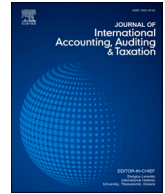




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The real effects of financial reporting: Evidence and suggestions for future research

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ABSTRACT

This article systematically reviews 94 accounting and finance studies that address the real effects of financial reporting. Whereas the effects of financial reporting on capital suppliers' decisions traditionally have received much attention, recent research has generated important new insights into the feedback effects of financial reporting on the reporting firms' real activities (e.g., investments or allocation and use of resources). We identify the consequences of financial reporting for (1) the reporting firm, (2) its peer firms, and (3) the input and output markets. We also highlight the effects of firms' internal controls over financial reporting and consider how accounting and auditing regulations influence and contribute to real effects. The studies we review are consistent in their findings that high-quality financial reporting is positively associated with the efficiency of the reporting firm's resource allocation. Many studies also suggest a positive association between high-quality financial reporting and an efficient allocation of resources in the real sector, which can also benefit other market participants like consumers or employees. The article concludes with an outlook on fruitful research opportunities.

1. Introduction

Most accounting research focuses on the capital market effects of financial reporting. Financial reporting informs investors, creditors, and the public about firms' activities, net assets, financial position, and results of operations. It thus decreases information frictions when firms need to fund (new) projects and activities. A large portion of the literature on the effects of financial reporting addresses efficiency problems in the capital market by investigating the decisions taken by capital suppliers (e.g., Ball & Sadka, 2015; Ball et al., 2009; Botosan, 2006; Dye & Sridhar, 2002; Verrecchia, 2001). However, the relevance of financial reporting for the real sector, which includes firms' decisions on investments and the production and consumption of goods and services, has received considerably less attention. Nevertheless, a small but fast-growing strand of the accounting and finance literature investigates the effects of financial reporting on the real sector. These effects are also referred to as *real effects*.

Most real effects studies investigate the economic effects of financial reporting on the investments and operations of the reporting firm (e.g., Biddle et al., 2009; García Lara et al., 2016; Kanodia & Sapra, 2016;

McNichols & Stubben, 2008). An increasing number of studies also address the effects of a firm's financial reporting on its peer firms. Examples of such studies are Badertscher et al. (2013), Beatty et al. (2013), Durnev and Mangen (2009), and Li (2016), who find that misreporting can distort the peer firms' investment and operational efficiency. The reason is that the peers seem to rely on misleading economic prospects. In contrast, peer firms might benefit from learning about market uncertainties from another firm's financial report (Badertscher et al., 2013; Bernard et al., 2020; Durnev & Mangen, 2020). Finally, a few studies investigate the real effects of financial reporting for the aggregate input or output market. These studies are consistent in their finding that financial reporting can facilitate the efficient allocation of resources across firms, for example, by reducing differences in productivity within an industry (Breuer, 2021; Francis et al., 2009; Hann et al., 2020). However, there is scarce research on the real consequences of financial reporting for other market participants in the input or output market. Yet real effects for consumers can exist in the output market, if, for example, firms change their pricing policies (Li, 2016; Sadka, 2006) or differentiate their products (Bernard et al., 2020) in response to their competitors' financial reports. Furthermore, in the labor input market,

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financial reporting relates to firms' labor investment efficiency (Choi, 2021; Jung et al., 2014; Kedia & Philippon, 2009), and this ultimately has implications for employees.

The main objective of this review is to provide the reader with a full map of the current literature on the effects of financial reporting in the real sector, which occur in addition to those in the capital market. For this purpose, we develop a classification scheme that categorizes articles by their research topic and their unit of analysis, that is, the firm level, the peer firm level, and the aggregate level. In contrast to existing reviews on the real effects literature (e.g., Kanodia & Sapra, 2016; Leuz & Wysocki, 2016; Roychowdhury et al., 2019), we follow a rigorous method to objectively identify and select the studies we consider. We also include citation metrics to survey the literature. To provide a basis for future research, we summarize the variables and the proxies of the studies that we review in detail in Appendix B.¹

Using our distinction between firm-level, peer firm-level, and aggregate-level effects, we aggregate and extend the existing literature reviews that focus on specific topics such as financial reporting regulations (Leuz & Wysocki, 2016), accounting measurement problems (Kanodia & Sapra, 2016), and innovation (Simpson & Tamayo, 2020). Our review also differs from the recent reviews by Roychowdhury et al. (2019), who focus exclusively on firms' investment decisions, and by Shakespeare (2020), who examines investment and financing decisions in a macroeconomic context. Most importantly, we review and contrast both empirical and theoretical real effects studies, whereas existing reviews focus on either the empirical literature (e.g., Roychowdhury et al., 2019; Shakespeare, 2020) or the analytical literature (e.g., Kanodia & Sapra, 2016). This allows us to compare both branches of the literature and to identify open research questions. We also shed light on how the internal and external accounting environment influences and contributes to the real effects of financial reporting. More precisely, we examine the role of a firm's internal control system and the (un)intended consequences of financial reporting regulation for the real sector. Finally, we identify gaps in the existing literature and highlight the research opportunities we consider relevant.

The remainder of this literature review is structured as follows: In Section 2, we introduce our key terms and propose a classification scheme for the real effects of financial reporting. We also explain three possible channels by which financial reporting can affect firms' real decisions. We then describe the method we used to identify the articles we include. In Section 3, we summarize the empirical findings and theoretical predictions about the consequences of financial reporting for the real sector. We differentiate between the consequences for the reporting firm itself, the consequences for its peer firms, and the consequences at the aggregate level (i.e., for the input and output market). We discuss the role of internal controls over financial reporting in Section 4. In Section 5, we review the findings on the real effects resulting from regulations on financial reporting and auditing. Finally, we discuss our results in Section 6, and we conclude in Section 7.

2. Conceptualization and methodology

2.1. Conceptualization

For the purpose of this review, we refer to *financial reporting* as the process of documenting and communicating a firm's activities and its resulting net assets, financial position, and results of operations for a given period to address the needs of investors and creditors. This

definition includes both mandatory and voluntary reports that are verified by an independent auditor.²

Our understanding of *real effects* is based upon the real effects theory pioneered by Kanodia (1980, 2006), which was further developed by Kanodia and Sapra (2016) and is in line with Leuz and Wysocki (2016). This theory understands the reporting decision of an individual firm as a maximization problem that simultaneously accounts for both (1) the evaluation of the firm by equity investors and creditors in the capital market and (2) the firm's investment strategy in the real sector. Analogously, a firm's operating strategy determines and is determined by the firm's (future) reported cash flows from operations taken in the real sector. The real effects perspective thus suggests that a firm's financial reporting not only has a capital market effect that results from the investors' and creditors' responses, but also feeds back into the reporting firm's real activities (i.e., its investments and/or operations).

We build upon this real-effects perspective and extend it in several ways. For the purpose of this review, we refer to a *real effect* of financial reporting as a situation in which the financial report of one firm has implications (1) for the reporting firm's real decisions, (2) for its peers' real decisions, and (3) for the decisions of other market participants in the input market (e.g., employees and suppliers) or the output market (e.g., consumers). Importantly, we presume that real effects are a consequence of a firm's reporting due to capital market pressure. Thus, real effects can be attributed to the financial report issued in the previous year (or in earlier years). This assumption implies that we exclude studies on real earnings management (REM) and on real activities manipulation (RAM), which typically examine the actions taken in the year preceding the firm's financial reporting at the end of the same year (e.g., Cheng et al., 2015; Ernstberger et al., 2017; Roychowdhury, 2006; Zang, 2012).³ We acknowledge, however, that a firm's financial reporting and its investment and operational decisions are intertemporally linked and recurring.

Fig. 1 illustrates the feedback effects of financial reporting for the real sector due to capital market pressure: Real effects can occur when a firm's financial report to the capital market affects the decisions of the reporting firm, its peer firms, or other participants in the input or output market, altering the allocation of resources (e.g., investing, consuming, producing). For example, a misreporting firm might be more likely to overinvest in the following period to conceal its own misreporting, whereas a truthfully reporting firm might invest more efficiently (in Fig. 1, the two circular arrows from and to the firm and peer firm(s), respectively). A peer firm might be more likely to invest inefficiently (efficiently) when it is misled (informed) by the exaggerated profitability information in another firm's financial report (in Fig. 1, the two opposing arrows between the firm and its peer firm(s)). Moreover, real effects can emerge due to the interaction of the reporting firm with other market participants via the input and output market (in Fig. 1, the two opposing arrows on the left (right) side of the figure between the firm (peer firm's(s')) and the box containing the input and output markets). Returning to the previous examples, a real effect can also occur if a peer firm observes the reporting firm's investments and responds by investing at a similar or different level. Furthermore, the regulator can mandate and enforce financial reporting and auditing standards, which determine whether and how financial reports must be made available to

¹ In Appendix B, we give more details about studies that explicitly focus on the real effects of financial reporting as defined in Section 2. For brevity and clarity, however, we do not tabulate the details of studies that add related findings, which are mentioned in the text. For this reason, we also do not include the effects of financial reporting on firms' capital structures (e.g., Bernard et al., 2021; see also Shakespeare, 2020 for a discussion).

² Most of the empirical studies investigate the real effects resulting from mandatory financial reporting. We exclude non-audited financial reports because those have a lower credibility and economic value than audited reports, which can also be interpreted as confirming other sources of non-audited information (e.g., internal management reports) (see, e.g., Ball, 2013; Ball & Shivakumar, 2008). Yet we do not have a narrow quantitative understanding of financial reporting; rather, we consider it in its entirety, since qualitative reports of business risks can also include decision-relevant financial information for investors and creditors.

³ For a literature review on earnings management, see Xu et al. (2007).

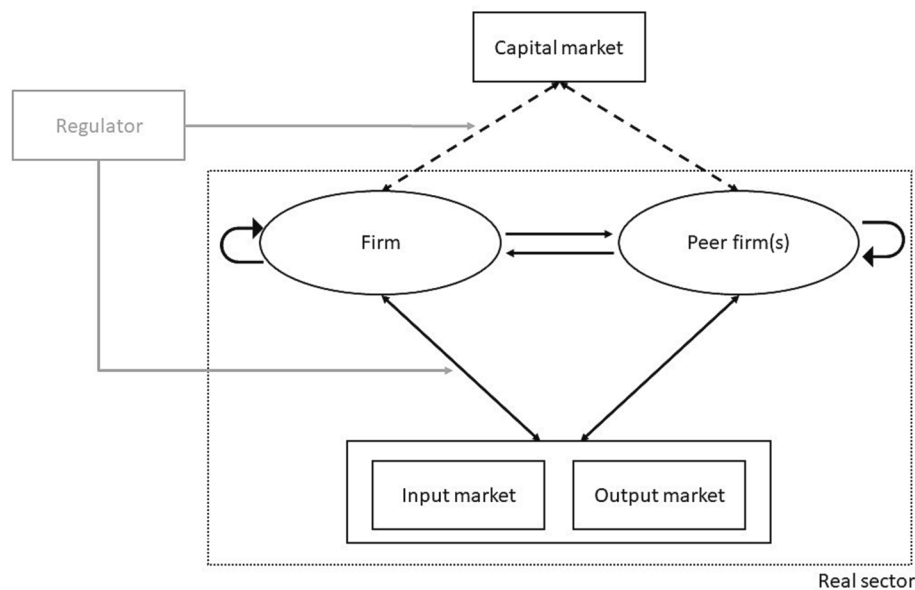


Fig. 1. The real effects of financial reporting. **Note:** This figure illustrates how a firm's and its peer firm's(s') financial reporting to the capital market (dashed arrows) can lead to feedback effects in the real sector (dotted box), specifically, for the reporting firm, for its peer firm(s), and in the input and output market (solid arrows). Financial reporting is subject to mandated and enforced accounting and auditing regulations and standards (grey arrows), which can also induce or moderate real effects. We use circles to represent the financial information reporting and receiving parties in the economy, whereas boxes show those parties that only receive financial information.

other market participants, what information needs to be reported, and how this information is to be audited. Mandating and enforcing accounting and audit regulations can safeguard the quality or credibility of the financial reports.

Why and how do real effects occur? Extending the framework in Roychowdhury et al. (2019), we introduce three possible channels whereby financial reporting can induce real effects.

First, firms' real decisions can be regarded as consequences of their capital market pressure due to external financing constraints. In an incomplete market, financial reporting can reduce information asymmetries between firm managers (agents) and capital suppliers (principals), who determine the firms' access to capital. The role of financial reporting is thus to provide information that is decision-useful for capital suppliers in the sense that it helps to achieve the efficient allocation of capital to the firms in the market. In the optimal case, financial reporting can lead to first-best investment levels. Further, financial reporting can decrease adverse selection problems by improving firms' access to capital and, thus, reduce underinvestment problems. Moreover, financial reporting can limit firms' access to capital in situations in which firm managers tend to overinvest (empire-building).⁴

The second channel whereby financial reporting can affect real decisions within the firm is through managerial compensation contracts based on performance measures derived from financial reporting to the capital market. However, managers' incentives can be misaligned with those of the stakeholders if managerial performance measures are based on financial reporting figures that are decision-useful for capital suppliers, but not incentive-useful for managers. Consequently, managers might, for example, over- or underinvest to maximize their compensation. In contrast, if financial reporting provides incentive-useful performance measures, managerial decisions will be closer to the first-best outcomes.

Third, absent principal-agent problems, financial reporting can reduce uncertainty by providing a signal that facilitates the updating of

beliefs about an expected economic outcome. Specifically, a firm's own financial report might change the information set of the reporting firm's manager. This could occur directly as the manager learns from the financial statements, or indirectly as the manager learns from the firm's interactions in the input, output, or capital market. For example, the capital market response to a firm's financial report can inform the manager about the firm's investment and growth opportunities (see, e.g., Gao & Liang, 2013; Goldstein & Yang, 2019). Further, peer firms' financial reports (and their real responses to their own financial reporting) can provide new information on expected economic outcomes. Roychowdhury et al., (2019, p. 3), refer to this role as "learning from peers" and "learning from [the] firm's reporting requirements". Similarly, Bushman and Smith (2001) argue that financial reporting can assist managers in identifying good or bad projects (i.e., the "project identification" channel). In both cases, updating their beliefs can improve (distort) managers' real decisions if the signal is true (false). For a discussion of how financial reporting can reduce uncertainty, see also Ferracuti and Stubben (2019). We refer to these three channels to categorize the findings in the articles we review.

2.2. Methodology

2.2.1. Selection of publications

To collect the studies we review, we used a four-step procedure based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher et al., 2009), which was initially developed for medical literature reviews. The systematic documentation of the search and selection process is widely recognized and has also been used in recent literature reviews in business and social sciences (e.g., Eierle et al., 2022; Haapamäki & Sihvonen, 2019; Kovermann & Velte, 2019; Preuss & Königgruber, 2021).

Applying the PRISMA method, we first conducted a structured literature search in the Web of Science (WOS) database from which we selected our sample (see Table 1). We searched for scientific publications that include keywords related to financial reporting (e.g., *financial reporting* or *disclosure*) and keywords related to real effects (e.g., *real*

⁴ We do not present the relevant principal-agent studies here but refer the reader to the summary provided by Roychowdhury et al. (2019).

Table 1
Sample selection from the WOS database for the search period 1900 to 2021.

