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Standing on the shoulders of giants: Financial reporting comparability and knowledge accumulation☆

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ABSTRACT

This study examines whether and how financial statement comparability facilitates the dissemination of innovative knowledge between firms and stimulates the creation of new knowledge. Using cross-patent citations to track interfirm knowledge transfers, we find that comparability increases firms' incentives to learn from peers and create new patents that cite their peers' existing patents. The investigation into the mechanism reveals that comparability improves firms' ability to estimate the monetary value of peer knowledge and predict their own financial benefits from knowledge acquisition. The impact of comparability is more pronounced when peer knowledge is more publicly accessible or of higher monetary value. Consequently, the acquired knowledge fosters follow-on innovation, enabling firms to produce more patents with greater economic significance. Evidence from two quasi-natural experiments suggests that our findings are plausibly causal. Overall, our study highlights the important role of accounting comparability in facilitating knowledge dissemination.

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1. Introduction

Knowledge dissemination enables an economic agent to build upon the ideas of others to create new ones. As Sir Isaac Newton famously stated in 1676, "If I have been able to see further, it was only because I stood on the shoulders of giants." Although knowledge dissemination is pivotal in driving economic growth (Romer, 1990), how knowledge can be best accessed and disseminated is not fully understood.[1] Economists posit that firms operating in closely related technological and business spaces benefit more from knowledge spillovers (Bloom et al., 2013; Jaffe, 1986), yet firms often lack *incentives* to learn from peers due to uncertainty about the value of peer knowledge and their ability to realize future financial benefits from knowledge acquisition. Our study provides novel evidence that proximity in accounting practices, as measured by financial statement comparability, increases firms' incentive to acquire innovative knowledge from peers, thereby facilitating knowledge dissemination.

Efficient knowledge dissemination requires economic agents to understand the *value* of each other's existing knowledge and pay the associated costs to access it (Mokyr, 2002). However, a firm's innovative knowledge is an intangible intellectual property with highly uncertain payoffs (Hall et al., 2005). In addition to the technological details disclosed in peers' patent applications (Kim and Valentine, 2021), firms need financial information to assess the economic value of peer knowledge and gauge the potential benefits (e.g., cash flows, profits) of acquiring and implementing such knowledge in their own operations. Financial statements can add business and commercial contexts to existing patents (Kim and Valentine, 2023; O'Connell et al., 2021). However, the diversity of accounting practices across firms often introduces noise into financial statements (Wu and Xue, 2023), making it difficult for firms to assess the underlying value of peer innovation and distinguish it from common cash flow shocks.[2] Accounting diversity can also undermine firms' confidence in their ability to replicate peers' financial success since each firm's path of converting innovation into profits can be distinctively different. Consequently, firms' uncertainty about the payoffs from knowledge acquisition *ex post* can dampen their *ex ante* incentives to learn from peers, hindering knowledge dissemination.

Financial statement comparability is a shared construct that captures the similarity in firms' accounting systems in mapping economic events onto earnings (Barth et al., 2018; De Franco et al., 2011). Its unique characteristics can provide important informational benefits that facilitate the transfer of innovative knowledge between firms. First, comparability can improve firms' ability to assess the value of peers' innovations. By enabling efficient benchmarking across firms, comparability can enhance users' ability to filter out the impact of group-wide common shocks and sharpen their inferences about firm-specific cash flows (Wu and Xue, 2023). Additionally, comparability can boost firms' confidence in converting acquired knowledge into future profits. Within a comparable reporting framework, firms experiencing similar economic events should generate similar earnings (De Franco et al., 2011). By enriching firms' understanding of how peer innovation contributes to earnings, comparability can increase their ability to predict the financial benefits from knowledge acquisition. To the extent that comparability reduces firms' uncertainty about their future payoffs from knowledge acquisition, it can increase firms' incentives to learn from peers, facilitating knowledge dissemination.

Our argument, however, is not without tension. There are plausible reasons that comparability may have little or even an adverse effect on knowledge dissemination. Since innovation investment is idiosyncratic, many innovation projects are unique to developing firms. Therefore, information disclosed by one firm about the productivity and value of its innovation may have little value to other firms (Aboody and Lev, 2000). Furthermore, even if the financial information conveys valuable insights, firms might lack the expertise or resources necessary to interpret it and apply it to inform their own innovation strategies. It is even possible that firms exploit financial statement information not to converge with their peers' innovations but to differentiate their products from them.[3] If this motivation for product differentiation prevails, comparability may result in divergent innovation paths and diminish knowledge transfers between firms. Given these competing theoretical arguments, whether and how comparability affects knowledge dissemination remains an open question.

Our study empirically evaluates this question. One challenge for examining the dissemination of innovative knowledge is to track the flow of knowledge between firms. To tackle this challenge, we draw upon the economic literature (Furman and Stern, 2011; Henderson et al., 1998; Jaffe et al., 1993) and utilize bibliometric interfirm cross-citations (e.g., one firm citing existing patents from its peers) to capture the *direction* and *intensity* of knowledge transfers between firms and over time. We obtain comprehensive patent information from Kogan et al. (2017) and its expansion (Kelly et al., 2021) to construct a directional, firm-pair cross-citation measure for all eligible firm pairs in the United States. This directional cross-citation measure enables us to identify the specific peer from which a firm selects to learn and quantify the amount of knowledge it acquires from that peer.

In our baseline analysis, we adopt a pairwise design and model the amount of knowledge that a firm acquires from a peer as a function of their financial statement comparability and the size of the peer's knowledge stock, while holding the similarity of their intrinsic characteristics (e.g., technology relatedness, business similarity) constant. Following the literature (e.g., Bloom et al., 2013;

[1] As highlighted by Nobel Prize Laureate Paul Romer in his seminal work, knowledge is a "nonrival" good, so understanding how it can be best accessed and disseminated is crucial for stimulating new knowledge creation and promoting aggregate growth (Romer, 1990). Since then, growth theorists emphasize the centrality of cumulative knowledge to overall economic growth (Aghion and Howitt, 1992; Grossman and Helpman, 1991; Jones, 1995), and innovation economists also model how the cumulativeness of knowledge affects incentives to innovate (Gallini and Scotchmer, 2002; Scotchmer, 1991).

[2] The cash flow to each firm is jointly determined by an idiosyncratic component specific to firms and the economy-wide shock common to all firms (Wu and Xue, 2023).

[3] The concept of product differentiation within industries dates back to Chamberlin (1933), who showed that the notion of product differentiation is fundamental to theories of industrial organization, with product differentiation reducing competition between firms.

Jaffe, 1986), we use a peer's accumulated R&D to gauge the size of its knowledge stock. The extent to which a firm can benefit from the spillover of a peer's knowledge depends on their intrinsic relatedness and accounting proximity. Given our focus on accounting proximity, we construct a directional, firm-pair spillover measure called "comparability-triggered knowledge spillover," which assigns financial statement comparability as the weight for a peer's knowledge stock.[4] If comparability indeed increases a firm's incentive to acquire existing knowledge from a peer, we expect that "comparability-triggered knowledge spillover" leads to more cross-citations of the peer's patents. Consistent with our expectation, we find that a one-standard-deviation increase in comparability-triggered knowledge spillover is associated with an approximately 19.6% increase in subsequent cross-citations. Since we fully control for technology relatedness and business similarity between paired firms, our result suggests that comparability has a distinct, *incremental* effect on knowledge dissemination.

We adopt multiple identification strategies to address endogeneity concerns and enhance causal inferences. In our main analyses, we use a dense fixed effect structure and a lead-lag design to mitigate the possibility that some omitted variables may simultaneously influence firms' financial reporting and learning behavior. If the concerns are that our results may be attributed to economic similarities between firms, the control for common auditors, technology relatedness, and business similarity should alleviate these concerns. Furthermore, our dense fixed-effect structure allows us to control for a wide range of potentially correlated, omitted variables. In all regressions, we include firm-pair, citing-firm-year, and cited-firm-year fixed effects to purge out confounding effects related to constant firm-pair differences (e.g., long-term technological research collaboration), time-varying citing/cited firm attributes (e.g., increasing investment in firm technology, temporal shifts in technology strategy), and aggregate shocks (e.g., economy-wide technological advancements).

To enhance our ability to draw causal inferences, we exploit two quasi-natural experiments as plausibly exogenous shocks to comparability and examine their subsequent impact on knowledge dissemination. Our first shock is related to the elimination of the 20-F reconciliation requirements for foreign cross-listed firms in the U.S. (Kim et al., 2012; Nam and Thompson, 2021). On November 15, 2007, the SEC removed the reconciliation requirement for cross-listed companies, resulting in a negative shock to their financial statement comparability with U.S. firms (Kim et al., 2012). We find that this negative shock to comparability adversely affects the incentives of U.S. firms to learn from their foreign peers (i.e., treatment cross-listed firms), leading to a significant decline in cross-citations.

In our second shock, we extend our analysis to an international setting and exploit the mandatory adoption of International Financial Reporting Standards (IFRS), a well-recognized regulatory shock aimed at promoting financial statement comparability (e.g., Brochet et al., 2013; Yip and Young, 2012). Since the adoption of IFRS is predominantly a country-level decision, it offers an ideal setting to examine whether an exogenous increase in comparability results in greater knowledge dissemination. Using a difference-in-differences design, we find that firm pairs in treatment countries experience a larger increase in their cross-citation rates following the IFRS adoption mandates, compared to firm pairs in control countries. The consistency of our results from these two experiments suggests that the positive impact of comparability on knowledge dissemination is unlikely driven by reverse causality or omitted variables.

To corroborate our main findings, we investigate whether the positive impact of comparability on knowledge dissemination becomes more pronounced with the accessibility of peers' innovative knowledge. An implicit assumption underlying our argument is that a firm's knowledge is a public good that can be accessed and acquired by other firms. To confirm this assumption, we follow Kim and Valentine (2021) and use the passage of the American Inventor's Protection Act (AIPA) as an exogenous shock that enhances public access to firm patent disclosure. If comparability indeed enables firms to make sharper inferences about the value of peer innovation, we expect an increase in knowledge transfers after the AIPA, when firms become more aware of their peers' latest innovation developments. We find consistent results that the positive impact of comparability on knowledge dissemination becomes significantly stronger after the passage of AIPA, leading to an additional 36.67% increase in the cross-citation rate.

We then provide more direct evidence on the mechanism through which comparability facilitates knowledge dissemination. Specifically, we examine whether comparability improves firms' ability to (1) assess the monetary value of peer knowledge and (2) predict their own future financial benefits from knowledge acquisition. In our first analysis, we use two market-based, patent-specific measures to quantify the dollar amounts of the forward-looking value of peer patents (Kogan et al., 2017). We find that comparability indeed improves firms' ability to assess the monetary value of their peers' patents. When we further divide our sample based on the value of peer patents, we find that comparability triggers greater knowledge acquisition when peer patents hold higher values. In our second analysis, we investigate whether comparability improves firms' ability to predict their own financial benefits associated with acquired knowledge. We observe a positive association between a focal firm's acquired knowledge (e.g., cross-citations) and its future cash flows, and this association is significantly stronger when the firm has higher comparability with its peers. These findings collectively support the mechanism that comparability enhances firms' ability to estimate the value of peer innovation and to predict their own financial benefits from knowledge acquisition.

Furthermore, we investigate the economic consequences of knowledge acquisition on focal firms' own innovation production. Consistent with the concept of "standing on the shoulders of giants," we find that comparability-triggered knowledge spillover stimulates follow-on innovation, enabling focal firms to produce more new patents and patents of greater economic significance.

