over the 2007-2019 period. The sample's distribution is represented in Table 1. According to this table, the US has 710 and the EU has 1,853 observations. The greatest contribution among EU countries we selected — 14 countries — is made jointly by France and Germany. Regarding the distribution by the industry, consumer discretionary and industrials take the lead with 575 and 555 observations, respectively. The lowest number of observations is related to the utilities and energy sectors, with the values of 91 and 81, respectively. In Panel C, the sample's distribution by year shows that the number of observations is increasing in recent years.

[Insert Table 1 Here]

[5] The ASSET4 database is a recognized provider of objective, relevant, and systematic environmental, social, and governance (ESG) firm-level information by using more than 250 key disclosure indicators (KPIs) and 750 individual data points, along with their original data sources. (http://www.trcri.com/index.php?page=ASSET4; http://extranet.datastream.com/data/ASSET4%20ESG/Index.htm)

[6] ASSET4 represents the only source of environmental scores whose construction is not based on survey data. See for example https://ink.library.smu.edu.sg/cgi/viewcontent.cgi?article=5961&context=lkcsb_research or http://nrs.harvard.edu/urn-3:HUL.InstRepos:9887635.

4.2. *Variable Construction*

4.2.1. *Dependent Variables*

In recent years, ASSET4 has become an attractive source of data for academic scholars from various disciplines who aim to construct reliable firm-level measures of corporate social disclosure or ESG disclosure (Ioannou and Serafeim, 2012; Ghoul, Guedhami, and Kim, 2016). Following previous literature, we also rely on this databank for measuring the ESG disclosure levels. ASSET4 provides variables and indicators for each of the environmental, social, and governance components separately. ASSET4 does not give a specific index or variable for the level of ESG disclosure, although it provides an overall score of ESG performance and the total performance for its pillars as well as sub-pillars. Besides the overall and categories scores, this databank provides 466 indicators for each firm-year observation, consisting of 184, 146, and 136 for social, corporate governance, and environmental pillars, respectively. We, therefore, create a variable for ESG disclosure based on the indicators but not the performances. To this end, we peruse the indicators' definitions, and based on it and the measurement of the indicators, we measure ESG disclosure. By way of illustration, one of the indicators of the environmental aspect of ESG is related to ozone-depleting substances with the Eikon code of *ENERDP032*. In this indicator, if a corporation gives information on the amount of these kinds of substances, we give the value 1 to this indicator and 0 otherwise. Likewise, for the other indicators, we also do the same approach according to the indicators' definitions and measurement. We then aggregate the dummies to measure ESG disclosure. We consider four variables as proxies for ESG disclosure levels: (1) *Dis_ESG* denotes the overall level of ESG disclosure; (2) *Dis_E* represents the environmental aspect of ESG disclosure level; (3) *Dis_S* is the social aspect of ESG disclosure level; and (4) *Dis_G* is the corporate governance aspect of ESG disclosure level. In a nutshell, the higher value of these variables represents the higher level of ESG disclosure.

4.2.2. ***Independent and Control Variables***

Our independent and control variables consist of country-specific and firm-specific characteristics as discussed below.

Country-specific characteristics. We use country-specific controls, since prior research documents that firms' ESG disclosure represents a strategic response to the institutional environment where they operate (Jackson & Apostolakou, 2010). Given this, we consider that the ESG disclosure level of firms is likely to be

significantly affected by the national, cultural, and institutional differences among countries. Following Liang & Renneboog (2017), we include the globalization index (*KOFIndex*) and the annual growth of gross domestic product (*GDPGrowth*) as our country-specific characteristics.

Firm-specific characteristics. Aside from country-level determinants of ESG disclosure, we also consider in our analyses the influence of firm-specific characteristics. Given that firm-specific characteristics also affect ESG disclosure level, we use return on assets (*ROA*), firm size (*Size*), closely held shares (*CloselyHeldShares*), selling, general, and administrative expenditures (*SGAExp*), research and development intensity (*R&DExp*), the volume of sales (*Sale*) as well as its growth (*SaleGrowth*), and financial leverage (*Leverage*). We expect the ESG disclosure level to increase in *ROA*, and *Size* (Campbell, 2007; Ioannou & Serafeim, 2012). Finally, closely held firms (*CloselyHeldShares*), are expected to perform lower on the disclosure level of ESG due to possible agency problems (Ioannou & Serafeim, 2012; Rees & Rodionova, 2015).

4.3. ***Methodology***

To examine the implications of voluntary and mandatory disclosure regimes on ESG disclosure level, we perform different sets of tests. First, we examine the relative difference between the ESG disclosure of EU and US firms for the entire test period (testing Hypothesis 1), under a voluntary disclosure regime (testing Hypothesis 2) and under a mandatory disclosure system (testing Hypothesis 3). To this end, following Ioannou & Serafeim (2012), Bertomeu & Magee (2015), and Ghoul et al. (2016) we estimate Model (1):

$$〚Dis〛\_(i,t)\text{^}j = \beta\_0 + \beta\_1 \; 〚EU〛\_(i,t) + \beta\_2 \; 〚FirmCharacteristics〛\_(i,t) + \beta\_3 \; 〚CountryCharacteristics〛\_(i,t) + IndustryDummies + CountryDummies + TimeDummies + FirmFixedEffects + \varepsilon\_0 \quad (1)$$

where superscript *j* indexes the ESG disclosures variables, consisting of *Dis_ESG*, *Dis_E*, *Dis_S*, and *Dis_G*. *EU* represents an indicator variable taking the value of 1 for firms listed in EU and 0 otherwise. The coefficient of *EU* captures the relative ESG disclosure of US and EU firms. *FirmCharacteristics* is a vector of the following control variables: *Size*, *CloselyHeldShares*, *Leverage*, *ROA*, *Sale*, *SaleGrowth*, *R&DExp*, and *SGAExp*. *CountryCharacteristics* also is a vector of the country-level control variables, including *GDPGrowth* and *KOFIndex*. We regress Model (1) using three different periods: (1) *2007-2019*. During this time frame, the

coefficient *EU* represents the relative ESG disclosure of US and EU firms regardless of the differences between ESG disclosure systems. (2) *2007-2016.* This time frame relates to the years prior to the adoption of mandatory ESG disclosure. During this time frame, the coefficient of *EU* captures the relative ESG disclosure of US and EU firms under a voluntary disclosure regime. (3) *2017-2019.* This period relates to the years following the adoption of mandatory disclosure. In this time frame, the beta of *EU* can show differences in the level of ESG disclosures between EU and US firms under a mandatory disclosure regime. We rely on the time frame of 2007-2019 for evaluating the first hypothesis but use the 2007-2016 and 2017-2019 periods for analyzing the second and third hypotheses, respectively.