Step	Keywords and filters	Number of identified publications
1	<i>Keyword search:</i> (“real effect*” OR “corporate investment*” OR “investment efficiency” OR “efficient investment*” OR “R&D investment*” OR “capital expenditure*” OR “operating decision*” OR “firm* operation*” OR “product market competition” OR “competition in product market*” OR “resource* allocation” OR “allocation of resource*” OR “externalit*”) AND (“financial reporting” OR “financial-reporting” OR “disclosure*” OR “accounting information” OR “internal control over financial reporting” OR “internal control weakness*” OR “material weakness*” OR “financial misconduct” OR “fraudulent financial reporting” OR “financial misstatement*” OR “fraud” OR “restatement*”)	808
2.1	<i>Document types:</i> Article, review article, early access article, book chapter	722
2.2	<i>Languages:</i> English	715
2.3	<i>WOS Categories:</i> Business, Business Finance, Economics	597
2.4	<i>Journals:</i> High-quality accounting or finance journals (i.e., journals in the fields <i>Accounting</i> and <i>Finance</i> ranked as 4*, 4, or 3 according to the CABS Academic Journal Guide 2021)	322
3	<i>Eligibility:</i> Manual selection of publications based on topic (i.e., exclusion of publications primarily related to financial effects (e.g., credit risk, hedging, banking, cost of capital, etc.), non-financial accounting information (e.g., media), taxation, and managerial research)	73
4	Manual inclusion of 21 additional publications (not contained in steps 1 to 3) based on forward and backward search of eligible articles	94
	Total number of studies included	94

effect, corporate investment, or operation) in their title, abstract, author keywords, or WOS keywords.⁵ We carried out our structured literature search on November 23, 2021. Our search of the WOS database identified 808 publications.

We excluded 211 publications because they were not written in English; not classified as *Business*, *Business Finance*, or *Economics* according to the WOS categories; or not classified as an article, review article, early access article, or book chapter. We further excluded 275 studies that were not published in high-quality journals as defined in the Academic Journal Guide 2021 by the Chartered Association of Business Schools (CABS) for the subfields *Accounting* and *Finance* (i.e., journals ranked lower than 3).⁶ This selection process yielded a sample of 322 studies, 231 (91) of which are published in accounting (finance) journals. Using the same keywords, we conducted an additional search in the Dimensions database, targeting 14 high-quality accounting and finance journals that are ranked as 4*, 4, or 3 in the CABS Academic Journal Guide 2021 but not included in the WOS database.⁷ This search, however, led to the inclusion of only one additional publication.

By taking a close look at the abstracts and full texts, we then assessed the studies selected in the first two steps of our procedure with respect to their suitability for our review. Because we are interested in the effects of financial reporting for the real sector, we excluded 249 studies that examine effects in the financial sector (e.g., decisions taken in the capital market or consequences of financial reporting for the banking industry).

⁵ Table 1 reports our exact keyword search terms. Table A.1 in Appendix A lists the search results for each step of our keyword search procedure.

⁶ A complete list of the journals we included in our review can be found in Appendix C and on the CABS website (CABS, 2021).

⁷ A list of the high-quality journals that are not included in the WOS database can be found in Appendix C and on the CABS website (CABS, 2021).

We only included those empirical studies that use some aspect of financial reporting as the independent variable and some real effect of financial reporting as the dependent variable. Hence, we excluded studies that investigate the determinants of a firm’s reporting decisions (i.e., financial reporting is regarded as the dependent variable).⁸ Finally, we manually added 21 articles that appear in the references or citations of the studies we selected but were not captured by our initial keyword search.⁹

Our final sample consists of 94 articles. Fig. 2 summarizes the total number of articles published and the mean number of total citations per article and year. We find that few studies were published before 2007 and that the number of publications has steeply increased over the past five years. We attribute the post-2007 spike in the research output on real effects to two developments. First, we believe that after the global financial crisis of 2008, accounting and finance researchers became more interested in the relation between the capital market and the real sector. The crisis had significant macroeconomic implications for firms and people (e.g., effects on consumption, unemployment, trade, etc.) (see, e.g., Claessens et al., 2012; Gros & Alcidi, 2010). Second, Biddle et al. (2009) published a highly influential study that empirically examines whether accounting information has real effects on firms’ investment efficiency. We also notice that research output on real effects increased in the years after 2013, which might be related to the publications by Beatty et al. (2013), who document evidence suggesting that financial reporting has spillover effects on peer firms’ investments, and by Cheng et al. (2013), who investigate the effect of internal control weaknesses on investment efficiency. Further, the increased research output after 2016 might stem from researchers following the call by Leuz and Wysocki (2016) for more research on the potential real effects of financial reporting regulations.¹⁰

2.2.2. Analysis of articles

We carefully read each article included in our final sample to inductively identify common research themes. First, we categorized the articles’ findings by the unit of analysis, that is, according to who (i.e., which market participant) is affected by the financial reporting or for whom the study finds a real effect. Specifically, we differentiated the studies based on whether the effect of financial reporting is measured at the level of (1) the reporting firm, (2) the peer firm(s) of the reporting firm, or (3) the input and output market. We discuss the studies that belong to more than one category in all respective sections of our article. Second, for findings at the firm and the peer firm level, we categorized the studies as related either to investment activities or to operational activities. For findings at the aggregate market level, we loosely categorized the articles based on which input market (e.g., the labor market) or output market (e.g., a product market) the study focuses on. Finally, we identified articles that focus on the reporting environment including the internal controls over financial reporting and external accounting standards and audit regulations. Acknowledging that these categories might sometimes overlap, we also describe in our discussion how the categories are interconnected.

⁸ See the reviews by Healy and Palepu (2001), Beyer et al. (2010), and Fields et al. (2001) for an overview of this literature.

⁹ All but six of our manually added studies fulfill the sample selection criteria summarized in Table 1. These are the case study by Sadka (2006) (American Law and Economics Review, ranked as 2 in the CABS Academic Journal Guide 2021) and the papers by Fu et al. (2020) (Journal of Law and Economics), Kanodia (1980) (Econometrica), and Bustamante and Frésard (2021), Brown and Martinsson (2019), and Dou et al. (2019) (all in Management Science). According to the CABS Academic Journal Guide 2021, the latter three journals are neither accounting nor finance journals.

¹⁰ Table A.2 in Appendix A lists the 10 most influential publications in terms of citations. Table A.3 gives an overview of the number of publications by journal.

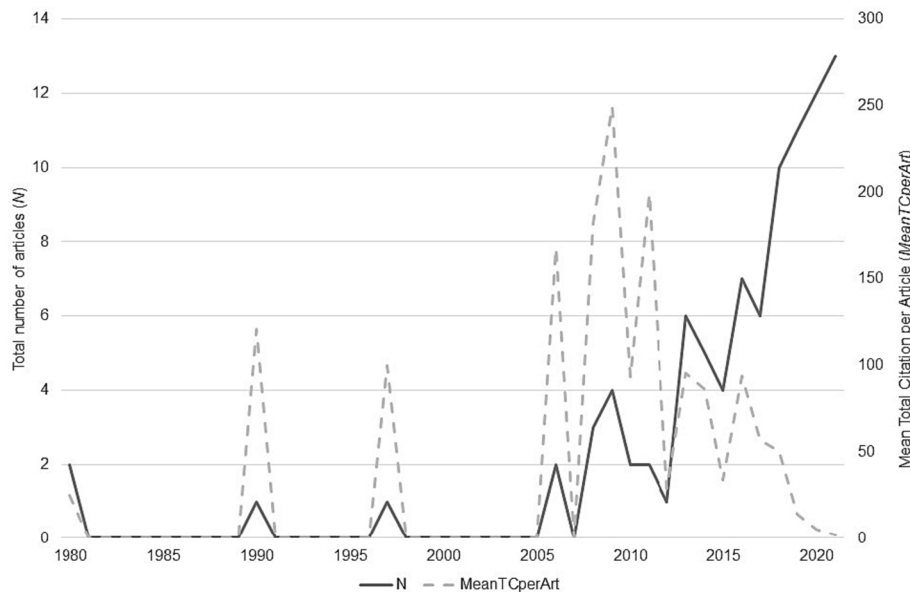


Fig. 2. Total number of studies published on real effects of financial reporting and mean total citations of these studies by year. **Note:** The solid black line indicates the total number (N) of studies published on the real effects of financial reporting included in our final sample. The dashed grey line refers to the mean total citations per article ($MeanTCperArt$) of these studies and is based on the total global citations of all studies published in the respective year.

3. Findings on the real effects of financial reporting

3.1. Real effects of financial reporting at the firm level

This section discusses empirical findings and theoretical predictions on how financial reporting feeds back into the reporting firm's real decisions. The objective of this section is to identify whether high-quality financial reporting, which primarily addresses the information needs of investors and creditors, is also positively related to the reporting firm's internal decision-making. To answer this question, we first summarize the main empirical findings on the real effects at the firm level; for more details on the variables and proxies that the respective studies use, see Appendix B (Panel A). We then turn to theoretical real effects studies.

3.1.1. Empirical findings

Most empirical real effects studies investigate the effect of financial reporting quality on the reporting firm's investment decisions. Biddle and Hilary (2006) find that a firm's financial reporting quality is positively associated with its capital investment efficiency. Extending Biddle and Hilary (2006), Biddle et al. (2009) differentiate between positive and negative deviations from a firm's predicted investments (measured with capital and non-capital expenditures) as proxies for over- and underinvestment, respectively. Biddle et al. (2009) find that high-quality financial reporting is negatively associated with both underinvestment in cash-constrained firms and overinvestment in firms with an excess of cash.

Following Biddle et al. (2009), many subsequent real effects studies use the residuals from an expected investment model as a proxy for investment efficiency. For example, using a sample of small- and medium-sized private firms in 21 emerging market countries, Chen et al. (2011) replicate the study of Biddle et al. (2009). Their findings suggest that real benefits of high-quality financial reporting exist beyond the US market, particularly for firms that do not depend much on external funding. Using a sample of Spanish firms, Gomariz and Ballesta (2014) add that debt maturity mediates the negative association between financial reporting quality and overinvestment. They show that the association between financial reporting quality and investment efficiency is stronger (weaker) for firms with a high (low) level of short-term debt.

Ramalingegowda et al. (2013) add that high-quality financial reporting is negatively associated with the likelihood that firms underinvest in order to pay dividends, particularly with respect to research and development (R&D) investments. Using a sample of listed firms from South Africa, Barth et al. (2017) find a positive association between integrated reporting quality and both firms' investment efficiency and their cash flow from operations.

Other studies examine the real effects of additional specific reports. For example, evidence reported in Bryan (1997) suggests a positive incremental effect of disclosing Management Discussion and Analysis (MD&A) information on firms' future capital expenditure efficiency. Goodman et al. (2014) investigate the effect of providing voluntary management forecasts and find that managers' forecast accuracy is positively associated with acquisitions and capital investment efficiency, supposedly because managers who provide more accurate forecasts are also better able to make efficient investment decisions.

Investigating the consequences of earnings management for firms' investment decisions, McNichols and Stubben (2008) find that firms in the US are more likely to overinvest in the misreporting period, but not after the misreporting has ended. For a sample of Chinese firms, however, Shen et al. (2015) find that the results obtained by McNichols and Stubben (2008) hold only if the regression includes outliers. Shen et al. (2015) do not find a significant association between earnings management and overinvestment when using an alternative estimation method that puts less weight on outliers. Findings by Kedia and Philippon (2009) suggest that during misreporting periods, the investment growth rates of misreporting firms are higher than the growth rates of control firms, but lower in periods following the correction of previous misstatements.

Previous research indicates that accounting conservatism is positively associated with financial reporting quality and might discipline managers (e.g., García Lara et al., 2009; Ruch & Taylor, 2015). Thus, conservatism seems relevant for firms' investment activities. Bushman et al. (2011) report evidence suggesting that firms operating in countries with more conservative accounting react more strongly to a decline in investment opportunities than firms in countries with less conservative accounting. Using a firm-level measure of accounting conservatism, García Lara et al. (2016) find a positive association between conservatism and firms' capital and R&D investment efficiency, conditional on whether overinvestment or underinvestment is likely in the industry.

Likewise, Francis and Martin (2010) report a positive association between conservatism and firms' acquisition and divestiture profitability.¹¹ Balakrishnan et al. (2016) add that investments declined less (more) sharply for firms with more (less) conservative accounting in the quarter after the beginning of the financial crisis.

In addition to studies examining the real effects of financial reporting on the firm level, a few studies investigate the real effects related to the external auditor, who can affect the credibility of the client firm's financial reporting. After controlling for the quality of the client's audited financial reports, Bae et al. (2017) report that client firms audited by Big 4 audit firms or industry specialists are more likely to invest efficiently than firms audited by other audit firms. Relatedly, Shroff (2020) shows that firms' investment efficiency is positively linked to more external capital raised if the firms' auditors receive deficiency-free reports following PCAOB inspections.¹² In contrast, Chy and Hope (2021) find that firms are more likely to reduce their R&D investments when auditor conservatism, proxied by a change in the auditor's legal liability within a US state, increases.

While most empirical studies focus on the effects of financial reporting on firms' capital input factors, only a few studies consider the consequences for labor inputs. The findings by Jung et al. (2014) indicate that high-quality financial reporting is negatively associated with firms' abnormal net hiring. In the same vein, Kedia and Philippon (2009) show that firms issuing a restatement are more likely to have a higher (lower) labor growth rate during (after) the misreporting periods than control firms have.

Finally, better financial reporting seems to be positively related to firms' innovation efficiency. Specifically, Zhong (2018) suggests that firms operating in countries with higher (lower) accounting transparency are more likely to file a larger (lower) number of patents and have more (less) citations to these patents, relative to their R&D expenditures. Chy and Hope (2021) report similar associations for firms that are audited by more conservative audit firms. For a comprehensive review on the real effects of financial reporting on innovation, we recommend the paper by Simpson and Tamayo (2020).

The studies building on Biddle and Hilary (2006) and Biddle et al. (2009) summarized above investigate real effects through the lens of imperfect markets that are characterized by information asymmetry. The findings suggest that high-quality financial reporting in the sense of a high degree of decision-usefulness for capital suppliers is an important factor in mitigating firms' financing constraints. The real investment decisions by firm managers can be interpreted as a consequence of the managers' financial reporting to the capital market.

3.1.2. Theoretical predictions

Analytical models of firm-level real effects resulting from financial reporting demonstrate the conflict between capital market price efficiency and real economic efficiency. These models show why financial reporting that provides decision-useful information for capital suppliers can distort real outcomes if the information is not incentive-useful for managers.

For example, Kanodia (2006) argues for a real effects perspective of accounting that includes not only the effect of financial reporting on the capital market, but also the feedback effect on a firm's investment decisions in the real sector. Extending early real effects studies, Kanodia

and Sapra (2016) formulate a unifying framework on how the reporting and the measurement of accruals affect firms' investments.¹³ The crucial assumptions needed for real effects to occur in the model are as follows: (1) a firm manager has relevant information that investors do not have, and (2) the shareholders' rewards (and the manager's compensation) are based on the firm's capital market price rather than on accumulated cash. One important insight of this model is that price efficiency in the capital market does not imply efficiency in the real sector because the benevolent manager prefers to choose and report an investment decision that yields short-term price effects at the capital market rather than long-term gains from efficient investments. Thus, the financial reporting regime might not be incentive-useful if the manager's compensation is tied to reporting figures that are decision-useful for capital market participants.

Consider a specific example in Kanodia and Sapra (2016). A manager's decision on how much to invest in intangible assets, relative to tangible assets, depends (1) on whether intangible assets are capitalized or expensed, and (2) on the measurement errors from misclassifying (a) operating expenses and intangibles, and (b) tangibles and intangibles. If intangibles are expensed and if accounting measurements are noisy, this can result in an inefficient ratio of tangible to intangible assets. Exploring an issue related to the differentiation between capitalizing and expensing, Lu and Sivaramakrishnan (2018) compare a firm's investment efficiency in settings in which the investments are capitalized or expensed, while considering the expected growth rates and growth volatility of assets. Lu and Sivaramakrishnan (2018) show that, absent measurement noise, capitalization incentivizes overinvestment to obtain a favorable capital market evaluation, whereas expensing induces an incentive to underinvest.