[4] The literature traditionally uses technology relatedness (e.g., the similarity in firms' technological classes) as the weight for knowledge stock, based on the premise that "technology neighbors" are more likely to benefit from each other's knowledge spillovers (Bloom et al., 2013; Jaffe, 1986; Tseng, 2022). Given our interest in accounting proximity, we measure a firm's exposure to its peers' knowledge spillover based on financial statement comparability.

Lastly, we perform a series of sensitivity analyses to ensure the robustness of our findings. Our results are robust to alternative comparability measures, including cash-flow-based comparability (Ball and Shivakumar, 2006; Cascino and Gassen, 2015), accrual-based comparability (Francis et al., 2014), and R&D-adjusted comparability (Chircop et al., 2020). In untabulated analyses, we also demonstrate that our finding is not sensitive to alternative measures of peer knowledge stock. Our inferences remain unchanged after controlling for analyst coverage overlaps (Martens and Sextroh, 2021), common investors (Reuer and Devarakonda, 2017), or common inventors (Zacchia, 2020).

Our study makes several contributions. First, it adds to the emerging literature on disclosure and innovation (see a review by Glaeser and Lang, 2023).[5] Prior research largely focused on how a firm's financial disclosure affects its own innovation decisions (e.g., Zhong, 2018). Recent studies extend this inquiry to patent disclosure. For instance, Tseng (2022) demonstrates how disclosure-induced spillovers enable firms to learn about new technology, facilitating its timely and large-scale adoption. Relatedly, Kim and Valentine (2021) show that the AIPA can expedite firms' patent disclosure, increasing their rivals' innovation. However, patent disclosure alone is insufficient to resolve firms' uncertainty about their ability to replicate the financial success of peer innovation. Our study is the first to demonstrate that financial statement comparability between firms can reduce firms' *ex post* uncertainty about the payoffs from knowledge acquisition and hence increase their *ex ante* incentives to learn from peers, thereby facilitating knowledge dissemination.

Second, our study extends the literature on the externality of corporate disclosure. Extant studies focus on the spillover of *financial* information from public firms to private firms, yet no studies have examined the transfer of *innovative* knowledge between firms. For instance, Badertscher et al. (2013) demonstrate that the presence of public firms can reduce industry uncertainty and generate positive externalities that improve private firms' investment decisions. Kim and Valentine (2023) illustrate how public firms can trigger information spillover in the patent-trading market, enabling trading parties to estimate the commercial value of emerging innovation.[6] Using granular cross-patent citation data to track interfirm knowledge transfers, we provide novel evidence that financial statement comparability can increase firms' incentive to learn and the ability to benefit from the spillover of innovative knowledge from peers, stimulating the creation of new knowledge.

Our findings also contribute to the emerging literature on financial statement comparability. Prior research has primarily focused on the benefits of comparability in capital markets (Barth et al., 2018; De Franco et al., 2011; Kim et al., 2016). Some recent studies began to explore its impact on firm investments (Chen et al., 2018; Chircop et al., 2020). For example, Chircop et al. (2020) find that comparability is positively associated with R&D investment efficiency. While their findings are in line with ours regarding the potential benefits of comparability for innovation, our research question and theoretical framework are conceptually different. In contrast to Chircop et al., who focus on firms' *own* investments, we study the dissemination of innovative knowledge *between* firms. For instance, do firms acquire innovative knowledge from peers? If so, what motivates them, which specific peers they choose to learn from, how much they learn, and to what extent the learning affects their subsequent innovation strategies? As Nobel Laureate Paul Romer pointed out, knowledge is "nonrival" good, so understanding how it can be best accessed and disseminated is crucial for stimulating new knowledge creation and promoting aggregate growth (Romer, 1990). Our study provides new insights into these important inquiries. We demonstrate that comparability is a crucial driver of firm *incentives* to acquire innovative knowledge from peers, thereby facilitating knowledge dissemination and stimulating new knowledge creation. In a knowledge-driven economy, our findings can offer policy implications for promoting economic growth. The influence of financial information on economic performance through firm incentives is likely a first-order effect (Bushman and Smith, 2001; Lang and Maffett, 2011).[7]

2. Background and hypotheses

2.1. Understanding frictions in knowledge dissemination

Knowledge does not exist in isolation. The creation of knowledge requires an economic agent to build upon the ideas of others to create their own, often referred to as "standing on the shoulders of giants." Economists emphasize that improvement in production is

[5] More broadly, we contribute to the literature on the real effects of financial reporting characteristics (see a review by Roychowdhury et al., 2019). Prior research largely focuses on how a firm's accounting information affects its own decisions. Biddle et al. (2009), Verdi (2006), and Francis et al. (2009) show that improved accounting quality may curb managerial incentives to overinvest through enhanced monitoring or better contracting.

[6] For other studies in this field, please see Bozanic et al. (2017), Breuer et al. (2019), Bernard et al. (2020), Kim et al. (2020), Barrios et al. (2022), Glaeser and Omartian (2022), and Chang et al. (2023).

[7] The conceptual differences between our study and Chircop et al. (2020) extend to our research design, mechanism, and measurement. Chircop et al. (2020) employ aggregate comparability across all peers to infer information regarding a firm's own R&D investment. In contrast, we adopt a pairwise design to examine how comparability within specific firm pairs affects their interfirm knowledge transfers. The use of granular cross-patent citation data allows us to identify specific peers from which a firm selects to learn and the extent of its learning. Furthermore, we use the patent-specific forward-looking value of peer patents to shed light on a novel mechanism driving knowledge dissemination: Comparability improves firms' ability to assess the value of peer knowledge and predict their own future financial benefits from acquired knowledge. Lastly, unlike Chircop et al. (2020), who primarily rely on OLS regressions, we employ three regulatory shocks (e.g., 20-F reconciliation, IFRS mandates, and AIPA) to establish a causal inference regarding the impact of comparability on knowledge dissemination.

directly linked to intertemporal knowledge spillover, rather than emerging exogenously as in Solow (1957).[8] Given the nonrival nature of knowledge and its importance in driving economic growth (Romer, 1990), understanding how existing knowledge can be best accessed and disseminated is a central theme in economics, finance, and accounting research, and a question of significant interest to practitioners and firms.

While knowledge can be shared indefinitely, it is not easily transferable. Existing research suggests that relatedness in firms' technology spaces and business positions can increase the likelihood of knowledge spillovers. The seminal work by Jaffe (1986) indicates that technological spillovers are more likely to occur among "technological neighbors." Using the distribution of the firms' patents over patent classes to characterize the technological position of the firm, he demonstrates that the extent to which a firm can benefit from knowledge spillover depends on technology proximity and the cumulative R&D stock invested by peer firms. The closer a firm is to its peers in their technological spaces, the more likely it can benefit from peers' knowledge spillovers. Bloom et al. (2013) further extend Jaffe's (1986) framework to the product market and show that closeness in product market spaces can also increase the likelihood of knowledge spillovers between firms.

Greater relatedness in technology or business spaces, however, does not guarantee that firms will have an incentive to learn from peers. To make an informed learning decision, a profit-driven firm must understand the value of peer knowledge and have the ability to appropriate future returns from knowledge acquisition (Kline and Rosenberg, 1986; Mokyr, 2002, 2005). Public financial statements can provide an important source that adds business and commercial contexts to a firm's innovation (Kim and Valentine, 2021). For instance, pricing information on past patent sales, product-related disclosure, and contingent disclosure on litigation risk can provide useful signals to external users about the technology scope and legal strength of a firm's existing patents. On top of that, corporate earnings represent the most visible aggregate measure of a firm's profitability, providing users with insights into future cash flows related to the firm's economic activities (Dechow et al., 2010).

Nevertheless, substantial reporting heterogeneity across firms often prevents users from accurately predicting a firm's future cash flows (Dechow et al., 2010; Wu and Xue, 2023). Since the present value of cash flows is jointly determined by a firm-specific component and a group-wide shock (Wu and Xue, 2023), diversity in accounting practices can hinder firms' ability to assess the underlying value of peer innovation and isolate it from industry-level shocks or common measurement errors. Accounting diversity can also weaken a firm's confidence in generating future profits from acquired knowledge, since each firm's path of converting innovation into earnings can be vastly different. As a result, firms' uncertainty about the payoffs of knowledge acquisition *ex post* can curb their *ex ante* incentives to learn from peers, impeding knowledge dissemination.

2.2. Financial statement comparability and knowledge dissemination

Our goal is to examine whether the proximity in firms' accounting practices—financial statement comparability—facilitates knowledge dissemination. Unlike traditional accounting quality measures based on a single firm's reporting characteristics, comparability is a shared construct that captures the similarity between firms' accounting systems in mapping economic events onto earnings (De Franco et al., 2011). Its unique characteristics can provide important informational benefits for knowledge dissemination. For one, it can enable firms to filter out noise in financial statements and make sharper inferences about the value of peer knowledge. Recent theory by Wu and Xue (2023) highlights this "noise-reduction" role of comparability. It suggests that comparability can facilitate efficient benchmarking across firms, enabling users to better infer the relative, firm-specific component of future cash flows and isolate it from industry shocks or common measurement errors. In our context, comparability can improve firms' ability to filter out common shocks (e.g., technology shocks) or measurement errors and more accurately assess the underlying value of peer innovation.

In addition, comparability can increase firms' confidence in realizing future financial benefits from acquired knowledge. Under a comparable reporting regime, firms experiencing similar economic events (e.g., developing a similar technology) should arguably produce similar earnings (De Franco et al., 2011). Firms operating in a similar technology area likely share the same supply, demand, and competitive conditions (Badertscher et al., 2013). The comparable information disclosed by peers about industry-level demand and cost conditions (Durnev and Mangen, 2009) and how competitors perceive and react to market developments (Leary and Roberts, 2014) can enhance a firm's understanding of the path of how peers convert their innovation into profits and use that insight to inform its own future financial benefits from knowledge acquisition.[9]

To illustrate the potential influence of comparability, consider two firms operating in the same industry, for example, Coca-Cola and Pepsi-Cola. Pepsi pioneered the launch of a zero-sugar soda, Diet Pepsi, in 1964. Before making a similar investment, Coca-Cola likely sought external signals for the commercial and financial success of Diet Pepsi to evaluate the potential financial benefits of pursuing a similar technology. In the year after introducing Diet Pepsi, sales of Pepsi-Cola company reached a record high of $500 million in 1965, a 12% increase over its $456 million earnings in 1964. Subsequently, Coca-Cola introduced Diet Coke in 1982. The patent filing for Diet Coke (EP2443942A1) cited Pepsi's patents 11 times (~10% of patent citations), suggesting that Coca-Cola learned from Pepsi and created a new sweetening formula for their own sodas. A closer investigation into the two firms' financial statements in the period 1961–1984 also reveals that their accounting comparability is above the 75th percentile of average firm pairs within the

[8] Please see Romer (1990), Grossman and Helpman (1991), Aghion and Howitt (1992), and Jones (1995) for theories. For more follow-on discussion, see Scotchmer (1991) and Gallini and Scotchmer (2002). Research also shows that new knowledge is often a form of reused, recombined, or complementary knowledge that adds to existing knowledge (Buchanan and Yoon, 2000; Matutes and Regibeau, 1988; Ménière and Parlane, 2010).