Although the results that will be obtained from Model (1) can provide evidence for the verification of Hypotheses 4 and 5 and could be infer that the superiority of ESG disclosure level of EU firms relative to US firms. To directly test hypothesis 4 and 5to determine whether the adoption of mandatory disclosure has led to the improvement in the level of ESG disclosures in EU firms relative to US firms, we use alternative models to verify these hypotheses directly and provide strong evidence. To this end, we use the following models:

$$Dis_{i,t}^{j} = \beta_0 + \beta_1 Adoption_{i,t} + \beta_2 FirmCharacteristics_{i,t} + \beta_3 CountryCharacteristics_{i,t} + IndustryDummies + CountryDummies + TimeDummies + FirmFixedEffects + \varepsilon_0 \quad (2)$$

We first estimate Model (2) using the full sample and then restrict the sample to the corporations headquartered in the EU to test the fourth hypothesis. In supporting this hypothesis, the coefficient of *Adoption* is expected to be positively significant. Regarding the differences in ESG disclosure between US and EU firms over the years succeeding the adoption of mandatory disclosure, we enter a dummy variable as well as its interaction effect with the variable *EU* in Model (2) and estimate the following model:

$$〚Dis〛\_(i,t)\hat{}j = \beta\_0 + \beta\_1 \ 〚EU〛\_(i,t) + \beta\_2 \ 〚Adoption〛\_(i,t) + \beta\_3 \ 〚Adoption \times EU〛\_(i,t) 〚+ \ \beta〛\_4 \ 〚FirmCharacteristics〛\_(i,t) + \beta\_5 \ 〚CountryCharacteristics〛\_(i,t) + IndustryDummies + CountryDummies + TimeDummies + FirmFixedEffects + \varepsilon\_0 \quad (3)$$

For confirming the fifth hypothesis, the betas of *EU* and *Adoption*×*EU* are expected to be positive and meaningful.

5. **Results**

5.1. ***Descriptive Statistics***

We provide a description of our sample characteristics in Table 2. While reporting the entire sample over the whole period in Panel A, we split the sample into EU and US firms and compare the descriptive statistics of the ESG-related variables of each of these two over two different periods preceding and following the adoption of mandatory disclosure. *Dis_ESG* in Panel A has a mean of 103.9. The greatest contribution to this variable is made by *Dis_G* with the mean of 57.56; however, the other two make relatively similar contributions. The superiority of the corporate governance dimension is also observable in Panel B and C where we provide descriptive statistics for each of the samples of the EU and US firms independently. The striking point is that the contribution of corporate governance in US firms is considerably greater than those in EU firms. In Panel B, which is related to the sample of EU firms, the contributions of governance in the years before and after the adoption are 43.56% (47.59/109.24) and 40.60% (54.38/133.94), respectively. However, in those firms from the US, these values are 74.07% (68.12/91.97) and 75.98% (66.99/88.17), confirming that corporate governance measures in the post-Sarbanes-Oxley Act of 2002 were significantly strengthened in the US (Rezaee and Fogarty, 2019). Regarding the comparison of the means of ESG-related variables, the untabulated z-test shows that the means of the social and environmental dimensions of ESG disclosure in EU firms is meaningfully greater than those in US firms. On the other hand, the governance aspect bucks the trend, and its mean for US firms is greater than that of EU firms. Moreover, Panel B shows that *Dis_ESG*'s mean in the years succeeding the adoption is significantly greater (133.94>109.24), confirming that the adoption has increased the level of disclosure. However, Panel C illustrates that the mean of *Dis_ESG* in both the periods of 2007-2016 and 2017-2019 are comparable with the values of 91.97 and 88.17 respectively. Turning to the control variables, there seems to be no problem in terms of the distribution indexes as they are comparable with the previous literature (see, Ioannou & Serafeim, 2019; Poursoleyman et al., 2021)

[insert Table 2 here]

Table 3 provides information about the Pearson and Spearman correlation matrixes for the variables. In this table, the highest correlation is spotted between *Size* and *Sale* with the values of 0.462 and 0.491 in Pearson and Spearman sections, respectively. Therefore, the likelihood of collinearity seems to not exist in this study.

The high correlations between ESG-related variables cannot create any problem for the results of the models because we will include each of which independently as dependent variable in the models.

[insert Table 3 here]

*5.2. **Main Regression Results***

We test our H1, in predicting that the ESG disclosure of EU firms throughout the sample period is expected to be higher than that of US firms, using Model (1) with the full sample and report them in Table 4. In the first equation, we include the overall ESG disclosure measure as the dependent variable, while in the remaining equations the pillars of ESG disclosures are included (Equations 2-4). The results show that the coefficient of *EU* in Equation (1) is positively significant (49.829; p-value<0.01), indicating that EU corporations enjoy higher levels of ESG disclosure relative to US firms. Replacing *Dis_ESG* as the dependent variable by *Dis_E* and *Dis_S* in Equations (2) and (3), we find that the coefficient of *EU* is still positive. However, when we include the governance component of ESG disclosure, the coefficient becomes a negative value. Taken together, our results show that the levels of social and environmental dimensions of ESG disclosure in EU firms are higher than those of US firms whereas the level of corporate governance dimension of ESG disclosure in US firms is higher than that in EU firms. The initial evidence for the finding relating to corporate governance pillar is observed in the descriptive statistics table (Table (3)), as the mean of corporate governance in US firms is shown to be higher than that in EU firms. In a nutshell, the ESG disclosure advantage of EU firms are mainly driven by their environmental and social disclosure.