In a departure from these static real effects models, Dutta and Nezhlobin (2017) use a setting with an infinite time horizon and overlapping shareholder generations. Dutta and Nezhlobin (2017) predict that a benevolent manager's investment incentives improve in the precision of the firm's exogenous capital stock reporting. However, depending on the firm's growth opportunities, the manager's investment incentives can increase or decrease in the precision of the firm's exogenous earnings reporting. Given this trade-off, a reporting precision below the maximum induces incentives that maximize a firm's investment efficiency over time.

Considering the impact of accounting conservatism in a game-theoretic model, Laux and Ray (2020) demonstrate how accounting conservatism can be used to design an incentive-useful contract for the manager by making the investment success more verifiable. According to Laux and Ray (2020), conservatism can increase a manager's incentive to innovate (i.e., to invest in a risky long-term project), which can reduce underinvestment (exacerbate overinvestment) in innovations if the firm's initial investment threshold is below (above) the first-best investment threshold.

The studies summarized above do not explicitly model the manager's reporting decision, but other models consider that decision as endogenous. Using a two-period signalling game, Kedia and Philippon (2009) assume that managers of low- (high-) productivity firms have (no) incentives to misreport profits. In addition to the reported profits, investors can also observe firms' real hiring and investment decisions. Kedia and Philippon (2009) show that in a partially pooling equilibrium, low-productivity firms overstate their actual profits and hire and invest above the efficient level to conceal their misreporting.

There are also theoretical studies investigating the real effects of voluntary disclosure that extend the voluntary disclosure model of Dye (1985). Focusing on investments, Guttman and Meng (2021) show that

¹¹ Roychowdhury (2010) argues that the link between conservatism and future investments hypothesized in Francis and Martin (2010) is potentially incomplete and that the evidence is insufficient to infer a causal relationship.

¹² Relatedly, Bentley et al. (2021) conduct an experiment to investigate the effect of critical audit matter (CAM) reporting on investment decisions, using students and professional managers as participants. The experiment manipulates (1) whether a loan is risk-increasing or risk-decreasing, and (2) whether CAMs are disclosed or not. Their findings suggest that CAM reporting is negatively (not) associated with risk-decreasing (risk-increasing) loan issuance.

¹³ Specifically, Kanodia (1980), Stein (1989), and Kanodia and Mukherji (1996) were among the first who accounted for the real effects resulting from financial reporting in their models. For brevity, we do not consider their studies separately (see Kanodia, 2006 and Kanodia & Sapra, 2016 for a discussion).

managers, who are uncertain about the outcome of an investment opportunity, are more likely to choose an inefficient, risky investment if they can conceal their overinvestment by making misleading voluntary disclosures in the next period. The investment decision is a result of high future costs of ignorance about the expected project outcome. Furthermore, [Beyer and Guttman \(2012\)](#) show that the voluntary disclosures managers manipulate to lower firms' cost of capital can lead to subsequent overinvestment (underinvestment) by unprofitable (moderately profitable) firms. Thus, inefficient investment strategies following disclosure manipulation can lead to costly real effects.

3.2. Real effects of financial reporting at the peer firm level

Unlike the discussion of firm-level real effects in view of the decision-usefulness and incentive-usefulness of financial reporting, studies on peer firm-level real effects focus on the explanation that firm managers use the financial reports of their peers to update their beliefs about uncertain outcomes. Research has only recently started to investigate the relevance of firms' financial reporting for the real decisions of their peers. A peer firm of the reporting firm can be a competitor operating in the same product market but also a supplier or customer of the reporting firm. We understand peer effects as situations in which the actions or behavior of one party issuing a financial report affects the actions or behavior of another (peer) party, for example, when deciding on corporate investments or operations.¹⁴ Based on this definition of peer effects, we classify both studies on externalities (e.g., [Badertscher et al., 2013](#)) and those on spillovers to other firms (e.g., [Beatty et al., 2013](#)) as studies on the real effects of financial reporting at the peer firm level. See Appendix B (Panel B) for more details on the empirical studies presented in the following section.

3.2.1. Empirical findings

[Durnev and Mangan \(2009\)](#) were the first to measure the real effects of financial reporting on peers. Their findings suggest that in response to a firm's restatement announcements, industry peers adjust their investments downwards during the following three years. [Beatty et al. \(2013\)](#) complement this finding by showing that the fraudulent financial reporting of industry leaders is positively associated with their peer firms' capital investments during the misstatement periods. However, such investments are associated with lower operational cash flows than investments made in the periods before the industry leaders committed financial statement fraud.¹⁵ [Li \(2016\)](#) generalizes the findings of [Beatty et al. \(2013\)](#) by using a large sample of US enforcement cases. [Li \(2016\)](#) finds that at the industry level, firms' misstatements are linked not only to capital overinvestment by peer firms, but also to peer firms' non-capital expenditures such as R&D and advertising. Anecdotal evidence in [Sadka \(2006\)](#) further illustrates the findings of [Beatty et al. \(2013\)](#) and [Li \(2016\)](#) for a specific case: Supposedly, the fraudulent capitalization of expenses by the telecommunication firm WorldCom in 2000–2001 due to capital market pressure might have contributed to WorldCom's competitors increasing their expenditures.¹⁶

In contrast to these potentially distorting effects of fraudulent financial reporting, peer firms can learn about potential market

uncertainties from another firm's financial report. First and foremost, the availability of financial reports can contribute to beneficial real effects for peer firms. For example, [Bernard et al. \(2020\)](#) find that the quality of firms' merger and acquisition (M&A) decisions is positively associated with their download statistics of the US Securities and Exchange Commission (SEC) filings of the firm they intend to acquire. [Badia et al. \(2021\)](#) find that North American oil and gas companies are more likely to increase their capital expenditures within one year following the announcement of an increase in a peer firm's oil and gas reserves. A related study by [Badertscher et al. \(2013\)](#) suggests that private firms are more likely to exploit investment opportunities in industries with larger public firm presence. A possible explanation is that the information contained in public firms' mandatory financial reporting benefits the decision-making of private firms.¹⁷

Moreover, high-quality financial reporting of peer firms can be linked to better updating of beliefs. [Durnev and Mangan \(2020\)](#) show, for example, that peer firms' investment efficiency is positively related to the tone of a competing firm's MD&A section, particularly in large industries with low barriers to entry. In an international setting with 63 countries, [Shroff et al. \(2014\)](#) find that the financial reporting transparency of the peers of a parent firm's subsidiaries is positively associated with the parent's internal investment efficiency.

[Chen, Collins, et al. \(2018\)](#) and [Chircop et al. \(2020\)](#) investigate the relevance of accounting comparability (i.e., the difference between a firm's and its peer firm's accounting system, based on a mapping of returns onto expected earnings) for learning from peers. [Chen, Collins, et al. \(2018\)](#) find that high accounting comparability to peers positively relates to the efficiency of subsequent M&As. The findings of [Chircop et al. \(2020\)](#) suggest a positive association between accounting comparability and innovation outputs (e.g., patents and citations to patents), R&D investments, and future operating cash flows.

[Bustamante and Frésard \(2021\)](#) find evidence suggesting that firms also adjust their investments in response to changes in peer firms' investments rather than to the reported information itself. Using the investments of local peers that do not operate in the product market of the reporting firm as an instrumental variable, [Bustamante and Frésard \(2021\)](#) find that the local firm's investments are positively associated with the investments of non-local product market peers.

Unlike most studies examining the role of the availability and quality of financial reporting for competing peer firms, [Chen et al. \(2019\)](#) and [Chiu et al. \(2019\)](#) study the relation between customers' financial reporting and their suppliers' real decisions. The results of [Chen et al. \(2019\)](#) suggest that suppliers invest more efficiently if their customers' management earnings forecasts are easier to read. [Chiu et al. \(2019\)](#) find that the suppliers' investment efficiency is positively related to how informative their customers' risk factor reporting in the annual reports is.

Having reviewed the findings on the association between firms' financial reporting and peer firms' investment decisions, we now summarize studies focusing on the role of financial reporting for peer firms' production and pricing strategies. [Bernard et al. \(2020\)](#) report that peer firms are more likely to differentiate their products from their competitors' products after having acquired their competitors' SEC filings. With respect to peers' financial reporting quality, [Li \(2016\)](#) reports that peers' gross profits decline during the misreporting periods of another firm in the industry, which suggests that peers respond to other firms' misreporting by lowering their prices (assuming similar production costs

¹⁴ Equivalently, corporate decisions of one party can depend on the peer's financial reporting. [Fig. 1](#) shows these reciprocal real effects by means of the two opposing arrows between the reporting firm and its peer(s).

¹⁵ Additional analyses in [Beatty et al. \(2013\)](#) also show that analyst recommendations for peer firms were more likely to be favorable during industry leaders' misstatement periods and that the likelihood of firms entering (exiting) the industry during those periods increased (decreased).

¹⁶ There are also other factors related to capital market pressure that might have contributed to the fall of WorldCom (e.g., before 2000–2001, WorldCom made numerous acquisitions in a short time, which falls in the period of a merger and acquisition wave (see, e.g., [King et al., 2018](#))).

¹⁷ [Badertscher et al. \(2013\)](#) proxy for public firm presence by using the total sales of public firms in the industry and the proportion of public firms of all firms operating in the industry. Thus, it is not clear whether the public firms' financial reporting or simply the presence of public firms in the market explains the association. Additional analyses of the industry information channel include financial reporting information, but also other information sources (e.g., analyst forecasts and management guidance).

and quantities produced). The case of WorldCom again illustrates this point. When WorldCom committed fraud in 2000–2001 and WorldCom's competitors lowered their prices supposedly in response, this might have contributed to (unsustainably) low profit margins for the competitors in the year 2002 (Sadka, 2006).

To summarize, the empirical studies investigating the effects of financial reporting for peer firms suggest that peer firms learn from a firm's financial reports. The studies are consistent in their findings that high-quality financial reporting is linked to peer firms' efficient investments and operational decisions, whereas low-quality reporting makes inefficient real decisions more likely.

3.2.2. Theoretical predictions

Analytical studies on the peer firm level examine how peer firms learn from other firms' financial reports, update their beliefs, and subsequently adjust their real decisions. For instance, learning can be beneficial if the other firms' financial reporting reduces market uncertainty.¹⁸ Preceding their empirical analysis, Durnev and Mangen (2009) model peer firms that update their beliefs about an investment after having observed another firm's restatement. The restatement, modeled as an exogenous signal on industry demand and costs, leads peer firms to change their investment decisions in the next period. Using a Cournot competition model, Friedman et al. (2016) show that adopting a liberal or conservative reporting bias can increase the informativeness of a peer firm's report on market uncertainty for the investing firm (i.e., reduce the difference between the prior and the expected posterior variance of a firm's economic state). If the uncertainty relates to the peer firm (the whole industry), biased reporting can increase (decrease) producer surplus but decrease (increase) consumer surplus.

Assuming that a firm's investment decision signals the investing firms' private information about industry demand, Bustamante and Frésard (2021) use a sequential price-taking competition model to show how peer firms incorporate such potentially misleading but nonetheless informative signals when making their own investment decisions.¹⁹ By adopting a beauty contest game played by two firms for which beneficial complementarities exist, Arya and Mittendorf (2016) examine how firms' endogenous reporting decisions can facilitate the coordination of the two firms on similar investment levels by reducing both firm-level and industry-level uncertainty.²⁰

However, learning can also distort peer firms' decisions if firm managers misreport and take real actions to conceal their misreporting. Sadka (2006) uses a price-taking competition model to demonstrate that a misreporting firm produces above its efficient output level to conceal the misreporting, which follows from the manager's incentive for higher pay. In contrast, due to the misreporting, peer firms produce less than their efficient outputs. Consequently, according to Sadka (2006), joint producer surplus decreases by more than the increase in consumer surplus.

Related to the models on the negative consequences of misreporting on the product market, Bagnoli and Watts (2010) show that in a Cournot competition model with Bayesian updating and endogenous reporting decisions, misreporting rather than truthful reporting occurs in equilibrium. Assuming that misreporting is costly, each firm reports lower-

than-actual production costs and produces below the efficient output level, because firms underestimate each other's concurrently downward-biased reports. Consequently, under-production leads to higher product prices and higher profits.²¹

3.3. Real effects of financial reporting at the aggregate level

This section summarizes articles that examine the aggregate market effects of financial reporting. Findings at the aggregate level are, however, relatively scarce. A few empirical studies that link financial reporting quality at the industry or the country level to the allocation of resources in the real sector have been published only recently. For more details on the studies presented below, see Appendix B (Panel C).

3.3.1. Empirical findings

Few empirical studies at the industry level extend the peer firm-level mechanisms, suggesting that financial reporting provides useful information for other market participants' belief-updating and decision-making. Feng et al. (2022) show that financial reporting transparency can contribute to less persistent within-industry profitability differences (i.e., differences in profit margins and asset turnover spreads). Relatedly, Hann et al. (2020) find that high-quality financial reporting containing information on firm productivity is negatively associated with within-industry productivity dispersion across firms.

However, it is difficult to isolate financial reporting information at the industry or country level from other information sources in the accounting environment. Thus, some studies use country-level financial reporting transparency proxies, which include not only the quality and credibility of financial reports but also the dissemination of information reported by financial analysts and the media. Bushman et al. (2004) provide an extensive framework on how to construct and compose a measure of corporate transparency; this framework is used in some of the studies on the real effects of financial reporting at the aggregate level.²² Given that the financial reporting transparency measure is more closely linked to the decision-usefulness of capital suppliers, these studies attribute beneficial real effects to reduced financing frictions. Using this measure, Habib (2008) finds a positive relationship between a country's financial reporting transparency and the extent to which firms in growing (declining) industries in the respective country increase (decrease) their investments. Brown and Martinsson (2019) add that transparency is positively associated with R&D investments, scaled by a country's value added. Francis et al. (2009) compare industry growth rates across countries. Their findings indicate that growth rates move similarly for country pairs with similar financial reporting transparency. Similarly to Habib (2008), Francis et al. (2009) suggest that transparency facilitates the efficient allocation of capital across a country's industries.

Whereas the studies summarized in the previous section investigate the link between industry- or country-level measures of financial reporting quality and the allocation of resources in the real sector, a related field in the accounting and economics literature examines the relevance of aggregate earnings for the economy as a whole. Researchers generally operationalize aggregate earnings by using an equal- or value-weighted average of firm-level accounting data, for example, quarterly net income or quarterly earnings scaled by assets.

¹⁸ For further reference, Ferracuti and Stubben (2019) discuss a theoretical framework on how underlying economic uncertainty and project-specific uncertainty can affect firms' and peer firms' investment efficiencies.

¹⁹ The model precedes the empirical analysis in the study by Bustamante and Frésard (2021).

²⁰ In addition to this finding, Arya and Mittendorf (2016) show which conditions lead to endogenous reporting decisions.

²¹ Bagnoli and Watts (2010) also examine the reverse causality, that is, how product market competition (i.e., product markets with high or low profit margins and firms with similar or different cost structures) affects firms' reporting decisions.

²² The transparency measure in Bushman et al. (2004) is a composite of (1) financial reporting intensity, (2) governance reporting intensity, (3) accounting principles used to measure financial reporting, (4) timeliness of financial reporting, (5) audit quality, (6) analyst coverage, and (7) media coverage of firms.

