

Bakhtiari, Sasan; Breunig, Robert; Magnani, Lisa; Zhang, Jacquelyn

**Working Paper**

## Financial Constraints and Small and Medium Enterprises: A Review

IZA Discussion Papers, No. 12936

**Provided in Cooperation with:**

IZA – Institute of Labor Economics

*Suggested Citation:* Bakhtiari, Sasan; Breunig, Robert; Magnani, Lisa; Zhang, Jacquelyn (2020) : Financial Constraints and Small and Medium Enterprises: A Review, IZA Discussion Papers, No. 12936, Institute of Labor Economics (IZA), Bonn

This Version is available at:

<https://hdl.handle.net/10419/215332>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

DISCUSSION PAPER SERIES

IZA DP No. 12936

**Financial Constraints and Small and  
Medium Enterprises: A Review**

Sasan Bakhtiari  
Robert Breunig  
Lisa Magnani  
Jacquelyn Zhang

JANUARY 2020

## DISCUSSION PAPER SERIES

IZA DP No. 12936

# Financial Constraints and Small and Medium Enterprises: A Review

**Sasan Bakhtiari**

*Department of Industry, Innovation and Science Australia*

**Robert Breunig**

*Australian National University and IZA*

**Lisa Magnani**

*Macquarie University*

**Jacquelyn Zhang**

*Australian National University*

JANUARY 2020

Any opinions expressed in this paper are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but IZA takes no institutional policy positions. The IZA research network is committed to the IZA Guiding Principles of Research Integrity.

The IZA Institute of Labor Economics is an independent economic research institute that conducts research in labor economics and offers evidence-based policy advice on labor market issues. Supported by the Deutsche Post Foundation, IZA runs the world's largest network of economists, whose research aims to provide answers to the global labor market challenges of our time. Our key objective is to build bridges between academic research, policymakers and society.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

ISSN: 2365-9793

**IZA – Institute of Labor Economics**

Schaumburg-Lippe-Straße 5–9  
53113 Bonn, Germany

Phone: +49-228-3894-0  
Email: [publications@iza.org](mailto:publications@iza.org)

[www.iza.org](http://www.iza.org)

## ABSTRACT

---

# Financial Constraints and Small and Medium Enterprises: A Review\*

We review the literature on financial constraints and the performance of small and medium enterprises (SMEs). We consider the important role that SMEs play in the economies of Australia and the Organisation for Economic Cooperation and Development. We examine the role of financial constraints in SME growth, with emphasis on business cycles and credit access. We discuss issues that SMEs face in accessing financial resources for expansion. We look at the literature that evaluates the impact of financial constraints on key outcomes: employment, productivity and wages. We review key policy debates and consider where government involvement might be appropriate.

**JEL Classification:** D22, L25

**Keywords:** small and medium enterprises (SME), firm financial constraints, government business assistance, employment, wages, productivity, innovation

**Corresponding author:**

Robert Breunig  
Crawford School of Public Policy  
Australian National University  
Canberra ACT 0200  
Australia  
E-mail: [Robert.Breunig@anu.edu.au](mailto:Robert.Breunig@anu.edu.au)

---

\* This research was supported with funding from the Australian Research Council, Discovery Grant ARC160101914.

## **1. Introduction**

In Organisation for Economic Cooperation and Development (OECD) countries, small and medium-sized enterprises (SME) account for a significant part of the private sector and constitute 50 to 60 per cent of value added (OECD, 2019a). SMEs have played an important role in job creation and economic dynamism. They serve as an engine of job creation (Birch, 1987; Neumark et al., 2011; Ayyagari et al., 2011) and are seedbeds of developing entrepreneurial talent and innovation (Acs and Audretsch, 1987; Acs et al., 1994; Brunswicker and Vanhaverbeke, 2015). Small businesses are flexible in keeping up with changing markets, responsive to new opportunities and quicker to adapt to capture economic upswings than large firms.

However, these economic benefits can only materialise if small businesses survive and thrive. Access to finance is often cited as an important factor in the survival and growth of small businesses. The lingering effects of the global financial crisis, persistent financial instability and diffused risk in credit markets are putting downward pressure on job creation and income security in Australia and many OECD economies. Together, they suggest the need to reconsider the impact of firms' access to financial resources and its relationship to labour market outcomes. Policies designed to guide and support employment and competitiveness while preserving financial stability need to be based upon a knowledge of the effect of firms' financial constraints on employment, wages and growth. This knowledge will be key in effectively targeting interventions for firms whose success is held back by lack of financing.

This paper surveys recent advances in the literature on the channels through which firms' financial conditions impact workers. We focus on small and medium enterprises (those with less than 250 employees) in Australia and other major OECD economies. We summarise and

analyse the conclusions from the growing literature on the effect of firms' financial conditions on employment, productivity and wages.

The rest of the paper is organized as follows. Section 2 reviews the role of SMEs in OECD economies. Section 3 discusses the role of financial constraints for SMEs in the context of business cycles and economic crises. Section 4 illustrates the impact of limited access to financial resources for SME growth and development. Section 5 focuses on the effect of SMEs' financial constraints of key labour outcomes: employment, wages and productivity. Section 6 reviews key policy debates and section 7 concludes.

## 2. The Role of SMEs: An OECD Picture

Small and Medium-sized Enterprises (SMEs), those firms with fewer than 250 employees, constitute the bulk of the businesses in OECD countries (Table 1). Even when excluding sole traders and firms that have no paid employees, over 99 per cent of firms are SMEs in most OECD countries. Germany has the lowest proportion, at 97.6 per cent, of small firms. Across the OECD, SMEs contribute between 50 to 60 per cent of all value added (OECD, 2019a)

Country	Count		Percentage
	All Firms	SMEs	SME
<b>Germany</b>	190,541	186,044	97.6
<b>Switzerland</b>	20,050	19,679	98.1
<b>Austria</b>	25,477	25,003	98.1
<b>Russia</b>	35,6867	352,735	98.8
<b>Hungary</b>	50,809	50,357	99.1
<b>Iceland</b>	2,106	2,090	99.2
<b>Croatia</b>	19,539	19,373	99.2
<b>Estonia</b>	7,507	7,445	99.2
<b>Norway</b>	17,001	16,886	99.3
<b>Lithuania</b>	20,268	20,131	99.3
<b>France</b>	197,657	196,272	99.3
<b>Slovenia</b>	19,376	19,260	99.4
<b>Spain</b>	168,717	167,870	99.5
<b>Turkey</b>	391,024	389,046	99.5

<b>Sweden</b>	53,674	53,388	99.5
<b>Netherlands</b>	66,662	66,339	99.5
<b>Latvia</b>	10,921	10,869	99.5
<b>Portugal</b>	67,555	67,261	99.6
<b>Slovakia</b>	72,563	72,260	99.6
<b>Australia</b>	125,035	124,512	99.6
<b>Cyprus</b>	5,024	5,015	99.8
<b>Greece</b>	57,373	57,243	99.8
<b>Malta</b>	2,146	2,146	100

Table 1 The proportion of SMEs from total business count by country in 2017. The statistics exclude non-employers. Source: OECD Structural and Demographic Business Statistics

Among OECD countries, Australia has one of the highest proportion of SMEs. The SME sector combines a wide range of firms, even in terms of size. In Australia, for instance, it includes 2.182 million small firms, defined as those with fewer than 20 employees. These firms make up the bulk of the 2.234 million SMEs in 2016–17. A substantial proportion of these small firms are family-owned and many are operated by sole traders and are thus not legally distinct from their owners.

A subcategory of small firms within the SME group is ‘micro-firms’, those with fewer than 5 employees. Within these micro-firms, one further finds a large population of sole traders and non-employers (firms with zero paid employees).<sup>1</sup> Because non-employers, small firms and medium-sized firms respond differently to government policies and stimuli, one might want to study them separately, depending on the research question. For example, most government assistance programs in Australia are unavailable to non-employers, hence, that group can be excluded from policy evaluations without any loss of generality.

---

<sup>1</sup> The Australian Bureau of Statistics (see <https://www.business.gov.au/planning/business-structures-and-types/business-structures/sole-trader>) states “A sole trader business structure is a person trading as the individual legally responsible for all aspects of the business. This includes any debts and losses, which can’t be shared with others. This is the simplest, and relatively inexpensive business structure that you can choose when starting a business in Australia. As a sole trader, you’ll generally make all the decisions about starting and running your business, although you can employ people to help you.”

Regardless of the size, there is a large international literature on the important contribution made by SMEs to job creation (Moscarini and Postel-Vinay, 2012; Haltiwanger et al., 2013; De Wit and De Kok, 2014).

