

Determinants and Consequences of Financial Constraints: A Review of the Empirical Literature*

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Abstract

We synthesise the empirical literature on the determinants and consequences of financial constraints in the disciplines of accounting and finance, critique the findings, and offer suggestions for future research. A prolonged run of financial constraints can eventually lead to corporate failure, because a company's financial performance depends on its ease of access to external financing. Determinants of financial constraints encompass firm-level fundamental, macro-economic, and corporate governance variables, with an overwhelming majority of papers using the investment-cash flow sensitivity model for measuring financial constraints. We also review the empirical literature on the consequences of financial constraints. Financial constraints lead to higher cash holdings, less asymmetric cost behaviour, and fewer innovations. Constrained firms also use income-increasing accruals more aggressively than unconstrained firms do. Finally, financially constrained firms avoid taxes in order to produce temporary cash tax savings.

Keywords: Financial Constraints, Investment-Cash Flow Sensitivity, Corporate Governance, Financial Reporting, Cash Holdings

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I. Introduction

We present a systematic literature review of the empirical literature on the determinants and consequences of firm-specific financial constraints. We intend to provide a critical review of the existing literature, including the measurement proxies used, and to offer avenues for future research. Lamont *et al.* (2001) define financial constraints as frictions that prevent firms from funding their desired investments. In a frictional environment, investment and growth depend largely on the availability of internal capital, because the cost of raising outside capital can be high relative to that of internally generated funds. This is particularly true for financially constrained firms that face severe agency and transaction costs in accessing external capital markets (Korajczyk and Levy, 2003). Consequently, firms with attractive growth opportunities but without access to external financing may invest less in optimal value-increasing investment projects, thereby engendering lower future growth and firm value.

Determinants of financial constraints encompass firm-level fundamental, macro-economic, and corporate governance variables, with an overwhelming majority of papers using investment-cash flow sensitivity (hereinafter ICF sensitivity), and/or other investment models for measuring financial constraints. Among the firm-level variables, surveyed papers find that large firms, and firms with a proactive corporate social responsibility (CSR) commitment, face fewer financial constraints. Macro and/or country-level factors that influence firms' ease of access to finances include level of bank competition, financial liberalisation, foreign direct investment, and financial market development, among others. Corporate governance variables affecting financial constraints include ownership structure, business group affiliations, and political connections. In our review of the empirical literature on the consequences of financial constraints, financial constraints lead to higher cash holdings, less cost stickiness, and fewer innovations. Financially constrained firms are lucrative targets of bidders for acquisition. Constrained firms are also found to use income-increasing accruals more aggressively than unconstrained firms do.

The available empirical literature on the determinants and consequences of financial constraints is voluminous and has been published in journals spanning a number of disciplines. We adapted Brauer's (2006), Haleblan *et al.*'s (2009), and Schweizer and Nienhaus's (2017) approaches for selecting papers for review by identifying, reviewing, and classifying relevant works. First, by defining a review period from 1988 to the first quarter of 2021, we ensured the inclusion of all publications beginning in 1988, the year when the seminal work by Fazzari *et al.* (1988) was published. Second, we identified two research areas on which to focus our search: accounting and finance. We consciously decided to focus on those subject areas because financial constraints are studied extensively in the corporate finance domain and traditionally are measured using accounting numbers; therefore, focusing on research outputs related to these two disciplines is a natural choice. Furthermore, we chose to review papers that are empirical in nature, and researchers in finance and accounting have published the bulk

of those papers. Although financial constraints can be equally applicable to other fields, such as management and marketing, among others, scholars from those other disciplines address very different research questions.⁴ Importantly, an extension of the review beyond accounting and finance, or the interface of accounting-finance and corporate governance, would make the review unmanageable owing to the effect that financial constraints have on every facet of firms' operations. Third, we conducted a keyword search that included the search terms: constraints, financial constraints, investment cash-flow sensitivity, access to capital, cash-flow sensitivity, and cash holdings. We used these search terms to retrieve articles from EBSCOhost, Emerald Insight, Scopus, and Web of Science. To maintain the quality of this review, we included the journals that are listed in the 2019 Australian Business Deans Council (ABDC) rankings.⁵

We included working papers that (1) have been presented at top conferences, (2) have been cited one or more times by published papers, or (3) have at least one author in the author team who has published one or more papers on our topic. That process resulted in 217 papers. Next, we skimmed through the articles initially singled out and identified whether they empirically test the determinants and consequences of financial constraints, and that resulted in a total of 137 papers to be considered for this review. We excluded papers in which financial constraints are used as a control or as a moderating and/or mediating variable in explaining specific outcomes.⁶ To make the review comprehensive, we also included articles that appeared to be relevant to our review on the basis of a keyword search, but that were published in journals outside the fields of accounting and finance.⁷

The measurement of financial constraints has been, and continues to be, a thorny issue. Various alternative measurement proxies have been developed since the publication of the seminal work by Fazzari *et al.* (1988). Therefore, we expect our review to provide the following contributions. First, by producing a comprehensive survey of the determinants and consequences of financial constraints, including their measurement and the limitations thereof, we provide researchers interested in this topic with an evaluation of what has been done and

⁴ For instance, Hamilton *et al.* (2019) examine the impact of financial constraints on consumer behaviour, and Scopelliti *et al.* (2014) conduct an experimental study to explore whether financial constraints possess a threat to creativity.

⁵ ABDC ranks journals into four categories: A*, A, B, and C. We review papers published in journals ranked B and above to ensure a certain quality threshold. ABDC tends to be the more inclusive list, and so we decided to follow the ABDC ranking. The full list of ABDC rankings can be retrieved from <https://abdc.edu.au/research/abdc-journal-list/> (Accessed at the end of February 2021). Since there have been some changes (both upward and downward) in journal rankings in the 2013 and 2019 versions of the ABDC lists, we use the rankings as they appeared in 2013 and 2019. Therefore, we exclude papers from journals ranked C according to the 2013 version, although the journal may have been later upgraded to B as per the 2019 ranking (e.g., *China Journal of Accounting Research* and *Managerial Finance*).

⁶ Such as Duchin (2010) and Li and Zheng (2017).

⁷ For instance, several papers related to corporate governance and financial constraints were published in ABDC Field of Research codes 1503 (Management) and 1505 (Marketing/Tourism/Logistics). Out of the 137 reviewed papers, 90 papers belong to ABDC Field of Research codes 1501 (Accounting) and 1502 (Finance).

what needs to be done. In that respect, we offer some suggestions for future research on both the determinants and consequences of financial constraints. Second, by adopting a systematic approach to this literature review, we are able to provide unbiased empirical insights and to allow other researchers to further explore this stream of research using alternative review techniques, such as meta-analysis and/or citation analysis. In particular, future research might wish to conduct a bibliometric analysis to explore the influential publications on financial constraints.

The paper proceeds as follows. In Section II, we provide an overview of the measurement of financial constraints as applied in the existing research. Section III reviews the literature on the determinants of financial constraints. Section IV presents the literature on the consequences of financial constraints. Finally, Section 5 presents the overall conclusions we draw in our review. We critique the existing studies, where appropriate, and offer suggestions for future research in the relevant sections. We also present two comprehensive tables to provide more detailed information about the research issues, study samples, and findings of the papers reviewed in the main sections.

II. Measurement of Financial Constraints

In this section we summarise and critique some of the measures of financial constraints that are used frequently in the existing literature. This is important because the validity of the reported findings in the literature about financial constraints must be judged against the reliability of the measurement techniques applied. Despite the importance of appropriate measures, there is no consensus on which one is the best proxy for measuring financial constraints.

2.1 Measures of Financial Constraints

In a seminal paper, Fazzari *et al.* (1988) use a reduced-form investment equation (equation 1) to show that firms that use only internal financing have a high ICF sensitivity compared with mature and high-dividend-paying firms—that is, unconstrained firms:

$$(I/K)_{it} = f(X/K)_{it} + g(CF/K)_{it} + u_{it} \quad (1)$$

Here, I indicates the investment in plant and equipment for firm i during period t ; K is the beginning-of-period capital stock; X is a vector of variables; CF is the internal cash flow, capturing the sensitivity of investment due to the availability of internal financing, and u is the error term.

Much of the subsequent research supports the claim that constrained firms are those with significantly positive and relatively higher ICF sensitivity (Bond and Meghir, 1994; Carpenter *et al.*, 1994, 1998; Hoshi *et al.*, 1991; Kashyap *et al.*, 1994; Mulier *et al.*, 2016; Whited, 1992). Despite its popularity, however, this measure is also criticised for its failure to capture the

construct of financing constraints (Kaplan and Zingales, 1997; Moshirian *et al.*, 2017). Deng *et al.* (2019) document that ICF sensitivity measures investment thirst, not financial constraints. Other criticisms are that large firms show high sensitivity (Kadapakkam *et al.*, 1998), whereas less creditworthy and more-constrained firms exhibit low sensitivity (Cleary, 1999), and financially strong and high-dividend-paying firms demonstrate high sensitivity (Cleary, 2006). Chen and Chen (2012) use data from 1967 to 2006 and find that ICF sensitivity declined dramatically during that period and, in recent decades, disappeared completely. They argue that, over the previous several decades, tangible capital and investment in tangible capital as a proportion of total assets decreased, whereas intangible capital and cash-flow volatility increased. Wang and Zhang (2020) also find that cash flow decreased, whereas errors related to predictability of cash flow increased. Therefore, using ICF sensitivity as a measure of financial constraints in recent decades raises concerns about the reliability of the results thus reported.

Kaplan and Zingales (1997) use five accounting variables as a predictor of financing constraints, which Lamont *et al.* (2001) formalise as the KZ index:

$$KZ = -1.002(CF/K) + 0.283(Q) + 3.139(Debt/Capital) - 39.368(Div/K) - 1.315(Cash/K), \quad (2)$$

where CF is defined as operating income plus depreciation; Q is book assets minus book common equity minus deferred taxes plus market equity over book assets; $Debt$ is short-term plus long-term debt; $Capital$ is debt added to total stockholders' equity; Div is total annual dividend payments; $Cash$ is cash plus marketable securities, and K is beginning-of-period PPE. The primary weakness of the KZ index is that it was constructed on the basis of a small sample of only 49 U.S. firms (Chan *et al.*, 2013; Fazzari *et al.*, 2000). Another major shortcoming of the KZ index is a modelling flaw, in which the same quantitative information is incorporated as both the dependent and independent variables (Hadlock and Pierce, 2010). Cleary (1999) develops a new constraint measure (based on Altman's Z score) as follows, and the results using this model are found to be in line with the KZ index:

$$Z_{fc} = 0.2398 \textit{Current} - 0.0193 \textit{FCCov} + 0.7519 \textit{Slack} + 7.7615 \textit{NI} + 0.7519 \textit{Growth} - 4.1121 \textit{Leverage}, \quad (3)$$

where $Current$ is the current ratio; $FCCov$ is the fixed charge coverage ratio; $Slack$ is defined as [cash + short term investments + (0.50*inventory) + (0.70*accounts receivable) – short-term loans]; NI is net income deflated by sales; $Growth$ is the change in net sales divided by sales lagged one period, and $Leverage$ is total debt divided by total assets. However, Cleary's (1999) financing constraint index has received very little research attention because its underlying essence is similar to that of the KZ index, and the Z_{fc} sample includes observations with negative cash flow, which decreases the ICF sensitivity for the constrained group (Allayannis and Mozumdar, 2004).

Whited and Wu (2006) develop another accounting-based constraint measure with six components:

$$WW_{it} = -0.091 CF_{it} - 0.062 DIVPOS_{it} + 0.021 TLTD_{it} - 0.044 LNTA_{it} + 0.102 ISG_{it} - 0.035 SG_{it}, \quad (4)$$

where CF is the ratio of cash flow to total assets; $DIVPOS$ is an indicator that takes the value of one if the firm pays cash dividends; $TLTD$ is the ratio of the long-term debt to total assets; $LNTA$ is the natural log of total assets; ISG is the firm's three-digit industry sales growth, and SG is firm sales growth.