In their review on the implications of aggregate earnings for the capital market, Ball and Sadka (2015) also cover the literature on the effect of aggregate earnings on real economic activities. Thus far, the findings indicate that aggregate earnings can predict future macroeconomic outcomes. For example, Konchitchki and Patatoukas (2014a) find that accounting for aggregate earnings is negatively associated with one-quarter-ahead nominal Gross Domestic Product (GDP) growth forecast errors of the Federal Reserve Bank of Philadelphia. Similarly, Konchitchki and Patatoukas (2014b) show that changes in aggregate firm profitability are positively associated with the next-quarter real GDP growth in the US. Findings by Shivakumar and Urcan (2017) suggest that aggregate earnings growth can be an important factor in explaining future inflation. Most probably, the reason is that firms adjust their investments upwards in response to earnings growth, which can lead to aggregate demand shifts and, as a result, to short-run price increases.

Nallareddy and Ogneva (2017) suggest that dispersion in aggregate earnings growth is linked not only to real and nominal GDP growth, but also to changes in the unemployment rate. Likewise, using US labor market data, Hann et al. (2021) regress job creation and destruction changes on aggregate earnings news and find a significant positive association. These results suggest that aggregating firm-level financial figures is informative for real economic outcomes at the country level. However, macroeconomic researchers have not yet exploited the incremental economic value from financial reporting.

3.3.2. Theoretical predictions

An early discussion on financial reporting externalities by Foster (1980) highlights that market prices incorporate the financial information from all firms in the economy. The few analytical models on the aggregate effects of financial reporting build upon Foster's (1980) argument that each firm's financial reporting entails some externality for other market participants and that price mechanisms account for this externality. These models thus suggest that market participants' belief-updating can occur indirectly when firms interact in the capital market or the input and output market rather than directly in response to the reported financial information itself.

Kanodia (1980) proposes a general equilibrium model in which an economically efficient equilibrium is characterized by jointly optimal (1) capital market prices, (2) firm investment and production decisions, and (3) consumption choices. Kanodia (1980) shows that firms respond to accounting information with better investment and production decisions, because interacting at the capital market can affect firm managers' beliefs about the 'true' economic conditions. Eventually, an economy with accounting information can attain an efficient equilibrium that differs from that of an economy without accounting on its equilibrium path.

Choi (2021) employs a general equilibrium model in which households provide labor and capital in the input market and firms compete in the product market. A firm's profit depends on the firm's uncertain productivity and the input factors chosen. Choi (2021) demonstrates that reporting accruals in addition to cash flows can reduce the reporting firm's uncertainty about its own productivity when hiring labor and deciding on how much to produce. Equilibrium wages and prices in the respective input and output market consequently lead to an efficient allocation of inputs and outputs across firms, because more productive firms can pay higher wages and produce higher quantities.

4. The role of internal controls over financial reporting

Examining the moderating effect of the reporting firm's internal controls over financial reporting on real effects is important for the following two reasons: First, efficient internal controls can increase the reliability of financial reporting. More precisely, previous research has established that high-quality internal controls are positively associated with financial reporting quality (see, e.g., Ashbaugh-Skaife et al., 2008), whereas firms with low internal control quality are more likely to restate

their earnings (Doyle et al., 2007) and have a higher risk of future fraudulent financial reporting (Donelson et al., 2017). Second, internal controls are intended to monitor and guide managerial decision-making to attain higher operational efficiency. For example, Feng et al. (2009) find that firms with effective internal controls are less likely to have management forecast errors than firms with weak internal controls. In turn, improved forecasts can contribute to a more efficient allocation of resources. For details on the studies presented below, see Appendix B (Panel D).

4.1. Empirical findings

In response to severe corporate scandals in the early 2000s, Section 404 of the Sarbanes-Oxley Act (SOX) (SEC, 2003) requires US public firms to provide an audited report on the effectiveness of their internal controls over financial reporting. The availability of Section 404 reports has facilitated empirical research on the effects of material weaknesses in internal controls on firms' investment and operating decisions in the US. By requiring firms to report their business risks, SOX Section 404 aimed to improve the decision-usefulness of financial reporting for investors and creditors. Deficient (deficiency-free) internal controls can be interpreted as a signal of low (high) financial reporting quality that supports external stakeholders in making capital allocation decisions. Thus, the reporting on internal controls follows the same mechanism as those for other financial reports, for example, relaxing the financing constraints of firms by reducing information asymmetries between firm management and capital suppliers.

Following this line of argument, Cortes (2021) shows that firms issuing a Section 404 management report for the first time are more likely to have higher R&D investments, but capital expenditures and acquisitions are less likely to be affected. Cheng et al. (2013) find a negative association between reporting an internal control deficiency and firms' investments in the year prior to the report. Two years after the reported deficiency, however, firms' investments revert to an efficient level. Lai et al. (2020) add that the negative association between reporting an internal control weakness and investment efficiency is stronger if the material weaknesses relate to firms' capital expenditures, fixed assets, or property, plant, and equipment (PPE). Importantly, Lai et al. (2020) suggest that this negative association "is not simply a manifestation of internal control quality as a proxy for corporate governance" (p. 127), as their results are robust to controlling for corporate governance characteristics like institutional ownership and financial analyst coverage.

Beyond its decision-usefulness for investors, internal control reporting can inform managers about uncertain investment outcomes or make managers aware of new information they can consequently act upon. For example, Heitzman and Huang (2019) find evidence for the argument that managers can benefit from internal control reporting when making investment decisions. Their evidence suggests that investments are less sensitive to market prices, but more sensitive to firms' own profitability if firms' internal information quality is high. Supporting the same argument, Cheng et al. (2018) and Feng et al. (2015) investigate the consequences of internal control weaknesses on firms' operational efficiency. Cheng et al. (2018) find a negative relation between internal control deficiencies and firms' operational efficiency based on an estimation of the firms' production frontiers (i.e., optimizing output to input ratios). Relatedly, Feng et al. (2015) report that inventory-related weaknesses in internal controls are negatively associated with firms' inventory turnover rates. Examining M&A decisions, Caplan et al. (2018) find that firms are more likely to book larger goodwill impairments in the three years following the report of a material weakness than in the years before the report. The authors attribute these impairments to managers making inefficient acquisition decisions in years of internal control deficiencies.

The ability to design managerial compensation contracts that incentivize efficient investment and operating decisions is also affected

by firms' internal controls over financial reporting (see, e.g., [Bushman & Smith, 2001](#) for a related discussion). A few studies investigate how the use of financial reporting as an input component in managers' compensation contracts affects firms' real outcomes. For example, [Cohen et al. \(2013\)](#) find that due to the implementation of SOX, manager compensation contracts are less likely to include incentive-pay and risk-rewarding components, which, in turn, is negatively associated with firms' investments and operating performance.²³ [Tsang et al. \(2021\)](#) show that adding Corporate Social Responsibility (CSR)-criteria to managers' compensation contracts might positively contribute to firms' innovation output, particularly in countries without mandatory CSR reporting.

The studies by [Cohen et al. \(2013\)](#) and [Tsang et al. \(2021\)](#) inform the debate on how financial reporting can be incentive-useful in the context of the classical principal-agent model.²⁴ In this vein, [Core \(2020\)](#) also discusses (but does not model explicitly) how imprecise and incomplete accounting measurements can be costly for the reporting firm because the noise in managers' incentive contracts increases, for example, because earnings undervalue long-term investments and operations. Thus, managers might require higher payment.²⁵

To summarize, the discussion of the empirical findings above shows that firms' internal controls are tied to all three channels through which real effects of financial reporting might occur at the firm level (see [Section 2](#)).

4.2. Theoretical predictions

[Gao and Zhang \(2019\)](#) investigate how investments in internal controls can discipline managers' reporting. The model in [Gao and Zhang \(2019\)](#) builds on the argument that peer pressure for earnings manipulation exists; that is, managers are more likely to manipulate if they believe that their peer firms' managers manipulate (see, e.g., [Bagnoli & Watts, 2010](#); [Einhorn et al., 2018](#)). According to [Gao and Zhang \(2019\)](#), investing in the internal control system to reduce the manager's own manipulation incentive also reduces the manipulation of peer firm managers through lower peer pressure. [Gao and Zhang \(2019\)](#) conclude that firms underinvest in internal controls because they fail to account for this positive externality.

5. The role of financial reporting regulation

This section reviews the role that regulators play in altering the real effects of financial reporting; for more details, see Appendix B (Panel E). If regulators implement measures to address the needs of capital market participants, the real effects of such regulations could be unintended.

5.1. Empirical findings

The research output on the costs and benefits of accounting regulation most likely increased in response to a call by [Leuz and Wysocki \(2016\)](#), who emphasize that the real effects of regulation remain unclear. We refer the reader to the review by [Leuz and Wysocki \(2016\)](#) for

an introduction to the research on financial reporting regulation.²⁶

Focusing on US Generally Accepted Accounting Principles (GAAP), [Dou et al. \(2019\)](#) investigate the consequences of Statement of Financial Accounting Standards (SFAS) 123R ([Financial Accounting Standards Board \(FASB\), 2004](#)) mandating that firms expense employee stock option costs rather than disclosing them in the notes. [Dou et al. \(2019\)](#) find that firms that experience cash constraints are less likely to underinvest after the adoption of SFAS 123R, whereas firms that are prone to overinvestment are less likely to be affected by the new standard. Their findings suggest that SFAS 123R is positively linked to firms' financial reporting quality, which can be associated with lower financing constraints of the reporting firms.

Other US-GAAP studies examine the real effects that relate to a change in business segment reporting following SFAS 131 ([FASB, 1997](#)). Specifically, SFAS 131 requires a more extensive and timelier reporting of quantitative and qualitative information on firms' operating segments and operating countries. Regarding the real benefits associated with SFAS 131, [Cho \(2015\)](#) finds evidence suggesting that firms with improved segment reporting are more (less) likely to allocate capital to segments with higher (lower) growth opportunities than firms without improved segment reporting. Using a similar SFAS 131 setting, [Hope and Thomas \(2008\)](#) find that no longer reporting earnings by geographic area is negatively (positively) associated with firms' profit margins (foreign sales growth). Their finding could stem from the idea that segment reporting reduces managerial empire-building incentives. The findings by [Cho \(2015\)](#) and [Hope and Thomas \(2008\)](#) hence suggest that additional segment reporting requirements not only can play an important role in mitigating agency problems by improving investors' and creditors' decision-making, but also can improve shareholders' monitoring and disciplining of managers to achieve better incentive alignment. With regard to the potential real costs of improved segment reporting, [Jayaraman and Wu \(2019\)](#) find that the investment activities of firms affected by SFAS 131 are less likely to respond to firms' respective stock market prices than those of firms that are unaffected by the standard. Supposedly, managers place more (less) emphasis on the reported information (capital market prices) when making investment decisions.

Whereas the previous findings relate to a specific reporting requirement, [Shroff \(2017\)](#) shows that the entirety of many US-GAAP changes implemented over 16 years is positively associated with capital investments, R&D, and acquisitions. In addition, [Shroff \(2017\)](#) finds that US-GAAP changes that lead to more informative reports for managerial decision-making (as measured by manual coding) have a stronger association. This finding supports the explanation that managers process newly available information and act accordingly.

We now turn to the real effects resulting from the implementation of the International Financial Reporting Standards (IFRS) in non-US countries. The evidence suggests that the similarity of reporting standards can increase the usefulness of reported financial information for managers. Regarding firm-level effects, [Gao and Sidhu \(2018\)](#) find that the country-level adoption of IFRS is negatively associated with the likelihood that a firm underinvests, but it does not negatively relate to overinvestment, relative to firms operating in non-IFRS adopting countries. [Caban-Garcia et al. \(2020\)](#) exploit the availability of cash flow reporting according to local accounting requirements before the adoption of IFRS in 15 countries and find a positive association between reporting and firms' investment efficiency. They attribute this effect to the improved accounting comparability across firms resulting from cash flow reports. Regarding peer firm-level effects, the findings of [Chen et al. \(2013\)](#) suggest that firms' investments are more likely to be efficient when their foreign industry peer firms disclose more information

²³ The empirical findings on the effect of SOX on reduced corporate risk-taking are, however, inconclusive (see, e.g., [Coates & Srinivasan, 2014](#), for a comprehensive review on the implications of SOX).

²⁴ For a general principal-agent framework and a discussion of the use of financial reporting in manager compensation contracts, we refer the reader to the literature review by [Bushman and Smith \(2001\)](#).

²⁵ A related question is whether financial reporting figures, such as earnings or cash flow, are useful for performance measurement. Theory predicts and empirical studies support the argument that performance measurements based on residual income can better align managers' incentives with those of stakeholders than other measurements (see, e.g., [Reichelstein, 1997](#); [Wagenhofer, 2003](#) for theoretical models and [Biddle et al., 1999](#); [Kleiman, 1999](#) for empirical evidence).

²⁶ [Minnis and Shroff \(2017\)](#) also consider real effects arguments when discussing the advantages and disadvantages of financial reporting and audit regulations.

in the post-IFRS period than before.²⁷ Relatedly, Shroff et al. (2014) find that financial reporting transparency at the country level and IFRS adoption itself are positively associated with the investment efficiency of subsidiaries of multinational firms. Goncharov and Peter (2019) find that both IFRS and US-GAAP reporting negatively relate to cartel duration in product markets. Studies on the implementation of IFRS thus support the argument that financial reporting can improve managers' decision-making through belief updating. Specifically, financial reports that comply with IFRS are more likely to provide both more extensive and more comparable financial information about the firm itself and its peer firms, which can facilitate information acquisition and processing.

Investigating the effects at the aggregate level, Breuer (2021) corroborates the evidence that belief-updating from peer firm financial reports is useful for managers. Specifically, Breuer (2021) exploits the differences in reporting exemption regulations based on firm size that are present in different European countries. Breuer (2021) finds that mandatory reporting is positively associated with product market competition and negatively associated with productivity dispersion among firms. Regarding the association between reporting requirements and aggregate productivity and labor productivity, Breuer (2021) reports no significant correlation.

Another strand of the literature examines the real effects of increasing the frequency of financial reporting. The evidence is inconclusive on whether a higher frequency intended to meet the information needs of investors leads to myopic managerial decisions. On the one hand, Kraft et al. (2018) show that US firms are more likely to have lower operating performance and lower investments following an increase in reporting frequency (either from annual to semi-annual or from semi-annual to quarterly). Relatedly, Fu et al. (2020) find that innovation output is negatively linked to higher reporting frequency in the US. On the other hand, Kajüter et al. (2018) find no association between investments and the implementation of quarterly reporting in Singapore. Furthermore, there is one article that studies how peer effects relate to financial reporting frequency: Fu et al. (2020) find that industry peer firms that are not mandated to report quarterly are unlikely to change their innovation output in response to other firms' quarterly reporting.

Real effects from reporting regulations can also arise outside the scope of audited financial reports. For example, patent disclosure regulations can contribute to changes in the decisions of the reporting firm and its peer firms. Evidence in Kim and Valentine (2021) suggests that firms' innovation inputs (e.g., R&D and capital expenditures) and outputs (e.g., patents and citations) increase (decrease) for firms that are likely to experience additional benefits (costs) from the introduction of the American Innovation and Patent Act (AIPIA) mandating faster patent publication.²⁸ Thus, the availability of patent disclosures can contribute to both incentive-useful and incentive-harmful effects for firm managers.