This is clearly the case in Australia as well. The SME sector is Australia's largest employer. The small business sector in Australia, by itself, employed around 4.8 million people at the end of June 2017—up 66,000 or 1.4 per cent compared with the previous year). Small businesses are responsible for 44 per cent of total employment, 35 per cent of total Industry Valued Added (IVA), and 34 per cent of sales and services income. However small businesses only pay 28 per cent of total wages and salaries (see Gilfillan, 2018 and Australian Bureau of Statistics (ABS) Cat.No.8155.0). The small business sector in Australia is more likely to employ casual workers and tends to pay them less than in other sectors of the economy (Gilfillan, 2018). This accords with the evidence that SMEs have lower labour productivity than large firms. This would appear to be particularly true for the smaller firms in the SME category.

The ABS reports that medium-sized businesses in Australia – 51,027 companies with 20-199 employees – employ almost 2.5 million people. Despite being much smaller in number, these firms generated 22 per cent of the IVA and paid about 28 per cent of the wages and salaries (ABS Cat.No.8165.0).

The gap in productivity between SMEs and large firms is large, not just in Australia but across many of OECD countries (OECD, 2019a). Because of the role played by capital investment and economies of scale in manufacturing, these gaps are wider in manufacturing than in services (OECD, 2019a, p. 34).

Both internal and external factors contribute to labour productivity in SMEs: managerial skills and management practices, workers' training, ICT and digitalisation, network activities including participation in clusters and global supply chains, and of course innovation, including



through R&D investment. Access to finance is cited as an important enabler of productivity-enhancing investments in all of these areas (Czarnitzki and Hottenrott, 2011). For example, using firm-level data from the Bureau van Dijk's *Amadeus* database, Ferrando and Ruggieri (2018) study the relation between firms' financial structure, access to external finance, and total factor productivity in several Euro area countries in the period 1995–2011. After controlling for the endogenous relationship between labour decisions and productivity innovations, they find an elasticity of total factor productivity with respect to financial constraints of -0.18 per cent.<sup>2</sup> The estimate is statistically significant and quite large. The elasticity is larger for small, young, and private companies. Moreover, the effect is persistent over time: lagged financial constraints affect current total factor productivity. The elasticity also appears to have become larger during the recent financial crisis.

Cross-country studies on the interrelation between economic performance of small and large firms are scarce. However, the existing literature suggests that an 'optimal' industry structure exists in terms of the SME share in economy-wide value added, and that deviations from this optimum come at a cost of forgone economic growth. Studies that focus on the dynamic interaction between productivity increases of SMEs and large firms are useful in addressing these questions (e.g., Carree and Thurik, 1998; and Audretsch et al., 2002).

Focusing on labour productivity spilling over from SMEs into larger firms and the aggregate economy, van Stel et al. (2019) empirically investigate the relative importance of channels such as knowledge spillovers, competition effects and the provision of high-quality intermediate goods and services in 26 Member States of the European Union (EU) for the period 1997-2015. Their analysis shows that a one percent increase in SME productivity increases productivity of large firms by 0.124 percent. The impact of a one percent increase in SME productivity on total

---

<sup>2</sup> Ferrando and Ruggieri (2018) build a synthetic (continuous) indicator which spans different dimensions of the firm which are related to the presence of financial constraints

(economy-wide) productivity growth is 0.63 percent. The spillover productivity effect from SMEs to larger firms is considerably stronger for countries with a bigger share of SMEs in the economy.

In terms of creativity, 70 per cent of businesses with 200 or more employees were innovation-active in 2016–17, compared to 36 per cent of businesses with 0 to 4 persons employed in the same year (ABS Cat.no.8166). Innovation by small young firms, in particular, is an integral part of the creative destruction process. In sections 3 and 4 below, we explore the role of SMEs in innovative activity.

In summary, SMEs claim an important chunk of economic activity in most OECD economies, making up the vast majority of firms and accounting for a sizeable amount of employment and value added. However, they have lower productivity, and this is at least partly due to financial constraints. SME productivity is an important issue both because of their importance in the economy but also because of the role they play in the creative destruction process and the spillovers they generate for large firms and economy-wide productivity.

Next, we turn to an assessment of the role of access to finance in the success or failure of SMEs.

### **3. SMEs and Access to Finance**

Determining which factors support or hinder SME performance is an important policy question for most OECD countries. Many countries have explicit policy objectives towards creating a supportive business environment for SMEs with the objectives of increased firm performance and employment creation. While there are many elements to a supportive business environment, considerable research has identified access to finance as a core constraint to SME performance (Holton et al., 2013).

Numerous studies have documented that SMEs are more financially constrained than large businesses. (We discuss the measurement of financial constraint in the next sub-section.) But, why do financial constraints present such a challenge for small businesses? There are a variety of reasons, one of which is the ability to deal with financial need through some type of internal re-allocation. Unlike large firms, who can internalize many of their financing needs through capital re-allocation, SMEs have to rely primarily on external financial resources (Beck and Demirguc-Kunt, 2006).

The root of the problem is that capital markets are imperfect and information is not, or cannot be, fully shared between all agents. Akerlof (1970), and later Stiglitz and Weiss (1981) among others, contemplated the implications of information asymmetry for the type of transactions that can take place and foresaw the possible path to market failure. In the market for financing, in particular, a firm's owner or manager has a full understanding of the value and the probability of success of the investment project that the firm is undertaking. Investors, on the other hand, cannot do a proper evaluation and have to assume that there is some probability that the project is a *lemon*. The perception of risk pushes investors to raise the cost of lending, creating a wedge between the cost of internal and external financing. Under such conditions, firms might decide not to seek external financing and rely on internal resources only; see Myers and Majluf (1984).

In this setting, size matters. Larger and more mature firms are less affected as they have a past history that can mitigate investors' concerns. Large firms also have larger tangible assets which can act as collateral. Having collateral is shown to provide better access to financial markets (Almeida and Campello, 2007). Small, young firms, on the other hand, lack a history and sizeable assets. These firms feel the full brunt of market frictions (Carpenter and Petersen, 2002).

These problems are aggravated when the firm is facing financial constraints. Lack of internal funds puts a strain on firms facing financing issues. As a result, the decision to invest and the amount of investment in these firms is sensitive to their internal finances. Fazzari et al. (1988) and Fazzari and Petersen (1993) test this theory using firms' internal cash flow and working capital, respectively, as proxies for financial constraint. They find that the firm's decision to invest in capital is sensitive to both cash flows and working capital.

In many cases, inefficient credit markets and lack of appropriate financing instruments leave the small players no other choice than to seek informal financing, which increases the potential financing risk and may further worsen the binding financial condition. This issue is more acute in developing countries where a thriving shadow banking competes with formal sector lenders.

In addition, without adequate production capacity to weather macro-environment fluctuations, small businesses appear to be more susceptible to financing difficulties induced by falling demand (Cowling et al., 2015). Further, the initial sunk cost in business set-up pushes small firms to delay additional investment before the viability of the start-up becomes relatively certain (Cabral and Mata, 2003). Both issues will be discussed in more details in Sections 3.2 and 4.4.

These issues aggravate the financial constraint situation that small businesses face during the early years of existence and hamper their survival and growth. Studying the impact of financial constraints on business dynamics must be based on these features of SMEs. Next, we discuss varying approaches in the literature to measuring financial constraints.

### **3.1 Measuring financial constraints**

We turn not to a brief discussion of the measurement of financial constraints. Papers have used the wedge between the costs of using external and internal funds (see, for example, Kaplan

and Zingales, 1997), the cash-flow sensitivity of investments (Fazzari *et al.* 1988) or a firm's cash flow (Carpenter *et al.* 1998; Chapman *et al.* 1996).

Cash-flow sensitivity of investments may not be a good proxy for financial constraints as a number of studies have found evidence that constrained firms' investment are less sensitive to cash flow (Carreira and Silva, 2010). This argument is supported by Kadapakkam *et al.* (1998) and Cleary (1999). Almeida and Campello (2007) draw similar conclusions. Recently, Dasgupta and Sengupta (2007) find that the response of investment to cash-flow shocks for Japanese firms is non-monotonic, further lending support to Kaplan and Zingales (2000) and Cleary (1999).

Other studies have suggested using an *a priori* firm classification or constructing indexes that allow one to measure the degree of constraints that, in their turn, use proxies such as (a) dividend payout ratio; (b) firm self-evaluation; (c) cash stocks; (d) degree of leverage; (e) age, size; (f) institutional affiliation; (g) credit ratings. All of these items have been shown in previous empirical studies to be strongly correlated with the presence of financial constraints.

### **3.2. Economic downturns and SME financing**

Financial constraints affect SME growth and survival through two channels during economic instability. Unlike large companies, which are better placed to absorb cyclical fluctuations in demand, small businesses are more vulnerable to swings in revenue growth. This is especially true during economic downturns when business revenue decreases and the demand for external finance increases. Smaller businesses may also lack the competitive advantage in production and market presence that their larger counterparts enjoy. As a result, these firms, when financially constrained, might find it more difficult to survive.