Hadlock and Pierce (2010) use firm size and age to develop the SA index (equation 5) and find that only two of the five components of the KZ index—cash flow and leverage—are related to constraints reliably.

$$SA_{it} = -0.737 SIZE_{it} + 0.043 (SIZE_{it})^2 - 0.040 AGE_{it} \quad (5)$$

In addition to firm size as a proxy measure of constraints, dividend payout is also used as a measure of financial constraints (Chan *et al.*, 2013; Chang *et al.*, 2007; Fazzari *et al.*, 1988). Another measure commonly used to separate constrained firms from unconstrained firms is credit rating (Adam, 2009; Almeida *et al.*, 2004; Kashyap *et al.*, 1994). However, Farre-Mensa and Ljungqvist (2016) suggest that none of the following identifies constrained firms—not KZ, SA, WW, dividend payout, or credit ratings—because many of the firms categorised as “constrained” following these measures are not constrained in their ability to raise external financing (both debt and equity).

The ambiguity in splitting constrained from unconstrained firms is present in other measures as well, owing to the underlying definition that researchers use for being constrained. For example, firms with lower-than-average leverage are categorised as unconstrained (Whited, 1992), based on the notion that having a large debt capacity can help a firm obtain external funds very easily. In contrast, firms with lower-than-average leverage are also considered to be constrained (Calomiris and Himmelberg, 1995) because the costs of being financially constrained would be extremely high.

Such ambiguity also remains with the use of cash holdings as a proxy for financial constraints. Kashyap *et al.* (1994) use high cash holdings as a proxy for sound financial health, whereas Almeida *et al.* (2004) document that small, non-dividend-paying firms that have low credit and bond ratings (typical characteristics of financial constraints) are likely to accumulate more cash. Calomiris *et al.* (1995) propose that high cash holdings are consistent with the precautionary motive for holding cash—that is, to avoid the high costs of financial constraints; thereby, accumulated cash could be a hedging mechanism against high cash flow volatility (Arslan *et al.*, 2006).

To overcome the limitations associated with accounting-based measures of financial constraints, researchers have developed text-based prediction models. According to Bodnaruk

et al. (2015), managers who predict the possibility of financial challenges in the foreseeable future are likely to use a more constraining tone in their 10-K filings, in order to convey their concerns to stakeholders. Bodnaruk *et al.* (2015) develop a list of 184 constraining words from all 10-K filings and use the percentage of constraining words used by a firm as a measure of its financial constraints. Hoberg and Maksimovic (2014) consider words such as *delay*, *abandon*, *curtail*, and *construction* in the 10-K Liquidity and Capital Resources subsection from MD&A as meaning “constrained”. They construct four scores on the basis of continuous-constraint variables for each firm: the “Delay Investment Score”, the “Equity Focus Delay Investment Score”, the “Debt Focus Delay Investment Score”, and the “Private Placement Focus Delay Investment Score”. In addition, some papers use survey data to compose either a dichotomous variable to classify constrained versus unconstrained firms (Berger *et al.*, 2017; Leon, 2015; Love and Martinez-Peria, 2014), or a scale variable for such a classification (Hope *et al.*, 2011).

2.2 A Critical Summary of the Financial Constraint Measures

Although there is no consensus about which of the existing measures best captures financial constraints, our review suggests that several papers incorporate multiple measures to demonstrate the robustness of their findings. However, it is interesting to observe that an overwhelming number of papers examining the determinants of being financially constrained deploy ICF sensitivity, despite the several shortcomings associated with that measure. Furthermore, the measure cannot be used in examining the consequences of being financially constrained, because it does not provide a composite financial constraint score.

Using cash holdings as a measure of financial constraints also raises concerns. The literature on cash holdings identifies several incentives for firms to accumulate cash: the trade-off, transaction, precautionary, pecking order, agency, and tax motives (Amess *et al.*, 2015). Unconstrained firms might also accumulate cash following some of these incentives. Moreover, according to Bates *et al.* (2009), there has been an increasing trend among U.S. firms to hoard cash, a move that is accompanied by a dramatic decline in net debt, thus indicating that firms may be using their accumulated cash to retire their debts. Similar concerns exist for leverage, as discussed in section 2.1.

A point of concern for text-based measurements is that such measures capture managerial tone, which can reflect managerial optimism and/or managerial conservatism. According to Bergman and Roychowdhury (2008) and Rogers and Stocken (2005), managers tend to reflect optimism about their firm’s future performance in order to attract investors. In other words, text-based measures may be biased and, hence, may fail to accurately reflect a firm’s financial health. Such a reflection of managerial tone is not captured in financial-statement-based measures of financial constraints. Researchers opting to use multiple measures of financial constraints could consider conducting their regressions on a subsample of firms that are defined as being constrained across alternative specifications—that is, on an overlapping

sample.

Because of the availability of long time-data series for calculating measures of financial constraints, empirical studies generally cover a long sample period. Thus, it is not surprising to find such long sample periods overlapping with one or several periods of economic crisis, such as the 1997 Asian Financial Crisis (AFC), the 2008 Global Financial Crisis (GFC), the 2009 European Debt Crisis (EDC), and the 2014 Shale Oil Revolution,⁸ among others. If the sample period of the surveyed papers overlaps with these crisis periods, we would expect many large and established firms to have become financially constrained, or even insolvent or bankrupt (e.g., Lehman Brothers during the GFC regime)—firms that were considered “too big to fail”. According to Rahman (1998), the AFC raised concerns over the transparency, disclosure, and reliability of financial reporting, and in that light such macroeconomic shocks could make accounting numbers a less reliable proxy for capturing financial constraints. Thus, to isolate the effect of external shocks confounding the research questions, researchers may wish to exclude crisis periods from their samples. Researchers also may wish to conduct a subperiod analysis—that is, to break the analysis into the pre-, during, and post-crisis periods—to be able to observe any variations in their findings.

An interesting question is whether existing measurements of financial constraints are generalisable to other countries, and/or to private firms, which differ in many ways from listed firms. A recent study by Schauer *et al.* (2019) uses managers’ self-assessments of their firms’ financial constraint status and finds that in a sample of European private firms, constrained firms have relatively lower ICF sensitivities. For Turkish firms, firm size and business group affiliation are found to be more appropriate measures of financial constraints (Arslan *et al.*, 2006). In China, political connections might be a proxy for ease of accessibility to external financing, thereby rendering other measures, such as cash holdings or the dividend payout ratio, to be less appropriate measures of financial constraints. Therefore, to validate their choice of financial constraint measures, we encourage researchers to consider the socio-economic environment within which firms operate.

III. Determinants of Financial Constraints

This section of the review categorises the determinants of financial constraints thematically. Three such themes are (1) firm fundamentals, (2) macroeconomic variables, and (3) corporate governance variables.

3.1 Firm Fundamentals and Financial Constraints

At the firm level, firm age, firm size (Arslan *et al.*, 2006; Beck *et al.* 2006), dividend

⁸ Prior to the Shale Oil Revolution, the price per barrel of oil ranged between \$90 and \$120. However, increased oil and gas production from shale in the U.S., accompanied by a declining demand in emerging countries, subsequently led to a drop in the oil price to as low as \$30 per barrel.

payouts (Fazzari *et al.*, 1988), and cash holdings (Almeida *et al.*, 2004; Arslan *et al.*, 2006; Bates *et al.*, 2009) have been used as predictors of financing obstacles. Dhole *et al.* (2019) document that efficient management of working capital decreases the likelihood of firms suffering from financial constraints for as long as two years into the future. Older, larger, and foreign-owned firms report less financing obstacles, whereas agricultural, non-listed, domestically owned, and government-owned firms exhibit relatively higher levels of constraint (Beck *et al.*, 2006). Although during the GFC period some large firms collapsed and some suffered financial constraints, almost all studies conclude that typically, large firms are relatively less constrained financially. The question then is *why* large firms are less financially constrained. Is it only because they exhibit less information asymmetry? One reason could be that large firms can appoint fairly able CEOs and CFOs who are more skilled, experienced, knowledgeable, resourceful, or (politically) connected, making those large firms less constrained. Similarly, large firms have a better reputation in the market and, because they have more to lose than small firms do, their managers may be more risk averse. In addition, large firms may find it easier to abide by corporate governance policies and to attract and appoint more non-executive directors, all of which are advantages that should result in better monitoring and easier access to financing.

Fazzari *et al.* (1988) and Bassetto and Kalatzis (2011) find that the investment decisions of financially constrained firms are relatively sensitive to cash flows. In contrast, Kaplan and Zingales (1997), Cleary (1999), and Agung (2000) show that unconstrained firms exhibit greater ICF sensitivity than their constrained firm counterparts do. Yang *et al.* (2009) find that NASDAQ-to-NYSE switchers experience significantly lower ICF sensitivity, probably owing to the higher visibility, liquidity, and reputation of the NYSE compared with the NASDAQ exchange. Whether such a switch would confer benefits for other stock exchanges and, if so, which features of those stock exchanges would result in relaxing constraints, could be an avenue for future research. Tam (2014) finds that listed (unlisted) firms' carve-outs⁹ have lower (higher) financial constraints. Listed parent firms must provide audited financial statements to stakeholders, thus making their stakeholders better-informed about the impact of the transactions between the parents and the carve-out entity. Greater transparency reduces the cost of external financing and, thus, makes the carve-out entity of listed parents less constrained.

Hope *et al.* (2011) find that externally audited private companies are less financially constrained than their non-externally-audited counterparts are. External auditing assures the credibility of financial reporting by mitigating adverse selection and moral hazard problems arising from information asymmetry (Watts and Zimmerman, 1986) and, thus, can ease financing constraints. Furthermore, that effect is found to be more pronounced in the presence

⁹ Equity carve-outs occur when a parent firm sells a minority stake in one of its private units to the public through an initial public offering (IPO) but retains the majority ownership and lists the carved-out unit on an exchange.

of a controlling shareholder, and especially so in countries with weak investor protection rights. Whether the reputation of the auditor or auditing firm mediates the documented association was not addressed. Private firms that have appointed external auditors are also likely to have been in business for an extended period of time (i.e., are older firms) and to be large in size—two features that equip them to afford external auditors. Hence, appointing an external auditor might signal financial health to investors, and that, in turn, could result in easy access to external financing. Therefore, use of an external auditor may not be the appropriate proxy for financial reporting credibility. Bayar *et al.* (2018) document that both tax management and tax sheltering increase firms' financial constraints.

3.2 Macroeconomic Determinants of Financial Constraints

At the macroeconomic level, firms in countries with higher levels of financial intermediary development, stock market development, and legal system efficiency, and higher GDP per capita, report fewer obstacles to obtaining financing (Beck *et al.* 2006). A country's level of intensity for bank competition is known to increase firm-level financial constraints (Alvarez and Bertin, 2016, in the context of six Latin American countries), and Ryan *et al.* (2014) report a similar result for 20 European countries. This finding is consistent with the "information hypothesis", which states that owing to the presence of information asymmetry between banks (lenders) and firms (borrowers) and the resulting agency costs, a higher level of banking competition disincentivises banks from building long-term lending relationships and therefore results in increased constraints on financing. This finding is inconsistent with the "market power hypothesis", which assumes that higher competition leads to lower interest rates, which, in turn, allow for easy access to capital. Ratti *et al.* (2008) find support for the latter hypothesis.¹⁰ Harhoff and Korting (1998) reveal that German firms in city areas tend to be more constrained compared with firms in fringe and rural areas.

Laeven (2003) finds that, in developing countries, small firms become less financially constrained after financial liberalisation, whereas large firms become more constrained.¹¹ The rationale behind this finding is that whereas preferential credit gives large firms easy access to financing prior to financial liberalisation, such arrangements decrease after financial liberalisation, and that decrease enables an efficient allocation of funds by removing interest rate ceilings and directed credit programs. The extant literature contains mixed evidence on this issue, however. Laeven's (2003) finding for 13 developing countries is consistent with Gelos and Werner's (2002) results for the Mexican market, and Chan *et al.* (2012a) show that, owing to financial reform, large firms become more constrained in China. However, Harris *et al.* (1994) and Gallego and Loayza (2001) find positive relationships between financial

¹⁰ Love and Martínez-Peria (2014) and Leon (2015), using a survey-based measure, also find support for the "market power hypothesis".

¹¹ The objective of financial linearisation or deregulation is both to increase the supply and to improve the allocation of funds for investment (Laeven, 2003).

deregulation and financial constraints in Indonesia and Chile, respectively, although Harris *et al.* (1994) did not consider the moderating effect of firm size in their study. Jaramillo *et al.* (1996) find no relationship at all in Ecuador. Berger *et al.* (2017) find that small banks are able to alleviate financial constraints for small and medium-sized enterprises (SMEs), and that advantage becomes more prominent during adverse economic conditions. Love (2003) shows that firms in highly financially-developed regions face lower financial constraints.¹² Hu *et al.* (2017) obtain similar results for high-tech Chinese firms. In addition, ICF sensitivity increases during periods of financial crisis (Arslan *et al.*, 2006).

