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THE REAL EFFECTS OF MODERN INFORMATION TECHNOLOGIES: EVIDENCE FROM THE EDGAR IMPLEMENTATION

Itay Goldstein
Shijie Yang
Luo Zuo

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ABSTRACT

Using the implementation of the Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system from 1993 to 1996 as a shock to information dissemination technologies, we examine how a significant reduction in disclosure processing costs affects the real economy. We find that the EDGAR implementation leads to an increase in corporate investment and that this effect is concentrated in value firms. We provide evidence that improved equity financing and enhanced managerial incentives are likely the underlying mechanisms. Specifically, the EDGAR implementation leads to an increase in a firm's stock liquidity, a decrease in the cost of equity capital, and an increase in the level of equity financing. Consistent with the monitoring effect of broad information dissemination, the EDGAR implementation leads to an increase in a firm's operating performance. Our findings suggest that it is important to consider information dissemination beyond information production when examining the real effects of corporate disclosures.

Itay Goldstein
The Wharton School
University of Pennsylvania
3620 Locust Walk
Philadelphia, PA 19104
and NBER
itayg@wharton.upenn.edu

Luo Zuo
National University of Singapore
Mochtar Riady Building, BIZ 1 # 07-25
15 Kent Ridge Drive
Singapore 119245
luozuo@nus.edu.sg

Shijie Yang
School of Business
Southern University of Science and Technology
1088 Xueyuan Avenue
Shenzhen, Guangdong 518055
China
yangsj6@sustech.edu.cn

1. Introduction

One of the most important developments in financial markets over the years is the greater availability of information to various market participants. Much of the information originates from firms themselves, as disclosures are enhanced and information technologies for their dissemination improve. Aside from understanding the financial-market implications, a fundamental and perhaps more important question is about the effects on the real economy (Goldstein and Yang 2017; Goldstein 2023). After all, the main function of financial markets is to assure the efficient allocation of capital. To understand this question, a large literature in accounting and finance has developed to examine the effects of financial reporting and disclosure on corporate investment (Roychowdhury, Shroff, and Verdi 2019; Kothari, Zhang, and Zuo 2023). In this paper, we build on this literature and examine how a significant reduction in disclosure processing costs, brought by technological advances, affects corporate investment decisions.

Traditionally, corporate disclosures are often viewed as public information that is costless for investors to process and is fully reflected in stock prices (Fama 1970). This notion is challenged by recent evidence showing that investors face frictions in using corporate disclosures and that it can be very costly, even for professional investors, to obtain, extract, and understand a disclosure (Blankespoor, deHaan, and Marinovic 2020). The existence of disclosure processing costs implies that investors who choose to process firms' disclosures must expect a competitive return that more than offsets the cost. It also means that stock prices cannot fully reveal the information in corporate disclosures; otherwise, no investors would process these disclosures in the first place (Grossman and Stiglitz 1980). Thus, disclosure processing costs can have important implications for capital market outcomes and corporate actions. Modern information technologies have significantly reduced investors' costs to monitor for, acquire, and analyze firm disclosures. While it is intuitive

that these technological advances often make at least some investors better off by reducing their information processing costs (Gao and Huang 2020), whether and how these technologies affect the real economy is less clear.

In this paper, we exploit the implementation of the Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system from 1993 to 1996 as a shock to information dissemination technologies that alter the costs of accessing firm disclosures (Gao and Huang 2020; Chang, Ljungqvist, and Tseng 2023). Before the EDGAR implementation, in order to access firm disclosures, investors had to subscribe to a commercial data vendor or physically visit a public reference room of the Securities and Exchange Commission (SEC). On February 23, 1993, the SEC specified a phase-in schedule for registered firms to start electronic filing on EDGAR in ten discrete groups (SEC Release No. 33-6977). Firms in the first and last groups became EDGAR filers in April 1993 and May 1996, respectively. This mandatory implementation of the EDGAR system reduces potential endogeneity concerns caused by unobserved firm-, industry-, or market-level shocks or reverse causality (Leuz and Wysocki 2016). For an omitted variable to confound our findings, it would need to affect different groups of firms at discrete points in time as specified in the phase-in schedule.

The enhancement of information dissemination from firms to the market through the EDGAR system reduces investors' costs of accessing corporate filings. Following prior theoretical literature, we argue that this reduction in investors' accessing costs can affect the level of corporate investment through two non-mutually exclusive channels: the equity financing channel and the managerial incentive channel. First, making corporate disclosures more easily available levels the playing field in the market and mitigates information asymmetry among investors. Before EDGAR, most retail investors and a large number of institutional investors likely chose not to access the

corporate filings given the high cost, only those located close to an SEC reference room likely chose to access the filings physically, and only the largest institutional investors likely subscribed to commercial data vendors for online access (Chang, Ljungqvist, and Tseng 2023). The EDGAR system gives everyone timely and free access to corporate filings and likely motivates more investors to become informed. Thus, it can help firms broaden their investor base, attract liquidity to the secondary market, and eventually achieve a lower cost of capital in the primary market (Merton 1987; Diamond and Verrecchia 1991).[1] According to this argument, reduced costs of accessing firm disclosures should lead to an increased level of equity financing and corporate investment.

Second, the EDGAR system can also affect managers' incentives to undertake investment projects through its effects on price efficiency and stakeholder monitoring. The price efficiency effect was formalized in Fishman and Hagerty (1989). In their model, when a firm's stock price perfectly reflects its expected future cash flows, the firm manager chooses the efficient investment level, which equates the investment's marginal benefit to its marginal cost. However, as a firm's investment choice is unobservable to investors, the firm's stock price does not perfectly reflect its expected cash flows; an investment project that increases the firm's expected cash flows by $1 leads to an increase in its stock price of less than $1. This underreaction of stock prices leads firm managers to underinvest. The EDGAR implementation lowers investors' information acquisition costs and makes a firm's stock price more closely reflect the firm's fundamental value and the marginal benefit of any investment project (Grossman and Stiglitz 1980; Gao and Huang 2020).

[1] Theories also point out a countervailing force that makes the effect of EDGAR on liquidity ambiguous. As a reduction in disclosure processing costs increases the number of informed investors, price changes are more likely to be caused by information than by noise, which can lead to heightened adverse selection for uninformed investors and reduced liquidity (Glosten and Milgrom 1985; Fishman and Hagerty 1992; Vives 2010).

Hence, the EDGAR implementation can reduce the underinvestment problem and lead to an increase in corporate investment.

Relatedly, broad dissemination of corporate disclosures through the EDGAR system can reduce stakeholders' (including investors') costs to track and acquire SEC filings and enhance their ability to use firm disclosures to monitor managerial actions (Blankespoor, deHaan, and Marinovic 2020). This argument is supported by prior research that demonstrates the disciplinary effects of broad information dissemination on mine safety violations (Christensen, Floyd, Liu, and Maffett 2017) and strategic analyst behavior (Chang, Ljungqvist, and Tseng 2023). This monitoring effect of the EDGAR system can reduce managers' over- and underinvestment and improve firm performance.

We assess the impact of the EDGAR implementation on corporate investment by testing the extent to which it affects investment and how it does so. Using a difference-in-differences (diff-in-diff) research design, we find that the EDGAR implementation leads to a 0.613-percentage-point increase in the level of corporate investment, which represents a 9% increase relative to the sample mean. This result continues to hold after we control for group-specific time trends, use a stacked diff-in-diff design (Cengiz, Dube, Lindner, and Zipperer 2019),[2] or employ recently proposed diff-in-diff estimators that are robust to heterogeneous treatment effects (Sun and Abraham 2021; Borusyak, Jaravel, and Spiess 2023). A standard dynamic test shows no significant difference in pre-trends in investment behavior between the treatment and control groups, supporting the parallel-trends assumption. These results confirm the hypothesis that leveling the playing field via information dissemination helps firms tap into new investment opportunities and

[2] The staggered diff-in-diff approach implicitly takes as the control group both already-treated firms and to-be-treated firms (Bertrand and Mullainathan 2003). The stacked diff-in-diff approach restricts the control group to the set of to-be-treated firms.

invest more. Firms' relatively rapid responses are consistent with the EDGAR system enhancing managerial incentives to undertake investment projects. In addition, we show that a firm's inclusion in the EDGAR system has a positive spillover effect on the investment of its industry peers and that the aggregate corporate investment growth rate exhibits a positive trend over our sample period. In a cross-sectional analysis, we find that the investment effect is concentrated in value firms, which is expected given that corporate filings disseminated by the EDGAR system likely contain more information about assets in place than about growth options.

To understand the underlying mechanisms through which the EDGAR implementation affects corporate investment decisions, we conduct a series of analyses. First, we examine the treatment effect of the EDGAR shock on a firm's liquidity, implied cost of capital (Gebhardt, Lee, and Swaminathan 2001; Lee, So, and Wang 2021), and equity issuance. We show that after a firm becomes an EDGAR filer, the firm indeed experiences an increase in stock liquidity, faces a lower cost of equity capital, and obtains more equity financing; these effects are more prominent in value firms than in growth firms. We do not find evidence that EDGAR inclusion affects a firm's debt financing. These findings are consistent with our prediction that EDGAR inclusion improves a firm's information environment and access to equity capital, and that this increased equity financing is one reason behind its ability to undertake more investments.

Second, we examine the overall effect of the EDGAR implementation on *ex post* firm performance. As discussed before, greater dissemination of corporate disclosures can better incentivize managers (who are the agents of the shareholders) to take value-maximizing actions. Empirically, we find that on average, the EDGAR implementation leads to a 0.198-percentage-point increase in a firm's return on assets, and this performance effect is again concentrated in value firms. An increase in a firm's return on assets post EDGAR suggests that greater information

dissemination likely enhances managers' incentives to improve firm performance. Prior to the EDGAR implementation, managers may have hesitated to pursue high-payoff investment projects with significant personal costs, and/or they may not have put forth their best effort, which would result in suboptimal returns on existing projects. Our findings suggest that broad information dissemination through EDGAR can reduce managers' opportunistic behavior and lead to more efficient utilization of resources. We also note that the equity financing channel and the managerial incentive channel are not mutually exclusive, and our empirical findings suggest that both mechanisms are at play.[3]

Our study is related to but different from that of Bird, Karolyi, Ruchti, and Truong (2021), who document a decrease in a firm's investment-to-price sensitivity after the firm is included in the EDGAR system.[4] Bird, Karolyi, Ruchti, and Truong (2021) interpret their results as evidence that publicizing corporate filings on EDGAR reduces investors' incentives to gather private information and reduces managerial learning from stock prices. Our finding of an increase in the level of corporate investment post EDGAR cannot be explained by their results. A reduction in a firm's responsiveness to its growth opportunities (proxied by Tobin's Q), as documented in Bird, Karolyi, Ruchti, and Truong (2021), generally implies a lower amount of capital investment when firms expand their operations. Moreover, while all our main results are concentrated in value firms, we do not find evidence that value firms experience any significant change in the investment-to-

[3] The performance effect is unlikely to take place through the equity financing channel, as firms typically need a certain period of time to fully realize returns from new investments, and the return on additional investments is expected to be lower than that of previous projects due to diminishing marginal returns.

[4] In an international setting, McClure, Shi, and Watts (2022) document a significant decrease in firms' investment sensitivity to price following country-level adoptions of centralized electronic disclosure systems (CEDS). Several concurrent studies also exploit the timing of the EDGAR implementation to examine various outcome variables, including investor disagreement (Chang, Hsiao, Ljungqvist, and Tseng 2022), analyst forecasts (Chang, Ljungqvist, and Tseng 2023), stock price crash risk (Guo, Lisic, Stuart, and Wang 2019; Ni, Wang, and Yin 2021), information asymmetry (Gomez 2020), cost of capital (Lai, Lin, and Ma 2023), corporate tax avoidance (Chen, Hong, Kim, and Ryou 2021), and financial reporting (Liu 2021).

price sensitivity. Overall, our findings suggest that the EDGAR implementation affects the level of corporate investment primarily through its effects on equity financing and managerial incentives rather than managerial learning.