[9] Existing studies document the importance of peer firms in shaping the policies of subject firms and provide theoretical interpretations for the motivations for interfirm learning and imitation of peers (Leary and Roberts, 2014).

same industry.[10] Although we caution against making strong causal inferences from these statistics, this example illustrates the potential correlation between financial statement comparability and knowledge dissemination.

Overall, the above arguments suggest that comparability can improve firms' ability to assess the value of peer knowledge and predict their own financial benefits from knowledge acquisition. In Section 6.1, we provide direct empirical evidence supporting these mechanisms. Even if the initial estimate of financial gains was inaccurate, managers can quickly update their beliefs and adjust their actions based on comparable information disclosed by peers. To the extent that comparability reduces firms' uncertainty about the payoffs from knowledge acquisition *ex post*, it can increase firms' *ex ante* incentive to learn from peers, thereby facilitating knowledge dissemination. We state our first hypothesis, H1 (in the alternate form), as follows.

H1 (Baseline): Financial statement comparability increases knowledge transfers.

One implicit assumption underlying our argument is that firms can access peers' innovative knowledge, such that financial statement comparability facilitates learning. To validate this assumption, we next examine the role of comparability conditional on the accessibility of peer knowledge (Mokyr, 2002, 2005). The literature suggests that a firm's patent disclosure provides an important channel for communicating its emerging innovation to outsiders. Using the AIPA as a shock to increase public access to a firm's patent disclosure, Kim and Valentine (2021) show that accelerated patent disclosure can trigger greater knowledge spillovers. If comparability facilitates knowledge dissemination by improving firms' ability to assess the value of peer knowledge, such an effect should be more pronounced after the passage of AIPA when firms have greater access to peers' latest technological developments. We formulate this as our hypothesis H2 (in the alternate form) as follows.

H2 (Cross-sectional): Financial statement comparability increases knowledge transfers more when the accessibility of peers' innovative knowledge is higher.

While our argument predicts that comparability facilitates knowledge dissemination, there are also plausible reasons why we may not find the predicted effect. Since the innovation process is long and idiosyncratic, many R&D projects are unique to the developing firm and may not be generalizable to other firms. Aboody and Lev (2000) argue that outsiders can derive little information about the productivity and value of a firm's R&D from observing the R&D performance of other firms.[11] It is also possible that firms may not have the expertise or resources to process and interpret information disclosed by their peers. Comparability may even impede peer learning if it encourages product differentiation. Since industry peers compete in the same market space, Hoberg and Phillips (2010) find that firms' R&D and advertising are associated with subsequent differentiation from competitors. If this incentive dominates, firms may exploit comparable information from peers to further differentiate rather than to learn from peers when making innovation decisions. Given the competing theoretical arguments, whether and how comparability affects knowledge dissemination remains an empirical question.

3. Variable measurement

3.1. Financial statement comparability

We define financial statement comparability as the closeness of the accounting functions between firm i and its peer firm j in mapping economic events onto earnings (De Franco et al., 2011). To construct this measure, we estimate the accounting function for each firm-year using the following time-series regression estimated over the previous 16 quarters of data prior to the fiscal year-end:

$$Earnings_{it} = \beta_{0i} + \beta_{1i} Return_{it} + \varepsilon_{it}$$

in which *Earnings* is quarterly net income before extraordinary items, scaled by the beginning-of-period market value of equity, and *Return* is the stock return during the quarter. The estimated coefficients β_{0i} and β_{1i} constitute firm i's accounting function. Similarly, we estimate β_{0j} and β_{1j} for firm j.

Next, we compute firm i's expected earnings using the accounting functions of firm i and j:

$$E(Earnings)_{iit} = \widehat{\beta}_{0i} + \widehat{\beta}_{1i} Return_{it}, E(Earnings)\_(ijt) = \widehat{\beta}_{oj} + \widehat{\beta}_{1j} Return_{it}$$

in which $E(Earnings)_{iit}$ and $E(Earnings)_{ijt}$ are the expected earnings of firm i for a given $Return_{it}$ using firm i's and firm j's accounting functions, respectively. By using firm i's return in both predictions, we explicitly hold the economic events constant.

Lastly, for each firm i–j pair, we calculate comparability as the negative value of the average absolute difference between the predicted earnings using firm i's and j's functions:

$$AcctComp_{ijt} = -1 \Big/ 16 \times \sum_{t-15}^{t} \left| E(Earnings_{iit}) - E\left(Earnings_{ijt}\right) \right|$$

and we estimate $AcctComp_{ijt}$ for all firm i–j pairs, for which i and j are in the same two-digit SIC industry group. Greater values of *AcctComp* indicate greater financial statement comparability in mapping economic events onto reported earnings.

[10] The mean value of *Comparability* (%) between Coca-Cola and Pepsi-Cola is −0.519, whereas the industry average is only −2.371.

[11] Aboody and Lev (2000) argue that many R&D projects, such as radically new drugs under development or software programs, are unique to the developing firm. For example, not much can be learned about Merck's drug development program from an FDA approval of a Pfizer drug.

3.2. Comparability-triggered knowledge spillover

We construct a directional firm-pair measure to capture firm *i*'s exposure to knowledge spillover from peer firm *j* due to accounting proximity. We adapt the technology spillover measure from Jaffe (1986) with one modification. The traditional technology spillover measure is calculated as peer firm *j*'s accumulated R&D stock, weighted by firm i–j's technology relatedness. The idea is that the likelihood of knowledge spillover is higher when two firms are "technological neighbors." Given our interest in accounting proximity, we use financial statement comparability as the weight for peer *j*'s knowledge stock. For each firm *i–j* pair, we define comparability-triggered knowledge spillover from peer firm *j* to firm *i* (*Spill_AcctComp*) as follows:

$$Spill\_AcctComp_{ijt} = AcctComp_{ijt} \times Peer\ Knowledge\ Stock_{jt}$$

$AcctComp_{ijt}$ is the financial statement comparability between firm *i* and firm *j* in year *t*. We scaled *AcctComp* by 100 to range from zero to one, with higher values indicating closer accounting proximity for a given firm *i–j* pair. *Peer Knowledge Stock*$_{jt}$ is peer firm *j*'s accumulated R&D stock in year *t* (measured in dollars).[12] By construction, *Spill_AcctComp* captures the potential knowledge spillover from peer firm *j* to firm *i* triggered by financial statement comparability, with higher values indicating greater knowledge spillover through the accounting channel.

3.3. Interfirm knowledge transfer

We follow the literature (Furman and Stern, 2011; Henderson et al., 1998; Jaffe et al., 1993) and use cross-citation rates to capture the actual knowledge that a (citing) firm *i* acquires from its peer (cited) firm *j*. We construct the cross-citation measure for all citing and cited firm pairs in a given year. For each eligible firm pair *i–j*, we use the number of citations from citing firm *i* to cited firm *j* in year *t* to capture actual knowledge transfers from firm *j* to *i*. For years without cross-citations, we set the number of citations to zero. This measure accounts for all citations in citing firm *i*'s new patents applied for in year *t* to all past patents granted by cited firm *j*. The cross-citation measure captures the extent to which past knowledge of cited firm *j* is reflected in the knowledge creation of citing firm *i*.

The cross-citation measure has several advantages. First, cross-patent citations allow us to capture both the direction and intensity of knowledge flows between firm *i–j* pairs (Agrawal et al., 2017; Jaffe et al., 1993). By tracking changes in cross-citations within each firm pair and over time, we can exploit both cross-sectional and time-series variations in knowledge flows between firms. Furthermore, this measure allows us to consider the characteristics of firms and their patenting, including the total number of citations, the total stock of potentially citable patents in a given year, and any idiosyncratic characteristics of each distinct firm pair.

4. Research design

4.1. Testing H1: comparability and knowledge dissemination

To test H1 on comparability and knowledge dissemination, we examine whether greater comparability-triggered knowledge spillover to a firm *i* from its peer *j* subsequently leads to more cross-patent citations from firm *i* to peer *j*, holding the two firms' technology relatedness and business similarity constant. Specifically, we estimate the following fixed effect model:

$$\begin{aligned} Log\left(Cross\_Citation_{ijt+1}\right) = {} & \beta_0 + \beta_1\, Log\left(Spill\_AcctComp_{ijt}\right) + \beta_2\, Log\left(Spill\_Tech\ Relatedness_{ijt}\right) + \beta_3\, Log\left(Spill\_Business\ Similarity_{ijt}\right) \\ & + \sum Other\ Controls_{ijt} + \sum Firm\ Pair_{ij} + \sum Citing\ Firm \times Year + \sum Cited\ Firm \times Year + \sum Year \\ & + \varepsilon_{ijt} \end{aligned} \tag{1}$$

in which *Cross_Citation*$_{ijt+1}$ is the number of one-year-ahead citations from a (citing) firm *i* to peer (cited) firm *j*, and *Spill_AcctComp*$_{ijt}$ captures firm *i's* exposure to knowledge spillovers from its peer firm *j* in year *t* due to their financial statement comparability, as introduced in Section 3.2. If financial statement comparability provides a distinct channel for facilitating knowledge dissemination, we expect β_1 in model (1) to be positive and significant. To control for serial correlations among the residuals, we cluster standard errors by firm pairs (Petersen, 2009).

In all regressions, we include a wide range of control variables. First, we control for similarities in the two firms' technology and business positions (Hoberg and Phillips, 2016; Jaffe, 1986) to isolate the incremental effect of accounting comparability. Second, we control for *Common Auditor* between paired firms, as research suggests that firms audited by the same Big 4 auditor exhibit greater financial statement comparability (Francis et al., 2014). Third, to ensure that our results are not confounded by systematic differences between firms, we control for a battery of time-varying firm-pair controls, including citing and cited firms' relative size (*Asset_ratio*), analyst following (*Analyst_ratio*), patent stock (*Patent_ratio*), and citations (*Cite_ratio*). This allows us to control for potentially

[12] Following Jaffe (1986) and Bloom et al. (2013), we measure a firm's knowledge stock based on its accumulated R&D spending using a perpetual inventory method with a 15% depreciation rate (e.g., Hall et al., 2005). Our results remain inferentially unchanged if we use a peer's existing patents to capture its knowledge stock.

confounding effects due to differences in firm information environments, investments, and patenting activity within firm pairs over time. Furthermore, we control for relative financial reporting quality (*Opacity_ratio*) within firm pairs.[13] The Appendix provides details of our variable definitions.

Lastly, we adopt a dense fixed-effect model structure by including *firm-pair*, *citing-firm-year*, *cited-firm-year*, and *year* fixed effects. This allows us to control for a wide range of potentially omitted variables related to static firm-pair differences (e.g., long-term technological research collaboration), time-varying citing and cited firm attributes (e.g., increasing investment in firm technology, temporal change in technology strategy), or aggregate shocks (e.g., economy-wide technological advancement).