Foreign direct investment (FDI) has been linked to national growth and productivity, as a result of technology spillover and foreign multinational competition, which work as monitoring mechanisms. Foreign direct investment is also known to constrain overinvestment-induced agency problems and to decrease financial constraints for both high-income and low-income countries, although the effect is more pronounced for the latter group (Harrison *et al.*, 2004; Wang, 2017). Harrison *et al.* (2004) show that restrictions on capital account transactions negatively affect financial constraints, but such restrictions have no impact on repatriation requirements for exporters. Wang (2017) also finds that FDI decreases the financial constraints of host-country firms, but it does so through the credit channels—that is, as a result of multinational competition, the loss of profit tightens borrowing and restricts the availability of external funds. Bellone *et al.* (2010) find that firms entering the foreign market through exporting are less financially constrained, because exporting incurs a significant sunk cost and thus strains the financial health of constrained firms and makes it less cost-effective for them to engage in exporting. Bernini and Montagnoli (2017) investigate the relationship between competitive pressure and financial constraints from both the supply and demand perspectives. On the demand side, firms operating in a competitive environment may require greater external funding for innovative endeavours, because those firms have low markup and profits and, as a result, insufficient internal funds. On the supply side, lenders may place a high risk of default on the constrained firms, thereby endangering the firms' chances of securing external financing. Following this notion, Bernini and Montagnoli (2017) confirm that the probability of a firm being financially constrained tends to be affected by the level of competition faced by the firm.

3.3 Corporate Governance Determinants of Financial Constraints

Corporate governance is a set of mechanisms through which outside investors protect themselves against expropriation by insiders (Shleifer and Vishny, 1997). Weak corporate governance creates an opportunity for controlling shareholders and managers to benefit from a company, at a cost to noncontrolling shareholders. Hence, corporate governance has been

¹² Similarly, Khurana *et al.* (2006), using modified cash holding as a measure of constraint, find that firms from financially underdeveloped countries exhibit a greater CF sensitivity of cash, because financial development eases financing constraints by improving firms' access to lower-cost, external financing.

one of the most discussed topics among researchers and policy-makers alike, and the role of corporate governance in mitigating financial constraints is relevant to our review.

Francis *et al.* (2013) document an increase in financial constraints in response to poor firm-level corporate governance in emerging markets, and that increase is more pronounced when the home country has weak investor protection. The firm-level governance index used in their study is based on the scoring of six factors: management discipline, transparency, independence, accountability, responsibility, and fairness. However, what is not clear from the study is whether any particular governance factor(s) impact financial constraints more than others do, and whether foreign ownership plays a mediating factor in the relationship between firm-level governance and constraints. According to Malik *et al.* (2021), the voluntary adoption of a board risk committee (BRC) can decrease financial constraints, owing to improved risk oversight and better governance practices. The authors find that the characteristics of BRCs, such as size, and the presence of financial experts and female directors, mitigate the risk of financial constraints. In addition, the authors find significant indirect effects of BRCs on the risk of financial constraints through a reduction in information asymmetry and agency costs.

Foreign-owned firms can attract both local and international investors and can access additional funds through and from a parent company; hence, they are not credit-constrained (Poncet *et al.*, 2010) and exhibit better export performance (Manova *et al.*, 2015). Chen *et al.* (2017) find that Chinese target firms suffer from financial constraints prior to acquisition, but the financial constraints are eased in the post-acquisition period for domestic and foreign-owned targets, owing to better access to both domestic and international capital markets. In addition, foreign acquisitions increase target firms' productivity and level of R&D investment. An interesting scope for future study would be to see whether the announcement of a merger or acquisition has any impact on a target firm's financial constraints. For instance, investors, or the market, might take the announcement of a merger or acquisition as a positive indicator, and confidence in the firm would increase, resulting in the provision of capital at a low cost. One reason that firms merge or are acquired is to benefit from synergy. If acquisition by another firm can cause a target firm's financial constraints to decrease, the impact on the financial health of an acquired firm is worth investigating. One possible explanation would be that acquisition of the target firm by a healthy firm may simply decrease the target firm's financial constraints, or alternatively, the decrease in constraints may result from a change in top management. The strength of the acquiring firm's reputation may also play a mediating role in decreasing the target firm's financial constraints.

Evidence from research on the association between family ownership of a firm and financial constraints is mixed. Documentation of family ownership exerting an adverse effect on financial constraints is available in the studies by Hanazaki and Liu (2007), Hung and Kuo (2011), and Peruzzi (2017), who find that concentrated family ownership and active

involvement of a family CEO in firms' day-to-day business result in a greater likelihood of wealth expropriation. In contrast, Andres (2011) finds that family firms are not financially constrained (as proxied by firm size and dividend payouts), because family ownership decreases agency costs and mitigates information asymmetry. It is also possible that founding family members and/or CEOs of large family firms are better connected with banks and/or politicians, who then can help them access external capital easily. Lin *et al.* (2011) document that U.S. firms with corporate insiders who have larger excess control rights are likely to be constrained. That relationship is more pronounced for firms with a high degree of informational opacity and for firms with financial statement misreporting and is moderated by institutional ownership.

Business group affiliations are found to be negatively associated with financial constraints. Business groups, comprising independent firms connected through formal and informal relationships (George *et al.*, 2011), are known to help affiliated firms overcome financial constraints (Saidani *et al.*, 2017), because such firms can derive benefits from internal capital markets (Deloof, 1998; Lensink *et al.*, 2003). Interestingly, Hoshi *et al.* (1991) and Kato *et al.* (2002) find that group-affiliated firms are less financially constrained than their unaffiliated counterparts in Japan are, whereas Shin and Park (1999) find the opposite in Korea. The variation in findings could result from different country-level settings—for example, Japanese group-affiliated firms are less centralised and operate through more informal networking than their Korean counterparts do (Shin and Park, 1999). George *et al.* (2011) document that both group-affiliated and unaffiliated firms in India exhibit high ICF sensitivity, which perhaps can be explained by Khanna and Palepu's (2000) finding that the firm performance of group-affiliated firms in India declines initially, but increases subsequently once group diversification exceeds a certain level. Therefore, with such varied evidence to date, future studies on business group affiliations should either control for the level of diversification or check the mediating role of diversification.

The political connections that corporations form and maintain are pervasive (Faccio *et al.*, 2006; Faccio, 2010), because such connections allow firms to have preferential access to borrowing and many other benefits (Faccio *et al.*, 2006; Khwaja and Mian, 2005, among others). Political connections can decrease the costs of market friction, and that cost reduction, in turn, reduces financial constraints. Furthermore, politically connected firms often have easy access to external financing because of increased investor confidence that stems, in part, from an implicit government guarantee for bailouts. Similarly negative relationships between political connections and financial constraints are documented by Poncet *et al.* (2010), Cull *et al.* (2015), Shen and Lin (2016), and Deng *et al.* (2019). In addition, Chan *et al.* (2012b) find that non-politically-connected family firms suffer more financial constraints than unconnected state-owned firms do. Sun and Jiang (2015) find a beneficial effect from connections with central and provincial governments: benefits that are related to loan

sanctions. However, connections with parties who rank below the provincial-level government apparently do not confer added benefits. All of the extant studies on political connections have been conducted in the Chinese setting, however, so it would be interesting to test the effects of political connections in settings that are legally and institutionally different from those in China. If political connections can mitigate financial constraints, as the aforementioned empirical studies have documented, then why do all firms not hire CEOs or top managers with good political connections? Is it because the cost associated with maintaining political connections outweighs the benefits derived from them? Future research could address the cost-benefit analysis of political connections in relation to financial constraints.

Jiang *et al.* (2019) find that firms possessing a corporate culture of high integrity have a low sensitivity to ICF, because such firms can build trust with capital providers. A culture of high integrity is characterised by individuals who honour contracts and adhere to regulations (Jiang *et al.*, 2019). Social capital and social trust, two broader constructs that can shape corporate culture, could also affect the degree of firms' financial constraints. Firms in regions of high social capital are found to be less financially constrained (Habib and Hasan, 2017). Because social capital reflects the degree of mutual trust and altruism in a society, the social norms of high social-capital regions may induce managers to behave more honestly (Guiso *et al.*, 2004). Both equity and debt providers consider that in regions with high social capital, managers are unlikely to behave opportunistically, and this reduces the moral hazard problem and encourages investors to charge lower financing costs, thereby reducing financial constraints. Whether social trust affects financial constraints, however, has remained unexplored.

Top managers are responsible for the sound strategies, investment decisions, and financing that underpin a firm's performance (Bertrand and Schoar, 2003; Hambrick and Mason, 1984). Despite the importance of top management in shaping corporate policies, we have found little empirical evidence on whether the composition of a firm's senior management team affects the firm's financial constraints. For example, overconfident CEOs are found to make suboptimal investment decisions (Malmendier and Tate, 2005, 2008), which could affect a firm's financial health adversely. Given the lack of such evidence, we do not know whether the boards of constrained firms choose to replace their overconfident CEOs with someone who has a history of reviving financial health.

Cheng *et al.* (2014) conclude that corporate social responsibility leads to better stakeholder engagement and transparency, which in turn result in fewer capital constraints. According to Attig *et al.* (2014), CSR can reduce capital market imperfections and improve firms' financial status. However, the impact of CSR on firm-level financial constraints is not homogeneous. Zhao and Xiao (2019) document that the effects of CSR in mitigating financial constraints are applicable only for firms in the growth, mature, or declining stages of their life

cycle. Xiao and Wang (2020) discover a marked increase in the severity of financial constraints of heavily polluting firms since the issuance of China's environmental policy.¹³ Because CSR and social capital are components of governance, future research should address the governance-constraints relationship by using a more holistic model that incorporates CSR and social capital. Perhaps firms operating in regions with high social capital engage in higher CSR activities and, thus, experience lower constraints. Alternatively, firms in regions with high social capital may have better employee relations due to higher investment in employee development, and that, in turn, creates employee loyalty and goodwill in the market and, thus, enables those firms to access financing with ease.

Table 1 summarises the surveyed papers chronologically, beginning with the oldest. The table details the papers' research question(s), country and sample observations, summarised findings, economic significance of reported findings, and thematic categorisations. However, the number of papers included in the table does not match precisely the number of papers that we reviewed—for instance, we do not include working papers in the table, and we leave out some of the measurement-related papers. As the table reveals, very few studies actually report the economic significance of their findings, despite Dyckman and Zeff's (2014) call to report the economic significance of the main variable(s) of interest explicitly. Furthermore, many of the reported findings could be statistically significant but not economically so. We consider these issues to be a major shortcoming of the existing research, and we encourage future researchers to provide both the statistical and economic impacts of their findings. This plea also extends to research on the consequences of financial constraints.

Table 1 Determinants of Financial Constraints

Author(s)	Research Question(s)	Sample/Countries	Measurement of Constraint	Findings	Economic Significance ¹⁴	Theme
Hoshi <i>et al.</i> (1991)	ICF sensitivity of firms with strong and weak ties with banks	Japan: 121 group-affiliated firms and 24 independent firms between 1977 and 1982	ICF sensitivity	Independent firms are financially constrained, because group-affiliated firms have the advantage of low informational opacity.	None	Corporate governance
Harris <i>et al.</i> (1994)	Impact of financial liberalisation on capital structure and investment decisions	Indonesia: 2,970 firms from 1981 to 1988	ICF sensitivity	Financial liberalisation has a favorable impact on the performance of smaller establishments and aids reallocation of domestic credit toward smaller establishments.	None	Macro-economic
Jaramillo <i>et al.</i> (1996)	Financial market liberalisation and financial	Ecuador: balanced panel of 420 firms from 1983 to	Euler model of investment	Financial liberalisation in Ecuador has failed to ease financial constraints faced by small firms when making	None	Macro-economic

¹³ The Chinese government has issued a number of environment policies, such as Administrative Regulations on the Levy and Use of Pollutant Discharge Fees (2003), Law on the Prevention and Control of Environmental Pollution by Solid Waste (2004), Law on Energy Conservation (2007), and Measures on Open Environmental Information (2007). These policies, however, proved ineffective until the issuance of "Administrative Measures on Use of China Environmental Labeling" in 2008 (Xiao and Wang, 2020).