[insert Table 4 here]

In the second and third hypotheses, we predicted the same trend while this time under a voluntary and mandatory disclosure systems respectively. To verify them, we estimate Model (1) using the time frame of 2007-2016 (pre-adoption of mandatory disclosure) and 2017-2019 (post-adoption of mandatory disclosure) for the second and third hypotheses, respectively. The regressions results are summarized in Table 5. The odd equations are related to the period of voluntary disclosure regime and the even equations to the mandatory disclosure regime. In the first two equations, we consider *Dis_ESG* as our dependent variable. The coefficient of *EU* in Equation (1) is significantly smaller than that in Equation (2) (19.911, p-value<0.01; 62.541, p-value<0.01). Therefore, we can conclude from the first equation's result that EU firms exhibit higher levels of ESG disclosures relative to US firms under a voluntary disclosure system. This finding can confirm the second

hypothesis. When it comes to the mandatory regime, Equation (2) represents the same trend while this time with greater value. This also, in turn, supports the third hypothesis. We also consider the components of ESG disclosures as the dependent variable in other equations (Equations 3-8). In Equations 3 and 4 where the dependent variable is the environmental dimension, the same results are spotted. Regarding the social aspect of ESG disclosure which is summarized in Equations (5) and (6), we can see the same outcomes as well. While, when we replace *Dis_ESG* with *Dis_G* the results change dramatically. In Equations (7) and (8), *Dis_G* has negatively meaningful (-10.708; p-value<0.01) and positively meaningless (2.348; p-value>0.1) coefficients, suggesting that the governance aspect of ESG disclosure in US firms is greater than that in EU firms in the years preceding the adoption of mandatory disclosure. This is in line with what we obtain in Table 4.

[insert Table 5 here]

Table 6 reports the regressions estimated using Model (2). In this table the odd equations are related to the sample of both EU and US firms while the even ones are related to only EU firms. Similar to Tables 4 and 5, the first two equations are estimated using *Dis_ESG* as the dependent variable, while Equations 3-8 are estimated using the pillars of ESG disclosure. *Adoption* has a positive and meaningful coefficient in all the equations at the 99% confidence level with the exception of those equations estimated using the corporate governance aspect of ESG disclosure; in the equations relating to governance, *Adoption* lacks a meaningful coefficient. In a nutshell, the adoption of mandatory disclosure has improved the level of environmental and social components of ESG disclosure in EU firms. This finding can, in turn, support the fourth hypothesis.

[insert Table 6 here]

For the last hypothesis, the differential ESG disclosure of EU relative to US firms between the pre- and post-adoption periods, we estimate Model (3) and summarize the regressions results in Table 7. In this table, the first column is estimated using *Dis_ESG*, while the other three equations are estimated using the components of ESG disclosure. The coefficient of *EU* in the first equation is meaningfully positive (30.898, p-value<0.01), representing that ESG disclosure of EU firms is greater than that of US firms. Regarding the variable *Adoption*, the coefficient is positive (6.443, p-value<0.01), indicating that the adoption of mandatory disclosure has improved ESG disclosure level. These findings are in line with what we presented in Tables (4) and (5). While regarding the interaction effect, this variable has a positive coefficient (3.125, p-value<0.05), illustrating that the adoption of mandatory disclosure increases the positive association between *EU* and *Dis_ESG*. By way of

illustration, the ESG disclosure of EU firms relative to US firms is greater under a mandatory regime as compared to a voluntary regime. This result can confirm our fifth hypothesis. Turning to the pillars of ESG disclosure, we can see the same results for *Dis_E* and *Dis_S*. However, similar to the previous tables, the corporate governance component bucks the trend.

[insert Table 7 here]

5.3. ***Additional analyses***

As an alternative model for the hypotheses, we rely on the difference-in-difference method. To this end, we use two different models which are as follows:

$$〖Dis〗\_(i,t)\^j = \beta\_0 + \beta\_1 \ 〖PreAdoption \times EU〗\_(i,t) + \beta\_2 \ 〖Adoption \times EU〗\_(i,t) + \beta\_3\, Post \ 〖Adoption \times EU〗\_(i,t) \ 〖+ \ \beta〗\_4 \ 〖FirmCharacteristics〗\_(i,t) + \beta\_5 \ 〖CountryCharacteristics〗\_(i,t) + IndustryDummies + CountryDummies + TimeDummies + FirmFixedEffects + \ \varepsilon\_0 \quad (4)$$

$$〖Dis〗\_(i,t)\^j = \beta\_0 + \beta\_1 \ 〖PreAdoption \times EU〗\_(i,t) + \beta\_2 \ 〖Adoption\&PostAdoption \times EU〗\_(i,t) \ 〖+ \ \beta〗\_3 \ 〖FirmCharacteristics〗\_(i,t) + \beta\_4 \ 〖CountryCharacteristics〗\_(i,t) + IndustryDummies + CountryDummies + TimeDummies + FirmFixedEffects + \ \varepsilon\_0 \quad (5)$$

Where *PreAdoption* takes the value 1 for the years from 2007 to 2016, *Adoption* takes the value 1 for the year 2017, *PostAdoption* takes 1 for the years from 2018 to 2019, and *Adoption&PostAdpotion* takes 1 for the years 2017 to 2019. For reconfirming the three first hypotheses, β_1, β_2, and β_3 in Model (4) and $\beta_1$and β_2 in Model (5) should be positive. Regarding the fourth and fifth hypotheses, β_2 and β_3 should be greater than $\beta_1$in Model (4) and β_2 should be higher than $\beta_1$in Model 5.

Table 8 reports the regressions estimated using these models. The first four equations are estimated using Model (4), and the remaining equations are estimated employing Model (5). When the dependent variable is *Dis_ESG* both *PostAdoption*×*EU* and *Adoption*×*EU* are meaningfully positive (51.993, p-value<0.01; 51.57, p-value<0.01, respectively) and greater than the positive coefficient of *PreAdoption*×*EU* with the value of 39.724 (p-value<0.01). This finding shows that during the adoption of mandatory disclosure as well as the years succeeding it, the superiority of the level of ESG disclosure in EU firms relative to that in US firms were greater than the years prior to the adoption of mandatory disclosure. In Equation (5) where we use Model (5), *Adoption&PostAdoption*×*EU* has a coefficient of 46.641 (p-value<0.01) and *PreAdoption*×*EU* has a 30.832

(p-value<0.01) coefficient, suggesting the same findings. Turning to the pillars of ESG disclosure we can also see the same results while, again, not for the corporate governance aspect.