4.2. Testing H2: public accessibility of peer knowledge

Our H2 predicts that comparability increases knowledge dissemination more when the accessibility of peer knowledge is higher. To test H2, we follow Kim and Valentine (2021) and exploit the passage of the AIPA as an exogenous shock to increase firms' access to peers' patent information. The AIPA was enacted on November 29, 2000, to increase the timeliness and scope of firms' patent disclosures (Hegde and Luo, 2018). After the passage of AIPA, U.S. patent disclosure was accelerated by an average of 31% (Kim and Valentine, 2021). To test the differential effect of comparability on knowledge dissemination before and after the passage of AIPA, we estimate the following model by interacting *Spill_AcctComp* with the treatment indicator of AIPA:

$$Log\left(Cross-Citation_{ijt+1}\right)=\beta_0+\beta_1\,Log\left(Spill\_AcctComp_{ijt}\right)\times AIPA\ Post+\beta_2\,Log\left(Spill\_AcctComp_{ijt}\right)+\sum Firm\ -\ Pair\ Controls_{ijt}+\sum Firm\ Pair_{ij}+\sum Citing\ Firm\times Year+\sum Cited\ Firm\times Year+\sum Year+\varepsilon_{ijt} \quad (2)$$

Consistent with Kim and Valentine (2021), we require nonmissing values of patent filings for peer (cited) firms to ensure that a firm has filed at least one patent leading up to the passage of AIPA. We code *AIPA Post* as one for firm-pair-year observations after the enactment year of AIPA in 2000, and zero otherwise. Since knowledge acquisition takes time, we use a five-year window surrounding the event to capture meaningful changes in firms' learning activities. If comparability enhances firms' ability to assess the value of peer patents, we expect such an effect to be more pronounced after the passage of AIPA, when firms have greater awareness and access to peer patent information. To be consistent with H2, we expect β_1 to be positive and significant.

4.3. Sample, data, and summary statistics

Our initial sample starts with the intersection of Kogan et al.'s (2017) patent database and the Compustat database. We use comprehensive cross-citation data from Kogan et al. (2017) and their expansions (Kelly et al., 2021) to capture interfirm knowledge flow between paired firms. We obtain firm-level financial data from the Compustat database and stock return data from the CRSP database. To construct our sample of directional firm-pair observations, we pair each firm with its industry peers within the same industry (based on two-digit SIC codes). To merge cross-citations with our financial data, we count the number of cross-citations included in the initial patent application, because the application year is closer to when the invention occurred (Martens and Sextroh, 2021). We exclude firms from the utility industry (SIC codes 4000–4999) and financial industry (SIC codes 6000–6999). We also require our firms to have positive R&D expenditure during the sample period to ensure we focus on a sample of firms with knowledge-creation activities.

We next merge this sample with our firm-pair-level control variables of common auditors (Francis et al., 2014), technology relatedness (Bloom et al., 2013; Jaffe, 1986; Tseng, 2022), and business similarity (Hoberg and Phillips, 2010, 2016). We also require nonmissing values on all other control variables. After removing observations with missing values, our final sample consists of 178,398 directional firm-pair-year observations based on a total 2,278 unique firms (including 1,178 citing firms and 1,100 cited firms) from 1989 to 2013. To mitigate the impact of outliers, we winsorize all continuous control variables at the top and bottom 1%.

In Table 1, Panel A, we report the descriptive statistics for all firm pairs in our sample. The average firm pair makes 1.03 directional cross-citations per year, comparable to that reported by Martens and Sextroh (2021). *Log (Cross_Citation)* varies considerably across firm pairs in our sample, with a standard deviation of 0.46. The average value of comparability for firm pairs in our sample is −2.56, suggesting that the differences in earnings between firm *i* and peer firm *j* are about 2.56% of the total market valuation. This magnitude is comparable with that reported by De Franco et al. (2011).

Panel B of Table 1 reports the Pearson correlation matrix. Financial statement comparability positively correlates with cross-citations, providing univariate evidence supporting our baseline hypothesis H1. Cross-citations are also positively correlated with firms' technology relatedness and business similarity, which underscores the importance of controlling for these two variables in our regressions to isolate the incremental impact of comparability on knowledge dissemination.

[13] Following Bhattacharya et al. (2003), we measure earnings opacity along three key dimensions: earnings smoothing, earnings aggressiveness, and loss avoidance. Please see the detailed variable definition in the Appendix.

Table 1
Summary statistics and correlations.

Panel A: Summary Statistics

Variable	N	Mean	P25	Median	P75	Std Dev
Log (Cross_Citation)	178,398	0.09	0.00	0.00	0.00	0.46
Cross_Citation	178,398	1.03	0.00	0.00	0.00	44.62
Log (Spill_AcctComp)	178,398	1.00	0.33	0.81	1.47	0.80
Log (Spill_Tech Relatedness)	178,398	2.50	0.69	2.21	3.98	1.97
Log (Spill_Business Similarity)	178,398	2.10	0.90	1.97	3.09	1.41
AcctComp (%)	178,398	−2.56	−3.59	−1.56	−0.68	2.74
Peer Knowledge Stock	178,398	3.04	0.38	1.23	3.28	5.01
Common Auditor	178,398	0.19	0.00	0.00	0.00	0.39
Analyst_ratio	178,398	1.25	0.73	1.04	1.46	0.85
Asset_ratio	178,398	1.21	0.81	1.08	1.43	0.69
Lev_ratio	178,398	6.01	0.06	0.71	2.91	14.23
RD_ratio	178,398	12.20	0.06	0.54	4.47	13.32
Patent_ratio	178,398	0.69	0.17	0.37	0.45	1.77
Cite_ratio	178,398	0.33	0.08	0.16	0.20	0.93
Opacity_ratio	178,398	0.13	−0.74	0.13	1.06	5.27

Panel B: Pearson Correlations (*N*=178,398)

		1	2	3	4	5	6	7	8	9	10
1	*Log (Cross_Citation)*										
2	*Acct Comp*	**0.08**									
3	*Tech Relatedness*	**0.32**	0.00								
4	*Business Similarity*	**0.13**	**−0.02**	**0.51**							
5	*Analyst_ratio*	**−0.01**	**−0.06**	−0.01	**−0.04**						
6	*Asset_ratio*	**−0.01**	**−0.15**	**0.08**	0.00	**0.42**					
7	*Lev_ratio*	**−0.03**	0.00	**−0.03**	**−0.02**	**0.01**	**0.15**				
8	*RD_ratio*	**−0.03**	**−0.06**	**0.01**	**−0.02**	**−0.22**	**−0.39**	**−0.11**			
9	*Patent_ratio*	**0.05**	**0.04**	**0.02**	**−0.02**	**−0.03**	**−0.11**	**−0.04**	**0.11**		
10	*Cite_ratio*	**0.05**	**0.04**	**0.02**	**−0.02**	**−0.03**	**−0.10**	**−0.04**	**0.11**	**1.00**	
11	*Opacity_ratio*	0.00	0.00	0.00	**0.01**	**−0.01**	**−0.01**	**−0.01**	−0.01	0.00	0.00

Table 1 reports summary statistics and correlations for variables used in our analyses. Panel A reports descriptive statistics. Panel B reports the Pearson correlation matrix of selected variables in our main analyses. Correlations with two-tailed significance at 0.01 are presented in bold text. For variable definitions and details of their construction, see the Appendix.

5. Empirical results

5.1. Results of testing H1: comparability and knowledge dissemination

Table 2 reports the results of testing H1 on the effect of financial statement comparability on knowledge transfers. Consistent with H1, the baseline result in Column (1) shows that the coefficient on *Log (Spill_AcctComp)* is positive and significant (p-value <0.01), suggesting that comparability increases firms' incentive to acquire peers' existing knowledge, leading to greater knowledge transfers. Our result continues to hold in Column (2), where we control for a wide array of time-varying firm-pair characteristics, including common auditor, relative analyst coverage, total assets, leverage, R&D expenditure, and financial reporting opacity. We also control for the relative number of patent stocks and total citations for each citing–cited firm pair to ensure that our results do not simply reflect the mechanical correlation of cross-citations with citing and cited firms' patenting activities.

In Columns (3) and (4), we further control for alternative knowledge spillover channels through technology relatedness and business similarity between paired firms (Bloom et al., 2013; Jaffe, 1986). We find that comparability has an incremental, economically meaningful impact on knowledge dissemination: a one-standard-deviation increase in *Log(Spill_AcctComp)* is associated with an approximately 19.6% increase in cross-citations relative to its mean.[14] The magnitude of this effect is comparable with prior studies on knowledge accumulation (Furman and Stern, 2011), collaborative innovation (Azoulay et al., 2010), and the effect of comparability (De Franco et al., 2011).[15]

Consistent with prior literature (e.g., Hoberg and Phillips, 2010, 2016; Jaffe, 1986), our results show that the coefficient estimates on *Log(Spill_Tech Relatedness)* and *Log (Spill_Business Similarity)* are positive and significant, suggesting that technology relatedness and

[14] Given that a standard deviation of *Log (Spill_AcctComp)* is 0.80, the mean value of *Log(Cross_Citation)* is 0.09 (Table 1, Panel A), and the regression coefficient from Column (4) is 0.022, a one-standard-deviation increase of accounting proximity-driven knowledge spillover presents a 19.6% (0.80*0.022/0.09) increase in cross-firm citations.

[15] For example, Furman and Stern (2011) find that the opening of biological resource centers boosts citations by 57%, while Azoulay et al. (2010) find that the deaths of academic superstars reduces collaborators' quality-adjusted publication rates by 8%. De Franco et al. (2011) find that a one-standard-deviation increase in comparability is associated with a 23% increase in analyst accuracy and a 27% decrease in analyst forecast dispersion.

Table 2
Financial statement comparability and knowledge dissemination.

	$Log\ (Cross\_Citation)_{ijt+1}$			
	(1)	(2)	(3)	(4)
Log (Spill_AcctComp)	0.040***	0.041***	0.030***	0.022***
	11.70	*11.92*	*7.59*	*5.25*
Controlling for Alternative Knowledge Spillover Channels				
Log (Spill_Tech Relatedness)			0.007***	0.006***
			5.12	*4.74*
Log(Spill_Business Similarity)				0.019***
				13.53
Firm-Pair Controls				
Common Auditor		0.003	0.003	0.002
		0.81	*0.84*	*0.73*
Analyst_ratio		0.003**	0.004**	0.004**
		2.23	*2.29*	*2.34*
Asset_ratio		0.004*	0.004*	0.004*
		1.83	*1.81*	*1.84*
Lev_ratio		0.000	0.000	0.000
		−0.15	*−0.15*	*−0.20*
RD_ratio		0.000**	0.000**	0.000**
		−2.49	*−2.55*	*−2.26*
Patent_ratio		0.077***	0.076***	0.072***
		4.35	*4.28*	*4.06*
Cite_ratio		−0.150***	−0.148***	−0.142***
		−3.95	*−3.92*	*−3.74*
Opacity_ratio		0.000	0.000	0.000
		0.19	*0.20*	*0.18*
Firm Pair Fixed Effects	yes	yes	yes	yes
Firm i × Year Fixed Effects	yes	yes	yes	yes
Firm j × Year Fixed Effects	yes	yes	yes	yes
Year Fixed Effects	yes	yes	yes	yes
S.E. clustering by Firm − Pair	yes	yes	yes	yes
R-squared	79.5%	79.5%	79.5%	79.6%
Model p-value	< 0.0001	< 0.0001	< 0.0001	< 0.0001
N	178,398	178,398	178,398	178,398

Table 2 reports the results of financial statement comparability-triggered knowledge spillover and knowledge dissemination. The dependent variable, *Log (Cross_Citation)*, is measured by the natural logarithm of one plus the number of cross-citations from a (citing) firm *i* to its peer (cited) firm *j* in year $t+1$. *Log (Spill_AcctComp)* is the natural logarithm of knowledge spillover through an accounting proximity channel, calculated as cited firm *j*'s accumulated R&D stock, weighted by pairwise spatial comparability in financial statements of two paired firms. We include the following controls in the model: *Log (Spill_Tech Relatedness)*, *Log (Spill_Business Similarity)*, *Common Auditor*, *citing-cited firm relative analyst following*, *relative size*, *relative leverage*, *relative R&D investment*, *relative patent stock*, *relative citations*, and *relative financial reporting quality*, as well as fixed effects for firm pair, cited-firm year, citing-firm year, and year. For variable definitions and details of their construction, see the Appendix. *t*-statistics based on heteroskedasticity-consistent standard errors clustered at the firm-pair level are shown in italics underneath the coefficient estimates. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (two-tailed), respectively.

business similarity remain important determinants of knowledge dissemination. We therefore include these two variables (along with other controls) in all our subsequent analyses.