¹⁴ "None" implies the study did not examine economic significance.

	constraints	1988		investment decisions.		
Kaplan & Zingales (1997)	ICF sensitivity and financial constraints	U.S.: 49 firms between 1970 and 1984	a) Dividend payout b) Stock repurchases c) Qualitative information from annual reports	Financially unconstrained firms tend to exhibit significantly greater ICF sensitivities.	None	Firm level
Harhoff & Korting (1998)	Firm-bank relationships and their impact on the collateral requirements	Germany: 1509 SMEs for 1997	Survey	Firms in city/counties tend to be more constrained compared with firms in fringe and rural areas.	None	Macro-economic
Cleary (1999)	Firm creditworthiness, financial constraints, and investment	U.S.: 1,317 firms from 1987 to 1994	Altman's Z score	Firms with high creditworthiness or that are least constrained demonstrate higher ICF sensitivity.		Firm level
Deloof (1998)	Association between corporate group affiliations and financial constraints	Belgium: 1,041 private firm from 1987 to 1991	ICF sensitivity	Corporate group-affiliated firms are financially unconstrained.	None	Corporate governance
Shin & Park (1999)	ICF sensitivity of conglomerates versus nonconglomerates	Korea: 123 conglomerate firms and 194 non-conglomerates between 1994 and 1995	ICF sensitivity	ICF sensitivity is low and insignificant for conglomerate firms, but it is high and significant for non-conglomerate firms. However, a conglomerate firm's investment is significantly affected by the cash flow of other firms within the same group.	None	Corporate governance
Gelos & Werner (2002)	Association between financial liberalisation and credit constraints	Mexico: Balanced panel of 1046 firms from 1984 to 1994	ICF sensitivity	Financial liberalisation relieves financial constraint for small firms.	None	Macro-economic
Laeven (2003)	Impact of financial liberalisation ¹⁵ on financial constraints	International: 13 developing countries. 1,645 firm-year observations from 1988 to 1998	Euler model of investment	After financial liberalisation small (large) firms become less (more) financially constrained. In developing countries small firms benefit from liberalisation because large firms have access to preferential credit prior to financial liberalisation.	None	Macro-economic
Love (2003)	Relationship between financial development and financing constraints	International: 48,132 firm year observations of 4794 unique firms from 36 countries during 1988-1998	Euler model of investment	Financial development mitigates financing constraints by reducing information asymmetry and results in ensuring firm growth through proper investment, owing to improved capital allocation.	None	Macro-economic

¹⁵ Financial liberalisation is the sum of six dummy variables related to six reform measures: (i) interest rate deregulation, (ii) reduction of entry barriers, (iii) reduction of reserve-economic requirements, (iv) reduction of credit controls, (v) privatisation of state banks, and (vi) strengthening of prudent regulation.

Harrison <i>et al.</i> (2004)	Global capital flows and financing constraint	International: 14 countries from 1991 to 1998, with 1006 firms	Euler model of investment	FDI decreases firm-level financing constraints and results are robust to a number of controls, including measures of GDP growth, other measures of credit changes, and a proxy for financial development. Results also show that FDI eases domestic financing constraints in both high- and low-income countries. However, the magnitudes are larger in low-income countries.	A one-S.D. increase in FDI inflows leads to a 0.04 decrease in the cash sensitivity; roughly a 60% decline in cash sensitivity.	Macro-economic
Arslan <i>et al.</i> (2006)	Cash holdings and ICF sensitivity	Turkey: 220 firms between 1998 and 2002	a) Cash holdings b) Size c) Age d) Dividend payouts e) Business groups	First, cash holdings work as an effective hedging device against fluctuations in cash flow, especially during financial crisis periods. Second, financially constrained firms exhibit greater ICF sensitivity. Third, firm size and business group affiliations are more appropriate measures of financial constraints for Turkish firms.	None	Firm level
Beck <i>et al.</i> (2006)	Determinants of financing obstacles	International: 80 countries with over 10,000 firms from 1999 to 2000	Response to the question: How problematic is financing for the operation and growth of your business? ¹⁶	Younger, smaller, and domestic firms report higher obstacles. Firms in countries with higher levels of financial intermediary development, more liquid stock markets, more efficient legal systems, and higher GDP per capita report lower financing obstacles.	The probability is 38.5% (37.7%) for a small (medium) firm to face financing obstacle compared with 28.5% probability for large firms.	Firm-level & macro-economic
Khurana <i>et al.</i> (2006)	Influence, if any, of financial development ¹⁷ on CF sensitivity of cash	International: 48,400 firm-year observations of 12,782 unique firms from 35 countries from 1994 to 2002	Modified cash holdings ¹⁸	Firms from financially underdeveloped countries exhibit a greater marginal propensity to save cash out of their current period cash flows.	None	Macro-economic
Hanazaki & Liu (2007)	Relationship between financial constraints and family-controlled firms	East Asia: 603 firm-year observations from Indonesia, Korea, Malaysia, the Philippines,	ICF sensitivity	Family-controlled firms are financially constrained compared with non-family-controlled firms.	None	Corporate governance

¹⁶ Takes values from 0 (no obstacle) to 4 (very severe obstacle).

¹⁷ Following Love (2003), the authors use an index of financial development, which is an average of five standardised indices obtained from the World Bank database as of 2002, including: market capitalisation over the GDP, total value traded over the GDP, total value traded over market capitalisation, the ratio of liquid liabilities to the GDP, and the credit going to the private sector over the GDP. The sum of the first three indices is coded as STKMKT and serves as a measure of stock market development. The sum of the last two indices is coded as FININT and reflects financial intermediary development. FD is the sum of STKMKT and FININT. A higher value of FD (STKMKT or FININT) indicates that a country's financial systems rely relatively more on market-oriented financing and financial intermediaries.

¹⁸ Measured as annual change in holdings of cash and marketable securities, divided by total assets.

		and Thailand for the period 1994 to 2000				
Ratti <i>et al.</i> (2008)	Bank concentration and financial constraints	Europe: 14 European countries with 14,104 firm-year observations of 1910 listed firms from 1992 to 2005	Euler model of investment	Highly concentrated banking sector firms are less financially constrained. In addition, greater banking competition is associated with less-tight financial constraints during both expansions and recessions.	A shift from the first quartile to the second quartile of bank concentration reduces the effect of internal funds on investment from 0.839 to 0.346.	Macro-economic
Yang <i>et al.</i> (2009)	Effect of switching from NASDAQ to NYSE on ICF sensitivity	U.S.: 304 firms for the period 1992 to 2005	ICF sensitivity	Switching from NASDAQ to NYSE decreases ICF sensitivity, indicating that firms rely less on internal financing after switching, as a result of easier access to financing.	None	Firm level
Bellone <i>et al.</i> (2010)	Association between financial constraints and firm export behaviour	France: 22,000 observations between 1993-2005	a) Liquidity ratio b) Sum of the seven ratios ¹⁹	Exporting firms are less financially constrained because exporting requires significant sunk costs, and that imposes more strain on the financial health of constrained firms, making it less cost-effective to export goods abroad. Moreover, firms with better financial health are more likely to export in the next period.	None	Macro-economic
Poncet <i>et al.</i> (2010)	Association between firm ownership type and financial constraints	China: 22,311 firm-year observations with 14,967 unique firms for 1998-2005	Euler model of investment	Private Chinese firms face severe financial constraints, whereas state-owned and foreign enterprises do not. ²⁰	A one-S.D. increase over the mean in the cash flow ratio of private firms increases investment by 10.5%.	Corporate governance
Andres (2011)	Family firms, financing constraints, and investment behaviour	Germany: 1,732 firm-year observations from 1997 to 2004	a) ICF sensitivity b) Size c) Dividend payouts	Family businesses are more responsive to their investment opportunities and seem to invest more, irrespective of the availability of cash, compared with their non-family business counterparts. This suggests that founding-family ownership can help reduce information asymmetries with external financiers.	None	Corporate governance

¹⁹ Size (total assets), profitability (return on total assets), liquidity (current asset over current liabilities), cash flow generating ability, solvency (own funds over total liabilities), trade credit over total assets, and repayment ability (financial debt over cash flow). For each variable, the authors scale each firm year observation for the corresponding two-digit NACE sector average and then assign to it a number corresponding to the quintiles of the distribution in which it falls. The resulting information for each of the seven variables (a number ranging from 1 to 5) is then converted into a single index by simply summing the seven numbers.

²⁰ Presence of FDI eases financing constraints and promotes growth and investment of Chinese private firms. However, the size of the state-owned corporate sector affects negatively the extent to which private Chinese firms' investment depends on internal finances.

Bassetto & Kalatzis (2011)	Investment decisions and financial constraints	Brazil: 367 firms from 1997 to 2004	Euler model of investment	Firms with more volatility and more value in cash holdings tend to have higher ICF sensitivity and thus are more financially constrained.	None	Firm level
George <i>et al.</i> (2011)	ICF sensitivity and constraint among affiliated firms	India: 339 firms between 1997 and 2000	ICF sensitivity	ICF sensitivity is high for both group-affiliated and independent firms, but there is no significant difference in the sensitivity between them.	None	Corporate governance
Hope <i>et al.</i> (2011)	Impact of financial credibility and controlling ownership on financial constraints in private companies	International: 68 countries with 30,871 observations between 2002 and 2005	Response to question of whether the "cost of financing" is a problem for the operation and growth of the firm's business	Increased financial reporting credibility reduces external financing constraints. This negative relationship increases in the presence of a controlling shareholder, especially in countries with weak investor protection rights.	None	Firm level
Hung & Kuo (2011)	Impact of family control on ICF sensitivity	Taiwan: 9,260 observations consisting of 9158 firm year observations from 1999 to 2008	ICF sensitivity	Family-owned businesses exhibit a greater ICF sensitivity than do non-family-owned firms. This relationship is pronounced due to asymmetric information.	None	Corporate governance
Lin <i>et al.</i> (2011)	Effect of divergence between corporate insiders' control rights and cash-flow rights on firm-level finance constraints	U.S.: 19,154 firm year observations from 1994 to 2002	Euler model of investment	Firms whose corporate insiders have larger excess control rights tend to be constrained. This is more pronounced for firms with higher degrees of informational opacity and for firms with financial misreporting, and it is moderated by institutional ownership.	A one-S.D. increase in control-ownership ratio increases the shadow cost of external financing by 13 percentage points.	Corporate governance
Chan <i>et al.</i> (2012a)	Relationship between financial reform and financing constraints	China: 7052 firm year observations of 1,271 firms from 1996 to 2007	Euler model of investment	Large firms face no credit constraints, whereas smaller firms display significant constraints. The ICF sensitivity of large firms becomes severe after financial reforms; however, no change in financing constraints is documented for smaller firms in China.	None	Macro-economic
Chan <i>et al.</i> (2012b)	Association between financial constraints and CEOs' political connections	China: 3,585 firm-year observations for 1,347 firms between 2005 and 2007	ICF sensitivity	Listed Chinese firms with a politically connected CEO or chairperson are less financially constrained than their non-connected counterparts. Factors like explicit preferential policy treatment and/or favorable lender perceptions about the implicit government guarantee for connected firms help ease financial constraints.	None	Corporate governance
Francis <i>et al.</i> (2013)	Corporate governance and ICF sensitivity	International: 14 emerging markets with 362 firms for year 2002	ICF sensitivity	Firms benefit from superior firm-level corporate governance through reduced financial constraints and more efficient investment allocations. They benefit even	A one-S.D. increase in firm-level governance decreases ICF sensitivity by	Corporate governance