A second problem is that financial constraints also arise from higher financing costs charged by potential lenders to compensate for the risk associated with economic decline. This falls

particularly hard on small firms. The already limited access to financial resources becomes even worse for small firms, and credit denials drive more small enterprises to exit the market.

Cowling et al. (2012) provide supporting evidence by constructing a UK longitudinal SME data source running from the pre-recession (2007/2008) through the post-recession years (2008/2010). They particularly analyse how credit demand and supply changed during the recessionary period as compared with the pre-recession time. They find that businesses experiencing growth stagnation or revenue decline during a recession are more likely to increase demand for credit. However, only the larger and older firms succeed in accessing capital; the smallest firms were completely cut off from all financing sources for three months. The authors also point out the failure of lending institutions to facilitate economic recovery by ignoring the growth and economic stimulating potential of micro-enterprises and blocking them from obtaining additional finance. Expanding the argument along this line, Cowling et al. (2015) and Cowling et al. (2018) highlight the performance and growth potential of SMEs after the recession. They find that entrepreneurs' confidence recovers faster than large firms coming out of the recession. Moreover, young firms remain resilient in their rapid growth.

Similarly for the UK, North et al. (2013) discuss the impact of financial collapse on technology-based small businesses. Due to the nature of innovation and R&D intensity, these firms are financially more restricted than others. The study documents that external financing is especially difficult to access during periods of macroeconomic stagnation or volatility. Even when the financing chance is available, the terms and conditions set by lenders are hard to accept for small enterprises. All of these are reported to hamper the growth potential of small firms. Other studies on innovative SMEs over the financial crisis yield similar insights.

Again for the UK, using a data set of more than 10,000 SMEs, Lee et al. (2015) examine the differential impacts of the financial crisis on credit access for innovation-intensive and non-

innovation-intensive firms. The article finds that small enterprises with high innovative intensity have a higher chance of being turned down when seeking external financing than less innovative small firms. This disadvantage for innovative firms grows during the crisis. Yet, Bartz and Winkler (2016) depict a slightly different story with German data. In their study, small firms with limited resources appear to be able to mobilize additional funding during the financial crisis and do not appear to have lower growth. The authors suggest that fast-growing small firms maintain their advantage during this economic turmoil. The article also points out the peculiarities of the German economy, such as the lending traditions in the banking system and the government's strong liquidity support to banks. These differences may have acted to protect small businesses from negative impacts of the crisis.

De La Torre et al. (2010) document competing evidence with bank survey data covering 12 emerging markets from both developed and developing countries. Their results suggest that the majority of SME financing comes from the broad range of services provided by large banks rather than relationship lending from small and niche banks, and that this pattern has not been affected by the Global Financial Crisis (GFC).

Other work has looked at the aggravating effect of business cycles and financial shocks on financially constrained firms. Duchin et al. (2010) use the global financial crisis in the US, where Goyal and Yamada (2004) look at Japan's asset bubble burst in the 1990s. Both demonstrate that financially constrained firms had a more sensitive response during the business cycles than other firms. Studies on SME's financing-growth relationship at the specific periods of economic disequilibrium are still limited to evidence obtained from a few countries and the results are inconclusive. The global financial crisis in 2007 exposed the world economies to great economic challenges. A comprehensive understanding of how economic fluctuations affect the financing-growth nexus and a thorough assessment of the potential

damage it might have had post-crisis on available financing options to small businesses requires more empirical evidence.

## **4. Financial Constraints and SME Survival and Growth**

SME's ability to effectively contribute to the economy with their unique advantages is conditional on firm survival. However, it is well-known that the SME sector is plagued by low prospects of firm survival. About 20 per cent of start-ups exit the market after the first year of entry and more leave in the following year. Only a small fraction move onto a path of fast growth (OECD, 2005; Bartelsman et al., 2005). In Australia, 24 per cent exit in the first three years, and only 39 per cent of new firms eventually reach the age of 10 (Bakhtiari, 2019a).

Many external and internal factors determine the short life expectancy of small enterprises or prevent them from growing to their optimal size. These include, but are not limited to, financing obstacles, taxation, regulation, corruption, crime, early international expansion, and deficient management skills (Schiffer and Weder, 2001; Beck and Demirguc-Kunt, 2006; Lee et al., 2012). With international evidence from OECD countries, lack of access to external finance has been shown to be the most direct and robust determinant of firm dynamism amongst SMEs (Pissarides, 1999; Beck and Demirguc-Kunt, 2006; Zehir et al., 2006; Ayyagari et al., 2008; Bridges and Guariglia, 2008; Gill and Biger, 2012).

### **4.1 Financial Service and SME Dynamics**

Reviewing the effects of financial constraints on entry, survival and growth of SMEs is inseparable from understanding the financing environment in which SMEs seek funding support and the financial resources available to the firm. Existing research indicates that improving the financial environment is the most effective way to facilitate businesses passing through the growth restrictions induced by financial constraints (Beck and Demirguc-Kunt, 2006).



Financial intermediaries play an important role in determining the degree to which financial constraints negatively impact on SMEs. Whether such intermediaries help or hurt firm liquidity depends in part on the level of development of the financial service system. There is a substantial literature that suggests that a developed financial service system can relax the financial constraint. An underdeveloped financial service system, on the other hand, can only aggravate the credit constraint that SMEs face.

With survey data from Central and Eastern European countries, Pissarides (1999) highlights the importance of credit constraints in hindering growth of the SME sector, and attributes it to the underdeveloped local financial system and the lack of appropriate financing instruments tailored to small businesses. Schiffer and Weder (2001) also document that smaller firms frequently list liquidity constraint as the major obstacle of operation and growth in the World Business Environment Survey data. Based on a sample of more than 200 SMEs in Slovenia, Bukvic and Bartlett (2003) further point to the high financing cost, e.g., cost for credit and loans, bank collateral requirements, alongside other bank charges and fees, as the key financial barriers to SME growth. It is the same story with Australian small businesses where access to finance, especially for innovation, tops the list of challenges they face (ASBFEO, 2019).

The financing channel not only can hamper growth, but in some cases may be used as a tool to generate an entry deterrence for new small business. Cestone and White (2003) provide a theoretical framework on a mechanism where incumbents' choice of financial instruments deters the entry of others, suggesting that the existing lending relationship can manipulate the behaviour of potential investors towards new entrants. This financial barrier to newcomers is even more important when the credit market is less competitive (Cetorelli and Strahan, 2006).

The above studies concentrate on either a single country or nations in similar economic development circumstances. To accommodate sufficient variation in the level of financial

development, cross-country comparisons can shed light on the implications of improved credit market on SME finance for developed countries.

With a dataset covering 54 developing and developed countries, Beck et al. (2005) document that financial and institutional development significantly ameliorate the financial obstacles faced by small businesses. Moreover, Beck et al. (2008a) exploit the full range of financing choices faced by large and small businesses, and find that property right protection greatly promotes SME's success in obtaining bank financing. Using a cross-country sample on industries from the manufacturing sector, Beck et al. (2008b) identify that financing development significantly benefits the growth of industries more dependent on SMEs. With data on SMEs from the European information and technology industry, Moreira (2016) confirms the contribution of widened credit accessibility on the growth of SME.

#### **4.2 SME, access to credit and innovation**

The problem of access to financial resources is more acute for SMEs planning to invest in Research and Development (R&D) and innovation projects. The risks involved in R&D and innovation and the uncertainty of outcomes and doubts about the commercial success of the end product increase the size of the wedge between the cost of internal and external finance. The matter is made worse by the lack of complete appropriability of the returns due to knowledge spillovers.

Himmelberg and Petersen (1994) use a small panel of small-sized high-tech firms and show that R&D investment in these firms are as sensitive, if not more, to internal finances as the decision for general capital investment. Similar sentiment is echoed through the literature on R&D investment where small young firms are shown to face much more difficulty in attracting investment for R&D and innovation, whereas larger firms are mostly unaffected (see Westhead and Storey, 1997; Freel, 2007; and Hall and Lerner, 2010; for instance).

### **4.3 The role of informal financing resources**

During their early years of existence, SMEs might be under-served by capital markets and formal financial institutions. Business owners are forced to rely on self-financing, borrowing from family members or friends, or trade credit, along with other informal financing methods. For instance, in Slovenia the data suggest that more than two thirds of small businesses finance over half of the start-up capital with their own savings (Bukvic and Bartlett, 2003).

In the face of severe financial distress, informal financing could save businesses from exiting and the reputation built in the informal financial market may contribute to successful financing in the formal credit market in the future. Thus, a stream of literature investigates the SME financing-survival/growth nexus through the lens of informal financing.