[insert Table 8 here]

6. Conclusions

Corporate disclosure, either mandatory or voluntary, is the cornerstone of financial reporting and financial markets worldwide. We examine whether higher ESG sustainability disclosure is attained under voluntary or mandatory disclosure regimes. We use the regulatory differences between the United States (US) and European Union (EU) settings, as firms in US disclose ESG information on a voluntary basis, whereas their counterparts in EU are now required to disclose such information in their financial year of 2017 and onward. Over the sample period, which covers both a voluntary and a mandatory disclosure regime for EU firms and a voluntary disclosure regime only for US firms, we find that EU firms have higher levels of ESG disclosure relative to US firms. In the voluntary disclosure regime period prior to 2017, EU firms have higher ESG disclosure than US companies. However, the ESG disclosure of EU firms increase relative to US firms once mandatory ESG disclosure comes into effect.

Our results support the efforts of regulators to institute more structured and homogeneous reporting guidelines, as it is likely to result in higher ESG disclosure for adopting firms. Our findings also provide important insight regarding the implications of ESG sustainability disclosure, which shed light in identifying the nature and benefits of sustainability reporting and assurance in the highly controversial voluntary disclosure literature. Additional analyses confirm our baseline results of the increased difference between US and EU firms after the adoption of sustainability disclosure guidelines. We also find that our results hold when using alternatives to our main explained variables.

The comparative study performed in this paper provides policy, practical, educational and research implications. Results should be relevant to regulators (SEC, EU) as they are requiring more ESG sustainability disclosures and standard setters (FASB, IASB) as they are moving toward standardization of ESG integrated sustainability reports. Our results provide insight for investors particularly portfolio asset management families (Block Rock, State Street, Vanguard) that are integrating ESG information into their investment decisions. Public companies can benefit from our results in improving the quality and enhancing the quantity of their ESG disclosures. The results also further our understanding of the importance of corporate disclosures, under either

the voluntary or mandatory regime, and the need for more research in this ESG sustainability emerging development.

There are several caveats in our study. First, the ESG measures provided by ASSET4 contain a vast array of components that aim at measuring firm-specific sustainability disclosure. While the majority is collected in accordance with firms' disclosures, a part is compiled independently of the available public information. This suggests that variation in the ASSET4 measures might not capture changes in disclosure and could conceivably be driven by unrelated sustainability performance factors. Future research could, therefore, better disentangle between sustainability performance and disclosure. Second, our post-adoption window is reduced to only three years. Tests based on a larger and more complete post-adoption sample would likely provide stronger evidence of the effect that the EU-wide adoption of guidelines had on firms' sustainability disclosures.

Appendix
Variable definitions, measures, and data sources

Variable	Measurement	Source
Panel A. Dependent variables		
Dis_ESG	Measured using the indicators descriptions and measurement provided by ASSET4. By way of illustration, one of the indicators of the environmental aspect of ESG is related to ozone-depleting substances with the Eikon code of *ENERDP032*. In this indicator, if a corporation gives information on the amount of these kinds of substances, we give the value 1 to this indicator and 0 otherwise. Likewise, for the other indicators we also do the same approach according to the indicators' definitions and measurement. We then aggregate the dummies to measure ESG disclosure. (*Dis_ESG = Dis_E + Dis_S + Dis_G*)	ASSET4
Dis_E	Measured similarly to the *Dis_ESG* approach. This variable is measured using only those indicators concerning the environmental aspect of ESG — 136 indicators.	ASSET4
Dis_S	Measured similarly to the *Dis_ESG* approach. This variable is measured using only those indicators concerning the social aspect of ESG — 146 indicators.	ASSET4
Dis_G	Measured similarly to the *Dis_ESG* approach. This variable is measured using only those indicators concerning the corporate governance aspect of ESG — 184 indicators.	ASSET4
Panel B. Country-specific variables		
GDPGrowth	Annual growth in gross domestic product	Liang & Renneboog (2017)
KOFIndex	Globalization index	Liang & Renneboog (2017)
Panel C. Firm-specific variables		
ROA	Industry-adjusted net income over total assets	Datastream (WC08326)
Size	Logarithm of total assets	Datastream (WC02999)
CloselyHeldShares	Percentage of shares held by investors owing more than 5%	Datastream (WC08021)
Leverage	Total debt to total assets	Datastream (WC08236)
SGAExp	Selling, General and Administrative expenses	Datastream (WC01101)
R&DExp	Research and Development expenses	Datastream (WC01201)
Sales	The natural logarithm of sales	Datastream (WC01001)
SaleGrowth	Sales growth	Datastream (WC01001)
Panel D. Main independent variables		
EU	A dummy variable taking the value of 1 for EU firms and 0 otherwise.	
Adoption	A dummy variable taking the value of 1 for the year 2017 and 0 otherwise.	
PreAdoption	A dummy variable taking the value of 1 for the years from 2007 to 2016 and 0 otherwise.	
PostAdoption	A dummy variable taking the value of 1 for the years 2018 and 2019 and 0 otherwise.	

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Figure 1

Timeline and hypotheses of ESG disclosure under voluntary and mandatory regimes

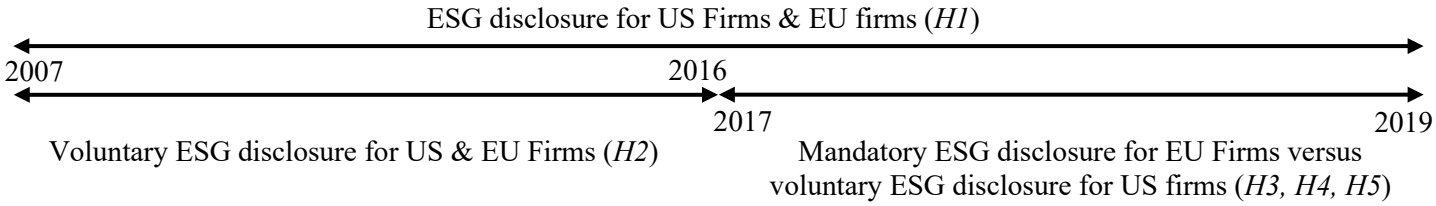

Table 1
Sample distribution

Sample distribution by country, industry, and year

Panel A. Sample distribution by country

Country	No. observation	Pct. observation	Country	No. observation	Pct. observation
Austria	13	0.51%	Hungary	5	0.20%
Belgium	5	0.20%	Ireland	21	0.82%
Czech Republic	9	0.35%	Italy	11	0.43%
Denmark	158	6.16%	Netherlands	8	0.31%
Finland	10	0.39%	Portugal	7	0.27%
France	617	24.07%	Sweden	363	14.16%
Germany	611	23.84%	USA	710	27.70%
Greece	15	0.59%	Total	2563	100%