				more when their countries have weak investor protections.	0.108, relative to the mean value of ICF sensitivity.	
Attig <i>et al.</i> (2014)	Impact of CSR on ICF sensitivity	U.S.: 18,012 firm year observations of 2,943 unique firms from 1992 to 2010	ICF sensitivity	Better CSR performance reduces financial constraints. The effect of CSR on ICF sensitivity is driven by Community, Diversity, and Human Rights components of the CSR index.	A shift from the first quartile of CSR strengths (CSR concerns) to the third quartile decreases (increases) ICF sensitivity by 0.006 (0.004).	Corporate governance
Cheng <i>et al.</i> (2014)	Impact of CSR on access to finance	International: 49 countries from 2002 to 2009	a) KZ index b) WW index c) SA	Better CSR performance leads to lower capital constraints. Both better stakeholder engagement and transparency around CSR performance are important in reducing capital constraints.	Firms on the 75 th percentile of the CSR Index have a 0.40 lower KZ Index than firms on the 25 th percentile of the CSR Index do.	Corporate governance
Love & Martínez Pería (2014)	Bank competition and firms' access to financing	International: 53 countries approx. 70,000 firms from 2002 to 2010	Survey-based measure to capture the ease of access to financing	Higher bank competition, as measured by lower levels of the Lerner index or the Boone indicator, increases firms' access to financing.	A one-S.D. change in the Lerner index leads to a 5.5 percentage point change in the probability of having access to financing.	Macro-economic
Ryan <i>et al.</i> (2014)	Impact of bank market power in SME credit constraints	Europe: 1,118,000 SMEs from 20 countries between 2005 to 2008	ICF sensitivity	Increased market power of banks leads to increased financing constraints for SMEs.	A shift from the median Lerner index to the 75 th percentile increases ICF sensitivity by 43.9%.	Macro-economic
Tam (2014)	Effect of a parent company's listing status on subsidiary's financial constraints	U.S.: 669 equity carve-outs (356 unlisted parent firms and 313 listed parent firms) from 1980 to 2006	ICF sensitivity	Listed parents are more capable of reducing the constraints of their carve-out units than private parents are. This is prominent for equity carve-outs in technological industries. In addition, listed parent carve-outs have lower costs of equity, owing to the parent firm's financial support.	A one-S.D. increase in cash flow results in a 49.6% increase in investment.	Firm level
Cull <i>et al.</i> (2015)	Effect of a firm's government connection on the severity of its financial constraints	China: 12,400 firms for the year 2005	ICF sensitivity	Government connections mitigate financial constraints. Large non-state innovative Chinese firms with weak government connections tend to suffer more from financial constraints.	None	Corporate governance
Leon (2015)	Does bank competition alleviate	International: 28,642 firms from 69 low-	Survey	Bank competition alleviates credit constraints and bank concentration measures are not	A one S.D. change in the level of	Macro-economic

	credit constraints?	income and middle-income countries from 2006 to 2011		a robust predictor of a firm's access to finance.	competition leads to a reduction of 3 percentage points in the probability of being credit constrained.	
Sun & Jiang (2015)	Effects of political affiliation with different levels of government on private firms' financial constraints	China: 35,975 privately owned industrial enterprises between 1998 and 2007	Euler model of investment	The effects of political connections on a firm's constraints differ significantly depending on the level of government with which the private firm is affiliated. Strong political connections can decrease financial constraints. However, those connections have to be with the ruling party. Connection with the opposition party does not mitigate financial constraints.	None	Corporate governance
Alvarez & Bertin (2016)	Relationship between banking competition and financial constraints	Latin America: 3,181 observations from 445 firms between 1999-2013 from Argentina, Brazil, Chile, Colombia, Mexico and Peru	Euler model of investment	Banking competition increases financial constraints, especially for smaller firms and more financially dependent industries.	The marginal effect of a one-S.D. change in cash flow for small and large firms implies an increase of 17% and 3.5%, respectively.	Macro-economic
Shen & Lin (2016)	Whether political connection to the ruling party mitigates financial constraints and increases investments	Taiwan 12,057 firm-years of 758 firms from 1991 to 2010	ICF sensitivity (using the endogenous switching model)	Firms connected to the ruling (opposition) party that transitioned into (out of) power face less (more) financial constraints. Constrained firms with a political connection to the ruling party are more likely to invest than non-connected constrained firms are.	None	Corporate governance
Berger <i>et al.</i> (2017)	Role of small banks in mitigating financial constraints of SMEs	U.S.: 76,973 SME-month observations from 1993 to 2012	Survey	Small banks are able to alleviate financial constraints of SMEs. Such a role becomes more prominent during adverse economic conditions.	Increase in the proportion of local branches belonging to small banks from the 25th to the 75th sample percentile leads to a 9.1% decrease in the proportion of small businesses that feel constrained.	Macro-economic
Bemini & Montagnoli (2017)	Association between competition and financial constraints	Emerging countries: 27 emerging economies for the years 2005 and 2009, consisting of 9,098 and	Survey	In economies with underdeveloped legal systems, financial constraints are severe in the presence of fiercer competitive pressure. Competitive pressure on the borrower affects both sides of the credit market. Although	None	Macro-economic

		10,038 firms, respectively		demand for credit is higher in competitive industries, the majority of firms are discouraged from loan application because of high collateral requirements and high cost of credit.		
Chen <i>et al.</i> (2017)	Impact of foreign acquisitions on financing constraints, productivity, and R&D	China: 914 target firms between 1994 and 2011	a) ICF sensitivity b) WW index c) Cash/total assets	Foreign acquisitions mitigate the financial constraints of target firms. The reduction is more pronounced for non-SOEs (<i>i.e.</i> domestic and foreign private-owned firms) than for SOEs.	None	Corporate governance
Deng <i>et al.</i> (2019)	Impact of political ²¹ connections and market friction ²² on financial constraints	China: 9,445 observations from 2001 to 2011	a) WW index b) SA	Firms facing severe market frictions are not as financially constrained as expected, because of their political connections.	None	Corporate governance
Hu <i>et al.</i> (2017)	Impact of regional development on R&D ICF sensitivity	China: 485 high-tech firms with 1,932 total firm-year observations from 2008 to 2011	Euler equation (using Tobin's Q)	In Chinese high-tech companies, R&D investment is highly dependent on the level of a firm's internal cash flow, implying that these firms are constrained by external financing resources. Importantly, financial market development decreases the financing constraints for these firms and is more prominent in the eastern and mid-country areas, where the financial institutions are more sophisticated than in the western area.	None	Macro-economic
Peruzzi (2017)	Whether family control, family management, and family ownership concentration affect the ICF sensitivity of SMEs	Italy: 9,260 observations consisting of 926 SMEs from 2004 to 2013	ICF sensitivity	Family-owned businesses exhibit a greater ICF sensitivity than their non-family-owned SMEs do. This relationship, however, is found to be driven by two distinct channels: (i) the ownership concentration channel and (ii) the family management channel.	None	Corporate governance
Wang (2017)	Impact of foreign direct investment (FDI) on host-country firms' financial constraints	U.S.: 3506 manufacturing firms from 1988 to 2012 with 39,461 firm-year observations	ICF sensitivity	FDI significantly reduces the ICF sensitivity, because profit or loss due to foreign competition tightens borrowing constraints, leading to limited availability of external funds for future investment. Increase in FDI is the reason behind the overall decrease in ICF sensitivity in US firms.	The average US domestic firm increases CAPEX by 4% with an extra dollar of CF, but a one-S.D. increase in FDI reduces this increase by 1%.	Macro-economic

²¹ Political connection is calculated in two ways: (i) a PC index based on the method used by Fan *et al.* (2007) and Luo and Ying (2014), and (ii) a dummy variable defined as state-owned firms that are politically connected.

²² Market frictions are measured in two ways: (i) stock turnover rate and (ii) probability of informed trading.

Bayar <i>et al.</i> (2018)	Corporate tax avoidance and financial constraints	U.S.: 35,000 firm year observations between 1990 and 2015	WW index	Both tax management and tax sheltering increase financial constraints.	A one-S.D. decrease in Cash ETR leads to an increase of 1.93% in financial constraints.	Firm-level
Dhole <i>et al.</i> (2019)	Impact of working capital (WC) management on financial constraints	Australia: 8,010 firm-year observations from 2000 to 2016.	Text-based measure by Bodnaruk <i>et al.</i> (2015)	Constrained firms with efficient working capital management are likely to have higher one-year-ahead prices and higher analyst target prices, suggesting that efficient working capital policies can mitigate the adverse effects of financial constraints on firm value.	None	Firm level
Jiang <i>et al.</i> (2019)	Corporate culture and financial constraint	China: 15,204 firm-year observations and 2,314 unique firms, from 2002 to 2012	ICF sensitivity	Firms with a strong culture of high integrity have lower ICF sensitivities than their weak-integrity-culture counterparts do.	None	Corporate governance
Zhao & Xiao (2019)	Role of firm life cycle on the association between CSR and financial constraints	China: 11,865 firm-year observations from 2010 to 2016	a) WW index b) Divined payout c) KZ index d) ICF sensitivity	For firms in the growth, mature, and declining stages of their life cycle, their CSR engagement decreases financial constraints.	None	Corporate governance
Xiao & Wang (2020)	CSR and financial constraints	China: 15,838 firm-year observations from 2004 to 2013	KZ index	Heavy-polluting firms tend to suffer from financial constraint as both debt and equity investors restrict their investment for such firms.	None	Corporate governance
Malik <i>et al.</i> (2021)	Effect of the voluntary adoption of a board risk committee (BRC) on financial constraints	U.S.: 28,265 firm-year observations between 2005 and 2017	a) KZ index b) WW index c) SA d) Principal Component Analysis (PCA) based on the above-mentioned measures	The voluntary adoption of a board risk committee (BRC) decreases financial constraints, owing to improved risk oversight and better governance practices. BRC characteristics, including size, and presence of financial experts and female directors, mitigate the risk of financial constraints. In addition, the authors find significant indirect effects of BRCs on financial constraint risk, through reduction in information asymmetry and agency costs.	None	Corporate governance

IV. Consequences of Financial Constraints

4.1 Financial Resources

One way for firms to mitigate the effect of high external costs is to hold more cash (Denis and Sibilkov, 2009), and a number of studies have investigated the effects of financial constraints on cash holdings. Bates *et al.* (2009) find that cash holding are higher for more-

constrained firms. A similar result is documented by Han and Qiu, (2007), who show that cash holdings of constrained firms increase as cash flows become more volatile. Faulkender and Wang (2006) show that the marginal value of cash is significantly higher for constrained firms than for unconstrained firms in the U.S., and Chan *et al.* (2013) discover similar evidence. However, according to Acharya *et al.* (2007), cash holdings by constrained firms depend on their hedging needs. They document that constrained firms accumulate cash when their hedging needs increase, but when their hedging needs are low, they behave similarly to unconstrained firms—that is, they service debt by using accumulated cash. Musso and Schiavo (2008) document that financial constraints affect firms' survival adversely by increasing firms' likelihood of exiting the market. Zhang (2020) also shows a negative relationship between financial constraints and firm survival.

Lee and Park (2016) find that the positive relationship between financial constraints and cash holdings is moderated by board governance. A well-functioning board is known to decrease information asymmetry, increase firm transparency, and reduce the probability that managers will waste cash for personal interests. Since financially constrained firms have limited access to external financing, shareholders of constrained firms tend to be less concerned about managers holding a large amount of cash reserves (Almeida *et al.*, 2004; Han and Qiu, 2007). Those arguments have led the authors to propose that financial constraints and board governance play substitution roles in corporate cash holdings, in that board governance helps constrained firms to increase their cash holdings.

Almeida and Campello (2007) document a positive but nonlinear relationship between ICF sensitivity and asset tangibility, among constrained firms only. They find a positive relationship at low levels of asset tangibility, but the effect disappears at high levels because high asset tangibility indicates high levels of pledgeable or collateralisable assets and, thus, improved credit status and reduced financial constraints. Insiders tend to pledge shares in a given year for firms that were constrained in the previous year (Cheng *et al.*, 2020), and that practice is even more common when the constrained firms refrain from paying dividends. In alignment with the agency problem hypothesis, Cheng *et al.* (2020) document that firms tend to experience more severe financial constraints when shares are pledged by their shareholders.

Future research would do well to investigate how the education and expertise of boards of directors affect their relationship with financial constraints. It is expected that directors' personal characteristics, including their financial expertise, may influence how effectively they monitor agency problems and, thus, the use of internal financial resources in financially constrained firms. Furthermore, different subcommittees, including audit and risk management committees, may also influence the effectiveness of monitoring by directors over managers.

Other studies investigate the capital expenditure behaviour of constrained firms. For example, Sheu and Lee (2012) show that excess cash is strongly related to capital expenditures.