Evans and Jovanovic (1989), with US household labour surveys, point to the underlying reasons why wealthier people tend to be more successful in starting businesses due to the larger amount of initial capital at their disposal. Their paper provides early empirical evidence on how access to sufficient self-financing determines the survival prospects of business start-ups.

Holtz-Eakin et al. (1994) examine entrepreneurial business growth using US federal income tax return data. By exploiting the bequest-induced increase in the available capital for entrepreneurs, the authors find that the substantial financial windfall from inheritances contributes to the growth of small businesses. Inheritances play two roles. First, they make it more likely for a small business to be started. Second, conditional on survival, they contribute to business growth through an extra capital injection.

Woodruff (2001) documents that informal credit and trade credit are much more common sources of financing than formal external finance for Mexican start-ups. Micro-enterprises located in states with higher emigration rates to the US tend to receive more informal loans,

which suggests that remittances are an important capital source and might affect micro-business development.

Again using Mexican data, Hernández-Trillo et al. (2005) compare the formal and informal financing sources available to small businesses and find that formal financial sources appear to invest in more efficient businesses than the informal instruments, providing a screening and monitoring function for micro-enterprise. Furthermore, Severin et al. (2004) explore the possible complementarity between bank loans and trade credit. With US small businesses data, the study concludes that informal financing helps small enterprises build reputation and signal business quality, which facilitates their subsequent access to formal financing sources.

#### **4.4 Sunk Cost and SME Dynamics**

Another source for SMEs' susceptibility to financial constraints is from the high degree to which the costs of establishing productive and technological capacities are sunk costs (Cabral, 1995). Sunk costs and uncertainty about viability drive new entrants to delay further investment until the start-up shows signs of profitability. This magnifies the binding financial constraint issue for small firms in the early years of existence (Cabral and Mata, 2003; Bartelsman et al., 2005). Moreover, a lack of scale economies makes it impossible for small businesses to compensate for the sunk cost with reduced average costs for production and transactions. High expenses incurred by small businesses on entry become another detrimental factor to SME survival and growth.

Fonseca et al. (2001) provide evidence from an OECD perspective on the relationship between initial set-up cost and business development by testing the effect of business start-up costs on owner's employment decisions. The results indicate that higher setting-up costs discourage owners from hiring workers, thus hampering small enterprise development. The authors also provide a theoretical explanation about how high initial start-up costs lead to fewer

entrepreneurs and more paid workers in a market. People choose to enter the market as employees rather than as business owners.

Using data from 36 different developed and developing economies, Gschwandtner and Lambson (2002) find suggestive evidence that higher sunk costs lead to more stability in the incumbent firms – that is less entry and exit but also higher survival rates for existing firms, large and small. In contrast, based upon within-country investigation with a panel data set covering an extended 30-year period for US manufacturing industries, Ghosal (2007) finds that higher sunk costs create profit uncertainty and this uncertain profitability leads to a lower chance of small business survival. He examines in some detail the effect of sunk cost-induced profit uncertainty on firm survival and the distribution of firm size. The result is supportive of the notion that higher sunk costs lower the survival probability of small firms; large incumbents are less affected. The overall impact on firm size distribution means a bias towards large firms as more attrition takes place among small firms due to the sunk costs.

Concentrating on a UK panel of SMEs, Requena-Silvente (2005) examines the relationship between sunk costs and firm dynamics in the context of foreign market participation. Based on the previous literature, the paper extends the definition of sunk business setting-up costs to refer to outlays associated with obtaining overseas market information and establishing distribution networks. Hence, it regards the firm's exporting choice as the overseas market entry and exit decision. The conclusion drawn is that sunk start-up costs contribute to SME's opting to continue business in the foreign market, but the effect falls as the firm ages.

## **5. SME, Financial Constraints and Employment**

Despite the generally more stable financial conditions in recent years, the overall economic recovery from the GFC has been slower in some OECD areas than in others, causing difficulties

in SMEs access to financial resources, particularly in fragile economies (e.g., Italy and Hungary). In Australia, the gap between the lending rates to small and large businesses has been constantly growing from 2002 to 2018, a trend that accelerated following the financial crisis. By 2018, small firms are charged almost double the interest rate charged to larger firms on their loans (Figure.1).

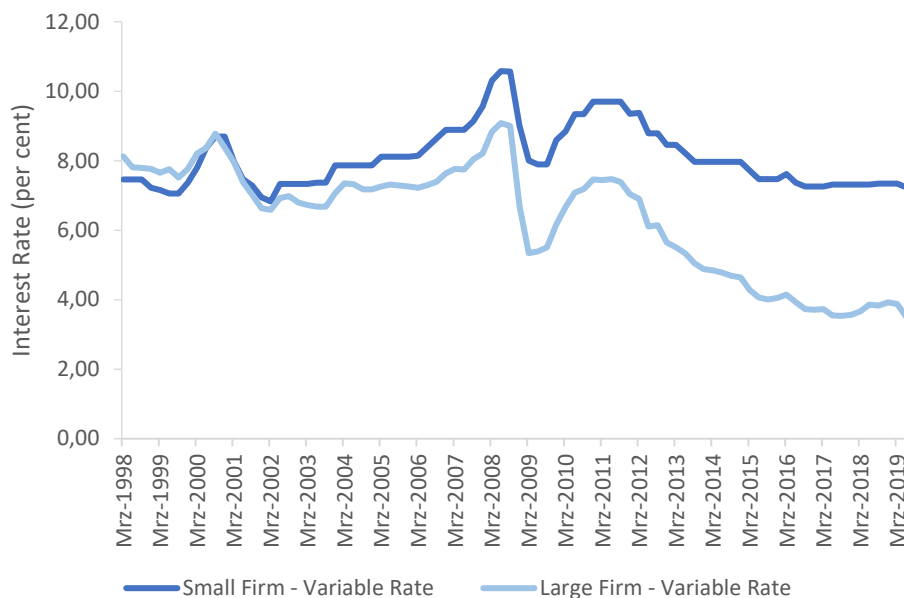


Figure.1: Variable interest rates charged to small and large firms. Source: RBA F5 statistics.

Understandably, one of the countries most affected by the GFC was the US. Lending to small businesses in the US fell dramatically after the onset of the Great Recession. Duygan-Bump et al. (2015) find that during the Great Recession workers were more likely to become unemployed if they worked in sectors with high external financial dependence. In these sectors the impact of the recession on the likelihood of becoming unemployed was stronger for workers in smaller firms.

Other papers in the literature have established an even stronger role for credit constraints in investment and employment decisions in the United States (Duchin et al., 2010) and in Ireland (Gerlach-Kristen and Merola, 2019). Siemer (2019) finds that employment declined substantially during the 2007–2009 recession in the US, especially in small and young firms. Using confidential, firm-level data on the universe of firms from the Census of Employment and Wages Data and a difference-in-differences methodology, this paper estimates that financial constraints reduced employment growth by 4 to 8 percentage points in small firms relative to large firms and by 7 to 9 percentage points in young relative to old firms.

Berton et al. (2018) analyse the employment effects of financial shocks using a rich data set of job contracts, matched with the universe of firms from administrative data and their lending banks in one Italian region (Veneto). Their preferred estimate indicates that the average elasticity of employment to a credit supply shock is 0.36. Adjustment affects both the extensive and the intensive margins and is concentrated among workers with temporary contracts.

Not surprisingly, difficulties in accessing credit are often cited among the challenges for firms' competitiveness, employment growth and job quality in Australia (Debelle, 2010; CPA Australia Asia-Pacific Small Business Survey, 2012). Evidence shows that constrained firms tend to plan deep cuts in employment, as well as in capital spending (Campello et al., 2010). In the OECD countries, the effect of credit constraints on workers appears to be worse for those in part-time or in casual employment (McDonnell and Burgess, 2013).

Overall, this literature suggests that there are two issues in the financial system. First, there is evidence of a structural problem which restricts access to finance for innovative firms. Second, cyclical problems, often associated with financial crises, impact relatively more severely on non-innovative firms.

## 5.1 Wage and productivity effects

Wages and productivity are often referred to interchangeably, and labour productivity in many papers is proxied with wage (Castillo et al., 2014). Therefore, evaluating the impact of financial constraints on wages and productivity isn't always straightforward.

Tan (2009) employs data over a period of 14 years from a random sample of Chilean SMEs to study financing support intervention. The random selection and the long duration of the panel data result in a relatively clean identification for the study. The finance program in Tan (2009) shows a positive effect on wages and labour productivity in the medium term (4-5 years). Benavente et al. (2007) use a shorter time period to study the same program and find no effect of significant change. The studies point out heterogeneous impacts across different financing lines, so the two sets of results are not necessarily inconsistent. Credit guarantees appear to be the least effective way to spur firms' productivity and more targeted financing projects appear to better aid firm technological development.