Panel B. Sample distribution by industry

Industry	No. observation	Pct. observation
Basic Materials	216	8.4%
Consumer Discretionary	575	22.4%
Consumer Staples	203	7.9%
Energy	81	3.2%
Financials	173	6.7%
Health Care	239	9.3%
Industrials	555	21.7%
Real Estate	202	7.9%
Technology	124	4.8%
Telecommunications	104	4.1%
Utilities	91	3.6%
Total	2563	100%

Panel C. Sample distribution by year

Year	No. observation	Pct. observation
2007	35	1.4%
2008	96	3.7%
2009	117	4.6%
2010	153	6.0%
2011	190	7.4%
2012	201	7.8%
2013	191	7.5%
2014	195	7.6%
2015	238	9.3%
2016	265	10.3%
2017	285	11.1%
2018	297	11.6%
2019	300	11.7%
Total	2563	100%

Table 2
Descriptive statistics for the continuous variables

Panel A. Descriptive statistics for the continuous variable over the whole period (2007-2019)

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Obs.
	Full sample	Full sample	Full sample	Full sample	Full sample	Full sample
Dis_ESG	103.93	98	245	0	46.77	2563
Dis_E	21.19	12	83	0	21.42	2563
Dis_S	25.18	21	88	0	17.66	2563
Dis_G	57.56	63	92	0	19.99	2563
Size	15.73	15.63	20.02	10.75	1.61	2563
CloselyHeldShares	0.21	0.11	0.83	0.00	0.23	2563
Leverage	0.26	0.24	0.82	0.00	0.20	2563
ROA	0.05	0.05	0.27	-0.47	0.09	2563
Sale	15.19	15.12	18.42	9.41	1.65	2563
SaleGrowth	0.08	0.06	1.43	-0.42	0.22	2563
R&DExp	0.05	0.00	1.09	0.00	0.14	2563
SGAExp	0.28	0.20	3.02	0.02	0.33	2563
GDPGrowth	1.09	1.51	4.08	-3.39	1.60	2563
KOFIndex	0.85	0.86	0.89	0.79	0.03	2563

Panel B. Descriptive statistics for ESG-related variables of the firms domiciled in EU over the years preceding and following the adoption of mandatory disclosure

Variable	Mean		Median		Maximum		Minimum		Std. Dev.		Obs.	
	2007-2016	2017-2019	2007-2016	2017-2019	2007-2016	2017-2019	2007-2016	2017-2019	2007-2016	2017-2019	2007-2016	2017-2019
Dis_ESG	109.24	133.94	120	148	224	245	0	0	55.97	56.64	1264	589
Dis_E	31.04	39.45	33	43	77	83	0	0	21.40	21.33	1264	589
Dis_S	30.61	40.10	32	44	82	88	0	0	19.06	19.62	1264	589
Dis_G	47.59	54.38	54	59.5	81	92	0	0	20.36	20.57	1264	589

Panel C. Descriptive statistics for ESG-related variables of the firms from US over the years preceding and following the adoption of mandatory disclosure

Variable	Mean		Median		Maximum		Minimum		Std. Dev.		Obs.	
	2007-2016	2017-2019	2007-2016	2017-2019	2007-2016	2017-2019	2007-2016	2017-2019	2007-2016	2017-2019	2007-2016	2017-2019
Dis_ESG	91.97	88.17	89.5	89	178	181	0	0	21.50	25.64	417	293
Dis_E	7.67	5.75	4	3	51	58	0	0	8.88	7.31	417	293
Dis_S	16.18	15.41	15	14	51	57	0	0	7.94	8.12	417	293
Dis_G	68.12	66.99	70	71	85	91	0	0	10.73	16.45	417	293

The variables are defined in Appendix.

Table 3

Correlation matrixes

Left and right triangles show Pearson and Spearman correlation matrixes for the continuous variables, respectively.

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14
X1: Dis_ESG	1-----	0.871***	0.894***	0.5***	-0.048**	-0.023	-0.009	0.036*	0.227***	0	0.39***	-0.025	0.086***	0.345***
X2: Dis_E	0.861***	1-----	0.753***	0.162***	0.109***	-0.093***	0.176***	0.019	0.308***	0.008	0.329***	-0.026	0.082***	0.304***
X3: Dis_S	0.908***	0.779***	1-----	0.27***	0.045**	-0.075***	0.17***	0	0.224***	0.006	0.429***	-0.034*	0.139***	0.36***
X4: Dis_G	0.771***	0.404***	0.547***	1-----	-0.345***	0.142***	-0.507***	0.062***	-0.065***	-0.016	0.096***	0.032*	-0.034*	0.087***
X5: CloselyHeldShares	-0.014	0.089***	0.049**	-0.171***	1-----	-0.141***	0.207***	-0.063***	-0.034*	-0.075***	-0.012	-0.013	0.075***	-0.021
X6: GDPGrowth	-0.021	-0.066***	-0.035*	0.046**	-0.076***	1-----	-0.071***	0.011	-0.02	0.126***	-0.034*	0.157***	-0.007	-0.045**
X7: KOFIndex	0.074***	0.265***	0.228***	-0.292***	0.285***	0.002	1-----	-0.1***	0.162***	0.079***	0.163***	0.009	0.042**	0.18***
X8: Leverage	-0.01	-0.005	-0.028	0.004	-0.094***	0.006	-0.13***	1-----	-0.161***	-0.15***	-0.171***	-0.053***	-0.233***	0.008
X9: R&DExp	0.056***	0.072***	0.049**	0.021	-0.043**	-0.004	0.055***	-0.2***	1-----	0.173***	-0.035*	0.095***	0.314***	-0.16***
X10: ROA	0.005	0.015	0.01	-0.011	-0.028	0.097***	0.062***	-0.188***	0.089***	1-----	-0.042**	0.294***	0.159***	-0.137***
X11: Sale	0.343***	0.328***	0.414***	0.139***	-0.031	-0.04**	0.155***	-0.192***	-0.126***	0.041**	1-----	-0.026	0.002	0.491***
X12: SaleGrowth	-0.017	-0.029	-0.038*	0.02	-0.013	0.181***	-0.001	-0.045**	0.126***	0.277***	-0.019	1-----	0.055***	-0.02
X13: SGAExp	0.044**	0.041**	0.079***	-0.004	0.1***	-0.006	0.048**	-0.222***	0.415***	0.106***	-0.048**	0.024	1-----	-0.044**
X14: Size	0.29***	0.285***	0.336***	0.123***	-0.038**	-0.04**	0.15***	-0.021	-0.139***	-0.057***	0.462***	-0.015	-0.081***	1-----

See Appendix for the variables' definitions.