Our paper contributes to two strands of literatures. First, it contributes to the literature on the effects of financial reporting and disclosure on corporate investment (see reviews in Kanodia and Sapra (2016), Leuz and Wysocki (2016), and Roychowdhury, Shroff, and Verdi (2019)). Prior research in this literature often assumes that investors' costs of acquiring and analyzing corporate disclosures are negligible and focuses on whether and how disclosure content, quantity, quality, or timing affects managerial actions. Exploiting the mandatory implementation of the EDGAR system, we show that information dissemination technologies affect the level of corporate investment and that they do so causally. Our findings highlight the importance of considering information dissemination beyond information production when examining the real effects of corporate disclosures.

Second, our paper contributes to the literature assessing how the costs of monitoring for, acquiring, and analyzing corporate disclosures affect investor information choices, trades, and market outcomes (see reviews in Lee and So (2015), Kothari, So, and Verdi (2016), and Blankespoor, deHaan, and Marinovic (2020)). In this literature, two financial reporting technologies have attracted the most academic attention: the SEC's EDGAR system and the eXtensible Business Reporting Language (XBRL). While evidence suggests that the XBRL mandate seems to have initially disadvantaged retail investors and unleveled the playing field (Blankespoor, Miller, and White 2014; Li, Zhu, and Zuo 2021), the EDGAR implementation has benefited retail investors (Gao and Huang 2020). Our study responds to the call of Blankespoor,

deHaan, and Marinovic (2020) for research that examines the implications of disclosure processing costs on the real economy.

Two caveats are worth noting in interpreting our results. First, the increased timeliness and reduced costs of accessing firm disclosures might alter managers' reporting incentives (by enhancing investor monitoring and/or increasing capital market pressure) and affect firms' disclosure quality. Thus, the EDGAR shock may represent changes to information dissemination and disclosure quality at the same time. This possibility adds nuance to the interpretation of our results but does not change our inferences that the documented real effects of the EDGAR shock are due to a reduction in investors' costs of accessing corporate filings. Second, the EDGAR system represents only one type of information technology. Thus, our findings based on the EDGAR implementation may not be generalizable to other types of information technology.

The remainder of the paper is organized as follows. Section 2 lays out the institutional setting and describes our sample and empirical specification. Section 3 presents the main analysis on corporate investment. Section 4 delves into the equity financing channel. Section 5 presents the analysis on firm performance. Section 6 analyzes a firm's investment-to-price sensitivity. Section 7 concludes and discusses some directions for future research.

2. Institutional Setting, Sample, and Empirical Specification

2.1.Institutional Setting

Before the implementation of the EDGAR system in 1993, SEC-registered firms were required to submit multiple paper copies of filings to the SEC. These paper copies of filings were stored in the SEC's public reference rooms located in three locations (Washington D.C., New York, and Chicago), and typically one or two paper copies of the same filing were available for access in each location. As vividly noted in a *New York Times* (1982) article, "[t]he place can be a zoo"

and "files are often misplaced or even stolen."[5] To view these corporate filings, investors could either physically visit one of the reference rooms or subscribe to commercial data vendors for a nontrivial fee.[6] Data aggregators such as Standard & Poor's were only able to disseminate SEC filings to their commercial customers with a significant production lag (D'Souza, Ramesh, and Shen 2010).[7] This restricted and delayed access to firm disclosures likely created information asymmetry among investors even though these SEC filings were deemed "public."[8]

To facilitate the timely dissemination of corporate filings through the internet, the SEC developed the EDGAR system, which enabled registered firms to file electronically. On February 23, 1993, the SEC released the phase-in schedule for the mandatory implementation of the EDGAR system (SEC Release No. 33-6977). In this schedule, all SEC-registered firms were divided into ten groups, and each group was required to submit corporate filings (e.g., 10-K, 10-Q, and 8-K) electronically through the EDGAR system after the respective implementation date.[9] The assignments of firms into the ten phase-in groups were based solely on firm size, where larger firms were required to start filing electronically earlier than smaller firms (SEC Release No. 33-6944).[10] According to the schedule, firms in the first group (Group CF-01) were required to start filing through the EDGAR system in April 1993, while firms in the last group (Group CF-10) were

[5] See "S.E.C. Data: Difficult Hunt" by the *New York Times* (May 19, 1982).
[6] Chang, Ljungqvist, and Tseng (2023, p. 7) note that Mead Data Central charged "a fee of $125 per month, plus a connect charge of $39 an hour, plus a charge of 2.5 cents per line of data plus search charges which range from $6 to $51 per search." Dialog charged "$84 per hour plus $1 per page." See http://www.bio.net/bionet/mm/ag-forst/1992-January/000187.html.
[7] D'Souza, Ramesh, and Shen (2010) show that EDGAR decreased Compustat's median collection lag by 50 percent (i.e., from 22 weekdays to 11 weekdays).
[8] Griffin (2003) and Li and Ramesh (2009) document significant stock price reactions surrounding 10-K and 10-Q filings in the EDGAR era.
[9] Initially, filers were not required to electronically submit their Forms 3, 4 and 5 (reporting insider ownership or trading). Effective June 30, 2003, filers became required to do so (SEC Release No. 33-8230).
[10] Chang, Ljungqvist, and Tseng (2023, p. 2) note: "In private correspondence, Scott Bauguess, then-Acting-Chief-Economist of the SEC, informed us that the wave assignments were randomized conditional on firm size." Gao and Huang (2020) further note that very few firms (3% of sample firms) deviated from the SEC's phase-in schedule. Thus, the prespecified timing is a strong instrument for the actual timing of the EDGAR implementation and has the advantage of not being contaminated by firms' endogenous decisions.

required to do so in May 1996.[11] The detailed implementation dates for the ten groups are tabulated in Appendix A.

2.2.Sample

To construct the sample for our analysis, we obtain the list of firms in these ten groups from the SEC Release No. 33-6977. This list contains each firm's Central Index Key (CIK), which we use to match these firms to Compustat. Our sample period starts in the second quarter of 1991 (i.e., two years before the implementation date of the first phase-in group) and ends in the second quarter of 1998 (i.e., two years after the implementation date of the last phase-in group). We obtain financial statement data from Compustat, stock price and return data from the Center for Research in Security Prices (CRSP), and analyst forecast data from IBES. Following prior research (e.g., Chen, Goldstein, and Jiang 2007), we exclude firms in the financial and utility industries as well as firms with total assets less than $10 million in 1992 (i.e., the last year prior to the EDGAR implementation). Our final sample consists of 3,020 firms and 66,628 firm-quarter observations.

2.3.Empirical Specification

Our baseline equation for testing the effect of the EDGAR implementation on the level of corporate investment is as follows:

$$INVESTMENT_{i,t+1} = \alpha_t + \eta_i + \gamma_1 EDGAR_{i,t} + \gamma_2 Q_{i,t} + \gamma_3 CF_{i,t} + \gamma_4 SIZE_{i,t} + \varepsilon_{i,t+1} \quad (1)$$

where $INVESTMENT_{i,t+1}$ is firm i's investment in quarter t+1, and α_t and η_i represent year-quarter and firm fixed effects, respectively. Specifically, $INVESTMENT_{i,t+1}$ is defined as firm i's capital expenditure in quarter t+1 scaled by its net property, plant, and equipment at the end of

[11] After completing the phase-in of the first four groups in December 1993, the SEC refrained from further phase-in of EDGAR filers over the first half of 1994 while evaluating EDGAR's performance. On December 19, 1994, the SEC issued Release No. 33-7122, which revised the phase-in dates for Group CF-05 and Group CF-06 (from August and November 1994 as in Release No. 33-6977 to January and March 1995, respectively) and confirmed the phase-in dates for the remaining four groups. Our analysis is based on the finalized implementation dates.

quarter *t*. $EDGAR_{i,t}$ is an indicator variable that equals one if firm *i* is a mandatory EDGAR filer in quarter *t*, and zero otherwise. Following prior research (Foucault and Frésard 2012, 2014), we control for three variables known to correlate with a firm's investment decisions: $Q_{i,t}$ is Tobin's Q of firm *i* measured at the end of quarter *t*. $CF_{i,t}$ is the cash flow of firm *i* in quarter *t*, computed as the earnings before extraordinary items plus depreciation and amortization, scaled by lagged book assets.[12] $SIZE_{i,t}$ is the natural logarithm of the book value of total assets of firm *i* measured at the end of quarter *t*.[13]

γ_1 is the diff-in-diff estimator that captures the effect of the EDGAR implementation on the level of corporate investment. We predict that the EDGAR implementation improves firms' information environments, facilitates firms' access to equity financing, and allows them to tap into new investment opportunities. Thus, we predict a positive γ_1.

Two things are worth noting. First, the assignments of firms into the ten phase-in groups were based solely on a snapshot of pre-EDGAR market capitalization (Chang, Ljungqvist, and Tseng 2023). Equation (1) does not include a control for pre-EDGAR market capitalization because it is subsumed by firm fixed effects. Second, the time-varying firm characteristics ($Q_{i,t}$, $CF_{i,t}$, and $SIZE_{i,t}$) are likely affected by the EDGAR implementation, and controlling for them might confound the estimate of the effect of the EDGAR implementation on investment (Angrist and Pischke 2009; Gao and Huang 2020).[14] Hence, we run all our regressions without and with

[12] The investment-*Q* sensitivity literature commonly computes cash flows as the earnings before extraordinary items plus depreciation and amortization. All our results are robust when we directly use the operating cash flows disclosed by firms (untabulated).

[13] Our inferences are unchanged when we use the natural logarithm of the market capitalization at the end of quarter *t* to proxy for firm size (see Table A1 of the online appendix).

[14] Gormley and Matsa (2016) illustrate the importance of excluding endogenous controls (e.g., firm size) when examining the effects of business combination (BC) laws. They note: "For example, prior studies of how BC laws affect firms' acquisition activity have included a time-varying control for firm size. But, presumably, if passage of the BC law affects acquisitions, it also affects firm size, making firm size an invalid control" (p. 443).

controls for time-varying firm characteristics, and the specification without these endogenous controls is our preferred one. We cluster standard errors by firm given the firm-level shock that we exploit and the relatively short time dimension of our panel (Petersen 2009; Chang, Ljungqvist, and Tseng 2023).[15]

3. Main Analysis

3.1.Descriptive Statistics

Table 1 reports the descriptive statistics for the variables used in our main analysis. All continuous variables are winsorized at the top and bottom 1% to mitigate the influence of extreme values. *INVESTMENT* exhibits reasonable variations in the sample, and its mean, median, and standard deviation are 7.1%, 4.9%, and 7.6%, respectively. We have a roughly equal number of firm-quarter observations before and after the EDGAR implementation (50.6% versus 49.4%). The average and median Tobin's Q are 1.8 and 1.4, respectively.

3.2.Main Results on Corporate Investment

We analyze the effect of the EDGAR implementation on corporate investment by estimating Equation (1). Panel A of Table 2 reports the baseline results. In column 1, *EDGAR* is the independent variable, and we include only firm and year-quarter fixed effects. The coefficient on *EDGAR* is 0.613 (p-value<0.01), which represents a 9% increase relative to the sample mean of *INVESTMENT*. In column 2, we control for Tobin's Q (*Q*), cash flows (*CF*), and firm size (*SIZE*), and the coefficient on *EDGAR* remains significantly positive (p-value<0.01). These results suggest that on average, the EDGAR implementation leads to an increase in the level of corporate investment.

[15] Petersen (2009, p. 460) notes that "[w]hen there are only a few clusters in one dimension, clustering by the more frequent cluster yields results that are almost identical to clustering by both firm and time." Our inferences remain unchanged when we double cluster standard errors at the firm and quarter (or industry-quarter) level (see Table A2 of the online appendix).