Evidence from Lopez-Acevedo and Tinajero-Bravo (2010) in Mexico also suggest important heterogeneity in outcomes. They use ten years of data, control for selection and study a relatively short period post-program in their evaluation. While their results are not indicative of a robust effect from a credit relaxing program on wage increases, they do show significant influences on other dimensions of SME performance and employment.

Similar conclusions can be drawn on productivity with evidence from South Korea. In the aftermath of the Asian financial crisis, the Korean government adopted a credit guarantee policy to promote SME development. Oh et al. (2009) conclude that this policy change is associated with growth in employment, sales and wages. However, this study does not support a definitive relationship between the policy and productivity changes in recipient firms.



Garcia-Tabuenca and Crespo-Espert (2010) investigate the impact of traditional SME-support programs in Spain and show that improved credit access facilitated by the supporting guarantee system is associated with productivity gains. The findings highlight that the weakest firms are those that benefit the most from the guarantee support.

In conformity with those findings, Asdrubali and Signore (2015) provide further evidence with data from a wide range of European countries in the period 2005-2012. Their study finds positive and relatively large effects of guarantee programs on SME beneficiaries' employment, production, profitability and productivity in the five years following the issuance of a guaranteed loan. Again, micro and young SMEs benefit the most from the guarantee programs.

Michelacci and Quadrini (2005) analyse the effect of financial constraints on firms' compensation structure. They suggest that financially constrained firms pay lower wages in exchange for higher future wages, effectively borrowing from their employees.

One well-documented area in the financial constraint literature is the effect on firm innovation and productivity. Since innovative activity and productivity change go hand-in-hand, financial subsidies on R&D activities can have implications on SMEs' productivity by relaxing their budget constraint related to innovative activity. Özçelik and Taymaz (2008) examine this relation with data from the manufacturing sector in Turkey. The results indicate that public R&D loans and grants generate a crowding-in effect on firms' R&D intensity and boost the firm productivity accordingly. Caggese (2019) provides new empirical evidence on the negative relationship between financial frictions and productivity growth over a firm's life cycle. Financing frictions matter for the overall degree of competition in an economy because they act as a barrier to entry that reduces competition and the risk-taking of young firms.

Though many of the existing studies show a strong relationship between SME productivity increases and access to finance, many others suggest that impacts on SME wage and

productivity are quite mixed. Some studies even criticise the efficiency and legitimacy of loans and credit guarantee schemes because (i) they may support entry to market of some unqualified entrepreneurs (De Meza, 2002), and (ii) they might impact on the long-term development of the SME sector by making these firms highly dependent on government support (Oh et al. 2009). We know that the exit of underperforming firms is a key aspect of aggregate productivity increases and support programs to SMEs may prevent those (unproductive) firms that ought to exit from exiting.

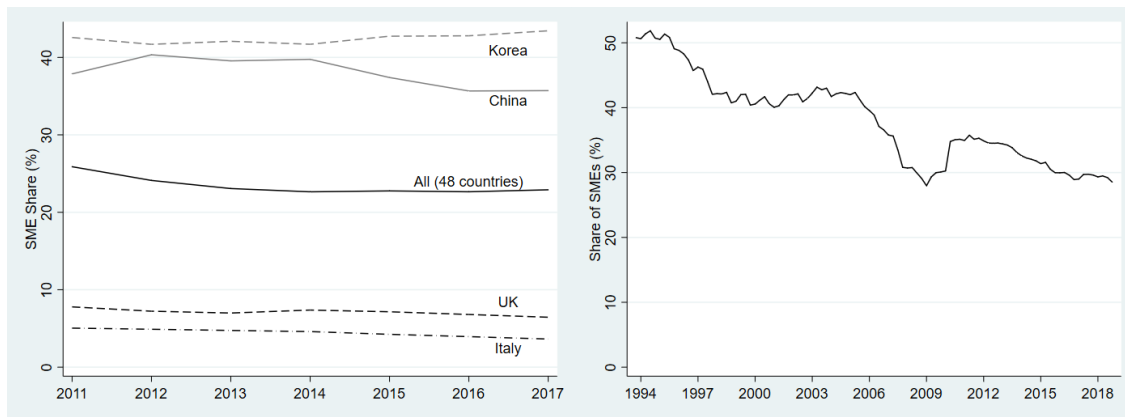
In summary, there is no wide-reaching consensus in the literature and more rigorous evaluation of government programs which are designed to improve access to credit for small firms is required.

## **6. A Policy View**

The lacklustre growth across global economies that followed the GFC has put job creation and growth high on the agenda in most countries and especially in the industrialised countries. Stagnating wage growth and a falling labour share of production is adding pressure on policymakers to take some action. Access to finance is one effective way of improving the job market outcomes without direct intervention which could be distortionary and mis-guided.

There is in fact much scope for policy action. For one thing, SME financing has not improved even as economies recovered from the shock of the GFC. OECD (2019b) shows that access to finance still remains a major concern among SMEs a decade after the GFC. A growing number of SMEs are relying on internal finance for investment, with the share of SMEs doing so increasing from 35 per cent in 2014 to 44 per cent in 2018 (Figure.2(a)). The trend hints that an increasing number of small firms are financially constrained and struggling to grow.

In Australia the share of loans that goes to SMES has been gradually falling over the years, pointing to an increasing number of SMEs feeling financially constrained (Figure.2(b)).



(a) 48 Countries

(b) Australia

Figure.2: The share of loans to SMEs as the percentage of total loans. The source for 48 country sample is IMF's Financial Access Survey. The source for Australian data is RBA's D7.3 statistics. In panel (b) SME is defined as having (AUD)10m revenue or less.

Blancher et al. (2019) identifies several areas where policy could improve the financial inclusion of SMEs:

- expanding the Financial Technology (FinTech) sector to reduce reliance on banks;
- credit information sharing; and
- modernising insolvency regulations and the legal system to support SMEs.

A growing FinTech sector can offer a host of services to small businesses in both developing and developed countries. FinTechs can benefit SMEs (Nanda, 2018; Török, 2018), for example by simplifying the application process and making financial services available to remote areas where access to the internet opens up new possibilities for entrepreneurship. In addition, as Fintech companies expand and multiply, they are becoming a major source of job creation themselves (Jackson, 2016).

The rising popularity of FinTech companies, however, is also raising concerns about the proliferation of predatory lending practices, such as higher interest rates, confusing loan terms, and non-transparent operations (Palladino, 2019). As it stands, FinTech companies operate

outside (for the most part) of the regulatory environment that binds the conventional financial institutions. Regulatory bodies are yet to catch up with the evolution of this sector.

There is some evidence that information sharing can facilitate access to finance. Brown et al. (2009) study firm-level data from the Soviet Union and transition countries in Eastern Europe. They find that information sharing among banks increased credit availability and lowered credit costs. Sharing a collateral registry, as Love et al. (2016) show, can increase access to credit, especially for small and young firms.

### **6.1 SME finance and risk-sharing mechanism**

Situated at an earlier stage of financial evolution, SMEs are highly reliant on external financing to fuel their development. The need to obtain adequate financial resources has prompted public authorities and non-profit organisations to set up interventions meant to compensate for the lack of finance available to SMEs through normal market channels.

As reviewed earlier, these financing support programs work mainly through direct financing loans and guarantees. Among these options, the guarantee has the advantage over others in that it is potentially a sustainable way to provide SMEs with financing while improving the efficiency of market allocation with minimal government interference. While loans and equity may help the business with one-off financial aid, guarantee arrangements offer an avenue to reduce the risk in SME lending and to lower the interest rates faced by SMEs with minimum market distortion.

Initiated in some developed markets, the risk-sharing scheme is now being promoted and expanded across different countries. Jointly funded by government, the banking sector and large companies, the KODIT initiative in Korea, for instance, had \$41.1 billion worth of outstanding guarantees in 2017. The Small Business Administration (SBA) in the US, as another example, provided guarantees of \$29.4 billion in 2016. The European Investment Fund

has also helped 275,000 SMEs to access finance through the COSME Loan Guarantee Facility since its initiation in 2014 (EIF, 2018).

Risk-sharing mechanisms have also motivated a strand of literature which looks at their features and the impact on financial additionality for SMEs. The two major forms of risk-sharing schemes available to SMEs are guarantee funds and mutual guarantee associations. Balkenhol (2007) compares their pros and cons.

First, information on borrowers' risk and trustworthiness are costly to generate, but not so expensive to disseminate. As a result, financial intermediaries do not have incentives to produce this information (Bannock, 1997). For that reason, government financed guarantee instruments can serve as the medium to produce and circulate this information. Further, by endorsing a loan application, the guarantee instrument facilitates a signal about the profit prospects of the proposed investment and effectively mobilizes the financial resources from lenders to small business borrowers (Beck and De La Torre, 2006).