*** significance at 1%; ** significance at 5%; and * significance at 10%.

Table 4
The differential ESG disclosure of US relative to EU firms

The equations are estimated using Model (1) with the full sample.

	Equation (1)	Equation (2)	Equation (3)	Equation (4)
	Dis_ESG	Dis_E	Dis_S	Dis_G
Variable	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)
EU	49.829***	14.277***	15.78***	-2.629***
	(6.259)	(5.655)	(9.413)	(-3.154)
Size	8.791***	0.462**	-0.403**	0.91***
	(10.559)	(1.995)	(-2.574)	(6.597)
CloselyHeldShares	-12.107***	-0.148	-1.563***	-4.246***
	(-8.906)	(-0.238)	(-3.618)	(-8.877)
Leverage	10.53**	9.984***	13.24***	0.122
	(2.487)	(5.38)	(16.217)	(0.169)
ROA	24.752***	2.253	-1.83	1.035
	(3.596)	(0.763)	(-0.859)	(0.472)
Sale	7.523***	3.819***	5.154***	1.615***
	(11.239)	(19.085)	(26.797)	(11.058)
SaleGrowth	-8.003**	-2.823**	-2.711	-3.025***
	(-2.483)	(-2.535)	(-1.566)	(-3.358)
R&DExp	181.593***	39.532***	27.717***	25.053***
	(23.907)	(13.017)	(14.127)	(7.421)
SGAExp	12.268***	3.828***	9.957***	-1.063
	(5.632)	(4.519)	(8.326)	(-1.209)
GDPGrowth	0.34	0.008	0.569*	0.725***
	(0.749)	(0.038)	(1.675)	(7.709)
KOFIndex	-872.931***	-55.468	-107.39***	-206.013***
	(-8.995)	(-1.482)	(-5.506)	(-18.452)
Intercept	611.278***	16.477	52.837***	196.413***
	(7.218)	(0.512)	(2.971)	(18.735)
R-squared	67.77%	56.10%	63.70%	72.20%
Adjusted R-squared	67.21%	55.90%	63.60%	72.10%
F-statistic	120.327	302.952	408.125	604.813
Prob F-statistic	0.0001	0.0001	0.0001	0.0001
Observations	2563	2563	2563	2563

Country dummies, industry dummies, and period dummies are included in all the equations. Firm fixed effects also are controlled in the regressions.
See Appendix for the definitions of the variables.
*** significance at 1%; ** significance at 5%; and * significance at 10%.

Table 5

The differential ESG disclosure of US relative to EU firms in the pre- and post-adoption periods

Equations (1), (3), (5), and (7) are estimated using Model (1) with the pre-adoption period, while Equations (2), (4), (6), and (8) are estimated using Model (1) with the post-adoption period.

	Equation (1)	Equation (2)	Equation (3)	Equation (4)	Equation (5)	Equation (6)	Equation (7)	Equation (8)
	Pre-adoption	Post-adoption	Pre-adoption	Post-adoption	Pre-adoption	Post-adoption	Pre-adoption	Post-adoption
	Dis_ESG	Dis_ESG	Dis_E	Dis_E	Dis_S	Dis_S	Dis_G	Dis_G
Variable	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)
EU	19.911***	62.541***	12.556***	18.943***	13.409***	23.259***	-10.708***	2.348
	(5.887)	(12.34)	(6.302)	(12.954)	(9.486)	(27.133)	(-6.524)	(0.714)
Size	1.41***	-3.068***	0.432**	0.986***	-0.086	-0.994***	0.879***	0.695***
	(5.232)	(-2.987)	(2.136)	(15.119)	(-0.433)	(-16.564)	(8.016)	(7.093)
CloselyHeldShare	-8.854***	-6.363*	0.603	2.348***	-2.514***	1.678***	-5.892***	-5.042***
	(-6.625)	(-1.905)	(0.942)	(7.853)	(-4.319)	(4.576)	(-13.054)	(-7.368)
Leverage	32.781***	23.93***	16.897***	4.045***	13.587***	8.532***	0.831***	4.445***
	(27.992)	(19.891)	(14.191)	(5.633)	(17.49)	(11.442)	(2.695)	(24.517)
ROA	15.708***	-10.662	7.459**	4.697	4.136	-4.77***	-4.763***	-3.988**
	(4.932)	(-1.15)	(2.501)	(1.564)	(1.35)	(-4.095)	(-3.416)	(-2.34)
Sale	9.109***	15.226***	3.636***	3.805***	4.879***	5.871***	0.851***	2.137***
	(14.186)	(27.254)	(15.94)	(43.003)	(21.259)	(175.948)	(4.444)	(14.785)
SaleGrowth	-16.766***	4.519*	-5.051***	-4.437***	-6.562***	0.487	-0.923**	2.299*
	(-5.93)	(1.756)	(-6.081)	(-5.024)	(-6.117)	(0.616)	(-2.105)	(1.921)
R&DExp	85.332***	153.456***	42.933***	50.143***	19.481***	45.638***	13.126***	38.26***
	(15.769)	(258.017)	(17.788)	(17.227)	(6.972)	(22.4)	(8.433)	(21.029)
SGAExp	10.879***	5.479***	1.778*	2.501***	9.188***	6.504***	-1.888***	0.988
	(5.449)	(3.232)	(1.919)	(3.197)	(9.63)	(10.804)	(-7.018)	(0.578)
GDPGrowth	1.05	3.886***	-0.23	0.22	0.346	0.319*	0.407	2.926***
	(1.429)	(3.167)	(-1.093)	(1.105)	(0.987)	(1.901)	(1.608)	(4.926)
KOFIndex	-314.768***	-682.98***	-51.981*	-120.137***	-109.368***	-218.499***	-88.257***	-189.956***
	(-6.499)	(-8.452)	(-1.805)	(-5.701)	(-6.015)	(-14.71)	(-3.866)	(-5.977)
Intercept	233.301***	538.148***	15.114	66.503***	53.478***	152.041***	107.733***	174.688***
	(6.123)	(7.914)	(0.63)	(3.6)	(3.288)	(11.473)	(5.78)	(5.859)
R-squared	62.83%	67.00%	77.70%	76.70%	84.20%	89.90%	85.10%	75.20%
Adjusted R-squared	62.58%	66.58%	77.60%	76.50%	84.10%	89.80%	85.00%	74.90%
F-statistic	256.439	160.572	548.914	341.449	814.508	922.842	872.798	240.782
Prob F-statistic	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Observations	1681	882	1681	882	1681	882	1681	882