Another recent branch of the literature investigates the effects of sustainability reporting regulations (e.g., reported information about firms' CSR or Environmental, Social and Governance (ESG) performance) on the reporting firms' operating conditions. Findings on the real effects of sustainability reporting in accounting and finance journals are rare, even though the number of countries mandating such reports is

increasing, and more and more firms are voluntarily reporting such information (see, e.g., European Commission, 2021). Christensen et al. (2017), for example, show that a decline in mineworker injuries could be associated with the mandatory reporting of mine safety information in firms' SEC filings. Findings by Downar et al. (2021) suggest that the carbon emissions of UK firms decreased after the mandatory disclosure of emission levels in firms' annual reports, relative to the carbon emissions of non-reporting European firms. Chen, Hung, et al. (2018) find a negative association between mandatory CSR reporting for Chinese firms and wastewater and emission levels in those cities where many affected firms operate. The preliminary evidence reported in all three studies suggests that sustainability reporting might contribute to its intended goal of improving firms' operating conditions. Christensen et al. (2018) give a multi-faceted overview of the known consequences of mandatory sustainability reporting. The authors also discuss the research opportunities and challenges associated with implementing sustainability reporting standards.²⁹

5.2. Theoretical predictions

This section is not intended to cover the entire debate on the costs and benefits of financial reporting regulation. Instead, we summarize models that, in the spirit of Kanodia (1980, 2006) and Kanodia and Sapra (2016), include a real benefit or a real cost of financial reporting regulation. Often, these models build on the argument that financial reporting carries externalities for peer firms in the capital market (e.g., Admati & Pfleiderer, 2000; Dye & Sridhar, 2002; Foster, 1980).

Although Dye (1990) does not explicitly model the real consequences of financial reporting, he establishes a general disclosure model with externalities in which the manager's reporting decision is endogenous. Specifically, Dye (1990) compares the level of voluntarily disclosed information with the mandatory welfare-maximizing information level if (1) only financial externalities and (2) both financial and real externalities exist.³⁰ Whereas the voluntary disclosure level is similar to the welfare-maximizing mandatory disclosure level in the case of financial externalities, accounting for real externalities can lead to less (more) voluntarily disclosed information than is optimal if the real externalities are positive (negative) for the market, but negative (positive) for undiversified firms.

Considering the real consequences of voluntary or mandatory reporting regulations for firms' investment decisions, Östberg (2006) shows that partial disclosure rather than full disclosure maximizes the investment efficiency of cash-constrained firms, whereas the optimal disclosure policy is firm-specific. Laux and Stocken (2018) suggest that firms' innovation effort first increases in the stringency and enforcement of reporting standards (i.e., by reducing overinvestment) but afterwards decreases due to higher expected penalties in the case of non-compliance.

There is one further prominent model that examines how the frequency of financial reporting can affect managers' incentives and lead to real effects. Gigler et al. (2014) demonstrate that managerial short-termism can occur under a frequent financial reporting regime but not under an infrequent regime. Specifically, Gigler et al. (2014) argue that a higher reporting frequency has real benefits (e.g., by disciplining managers when they undertake unprofitable projects) but higher real costs (e.g., because managers prefer short-term over long-term investments).

Regarding segment reporting, Schneider and Scholze (2015) show that an incumbent firm in a market prefers to report aggregate information over disaggregated information even though disaggregated

²⁷ Napier and Stadler (2020) suggest that new accounting regulations can also change practices and operations within the firms (e.g., contracts, software applications, behavior) and develop a framework to analyze such real effects. Napier and Stadler (2020) apply their framework to analyze the implementation of IFRS 15, which changed the recognition of revenue from customer contracts, using interviews with professionals, comment letters, and annual reports.

²⁸ Kim and Valentine (2021) classify firms with potential spillover benefits (costs) based on the long (short) average time lag between the application for and the publication of their patents.

²⁹ For a more general discussion on the lack of consistent accounting methods and reporting principles in sustainability reporting, see Unerman et al. (2018).

³⁰ Dye (1990) defines a real externality of disclosure as an effect on the reporting firm's or its peer firms' cash flows.

information enhances the incumbent's internal resource allocation. The reason is that aggregate information can both deter entry and lead a potential entrant to adopt a less aggressive production strategy.³¹

6. Summary of the findings and avenues for future research

6.1. Firm level

Empirical evidence suggests that financial reporting quality is positively associated with the reporting firm's efficiency because it provides decision-useful information for capital suppliers. The majority of the empirical real effects studies focus on investment efficiency and find that the quality of a firm's financial reporting is positively associated with the efficiency of its capital investments, as financial reporting can contribute to reducing financing frictions (Balakrishnan et al., 2016; Barth et al., 2017; Biddle & Hilary, 2006; Bryan, 1997; Bushman et al., 2011). More precisely, high-quality financial reporting is negatively associated with both under- and overinvestment (Biddle et al., 2009; Chen et al., 2011; García Lara et al., 2016; Gomariz & Ballesta, 2014). Additionally, high-quality audits strengthen the positive association between financial reporting quality and investment efficiency (Bae et al., 2017; Chy & Hope, 2021; Shroff, 2020). Changes in financial reporting regulation, which are intended to increase the availability and quality of decision-useful information for capital suppliers, can also contribute to higher efficiency for the reporting firm by relaxing capital constraints (Caban-Garcia et al., 2020; Dou et al., 2019; Gao & Sidhu, 2018). Earnings management, in contrast, seems to be negatively associated with the efficiency of the reporting firm's capital investments (Kedia & Philippon, 2009; McNichols & Stubben, 2008). Consistent with these results, high-quality internal controls are positively associated with the reporting firm's investment efficiency (Cortes, 2021; Heitzman & Huang, 2019), whereas internal control deficiencies negatively relate to firms' investments (Cheng et al., 2013; Lai et al., 2020) and operations (Caplan et al., 2018; Cheng et al., 2018; Feng et al., 2015).

While existing research extensively investigates the effect of financial reporting quality on firms' capital investments (or a compound measure of capital, R&D, and acquisition expenditures), only a few studies disentangle how financial reporting quality links to firms' R&D investments or M&As specifically (Caban-Garcia et al., 2020; Caplan et al., 2018; Chy & Hope, 2021; Cortes, 2021; Zhong, 2018). However, doing so can provide more precise insights into the adjustments of firms' operations due to financial reporting. Furthermore, the association between the quality of a firm's financial reporting and the efficiency of its non-capital production inputs is by far less explored. There is some evidence of a positive association between financial reporting quality and the efficiency of both labor inputs (Jung et al., 2014; Kedia & Philippon, 2009) and inventory management (Feng et al., 2015), as well as the success of innovations (Chy & Hope, 2021; Zhong, 2018). One avenue for future research could thus be to provide more evidence on whether financial reporting quality also positively relates to firms' decision-making within the context of non-capital production inputs.

However, it can be difficult for empirical researchers to clearly distinguish the capital market reactions from the feedback effect of financial reporting on firms' real activities. Most empirical firm-level studies draw on information asymmetry between the firm and investors and/or creditors. This literature understands real effects as following from firms' improved or constrained access to capital. Yet the information asymmetry hypothesis does not clarify how the feedback effect from financial reporting emerges within the firm and how financial reporting affects other market participants. Only a few studies at the

firm level consider that financial reporting, particularly internal controls over financial reporting, contains useful or misleading incremental information on which managers base their real decisions (Cheng et al., 2018; Feng et al., 2015; Heitzman & Huang, 2019). A research opportunity thus lies in examining how real effects occur beyond capital constraints if financial reporting enhances a manager's information set.

Empirical research building on the information asymmetry hypothesis uses various measures of earnings quality that presuppose that managers have incentives to manipulate their firms' financial reports. In contrast, most theoretical work on the real effects of financial reporting at the firm level is primarily concerned with examining real effects that follow a firms' given financial report; thus, it (implicitly) assumes that managers do not have incentives to manipulate their financial reports (Dutta & Nezlobin, 2017; Kanodia, 2006; Kanodia & Sapra, 2016; Lu & Sivaramakrishnan, 2018). Consequently, there is a discrepancy between the assumptions in the empirical literature and those in theoretical studies. Therefore, a research opportunity for theoretical real effects studies is to examine the real consequences of financial reporting if the manager can manipulate the financial reports. Another crucial assumption in theoretical real effects models following Kanodia (2006) and Kanodia and Sapra (2016) is that managers have complete information about the expected outcomes. However, many empirical findings, both at the firm level and the peer firm level, contradict this assumption and suggest that financial reporting itself can alter managers' information sets. Future research might therefore introduce uncertainty in firm-level real effects models.

Theoretical research on the real effects of financial reporting can provide topics for future empirical investigations. Real effects models predict that if managers' incentives are aligned with capital market prices, managers will make inefficient real decisions because financial reporting is not incentive-useful (e.g., Kanodia, 2006; Kanodia & Sapra, 2016). The same is true if accounting does not measure what is intended to be measured (i.e., measurements are missing or imprecise) (Dutta & Nezlobin, 2017; Kanodia & Sapra, 2016; Lu & Sivaramakrishnan, 2018). Further, analytical models on how to design efficient manager compensation contracts that are based on reported financial figures provide additional insights on this topic and could be used as the theoretical foundation for empirical research (Bushman & Smith, 2001; Core, 2020).

While existing empirical research does control for the classical corporate governance proxies (e.g., institutional ownership, corporate governance quality scores) when regressing financial reporting quality on investments, the interaction between managers' and shareholders' incentives might provide another fruitful avenue for investigation. So far, only a few studies have focused on the real effects of specific manager pay components (Cohen et al., 2013; Tsang et al., 2021). It might be interesting to know more, for example, about the implications of integrating sustainability reporting components into manager pay.

The conflict between the decision-usefulness of financial reporting for capital market participants and its incentive-usefulness with respect to real economic decisions should also be of interest to regulators. Considering that capital market efficiency does not necessarily imply real economic efficiency, regulators might need to weigh the needs of capital market participants against real efficiency losses. For example, studies investigating financial reporting frequency suggest that more frequent financial reports might induce myopic managerial incentives (Fu et al., 2020; Gigler et al., 2014; Kajüter et al., 2018; Kraft et al., 2018). However, future research needs to reconcile the mixed findings on financial reporting frequency effects. Nonetheless, financial reporting regulation can lead to real benefits for the reporting firm, for example, if the regulator requires the manager to report disaggregated rather than aggregate information (Cho, 2015; Hope & Thomas, 2008; Schneider & Scholze, 2015), or if the regulation leads to the reporting of new information that can enhance managers' internal decision-making (Cheng et al., 2018; Feng et al., 2015; Heitzman & Huang, 2019; Shroff, 2017). Thus, future research could address the role of financial

³¹ There are more studies investigating the trade-off between aggregated and disaggregated information (e.g., Arya et al., 2010). However, those studies usually analyze the conditions that must be fulfilled for aggregated or disaggregated disclosure to be optimal for the firm.

reporting regulation for managerial decision-making beyond its role of safeguarding the credibility of financial reporting to firm outsiders.

6.2. Peer level

Regarding peer firm-level real effects research, empirical findings and theoretical predictions are consistent, implying that peer firm managers update their beliefs on uncertain market outcomes based on other firms' financial reports. Empirical studies report evidence suggesting that truthful financial reporting can benefit peer firm managers by helping them to make more efficient investments (Badertscher et al., 2013; Badia et al., 2021; Bernard et al., 2020; Durnev & Mangen, 2020) and more competitive production and pricing decisions (Bernard et al., 2020). Specifically, the peer firm managers' belief updating works better if the financial reporting signal is more precise and easier to interpret, which is positively linked to high financial reporting transparency and comparability (Chen, Collins, et al., 2018; Chircop et al., 2020; Durnev & Mangen, 2020; Shroff et al., 2014). Furthermore, the studies are consistent in suggesting that misreporting and firms' real decisions to conceal misreporting can mislead peer firm managers to incorrectly adjust their investment (Beatty et al., 2013; Durnev & Mangen, 2009; Li, 2016; Sadka, 2006), pricing, and production strategies (Li, 2016; Sadka, 2006).

The existing literature covers how peer firms interact in the product market in response to financial reporting, but the nature of peer firm interactions in the input market is still unclear. Given the result that peer firms' gross profits negatively relate to other firms' misreporting (Bernard et al., 2020; Li, 2016; Sadka, 2006), we propose testing not only whether this is the result of strategic underpricing, but also whether it is a result of production input choices. Existing research assumes that firms' production decisions remain unchanged when other firms misreport (Li, 2016; Sadka, 2006). Future research might investigate whether peer firms also respond with myopic production input choices (e.g., over-hiring, suboptimal inventory ordering, etc.) that result in higher costs of goods sold.

The usefulness of financial reporting for the decision-making of supplier firms in the input market also needs further investigation. There is some evidence that customer firms' financial reports can contribute to suppliers' investment efficiency (Chen et al., 2019; Chiu et al., 2019). Future research could explore the role of financial reporting for supplier firms in more detail. Additionally, it remains unclear how customer firms use their suppliers' financial reports for production decisions.

Measuring how and when peer firm managers process the information contained in another firm's financial report is a methodological challenge for empiricists. Most empirical studies identify peer firms based on the reporting firm's product market classification (e.g., Standard Industrial Code (SIC) code). Yet this procedure leads to only indirect evidence on whether peer firms indeed act upon the other firms' financial reports. Future research could (1) develop more innovative measures to study if and how peer firms acquire and process another firm's reported information (e.g., Bernard et al., 2020), (2) use SEC filing download statistics (Minnis & Shroff, 2017), and (3) conduct surveys with Chief Executive Officers (CEOs). It might also be useful to collect more insights from qualitative research and case studies (e.g., Minnis & Shroff, 2017), which could lead to innovative empirical research designs. It is essential to ensure that unrelated local events and industry-level effects do not confound the peer effects; an instrumental variable approach, as found in Bustamante and Frésard (2021), might solve this problem.

Another research opportunity involves integrating the findings of behavioral accounting research indicating that individuals frequently make mistakes in belief updating. Doing so would reveal under what conditions peer firms' belief-updating works best. Recent results suggest that more precise and interpretable signals are associated with stronger peer firm reactions (Chen, Collins, et al., 2018; Chen et al., 2019; Chircop et al., 2020; Durnev & Mangen, 2020; Shroff et al., 2014); these

studies provide a good starting point for future research. Furthermore, since a firm's truthful (fraudulent) financial reporting can be beneficial (harmful) for peer firm managers' decision-making, the question arises as to how peer firm managers can learn to distinguish between truthful and misleading information.

The theoretical literature on real effects on peer firms is congruent with empirical research that models financial reporting as an informative signal peer firms use to update their beliefs about the probability of an uncertain outcome (Arya & Mittendorf, 2016; Bagnoli & Watts, 2010; Durnev & Mangen, 2009; Friedman et al., 2016; Sadka, 2006). A misleading signal in the form of misreported or restated earnings can distort peer firms' real decision-making (Bagnoli & Watts, 2010; Durnev & Mangen, 2009; Sadka, 2006). It would be helpful to know more about the real effects from financial reporting that occur indirectly (i.e., if peer firms interpret a firm's real decision as an informative signal) (Bustamante & Frésard, 2021). Specifically, future research could investigate the interdependence of firms' real actions in the input and output market and their reporting decisions.

Moreover, only a few peer firm models endogenize the reporting decision (Arya & Mittendorf, 2016; Bagnoli & Watts, 2010; Sadka, 2006), which seems reasonable if firms report strategically to the capital market. In addition, most analytical models on peer firm real effects do not account for the potential misalignment of manager incentives, as proposed in firm-level real effects models. Future research could thus explore how peer firms account for and react to other firms' misaligned reporting decisions if firms' reporting choices are endogenous (see, e.g., Bagnoli & Watts, 2010).