It should be noted that, in all regressions, we control for firm-pair, citing-firm-time, cited-firm-time, and time-fixed effects to purge out confounding effects related to static firm-pair differences, time-varying citing, cited firm attributes, and aggregate shocks. Therefore, any incremental increase in cross-citation rates is consistent with our H1 that financial statement comparability has a distinct and incremental effect on knowledge dissemination.

In additional analyses (untabulated), we further control for several additional firm-pair characteristics, including analyst coverage overlaps (Martens and Sextroh, 2021), common investor base (Reuer and Devarakonda, 2017), and common inventors (Zacchia,

2020). The coefficient estimates on *Log(Spill_AcctComp)* remain stable after we add these controls, suggesting that our results are less prone to omitted-variable bias (Oster, 2019).[16]

5.2. Two quasi-natural experiments

An ideal setting to address potential endogeneity concerns is exploiting an exogenous shock that affects firms' financial statement comparability but is *ex ante* unrelated to knowledge acquisition. In this section, we exploit two quasi-natural experiments, (1) the elimination of 20-F reconciliation requirements and (2) mandatory IFRS adoption, as two plausibly exogenous shocks to firms' financial statement comparability and examine their subsequent impact on knowledge dissemination.

Before proceeding to difference-in-differences analyses, we validate our experimental settings by evaluating the parallel trend assumption for both regulatory shocks. Fig. 1 plots the coefficient estimates for the treatment dummies before and after each shock. To capture meaningful changes in interfirm knowledge transfers, we use a five-year window surrounding each shock to allow sufficient time for technological changes (e.g., Zhong, 2018). Consistent with Kim and Valentine (2020), we leave out the two years prior to each shock (i.e., year −1 and −2) for comparison. As shown, our treatment and control firms follow a similar trend before each shock, and the changes in knowledge transfers only occur after the shock. The treatment effects are gradual and persistent after each shock, suggesting that the impact of comparability on knowledge dissemination is likely to be long-term. Overall, Fig. 1 validates the parallel trends underlying our experimental design. We next discuss the institutional background and report difference-in-differences results.

5.2.1. Negative shock to comparability: the elimination of 20-F reconciliation requirement

In 2007, the SEC removed the requirement for foreign cross-listed firms to provide a 20-F reconciliation to convert International Financial Reporting Standards into U.S. GAAP (SEC, 2007). Given the additional time and effort to reconcile accounting numbers across different standards, 20-F reconciliation should enhance the financial statement comparability of foreign cross-listed firms with their U.S. peers. When the SEC eliminated the reconciliation requirement, it represents a *negative* shock to comparability for 20-F filers relative to non-20-F filers.[17]

Using this regulatory change, we employ a difference-in-differences design by comparing changes in knowledge transfers for treatment firm pairs (e.g., firm pairs where cited firms are cross-listed firms that used to file 20-Fs) relative to the changes for a control group of firm pairs (e.g., firm pairs where cited firms are cross-listed firms that did not file 20-Fs). Specifically, we estimate the following difference-in-difference regression model:

$$\begin{aligned} Log\left(Cross\_Citation_{ijt+1}\right) = {} & \beta_0 + \beta_1 Peer\ Knowledge\ Stock_{jt} \times Treat \times Post + \beta_2 Peer\ Knowledge\ Stock_{jt} \\ & \times Treat + \beta_3 Peer\ Knowledge\ Stock_{jt} \times Post_{ijt} + \beta_4 Treat \times Post + \sum Firm\ Pair_{ij} \\ & + \sum Citing\ Firm \times Year + \sum Cited\ Firm + \sum Year + \varepsilon_{ijt+1}, \end{aligned} \tag{3}$$

where β_1 is the coefficient of interest. Given our interest in knowledge transfer from peer (cited) firm *j* to (citing) firm *i*, we define the treatment dummy for our treatment firm pairs, *Treat*, as one for firm pairs where cited firms are cross-listed 20-F filers and zero for firm pairs where cited firms are non-20-F filers. Consistent with Kim et al. (2012), we set *Post* to one for firm-pair-year observations after 2007 and zero otherwise. Since the amount of knowledge transferred from peer firm *j* to firm *i* depends on their comparability and peer *j*'s knowledge stock, we interact the treatment dummies *Treat*×*Post* with *Peer Knowledge Stock* to hold peer *j*'s knowledge stock constant. This design mitigates endogeneity concerns related to heterogeneous characteristics across 20-F filer (treatment) and non-20-F filer (control) groups (Kim et al., 2012). If the decline in comparability due to the elimination of the 20-F requirement impairs the incentive of U.S. firms to learn from their foreign peers (i.e., treatment cross-listed firms), we expect β_1 to be negative and significant.

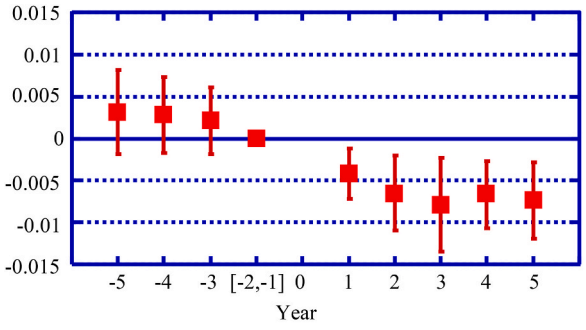
Table 3 reports the results of this difference-in-differences analysis. In Column (1), we first validate our experimental setting by showing that the elimination of the 20-F requirement indeed results in a significant decrease in *AcctComp* between our treatment firm pairs (p-value <0.05). Consistent with our main findings, Column (2) shows that the coefficient estimate of *Peer Knowledge Stock*×*Treat*×*Post* is negative and significant (p-value <0.05). This result suggests that the decline in financial statement comparability induced by the 20-F elimination adversely affects the incentives of U.S. firms to learn from their foreign cross-listed peers (e.g., 20-F filers), resulting in a significant decrease in knowledge transfers between treatment firm pairs.

5.2.2. Positive shock to comparability: mandatory IFRS adoption

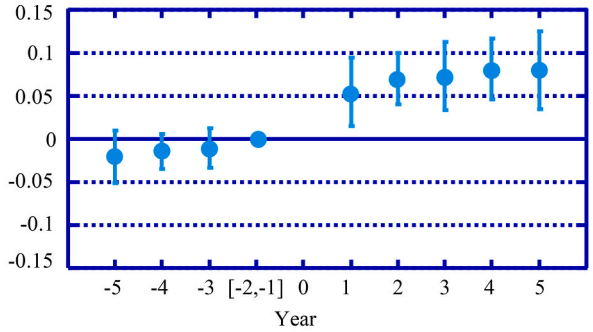
Our second shock exploits the mandatory adoption of international financial reporting standards (IFRS), representing the most significant regulatory effort in the past decade to promote comparability in a wide range of firms (e.g., Brochet et al., 2013; Yip and Young, 2012). Since the IFRS mandate is largely a country-level decision that individual firms cannot control, it provides an ideal setting to examine whether a plausibly exogenous *increase* in financial statement comparability triggers more knowledge transfers

[16] Oster (2019) discusses concerns about omitted-variable bias in empirical research. She suggests that a common approach is to explore the sensitivity of treatment effects to the inclusion of observed controls. If a coefficient is stable after the inclusion of observed controls, this signals that omitted-variable bias is limited.

[17] Although firms could still voluntarily provide this reconciliation after the rule change, Kim et al. (2012) find that none of the treatment firms in their sample do so, suggesting that the rule change impacted these firms' disclosure.



(a) Elimination of 20-F Reconciliation Requirement



(b) Mandatory Adoption of IFRS

Fig. 1. Testing for Parallel Trends: Two Quasi-Natural Experiments
This figure plots the coefficient estimate β_k from the equation below against years to treatment k. The estimate represents the difference in the cross-citation rate of firm *i* citing firm *j*'s patents between treatment and control observations, both before and after the regulatory shocks to financial statement comparability. Year 0 is the year of the shock. *K years to shock* is a dummy variable, indicating the relative year to shock. Year −2 and −1 relative to the shock year is the omitted category for comparison.

$$Log\ (Cross\_Citation)_{ijt} = \alpha + \sum \beta_k \{Peer\ Knowledge\ Stock_{jt} \times Treat \times k\ years\ to\ shock\} + \sum Controls_{ijt} + \sum Firm\ Pair + \sum Citing\ Firm \times Year + \sum Cited\ Firm \times Year + \varepsilon_{ijt}$$

between firms.

To conduct this analysis, we expand our sample to an international setting. We construct a large global sample of 969,902 firm-pair-years from 49 countries using financial data from Worldscope. To capture cross-citation between each firm pair, we retrieve detailed, global patent citation data from the Harvard Patent Dataverse and pair each firm with its industry peers within the same industry group (two-digit SIC code). Since financial statement comparability is a shared construct, the improvement in comparability between firm pairs should be more pronounced when both firms adopt the same accounting standards (i.e., IFRS) after the mandates. Therefore, we code *Treat* as one if both a (citing) firm *i* and its peer (cited) firm *j* adopted IFRS, zero otherwise.[18] *Post* is coded as one for the post-IFRS period and zero for the pre-IFRS period. Adoption year *t* is 2005 (2006) for firms with a December (non-December) fiscal year-end.[19] If increased comparability associated with IFRS mandates increases interfirm knowledge transfers, we expect β_1 in Model 3 to be positive and significant.

Table 4 reports the difference-in-differences results of this analysis. We follow a similar model specification as in Table 3. The coefficient of *Peer Knowledge Stock* × *Treat* × *Post* captures the effect of mandatory IFRS adoption on knowledge transfers between treatment firm pairs relative to those in control pairs. In Column (1), we first confirm a significant increase in financial statement comparability between treatment firm pairs following the IFRS mandate, suggesting that IFRS adoption provides a valid, positive shock to comparability. Next, in Column (2), we show that treatment firm pairs experienced a larger increase in their subsequent cross-citations after the IFRS mandate, compared to control firm pairs. Collectively, the results in Tables 3 and 4 reinforce our main findings and suggest that the positive impact of comparability on knowledge dissemination is likely to be causal.

[18] In an untabulated result, we find similar results if we use *Treat_cited firms* (e.g., firm-pairs where only cited firms adopt IFRS), suggesting that adopting harmonized accounting standards by cited firm *j* can also facilitate knowledge flow from firm *j* to firm *i*.

[19] Following DeFond et al. (2011), we omit the year of adoption, 2005, to avoid confounding effects in the transition year, as it is not clear whether peers fully understood IFRS-compliant financial statements or whether firms applied the new rules appropriately. Our results remain qualitatively unchanged when we include 2005 in the sample.

Table 3
Natural experiment: The elimination of the 20-F reconciliation requirement.