The potential shortcomings in the risk-sharing mechanism are also highlighted in the literature. As summarised by Balkenhol (2007), the major concerns raised are adverse selection and moral hazard. On the side of financial intermediaries, it is possible that under the risk-sharing arrangement banks could shift risky investments to guarantee funds. On the borrower side, by knowing that the guarantee funds might get involved, guaranteed firms might not make full effort to pay back the loans. Moreover, since closely monitoring peer firms' performance is rather difficult, mutual guarantee associations are likely to attract risky firms; the less risky SMEs might not choose mutual guaranteed schemes (Zecchini and Ventura, 2009). On top of those, the guarantee mechanism is also subject to the criticism of generating subsidy reliance and showing mixed results in terms of cost-effectiveness. Other forms of assistance to SMEs often face the same criticisms.

Extended from these theoretical arguments, a stream of research empirically tests the influence of the risk-sharing mechanism on SME finance. Using firm level data from the UK, Cowling (2010) compares the capital constraints faced by smaller firms with and without an available guarantee scheme and finds support for the notion that programs which provide loan security relax the financial constraint for small businesses. Similar positive effects of opening up credit access for SMEs are also found in other OECD countries, including Italy (Zecchini and Ventura, 2009), Canada (Riding et al., 2007), Korea (Kang and Heshmati, 2008), Spain (Garcia-Tabuenca and Crespo-Espert, 2010), France (Lelarge et al., 2010), and Chile (Cowan et al., 2015).

For the guarantee scheme to operate over a relatively long time period, it has to be financially sustainable and fee revenue must cover losses and operating cost. Hennecke et al. (2018) present an analysis on the state-backed credit guarantee schemes implemented in Germany and compare the scheme effectiveness with guarantee arrangements in other countries. These findings suggest that guarantee programs, by extending credit availability and prompting the investment activities of SMEs, contribute to real GDP increases and guarantee banks' fiscal gains in states running the scheme.

However, not all guarantee schemes are profitable to the guarantors. The Italian guarantee system has a deficit of roughly 0.3 per cent per guarantee (Zecchini and Ventura, 2009). In fact, Gudger (1997) suggests that most guarantee systems could not achieve self-sufficiency in operation. When guaranteed firms cannot fulfil payment obligations, the guarantor is required to bear the cost of paying the debt to the lender. How to confine the default rate into a reasonable level is another focus when conducting cost-benefit analysis for risk-sharing schemes. Previous literature suggests default rates vary significant across countries and sectors, ranging from less than 5 per cent in Germany to more than 40 per cent in United Kingdom (see Riding and Haines Jr (2001) for a review). Also controversial is where to set the benchmark

for a reasonable government-guaranteed ratio in the loan provided by a bank. This ratio regulates the coverage of the default cost incurred by borrowers.

Finally, governments can also have an indirect role in mitigating the difficult access to finance faced by SMEs. A few studies have shown that government financial assistance to small and young firms in the forms of subsidies and grants improves their prospects of also obtaining market loans and investment. In a theoretical setting, Takalo and Tanayama (2010) show that government R&D subsidies to small businesses not only reduce the capital cost for these firms, but also send a quality signal about these firms which makes it easier for them to obtain financing. Meuleman and De Maeseneir (2012) show that R&D tax subsidies in Belgium resulted in better access to debt financing for small firms. Bakhtiari (2019b) tests the effect of government assistance in Australia and finds a positive impact on the probability of firms obtaining external finances.

## **6.2 Future directions for policy research**

Two big unresolved questions are (1) the relationship between SME assistance and wider economic objectives; and (2) the heterogeneity of SMEs and what this means for policy. For example, is promotion of and assistance to SMEs an effective way to achieve key economic objectives such as high employment or high rates of innovation. This can be very difficult to test as SME assistance is relatively small compared to large macro-economic fluctuations and trends. The effects of SME assistance on wider economy aggregates remain unknown.

Heterogeneity presents real challenges. Can we meaningfully aggregate micro and small business with medium size business in an attempt to achieve specific policy goals? Are the programs and policies which help the ‘average’ SME well-suited to the micro-firms? Do we need different kinds of policies for different kinds of SMEs. These important questions suggest that much fruitful research can still be produced in this area.

## 7. Conclusions

Small and Medium Enterprises (SMEs) make up the vast majority of businesses in most OECD countries. Their success and survival, employment growth strategies, productivity and innovation largely depend on access to financial resources. Small businesses, especially young firms, generally face tight resource constraints. This is particularly true when financial markets are volatile or unfavourable. This survey has reviewed a large body of evidence related to the impact of financial constraints on SMEs' performance. Based upon the evidence, we also highlight a few important policy debates about the best way to support SMEs access to finance.

## References

- Acs, Z.J. and Audretsch, D.B. (1987), '[Innovation, market structure, and firm size](#)', *The Review of Economics and Statistics*, **69**(4), 567–574.
- Acs, Z. J., Audretsch, D. B. and Feldman, M.P. (1994), '[R&D spillovers and recipient firm size](#)', *The review of Economics and Statistics*, **76**(2), 336–340.
- Akerlof, G.A. (1970), '[The market for 'Lemons': quality uncertainty and market mechanism](#)', *Quarterly Journal of Economics*, **84**(3), 488–500.
- Almeida, H. and Campello, M. (2007), '[Financial constraints, asset tangibility, and corporate investment](#)', *Review of Financial Studies*, **20**(5), 1429–1460.
- ASBFEO (2019), '[Small business counts: small business in the Australian economy](#)', *Australian Small Business and Family Enterprise Ombudsman*, July.
- Asdrubali, P. and Signore, S. (2015), '[The economic impact of EU guarantees on credit to SMEs-evidence from CESEE countries](#)', Technical report, EIF Working Paper.
- Audretsch, D.B., Carree M.A., van Stel, A.J. and Thurik, A.R. (2002), '[Impeded industrial restructuring: The growth penalty](#)', *Kyklos*, **55**, 81–98.
- Ayyagari, M., Demirgüç-Kunt, A. and Maksimovic, V. (2008), '[How important are financing constraints? The role of finance in the business environment](#)', *The World Bank Economic Review*, **22**(3), 483–516.
- Ayyagari, M., Demirguc-Kunt, A. and Maksimovic, V. (2011). [Small vs. young firms across the world: contribution to employment, job creation, and growth](#), The World Bank.



- Bakhtiari (2019a), 'Entrepreneurship dynamics in Australia: lessons from mirco-data', *Economic Record*, 95(308), 114–140.
- Bakhtiari, S (2019b), '[Government financial assistance as catalyst for private financing](#)', *Department of Industry, Innovation and Science*, Working Paper 6/2019.
- Balkenhol, B. (2007), '[Access to finance: the place of risk sharing mechanisms](#)', *Savings and Development*, **31**(1), 69–90.
- Bannock, G. (1997), *Credit Guarantee Schemes for Small Business Lending: A Global Perspective: Volume II-Technical Directory*. Graham Bannock and Partners.
- Bartelsman, E., Scarpetta, S. and Schivardi, F. (2005), '[Comparative analysis of firm demographics and survival: evidence from micro-level sources in OECD countries](#)', *Industrial and Corporate Change*, **14**(3), 365–391.
- Bartz, W. and Winkler, A. (2016), '[Flexible or fragile? The growth performance of small and young businesses during the global financial crisis evidence from Germany](#)', *Journal of Business Venturing*, **31**(2), 196–215.
- Beck, T. and De La Torre, A. (2006), *The basic analytics of access to financial services*. The World Bank.
- Beck, T. and Demirguc-Kunt, A. (2006), '[Small and medium-size enterprises: Access to finance as a growth constraint](#)', *Journal of Banking and Finance*, **30**(11), 2931–2943.
- Beck, T., Demirgüç-Kunt, A. and Maksimovic, V. (2005), '[Financial and legal constraints to growth: does firm size matter?](#)', *The Journal of Finance*, **60**(1), 137–177.
- Beck, T., Demirgüç-Kunt, A. and Maksimovic, V. (2008a), '[Financing patterns around the world: Are small firms different?](#)', *Journal of Financial Economics*, **89**(3), 467–487.
- Beck, T., Demirguc-Kunt, A., Laeven, L. and Levine, R. (2008b), '[Finance, firm size, and growth](#)', *Journal of Money, Credit and Banking*, **40**(7), 1379–1405.
- Benavente, J. M., G. Crespi, A. Maffioli, et al. (2007). Public support to firm-level innovation: an evaluation of the fontec program. *Documento de trabajo* 5(07).
- Berton, F., Mocetti, S., Presbitero, A.F. and Richiardi, M. (2018), '[Banks, firms, and jobs](#)', *The Review of Financial Studies*, **31**(6), 2113–2156.
- Birch, D. G. (1987), '[Job creation in America: How our smallest companies put the most people to work](#)', *University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship*.
- Blancher, N., Appendino, M., Bibolov, A., Fouejieu, A., Li, J., Ndoye, A., Panagiotakopoulou, A. Shi, W. and Sydorenko, T. (2019), '[Financial Inclusion of Small and Medium-Sized Enterprises in the Middle East and Central Asia](#)', *International Monetary Fund*, Research Paper No.19/02.
- Bridges, S. and Guariglia, A. (2008), '[Financial constraints, global engagement, and firm survival in the United Kingdom: evidence from micro data](#)'. *Scottish Journal of Political Economy*, **55**(4), 444–464.
- Brown, M., Jappelli, T., and Pagano, M. (2009) '[Information sharing and credit: firm-level evidence from transition countries](#)', *Journal of Financial Intermediation*, **18**(2), 151–172.