Baños-Caballero *et al.* (2014) find that the optimal working capital level is lower for financially constrained firms. This is consistent with the Fazzari and Petersen (1993) argument that positive working capital needs to be financed. Financially constrained firms engage in inventory adjustments in order to respond to temporary cash flow shocks (Carpenter *et al.*, 1994, 1998). Dasgupta *et al.* (2019) show that when costs are low, unconstrained firms tend to accumulate inventory more rapidly than their constrained counterparts do, but as the favourable cost shocks ease financial constraints, constrained firms tend to build surplus inventory, resulting in an aggressive depletion of inventory when costs increase. Thus, the findings of Dasgupta *et al.* (2019) are consistent with those of Carpenter *et al.* (1994, 1998). According to Dhole *et al.* (2019), constrained firms that efficiently manage their working capital are likely to have higher one-year-ahead prices and higher analyst target prices, suggesting that efficient policies for working capital can mitigate the adverse effects of financial constraints on firm value. With respect to the financing choices of constrained firms, Lin *et al.* (2013) hypothesise that financially constrained firms will tend to choose leasing over debt financing. This is based on the “high debt capacity of leasing” argument, which posits that a lessor has the ability to repossess an asset, thus allowing the lessor to extend more credit (which is vital for constrained firms), in comparison with a lender whose claim is secured by the same asset. In line with this argument, Lin *et al.* (2013) find that financially constrained firms (firms that are smaller, with low internal funds, higher variability of internal funds and/or low asset tangibility) tend to lease relatively more and borrow less.

As financial constraints tend to influence firms’ access to capital, Cheng *et al.* (2018) examine the relationship between access to capital and cost stickiness, using the regional financial development index as a proxy for access to capital. By examining several small private firms in China, Cheng *et al.* (2018) find that private companies in regions that are poorly developed financially are characterised by limited access to capital and exhibit cost anti-stickiness. Costa *et al.* (2021) find that financially constrained U.S. firms exhibit less cost stickiness. Such findings are consistent with the “adjustment cost theory” argument, as evidenced by the presence of less cost stickiness in three contextual settings: the future value-creating potential of selling, general, and administrative (SG&A) expenses setting, the investment opportunities setting, and the earnings management setting.

4.2 Investment Policy

A study by Almeida *et al.* (2004) suggests that financial constraints increase a firm’s propensity to save cash out of incremental cash flows. They show that constrained firms’ cash holdings are related positively to internal funds, because such firms hoard cash from cash flow as a safeguard for future investment requirements. Using data from Australia, Pawlina and Renneboog (2005) and Chang *et al.* (2007) also find evidence that constrained firms show higher CF sensitivity for cash than their unconstrained counterparts do. Guariglia (2008) finds that ICF sensitivity is strongest for firms that are externally financially constrained but have

a high level of internal funds, compared with internally financially constrained firms. Using cash holdings as a proxy for financial constraint, Arslan *et al.* (2006) find that constrained firms' investment expenditures exhibit a greater sensitivity to cash flow changes, owing to their need to forgo investment opportunities when internal funds are insufficient. He *et al.* (2016) assess the impact of financial constraints on the relationship between internal and external financing by examining the relationship before and after the "2008 dividend regulation" in China. They find that before the dividend regulation, there was a negative relationship between firms' internal funds and the availability of external funds and, hence, financially constrained Chinese listed firms were less willing to pay cash dividends than unconstrained firms were—but that relationship disappeared with the enforcement of the 2008 dividend policy. This result highlights the observation that, when a stringent financing environment is enforced, financially constrained firms increase their propensity to pay cash dividends in order to increase their external financing capacity, thus providing an alternative perspective to the pecking order hypothesis (Myers, 1984). Chen and Wang (2012) find that constrained firms repurchase shares more often than their unconstrained counterparts do, thus resulting in reductions in investment.

Using the sudden increase in the price of oil in the mid 2000s as an external shock, Andrén and Jankensgård (2015) investigate how the abundance of cash supplies in the U.S. oil and gas industry impacts investment sensitivity. Using firm size to classify constrained firms versus unconstrained firms, they find that the ICF sensitivity of small firms decreases during the periods of an excess supply of cash, because of significant declines in the cost of external financing. Manova *et al.* (2015) document that Chinese credit-constrained firms suffer from low exports, low product ranges, and restricted access to new foreign markets. However, if such firms are subsidiaries of multinational corporations, they have better export performance than the private domestic firms do.

Several studies investigate the impact of financial constraints on innovative activities, working from the notion that innovation is costly and requires significant, risky investment. However, the results of the studies are mixed. For example, Himmelberg and Petersen (1994) conclude that internal financing is an important determinant of R&D expenditures, and Aghion *et al.* (2010) and Savignac (2008) find that financial constraints decrease investment in R&D and other innovative activities, whereas Bond *et al.* (2003) find no significant association in data from the U.K. and Germany. In addition, Sheu and Lee (2012) show that in Taiwan, excess cash is significantly correlated with capital expenditures for constrained firms, whereas cash holdings are positively related to R&D expenditures for both constrained and unconstrained firms. Brown *et al.* (2012) document a strong link between R&D and both internal and external equity financing for young, publicly traded U.S. firms. Basing their work on a sample of European firms, Brown and Petersen (2011) identify a weak relationship between financial constraints and R&D, which is consistent with most of the prior studies.

However, once those authors control for the firms' (i) efforts to smooth R&D with cash reserves and (ii) use of external equity financing, they find that financial constraints significantly decrease investments in R&D. For a sample of SMEs, Czarnitzki and Hottenrott (2011) find that an increase in the availability of internal funds, as measured by increases in the firms' price-cost margin, has a larger impact on R&D investment than on capital investment, thus suggesting that the availability of internal funds is more decisive for R&D investment. Using survey data to measure innovation directly, Gorodnichenko and Schnitzer (2013) show that financial constraints restrain the ability of domestically owned firms to innovate, and that restraint can prevent firms from adopting better technologies. Using an innovation follow-up survey of 4,720 firms from 11 African countries, Misraku and Zhang (2019) find that financial constraints adversely affect firms' decisions to engage in innovative activities, including in product and process innovation. It is possible that overvalued firms have greater freedom to engage in more risky and creative forms of innovation. In accord with that notion, in fact, a recent study by Dong *et al.* (2020) shows that overvalued firms encourage "moon shot" projects (groundbreaking projects that have a significant downside risk). Overvaluation can relax financing constraints and can lead to a reduction in the cost of external financing.

Future research would do well to consider the effect that the interaction between corporate governance and financial constraints has on firm innovation. Previous research, such as that of Chan *et al.* (2015) and Zhang *et al.* (2014), indicates that differences in corporate governance matter significantly for innovative performance. Therefore, investigating the effect of corporate governance and financial constraints on firm innovation could enhance our understanding of the determinants of innovative performance. In addition, future research may wish to consider whether workers' participation has any effect on the relationship between innovation and financial constraints (Belloc, 2014). Employers have recognised employees as important assets in creating innovation, and Smith (1991) argues that worker participation can correct coordination failures through checking management actions. However, empirical research examining the moderating role that worker participation plays in the association between financial constraints and innovation is lacking. Due to the mixed results in regard to innovation and financial constraints in different countries, future studies should also conduct cross-country research and investigate whether the institutional setting has any impact on that relationship. In addition, direct measures of innovation are still needed. Previous studies generally use R&D cost as a proxy for innovation, so future studies could use the number of patents and number of employees in the departments involved in innovation as more direct proxies for innovative activities.

Owing to their difficulties in arranging external financing, financially constrained firms must forgo profitable investment opportunities, and that in turn restricts their growth. As a result, constrained firms are lucrative targets of bidders for acquisition. Hubbard and Palia

(1999) provide empirical evidence of highest-bidder returns when unconstrained firms acquire financially constrained target firms. Recently, Erel *et al.* (2015) show that after acquisition, target firms' cash holdings, sensitivity of cash to cash flow, and ICF sensitivity all decrease—a finding that is consistent with the view that financial constraints are reduced for target firms when they are acquired. Similar results are found by Khatami *et al.* (2015), who document that being financially constrained is the key characteristic of target firms in takeover bids, and the financial constraints of target companies increase acquisition premiums and abnormal returns for both the targets and the bidders, whereas the bidders' financial constraints have no impact on value creation. This evidence supports the idea that acquisitions help financially constrained firms to access the internal capital market and/or the external market.

Given the fact that financial constraints expose firms to significant investment risks, it is expected that investors in such firms require a risk premium. However, the evidence on that issue is mixed. Using a sample of U.S. firms, Lamont *et al.* (2001) find that constrained firms earn lower returns than unconstrained firms do. Chan *et al.* (2010), too, find similar evidence using data from Australia. In contrast, using a text-based measure of financial constraint, Buehlmaier and Whited (2018) document that constrained firms earn higher returns than unconstrained firms do.

4.3 Earnings Management

As is well known, constrained firms have limited access to the equity market because of the high transaction cost of external financing (Hennessy and Whited, 2007; Kurt, 2018). Kurt (2018) examines whether constrained firms use income-increasing accruals more aggressively than unconstrained firms do around seasoned equity offerings (SEO), despite the threat of a damaged reputation over the long term. Kurt (2018) finds that this is indeed the case, and further finds that aggressive earnings management by constrained issuers is associated with lower SEO-period announcement returns and less abnormal long-run stock return performance during the post-SEO period. That scenario is consistent with the rational expectation hypothesis, which posits that investors understand managers' reporting incentives and can rationally adjust their valuation accordingly (Shivakumar, 2000). Linck *et al.* (2013), too, find that constrained firms overstate earnings compared with unconstrained firms during the quarters prior to investment. However, their results are consistent with the “signaling hypothesis”, which states that managers of constrained firms use income-increasing accruals to communicate positive prospects to investors in an effort to increase the firms' financing capacity. Future research should follow that line of study and investigate the earnings management behaviour of financially constrained firms surrounding IPO announcements and merger and acquisition (M&A) announcements. Relatedly, researchers would do well to examine whether such practices of earnings manipulation also increase the risk of a future stock price crash. Bowen *et al.* (2018) document a positive association between financial

constraints and future accounting restatements: financially constrained firms exhibit higher discretionary accruals and, hence, more restatements. In contrast, although firms with greater investment opportunities report higher discretionary accruals, that does not lead to more restatements—a finding that is consistent with those of Linck *et al.* (2013).

4.4 Product Market Competition

The financial status of a firm can affect its conduct or that of its competitors in the product market, both of which can determine competitive outcomes (Campello, 2003). Hence, to meet financing costs, one option for a firm is to increase its product price in the market. Gustafson *et al.* (2015) document that liquidity-constrained firms in the airline industry tend to hike prices, and their industry peers adopt the same strategy. Chevalier and Scharfstein (1996) and Campello (2003) find that, during recessions, constrained firms tend to engage in price hikes to increase their profit in the short term and manage their liquidity concerns.

4.5 Corporate Tax Avoidance

Given the challenges associated with constrained firms' ability to access external financing, it is intuitive to argue that constrained firms are likely to grab opportunities to reduce their cash taxes in order to conserve valuable cash. Edwards *et al.* (2016) investigate this proposition and find that firms increase their tax planning (decrease cash effective tax rates) to generate internal funds in response to increasing financial constraints, and that such association is less pronounced for firms with high cash holdings. Dyreng and Markle (2016) examine the effect of financial constraints on income shifting, using a sample of U.S. multinational firms. Income shifting from the U.S. to a foreign jurisdiction incurs costs and benefits, and the benefits can be reduced if the income is paid as dividends back to the U.S. in the short term, meaning that firms have an incentive to defer their repatriation of earnings and to fund their domestic cash needs with external financing. Consequently, Dyreng and Markle (2016) argue that constrained firms do not have the ability to defer repatriation of earnings and, thus, are not able to benefit from income shifting. Consistently with that prediction, their results show that firms facing financial constraints shift less income out of the U.S. into foreign jurisdictions than their unconstrained peers do. Furthermore, using a text-based measure of constraint, Law and Mills (2015) show that financially constrained firms pursue more aggressive tax planning strategies, which are manifested in significantly higher unrecognised tax benefits, lower effective tax rates, higher audit adjustments, and increased use of tax havens. Finally, Akamah *et al.* (2021) document a positive association between financial constraints and the volatility of cash effective tax rates in subsequent periods—an association that becomes more pronounced as firms avoid more cash taxes. Those findings are consistent with the benefits of cash tax savings outweighing the costs associated with more volatile tax outcomes in conjunction with an increase in financial constraints.