	$AcctComp_{ijt}$	$Log\ (Cross\_Citation)_{ijt+1}$
	(1)	(2)
Peer Knowledge Stock × *Treat* × *Post*		−0.005**
		−2.06
Peer Knowledge Stock × *Treat*		0.016***
		3.81
Peer Knowledge Stock × *Post*		0.006***
		4.53
Treat × *Post*	−1.202**	0.030
	−2.48	*0.83*
Controls	yes	yes
Firm − Pair Fixed Effects	yes	yes
Firm i × *Year Fixed Effects*	yes	yes
Firm j × *Year Fixed Effects*	yes	yes
Year Fixed Effects	yes	yes
S.E. clustering by Firm − Pair	yes	yes
R-squared	59.2%	80.6%
Model p-value	< 0.0001	< 0.0001
N	26,558	26,558

Table 3 reports the difference-in-differences results exploiting a negative shock to financial statement comparability, using the 2007 elimination of the 20-F reconciliation requirement for cross-listed foreign firms following IFRS (20-F filers). The dependent variable, *Log (Cross_Citation)*, is the natural logarithm of one plus the number of cross-citations from the (citing) firm to the peer (cited) firm in year *t*. *Peer Knowledge Stock* is the accumulated R&D stock peer firm *j* possesses in year *t* (measured in dollars). Following Kim et al. (2012), we define *Treat* as one for firm pairs in which peer (cited) firms are cross-listed 20-F filers, and zero for firm pairs in which peer (cited) firms are non-20-F filers. *Post* equals one for firm-pair-year observations after 2007, and zero otherwise. The main effects of treatment dummies are subsumed by firm-pair fixed effects. For variable definitions and details of their construction, see the Appendix. *t*-statistics based on heteroskedasticity-consistent standard errors clustered at the firm-pair level are shown in italics underneath the coefficient estimates. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (two-tailed), respectively.

5.3. Results of testing H2: public accessibility of peer knowledge

Table 5 reports the results for testing H2 using the passage of AIPA as a shock to increase the accessibility of peer knowledge. As shown in Column (1), consistent with H2, we find that comparability plays a larger role in facilitating knowledge dissemination after the passage of AIPA, leading to a further increase in cross-citations between paired firms. Our result continues to hold in Column (2) after controlling for technology relatedness, business similarity, and their interaction terms with *AIPA Post*. Taking the coefficient in Column (2) as an example, the additional increase in the cross-citation rate after AIPA is approximately 36.67% of its mean value for average sample firms. Interestingly, we find a decrease in knowledge transfers through the technology channel after the passage of AIPA. This is plausible, as firms inherently closer in their technology spaces (e.g., technological neighbors) likely already have shared access to each other's latest knowledge development, so the marginal benefit they can gain from AIPA is smaller.

Overall, these results are consistent with H2 and suggest that financial statement comparability facilitates the process of knowledge dissemination when firms have greater awareness and access to their peers' latest technological developments.

6. Additional analyses and robustness tests

6.1. Mechanism analyses: enhanced firm ability to assess the value of peer knowledge and to predict future benefits from knowledge acquisition

In this section, we conduct further analyses to unravel the underlying mechanism. Specifically, we examine whether financial statement comparability improves firms' ability to (1) assess the monetary value of peer knowledge, and (2) predict their own future financial benefits (e.g., cash flows) from knowledge acquisition.

Following Kogan et al. (2017), we use two patent-specific, forward-looking measures to capture the monetary value of peer knowledge, including the dollar value of cited patents (in millions of nominal dollars) and the deflated value of cited patents (deflated to 1982 million dollars). These measures are calculated based on stock price movements following patent grant dates, which provide a good gauge of the patents' economic value (Kogan et al., 2017). One advantage of these asset-pricing-based measures is that they are *forward-looking* and provide us with an estimate of the private value to patent holders based on *ex ante* information. Another benefit of

Table 4
Natural experiment: The mandatory adoption of IFRS.

	$AcctComp_{ijt}$	$Log\ (Cross\_Citation)_{ijt+1}$
	(1)	(2)
Peer Knowledge Stock × *Treat* × *Post*		0.077***
		9.95
Peer Knowledge Stock × *Treat*		−0.106***
		−12.17
Peer Knowledge Stock × *Post*		−0.079***
		−27.93
Treat × *Post*	0.055***	0.003***
	5.50	*3.64*
Controls	yes	yes
Firm − Pair Fixed Effects	yes	yes
Firm i × *Year Fixed Effects*	yes	yes
Firm j × *Year Fixed Effects*	yes	yes
Year Fixed Effects	yes	yes
S.E. clustering by Firm − Pair	yes	yes
R-squared	87.9%	92.1%
Model p-value	< 0.0001	< 0.0001
N	969,902	969,902

Table 4 reports the difference-in-differences results exploiting a positive shock to financial statement comparability, using the mandatory adoption of International Financial Reporting Standards (IFRS). The dependent variable, *Log (Cross_Citation)*, is the natural logarithm of one plus the number of cross-citations from the (citing) firm to the peer (cited) firm in year *t*. *Peer Knowledge Stock* is the accumulated R&D stock peer firm *j* possesses in year *t* (measured in dollars). *Treat* is coded as one for firm pairs where both (citing) firm *i* and peer (cited) firm *j* adopted IFRS, and zero otherwise. *Post* is coded as one in the post-IFRS period and zero for the pre-IFRS period. The main effects of treatment dummies are subsumed by firm-pair fixed effects. For variable definitions and details of their construction, see the Appendix. *t*-statistics based on heteroskedasticity-consistent standard errors clustered at the firm-pair level are shown in italics underneath the coefficient estimates. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (two-tailed), respectively.

using these two measures, as opposed to firm-level aggregate earnings or cash flows, is that they are *patent-specific*. Therefore, we can isolate the value attributed to the peers' knowledge outputs (e.g., patents) from other confounding firm-level, revenue-generating business activities.

Table 6 reports the results of our mechanism analyses. In panel A, we first examine whether comparability improves firms' ability to assess the monetary value of peer knowledge. The indicator variable, *High_AcctComp*, is coded one for firm pairs with comparability in the top quartile of our sample, zero otherwise. Using both monetary value measures of peer patents, we find consistent evidence that a firm can more accurately estimate the monetary value of a peer's patents when two firms' financial statements are more comparable.

In Panel B, we examine whether comparability triggers greater knowledge acquisition when a peer's patents are of higher value. We partition our sample based on the monetary value of peer patents. *High_PeerValue* is coded one for firm pairs with corresponding value proxy in the top quartile of our sample, zero otherwise. As shown in Columns (1) and (2), we find that comparability incentivizes a firm to learn more from a peer when the peer's existing patents hold higher values. The results from Panels A and B are consistent with our argument that comparability enhances firms' ability to make sharper inferences about the value of peer knowledge.

Panel C delves further into whether comparability improves firms' ability to predict their *own* future benefits associated with acquired knowledge. Specifically, we link a firm's acquired knowledge to its future cash flows and examine whether comparability enhances this association. We measure a firm's future cash flows in year $t+1$ and over a three-year rolling window from $t+1$ to $t+3$. In both columns, we find that firm *i*'s acquired knowledge, measured by the number of cited patents from peer *j*, is a significant predictor of firm *i*'s future cash flows. This positive association is further intensified by firm *i-j* comparability (p-value <0.05), suggesting that comparability enhances firms' ability to predict their own future benefits associated with acquired knowledge.

Overall, Table 6 supports the mechanism driving firms' incentives in knowledge acquisition: Comparability enhances firms' ability to evaluate peer knowledge and predict their own future financial benefits from knowledge acquisition, thereby facilitating knowledge dissemination.

6.2. Consequence analysis: knowledge acquisition and follow-on innovation

To complete our analyses, we take one step further to examine the economic consequences of knowledge acquisition on focal firms' innovation decisions. Table 7 reports the results of this analysis. Our dependent variable is *Follow-On Innovation,* proxied by the

Table 5
Cross-sectional test: AIPA, financial statement comparability, and knowledge dissemination.

Log (*Cross_Citation*)$_{ijt+1}$		
	(1)	(2)
Log (*Spill_AcctComp*)	0.017***	0.006
	3.10	*0.94*
Log (*Spill_AcctComp*) × *AIPA Post*	0.043***	0.033***
	6.70	*2.97*
Controlling for Alternative Knowledge Spillover Channels		
Log (Spill_Tech Relatedness)		0.003
		1.49
Log (*Spill_Tech Relatedness*) × *AIPA Post*		−0.012***
		−2.02
Log (*Spill_Business Similarity*)		0.006***
		2.65
Log (*Spill_Business Similarity*) × *AIPA Post*		*0.049***
		13.79
Firm-Pair Controls		
Common Auditor	0.001	0.001
	0.17	*0.16*
Analyst_ratio	0.001	0.001
	0.43	*0.51*
Asset_ratio	0.001	0.002
	0.45	*0.45*
Lev_ratio	0.000	0.000
	−0.65	*−0.74*
RD_ratio	0.000	0.000
	−0.28	*−0.07*
Patent_ratio	0.091***	0.081***
	3.08	*0.75*
Cite_ratio	−0.242***	−0.200***
	−3.37	*−2.80*
Opacity_ratio	0.000	0.000
	0.02	*0.02*
Firm − Pair Fixed Effects	yes	yes
Firm i × Year Fixed Effects	yes	yes
Firm j × Year Fixed Effects	yes	yes
Year Fixed Effects	yes	yes
S.E. clustering by Firm − Pair	yes	yes
R-squared	83.3%	83.4%
Model p-value	< 0.0001	< 0.0001
N	88,080	88,080

Table 5 reports the cross-sectional results of comparability and knowledge transfers conditional on the accessibility of peer knowledge. We exploit the passage of the American Inventor's Protection Act (AIPA) as a plausibly exogenous shock to increase public access to a firm's technology information (Kim and Valentine, 2021). The dependent variable, *Log (Cross_Citation)*, is the natural logarithm of one plus the number of cross-citations from the (citing) firm to the peer (cited) firm in year $t+1$. *AIPA Post* is an indicator variable that equals one for firm-pair-year observations after the passage of AIPA in 2000, and zero otherwise. We include the following controls in the model: *Log (Spill_Tech Relatedness)*, *Log (Spill_Business Similarity)*, *Common Auditor*, *citing-cited firm relative analyst following*, *relative size*, *relative leverage*, *relative R&D investment*, *relative patent stock*, *relative citations*, and *relative financial reporting quality*, as well as fixed effects for firm pair, cited-firm year, citing-firm year, and year. For variable definitions and details of their construction, see the Appendix. *t*-statistics based on heteroskedasticity-consistent standard errors clustered at the firm-pair level are shown in italics underneath the coefficient estimates. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (two-tailed), respectively.

number of focal firm *i*'s newly created patents and their forward citations. If comparability enables a firm to benefit more from knowledge spillovers of peers, it should improve its ability to produce more innovation of higher economic impact. In Column (1), we find that knowledge acquisition stimulates follow-on innovation: the coefficient on *Log (Spill_AcctComp)* is positive and significant (*p*-value <0.01), suggesting that compatibility-triggered knowledge spillovers enhance a firm's ability to produce more patents.

Column (2) shows that knowledge acquisition also increases the economic impact of follow-on innovation. Specifically, a one-standard-deviation increase in *Log(Spill_AcctComp)* leads to a 19.6% increase in forward citations of a firm's newly created patents.