Country dummies, industry dummies, and period dummies are included in all the equations. Firm fixed effects also are controlled in the regressions. See Appendix for the definitions of the variables. *** significance at 1%; ** significance at 5%; and * significance at 10%.

Table 6

The impact of mandatory ESG disclosure adoption on the level of ESG disclosure

Equations (1), (3), (5), and (7) are estimated using Model (2) with the sample of both EU and US firms, while Equations (2), (4), (6), and (8) are estimated using Model (2) with the sample of EU corporations.

	Equation (1)	Equation (2)	Equation (3)	Equation (4)	Equation (5)	Equation (6)	Equation (7)	Equation (8)
	Full sample	EU firms	Full sample	EU firms	Full sample	EU firms	Full sample	EU firms
	Dis_ESG	Dis_ESG	Dis_E	Dis_E	Dis_S	Dis_S	Dis_G	Dis_G
Variable	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)
Adoption	5.559***	8.627***	1.865***	1.804***	2.359***	1.841***	1.24	-0.585
	(3.663)	(3.993)	(5.744)	(4.611)	(4.847)	(3.781)	(1.622)	(-0.956)
Size	1.653***	4.756***	1.198***	1.146***	0.292	1.099***	0.949***	1.65***
	(3.397)	(11.314)	(9.482)	(7.743)	(1.112)	(4)	(5.546)	(9.628)
CloselyHeldShares	-11.431***	-6.927***	-1.659**	-1.671**	-3.783***	-2.665***	-6.876***	-5.995***
	(-7.961)	(-4.594)	(-2.126)	(-2.122)	(-5.89)	(-3.957)	(-12.403)	(-12.149)
Leverage	23.584***	21.949***	9.324***	10.934***	10.856***	10.313***	-0.003	-0.711
	(11.141)	(7.128)	(5.768)	(7.37)	(8.765)	(5.411)	(-0.004)	(-0.769)
ROA	32.599***	17.312**	17.645***	23.445***	11.846***	19.394***	2.363*	3.493*
	(4.954)	(2.438)	(8.12)	(9.695)	(3.749)	(4.406)	(1.662)	(1.91)
Sale	12.403***	8.767***	4.508***	5.505***	5.229***	5.169***	1.463***	1.34***
	(19.184)	(11.636)	(19.668)	(23.864)	(21.151)	(24.279)	(8.637)	(5.242)
SaleGrowth	-8.757***	-3.846	-4.106***	-2.706*	-4.925***	-4.856***	-2.469***	-2.265*
	(-3.254)	(-1.084)	(-2.719)	(-1.845)	(-3.635)	(-2.864)	(-3.002)	(-1.958)
R&DExp	155.907***	106.552***	82.127***	78.581***	40.762***	38.687***	17.094***	16.243***
	(17.045)	(12.024)	(18.29)	(20.868)	(9.651)	(10.16)	(9.994)	(9.475)
SGAExp	2.478	21.615***	-1.173	3.535**	5.05***	8.778***	-1.479	0.286
	(1.494)	(7.345)	(-1.484)	(2.256)	(4.237)	(9.126)	(-1.644)	(0.249)
GDPGrowth	1.437*	1.097	0.154	-0.08	0.442*	0.239	0.678*	0.207
	(1.838)	(0.977)	(0.859)	(-0.434)	(1.952)	(1.225)	(1.844)	(0.725)
KOFIndex	-150.84***	-651.469***	40.272***	162.611***	31.51***	232.253***	-233.961***	80.877
	(-7.189)	(-5.681)	(4.945)	(4.026)	(3.909)	(5.705)	(-18.277)	(1.121)
Intercept	14.456	475.774***	-101.603***	-229.863***	-88.703***	-281.812***	222.714***	-67.443
	(0.801)	(4.927)	(-14.015)	(-6.628)	(-14.411)	(-8.251)	(17.699)	(-1.043)
R-squared	63.65%	60.74%	74.80%	80.80%	74.10%	71.60%	61.20%	55.00%
Adjusted R-squared	63.26%	60.20%	74.50%	80.50%	73.90%	71.20%	60.80%	54.30%
F-statistic	164.375	158.326	279.259	284.480	269.904	170.739	148.227	82.703
Prob F-statistic	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Observations	2563	1853	2563	1853	2563	1853	2563	1853

Country dummies, industry dummies, and period dummies are included in all the equations. Firm fixed effects also are controlled in the regressions. See Appendix for the definitions of the variables. *** significance at 1%; ** significance at 5%; and * significance at 10%.

Table 7

The differential ESG disclosure of US relative to EU firms between the pre- to post-adoption periods

The equations are estimated using Model (3).