The interaction between internal controls and peer effects of financial reporting has also received little attention. Gao and Zhang (2019) presume that peer effects can lead to underinvestment in internal controls if shareholders do not account for the positive externalities of internal control investments for peer firms when peer firms interact at the capital market (i.e., peer firms misreport to reduce their costs of capital). Future theoretical studies might investigate the externalities of firms' internal controls over financial reporting when firms compete in the input or output market. Future empirical research might try to capture the externalities of internal control systems for peer firms (the existing empirical research shows that internal control efficiency can positively affect firm-level decisions (Cheng et al., 2013; Cheng et al., 2018; Feng et al., 2015; Heitzman & Huang, 2019; Lai et al., 2020)). In line with Gao and Zhang (2019), we propose that regulators should revise their standards on internal controls and consider the externalities of internal control efficiency.

6.3. Aggregate level

Accounting and finance research on real effects measured at the industry and country level addresses the economically important question of how financial reporting facilitates the efficient allocation of resources across firms. However, results on aggregate-level real effects are scarce. Previous research shows that country-level financial reporting transparency can contribute to capital flowing from low-growth to high-growth industries because more transparent financial reporting is more useful for capital suppliers' decisions (Brown & Martinsson, 2019; Francis et al., 2009; Habib, 2008). Additionally, financial reporting (transparency) is positively associated with product market competition (Feng et al., 2022; Hann et al., 2020), which is in line with the argument that peer firms update their beliefs based on other firms' financial reports.

Financial reporting regulations positively relate to higher product market competition (Breuer, 2021; Goncharov & Peter, 2019) but negatively relate to innovation outputs (Kim & Valentine, 2021). Relatedly, theoretical models caution that a full disclosure policy and excessively stringent standards need not always lead to welfare-maximizing outcomes (Dye, 1990; Laux & Stocken, 2018; Östberg, 2006). Findings related to audit regulations are inconclusive (Breuer,

2021). However, since auditing can contribute to firm-level efficiency (Bae et al., 2017; Bentley et al., 2021; Chy & Hope, 2021; Shroff, 2020), we can expect that economy-wide real benefits from audit regulations exist. In general, economy-wide real effects of financial reporting and audit regulations are an important topic for future research, which could inform regulators about the welfare-maximizing extent of regulations. Investigating peer firm effects and market responses to financial reporting provides new insights into the debate on whether firms incur proprietary costs from financial reporting (see also Leuz & Wysocki (2016) and Minnis & Shroff (2017) for a discussion).

The empirical literature might learn from theoretical studies using general equilibrium models that there are real effects from financial reporting via capital market pricing mechanisms. Specifically, interactions in the labor or product market and in the capital market illustrate the role of financial reporting for the economy as a whole (Choi, 2021; Foster, 1980; Kanodia, 1980). However, it remains unclear how, for example, wages react to financial reporting information or whether workers (firms) incorporate such information during their job (employee) searches. Aggregated financial reporting figures are informative about macroeconomic outcomes like GDP (Konchitchki & Pata-toukas, 2014a, 2014b; Nallareddy & Ogneva, 2017), inflation (Shivakumar & Urcan, 2017), and labor growth (Hann et al., 2021; Nallareddy & Ogneva, 2017). Thus, there is likely to be a positive association between financial reporting and firms' labor and other production decisions. Tracking down where these associations come from requires further investigation.

6.4. Other market participants

As previously argued, financial reporting induces real effects in the input and output markets; these effects are relevant for other market participants. In the input market, employees are affected by the financial reporting quality of their employers, as high-quality financial reporting relates to lower over- and under-staffing (Choi, 2021; Jung et al., 2014; Kedia & Philippon, 2009). Moreover, sustainability reporting can contribute to better working conditions for employees (Chen, Hung, et al., 2018; Christensen et al., 2017; Downar et al., 2021). At the aggregate level, financial reporting might positively affect labor allocations across firms (Choi, 2021). The relationship between financial reporting regulations and labor growth is unclear (Breuer, 2021), but evidence suggests that earnings can help to predict labor market upswings and downturns (Hann et al., 2021; Nallareddy & Ogneva, 2017). Thus, accounting information might improve labor market policy-making. However, there are still many unanswered questions about how financial reporting affects the individual employee and the whole labor market.

In the output market, consumers are affected by product price decreases, which relate to higher product market competition due to firms' financial reporting (Breuer, 2021; Brown & Martinsson, 2019; Feng et al., 2022; Goncharov & Peter, 2019; Hann et al., 2020). Yet fraudulent reporting can also negatively affect consumer welfare if short-run price reductions reverse in the long run (Sadka, 2006) or if firms price above marginal cost and produce below the efficient output level (Bagnoli & Watts, 2010). Future research is needed to develop a better understanding of the consequences of financial reporting for consumers.

Appendix A

Tables A1-A3.

7. Conclusion

This review article summarizes 94 studies on the role of financial reporting for the real sector, focusing on (1) the reporting firm, (2) its peer firms, and (3) the input and output market. First, we find that most of the studies investigate real effects for the reporting firm. The findings of these studies suggest that high-quality financial reporting is positively associated with firms' investments and operations efficiency. The reporting of (in)efficient internal controls can be interpreted as a moderating factor in firms' efficiency in real decisions. Second, an increasing number of studies investigate the real effects of financial reporting for the reporting firm's peers. These studies suggest that high-quality financial reporting can improve the efficiency of peer firms' real decisions through learning. Low-quality reporting, on the other hand, can be misleading and result in inefficient real decisions by peer firms. Third, we find that only a few studies focus on the real consequences of financial reporting at the aggregate level. The findings suggest a positive association between industry- or country-level measures of financial reporting quality and the efficient allocation of resources across firms (e.g., by increasing product market competition). However, the economic implications of financial reporting for other market participants (e.g., consumers or employees) remain insufficiently explored. For example, consumers might benefit from an increase in product market competition resulting from high-quality financial reporting. Moreover, financial reporting quality positively relates to firms' labor investment efficiency, which can affect employees. Finally, we observe that an increasing number of studies investigate the real effects of accounting and auditing regulations. These studies suggest that financial reporting regulations addressing the needs of capital market participants can have unintended economic consequences for firms and other market participants in the real sector.

Our review highlights the various interactions of the reporting firm in the real sector, and we hope it stimulates accounting and finance researchers to think beyond the well-explored capital market effects of financial reporting. Finally, we believe that the existing and future insights on the real effects of financial reporting are relevant not only to the fields of accounting and finance, but also to the more general field of economics.

Declaration of competing interest

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

Data availability

No data was used for the research described in the article.

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Table A1

Keyword search procedure using the WOS database.

Step	Keywords	Number of identified publications
1	“real effect*” AND (“financial reporting” OR “financial-reporting” OR “disclosure*” OR “accounting information” OR “internal control over financial reporting” OR “internal control weakness*” OR “material weakness*” OR “financial misconduct” OR “fraudulent financial reporting” OR “financial misstatement*” OR “fraud” OR “restatement*”)	75
2	(“real effect*” OR “corporate investment*” OR “investment efficiency” OR “efficient investment*” AND (“financial reporting” OR “financial-reporting” OR “disclosure*” OR “accounting information” OR “internal control over financial reporting” OR “internal control weakness*” OR “material weakness*” OR “financial misconduct” OR “fraudulent financial reporting” OR “financial misstatement*” OR “fraud” OR “restatement*”)	230
3	(“real effect*” OR “corporate investment*” OR “investment efficiency” OR “efficient investment*” OR “R&D investment*” OR “capital expenditure*” OR “operating decision*” OR “firm* operation*”) AND (“financial reporting” OR “financial-reporting” OR “disclosure*” OR “accounting information” OR “internal control over financial reporting” OR “internal control weakness*” OR “material weakness*” OR “financial misconduct” OR “fraudulent financial reporting” OR “financial misstatement*” OR “fraud” OR “restatement*”)	372
4	(“real effect*” OR “corporate investment*” OR “investment efficiency” OR “efficient investment*” OR “R&D investment*” OR “capital expenditure*” OR “operating decision*” OR “firm* operation*”) OR “product market competition” OR “competition in product market*” AND (“financial reporting” OR “financial-reporting” OR “disclosure*” OR “accounting information” OR “internal control over financial reporting” OR “internal control weakness*” OR “material weakness*” OR “financial misconduct” OR “fraudulent financial reporting” OR “financial misstatement*” OR “fraud” OR “restatement*”)	479
5	(“real effect*” OR “corporate investment*” OR “investment efficiency” OR “efficient investment*” OR “R&D investment*” OR “capital expenditure*” OR “operating decision*” OR “firm* operation*” OR “product market competition” OR “competition in product market*” OR “resource* allocation” OR “allocation of resource*” OR “externalit*”) AND (“financial reporting” OR “financial-reporting” OR “disclosure*” OR “accounting information” OR “internal control over financial reporting” OR “internal control weakness*” OR “material weakness*” OR “financial misconduct” OR “fraudulent financial reporting” OR “financial misstatement*” OR “fraud” OR “restatement*”)	808

Note: We conducted the search on November 23, 2021. For each step, we searched for the respective keywords in the publications’ titles, abstracts, and author keywords, as well as in the WOS keywords.

Table A2

The 10 most influential original research articles and the 3 most influential literature review articles on real effects (sorted by total local citations).

Rank	Article	TLC	TLC/t	TGC
Panel A: Original research				
1	Biddle et al. (2009)	44	3.38	724
2	Biddle and Hilary (2006)	32	2.00	322
3	McNichols and Stubben (2008)	25	1.79	295
4	Badertscher et al. (2013)	22	2.44	112
5	Hope and Thomas (2008)	19	1.36	237
6	Bushman et al. (2011)	18	1.64	118
7	Cheng et al. (2013)	16	1.78	207
8	Shroff et al. (2014)	15	1.88	97
9	Shroff (2017)	14	2.80	47
10	Durnev and Mangen (2009)	14	1.08	73
Panel B: Literature reviews				
1	Leuz and Wysocki (2016)	18	3.00	336
2	Roychowdhury et al. (2019)	12	4.00	60
3	Kanodia and Sapra (2016)	8	1.33	52

Note: Total local citations (TLC) refers to the number of citations within the other 94 articles reviewed in this study. Total local citations per year (TLC/t) is obtained by dividing TLC by the study’s age. Total global citations (TGC) refers to the number of citations in any other source in the WOS database. The data were obtained on February 19, 2022 from the WOS database and analyzed using the Bibliometrix R package ([Aria & Cuccurullo, 2017](#)). We do not have data on the TLC of [Kanodia \(2006\)](#) and [Sadka \(2006\)](#); their TGCs in peer-reviewed journals are 48 and 20, respectively, according to the Dimensions database.

Table A3

The 10 most influential journals, sorted by total number of publications on real effects.

Rank	Journal	Total publications	Total citations
1	The Accounting Review	23	1,694
2	Journal of Accounting & Economics	15	1,759
3	Journal of Accounting Research	11	909
4	Contemporary Accounting Research	9	258
5	Accounting and Business Research	6	112
6	Review of Accounting Studies	5	63
7	Management Science	3	38
8	Journal of Business Finance & Accounting	2	171
9	Review of Financial Studies	2	163
10	Journal of Financial Economics	2	119

Note: The data were obtained from the WOS database and analyzed using the Bibliometrix R package ([Aria and Cuccurullo, 2017](#)). The total number of publications refers to the 94 articles analyzed in this review; the total number of citations refers to the citations received in all other publications in the WOS database.

Appendix B

Empirical studies on the real effects of financial reporting.

Author(s) (Year)	Journal	Country SampleTime	Independent variable	Dependent variable	Main result(s)
Panel A: Real effects of financial reporting at the firm level					
Bae et al. (2017)	The Accounting Review	US 41,453 firm-year observations 1992–2012	Auditor characteristics (industry specialization; audit firm size)	Investment efficiency (residuals from an expected investment model following Biddle et al. (2009))	Positive association between both industry specialization and audit firm size and investment efficiency
Balakrishnan et al. (2016)	Journal of Business Finance & Accounting	US 23,120 firm-quarter observations 2006–2008	Pre-financial crisis accounting conservatism (C-score; difference between the skewness in cash flows from operations and the skewness in earnings; timeliness of loss recognition (industry-level estimates based on Basu (1997))	Investment (capital expenditures divided by total assets)	Positive association between pre-financial crisis accounting conservatism and (early) post-financial crisis investments (i.e., sharper decline in investments given lower pre-financial crisis conservatism)
Barth et al. (2017)	Accounting, Organizations and Society	South Africa 320 firm-year observations 2011–2014	Integrated reporting quality (proprietary EY score on the quality of integrated reports)	Investment efficiency (residuals from an expected investment model following Biddle et al. (2009)); expected future cash flows; ex-post realized operating cash flows	Positive association between integrated reporting quality and investment efficiency, expected future cash flows, and realized operating cash flows
Biddle and Hilary (2006)	The Accounting Review	Cross-country tests: 34 countries 1993–2004; within-country tests: US, Japan ~15,000 Japaneses and 28,353 US firm-year observations 1975–2001	Accounting quality (earnings aggressiveness; loss avoidance; earnings smoothing; timeliness)	Investment cash flow sensitivity (cross-country tests: capital investment, scaled by beginning-of-period capital; within-country tests: difference between the cash-flow-weighted and unweighted average investment)	Negative association between accounting quality and investment cash flow sensitivity (stronger (weaker) effect for economies with more equity (debt) financing)
Biddle et al. (2009)	Journal of Accounting and Economics	US 34,791 firm-year observations 1993–2005	Financial reporting quality (discretionary accruals according to Dechow and Dichev (2002) and Wysocki (2008); financial statement readability (Gunning Fog Index (according to Li (2008))) [Financial reporting quality is interacted with a ranked variable that increases in the likelihood of overinvestment]	Investment (sum of capital expenditures, R&D expenditures, and acquisitions minus sales of PPE, scaled by lagged total assets) [Positive (negative) residuals from an expected investment classify firms as overinvesting (underinvesting)]	Negative association between financial reporting quality and both under- and overinvestment; negative (positive) association between financial reporting quality and investment when aggregate investment is high (low)
Bryan (1997)	The Accounting Review	US 250 firm observations 1990	Management Discussion and Analysis (MD&A) disclosure items (selling price changes; sales volume changes; revenue changes; cost changes; future liquidity; planned capital expenditures; known trends on prices, sales, revenues, and costs)	Future (short-term) performance measures (changes in: sales; earnings per share; operating cash flows) Investment decisions (change in capital expenditures)	Positive (no) association between prospective MD&A disclosure items and one-year-ahead (two- or three-year ahead) changes in sales, earnings per share, and capital expenditures
Bushman et al. (2011)	Journal of Business Finance & Accounting	25 countries 43,210 firm-year observations 1995–2003	Timeliness of loss recognition (country-level estimates based on Basu (1997)) [Timeliness of loss recognition is interacted with industry investment opportunities (lagged industry stock returns)]	Investment growth (ratio of current to lagged additions to fixed assets)	Positive (no) association between country-level timeliness of loss recognition and corporate investment growth for decreasing (increasing) investment opportunities
Chen et al. (2011)	The Accounting Review	21 emerging market countries 9,992 firm-year observations 2002–2005	Financial reporting quality (discretionary accruals according to Kothari et al. (2005) and Dechow and Dichev (2002)); discretionary revenues (estimates according to McNichols and Stubben (2008))	Investment efficiency (residuals from an expected investment model following Biddle et al. (2009))	Positive association between financial reporting quality and investment efficiency
Chy and Hope (2021)	Review of Accounting Studies	US 63,976 firm-year observations 1970–1998	Auditor conservatism (indicator (=1) if state-level auditor liability changes from a low- to a high-liability regime)	Corporate innovation (number of patent applications; patent citations; R&D expenditures, scaled by book value of assets)	Negative association between auditor conservatism and corporate innovation
Francis and Martin (2010)	Journal of Accounting and Economics	US 17,202 merger and acquisition	Timeliness of loss recognition (estimates based on Basu (1997))	Acquisition profitability (change in: operating performance (return on assets, cash flow from	Positive association between the timeliness of loss recognition and acquisition profitability