Table 6
Mechanism analyses: Financial statement comparability, monetary value of peer knowledge, and predictability of future financial benefits.

Panel A: Comparability and Estimation of Monetary Value of Peer Patents

	Dollar Value_Cited Patents$_{ijt+1}$ (in millions of nominal dollars)	*Deflated Value_ Cited Patents*$_{ijt+1}$ (deflated to 1982 million dollars)
	(1)	(2)
Log (*Cited Patents*)	0.072***	0.060***
	19.40	*11.85*
Log (*Cited Patents*) ×	0.319***	0.180***
High_AcctComp	*8.49*	*8.69*
High_AcctComp	0.017***	0.021***
	3.81	*5.58*
Controls	yes	yes
Firm − Pair Fixed Effects	yes	yes
Firm i × Year Fixed Effects	yes	yes
Firm j × Year Fixed Effects	yes	yes
Year Fixed Effects	yes	yes
S.E. clustering by Firm − Pair	yes	yes
R-squared	88.5%	89.4%
Model p-value	< 0.0001	< 0.0001
N	222,504	222,504

Panel B: Comparability and Knowledge Acquisition Conditional on Monetary Value of Peer Knowledge

Log (*Cross_Citation*)$_{ijt+1}$

	Dollar Value of Cited Patents (in millions of nominal dollars)	Deflated Value of Cited Patents (in millions deflated to 1982 dollars)
	(1)	(2)
Log (*Spill_AcctComp*) ×	0.179***	0.184***
High_PeerValue	*20.22*	*21.51*
Log (*Spill_AcctComp*)	0.009**	0.008**
	2.26	*2.04*
Controls	yes	yes
Firm − Pair Fixed Effects	yes	yes
Firm i × Year Fixed Effects	yes	yes
Firm j × Year Fixed Effects	yes	yes
Year Fixed Effects	yes	yes
S.E. clustering by Firm − Pair	yes	yes
R-squared	79.7%	79.8%
Model p-value	< 0.0001	< 0.0001
N	178,398	178,398

Panel C: Comparability and Predictability of Focal Firms' Financial Benefits from Knowledge Acquisition

Focal Firms' Future Financial Benefits

	CFO $_{it+1}$	CFO $_{[it+1,\ it+3]}$
	(1)	(2)
Log (*Cross_citation*)	0.002**	0.005**
	2.42	*2.35*
Log (*Cross_citation*) × *High_AcctComp*	0.001**	0.002***
	2.26	*4.44*
High_AcctComp	0.005***	0.006***
	22.85	*10.34*
Controls	yes	yes
Firm − Pair Fixed Effects	yes	yes
Firm i × Year Fixed Effects	yes	yes
Firm j × Year Fixed Effects	yes	yes
Year Fixed Effects	yes	yes
S.E. clustering by Firm − Pair	yes	yes

(*continued on next page*)

Table 6 (*continued*)

Panel C: Comparability and Predictability of Focal Firms' Financial Benefits from Knowledge Acquisition		
Focal Firms' Future Financial Benefits		
	CFO_{it+1}	$CFO_{[it+1,\ it+3]}$
	(1)	(2)
R-squared	71.6%	67.5%
Model p-value	< 0.0001	< 0.0001
N	178,398	178,398

Table 6, Panel A reports the results of financial statement comparability and the estimation of the monetary value of cited patents from peer firm *j*. Columns (1) and (2) report the results using the nominal value in million dollars and real value deflated to 1982 dollars of cited patents as the dependent variable, respectively. *Log(Cited Patents)* is the natural logarithm of the number of cited patents that (citing) firm *i* cites from peer firm *j* in year *t*. *High_AcctComp* is an indicator variable that equals one for firm pairs with financial statement comparability in the top quartile of our sample, zero otherwise. Panel B reports the results on the amount of accounting proximity-triggered knowledge acquisition conditional on the monetary value of peer knowledge. The dependent variable, *Log (Cross_Citation)*, is the natural logarithm of one plus the number of cross-citations from the (citing) firm *i* to the peer (cited) firm *j* in year *t+1*. The partitioning variable, *High_PeerValue*, equals one if the corresponding proxy for the monetary value of peer knowledge is in the top quartile within the sample, zero otherwise. Panel C reports the results on the impact of financial statement comparability on the association between focal firm *i*'s knowledge acquisition and its future cash flows. The dependent variable, *CFO,* is (citing) firm *i*'s operating cash flows in year *t*+1 or moving average over a rolling three-year window from *t*+1 to *t*+3. *High_AcctComp* is an indicator variable that equals one for firm pairs with financial statement comparability in the top quartile of our sample, zero otherwise. For variable definitions and details of their construction, see the Appendix. *t*-statistics based on heteroskedasticity-consistent standard errors clustered at the firm-pair level are shown in italics underneath the coefficient estimates. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (two-tailed), respectively.

Given that economists estimate the value of one additional citation of a firm's patents is worth $1 million (Hall et al., 2005; Harhoff et al., 1999), the increase in focal firms' citations represents a $17,756 gain. The magnitude of this financial benefit is plausible since we only focus on knowledge spillover through the accounting channel, after controlling for firm-pair, citing-firm-time, and cited-firm-time fixed effects.[20] Since a firm could benefit from knowledge spillovers from multiple peers, the accumulated benefits from knowledge acquisition can increase exponentially with the number of peers.

Overall, these results support our main findings and provide complementary evidence on the economic benefits of comparability in stimulating new knowledge creation: comparability enables firms to learn more from peers and create more follow-on innovations of greater economic impact.

6.3. Robustness tests: alternative measures of comparability

In this section, we construct three alternative measures of comparability to evaluate the robustness of our findings. Our first measure is a cash-flow-based comparability measure (*AcctComp1*) (Ball and Shivakumar, 2006; Cascino and Gassen, 2015). The De Franco et al. (2011) comparability measure relies on constant stock market efficiency across countries (Holthausen, 2003). To overcome this limitation, Cascino and Gassen (2015) construct a cash flow-based comparability measure based on the mapping between cash flows and accruals. This measure similarly maps economic events while avoiding the potential confounding effects of cross-country differences in market efficiency.

Our second measure of comparability is based on the distance in accruals (*AcctComp2*) (e.g., Francis et al., 2014). This measure captures the "closeness of accruals," which is the primary earnings component subject to managerial discretion. Specifically, this accrual-based comparability measure is calculated as the product of −1 multiplied by the absolute value of the difference between signed total accruals between two paired firms.

Our third alternative measure (*AcctComp3*) is R&D-adjusted comparability (Chircop et al., 2020). For this measure, we use earnings adjusted for R&D capitalization as our summary measure of firms' accounting outputs. This R&D-adjusted comparability aims to capture the closeness of two firms' accounting systems in mapping the same economic events onto adjusted pro forma capitalized R&D earnings rather than GAAP earnings. This measure helps align accounting comparability with what firms spend on R&D, how these expenditures are linked to future earnings, and how the market appears to value these R&D expenditures.

Table 8 reports the results of these robustness tests. Across all three comparability measures, we find consistent evidence that greater accounting comparability between paired firms is associated with greater interfirm knowledge transfers. These results further support our findings and suggest that our results are not sensitive to the choice of comparability measures.

[20] The economic magnitude is calculated as follows: coefficient on *Log(Spill_AcctComp)* in column (2) is 0.022; a one-standard-deviation increase in *Log(Spill_AcctComp)* of 0.80 (from Table 1) can lead to 0.0174 (=0.80*0.022) increase in the citing firm's forward citations, measured by *Log (1+citations)*. According to the estimate of a $1 million value for one citation, the increase in citations of the firm is equivalent to a $17,756 dollar gain (exp (0.0174) −1 = 0.017756).

Table 7
Economic consequence: Knowledge acquisition and follow-on innovation.

	Number of Follow − On Patents$_{it+1}$	*Forward Citations of Follow − On Patents* $_{it+1}$
	(1)	(2)
Log (*Spill_AcctComp*)	0.016***	0.022***
	4.69	*2.32*
Controlling for Alternative Knowledge Spillover Channels		
Log (*Spill_Tech Relatedness*)	0.007***	0.025***
	5.96	*8.12*
Log (*Spill_Business Similarity*)	0.015***	0.009***
	13.26	*2.73*
Firm-Pair Controls		
Common Auditor	0.001	0.001
	0.41	*0.61*
Analyst_ratio	0.003**	0.000
	1.99	*0.68*
Asset_ratio	0.004**	0.000
	2.04	*0.05*
Lev_ratio	0.000	0.000
	−0.06	*−0.10*
RD_ratio	0.000	0.000**
	−1.36	*−1.97*
Patent_ratio	0.073***	−0.035
	5.06	*−0.85*
Cite_ratio	−0.126***	0.240***
	−4.06	*2.72*
Opacity_ratio	0.000	0.000
	−0.13	*0.82*
Firm Pair Fixed Effects	yes	yes
Year Fixed Effects	yes	yes
S.E. clustering by Firm − Pair	yes	yes
R-squared	80.6%	71.9%
Model p-value	< 0.0001	< 0.0001
N	178,398	178,398

Table 7 reports the results of comparability-triggered knowledge spillover and its economic impact on focal firms' follow-on innovation. Columns (1) and (2) report the results using numbers of (citing) firm *i*'s patents and forward citations as the dependent variable, respectively. *Log (Spill_AcctComp)* is the natural logarithm of knowledge spillover through an accounting proximity channel, calculated as peer (cited) firm *j*'s R&D stock weighted by pairwise spatial comparability in the financial statements of two paired firms. All specifications are estimated using OLS regressions and include these controls: *Log (Spill_Tech Relatedness)*, *Log (Spill_Business Similarity)*, *Common Auditor*, *citing-cited firm relative analyst following*, *relative size*, *relative leverage*, *relative R&D investment*, *relative patent stock*, *relative citations*, and *relative financial reporting quality*, as well as fixed effects for firm pair, cited-firm year, citing-firm year, and year. For variable definitions and details of their construction, see the Appendix. *t*-statistics based on heteroskedasticity-consistent standard errors clustered at the firm-pair level are shown in italics underneath the coefficient estimates. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (two-tailed), respectively.

7. Conclusion

This paper provides novel evidence on whether and how financial statement comparability facilitates knowledge dissemination and stimulates new knowledge creation. We show that financial statement comparability provides a distinct channel for knowledge transmission and incentivizes firms to learn from peers. Our analyses of the mechanism show that comparability enhances firms' ability to assess the monetary value of peer knowledge and predict their own financial gains from knowledge acquisition, thereby facilitating knowledge dissemination. Comparability increases knowledge transfers more when peer knowledge is more publicly accessible or of higher value. Lastly, we show that comparability-triggered knowledge spillovers foster follow-on innovation, enabling firms to produce more patents and patents of greater economic significance.

We exploit two quasi-natural experiments, one in the U.S. and one in an international setting, to enhance our causal inferences. First, we use the elimination of the 20-F reconciliation requirement as a negative shock to comparability. We document a significant decline in knowledge transfers between treatment firm pairs after the SEC eliminated the 20-F requirement. Second, we expand our sample to an international setting to take advantage of the mandatory adoption of IFRS as a positive shock to promote comparability. We find that increased comparability after the mandate of IFRS adoption significantly increases knowledge transfers between treatment firm pairs.

Table 8
Alternative measures of financial statement comparability.