- Brunswick, S. and Vanhaverbeke, W. (2015), '[Open innovation in small and medium-sized enterprises\(smes\): External knowledge sourcing strategies and internal organizational facilitators](#)', *Journal of Small Business Management*, **53**(4), 1241–1263.
- Bukvic, V. and Bartlett, W. (2003), 'Financial barriers to SME growth in Slovenia', *Economic and Business Review for Central and South-Eastern Europe*, **5**(3), 161–181.
- Cabral, L. (1995), 'Sunk costs, firm size and firm growth', *Journal of Industrial Economics*, **43**(2), 161–72.
- Cabral, L. and Mata, J. (2003), '[On the evolution of the firm size distribution: Facts and theory](#)', *American Economic Review*, **93**(4), 1075–1090.
- Caggese, A. (2019), '[Financing constraints, radical versus incremental innovation, and aggregate productivity](#)', *American Economic Journal: Macroeconomics*, **11**(2), 275–309.
- Campello, M., Graham, J. R. and Harvey, C. R. (2010), '[The real effects of financial constraints: Evidence from a financial crisis](#)', *Journal of Financial Economics*, **97**(3), 470–487.
- Carpenter, R.E. and Petersen, B.C. (2002), '[Is the growth of small firms constrained by internal finance?](#)', *Review of Economics and Statistics*, **84**(2), 298–309.
- Carpenter, R.E., Fazzari, S.M. and Petersen, B.C. (1998), '[Financing constraints and inventory investment: a comparative study with high-frequency panel data](#)'. *Review of Economics and Statistics*, **80**(4), 513–519
- Carree, M.A. and Thurik, A.R. (1998), '[Small firms and economic growth in Europe](#)', *Atlantic Economic Journal*, **26**(2), 137–146.
- Carreira, C. and Silva, F. (2010), '[No deep pocket: some stylized empirical results on firms' financial constraints](#)', *Journal of Economic Surveys*, **24**(4), 731–753.
- Castillo, V., Maffioli, A., Rojo Brizuela, A.S. and Stucchi, R. (2014), '[Knowledge spillovers of innovation policy through labor mobility: An impact evaluation of the FONTAR program in Argentina](#)'. Technical report, IDB Working Paper Series.
- Cestone, G. and White, L. (2003), '[Anticompetitive financial contracting: The design of financial claims](#)', *The Journal of Finance*, **58**(5), 2109–2141.
- Cetorelli, N. and Strahan, P.E. (2006), '[Finance as a barrier to entry: Bank competition and industry structure in local us markets](#)', *The Journal of Finance*, **61**(1), 437–461.
- Chapman, D.R., Junor, C.W. and Stegman, T.R. (1996), '[Cash flow constraints and firms' investment behaviour](#)', *Applied Economics*, **28**(8), 1037–1047.
- Cleary, S. (1999), '[The relationship between firm investment and financial status](#)', *Journal of Finance*, **54**(2), 673–692.
- Cowan, K., Drexler, A. and Yañez, A. (2015), '[The effect of credit guarantees on credit availability and delinquency rates](#)', *Journal of Banking and Finance*, **59**, 98–110.
- Cowling, M. (2010), '[The role of loan guarantee schemes in alleviating credit rationing in the UK](#)', *Journal of Financial Stability*, **6**(1), 36–44.
- Cowling, M., Liu, W. and Ledger, A. (2012), '[Small business financing in the UK before and during the current financial crisis](#)', *International Small Business Journal*, **30**(7), 778–800.

- Cowling, M., Liu, W. and Zhang, N. (2018), '[Did firm age, experience, and access to finance count? SME performance after the global financial crisis](#)', *Journal of Evolutionary Economics*, **28**(1), 77–100.
- Cowling, M., Liu, W., Ledger, A. and Zhang, N. (2015). '[What really happens to small and medium-sized enterprises in a global economic recession? UK evidence on sales and job dynamics](#)', *International Small Business Journal*, **33**(5), 488–513.
- Czarnitzki, D. and Hottenrott, H. (2011), '[R&D investment and financing constraints of small and medium-sized firms](#)', *Small Business Economics*, **36**(1), 65–83.
- Dasgupta, S. and Sengupta, K. (2007), 'Corporate Liquidity, Investment and Financial Constraints: Implications from a Multi-Period Model', *Journal of Financial Intermediation*, **16**(2), 151-174.
- De La Torre, A., Peria, M.S.M. and Schmukler, S. (2010), '[Bank involvement with SMEs: Beyond relationship lending](#)', *Journal of Banking and Finance*, **34**(9), 2280–2293.
- De Meza, D. (2002), '[Overlending?](#)', *The Economic Journal*, **112**(477), F17–F31.
- De Wit, G. and de Kok, J.M.P. (2014), '[Do small businesses create more jobs? New evidence for Europe](#)', *Small Business Economics*, **42**(2), 283–295.
- Debelle, G. (2010), '[Bank funding and capital flows in the wake of the GFC](#)', keynote speech, Australasian Finance and Banking Conference.
- Duchin, R., Ozbas, O. and Sensoy, B.A. (2010), '[Costly external finance, corporate investment, and the subprime mortgage credit crisis](#)', *Journal of Financial Economics*, **97**, 418–435.
- Duygan-Bump, B., Levkov, A. and Montoriol-Garriga, J. (2015), 'Financing constraints and unemployment: Evidence from the Great Recession', *Journal of Monetary Economics*, **75**, 89-105.
- EIF (2018), *EIF Annual Report 2017*.
- Evans, D. S. and Jovanovic, B. (1989), '[An estimated model of entrepreneurial choice under liquidity constraints](#)', *Journal of political economy*, **97**(4), 808–827.
- Fazzari, S.M., Hubbard, R.G. and Petersen, B. C. (1988), '[Financing constraints and corporate investment](#)'. *Brookings Papers on Economic Activity*, **1**, 141–195.
- Fazzari, S. M. and Petersen, B. (1993), '[Working capital and fixed investment: new evidence on financing constraints](#)', *RAND Journal of Economics*, **24**(3), 328–342.
- Ferrando, A. and Ruggieri, A. (2018), '[Financial constraints and productivity: evidence from Euro area companies](#)', *International Journal of Finance and Economics*, **23**(3), 257–282.
- Fonseca, R., Lopez-Garcia, P. and Pissarides, C.A. (2001), '[Entrepreneurship, start-up costs and employment](#)', *European Economic Review*, **45**(4-6), 692–705.
- Freel, M. S. (2007), '[Are small innovators credit rationed?](#)', *Small Business Economics*, **28**(1), 23–35.