4.6 Employees

Popov and Rocholl's (2015) study of the German market shows that firms that have a credit relationship with at least one global financial crisis-affected bank have to decrease both the number of people they employ and their average compensation to employees. Ferrando and Ruggieri (2017) document that being financially constrained significantly reduces employee productivity across all industries. However, the negative shock on labour productivity is more prominent for the industries associated with innovation. Fernandes and Ferreira (2017) show that to maintain flexibility with future adjustments to employment without incurring additional firing costs, in the post-GFC era, financially constrained Portuguese firms hire more fixed-term workers than their unconstrained counterparts do. Taking a different perspective, Cohn and Wardlaw (2016) examine the impact of financial constraints (proxied by leverage and cash flow shocks) on workplace safety (proxied by injury rates) and document a positive association. That finding is consistent with the notion that financial constraints inhibit firms' ability to invest adequately in workplace safety. Habib *et al.* (2020) extend Cohn and Wardlaw's work into an international setting and document that financially constrained firms tend to have poor workforce environments. That relationship is moderated by country-level employment protection legislation (EPL), however, in that constrained firms domiciled in low (high) EPL countries reduce (do not reduce) investment in their workforce environments. Further research should examine labour market penalties for directors and managers of financially constrained firms with high rates of reported injuries. In addition, researchers are encouraged to investigate whether such firms suffer from any loss of employee productivity or growth, and whether they retain talented employees.

4.7 Corporate Social Responsibility Activities

Chan *et al.* (2017) find a negative association between financial constraints and CSR engagement—a finding that confirms the assertion of Campbell (2007) about CSR. Leong and Yang (2021) deploy a propensity score matching technique and uncover evidence that financially constrained firms exhibit greater concerns about CSR than unconstrained firms do, thus resulting in impaired CSR performance by the constrained firms. Further investigation shows that financially constrained firms tend to place emphasis on strengthening their CSR performance by investing more in employee relations and corporate governance. Zhang *et al.* (2019) document that financially constrained Chinese firms make fewer investments in initiatives to reduce industrial waste gas emissions. State-owned enterprises are able to access bank loans and other external financing to invest in environmental protection initiatives, whereas both private-owned and foreign-owned enterprises have to rely on internal cash flow for such investment. Unfortunately, research on CSR is often plagued with reverse causation concerns (e.g., CSR and firm performance), and we find similar problems in the research on CSR and financial constraints. As we discussed in Section 3.3, CSR has been shown to be a

determinant of financial constraints, whereas the papers reviewed in this section indicate that financial constraint status can affect a firm's CSR activities. We therefore suggest that researchers adopt a difference-in-differences design to exploit exogenous shocks in CSR or financial constraints, in order to establish a causal inference between CSR and financial constraints. Hong *et al.* (2012) is one such study. At a minimum, researchers should report results from the Granger causality test to reveal bidirectional causality.

Table 2 shows the relevant papers reviewed in this section. As is the case with the studies summarised in Table 1, we find few studies that report the economic impact of the consequences of being financially constrained.

Table 2 Consequences of Financial Constraints

Author(s)	Research Question(s)	Sample/countries	Measurement of Constraint	Findings	Economic Significance	Theme
Fazzari <i>et al.</i> (1988)	Financial constraints and investment behaviour	U.S.: manufacturing firms from 1970 to 1984	Dividend payouts	Firms that refrain from paying out dividends have the greatest sensitivity of investments to cash flows and liquidity.	Predicted changes in the investment-capital ratio resulting from a one-standard-deviation (S.D.) change in the ratio of cash flow to capital are 4.48 percentage points for firms with dividend income ratio less than 0.1 and 0.74 percentage points for firms with dividend income ratio between 0.1 to 0.2.	Investment policy
Fazzari & Petersen (1993)	Working capital sensitivity	U.S.: from 1970 to 1979	Dividend payouts	In constrained firms, working-capital investment competes with fixed investment for the limited pool of finance that is available.	None	Financial resources
Carpenter <i>et al.</i> (1994)	Inventory investment due to financial constraints	U.S.: manufacturing firms from 1981 to 1992	Size	Financially constrained firms engage in inventory adjustment, as this is a low-cost strategy to respond to temporary cash flow shocks.	None	Financial resources
Himmelberg & Petersen (1994)	R&D and internal finance	U.S.: 179 small high-tech firms from 1983 to 1987	Dividend payouts	High-tech firms are financially constrained and rely on internal funds to finance R&D.	None	Investment policy
Carpenter <i>et al.</i> (1998)	Association between financial constraints and inventory investment, re-examined	U.S.: durable-goods and nondurable-goods manufacturing firms from 1981 to 1992	Size	Using high-frequency data for durable versus non-durable-good manufacturing firms, the authors find that financially constrained firms engage in inventory adjustment to respond to temporary cash flow shocks.	None	Financial resources
Hubbard & Palia (1999)	M&A in the 1960s	U.S.: 392 bidder firms from 1961 to	Dividend payouts	The highest bidder returns when financially "unconstrained" buyers	None	Investment policy

		1970		acquire "constrained" targets.		
Lamont <i>et al.</i> (2001)	Financial constraints and stock returns	U.S.: 1968-1997	KZ index	Constrained firms earn lower returns than unconstrained firms do.	None	Investment policy
Bond <i>et al.</i> (2003)	Financial constraints and investment	Europe: Firms from Belgium, France, Germany, and the U.K. from 1978 to 1989	Euler model	Financial constraints have severe impact on investment in the more market-oriented U.K. financial system compared with continental European countries.	None	Investment policy
Campello (2003)	Capital structure and product market competition	U.S.: 128,133 firm-quarter observations from 1976 to 1996	Debt	Financially constrained firms increase markups during recessions, implying that such firms engage in short-term profits at the expense of future sales in response to negative shocks to demand.	None	Product market competition
Almeida <i>et al.</i> (2004)	Cash flow sensitivity of financially constrained firms	U.S.: 29,954 firm-year observation from 1971 to 2000	a) Dividend payout ratio b) Size c) Bond rating d) Commercial paper rating e) KZ index	Financially constrained firms demonstrate positive cash-cash flow sensitivities, whereas unconstrained firms do not.	None	Financial resources
Pawlina & Renneboog (2005)	ICF sensitivity driven by agency cost or information asymmetry	U.K.: 985 firms from 1992 to 1998	Dividend payouts	ICF sensitivity is almost four times higher in constrained firms than in unconstrained firms.	None	Investment policy
Faulkender & Wang (2006)	Financial constraints and the value of cash	U.S.: 1971-2001	a) Dividend payouts b) Size c) Long-term bond rating d) Commercial paper rating	The marginal value of cash is significantly higher for constrained firms than for unconstrained firms in the US.	None	Financial resources
Almeida & Campello (2007)	Association between asset tangibility and ICF sensitivity of constrained firms	U.S.: 18,304 firm-year observations from 1985 to 2000	a) Dividend payouts b) Size c) Bond rating d) Commercial paper rating	A positive but nonlinear relationship between ICF sensitivity and asset tangibility for constrained firms only.	A shift from first quartile to third quartile of asset tangibility results in partial effect of a one-S.D. cash flow innovation on investment per dollar of capital to shift from 0.09 to 0.20.	Financial resources
Acharya <i>et al.</i> (2007)	Role of cash and negative debt in investment by financially constrained firms	U.S.: 1971 to 2001	a) Dividend payouts b) Size c) Bond rating d) Commercial paper rating	Constrained firms prefer higher cash when their priority is hedging, but these firms prefer lower debt when hedging needs are low.	None	Financial resources
Chang <i>et al.</i> (2007)	Financial constraints and investment decisions	Australia: 420 firms from 1990-2003	a) Size b) Dividend payouts c) Financial status index	Constrained firms show higher CF sensitivity for cash compared with their unconstrained counterparts using data from Australia.	A one-S.D. shock to cash flow moves the investment ratio of large firms by 10.1%, but alters small firms' investment by 5.8%.	Investment policy
Han & Qiu (2007)	Relationship between financial constraints and	U.S.: from 1997 to 2002	a) Dividend payouts b) Size c) Long-term	Cash holdings of constrained firms increase as cash flows become more volatile.	A one-S.D. increase in cash flow leads to 0.017 increase in	Financial resources

	cash flow volatility		bond rating d) Commercial paper rating		the cash to total assets ratio of average financially constrained firms.	
Guariglia (2008)	Whether internal and external financial constraints have different effects on firms' ICF sensitivity	U.K.: 24,184 firms over the period 1993-2003	a) Cash flow to beginning-of-period capital stock ratio as a proxy for the degree of internal financial constraint b) Firms' size as a proxy for the degree of external financial constraints	The sensitivity of investment to cash flow tends to increase monotonically with the degree of external financial constraints.	None	Investment policy
Musso & Schiavo (2008)	Financial constraints, firm survival, and growth	France: Survey data of 104,000 firm-year observations for 1996-2004	A synthetic index based on size, profitability, liquidity, cash flow generating ability, solvency, trade credit over total assets and repayment ability	Financial constraints increase the probability of exiting the market significantly; financial constraints are related positively to productivity growth in the short-run.	None	Financial resources
Savignac (2008)	Financial constraints and innovation	1940 firms	No financing source, too-high interest rates, or slowness in the setting up of the financing	Financial constraints decrease investment in R&D and other innovating activities.	None	Investment policy
Bates <i>et al.</i> (2009)	Cash holding and financial constraints	U.S.: 117,438 firm-year observations from 1980 to 2006	a) Leverage b) Market-to-book ratio	Cash holding is higher for more constrained firms than for their unconstrained counterparts.	None	Financial resources
Denis & Sibilkov (2009)	Importance of cash holding for constrained firms	U.S.: 74,347 firm-year observations from 1985 to 2006	a) Dividend payouts b) Size c) Debt rating d) Paper rating	Financially constrained firms with hedging needs tend to hold more cash. High cash holdings by constrained firms enable them to invest in positive NPV projects.	None	Financial resources
Aghion <i>et al.</i> (2010)	Impact of uncertainty and credit constraints on investment volatility and growth	International: 21 OECD countries from 1960 to 2000	Private credit	Credit constraints lead to both higher volatility and lower mean growth.	A one-S.D. improvement in private credit decreases the negative growth impact of a 1% rise in volatility by -0.14%.	Investment policy
Chan <i>et al.</i> (2010)	Financial constraints and stock returns	Australia: monthly data from 1975-2004	Financial constraint index using discriminant analysis based on current ratio, financial slack, debt ratio, fixed charge coverage, net income margin and sales growth.	Financially constrained firms earn lower returns than their unconstrained counterparts do.	None	Investment policy
Brown & Petersen (2011)	Cash holding and R&D smoothing	U.S.: from 1970 to 2006	a) Age b) Size c) Dividend payouts d) Bond rating	Financially constrained firms are likely to exhibit R&D smoothing.	None	Investment policy

Czarnitzki & Hottenrott (2011)	R&D investment of SMEs	Europe: from 1992 to 2002	Credit rating index	R&D investment differs from capital investment with respect to financing constraints as well as the importance of internal and external resources. Compared with larger firms, smaller firms suffer more from external constraints on R&D investment.	None	Investment policy
Brown <i>et al.</i> (2012)	Financial constraints and investments in R&D.	Europe: 3,977 firm-year observations across 16 European economies between 1995 and 2007	a) Age b) Size c) Dividend payouts	Access to internal and external equity financing matters a great deal for R&D, particularly in firms most likely to face binding financing constraints.	None	Investment policy
Sheu & Lee (2012)	Association between excess cash holding and investment	Taiwan: 2,596 firm-year observations from 2000 to 2006	a) Size b) Dividend payouts c) Cash flow d) Age e) Bank loans f) KZ index	Constrained firms depend more on excess cash for capital expenditures compared with their unconstrained counterparts. However, excess cash is associated with R&D for both constrained and unconstrained firms.	None	Financial resources
Chan <i>et al.</i> (2013)	Financial constraints and the value of cash holding	Australia: 6,412 firm-year observations over 1990-2007	a) Book value of assets b) Dividend payouts	The marginal value of cash is significantly higher for constrained firms than for unconstrained firms.	None	Financial resources
Gorodnichenko & Schnitzer (2013)	Financial constraints and innovation	Europe: 700 firms surveyed in 2002 and in 2005	Self-reported measures of access to finance	Financial constraints restrain the ability of domestically-owned firms to innovate and, hence, to catch up to the technological frontier.	An increase of one S.D. in financial constraints lowers the probability of a successful innovation by 16 to 27 percentage points.	Investment policy
Linck <i>et al.</i> (2013)	Whether constrained firms use discretionary accruals as a signal to attract funds for valuable investment projects	U.S.: 240,940 firm-quarter observations from 1989 to 2009	a) SA index b) Net leverage c) Free cash flow	Financially constrained firms with good investment opportunities have significantly higher discretionary accruals prior to investment compared with their unconstrained counterparts. Constrained but high-accrual firms have higher earnings announcement returns than constrained but low-accrual firms do, and invest more in value-increasing projects.	None	Earnings management
Lin <i>et al.</i> (2013)	Financial constraints and leasing	U.S.: 32,784 firm-year observations from 1991 to 2005	a) Internal funds b) Variability of internal funds c) Growth opportunity d) Asset tangibility e) Size	Firms that are smaller, with low internal funds, higher variability of internal funds or low asset tangibility, tend to lease more and borrow less.	None	Financial resources
Baños-Caballero <i>et al.</i> (2014)	Financial constraints and working capital (WC)	U.K.: 1,606 firm-year observation from 2001 to	a) Dividends payout b) Cash flow c) Size	The optimal WC level (the turning point of the inverted U-shaped relationship between	None	Financial resources