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Author(s) (Year)	Journal	Country SampleTime	Independent variable	Dependent variable	Main result(s)
García Lara et al. (2016)	Journal of Accounting and Economics	announcements 1997–2002 US 41,626 firm-year observations 1990–2007	Accounting conservatism (timeliness of loss recognition based on Khan and Watts (2009)) [Accounting conservatism is interacted with a ranked variable that increases in the likelihood of underinvestment]	operations); the likelihood of divestitures) Investment (sum of capital expenditures, R&D expenditures, and acquisition expenditures minus cash receipts from sales of PPE, scaled by lagged sales)	Negative (positive) association between accounting conservatism and investment for firms operating in settings prone to overinvestment (underinvestment)
Gomariz and Ballesta (2014)	Journal of Banking & Finance	Spain 576 firm-year observations 1998–2008	Financial reporting quality (discretionary revenues (estimates according to McNichols and Stubben (2008)); discretionary accruals (according to Kasznik (1999) and Dechow and Dichev (2002))) [Financial reporting quality is interacted with an indicator (=1) if the proportion of short-term debt over total debt is above the median]	Investment efficiency (residuals from an expected investment model following Biddle et al. (2009))	Positive association between financial reporting quality and investment efficiency (stronger effect if short-term debt is low)
Goodman et al. (2014)	The Accounting Review	US 948 firm-year observations 1996–2008	Managerial forecasting quality (absolute value of the difference between the management's earnings per share forecast and the actual earnings per share, divided by the current stock price)	Post-acquisition change in operating performance (changes in return on assets and cash flow from operations); post-acquisition divestitures (indicator (=1) if acquisition results in a subsequent divestiture); investment efficiency (indicator (=1) if the residuals from an estimated investment model following Biddle et al. (2009) are below the median)	Positive association between managerial forecasting quality and operating performance; negative association between managerial forecasting quality and divestitures
Jung et al. (2014)	Contemporary Accounting Research	US 44,861 firm-year observations 1983–2007	Financial reporting quality (working capital accruals (according to McNichols (2002)))	Labor investment inefficiency (residuals from an expected net hiring model) [Positive residuals from a positive (negative) expected labor investment classify firms as over-hiring (under-firing); negative residuals from a positive (negative) expected labor investment classify firms as under-hiring (over-firing)]	Negative association between financial reporting quality and labor investment inefficiency
Kedia and Philippon (2009)	Review of Financial Studies	US 2,976 firm-year observations 1997–2002	Restatement period (indicator (=1) for a restatement in the current period; indicator (=1) for a restatement in the periods before, and after)	Growth rates (growth rates of: market value; sales; number of employees; PPE; capital expenditures to PPE; total factor productivity; sales per employee)	Overinvestment and over-hiring during misreporting periods; underinvestment and under-hiring during the periods after a restatement
McNichols and Stubben (2008)	The Accounting Review	US 134,561 firm-year observations 1978–2002	Earnings manipulation (SEC or shareholder accusations; restatements; discretionary revenues)	Overinvestment (residuals from an expected investment model based on Tobin's Q and cash flows from operations, scaled by PPE)	Positive (no) association between earnings manipulation and overinvestment during (after) the misreporting period
Ramalingegowda et al. (2013)	The Accounting Review	US 41,475 firm-year observations 1994–2010	Financial reporting quality (working capital accruals (according to McNichols (2002))) [Financial reporting quality is interacted with dividends (common dividends declared, scaled by total assets)] [Above- (below-)median Tobin's Q classifies firms with high (low) growth opportunities]	Investment (sum of capital expenditures, R&D expenditures, and acquisitions minus sales of PPE, scaled by lagged total assets)	Financial reporting quality mitigates the negative association between dividends and investments; stronger association for R&D investments; stronger association for firms with high growth opportunities
Shen et al. (2015)	Journal of Empirical Finance	China 14,514 firm-year observations 1998–2010	Fraud (firm accused of disclosing false information; tunneling of controlling shareholders; earnings manipulations to avoid losses or to inflate profits); earnings management (discretionary revenues (according to Stubben (2010)); discretionary accruals (according to Kothari et al. (2005)))	Overinvestment (difference between firm investment and average industry investment); investment efficiency (residuals from an expected investment model based on Tobin's Q and net cash flows from operations)	Positive (no) association between fraud or earnings management and overinvestment or investment efficiency if estimation includes (does not include) outliers

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Author(s) (Year)	Journal	Country SampleTime	Independent variable	Dependent variable	Main result(s)
Shroff (2020)	The Accounting Review	35 countries 52,329 firm-year observations 2002–2014	PCAOB inspection of a firm's auditor (indicator (=1) for the post-PCAOB inspection and pre-PCAOB disclosure period); disclosure of a PCAOB inspection report (indicator (=1) for the post-PCAOB disclosure period) [PCAOB inspection and PCAOB disclosure are each interacted with an indicator (=1) if the PCAOB report contains an engagement-level deficiency or quality-control deficiency, respectively]	Investment (capital expenditures, scaled by lagged total assets); amount of external capital raised	Positive association between the disclosure of a (deficiency-free) PCAOB inspection report and both the auditee's investments and amount of external capital raised
Zhong (2018)	Journal of Accounting and Economics	29 countries 88,687 firm-year observations 1990–2010	Financial reporting transparency (earnings smoothing using accruals or based on the correlation between changes in accruals and operating cash flow; total accruals; use of international accounting standards; number of analysts following or analyst forecast accuracy)	Firm innovation (R&D investment, scaled by total assets; number of patents; number of patent citations); management turnover (probability of turnover estimated following a logit model according to DeFond and Hung (2004))	Positive association between financial reporting transparency and firm innovation; negative association between transparency and management turnover

Panel B: Real effects of financial reporting at the peer firm level

Badertscher et al. (2013)	Journal of Financial Economics	US 70,235 firm-year observations 2000–2010	Public firm presence (sales by public firms, scaled by total industry sales) [Public firm presence is interacted with private firms' investment opportunities (sales growth)]	Private firms' investment (gross fixed asset growth)	Positive association between public firm presence and private firms' response to investment opportunities
Badia et al. (2021)	The Accounting Review	Canada, US 395,968 firm-peer-disclosure observations 2002–2011	Mandatory disclosure of oil and gas reserves (i.e., change in disclosed reserves)	Peer's investment (capital expenditures, scaled by total assets)	Positive association between disclosure of oil and gas reserves and peers' investments
Beatty et al. (2013)	Journal of Accounting Research	US 35 accounting fraud observations; 2,305 peer firm observations 1999–2009	Fraudulent earnings overstatement (indicator (=1) for years during which a firm committed fraud)	Peer's investment (ratio of capital expenditures to lagged PPE); peer's future performance (cash flows from operations one year to three years ahead)	Positive association between earnings overstatements and peers' investments; negative association between peers' investments made in fraud periods and peers' future performance
Bernard et al. (2020)	Journal of Financial Economics	US 252,370 firm-pair-year observations 2004–2015	Information acquisition (number of downloads of peer firm j's SEC filings by firm i)	Acquisition decision (indicator (=1) if firm i acquires the peer firm j); investment similarity on the firm-pair level (change in the similarity of capital expenditures; R&D expenditures); product similarities (between firm i and peer firm j)	Positive association between the information flow between firms and their peers and subsequent acquisitions, investment similarities, and product differentiation
Bustamante and Frésard (2021)	Management Science	US 44,013 firm-year observations 1996–2001	Average investment of non-local product market peers (capital expenditures, scaled by lagged PPE) [The instrument for the investment of non-local product market peers is the investment of non-local firms in an unrelated product market]	Investment of a local firm in the same product market (capital expenditures, scaled by lagged PPE)	Positive association between a firm's investment and its peers' investments when peers operate in the same product market
Chen, Collins, et al. (2018)	Contemporary Accounting Research	US 1,307 M&A observations 1983–2009	Financial statement comparability (difference between firm's and peer firm's expected adjusted earnings based on a mapping of returns onto earnings following De Franco et al. (2011))	Future operating performance (difference between return on assets before and after the acquisition); post-acquisition divestiture (indicator (=1) if the acquiring firm has a future divestiture)	Positive (negative) association between financial statement comparability and acquisition future operating performance (post-acquisition divestiture)
Chen et al. (2019)	Contemporary Accounting Research	US 8,679 supplier-customer-year observations 1998–2011	Readability of customer's management earnings forecast reports (indicator (=1) if composite word score measure is higher than the sample median;	Supplier's investment efficiency (residuals from an expected investment model following Biddle et al. (2009))	Positive association between the readability of customers' management earnings forecast reports and suppliers' investment efficiency

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Author(s) (Year)	Journal	Country SampleTime	Independent variable	Dependent variable	Main result(s)
Chircop et al. (2020)	The Accounting Review	US 9,772 firm-year observations 1992–2006	indicator (=1) if composite length score measure is higher than the sample median) Accounting comparability to an industry peer (difference between firm's and peer firm's expected adjusted earnings based on a mapping of returns onto earnings before extraordinary items, adjusted for R&D capitalization, based on De Franco et al. (2011))	Innovative efficiency (number of patents; number of citations to patents)	Positive association between firms' accounting comparability to industry peers and innovative efficiency
Chiu et al. (2019)	Contemporary Accounting Research	US 1,829 firm-year observations 2005–2011	Informativeness of customer's risk factor disclosures (textual analysis including number of words, risk keywords, and forward-looking keywords)	Supplier's investment efficiency (categorical variable (=1, 2, 3, or 4) indicating the quartile of the ranked residuals from an expected investment model following Biddle et al. (2009))	Positive association between the informativeness of customers' risk factor disclosures and suppliers' investment efficiency (stronger effect if suppliers disclose demand risk in their own risk factor disclosures)
Durnev and Mangen (2009)	Journal of Accounting Research	US 785 restatement observations, 73,667 peer firm-year observations 1997–2002	Restatement announcements (firm's and industry peers' cumulative abnormal returns at the restatement announcement; restatement amount)	Competitors' investment (capital expenditures plus R&D expenditures, scaled by lagged total assets; benchmark-adjusted change in investment)	Negative association between restatement announcements and competitors' investments
Durnev and Mangen (2020)	Journal of Accounting and Economics	US 60,377 firm-year observations 1996–2016	Tone of industry peers' Management Discussion and Analysis (MD&A) disclosure (difference between the number of positive and negative words in a MD&A relative to its length)	Investment (capital expenditures plus R&D expenditures minus receipts from sales of PPE, scaled by lagged total assets); investment efficiency (residuals from an expected investment model following Biddle et al. (2009))	Positive association between the tone of peers' MD&A disclosure and investments or investment efficiency (stronger effect for large industries with low entry costs, and low product substitutability)
Li (2016)	The Accounting Review	US 180,633 firm-year observations 1975–2008	Misstatements at the industry level (indicator (=1) if at least one firm in the industry is subject to SEC and DOJ enforcement actions for accounting misstatements)	Peer's operating decisions (capital expenditures; R&D expenditures; advertising expenditures); peer's gross profit	Positive association between misstatements at the industry level and peers' operating expenditures; negative association between misstatements at the industry level and peers' gross profit
Shroff et al. (2014)	The Accounting Review	63 countries 32,163 parent-subsidiary-year observations 2000–2009	Transparency of the external information environment at the country-industry level (analyst coverage; press coverage; earnings transparency) [Transparency of the external information environment is interacted with subsidiary's growth opportunities (price-to-earnings-ratio)]	Foreign subsidiary's investment (change in total assets)	Positive association between the transparency of the external information environment and foreign subsidiaries' investments; positive association between transparency and foreign subsidiaries' responsiveness to growth opportunities

Panel C: Real effects of financial reporting at the aggregate level

Brown and Martinsson (2019)	Management Science	36 countries 433 industry-year observations 1990–2012	Transparency (financial transparency (composite measure based on Bushman et al. (2004)); earnings transparency (based on the aggregate measure of earnings management constructed by Leuz et al. (2003))) [Transparency is interacted with a measure of the industry's sensitivity to the information environment]	R&D intensity (R&D investment divided by value added); patenting (patent citations; patent counts)	Positive association between transparency and R&D intensity, or patenting
Feng et al. (2022)	Review of Accounting Studies	US 1,134 industry-year observations 1981–2017	Information transparency at the industry level (earnings transparency (adjusted R ² from regressing returns on earnings); disclosure quality based on Chen et al. (2015) ; analyst coverage; press coverage) [Information transparency is interacted with the industry profitability difference between the average return on assets	Within-industry profitability differences (difference in the industry profitability difference)	Negative association between industry-level transparency and the persistence of within-industry profitability differences; negative (no) association between industry-level transparency and the persistence of profit margins (asset turnover spreads)

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Author(s) (Year)	Journal	Country SampleTime	Independent variable	Dependent variable	Main result(s)
Francis et al. (2009)	Journal of Accounting Research	37 countries 666 country-year observations 1980–1990	between firms in the top and bottom 20 % of profitability] Corporate transparency at the country level (earnings opacity (earnings aggressiveness; earnings smoothing; loss avoidance); financial transparency (composite measure based on Bushman et al. (2004)))	Co-movement in industry growth rates across countries (average correlation in value-added real growth rates of the industries in any two countries)	Positive association between similar corporate transparency at the country level and the country pair's correlation of industry growth rates
Goncharov and Peter (2019)	The Accounting Review	25 countries 1,072 cartel firm-year observations (60 unique cartels) 1980–2010	Financial reporting transparency at the firm level (indicator (=1) if firms report under IFRS or US-GAAP); segment disclosure transparency (average number of segments reported by cartel firms)	Cartel duration (probability of cartel termination)	Negative association between reporting transparency (segment disclosure transparency) and cartel duration
Habib (2008)	Abacus	39 countries n.a.	Financial transparency at the country level (composite measure based on Bushman et al. (2004)); governance transparency (indicator (=1) for code law countries)	Capital allocation efficiency at the country level (investment value added elasticity (i.e., the extent to which a country increases (decreases) investment in its growing (declining) industries based on Wurgler (2000))	Positive (no) association between financial transparency (governance transparency) and capital allocation efficiency at the country level
Hann et al. (2020)	The Accounting Review	US 40,737 firm-year observations 1976–2011	Financial reporting quality with respect to firm productivity at the industry level (R^2 from regressing net operating income on net operating assets; percentage of firms with high reporting quality in terms of asset turnover (i.e., firms where (1) asset turnover and profit margin move in the same direction and (2) the absolute percentage change in asset turnover from year/t to t is below the 75th percentile))	Within-industry productivity dispersion (interquartile range; difference between the 90th and 10th percentiles; and the standard deviation of estimated firm-level total factor productivity (sales minus estimated labor, materials, and capital inputs))	Negative association between financial reporting quality with respect to firm productivity and within-industry productivity dispersion