As noted earlier, the assignments of firms into the ten EDGAR phase-in groups were based on firm size. To ensure that our results are not confounded by time trends that vary across different groups, we control for group-specific time trends. Panel B of Table 2 shows that both the coefficient on *EDGAR* and the adjusted *R*-squared remain quite similar to those reported in Panel A. These results provide comfort that group-specific time trends do not seem to explain the time-series variation in corporate investment or confound our estimation of the EDGAR effect.

The staggered diff-in-diff approach above implicitly takes as the control group both already-treated firms and to-be-treated firms (Bertrand and Mullainathan 2003). Recent research demonstrates that this approach can produce biased estimates in the presence of delayed or heterogeneous treatment effects (e.g., Baker, Larcker, and Wang 2022; Barrios 2021). To ensure the robustness of our results, we use a stacked diff-in-diff approach in which the control group is restricted to the set of to-be-treated firms (Cengiz, Dube, Lindner, and Zipperer 2019). To conduct this analysis, we construct a matched sample where treated firms are from groups CF-01 through CF-07 and control firms are selected from the set of to-be-treated firms using a nearest-neighbor propensity-score method.[16] Treated firms are tracked in the window of event quarters [-4, +4], with quarter 0 being the EDGAR implementation quarter. We match treated and control firms on three dimensions (*Q*, *CF*, and *SIZE*) in the quarter before the EDGAR implementation and produce a stacked dataset that consists of seven groups of treated and control firms.[17] We include group-specific firm and year-quarter fixed effects in a stacked diff-in-diff analysis. Panel C of Table 2 shows that our results continue to hold in this specification.[18]

[16] Following Chang, Ljungqvist, and Tseng (2023), we exclude firms from groups CF-08 through CF-10 in constructing the treated firms as they lack (to-be-treated) control firms.
[17] We consider only the matches in the common support, using a 0.05 caliper.
[18] A caveat with this stacked diff-in-diff analysis is that its reliance on propensity-score matching can potentially produce unstable results (Angrist and Pischke 2009).

In addition to the stacked diff-in-diff approach, we employ two recently proposed diff-in-diff estimators that are robust to heterogeneous treatment effects (Sun and Abraham 2021; Borusyak, Jaravel, and Spiess 2023).[19] Our inferences remain unchanged (see Table A3 of the online appendix).

3.3.Parallel Trends

One important identifying assumption for the diff-in-diff estimates is that the treatment and control groups follow parallel trends in the absence of the EDGAR treatment.[20] A common way to assess the plausibility of this parallel-trends assumption is to check whether the treatment and control groups share similar trends prior to the treatment. Following Foucault and Frésard (2012), we plot the dynamic diff-in-diff estimates (along with the 95% confidence intervals) of the effect of the EDGAR implementation on the investment level. Figure 1 shows that the level of investment is not statistically different between the treatment and control groups in the four quarters before the EDGAR implementation. These estimates provide support for the parallel-trends assumption.[21] Moreover, Figure 1 shows that the treatment effect is rather persistent and does not exhibit any reversal in the quarters after the EDGAR shock. The relatively rapid response of firms in the event quarter is consistent with EDGAR enhancing managerial incentives to undertake value-enhancing investment projects.

[19] See de Chaisemartin and D'Haultfoeuille (2023) for a detailed discussion of various diff-in-diff estimators proposed in the recent literature.

[20] The diff-in-diff approach does not require *ex ante* firm characteristics (e.g., firm size) to be identical between the treatment and control groups as any systematic difference between them will be eliminated in the estimation (through firm fixed effects).

[21] To further alleviate concerns that time trends might drive our results, we include group-specific trends as controls in our model, use a stacked diff-in-diff design (Cengiz, Dube, Lindner, and Zipperer 2019), and employ recently proposed diff-in-diff estimators that are robust to heterogeneous treatment effects (Sun and Abraham 2021; Borusyak, Jaravel, and Spiess 2023).

3.4.Robustness Checks

We conduct two additional analyses to ensure the robustness of our results. First, we repeat our analysis after excluding firms assigned to Group CF-01 (the first group) as this group contains "transitional" filers that volunteered to file electronically prior to the mandatory phase-in of the EDGAR system in April 1993 (SEC Release No. 33-6977).[22] Table A4 of the online appendix reports the results of this analysis. Both the magnitude and statistical significance of the coefficient on *EDGAR* are quite similar to those reported in Table 2.

Second, we repeat our analysis after redefining the *EDGAR* indicator for firms assigned to groups CF-01 through CF-04 (the first four groups) to take the value of one if the firm-quarter is after January 17, 1994 (when all electronic EDGAR filings became freely available online via a National Science Foundation grant to New York University), and zero otherwise. Prior to January 17, 1994, electronic EDGAR filings were available for a fee through Mead Data Central (a commercial data vendor).[23] Table A5 of the online appendix presents the results, and our inferences remain largely unchanged.

3.5.Spillover Effects

As a firm's SEC filings often contain information about the firm's industry environment and outlook (Badertscher, Shroff, and White 2013), the firm's inclusion in the EDGAR system can potentially impact the investment decisions of its peer firms in the same industry. If such a within-industry spillover effect exists, it could affect the interpretation of the EDGAR treatment effect that we estimated earlier. To understand whether this kind of spillover effect attenuates or

[22] The SEC started developing an electronic disclosure system in 1983. A pilot system was opened for volunteers filing with the SEC by the fall of 1984. On July 15, 1992, the operational EDGAR system was made available to those filers. See the regulatory overview of electronic filing at: https://www.sec.gov/info/edgar/regoverview.htm.
[23] See "Plan Opens More Data to Public" by the *New York Times* (October 22, 1993).

exaggerates our estimate, we rerun the stacked diff-in-diff analysis with three different sets of matched samples.

In the first sample, we require each control firm to be in the same industry as the treated firm (based on the two-digit SIC classification). In the second sample, we require each control firm be in a different industry from the treated firm. To the extent that a firm's EDGAR inclusion is less likely to affect other firms in a different industry, the diff-in-diff estimate from the second sample is less confounded by potential within-industry spillovers. To further understand the industry spillover effects, we construct the third sample by including the control groups from the first two samples; our goal is to understand how a firm's EDGAR inclusion affects its industry peers (relative to other firms in different industries).

Table 3 shows the results of this analysis. Panel A shows the results based on the sample where the control group consists of the treated firms' industry peers. The coefficient on *EDGAR* is 0.847 (p-value<0.01), which is comparable to our baseline estimate. Panel B reports the results based on the sample where the control group consists of firms in industries different from the treated firms. The coefficient on *EDGAR* is 2.579 (p-value<0.01), which is much larger in magnitude than the estimate in Panel A. This result suggests that the within-industry spillovers potentially attenuate our estimate of the EDGAR treatment effect. In Panel C, we more explicitly examine the spillover effects by comparing the two control groups; we code *EDGAR* as an indicator variable that equals one if firm i is the matched industry peer of a mandatory EDGAR filer in quarter t, and zero otherwise. The coefficient on *EDGAR* is 1.874 (p-value<0.01), consistent with a positive spillover effect on industry peers.

Overall, the results in Table 3 suggest that a firm's inclusion in the EDGAR system has a positive spillover effect on the investment of its industry peers. This positive industry spillover likely attenuates the EDGAR treatment effect that we estimate.

3.6.Aggregate Effects

Our previous firm-level analysis shows that the EDGAR implementation has a positive effect on corporate investment. We also find some evidence that a firm's inclusion in the EDGAR system has a positive spillover effect on its industry peers. These results suggest that the EDGAR implementation likely leads to an economy-wide increase in investment. In this section, we provide some descriptive evidence on the aggregate effects of the EDGAR system on corporate investment.

To do so, we construct a constant sample of firms that existed for the whole sample period. For each quarter, we calculate the total dollar amount of corporate investment (in 1992 constant dollars) and then compute the growth rate relative to the same quarter in the previous year. Panel A of Figure 2 plots the aggregate corporate investment growth rate of this sample (the solid line), along with the time trend (the dashed line). Consistent with Kothari, Lewellen, and Warner (2014), this figure shows an upward trend of corporate investment growth rate over our sample period. This pattern is consistent with the firm-level effects we document (both the treatment effect and the spillover effect). However, we note that the aggregate effect, as the figure shows, is descriptive, as aggregate corporate investment is influenced not only by the EDGAR implementation but also by other economic factors (Kothari, Lewellen, and Warner 2014).

3.7.Value Firms versus Growth Firms

As the EDGAR system likely contains more information about assets in place than about growth options, the increased level of investment documented in Table 2 is more likely to manifest in value firms than in growth firms. To assess this cross-sectional prediction, we divide the full

sample into two types of firms based on the market-to-book ratios in 1992 (the last year prior to the EDGAR implementation). *VALUE_FIRM* (*GROWTH_FIRM*) is an indicator that equals one if a firm's market-to-book ratio in 1992 is below (above) the median, and zero otherwise.

In Panel A of Table 4, we repeat the analysis on the level of investment by replacing *EDGAR* in Equation (1) with its interactions with *VALUE_FIRM* and *GROWTH_FIRM*. We find that the observed EDGAR effect on corporate investment is concentrated in value firms. To ensure that this result based on the value and growth dichotomy is not confounded by the propensity to treat (based on firm size), we further control for *EDGAR*×*PRE_MVE* in Panel B of Table 4, where *PRE_MVE* is the pre-EDGAR market capitalization (measured in 1992). We continue to observe a significantly positive coefficient on *EDGAR*×*VALUE_FIRM*, while both the coefficient on *EDGAR*×*GROWTH_FIRM* and that on *EDGAR*×*PRE_MVE* are small and statistically insignificant. These results are consistent with our prediction that the investment effect is more likely to occur for value firms.

Panel B of Figure 2 plots the aggregate corporate investment growth rate for the subsamples of value firms and growth firms, respectively. We do not observe differential time trends across these two subsamples. To further ensure that the differential results on value firms versus growth firms are not driven by how *INVESTMENT* is computed, we use two alternative measures of investment. The first measure, *CAPEX_GROWTH*, is the growth rate of the physical investment made by the firm, defined as capital expenditure in the quarter scaled by capital expenditure in the same quarter of the previous year (in 1992 constant dollars) minus one. The second measure, *INTANG_GROWTH*, is the growth rate of the intangible investment made by the firm, defined as intangible investment (R&D expenditure plus 30% of SG&A expenditure, following Peters and Taylor (2017)) in the quarter scaled by the intangible investment in the same

quarter of the previous year (in 1992 constant dollars) minus one. The results using these two alternative measures are tabulated in Table A6 of the online appendix. Our inferences are largely unchanged.

4. Equity Financing

In this section, we analyze the equity financing channel through which the EDGAR implementation affects the level of corporate investment by estimating the following model:

$$DEPVAR_{i,t} = \alpha_t + \eta_i + \beta_1 EDGAR_{i,t} + \beta_2 SIZE_{i,t-1} + \beta_3 PRC\_INV_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

where $DEPVAR_{i,t}$ represents the simple bid-ask spread (*SPREAD*), the high-low spread estimator (*HL_SPREAD*) developed by Corwin and Schultz (2012), the implied cost of capital (*ICC*) measure derived from Gebhardt, Lee, and Swaminathan (2001), and the amount of equity issuance (*EQUITY*). The first two variables are liquidity measures.[24] The third variable is computed based on a residual-income model and defined as the internal rate of return that equates the firm's market value to the present value of its expected future earnings estimates (from analysts' forecasts). This measure is well suited in our setting as our objective is to compare the difference in a firm's cost of capital over time (Lee, So, and Wang 2021).[25]

Following Jayaraman and Wu (2019), we include two basic controls. $SIZE_{i,t-1}$ is the lagged firm size (the natural logarithm of total assets), and $PRC\_INV_{i,t-1}$ is the inverse of stock price measured at the end of quarter *t*–1. Year-quarter fixed effects (α_t) and firm fixed effects (η_i)

[24] Corwin and Schultz (2012, p. 721) note that "the high–low spread estimator captures liquidity more broadly than just the bid-ask spread. Price pressure from large orders will often lead to execution at daily high or low prices. Similarly, a succession of buy or sell orders in a shallow market may result in executions at daily high or low prices. The high–low spread estimator captures these transitory price effects in addition to the bid-ask spread."