	management	2007	d) Cost of external financing e) Interest coverage f) Altman's Z score g) WW index	investment in WC and firm performance) is lower for those firms that are more likely to be financially constrained.		
Andrén & Jankensgård (2015)	Abundance of liquidity versus ICF sensitivity	U.S.: 612 firm-year observation between 2000 and 2008 for oil and gas industry	Size	For constrained firms, ICF sensitivity decreases during periods with abundant liquidity.	None	Investment policy
Erel <i>et al.</i> (2015)	Financial constraints and acquisition	Europe: 5,187 firm year observations from 2000 to 2009	a) Cash b) ICF sensitivity c) Sensitivity of cash to cash flow	Post-acquisition, the cash holdings, sensitivity of cash to cash flow, and ICF sensitivity of the target firms decreases.	None	Investment policy
Gustafson <i>et al.</i> (2015)	Financial constraints and product market cooperation	U.S.: 200 observations from 2005 to 2012 (airlines industry)	a) Current ratio b) Cash flow to debt ratio c) Long-term debt to assets ratio	Financial constraints result in firms pursuing cooperative actions.	None	Product market competition
Khatami <i>et al.</i> (2015)	Financial constraints and acquisition	U.S.: 81533 firm year observations from 1985 to 2013	a) Composite I & II indices b) Dividend payout c) KZ index d) SA	Both targets and bidders gain significantly more when financially constrained companies are acquired. Stronger financial constraints in a company have a positive and significant impact on its likelihood of being acquired.	A 1% change in target's financial constraints increases the likelihood of receiving takeover bids by more than 0.2%.	Investment policy
Law & Mills (2015)	Financial constraints and tax avoidance (unrecognised tax benefits or UTB)	U.S.: 3,288 observations from 2000 to 2011	Use of negative words	Financially constrained firms use more negative words in their annual reports and pursue more aggressive tax planning strategies.	A one-S.D. increase in negative words is associated with a 6.2% increase in UTB balance.	Corporate tax avoidance
Manova <i>et al.</i> (2015)	Explores credit constraints and international trade flows	China: 88,004 firms in 2005	a) Industry external finance dependence b) Inventory to sales ratio c) Availability of tangible assets d) Trade credit	Credit constraints restrict international trade and affect the pattern of multinational activities—they restrict total exports, prevent entering new markets, and limit export product range.	None	Investment policy
Cohn & Wardlaw (2016)	Financial constraints and workplace safety	U.S.: 2,251 firms from 2002 to 2009	a) Cash flow b) Leverage	Financial constraints affect investment in workplace safety adversely. Injury rates increase with leverage and negative cash flow shocks.	A one-S.D. increase in a firm's debt-to-assets ratio is associated with a 5.6 percentage point increase in total workplace injuries the following year.	Employee
Dyreng & Markle (2016)	Financial constraints and income shifting	U.S.: 9,727 firm-year observations between 1998 and 2011	a) Non-investment grade rating b) SA c) Dividend payout	Financially constrained firms shift less income out of the US and into foreign jurisdictions than do their unconstrained peers.	A one-S.D. increase in FTR5 (35% less the 5 years foreign effective tax rate for the firm) results in an increase in outbound transfers of 0.035.	Corporate tax avoidance

Edwards <i>et al.</i> (2016)	Financial constraints and corporate tax planning behaviour	U.S.: 40,538 firm year observations between 1987 and 2011	a) Altman Z-score b) KZ index c) Cost & accessibility of external debt	Firms increase tax planning to generate internal funds in response to increasing financial constraints. In addition, firms with lower cash holdings exhibit higher increases in tax planning when faced with increased financial constraints.	Firms with a change in constraint in the largest decile exhibit a decline in their cash ETR ranging between 3.00 to 5.14 percentage points.	Corporate tax avoidance
He <i>et al.</i> (2016)	Financial constraints, 2009 Chinese regulation and dividend policy	China: 8,758 firm-year observations from 941 non-financial firms between 2003 and 2012	Chinese version of WW index, excluding dividend-paying indicators but including SOE indicator	In the absence of the 2008 regulation, constrained firms are less willing to pay cash dividends than unconstrained firms are; when they do pay, they tend to pay lower dividends. With the enforcement of the 2008 regulation, both financially constrained firms and unconstrained firms are forced to choose from two options: restraining dividend payments as a response to aggravated financial constraints, or paying dividends to attain the 'permit' for raising equity financing.	None	Investment policy
Lee & Park (2016)	Financial constraints, board governance and cash holding	U.S.: 19,981 firm-year observations 2001-2009	a) Dividend payout b) Size c) Bond rating d) Paper rating	Financially less-constrained firms have stronger board governance. The levels of cash holdings for such firms increase further with the strength of board governance.	None	Financial resources
Chan <i>et al.</i> (2017)	Effects of financing constraints on CSR behaviour	6,000 firm years in the US 1992-2010	a) KZ index b) Altman Z-score c) Interest coverage ratio	There is a negative association between CSR activities and the degree of financial constraints/distress.	None	CSR activities
Fernandes & Ferreira (2017)	Financial constraints and firms' employment decisions	Portugal: 400,303 firm-year observations between 2002 and 2012	a) External financing dependence b) Asset tangibility c) Trade credit d) SA e) Short-term debt ratios	Firms in industries with above-median dependence on external financing increased their share of fixed-term hires after the GFC. Workers employed by firms in industries with above-median financial constraints are more likely to be hired with a fixed-term contract after the crisis, relative to comparable workers hired by unconstrained firms.	A differential increase occurs of 1.6 percentage points in the share of fixed-term hires for firms with above-median dependence on external finance, relative to other firms.	Employee
Buehlmaier & Whited (2018)	Relation between financial constraints and stock returns	U.S.: 200 observations from 1994 to 2010	Three textual measures of financial constraints (textual analysis of annual reports)	Constrained firms earn higher returns.	None	Investment policy
Cheng <i>et al.</i> (2018)	Impact of access to capital (a proxy for financing constraints) on cost stickiness	China: 241,982 private firms with 10,46,294 firm year observations between 1998 to 2007.	Regional financial market development index	For firms in regions with lower levels of financial development, SG&A costs have lower sensitivity to sales increases and exhibit lower stickiness.	None	Financial resources
Kurt (2018)	Impact of financial	U.S.: 1,317 observations	a) Size b) Dividend	Constrained firms engage in greater upward earnings	A one-S.D. increase in	Earnings management

	constraints on financial reporting quality during a seasoned equity offering (SEO)	between 1983 and 2014	payouts c) WW index d) SA	management than unconstrained firms do around a SEO, as is consistent with the opportunism hypothesis.	discretionary accruals is associated with a 1.14 percentage point decline in announcement returns for constrained firms.	
Dasgupta <i>et al.</i> (2019)	Inventory management by financially constrained firms	U.S.: 430,800 firm-year observations from 1971 to 2010	a) Size b) Credit rating c) SA d) WW Index	When costs are low, unconstrained firms tend to accumulate inventory more rapidly than their constrained counterparts do. However, as the favorable cost shocks ease the financial constraints, constrained firms tend to build inventory surplus to an unfavorable state, resulting in aggressive depletion of inventory when costs increase.	None	Financial resources
Misraku & Zhang (2019)	Financial constraints and innovation	11 African countries: 4720 firms over 2011-2014	Section K of the WBES questionnaire	Financial constraints adversely affect a firm's decision to engage in innovative activities, including in product and process innovation.	None	Investment policy
Zhang <i>et al.</i> (2019)	Impact of financial constraints on investment in pollution control	China: 34,235 observations for 2013	ICF sensitivity	Financially constrained firms face severe limitations in investing in reduction of industrial waste gas emissions.	None	CSR activities
Akamah <i>et al.</i> (2021)	Financial constraints and future tax outcome volatility	U.S.: 20,908 firm-year observations from 1987 to 2011	a) WW index b) KZ index c) Altman Z-score d) Cash-based interest coverage ratio e) Leverage	A positive association exists between financial constraints and the volatility of cash effective tax rates in subsequent periods, and it becomes more pronounced as firms avoid more cash taxes.	A one-S.D. increase in financial constraints is associated with a 9% standard-deviation increase in predicted tax outcome volatility.	Corporate tax avoidance
Cheng <i>et al.</i> (2020)	Association between share pledging and constraints	China: 26,543 firm-year observations from 2003 to 2018	KZ index	Insiders tend to pledge shares in a given year if the firms were constrained in the previous year. This is greater when the constrained firms refrain from paying dividends. Aligned with the agency problem hypothesis, it is documented that firms tend to experience more severe financial constraints when shares are pledged by their shareholders.	None	Financial resources
Habib <i>et al.</i> (2020)	Financial constraints and workforce environment	International: 43 countries from 2002 to 2017	a) Book debt b) Cash c) Operating cash flows	Financially constrained firms tend to have poor workforce environments. Constrained firms domiciled in low (high) employment protection legislation (EPL) countries reduce (do not reduce) investment in their workforce environments.	A one-S.D. increase in debt ratio is associated with a 0.14% decrease in workforce environment.	Employees
Leong & Yang (2020)	Relationship between	U.S.: 27,246 firm-year	KZ index	Financially constrained firms have significantly	None	CSR activities

	financial constraints and CSR activities	observations from 1991 to 2013		higher CSR concerns.		
Zhang (2020)	Relationship between financial constraints and firm survival	China: 3,298,037 firm-year observations from 1998 to 2013	WW index	When the level of financial constraints increases, the chances of firms surviving dwindle.	None	Financial resources
Costa <i>et al.</i> (2021)	Impact of financial constraints on cost asymmetry	U.S.: 124,839 firm-year observations from 1976 to 2016	a) SA b) WW index c) Bondnaruk <i>et al.</i> (2015) text-based measure	Financially constrained firms exhibit less cost asymmetry.	A 1% decrease in sales leads to 14.9 percentage points more reduction in SG&A costs for constrained firms.	Financial resources

V. Conclusions

In this paper, we have reviewed the empirical literature on the determinants and consequences of financial constraints on firms. This literature is based on the premise that external financing is costlier than internal financing, as a result of asymmetric information and agency problems. We include a critical review of the various methods researchers use to measure financial constraints, because there is no consensus on what the best proxy is for such measurement. Financial-statement-based constraint measures are used frequently, but in recent times, text-based measures have begun to gain in popularity, and a significant number of papers use multiple measures as a robustness check.

Sensitivity to ICF, and other investment models, are used predominantly to investigate the determinants of financial constraints. Such determinants include firm-level fundamental, macro-economic, and corporate governance variables. For example, studies related to bank competition fail to address country-level differences in actual and perceived corruption, institutional development, and legal enforcement of contracts, all of which are likely to shape banks' incentives for building long-term relationships with clients. Corporate governance-related studies are advised to focus on whether any particular governance factor(s), such as board independence, CEO non-duality, subcommittees (e.g., an audit committee) and/or the existence of advisory directors, might help to alleviate financial constraints.

Among the studies on the consequences of constraints, the KZ index is a popular measure of financial constraints, and the broad themes for studies on consequences are financial resources, investment policies, financial reporting quality and tax avoidance, and corporate governance. Future studies related to financial constraints should focus on the characteristics of directors, including their financial expertise, that are likely to influence the effectiveness of agency problem-monitoring and, in turn, to affect the use of internal financial resources by financially constrained firms. Studies related to CSR have reverse causality concerns—in other words, it is possible that past CSR performance can lead to lower future-period financial constraints. In addition, this causal relationship can be affected by mediating factors such as firm size, age, and growth opportunities.

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