Panel D: Real effects related to internal controls over financial reporting

Caplan et al. (2018)	Auditing: A Journal of Practice & Theory	US 4,948 firm-year observations (191 MWIC firm-year observations) 2004–2010	Material weaknesses in internal control (indicator (=1) if a firm reports a MWIC); [MWIC is interacted with newly recognized goodwill, scaled by total assets]	Low-quality M&A decisions (sum of goodwill impairments over the future three years, scaled by total assets of the first year)	Positive association between MWIC and low-quality M&A decisions (i.e., larger future goodwill impairments if firms overpay for acquisitions)
Cheng et al. (2013)	Journal of Accounting and Economics	US 13,566 firm-year observations (1,372 MWIC firm-year observations) 2004–2007	Material weaknesses in internal control (indicator (=1) if a firm reports a MWIC) [MWIC is interacted with a ranked variable that increases in the likelihood of overinvestment]	Investment (sum of capital expenditures, R&D expenditures, and acquisitions minus sales of PPE, scaled by lagged total assets in the year before, and the first and second year after the disclosure)	Negative (positive) association between MWIC and investments in the year before the disclosure for firms prone to overinvestment (underinvestment); no association between MWIC and investments in the second year after the disclosure
Cheng et al. (2018)	Contemporary Accounting Review	US 24,462 firm-year observations (4,472 MWIC firm-year observations) 2004–2013	Internal control effectiveness (indicator (=1) if a firm reports a MWIC)	Operational efficiency (ranked variable that increases in a firm's efficiency, relative to other firms in the industry, based on the firm's distance to its efficiency production frontier (sales less production inputs) obtained from data envelopment analysis following Demerjian et al. (2012))	Negative association between internal control effectiveness and operational efficiency
Cortes (2021)	Journal of Corporate Finance	US 761 firm-year observations 2005–2016	Accelerated filer (indicator (=1) if a firm filed a management report in compliance with SOX Section 404 for the first time)	Corporate expenditures (capital expenditures, R&D expenditures, acquisitions (each divided by book value of total assets))	Positive (no) association between first-time compliance to Section 404 and R&D expenditures (capital expenditures and acquisitions); positive (negative) association between first-time compliance and access to external financing (the holding of liquid assets)
Feng et al. (2015).	The Accounting Review	US 8,953 firm-year	Inventory-related material weaknesses in internal control	Inventory turnover (inventory turnover ratio (cost of sales	Negative association between inventory-related MWIC and

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Author(s) (Year)	Journal	Country SampleTime	Independent variable	Dependent variable	Main result(s)
		observations (161 inventory-related MWIC firm-year observations) 2004–2009	(indicator (=1) if a firm reports an inventory-related MWIC); revenue-related MWIC (indicator (=1) if the firm reports a MWIC over revenue recognition); other MWIC (indicator (=1) if the firm reports a MWIC other than inventory or revenue related)	divided by inventory); industry- adjusted turnover ratios)	inventory turnover; no association between revenue- related or other MWIC and inventory turnover
Heitzman and Huang (2019)	Contemporary Accounting Research	US 83,645 firm-year observations 1988–2015	Internal information quality (speed of earnings release (ranked variable that decreases in the days between the fiscal year-end and the earnings release); earnings guidance (indicator (=1) if a firm reports an earnings forecast); average earnings guidance accuracy (difference between forecasted and actual EPS), no internal control weaknesses (indicator (=1) if a firm reports no MWIC)) [Internal information quality is interacted with investment opportunities based on market prices (market-to-book asset ratio)] [Internal information quality is interacted with operating profits (earnings before extraordinary items, depreciation, and R&D expenditures, scaled by total assets)]	Investment (sum of capital and R&D expenditures, scaled by total assets)	Positive (negative) association between internal information quality and sensitivity of investment to own profitability (to market prices of investment opportunities)
Lai et al. (2020)	Accounting Horizons	US 4,207 firm-year observations (437 MWIC firm-year observations) 2004–2008	Material weakness in internal control (indicator (=1) if a firm reports a MWIC in t-1); investment-specific MWIC (indicator (=1) if a firm reports a MWIC related to capital expenditures, PPE, or fixed asset)	Investment inefficiency (absolute values of the residuals from an expected investment model in t based on Tobin's Q and net cash flows from operations, positive (negative) residuals from an expected investment classify firms as overinvesting (underinvesting))	Positive association between MWIC and investment inefficiency; stronger effect for investment- specific MWIC

Panel E: Real effects related to financial reporting regulation

Breuer (2021)	Journal of Accounting Research	26 European countries 223,924 firm-year observations plus simulated observations 2000–2015	Reporting and auditing mandates at the country-industry level (proportion of firms exceeding size-based reporting exemption thresholds; proportion of firms exceeding size-based audit exemption thresholds)	Product market competition at the country-industry level (fraction of firms entering/exiting the market; HHI; gross margin dispersion (standard deviation of gross margins); gross margin distance (difference between the 80th and 20th percentile of gross margins)); across-firm resource allocation efficiency (revenue-productivity dispersion (standard deviation of total factor productivity); revenue-productivity distance (difference between the 80th and 20th percentile of total factor productivity)); size-productivity covariance; aggregate productivity (average labor productivity; market-share weighted sum of labor productivity; labor productivity growth; total factor productivity growth)	Positive association between financial reporting mandates and both product market competition (i.e., increased entry and exit, reduced concentration) and across-firm resource allocation (i. e., reduced revenue-productivity dispersion, weakly increased size- productivity covariance); negative association between auditing mandates and market entry; unclear association between financial reporting mandates and aggregate (labor) productivity growth
Caban-Garcia et al. (2020)	British Accounting Review	15 countries 10,024 firm-year observations 1995–2004	Disclosure of operating cash flows (indicator (=1) if a firm discloses operating cash flows according to local requirements) [Disclosure is interacted with a ranked variable that increases in the likelihood of overinvestment]	Investment (capital expenditures; R&D expenditures; acquisitions)	Positive (negative) association between the disclosure of operating cash flows and investment for firms prone to overinvestment (underinvestment)

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Author(s) (Year)	Journal	Country SampleTime	Independent variable	Dependent variable	Main result(s)
Chen et al. (2013)	The Accounting Review	17 European countries 8,857 firm-year observations 2000–2009	IFRS adoption (indicator (=1) in the post-IFRS adoption period) [IFRS adoption is interacted with the ROA difference to peers (difference between firm i's and foreign peer firm j's average ROA (net income divided by total assets))] [IFRS adoption is interacted with improved disclosure by foreign peer firms (average number of additional disclosures relative to peer firms' local standards)]	Investment efficiency (change in investment (sum of capital expenditures and R&D expenditures divided by total assets)) [Cash balance and leverage above (below) median classify firms into overinvesting (underinvesting)]; residuals from an expected investment model following Biddle et al. (2009) [Negative (positive) residuals classify firms into underinvesting (overinvesting) firms]	Negative association between foreign peers' disclosure and both firm's under- and overinvestment following IFRS adoption; no association between ROA difference to peers and firm's investment efficiency following IFRS adoption
Cho (2015)	Journal of Accounting Research	US 1,391 firm-year observations 1996–2000	Segment disclosure transparency (indicator (=1) if firms change segment definitions due to SFAS 131 adoption) [Segment disclosure transparency is interacted with an indicator (=1) for the post-SFAS 131 adoption period]	Capital allocation efficiency (asset-weighted average of the ratio of segment capital expenditures to firm capital expenditures minus the ratio of segment sales to firm sales)	Positive association between segment disclosure transparency (following SFAS 131 adoption) and capital allocation efficiency
Dou et al. (2019)	Management Science	US 6,187 firm-year observations 2003–2007	Interaction of intensive use of employee stock options (ESO) (indicator (=1) if a firm's mean ESO expense, scaled by net income, is above the industry median in the pre-SFAS 123R period and SFAS 123R period (indicator (=1) for post-SFAS 123R adaption periods) [The interaction term is interacted with a ranked variable that increases in the likelihood of overinvestment]	Investment (sum of capital expenditures, R&D expenditures, and acquisitions minus sales of PPE, scaled by total assets)	Positive (no) association between SFAS 123R adoption (i.e., expensing ESO costs rather than disclosing them in the notes) and firms' investment when firms are likely to underinvest (overinvest)
Fu et al. (2020)	Journal of Law and Economics	US 9,904 firm-year observations 1951–1973	Financial reporting frequency (indicator (=1) if a firm voluntarily or mandatorily increases reporting frequency) [Financial reporting frequency is interacted with indicators (=1) for the first and second pre-frequency increase period, and the first to sixth post-frequency increase period, respectively] [Pre- and post-frequency increase period is interacted with an indicator (=1) if a firm is an industry-peer of the affected firm without a reporting frequency increase] [Subsamples classify firms with mandatory and voluntary reporting frequency increases]	Innovation output (number of patents filed; number of citations to patents received)	Negative (no) association between mandatory or voluntary financial reporting frequency and the reporting firm's (peer firms') innovation output
Gao and Sidhu (2018)	Abacus	23 IFRS-adopting countries; 17 non-adopting countries 20,396 IFRS-adopting firm-year observations; 62,328 non-adopting firm-year observations 2002–2008	Mandatory IFRS adoption (indicator (=1) if IFRS is mandatory) [Mandatory IFRS adoption is interacted with an indicator (=1) for the post-IFRS adoption period]; regulatory enforcement (indicator (=1) if the enforcement quality score based on Brown et al. (2014) is above the sample median)	Likelihood of suboptimal investment (probability of firms to underinvest, overinvest, or invest efficiently, using a categorical variable (=-1, 0, 1) that indicates the first, second and third, and fourth quartile(s) of the ranked residuals from an expected investment model following Goodman et al. (2014) to classify firms as underinvesting, efficiently investing, and overinvesting	Negative (no) association between mandatory IFRS adoption on the country level and firms' probability to underinvest (overinvest), relative to control firms in countries without mandatory IFRS adoption; stronger (weaker) association if country-level enforcement is strong (weak)
Hope and Thomas (2008)	Journal of Accounting Research	US 4,773 firm-year observations 1992–2002	Non-disclosure of geographic earnings in the post-SFAS 131 period (indicator (=1) if the firm does not report earnings for at least two foreign segments in the first two years upon SFAS-adoption)	Growth in foreign sales in the post-SFAS 131 period; foreign profit margins (pre-tax income divided by foreign sales) in the post-SFAS 131 period	Positive (negative) association between non-disclosure of geographic earnings and foreign sales growth (foreign profit margins)

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Author(s) (Year)	Journal	Country SampleTime	Independent variable	Dependent variable	Main result(s)
Jayaraman and Wu (2019)	Review of Financial Studies	US 32,324 firm-year observations 1993–2004	Interaction of mandatory increase in segment reporting (indicator (=1) if a firm discloses more segments post-SFAS 131 adoption relative to SFAS 141 periods) and SFAS 131 period (indicator (=1) for the post-SFAS 131 period) [The interaction term is interacted with Tobin's Q (market value of equity plus book value of debt, scaled by book value of assets)]	Investment (capital expenditures, scaled by fixed assets)	Negative association between mandatory increase in segment reporting and firms' sensitivity of investment to own profitability (to market prices of investment opportunities) following SFAS 131 adoption, relative to firms unaffected by SFAS 131; stronger (weaker) association for financially unconstrained (constrained) firms
Kajüter et al. (2018)	The Accounting Review	Singapore 340 firm observations (118 firms with a change in frequency) 2000–2005	Mandatory quarterly reporting (indicator variable (=1) if quarterly reporting is mandatory for the firm following a regulatory change)	Change in investments (one-year and three-year changes around the implementation in: capital expenditures, scaled by PPE; change in net fixed assets, scaled by net PPE)	No association between a switch to mandatory quarterly reporting and a change in investments
Kim and Valentine (2021)	Journal of Accounting and Economics	US 23,048 firm-year observations 1996–2005	Patent disclosure spillovers (firm's patent-weighted average patent publication lag relative to the industry average)[Top (bottom) three decile ranks classify firms as having a high likelihood of spill-in (spill-out) effects relative to the benchmark (i.e., middle decile ranked) firms] [Patent disclosure spillovers is interacted with an indicator (=1) for the post American Inventor's Protection Act (AIPA)-enactment period]	Innovative activity (number of total patent citations; average number of patent citations per patent); R&D intensity (ratio of R&D expenditures to total assets); capital expenditures (ratio of capital expenditures to total assets)	Positive (negative) association between AIPA-adoption and innovation for firms that are likely to have spill-in (spill-out) effects; positive association between relative disclosure spillovers and R&D intensity and capital expenditures
Kraft et al. (2018)	The Accounting Review	US 12,217 firm-year observations (937 firms with a change in reporting frequency) 1950–1970	Financial reporting frequency (indicator (=1) if a firm voluntarily or involuntarily increases its reporting frequency)	Operating performance (asset turnover (sales, scaled by lagged assets); return on assets (net income, scaled by lagged assets); annual sales growth (percentage change in sales)); investments (capital expenditure, scaled by total assets; change in net fixed assets, scaled by total assets)	Negative association between increased reporting frequency and both operating performance and investments
Shroff (2017)	Review of Accounting Studies	US 2,795 firm-year observations 1991–2007	Cumulative effect of a GAAP accounting change (adjustments reported in the income statement deflated by average assets following 49 US-GAAP accounting rule changes) [Cumulative effect is interacted with an indicator (=1) if standards are likely to inform managers on project profitability (based on manual coding)]	Investments (capital expenditures (cash outflow or funds used for additions to PPE minus acquisitions); R&D expenditures; acquisition expenditures, each deflated by average assets)	Positive association between the cumulative effect of accounting changes in US-GAAP and investments; stronger association when debt contracts are based on floating GAAP; stronger association when the change in GAAP is more informative for managers

Note: Some studies investigate both the real effects and the capital market effects of financial reporting. For brevity, we focus only on the real effects. We include additional analyses and sensitivity checks provided in the original publication only occasionally. We acknowledge that we thus might omit elements of the analyses some researchers consider essential.

Appendix C

Journals included in this review.

Panel A: Journals in the subfield Accounting (Total: 27)

Abacus	Foundations and Trends in Accounting (*)
Accounting and Business Research	International Journal of Accounting (*)
Accounting, Auditing and Accountability Journal	Journal of Accounting and Economics
Accounting Forum	Journal of Accounting and Public Policy
Accounting Horizons	Journal of Accounting, Auditing and Finance (*)
Accounting, Organizations and Society	Journal of Accounting Literature (*)

(continued on next page)

(continued)

Panel A: Journals in the subfield Accounting (Total: 27)	
Auditing: A Journal of Practice & Theory	Journal of Accounting Research
Behavioral Research in Accounting (*)	Journal of Business Finance and Accounting
British Accounting Review	Journal of International Accounting, Auditing and Taxation (*)
British Tax Review (*)	Journal of the American Taxation Association (*)
Contemporary Accounting Research	Management Accounting Research
Critical Perspectives on Accounting	Review of Accounting Studies
European Accounting Review	The Accounting Review
Financial Accountability and Management (*)	
Panel B: Journals in the subfield Finance (Total: 40)	
Annual Review of Financial Economics	Journal of Financial Economics
Corporate Governance: An International Review	Journal of Financial Intermediation
European Financial Management	Journal of Financial Markets
European Journal of Finance	Journal of Financial Research
Financial Analysts Journal	Journal of Financial Services Research
Finance and Stochastics	Journal of Financial Stability
Financial Management	Journal of Futures Markets
Financial Markets, Institutions and Instruments (*)	Journal of International Financial Markets, Institutions and Money
Financial Review (*)	Journal of International Money and Finance
Insurance: Mathematics and Economics	Journal of Money, Credit and Banking
International Journal of Central Banking	Journal of Portfolio Management
International Journal of Finance and Economics	Journal of Real Estate Finance and Economics
International Review of Financial Analysis	Journal of Risk and Insurance
Journal of Banking and Finance	Mathematical Finance
Journal of Commodity Markets	Quantitative Finance
Journal of Corporate Finance	Review of Asset Pricing Studies (*)
Journal of Empirical Finance	Review of Corporate Finance Studies (*)
Journal of Finance	Review of Finance
Journal of Financial and Quantitative Analysis	Review of Financial Studies
Journal of Financial Econometrics	Review of Quantitative Finance and Accounting (*)

Note: The journals we included are ranked 4*, 4, or 3 in the Academic Journal Guide 2021 published by the [Chartered Association of Business Schools \(CABS\) \(2021\)](#). Those journals not covered in the WOS database (total: 14) are marked with an asterisk (*).

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