[25] Lee, So, and Wang (2021) thoroughly evaluate alternative proxies of cost of capital and demonstrate that "implied-costs-of-capital" metrics perform best in time series (while "characteristic-based" proxies perform best in the cross-section). By comparing average cross-sectional measurement-error variances, they also show that the measure proposed by Gebhardt, Lee, and Swaminathan (2001) outperforms a trivial expected-return proxy.

are included. We run our regressions without and with controls for time-varying firm characteristics, and the specification without these endogenous controls is our preferred one.

Panel A of Table 5 reports the regression results on stock liquidity measures. We include only *EDGAR* as the independent variable in columns 1 and 3 and add firm size (*SIZE*) and the inverse of stock price (*PRC_INV*) as controls in columns 2 and 4. In columns 1 and 2, the dependent variable is the simple bid-ask spread (*SPREAD*). The coefficient on *EDGAR* is significantly negative at the 1% level, suggesting an increase in stock liquidity after the EDGAR shock. In columns 3 and 4, the dependent variable is the high-low spread estimator (*HL_SPREAD*). The coefficient on *EDGAR* is significantly negative (p-value<0.01) in both columns, consistent with an increase in stock liquidity. In Panel B of Table 5, we repeat the analysis in Panel A by replacing *EDGAR* with its interactions with *VALUE_FIRM* and *GROWTH_FIRM*. The observed EDGAR effects on the stock liquidity measures are present in both value firms and growth firms.

Panel A of Table 6 reports the regression results on the implied cost of capital and equity issuance. Again, we include only *EDGAR* as the independent variable in columns 1 and 3 and add firm size (*SIZE*) and the inverse of stock price (*PRC_INV*) as controls in columns 2 and 4. In columns 1 and 2, the coefficient on *EDGAR* is significantly negative at the 5% level, suggesting a decrease in a firm's cost of equity capital by 0.195 percentage points after the EDGAR shock. In columns 3 and 4, the dependent variable is the amount of equity financing (*EQUITY*). The coefficient on *EDGAR* is significantly positive (p-value<0.01) in both columns. The magnitude is also economically meaningful. The coefficient of 0.294 in column 3 suggests an increase in equity financing by 0.294% of total assets each quarter on average. In Panel B of Table 6, we repeat the analysis on the equity financing channel by replacing *EDGAR* in Equation (2) with its interactions

with *VALUE_FIRM* and *GROWTH_FIRM*. We find that the observed EDGAR effects on the implied cost of capital and equity issuance are concentrated in value firms.

Together, Tables 5 and 6 provide evidence supporting the equity financing channel: The EDGAR shock leads to an increase in stock liquidity, a decrease in the implied cost of capital, and an increase in equity financing, and these effects are concentrated in value firms.

Our previous analysis focuses on the effect of EDGAR inclusion on equity financing instead of debt financing because the former is more likely to be affected by the EDGAR implementation, which reduces the disclosure processing costs for equity investors. A firm's EDGAR inclusion is less likely to affect the availability of or access to information by its lenders. In Table 7, we repeat the analysis using debt issuance (*DEBT*) as the dependent variable. This analysis can be seen as a placebo-effect check. We find no evidence that the EDGAR implementation affects the amount of debt financing, consistent with EDGAR affecting the dissemination of information that debt holders already had access to.

5. Firm Performance

The EDGAR system can enable stakeholders (including investors) to use firm disclosures to monitor managerial actions (Blankespoor, deHaan, and Marinovic 2020), reduce managers' over- and underinvestment, and enhance firm performance. Figure 1 shows that firms start to respond in the event quarter, which seems to be a rapid response. This response is consistent with EDGAR enhancing managerial incentives to undertake investment projects. To provide further evidence on the managerial incentive channel, we investigate the effect of the EDGAR implementation on *ex post* firm performance.

We perform two sets of analyses. First, in Panel A of Table 8, we rerun the regression model in Equation (2) by replacing the dependent variable with return on assets (*ROA*). We report

the regression results without and with control variables in columns 1 and 2, respectively. The coefficient on *EDGAR* is significantly positive at the 1% level in both columns, suggesting that the EDGAR shock has a positive effect on firm profitability. In terms of economic significance, the coefficient in column 1 indicates that the EDGAR implementation leads to a 0.198-percentage-point increase in a firm's return on assets, which represents 12% of *ROA*'s sample mean.[26]

Second, we rerun the same regression but replace *EDGAR* with *EDGAR*×*VALUE_FIRM* and *EDGAR*×*GROWTH_FIRM* in Panel B of Table 8. The coefficient on *EDGAR*×*VALUE_FIRM* is significantly positive at the 1% level, while the coefficient on *EDGAR*×*GROWTH_FIRM* is negative and largely statistically insignificant in both columns. The difference between the coefficients on these two interaction terms is significant at the 1% level in both columns. These results show that the observed improvement in firm profitability is largely concentrated in value firms.

Collectively, the results in Table 8 suggest that greater and broader information dissemination facilitated by modern information technologies can better incentivize managers to exert effort and improve firm performance.

6. Investment-to-Price Sensitivity

Finally, we examine whether and how the EDGAR implementation affects a firm's investment-to-price sensitivity, which is the sole focus of Bird, Karolyi, Ruchti, and Truong (2021). Our goal is to explain why our main finding on the level of corporate investment cannot readily be inferred from the results documented in Bird, Karolyi, Ruchti, and Truong (2021).

[26] To ensure that these results are not contaminated by survivorship bias, we repeat the analysis in a constant sample of firms that existed for the whole sample period. Our inferences remain unchanged (see Table A7 of the online appendix).

The investment-to-price sensitivity is often used to assess revelatory price efficiency, i.e., the extent to which prices reveal new information to managers (Bond, Edmans, and Goldstein 2012).[27] The notion of revelatory price efficiency builds on the idea that prices are a useful source of new information (Hayek 1945).[28] Stock prices can reveal dimensions of traders' private information that are new to managers; hence they can affect managers' forecasts about their own firms' fundamentals (Zuo 2016; Jayaraman and Wu 2020) and their corporate investment decisions (Dye and Sridhar 2002; Luo 2005; Chen, Goldstein, and Jiang 2007).[29] The sensitivity of investment to price will be stronger when movements in the price are more likely to originate from information that is new to the manager than from information she already knew.[30]

To examine how the EDGAR implementation affects the investment-to-price sensitivity, we augment Equation (1) by interacting $EDGAR_{i,t}$ with $Q_{i,t}$, $CF_{i,t}$, and $SIZE_{i,t}$ as follows:

$$\begin{aligned} INVESTMENT_{i,t+1} &= \alpha_t + \eta_i + \gamma_1 EDGAR_{i,t} + \gamma_2 Q_{i,t} + \gamma_3 CF_{i,t} + \gamma_4 SIZE_{i,t} + \gamma_5 Q_{i,t} \times EDGAR_{i,t} \\ &+ \gamma_6 CF_{i,t} \times EDGAR_{i,t} + \gamma_7 SIZE_{i,t} \times EDGAR_{i,t} + \varepsilon_{i,t+1} \end{aligned} \quad (3)$$

where γ_5 captures the effect of the EDGAR implementation on the investment-to-price sensitivity.

[27] See, for example, Chen, Goldstein, and Jiang (2007), Bakke and Whited (2010), Foucault and Frésard (2012, 2014), Bai, Philippon, and Savov (2016), Edmans, Jayaraman, and Schneemeier (2017), Dessaint, Foucault, Frésard, and Matray (2019), Jayaraman and Wu (2019), Lin, Liu, and Sun (2019), Sani, Shroff, and White (2023), and Ye, Zheng, and Zhu (2023).

[28] Fama and Miller (1972, p. 335) note: "(An efficient market) has a very desirable feature. In particular, at any point in time market prices of securities provide accurate signals for resource allocation; that is, firms can make production-investment decisions …" Rappaport (1987, p. 57) further notes: "[Managers] can learn a lot if they analyze what the stock price tells them about the market's expectations for their company's performance." George Soros (a prominent trader) calls this feature "reflexivity" and states: "Stock prices are not merely passive reflections; they are active ingredients in the process in which both stock prices and the fortunes of companies whose stocks are traded are determined" (Soros 1994, p. 49).

[29] As a recent anecdote of managerial learning from the market, Intercontinental Exchange (ICE, the parent company of the New York Stock Exchange) quickly abandoned its pursuit of eBay after the news of its interest in a deal triggered a 10.5% drop in its stock price. See "NYSE Owner Abandons Potential eBay Deal" by the *Wall Street Journal* (February 6, 2020). In a survey by Goldstein, Liu, and Yang (2023), 90% of firms in China report that they pay attention to the stock market for learning and financing purposes. Zhang (2023) provides evidence that managers learn from their firms' institutional investors through direct interactions.

[30] While revelatory price efficiency is necessary for managerial learning, it is not sufficient. The extent to which managers incorporate price information in their decision making depends on their willingness and ability to learn, and it is ultimately an empirical question (Hanlon, Yeung, and Zuo 2022).

Table 9 presents the results of this analysis. In column 1 of Panel A, we report the results of the regression model in Equation (3). The coefficient on *Q* measures the investment-to-price sensitivity prior to the EDGAR implementation and is 1.908 (*p*-value<0.01). The coefficient on *Q*×*EDGAR* measures the change in the sensitivity of investment to price after the EDGAR shock and is -0.392 (*p*-value<0.01). Comparing these two coefficients suggests that the EDGAR implementation leads to a 21% decline in the investment-to-price sensitivity.

In column 2 of Panel A, we further augment Equation (3) by interacting *Q* with firm fixed effects to allow the investment-to-price sensitivity to vary across firms. The coefficient on *Q*×*EDGAR* remains significantly negative (*p*-value<0.05).[31] In column 3 of Panel A, we use the same stacked diff-in-diff approach as in Panel C of Table 2 and continue to find a significantly negative coefficient on *Q*×*EDGAR*.

These results in Panel A suggest that EDGAR inclusion leads to a crowding-out of investor information and reduces managerial learning from prices, consistent with the theoretical prediction of Dugast and Foucault (2018) and the empirical findings of Bird, Karolyi, Ruchti, and Truong (2021).[32] Interestingly, the coefficients on *CF* and *CF*×*EDGAR* are both significantly positive. Since a firm's cash flows are informative about its performance and investment opportunities (Alti 2003; Heitzman and Huang 2019), these results suggest that managers increase their reliance on internal profit signals (i.e., *CF*) and decrease their reliance on external price signals (i.e., *Q*) after

[31] A caveat is that our result on the investment-to-price sensitivity is not robust after we control for *Q* interacted with firm-specific time trends and/or year-quarter fixed effects. This might reflect an estimation issue that arises when we include many interaction terms that involve high-dimensional fixed effects. It might also be the case that the changes in the investment-to-price sensitivity around the EDGAR rollout are part of a secular trend. Our main results on the level of investment are not subject to these concerns.

[32] This observed decrease in the investment-to-price sensitivity is unlikely to be explained by alternative channels, such as greater financing, stronger governance, or less noise in prices after the EDGAR implementation (e.g., Kanodia and Lee 1998; Bushee and Friedman 2016), which all point to an increase in the investment-to-price sensitivity.

the EDGAR implementation.[33] This increased reliance on internal profit signals is also consistent with the model of Kanodia and Lee (1998) in which periodic performance reports discipline managers' investment choices. The EDGAR implementation facilitates stakeholders' access to firms' periodic performance reports and strengthens their disciplinary role.