	Equation (1)	Equation (2)	Equation (3)	Equation (4)
	Dis_ESG	Dis_E	Dis_S	Dis_G
	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)
EU	30.898***	10.901***	10.058***	-10.701***
	(7.963)	(3.683)	(3.047)	(-12.436)
Adoption	6.443***	3.513***	4.471***	1.44
	(5.063)	(6.566)	(8.259)	(1.781)
Adoption*EU	3.125**	1.011**	1.002**	0.26
	(1.969)	(1.989)	(2.102)	(0.531)
Size	8.614***	4.909***	3.764***	1.589***
	(8.113)	(24.487)	(16.083)	(8.877)
CloselyHeldShares	-7.95***	2.102***	-1.93***	-4.89***
	(-2.815)	(3.252)	(-3.767)	(-10.402)
Leverage	14.811***	5.132***	4.833***	0.653
	(4.233)	(5.193)	(7.073)	(1.248)
ROA	-3.482	1.047	0.406	-6.452***
	(-0.548)	(0.392)	(0.23)	(-5.124)
Sale	4.264***	0.496*	1.385***	0.065
	(4.154)	(1.856)	(5.77)	(0.38)
SaleGrowth	-6.482**	-1.309	-3.738***	-0.648
	(-2.461)	(-1.181)	(-3.595)	(-1.016)
R&DExp	105.373***	63.734***	21.239***	6.056**
	(5.519)	(13.752)	(9.634)	(2.561)
SGAExp	17.22***	6.783***	9.334***	-2.639***
	(3.919)	(6.893)	(7.486)	(-3.928)
GDPGrowth	0.025	-0.181	0.024	0.129*
	(0.073)	(-0.738)	(0.072)	(1.667)
KOFIndex	-497.539***	-46.212	-56.36	-97.899***
	(-8.509)	(-1.075)	(-1.177)	(-7.76)
Intercept	305.957***	-38.092	-20.365	126.535***
	(6.276)	(-1.166)	(-0.545)	(12.279)
R-squared	69.28%	81.10%	75.00%	86.10%
Adjusted R-squared	68.80%	80.80%	74.60%	85.90%
F-statistic	143.514	300.953	203.666	414.620
Prob F-statistic	0.0001	0.0001	0.0001	0.0001
Observations	2563	2563	2563	2563

Country dummies, industry dummies, and period dummies are included in all the equations. Firm fixed effects also are controlled in the regressions. See Appendix for the definitions of the variables. *** significance at 1%; ** significance at 5%; and * significance at 10%.

Table 8

Using difference-in-difference model as an alternative approach

Equations 1-4 are estimated using Model (4), while Equations 6-8 are estimated based on Model (5).

	Equation (1)	Equation (2)	Equation (3)	Equation (4)	Equation (5)	Equation (6)	Equation (7)	Equation (8)
	Dis_ESG	Dis_E	Dis_S	Dis_G	Dis_ESG	Dis_E	Dis_S	Dis_G
Variable	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)	Coef. (T-stat)
PostAdoption*EU	51.993***	24.875***	20.714***	3.517				
	(10.644)	(12.622)	(12.414)	(1.029)				
Adoption*EU	51.57***	26.079***	21.228***	2.193				
	(11.069)	(12.966)	(12.478)	(0.711)				
Adoption&PostAdoption*EU					46.641***	13.905***	20.441***	0.51
					(5.646)	(4.718)	(11.874)	(0.213)
PreAdoption*EU	39.724***	21.995***	16.254***	0.089	30.832***	9.511***	16.693***	-4.675**
	(7.744)	(11.509)	(9.401)	(0.028)	(4.798)	(3.106)	(9.493)	(-2.128)
Size	7.935***	5.312***	3.153***	0.717***	7.082***	5.202***	2.911***	1.34***
	(13.938)	(25.64)	(11.207)	(3.893)	(10.928)	(17.688)	(10.911)	(4.64)
CloselyHeldShares	-6.931***	-1.185	-1.071**	-5.482***	-8.366***	0.08	-2.894***	-6.338***
	(-4.213)	(-1.392)	(-2.392)	(-13.884)	(-5.015)	(0.105)	(-4.631)	(-8.055)
Leverage	14.602***	4.909***	6.266***	0.78	15.192***	4.552***	4.348***	0.301
	(5.496)	(2.822)	(4.161)	(0.801)	(4.243)	(3.862)	(4.424)	(0.262)
ROA	-7.888	1.694	-4.61*	0.592	31.162***	14.499***	10.214***	4.721**
	(-1.468)	(0.657)	(-1.838)	(0.454)	(5.697)	(5.599)	(4.755)	(2.197)
Sale	5.526***	0.216	2.091***	1.47***	9.02***	1.627***	3.333***	1.505***
	(10.288)	(1.03)	(8.159)	(5.175)	(15.245)	(5.877)	(13.071)	(5.144)
SaleGrowth	-5.671	-2.516*	-3.198**	-2.886***	-4.479	-4.422***	-3.402***	-2.06**
	(-1.457)	(-1.827)	(-2.399)	(-3.999)	(-1.402)	(-3.678)	(-3.467)	(-2.442)
R&DExp	140.921***	64.08***	33.266***	19.982***	184.422***	80.265***	41.332***	16.591***
	(21.861)	(12.86)	(15.731)	(8.359)	(19.087)	(15.159)	(9.783)	(5.41)
SGAExp	14.777***	9.672***	7.585***	-2.857***	11.756***	5.17***	5.84***	-0.545
	(6.051)	(11.49)	(6.229)	(-3.854)	(6.944)	(4.732)	(6.183)	(-0.549)
GDPGrowth	1.58*	0.319*	0.51*	0.547	1.73***	0.403**	0.712***	0.326***
	(1.919)	(1.835)	(1.667)	(1.543)	(3.266)	(2.341)	(4.995)	(2.625)
KOFIndex	-628.033***	-207.486***	-163.628***	-246.811***	-691.992***	-131.089***	-233.814***	-215.595***
	(-8.3)	(-7.757)	(-6.464)	(-5.278)	(-7.376)	(-3.278)	(-10.069)	(-7.462)
Intercept	401.347***	94.865***	73.514***	237.98***	410.051***	13.16	115.458***	200.21***
	(7.051)	(4.405)	(3.65)	(6.69)	(5.622)	(0.399)	(6.04)	(8.406)
R-squared	0.71	0.898	0.765	0.618	72.46%	0.826	0.816	0.784
Adjusted R-squared	0.708	0.897	0.763	0.615	72.00%	0.823	0.813	0.78
F-statistic	260.04	933.636	345.592	171.68	157.895	286.328	266.655	218.007
Prob F-statistic	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Observations	1853	1853	1853	1853	1853	1853	1853	1853

Country dummies, industry dummies, and period dummies are included in all the equations. Firm fixed effects also are controlled in the regressions. See Appendix for the definitions of the variables. *** significance at 1%; ** significance at 5%; and * significance at 10%.