- Garcia-Tabuenca, A. and Crespo-Espert, J. L. (2010), '[Credit guarantees and SME efficiency](#)', *Small Business Economics*, **35**(1), 113–128.
- Gerlach-Kristen, P. and Merola, R. (2019). 'Consumption and credit constraints: a model and evidence from Ireland. *Empirical Economics*, **57**(6).
- Ghosal, V. (2007). '[Small is beautiful but size matters: The asymmetric impact of uncertainty and sunk costs on small and large businesses](#)', *University Library of Munich*, Technical Paper 5461.
- Gilfillan, G. (2018), '[Small business sector contribution to the Australian economy](#)', *Australian Parliamentary Library*, Research Paper series, 2018–19.
- Gill, A. and Biger N. (2012), '[Barriers to small business growth in Canada](#)', *Journal of Small Business and Enterprise Development*, **19**(4), 656–668.
- Goyal, V. K. and Yamada, T. (2004), '[Asset price shocks, financial constraints, and investment: evidence from Japan](#)', *Journal of Business*, **77**(1), 175–199.
- Gschwandtner, A. and Lambson V. E. (2002), '[The effects of sunk costs on entry and exit: evidence from 36 countries](#)', *Economics Letters*, **77**(1), 109–115.
- Gudger, M. (1997), '[The sustainability of credit guarantee systems](#)', *Small Enterprise Development*, **8**(2), 18–23.
- Hall, B. H. and Lerner, J. (2010), '[The Financing of R&D and Innovation](#)', in Hall and Rosenberg (eds), *Handbook of the Economics of Innovation*, Vol.1; 609–639.
- Haltiwanger, J., Jarmin, R. S. and Miranda, J. (2013), '[Who creates jobs? Small versus large versus young](#)', *Review of Economics and Statistics*, **95**(2), 34–361.
- Hennecke, P., Neuberger, D. and Ulbricht, D. (2018), '[The economic and fiscal benefits of guarantee banks in Germany](#)', *Small Business Economics*, 1–24.
- Hernández-Trillo, F., Pagán, J. A. and Paxton, J. (2005), '[Start-up capital, microenterprises and technical efficiency in Mexico](#)', *Review of Development Economics*, **9**(3), 434–447.
- Himmelberg, C. P. and Petersen, B. C. (1994), '[R&D and internal finance: a panel study of small firms in high-tech industries](#)', *Review of Economics and Statistics*, **76**(1), 38–51.
- Holton, S., Lawless, M. and McCann, F. (2013), '[Firm credit in euro area: a tale of three crises](#)', *Applied Economics*, **46**(2), 190–211.
- Holtz-Eakin, D, Joulfaian, D. and Rosen, H. S. (1994), '[Sticking it out: entrepreneurial survival and liquidity constraints](#)', *Journal of Political Economy*, **102**(1), 53–75.
- Jackson, T. (2016), '[Fintech jobs increase by 1,400 per cent in SA](#)', *Disrupt Africa*, 27 September.
- Kadapakkam, P.R., Kumar, P.C. and Riddick, L.A. (1998), '[The impact of cash flows and firm size on investment: the international evidence](#)', *Journal of Banking and Finance*, **22**(3), 293–320.
- Kang, J.W. and Heshmati, A. (2008), '[Effect of credit guarantee policy on survival and performance of SMEs in Republic of Korea](#)', *Small Business Economics*, **31**(4), 445–462.

- Kaplan, S. N. and Zingales, L. (1997), '[Do investment-cash flow sensitivities provide useful measures of financing constraints?](#)', *Quarterly Journal of Economics*, **112**(1), 169–215.
- Kaplan, S.N. and Zingales, L. (2000), '[Investment-cash flow sensitivities are not valid measures of financing constraints](#)', *Quarterly Journal of Economics*, **115**(2), 707–712.
- Lee, H., Kelley, D., Lee, J. and Lee, S. (2012), '[SME survival: The impact of internationalization, technology resources, and alliances](#)', *Journal of small business management*, **50**(1), 1–19.
- Lee, N., Sameen, H. and Cowling, M. (2015), '[Access to finance for innovative SMEs since the financial crisis](#)', *Research policy*, **44**(2), 370–380.
- Lelarge, C., Sraer, D. and Thesmar, D. (2010), '[Entrepreneurship and credit constraints: Evidence from a French loan guarantee program](#)', in *International differences in entrepreneurship*, University of Chicago Press; 243–273.
- Lopez-Acevedo, G. and Tinajero-Bravo, M. (2010), 'Impact evaluation of SME programs using panel firm data', *Policy Research Working Paper 5186*, The World Bank. Accessed 17 November 2019:  
<https://openknowledge.worldbank.org/bitstream/handle/10986/19860/WPS5186.pdf?sequence=1>.
- Love, I., Martinez Peria, M.S., Singh, S. (2016) '[Collateral registries for moveable assets: does their introduction spur firms' access to bank financing?](#)' *Journal of Financial Services Research*, **49**(1), 1–37.
- McDonnell, A. and Burgess, J. (2013), '[The impact of the global financial crisis on managing employees](#)', *International Journal of Manpower*, **34**(3), 184–197.
- Meuleman, M. and De Maeseneir, W. (2012), '[Do R&D subsidies affect SME's access to external financing?](#)' *Research Policy*, **41**(3), 580–591.
- Michelacci, C. and Quadrini, V. (2005), '[Borrowing from employees: wage dynamics with financial constraints](#)', *Journal of the European Economic Association*, **3**(2-3), 360–369.
- Moreira, D. F. (2016), '[The microeconomic impact on growth of SMEs when the access to finance widens: evidence from internet and high-tech industry](#)', *Procedia-Social and Behavioral Sciences*, **220**, 278–287.
- Moscarini, G. and Postel-Vinay, F. (2012), '[The contribution of large and small employers to job creation in times of high and low unemployment](#)', *American Economic Review*, **102**(6), 2509–39.
- Myers, S. C. and Majluf, N. S. (1984), '[Corporate financing and investment decisions when firms have information that investors do not have](#)', *Journal of Financial Economics*, **13**(2), 187–221.
- Nanda, S. (2018), '[How FinTech is changing the game for microbusiness](#)', *Entrepreneur India*, 19 November.
- Neumark, D., Wall, B. and Zhang, J. (2011), '[Do small businesses create more jobs? New evidence for the united states from the national establishment time series](#)', *The Review of Economics and Statistics*, **93**(1), 16–29.



- North, D., Baldock, R. and Ullah, F. (2013), '[Funding the growth of UK technology-based small firms since the financial crash: are there breakages in the finance escalator?](#)' *Venture Capital*, **15**(3), 237–260.
- OECD (2005), *OECD SME and Entrepreneurship Outlook 2005*. OECD Publishing, Paris.
- OECD (2019a), *OECD SME and Entrepreneurship Outlook 2019*. OECD Publishing, Paris.
- OECD (2019b), '[Financing SMEs and entrepreneurs 2019: an OECD scoreboard](#)'. OECD Publishing, Paris.
- Oh, I., Lee, J-D., Heshmati, A., and Choi, G-G. (2009), '[Evaluation of credit guarantee policy using propensity score matching](#)', *Small Business Economics*, **33**(3), 335–351.
- Özçelik, E. and Taymaz, E. (2008), '[R&D support programs in developing countries: The Turkish experience](#)', *Research Policy*, **37**(2), 258–275.
- Palladino, L. (2019), '[Small business FinTech lending: the need for comprehensive regulation](#)', *Journal of Corporate and Financial Law*, **24**(1), 77–103.
- Pissarides, F. (1999), '[Is lack of funds the main obstacle to growth? ERBD's experience with small and medium-sized businesses in central and eastern Europe](#)', *Journal of Business Venturing*, **14**(5-6), 519–539.
- Requena-Silvente, F. (2005), '[The decision to enter and exit foreign markets: evidence from UK SMEs](#)', *Small Business Economics*, **25**(3), 237–253.
- Riding, A. L. and Haines Jr, G. (2001), '[Loan guarantees: Costs of default and benefits to small firms](#)', *Journal of business venturing*, **16**(6), 595–612.
- Riding, A., Madill, J. and Haines, G. (2007), '[Incrementality of SME loan guarantees](#)' *Small Business Economics*, **29**(1-2), 47–61.
- Schiffer, M. and Weder, B. (2001), *Firm size and the business environment: Worldwide survey results*. The World Bank.
- Severin, E., Alphonse, P. and Ducret, J. (2004), '[When trade credit facilitates access to bank finance: Evidence from us small business data](#)', in *EFMA 2004 Basel Meetings Paper*.
- Siemer, M., (2019), '[Employment effects of financial constraints during the great recession](#)', *Review of Economics and Statistics*, **101**(1), 16–29.
- Stiglitz, J. E. and Weiss, A. (1981), '[Credit rationing in markets with imperfect information](#)', *American Economic Review*, **71**(1981), 393–410.
- Takalo, T. and Tanayama, T. (2010), '[Adverse selection and financing of innovation: is There a need for R&D subsidies?](#)', *Journal of Technology Transfer*, **35**(1), 16–41.
- Tan, H. (2009) '[Evaluating SME support programs in Chile using panel firm data](#)', *World Bank Policy Research, Working Paper No.5082*.
- Török, L. (2018), '[Is Fintech replacing banks for small business lending?](#)', *Veem*, 18 October.
- van Stel, A., Lokshin, B. and de Vries, N. (2019), '[The effect of SME productivity increases on large firm productivity in the EU](#)', *Kyklos*, **72**(2), 332–353.

Westhead, P. and Storey, D. J. (1997), '[Financial Constraints on the Growth of High Technology Small Firms in the United Kingdom](#)', *Applied Financial Economics*, **7**(2), 197–201.

Woodruff, C. (2001) '[Firm finance from the bottom up: microenterprises in Mexico](#)', *Stanford Center for International Development, Working Paper* 112.

Zecchini, S. and Ventura, M. (2009), '[The impact of public guarantees on credit to SMEs](#)', *Small Business Economics*, **32**(2), 191–206.

Zehir, C., Acar, A., and Tanriverdi, H. (2006), 'Identifying organizational capabilities as predictors of growth and business performance', *The Business Review*, **5**(2), 109–116.