In Panel B of Table 9, we repeat the regression on the investment-to-price sensitivity as specified in Equation (3) by replacing *Q* with *Q*×*VALUE_FIRM* and *Q*×*GROWTH_FIRM* in column 1, and we further add their interactions with *EDGAR* in column 2. In column 1, the coefficients on both *Q*×*VALUE_FIRM* and *Q*×*GROWTH_FIRM* are significantly positive at the 1% level. In column 2, the interaction term *Q*×*GROWTH_FIRM*×*EDGAR* is significantly negative at the 1% level, while the coefficient on *Q*×*VALUE_FIRM*×*EDGAR* is statistically insignificant.

It is worth emphasizing that our main finding of an increase in the level of corporate investment cannot be explained by a firm's reduced investment-to-price sensitivity post EDGAR. Ceteris paribus, a decrease in a firm's responsiveness to Tobin's Q generally implies a lower amount of capital investment when firms expand their operations. In addition, we do not find evidence that value firms experience any significant change in the investment-to-price sensitivity; rather, most of our previous findings are concentrated in value firms. Together, these results suggest that our documented effects of EDGAR on the level of corporate investment are unlikely to be driven by the managerial learning channel as studied in Bird, Karolyi, Ruchti, and Truong (2021).

[33] Both earnings and cash flows are internal profit signals, and the underlying theory does not distinguish between these two measures. Our inferences remain unchanged when we define *CF* as a firm's operating cash flows (see Table A8 of the online appendix).

7. Conclusion

Modern information technologies have greatly facilitated timely dissemination of information to a broad base of investors at low costs. In this paper, we exploit the staggered mandatory implementation of the EDGAR system from 1993 to 1996 as a shock to information dissemination technologies. We find that the EDGAR implementation leads to an increase in the level of corporate investment and that this effect is concentrated in value firms. We provide evidence that the increased level of investment is likely explained by two mechanisms: improved equity financing and enhanced managerial incentives.

Overall, our findings suggest that it is important to consider information dissemination beyond information production when evaluating the real effects of modern information technologies. With the rise of FinTech innovation through big data and machine learning techniques, the investing public can now obtain a huge amount of data at relatively low costs (Goldstein, Jiang, and Karolyi 2019). We might reasonably expect the decline in the cost of accessing information to increase price efficiency. However, greater information production and dissemination brought by modern technologies may not necessarily enhance real efficiency or the welfare of investors, as they can lead to a reduction in managerial learning from prices (Goldstein 2023), a reduction in risk-sharing and trading opportunities among investors (Hirshleifer 1971; Kurlat and Veldkamp 2015), or an overemphasis on public signals due to beauty-contest incentives (Morris and Shin 2002). Evaluating the various tradeoffs of FinTech developments is an interesting avenue for future research.

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Appendix A: Phase-in Schedule of the EDGAR Implementation

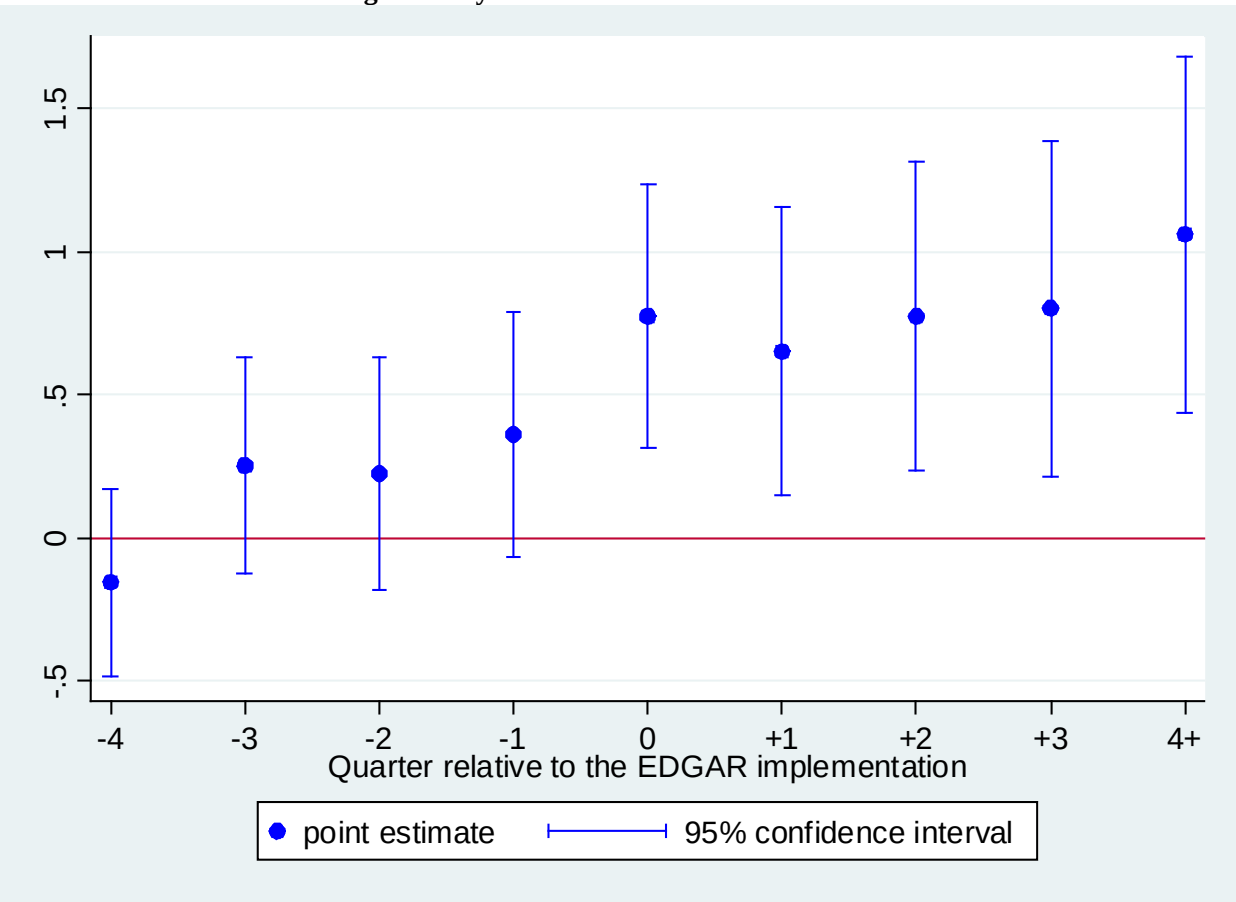
Implementation Date	Group
April 26, 1993	Phase-in of Group CF-01
July 19, 1993	Phase-in of Group CF-02
October 4, 1993	Phase-in of Group CF-03
December 6, 1993	Phase-in of Group CF-04
January 30, 1995	Phase-in of Group CF-05
March 6, 1995	Phase-in of Group CF-06
May 1, 1995	Phase-in of Group CF-07
August 7, 1995	Phase-in of Group CF-08
November 6, 1995	Phase-in of Group CF-09
May 6, 1996	Phase-in of Group CF-10

Note: This table presents the finalized EDGAR implementation dates for the ten phase-in groups (SEC Releases No. 33-6977 and No. 33-7122).

Appendix B: Variable Definitions

Variable	Definition
EDGAR	An indicator that equals one after a firm becomes a mandatory EDGAR filer, and zero otherwise.
INVESTMENT	Capital expenditure scaled by lagged net property, plant, and equipment (PPENTQ). Compustat quarterly data provide the year-to-date amount of net capital expenditure (CAPXY). We therefore set quarterly capital expenditure to be CAPXY (in the first fiscal quarter) or the change in CAPXY (in the second, third, and fourth fiscal quarters). It is expressed in percentage points.
Q	The book value of total assets (ATQ) minus the book value of equity (CEQQ) plus the market value of equity (CSHOQ×PRCCQ), scaled by the book value of total assets (ATQ).
CF	Cash flow computed as the earnings before extraordinary items plus depreciation and amortization (IBQ+DPQ) scaled by lagged total assets (ATQ). It is expressed in percentage points.
SIZE	The natural logarithm of the book value of total assets (ATQ).
SPREAD	The average daily bid-ask spread over the quarter. Daily bid-ask spread is calculated as the closing ask price less the closing bid price, divided by the average of the ask and bid price. It is expressed in percentage points.
HL_SPREAD	The bid-ask spread estimated from daily high and low prices following Corwin and Schultz (2012). It is expressed in percentage points.
PRC_INV	The inverse of the stock price (PRCCQ) at the fiscal quarter end.
ICC	The implied cost of capital measure derived from Gebhardt, Lee, and Swaminathan (2001). It is expressed in percentage points.
EQUITY	Equity issuance scaled by lagged total assets (ATQ). Compustat quarterly data provide the year-to-date amount of common and preferred stock issuance (SSTKY). Following Farre-Mensa and Ljungqvist (2016), we set quarterly equity issuance to be SSTKY (in the first fiscal quarter) or the change in SSTKY (in the second, third, and fourth fiscal quarters). It is expressed in percentage points.
DEBT	Net debt issuance (DLTISQ minus DLTRQ) scaled by lagged total assets (ATQ); when DLTISQ and DLTRQ are missing, this variable equals the change in total debt for the company (change in DLTTQ plus change in DLCQ) scaled by lagged total assets. It is expressed in percentage points.
VALUE_FIRM	An indicator that equals one if a firm's market-to-book ratio in 1992 is below the sample median, and zero otherwise. Market-to-book ratio is defined as the ratio of the market value of a firm's common stock (CSHO×PRCC_F) to its book value (CEQ). It is set to missing if CEQ is negative.
GROWTH_FIRM	An indicator that equals one if a firm's market-to-book ratio in 1992 is above the sample median, and zero otherwise.
PRE_MVE	The natural logarithm of the market value of equity (CSHO×PRCC_F) in 1992.
ROA	The ratio of operating income after depreciation (OIADPQ) to lagged book value of total assets (ATQ). It is expressed in percentage points.

Figure 1: Dynamic Test of the Investment Level

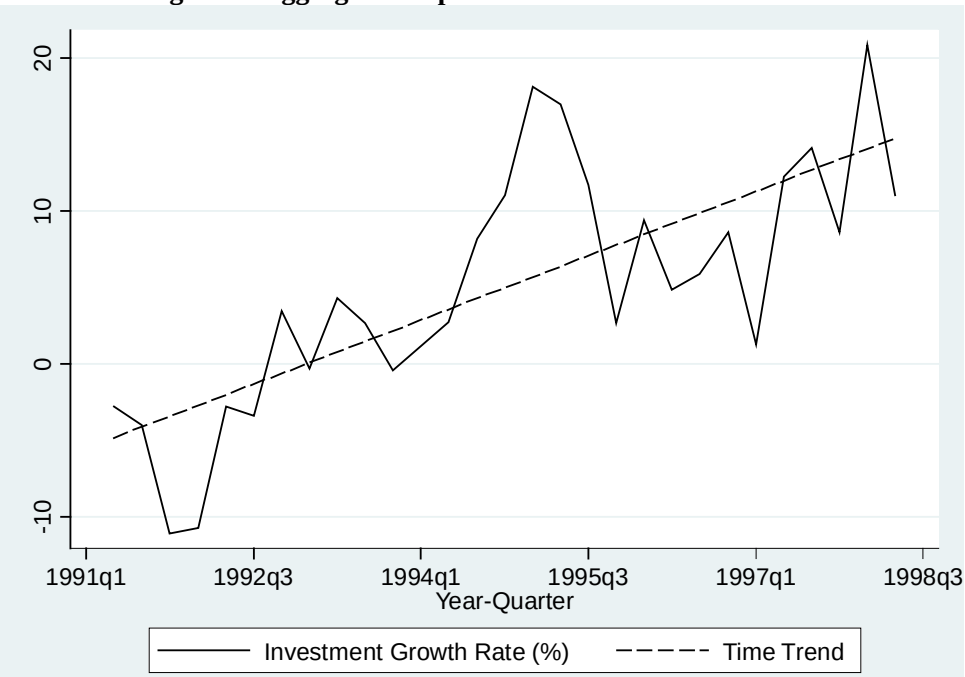


Notes: This figure reports the results from an event-time analysis of the effect of the EDGAR implementation on the level of corporate investment. We re-estimate the regression model on the level of investment in column 1 of Table 2 by replacing *EDGAR* with a set of indicators for the quarters around the EDGAR implementation for each firm in our sample. Specifically, the regression model is as follows:

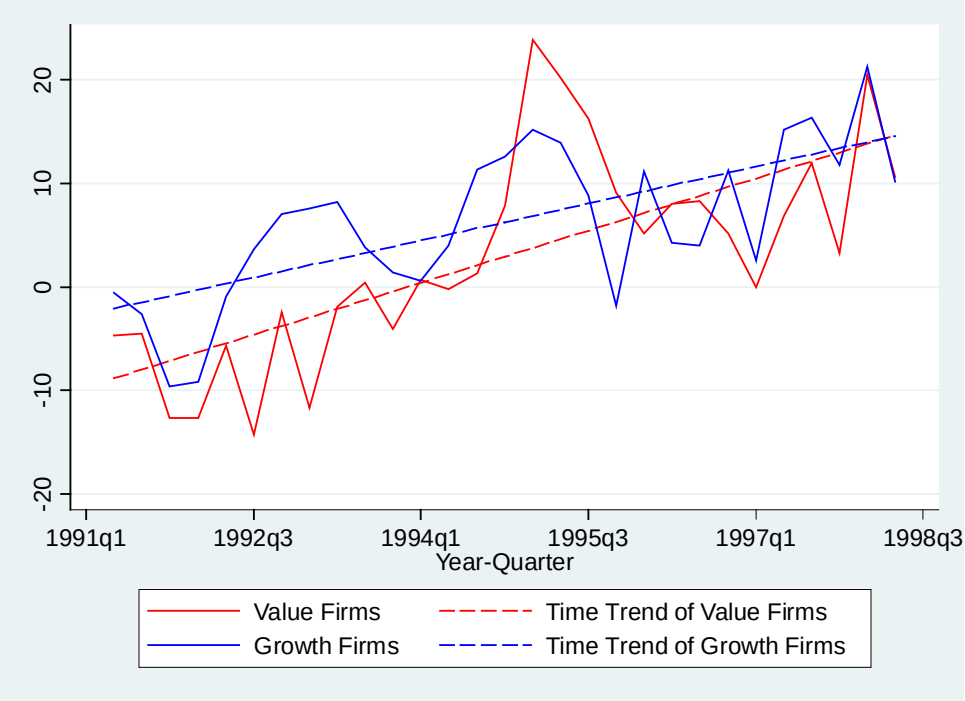
$$INVESTMENT_{i,t} = \alpha_t + \eta_i + \gamma_1 EDGAR(-4)_{i,t} + \gamma_2 EDGAR(-3)_{i,t} + \gamma_3 EDGAR(-2)_{i,t} + \gamma_4 EDGAR(-1)_{i,t} + \gamma_5 EDGAR(0)_{i,t} + \gamma_6 EDGAR(+1)_{i,t} + \gamma_7 EDGAR(+2)_{i,t} + \gamma_8 EDGAR(+3)_{i,t} + \gamma_9 EDGAR(4+)_{i,t} + \varepsilon_{i,t}$$

where $EDGAR(-4)_{i,t}$ ($EDGAR(-3)_{i,t}$, $EDGAR(-2)_{i,t}$, $EDGAR(-1)_{i,t}$) is an indicator that equals one if a firm will become a mandatory EDGAR filer in four quarters (three quarters, two quarters, one quarter), and zero otherwise. $EDGAR(0)_{i,t}$ is an indicator that equals one if a firm becomes a mandatory EDGAR filer in the current quarter *t*, and zero otherwise. $EDGAR(+1)_{i,t}$ ($EDGAR(+2)_{i,t}$, $EDGAR(+3)_{i,t}$) is an indicator that equals one if a firm became a mandatory EDGAR filer one quarter (two quarters, three quarters) ago, and zero otherwise. $EDGAR(4+)_{i,t}$ is an indicator that equals one if a firm became a mandatory EDGAR filer four or more quarters ago, and zero otherwise. The figure reports the coefficient estimates on each event quarter indicator as well as their 95% confidence intervals. The estimation includes firm and year-quarter fixed effects, as well as group-specific trends. The standard errors are clustered at the firm level.

Figure 2: Aggregate Corporate Investment Growth Rate



Panel A: Whole Sample



Panel B: Value Firms versus Growth Firms

Notes: Panel A plots the aggregate corporate investment growth rate of a constant sample (the solid line), along with the time trend (the dashed line). We construct the constant sample of firms that existed for the whole sample period. For each quarter, we calculate the total dollar amount of corporate investment (in 1992 constant dollars) and then compute the growth rate relative to the same quarter in the previous year. Panel B plots the aggregate corporate investment growth rate separately for the subsamples of value firms and growth firms.

Table 1: Summary Statistics

Variable	N	Mean	Std. Dev.	Q1	Median	Q3
INVESTMENT	66,628	7.090	7.582	2.543	4.867	8.768
EDGAR	66,628	0.494	0.500	0.000	0.000	1.000
Q	66,628	1.803	1.215	1.086	1.412	2.037
CF	66,628	1.708	4.394	0.966	2.374	3.759
SIZE	66,628	5.106	1.760	3.770	4.861	6.241
PRC_INV	66,628	0.222	0.477	0.041	0.081	0.186
SPREAD	57,366	4.742	4.880	1.653	3.146	5.882
HL_SPREAD	64,007	1.727	2.636	0.032	0.763	2.489
ICC	38,166	10.431	3.283	8.467	10.266	12.151
EQUITY	64,335	1.001	5.058	0.000	0.012	0.183
DEBT	65,672	0.291	4.589	-0.691	-0.021	0.207
ROA	66,094	1.624	4.154	0.448	2.089	3.665

Notes: This table presents the summary statistics for the variables used in our main analysis. The sample period starts in the second quarter of 1991 and ends in the second quarter of 1998. All continuous variables are winsorized at the top and bottom 1% to mitigate the influence of extreme values. Variable definitions are provided in Appendix B.

Table 2: Main Results on Corporate Investment

Panel A: Baseline Analysis		
Dependent Variable =	*INVESTMENT*	
	(1)	(2)
EDGAR	**0.613*** **	**0.403*** **
	(4.05)	**(2.84)**
Q		1.714***
		(18.97)
CF		0.178***
		(12.94)
SIZE		0.354**
		(2.10)
Firm FE	Yes	Yes
Year-Quarter FE	Yes	Yes
Observations	66,628	66,628
Adjusted *R*-squared	0.272	0.302
Panel B: Controlling for Group-Specific Trends		
Dependent Variable =	*INVESTMENT*	
	(1)	(2)
EDGAR	**0.535*** **	**0.344** **
	(3.59)	**(2.46)**
Q		1.621***
		(18.46)
CF		0.169***
		(12.69)
SIZE		0.562***
		(3.33)
Firm FE	Yes	Yes
Year-Quarter FE	Yes	Yes
Group-Specific Trends	Yes	Yes
Observations	66,628	66,628
Adjusted *R*-squared	0.281	0.308
Panel C: Stacked Diff-in-Diff Regression		
Dependent Variable =	*INVESTMENT*	
	(1)	(2)
EDGAR	**0.506*** **	**0.445** **
	(2.79)	**(2.52)**
Q		1.483***
		(9.63)
CF		0.086***
		(5.43)
SIZE		0.511*
		(1.78)
Group-Specific Firm FE	Yes	Yes
Group-Specific Year-Quarter FE	Yes	Yes
Observations	31,319	31,319
Adjusted *R*-squared	0.362	0.374

Notes: This table reports the regression results on corporate investment. The dependent variable is the quarterly investment made by the firm (*INVESTMENT*), defined as capital expenditure in the next quarter scaled by the net property, plant, and equipment at the current quarter end. *EDGAR* is an indicator that equals one after a firm becomes a mandatory EDGAR filer, and zero otherwise. All other variables are defined in Appendix B. In Panel A, we report the regression results using the baseline model. In Panel B, we control for group-specific time trends. In Panel C, we run a stacked diff-in-diff regression with a matched sample, where treated firms are from groups CF-01 through CF-07, and control firms are selected from the set of to-be-treated firms using a nearest-neighbor propensity-score method for each group. Treated firms are tracked in the window of event quarters [-4, +4], with quarter 0 being the EDGAR implementation quarter. We match treated and control firms on three dimensions (*Q*, *CF*, and *SIZE*) in the quarter before the EDGAR implementation. The *t*-statistics of robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 3: Spillover Effects

Panel A: Industry Peers as Control Group		
Dependent Variable =	*INVESTMENT*	
	(1)	(2)
EDGAR	**0.847*** **	**0.759*** **
	(3.51)	**(3.18)**
Q		1.158***
		(6.75)
CF		0.077***
		(4.00)
SIZE		0.431
		(1.24)
Group-Specific Firm FE	Yes	Yes
Group-Specific Year-Quarter FE	Yes	Yes
Observations	19,879	19,879
Adjusted *R*-squared	0.356	0.363
Panel B: Firms in Different Industries as Control Group		
Dependent Variable =	*INVESTMENT*	
	(1)	(2)
EDGAR	**2.579*** **	**2.056*** **
	(11.27)	**(7.82)**
Q		1.341***
		(9.58)
CF		-0.051***
		(-3.93)
SIZE		1.799***
		(4.03)
Group-Specific Firm FE	Yes	Yes
Group-Specific Year-Quarter FE	Yes	Yes
Observations	18,014	18,014
Adjusted *R*-squared	0.362	0.371
Panel C: Industry Peers versus Firms in Different Industries		
Dependent Variable =	*INVESTMENT*	
	(1)	(2)
EDGAR	**1.874*** **	**0.902*** **
	(7.67)	**(3.37)**
Q		1.658***
		(11.59)
CF		-0.044***
		(-4.23)
SIZE		0.630*
		(1.69)
Group-Specific Firm FE	Yes	Yes
Group-Specific Year-Quarter FE	Yes	Yes
Observations	18,774	18,774
Adjusted *R*-squared	0.365	0.375

Notes: This table reports the regression results using different samples. We run a stacked diff-in-diff regression with a matched sample, where treated firms are from groups CF-01 through CF-07, and control firms are selected from the set of to-be-treated firms using a nearest-neighbor propensity-score method for each group. Treated firms are tracked in the window of event quarters [-4, +4], with quarter 0 being the EDGAR implementation quarter. We match treated and control firms on three dimensions (*Q*, *CF*, and *SIZE*) in the quarter before the EDGAR implementation. The dependent variable is the quarterly investment made by the firm (*INVESTMENT*), defined as capital expenditure in the next quarter scaled by the net property, plant, and equipment at the current quarter end. In Panels A and B, *EDGAR* is an indicator that equals one after a firm becomes a mandatory EDGAR filer, and zero otherwise. Panel A shows the results based on the sample where the control group consists of the treated firms' industry peers. Panel B reports the results based on the sample where the control group consists of firms in industries different from the treated firms. In Panel C, we more explicitly examine the spillover effects by comparing the two control groups; we code *EDGAR* as an indicator variable that equals one if firm *i* is the matched industry peer of a mandatory EDGAR filer in quarter *t*, and zero otherwise. All other variables are defined in Appendix B. The *t*-statistics of robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 4: Value Firms versus Growth Firms