Log (*Cross_Citation*)$_{ijt+1}$			
	(1)	(2)	(3)
Log (*Spill_AcctComp*1)	0.018***		
	4.50		
Log (*Spill_AcctComp*2)		0.018***	
		4.52	
Log (*Spill_AcctComp*3)			0.021***
			4.66
Controlling for Alternative Knowledge Spillover Channels			
Log (*Spill_Tech Relatedness*)	0.006***	0.008***	0.007***
	5.67	*6.08*	*5.11*
Log (*Spill_Business Similarity*)	0.016***	0.016***	0.016***
	11.16	*11.17*	*10.88*
Firm-pair Controls			
Common Auditor	0.004	0.004	0.003
	1.21	*1.20*	*0.77*
Analyst_ratio	0.003*	0.003**	0.003**
	1.86	*1.98*	*2.06*
Asset_ratio	0.004	0.004	0.005
	1.62	*1.63*	*1.90*
Lev_ratio	0.000	0.000	0.000
	−0.21	*−0.02*	*−0.08*
RD_ratio	0.000**	0.000***	0.000**
	−2.21	*−2.22*	*−2.38*
Patent_ratio	0.112***	0.112***	0.085***
	5.48	*5.49*	*4.12*
Cite_ratio	−0.240***	−0.241***	−0.163***
	−5.29	*−5.34*	*−3.60*
Opacity_ratio	0.000	0.000	0.000
	−0.58	*0.12*	*0.03*
Firm Pair Fixed Effects	yes	yes	yes
Firm i × Year Fixed Effects	yes	yes	yes
Firm j × Year Fixed Effects	yes	yes	yes
Year Fixed Effects	yes	yes	yes
S.E. clustering by Firm − Pair	yes	yes	yes
R-squared	77.9%	79.0%	80.7%
Model p-value	< 0.0001	< 0.0001	< 0.0001
N	158,332	158,332	142,574

Table 8 reports additional analyses using alternative measures of financial statement comparability. We measure knowledge dissemination based on the cross-citations between each pair of firms. The dependent variable *Log (Cross_Citation)* is the natural logarithm of one plus the number of cross-citations from the (citing) firm to the peer (cited) firm in year $t+1$. *Log (Spill_AcctComp1)* is cash flow-based comparability calculated based on the closeness in expected accruals for all firm pairs in the same industry, based on two-digit SIC codes (Cascino and Gassen, 2015). *Log(Spill_AcctComp2)* is accrual-based comparability calculated based on the closeness in signed total accruals for firm pairs in the same industry, based on two-digit SIC codes (Francis et al., 2014). *Log (Spill_AcctComp3)* is accounting comparability adjusted for R&D capitalization, based on the closeness of accounting systems in mapping economic events onto R&D-adjusted earnings (Chircop et al., 2020). All specifications are estimated using OLS and include these controls: *Log (Spill_Tech Relatedness)*, *Log (Spill_Business Similarity)*, *Common Auditor*, *citing-cited firm relative analyst following*, *relative size*, *relative leverage*, *relative R&D investment*, *relative patent stock*, *relative citations*, and *relative financial reporting quality*, as well as fixed effects for firm pair, cited-firm year, citing-firm year, and year. For variable definitions and details of their construction, see the Appendix. *t*-statistics based on heteroskedasticity-consistent standard errors clustered at the firm-pair level are shown in italics underneath the coefficient estimates. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level (two-tailed), respectively.

Our study makes two main contributions. First, our findings contribute to an emerging literature on the real effect of firm disclosure on innovation. While much progress has been made in this literature (see a review by Roychowdhury et al., 2019), most studies focus on how a firm's own financial reporting characteristics affect its innovation decisions. Our study extends the literature by demonstrating that comparability, as a shared accounting construct between firms, influences the direction and intensity of knowledge flows between specific firm pairs. Second, our findings contribute to the literature on the informational benefits of financial statement comparability. Prior studies have largely focused on the benefits of comparability in capital markets or firm investments. Our evidence shows that comparability is a crucial driver of firm incentives to acquire innovative knowledge from peers, facilitating knowledge dissemination and stimulating new knowledge creation.

Finally, we acknowledge a few caveats of our study. First, not all interfirm learning is observable. Although we use cross-citations to capture the flows of innovative knowledge between firms, we cannot fully capture all interfirm learning. Second, despite the use of a dense fixed-effect structure and a wide range of control variables, we cannot completely eliminate all potential influences of omitted correlated variables, such as time-varying firm-pair level attributes (e.g., short-term technological research collaboration between firms). Lastly, innovative knowledge is unique due to its long-term and intangible nature. While it is reasonable to assume that the informational benefits of comparability in knowledge dissemination can be extrapolated to other two-way interfirm interactions, we advise caution when generalizing our findings. Subject to these caveats, this study provides the first evidence on the importance of accounting comparability in facilitating knowledge dissemination, a pivotal factor for promoting aggregate economic growth.

Appendix

Variable Descriptions

Variables	Description	Source
Measure of Interfirm Knowledge Transfer		
Cross_Citation	The number of cross-citations from a (citing) firm *i* to a peer (cited) firm *j* in year *t*.	Kogan et al. (2017) patent data
Measures of Monetary Value of Peer Knowledge		
Dollar Value_Cited Patents	The monetary value of cited patents that firm *i* cites from peer firm *j* in millions of nominal dollars, as reported by the patent database in Kogan et al. (2017).	Kogan et al. (2017) patent data
Deflated Value_Cited Patents	The monetary value of cited patents that firm *i* cites from peer firm *j* deflated to 1982 (million) dollars as reported by the patent database in Kogan et al. (2017).	Kogan et al. (2017) patent data
Measure of Focal Firms' Future Financial Benefits		
CFO_{t+1}	Firm *i*'s future operating cash flows in year *t*+1.	Compustat database
$CFO_{[t+1,\ t+3]}$	Firm *i*'s future operating cash flows calculated as the moving average of cash flows over a three-year rolling window [+1, +3].	Compustat database
Measures of Knowledge Spillover		
Peer Knowledge Stock	Accumulated R&D stock of peer firm j calculated using a perpetual inventory method with a 15% depreciation rate following Hall et al. (2005).	Compustat database
Spill_AcctComp	Knowledge spillover through an accounting proximity channel, calculated as peer firm *j*'s R&D stock, weighted by pairwise spatial comparability in financial statements of two paired firms.	Compustat database
Spill_Tech Relatedness	Knowledge spillover through a technology relatedness channel, calculated as peer firm *j*'s R&D stock, weighted by pairwise spatial closeness in technology space of two paired firms. Pairwise technology closeness is proxied by the correlation in patent application filings $w_{ij} = (\sum P_{ict}P_{ict}/(\sum P_{ict}^2)((\sum P_{jct}^2)$.	Kogan et al. (2017) patent data, Compustat database
Spill_Business Similarity	Knowledge spillover through a business similarity channel, calculated as peer firm *j*'s R&D stock, weighted by pairwise spatial similarity in products of two paired firms. The pairwise product similarity scores are obtained from Hoberg and Phillips (2010, 2016).	Hoberg and Phillips (2010, 2016)
Measures of Financial Statement Comparability		
AcctComp	Financial statement comparability, calculated as the closeness in accounting systems in mapping economic events onto earnings for all firm-pairs in the same industry based on two-digit SIC codes, following De Franco et al. (2011).	Compustat database
AcctComp1	Cash flow-based comparability, calculated as the closeness in accounting systems in mapping cash flows onto accruals for all firm-pairs in the same industry based on two-digit SIC codes.	Compustat database
AcctComp2	Accrual-based comparability, calculated as the closeness between signed total accruals for firm pairs in the same industry based on two-digit SIC codes. Total accruals are calculated as the difference between income before extraordinary items and cash flows from operations adjusted for cash flows from extraordinary items, scaled by beginning-of-year total assets.	Compustat database
AcctComp3	Accounting comparability adjusted for R&D capitalization, calculated as the closeness of accounting systems in mapping economic events onto R&D-adjusted earnings. The measure is originally developed by De Franco et al. (2011) and modified by Chircop et al. (2020).	Compustat database
Firm-Pair Control Variables		
Common Auditor	An indicator variable that equals one if firm *i* and firm *j* have the same auditor, and zero otherwise.	Compustat database
Technology Relatedness	A measure of pairwise spatial closeness in technology space of two paired firms. Pairwise technology closeness is proxied by the correlation in patent application filings. $w_{ij} = (\sum P_{ict}P_{ict}/(\sum P_{ict}^2)((\sum P_{jct}^2)$.	Kogan et al. (2017) patent data, Compustat database
Business Similarity	A measure of pairwise spatial closeness in the product market space of two paired firms. The pairwise product similarity scores are obtained based on a textual analysis of firms' 10-K filings.	Hoberg and Phillips (2010, 2016)

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(*continued*)

Variables	Description	Source
Analyst_ratio	The ratio of analyst coverage for firm *i* over that of firm *j*, in which analyst coverage is the number of analysts making earnings forecasts over year *t*.	I/B/E/S summary file
Asset_ratio	The ratio of total assets for firm *i* scaled by that of firm *j*, in which total asset is the natural log of total assets in year *t*.	Compustat database
Lev_ratio	The ratio of leverage for firm *i* scaled by that of firm j, in which leverage is calculated as total liabilities scaled by total assets in year *t*.	Worldscope
RD_ratio	The ratio of R&D intensity for firm *i* scaled by that of firm *j*, in which R&D intensity is calculated as total R&D expenditures scaled by total assets in year t.	Compustat database
Patent_ratio	Citing patent stock plus one divided by cited patent stock plus one in year t, in which patent stock is the number of citable patents in the corresponding firm until and including year t.	Kogan et al. (2017) patent data
Cite_ratio	Citing total citations plus one divided by cited total citations plus one in year t.	Kogan et al. (2017) patent data
Opacity_ratio	The ratio of financial reporting opacity for firm *i* scaled by that of firm j, in which opacity is calculated as the percentile rank of four components of financial reporting quality based on (Bhattacharya et al., 2003): two measures of income smoothing, one accrual-based measure, and one small loss avoidance. The first measure of earnings smoothing is computed as the product of −1 and the ratio of the standard deviation of earnings to the standard deviation of cash flow from operations (Francis et al., 2004; Leuz et al., 2003). Our second smoothing measure is the correlation between the change in accruals and the change in cash flows from operations, both scaled by average total assets (Barth et al., 2008; Lang et al., 2006). For our third measure of opacity, we follow Leuz et al. (2003) and use the magnitude of accruals to capture the extent to which managers exercise discretion in reporting earnings. Our last measure captures the incentives of managers to avoid reporting small losses (Burgstahler and Dichev, 1997; Degeorge et al., 1999). To mitigate measurement errors, we construct a composite measure of earnings opacity using the average percentile rank of four individual opacity measures.	Compustat database
Conditioning Variables		
Accessibility of Peer Knowledge		
AIPA Post	An indicator variable that equals one for firm-pair-year observations after the passage of the American Investor's Protection Act (AIPA) in 2000, and zero otherwise.	Kim and Valentine (2021)
Monetary Value of Peer Knowledge		
High_PeerValue1	An indicator variable that equals one if the monetary value of peer patents (in millions of nominal dollars) is within the top quartile of the sample, and zero otherwise.	Kogan et al. (2017) patent data
High_PeerValue2	An indicator variable that equals one if the monetary value of peer patents (deflated to 1982 million dollars) is within the top quartile of the sample, and zero otherwise.	Kogan et al. (2017) patent data

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