Panel A: Baseline Analysis		
Dependent Variable =	*INVESTMENT*	
	(1)	(2)
***EDGAR×VALUE_FIRM* (a)**	**1.384*** **	**0.899*** **
	(7.74)	**(5.35)**
***EDGAR×GROWTH_FIRM* (b)**	**-0.123**	**-0.051**
	(-0.68)	**(-0.30)**
Q		1.721***
		(18.49)
CF		0.174***
		(12.09)
SIZE		0.473***
		(2.62)
Test of (a)=(b) (*p*-value)	**<0.001**	**<0.001**
Firm FE	Yes	Yes
Year-Quarter FE	Yes	Yes
Observations	62,441	62,441
Adjusted *R*-squared	0.273	0.304
Panel B: Controlling for Pre-Size Effects		
Dependent Variable =	*INVESTMENT*	
	(1)	(2)
***EDGAR×VALUE_FIRM* (a)**	**1.472*** **	**0.910*** **
	(5.49)	**(3.66)**
***EDGAR×GROWTH_FIRM* (b)**	**-0.004**	**-0.035**
	(-0.01)	**(-0.11)**
Q		1.721***
		(18.49)
CF		0.174***
		(12.09)
SIZE		0.473***
		(2.62)
EDGAR×PRE_MVE	-0.021	-0.003
	(-0.44)	(-0.06)
Test of (a)=(b) (*p*-value)	**<0.001**	**<0.001**
Firm FE	Yes	Yes
Year-Quarter FE	Yes	Yes
Observations	62,441	62,441
Adjusted *R*-squared	0.277	0.304

Notes: This table reports the regression results for the differential treatment effects in value firms and growth firms. The dependent variable is the quarterly investment made by the firm (*INVESTMENT*), defined as capital expenditure in the next quarter scaled by the net property, plant, and equipment at the current quarter end. *VALUE_FIRM* (*GROWTH_FIRM*) is an indicator that equals one if a firm's market-to-book ratio in 1992 is below (above) the median, and zero otherwise. *EDGAR* is an indicator that equals one after a firm becomes a mandatory EDGAR filer, and zero otherwise. *PRE_MVE* is the natural logarithm of the market value of equity in 1992. All other variables are defined in Appendix B. Reflecting the signed nature of the predictions, the test for equal treatment effects is one-sided. The *t*-statistics of robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 5: Stock Liquidity

Panel A: Baseline Analysis				
Dependent Variable =	*SPREAD*		*HL_SPREAD*	
	(1)	(2)	(3)	(4)
EDGAR	**-0.416*** **	**-0.373*** **	**-0.277*** **	**-0.256*** **
	(-5.55)	**(-5.98)**	**(-6.89)**	**(-7.80)**
SIZE		-0.645***		-0.115***
		(-7.59)		(-3.24)
PRC_INV		5.932***		3.454***
		(25.68)		(32.23)
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Observations	57,366	57,366	64,007	64,007
Adjusted *R*-squared	0.688	0.759	0.677	0.760
Panel B: Value Firms versus Growth Firms				
Dependent Variable =	*SPREAD*		*HL_SPREAD*	
	(1)	(2)	(3)	(4)
EDGAR*×*VALUE_FIRM **(a)**	**-0.475*** **	**-1.977*** **	**-0.430*** **	**-1.645*** **
	(-4.35)	**(-7.99)**	**(-8.30)**	**(-15.70)**
EDGAR*×*GROWTH_FIRM **(b)**	**-0.217** **	**-2.256*** **	**-0.072**	**-1.707*** **
	(-2.38)	**(-7.94)**	**(-1.45)**	**(-13.87)**
EDGAR×PRE_MVE		0.392***		0.295***
		(8.02)		(14.71)
Test of (a)=(b) (*p*-value)	**0.030**	**0.022**	**<0.001**	**0.159**
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Observations	54,272	54,272	60,471	60,471
Adjusted *R*-squared	0.691	0.694	0.682	0.690

Notes: This table reports the regression results on stock liquidity. The dependent variables include the simple bid-ask spread (*SPREAD*) and the high-low spread estimator (*HL_SPREAD*) developed by Corwin and Schultz (2012). Both dependent variables are expressed in percentage points. *EDGAR* is an indicator that equals one after a firm becomes a mandatory EDGAR filer, and zero otherwise. *VALUE_FIRM* (*GROWTH_FIRM*) is an indicator that equals one if a firm's market-to-book ratio in 1992 is below (above) the median, and zero otherwise. *PRE_MVE* is the natural logarithm of the market value of equity in 1992. All other variables are defined in Appendix B. Reflecting the signed nature of the predictions, the test for equal treatment effects is one-sided. The *t*-statistics of robust standard errors clustered at the firm level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 6: Equity Financing

Panel A: Baseline Analysis				
Dependent Variable =	*ICC*		*EQUITY*	
	(1)	(2)	(3)	(4)
EDGAR	**-0.195****	**-0.168****	**0.294*****	**0.253*****
	(-2.55)	**(-2.29)**	**(3.20)**	**(2.83)**
SIZE		0.488***		-1.999***
		(4.88)		(-16.33)
PRC_INV		7.501***		-1.214***
		(8.42)		(-11.18)
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Observations	38,166	38,166	64,335	64,335
Adjusted *R*-squared	0.604	0.627	0.088	0.107
Panel B: Value Firms versus Growth Firms				
Dependent Variable =	*ICC*		*EQUITY*	
	(1)	(2)	(3)	(4)
EDGAR*×*VALUE_FIRM **(a)**	**-0.622*****	**-0.422****	**0.490*****	**0.506*****
	(-6.44)	**(-2.25)**	**(4.79)**	**(3.88)**
EDGAR*×*GROWTH_FIRM **(b)**	**0.103**	**0.348**	**0.052**	**0.073**
	(1.23)	**(1.64)**	**(0.48)**	**(0.42)**
EDGAR×PRE_MVE		-0.041		-0.004
		(-1.30)		(-0.19)
Test of (a)=(b) (*p*-value)	**<0.001**	**<0.001**	**<0.001**	**<0.001**
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Observations	36,901	36,901	60,335	60,335
Adjusted *R*-squared	0.610	0.633	0.090	0.090

Notes: This table reports the regression results on the equity financing channel. The dependent variables include the implied cost of capital (*ICC*) and the amount of equity issuance (*EQUITY*). *EDGAR* is an indicator that equals one after a firm becomes a mandatory EDGAR filer, and zero otherwise. *VALUE_FIRM* (*GROWTH_FIRM*) is an indicator that equals one if a firm's market-to-book ratio in 1992 is below (above) the median, and zero otherwise. *PRE_MVE* is the natural logarithm of the market value of equity in 1992. All other variables are defined in Appendix B. Reflecting the signed nature of the predictions, the test for equal treatment effects is one-sided. The *t*-statistics of robust standard errors clustered at the firm level are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 7: Debt Financing

Dependent Variable =	*DEBT*	
	(1)	(2)
EDGAR	**-0.101**	**-0.111**
	(-1.34)	**(-1.46)**
SIZE		-0.490***
		(-6.05)
PRC_INV		-0.456***
		(-5.03)
Firm FE	Yes	Yes
Year-Quarter FE	Yes	Yes
Observations	65,672	65,672
Adjusted *R*-squared	0.026	0.028

Notes: This table reports the regression results on debt financing. The dependent variable is the amount of debt issuance (*DEBT*). We define *DEBT* as net debt issuance (DLTISQ minus DLTRQ) scaled by lagged total assets (ATQ); when DLTISQ and DLTRQ are missing, this variable equals the change in total debt for the company (change in DLTTQ plus change in DLCQ) scaled by lagged total assets. *DEBT* is expressed in percentage points. *EDGAR* is an indicator that equals one after a firm becomes a mandatory EDGAR filer, and zero otherwise. All other variables are defined in Appendix B. The *t*-statistics of robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 8: Firm Performance

Panel A: Baseline Analysis		
Dependent Variable =	*ROA*	
	(1)	(2)
EDGAR	**0.198*** **	**0.200*** **
	(3.07)	**(3.12)**
SIZE		-0.054
		(-0.61)
PRC_INV		-0.853***
		(-8.79)
Firm FE	Yes	Yes
Year-Quarter FE	Yes	Yes
Observations	66,094	66,094
Adjusted *R*-squared	0.557	0.560
Panel B: Value Firms versus Growth Firms		
Dependent Variable =	*ROA*	
	(1)	(2)
EDGAR*×*VALUE_FIRM **(a)**	**0.515*** **	**0.367** **
	(6.23)	**(2.57)**
EDGAR*×*GROWTH_FIRM **(b)**	**-0.111**	**-0.311***
	(-1.34)	**(-1.67)**
EDGAR×PRE_MVE		0.036
		(1.31)
Test of (a)=(b) (*p*-value)	**<0.001**	**<0.001**
Firm FE	Yes	Yes
Year-Quarter FE	Yes	Yes
Observations	62,054	62,054
Adjusted *R*-squared	0.562	0.562

Notes: This table reports the regression results on firm performance. The dependent variable is return on assets (*ROA*). *EDGAR* is an indicator that equals one after a firm becomes a mandatory EDGAR filer, and zero otherwise. *VALUE_FIRM* (*GROWTH_FIRM*) is an indicator that equals one if a firm's market-to-book ratio in 1992 is below (above) the median, and zero otherwise. *PRE_MVE* is the natural logarithm of the market value of equity in 1992. All other variables are defined in Appendix B. Reflecting the signed nature of the predictions, the test for equal treatment effects is one-sided. The *t*-statistics of robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 9: Investment-to-Price Sensitivity

Panel A: Baseline Analysis			
Dependent Variable =	*INVESTMENT*		
	(1)	(2)	(3)
EDGAR	0.933***	0.923***	1.510**
	(3.09)	(2.67)	(2.54)
Q	1.908***	1.490***	1.614***
	(18.64)	(8.48)	(10.20)
CF	0.136***	0.091***	0.054***
	(7.34)	(4.69)	(3.16)
SIZE	0.381**	0.468**	0.541*
	(2.23)	(2.23)	(1.86)
Q*×*EDGAR	**-0.392*** **	**-0.234** **	**-0.295** **
	(-3.90)	**(-1.99)**	**(-2.05)**
CF×*EDGAR*	0.081***	0.069***	0.117***
	(3.35)	(2.92)	(3.90)
SIZE×*EDGAR*	0.004	-0.054	-0.154
	(0.08)	(-1.02)	(-1.54)
Firm FE	Yes	Yes	No
Year-Quarter FE	Yes	Yes	No
Q×Firm FE	No	Yes	No
Group-Specific Firm FE	No	No	Yes
Group-Specific Year-Quarter FE	No	No	Yes
Observations	66,628	66,628	31,319
Adjusted *R*-squared	0.304	0.346	0.375

Panel B: Value Firms versus Growth Firms		
Dependent Variable =	*INVESTMENT*	
	(1)	(2)
EDGAR	0.405***	0.938***
	(2.82)	(3.71)
CF	0.173***	0.170***
	(11.88)	(11.83)
SIZE	0.357**	0.477***
	(2.01)	(2.64)
Q×*VALUE_FIRM*	2.378***	2.444***
	(10.72)	(10.35)
Q×*GROWTH_FIRM*	1.592***	1.754***
	(15.40)	(15.20)
Q*×*VALUE_FIRM*×*EDGAR **(a)**		**-0.206**
		(-1.08)
Q*×*GROWTH_FIRM*×*EDGAR **(b)**		**-0.371*** **
		(-3.41)
Test of (a)=(b) (*p*-value)		**0.111**
Firm FE	Yes	Yes
Year-Quarter FE	Yes	Yes
Observations	62,441	62,441
Adjusted *R*-squared	0.303	0.304

Notes: This table reports the regression results on the investment-to-price sensitivity. The dependent variable is the quarterly investment made by the firm (*INVESTMENT*), defined as capital expenditure in the next quarter scaled by the net property, plant, and equipment at the current quarter end. *EDGAR* is an indicator that equals one after a firm becomes a mandatory EDGAR filer, and zero otherwise. *Q* is Tobin's Q. All other variables are defined in Appendix B. In column 1 of Panel A, we report the regression results using the baseline model. In column 2 of Panel A, we control for *Q* times firm fixed effects. In column 3 of Panel A, we run a stacked diff-in-diff regression with a matched sample, where treated firms are from groups CF-01 through CF-07, and control firms are selected from the set of to-be-treated firms using a nearest-neighbor propensity-score method for each group. Treated firms are tracked in the window of event quarters [-4, +4], with quarter 0 being the EDGAR implementation quarter. We match treated and control firms on three dimensions (*Q*, *CF*, and *SIZE*) in the quarter before the EDGAR implementation. In Panel B, *VALUE_FIRM* (*GROWTH_FIRM*) is an indicator that equals one if a firm's market-to-book ratio in 1992 is below (above) the median, and zero otherwise. Reflecting the signed nature of the predictions, the test for equal treatment effects is one-sided. The *t*-statistics of robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Online Appendix for

The Real Effects of Modern Information Technologies: Evidence from the EDGAR Implementation

Table A1: An Alternative Proxy for Firm Size

Dependent Variable =	*INVESTMENT*	
	(1)	(2)
EDGAR	**0.613*** (4.05)**	**0.406*** (2.90)**
Q		1.118*** (10.59)
CF		0.136*** (10.17)
MVE		1.538*** (13.96)
Firm FE	Yes	Yes
Year-Quarter FE	Yes	Yes
Observations	66,628	66,628
Adjusted *R*-squared	0.272	0.311

Notes: This table reports the regression results on corporate investment with an alternative proxy for firm size, i.e., the natural logarithm of market capitalization (*MVE*). The dependent variable is the quarterly investment made by the firm (*INVESTMENT*), defined as capital expenditure in the next quarter scaled by the net property, plant, and equipment at the current quarter end. *EDGAR* is an indicator that equals one after a firm becomes a mandatory EDGAR filer, and zero otherwise. All other variables are defined in Appendix B. The *t*-statistics of robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A2: Alternative Clustered Standard Errors

Dependent Variable =	*INVESTMENT*			
	(1)	(2)	(3)	(4)
EDGAR	**0.535*** (3.15)**	**0.535*** (4.71)**	**0.535*** (2.68)**	**0.535*** (3.45)**
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Group-Specific Trends	Yes	Yes	Yes	Yes
Clustered SE	Year-Quarter	Year-Quarter-Industry	Firm and Year-Quarter	Firm and Year-Quarter-Industry
Observations	66,628	66,628	66,628	66,628
Adjusted *R*-squared	0.281	0.281	0.281	0.281

Notes: This table reports the regression results on corporate investment using alternative clustered standard errors. The dependent variable is the quarterly investment made by the firm (*INVESTMENT*), defined as capital expenditure in the next quarter scaled by the net property, plant, and equipment at the current quarter end. *EDGAR* is an indicator that equals one after a firm becomes a mandatory EDGAR filer, and zero otherwise. In all columns, we control for group-specific time trends. In column 1, we cluster standard errors by year-quarter. In column 2, we cluster standard errors by year-quarter-industry (based on the two-digit SIC classification). In column 3, we cluster standard errors by firm and year-quarter. In column 4, we cluster standard errors by firm and year-quarter-industry (based on the two-digit SIC classification). The *t*-statistics of these standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A3: Alternative Diff-in-Diff Estimators

Panel A: Sun and Abraham (2021)		
Dependent Variable	Diff-in-Diff Estimates	*t*-statistics
INVESTMENT	1.649	8.898
SPREAD	-0.129	-1.434
HL_SPREAD	-0.125	-2.558
ICC	-0.465	-4.920
EQUITY	0.398	4.205
DEBT	0.001	0.011
ROA	0.434	4.917
Panel B: Borusyak, Jaravel, and Spiess (2022)		
Dependent Variable	Diff-in-Diff Estimates	*z*-statistics
INVESTMENT	2.428	9.447
SPREAD	-0.207	-1.720
HL_SPREAD	-0.112	-1.585
ICC	-0.564	-4.513
EQUITY	0.427	2.465
DEBT	0.064	0.583
ROA	0.718	6.082

Notes: This table reports the regression results of using alternative diff-in-diff estimators. The dependent variables include the quarterly investment made by the firm (*INVESTMENT*), the bid-ask spread (*SPREAD*), the high-low spread estimator (*HL_SPREAD*), the implied cost of capital (*ICC*), the amount of equity issuance (*EQUITY*), the amount of debt issuance (*DEBT*), and return on assets (*ROA*). In Panel A, we tabulate the results of diff-in-diff estimates and *t*-statistics (based on standard errors clustered at the firm level) using Sun and Abraham's (2021) estimator and the Stata command "eventstudyinteract." In Panel B, we tabulate the results of diff-in-diff estimates and *z*-statistics (based on standard errors clustered at the firm level) using Borusyak, Jaravel, and Spiess's (2022) estimator and the Stata command "did_imputation." All variables are defined in Appendix B.

Table A4: Removal of Transitional Filers

Dependent Variable =	*INVESTMENT*	
	(1)	(2)
EDGAR	**0.717*** (4.60)**	**0.488*** (3.32)**
Q		1.711*** (18.77)
CF		0.178*** (12.81)
SIZE		0.353** (2.07)
Firm FE	Yes	Yes
Year-Quarter FE	Yes	Yes
Observations	64,612	64,612
Adjusted *R*-squared	0.271	0.301

Notes: This table reports the regression results on corporate investment after excluding firms assigned to Group CF-01 (the first group) as this group contains "transitional" filers that volunteered to file electronically prior to the mandatory phase-in of the EDGAR system in April 1993. The dependent variable is the quarterly investment made by the firm (*INVESTMENT*), defined as capital expenditure in the next quarter scaled by the net property, plant, and equipment at the current quarter end. *EDGAR* is an indicator that equals one after a firm becomes a mandatory EDGAR filer, and zero otherwise. All other variables are defined in Appendix B. The *t*-statistics of robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A5: Requirement of Free Online Access

Dependent Variable =	*INVESTMENT*	
	(1)	(2)
EDGAR	**0.803*** (4.84)**	**0.532*** (3.39)**
Q		1.712*** (18.95)
CF		0.177*** (12.93)
SIZE		0.356** (2.12)
Firm FE	Yes	Yes
Year-Quarter FE	Yes	Yes
Observations	66,628	66,628
Adjusted *R*-squared	0.272	0.302

Notes: This table reports the regression results on corporate investment after redefining the *EDGAR* indicator for groups CF-01 through CF-04 (the first four groups) to take the value of one if the firm-quarter is after January 17, 1994 (when all electronic EDGAR filings became freely available online via a National Science Foundation grant to New York University), and zero otherwise. For the remaining six groups, *EDGAR* is an indicator that equals one after a firm becomes a mandatory EDGAR filer, and zero otherwise. The dependent variable is the quarterly investment made by the firm (*INVESTMENT*), defined as capital expenditure in the next quarter scaled by the net property, plant, and equipment at the current quarter end. All other variables are defined in Appendix B. The *t*-statistics of robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A6: Alternative Measures of Corporate Investment

Panel A: Baseline Analysis				
Dependent Variable =	*CAPEX_GROWTH*		*INTANG_GROWTH*	
	(1)	(2)	(3)	(4)
EDGAR	**0.131****	**0.110****	**0.031*****	**0.025*****
	(2.47)	**(2.12)**	**(3.25)**	**(2.69)**
Q		0.245***		0.064***
		(10.41)		(12.87)
CF		0.039***		0.006***
		(9.00)		(6.99)
SIZE		0.186***		0.111***
		(3.73)		(9.82)
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Observations	62,403	62,403	60,760	60,760
Adjusted *R*-squared	0.059	0.066	0.161	0.182
Panel B: Value Firms versus Growth Firms				
Dependent Variable =	*CAPEX_GROWTH*		*INTANG_GROWTH*	
	(1)	(2)	(3)	(4)
EDGAR*×*VALUE_FIRM **(a)**	**0.243*****	**0.194*****	**0.064*****	**0.058*****
	(3.92)	**(3.15)**	**(5.55)**	**(5.13)**
EDGAR*×*GROWTH_FIRM **(b)**	**0.051**	**0.057**	**0.005**	**-0.000**
	(0.87)	**(1.00)**	**(0.49)**	**(-0.04)**
Q		0.239***		0.063***
		(9.80)		(12.27)
CF		0.040***		0.006***
		(8.83)		(6.54)
SIZE		0.185***		0.111***
		(3.50)		(9.42)
Test of (a)=(b) (*p*-value)	**<0.001**	**0.004**	**<0.001**	**<0.001**
Firm FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Observations	58,610	58,610	57,076	57,076
Adjusted *R*-squared	0.060	0.067	0.160	0.180

Notes: This table reports the regression results using alternative measures of corporate investment. The first dependent variable is the growth rate of the physical investment made by the firm (*CAPEX_GROWTH*), defined as capital expenditure in the quarter scaled by capital expenditure in the same quarter of the previous year (in 1992 constant dollars) minus one. The second dependent variable is the growth rate of the intangible investment made by the firm (*INTANG_GROWTH*), defined as intangible investment (R&D expenditure plus 30% of SG&A expenditure) in the quarter scaled by the intangible investment in the same quarter of the previous year (in 1992 constant dollars) minus one. *EDGAR* is an indicator that equals one after a firm becomes a mandatory EDGAR filer, and zero otherwise. All other variables are defined in Appendix B. In Panel A, we report the regression results using the baseline model. In Panel B, we report the regression results for the differential treatment effects in value firms and growth firms. *VALUE_FIRM* (*GROWTH_FIRM*) is an indicator that equals one if a firm's market-to-book ratio in 1992 is below (above) the median, and zero otherwise. Reflecting the signed nature of the predictions, the test for equal treatment effects is one-sided. The *t*-statistics of robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A7: Constant Sample

Dependent Variable =	*ROA*	
	(1)	(2)
EDGAR	**0.186*** **	**0.197*** **
	(2.63)	**(2.79)**
SIZE		-0.018
		(-0.18)
PRC_INV		-0.895***
		(-7.97)
Firm FE	Yes	Yes
Year-Quarter FE	Yes	Yes
Observations	54,410	54,410
Adjusted *R*-squared	0.563	0.567

Notes: This table reports the regression results on firm performance using a constant sample of firms that existed for the whole sample period. The dependent variable is a firm's return on assets (*ROA*). *EDGAR* is an indicator that equals one after a firm becomes a mandatory EDGAR filer, and zero otherwise. All other variables are defined in Appendix B. The *t*-statistics of robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table A8: An Alternative Measure of Cash Flows

Dependent Variable =	*INVESTMENT*	
	(1)	(2)
EDGAR	**0.438*** **	**0.963*** **
	(3.03)	**(3.13)**
Q	1.789***	1.998***
	(19.17)	(19.21)
OCF	-0.003	-0.021*
	(-0.44)	(-1.90)
SIZE	0.458***	0.529***
	(2.65)	(3.02)
Q×EDGAR		**-0.436*** **
		(-4.20)
OCF×EDGAR		0.036**
		(2.46)
SIZE×EDGAR		0.032
		(0.67)
Firm FE	Yes	Yes
Year-Quarter FE	Yes	Yes
Observations	66,491	66,491
Adjusted *R*-squared	0.296	0.297

Notes: This table reports the regression results on corporate investment using an alternative measure of cash flows. The dependent variable is the quarterly investment made by the firm (*INVESTMENT*), defined as capital expenditure in the next quarter scaled by the net property, plant, and equipment at the current quarter end. *EDGAR* is an indicator that equals one after a firm becomes a mandatory EDGAR filer, and zero otherwise. *OCF* is the operating cash flows from the cash flow statement (OANCFQ) scaled by lagged total assets (ATQ). It is expressed in percentage points. All other variables are defined in Appendix B. The *t*-statistics of robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.