
**ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS**

**DEPARTMENT OF ECONOMICS**

# FUNDING OF SMEs AND INNOVATIVE BUSINESSES

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## CONTENTS:

## Abstract

The purpose of the dissertation was to investigate the critical issue of funding SMEs and innovative businesses. One additional purpose of this dissertation was to examine the characteristics that play a role in accessing external finance. Literature review and comparative analysis was used as research method. In particular, the framework of innovation and eco-innovation was examined as well as the funding conditions that prevail nowadays. Furthermore, seven studies were reviewed related to the access to finance of SMEs and innovative SMEs. The analysis of data revealed that government related firms have not benefited and that transparency of information can play a vital role in access to finance. Moreover, the data showed that high competition within a market and inside firms' base country causes difficulties in getting access to funding whereas banking competition inside a country facilitates access to finance. Finally, product and process innovation affect positively access to external finance.

## Περίληψη

Ο σκοπός της διατριβής ήταν να ερευνήσει το κρίσιμο ζήτημα της χρηματοδότησης των μικρομεσαίων και καινοτόμων επιχειρήσεων. Ένας επιπλέον σκοπός αυτής της διατριβής ήταν να εξετάσει τα χαρακτηριστικά των επιχειρήσεων που παίζουν ρόλο στην πρόσβαση στην εξωτερική χρηματοδότηση. Η ανασκόπηση της βιβλιογραφίας και η συγκριτική ανάλυση χρησιμοποιήθηκαν ως ερευνητικές μέθοδοι. Συγκεκριμένα, το πλαίσιο της καινοτομίας και της περιβαλλοντικής καινοτομίας εξετάσθηκαν, όπως επίσης οι συνθήκες χρηματοδότησης που κυριαρχούν στις μέρες μας. Επιπλέον, εφτά έρευνες εξετάστηκαν που σχετίζονται με την πρόσβαση στην χρηματοδότηση των μικρομεσαίων και καινοτόμων επιχειρήσεων. Η ανάλυση των δεδομένων έδειξε ότι οι επιχειρήσεις που σχετίζονται με την κυβέρνηση δεν επωφελούνται όσον αφορά την πρόσβαση στην χρηματοδότηση, ενώ η διαφάνεια των πληροφοριών μπορεί να παίξει σημαντικό ρόλο στην διευκόλυνση της πρόσβασης των επιχειρήσεων στην χρηματοδότηση. Επιπρόσθετα, τα δεδομένα έδειξαν πως ο υψηλός ανταγωνισμός μέσα στις χώρες που έχουν την έδρα τους οι επιχειρήσεις, προκαλεί δυσκολίες στο να αποκτήσουν πρόσβαση στην χρηματοδότηση. Από την άλλη μεριά ο υψηλός ανταγωνισμός των τραπεζών σε μια χώρα διευκολύνει την πρόσβαση στην χρηματοδότηση. Τέλος, τα καινοτόμα προϊόντα και οι καινοτόμες διαδικασίες επηρεάζουν θετικά την πρόσβαση στην εξωτερική χρηματοδότηση.

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# Chapter 1: Introduction

Small and Medium Enterprises (SMEs) play a vital role in the economies around the world because they are responsible for a great percentage of job creation and they are part of the factors which enhance development and innovation. Innovation on the other hand is key to economic growth as it is responsible for new processes, services and products which enhance the well being of people around the world.

Furthermore, SMEs play a crucial role for economic growth after the international financial crisis because they can help economies to respond quickly to new market and social conditions. Necessary condition for SMEs to help their economies to overcome the financial crisis is the obtaining of finance in order either to start or to continue their business cycle. Access to finance plays a vital role in the beginning of a start up as well as in the development and the growth of SMEs irrespective of them being innovative or non-innovative.

There are many factors that hamper not only SMEs but also innovative SMEs. Some of these factors are lack of management qualifications, limited market power, assets and collateral, and transaction costs. In addition, SMEs are characterized by information asymmetries and uncertainty which are augmented for innovative SMEs. As a matter of fact, innovative SMEs face more difficulties in getting access to finance through the traditional financial resources.

SMEs are often not able to meet their needs due to the financial crisis and its consequences in relation to credit supply conditions which arise from the low ability of banks and other sectors to provide financing. As a result, the improvement of access to finance for SMEs should be a priority for European countries as well as countries all around the world. Solutions should be found concerning the improvement of entrepreneurship and financial conditions. Moreover, the attraction of new financial sources and collaboration between SMEs governments and financial institutions would be of crucial importance.

The purpose of my dissertation is to investigate funding of SMEs and innovative start up businesses. For this purpose I am going to investigate the field of innovation and eco-innovation as well as the factors that enhance and hamper innovation (chapter 2). Moreover, I will examine the financial sources of SMEs and the situation of funding conditions nowadays (chapter 3). In order to examine in depth the factors that play role in access to finance I will examine the literature related to this issue (chapter 4). Finally, I will compare the most relevant and interesting papers with respect to the factors that play role in access to finance in order to come to conclusions about this issue and have the chance to understand in depth the characteristics of firms which have access to external finance (chapter 5).

As a matter of fact, it is clear that there is a need for further research in the field of funding SMEs which will help entrepreneurs to become aware of the factors that play role in access to external finance. With the help of such research government, regulators and financial institutions will have the chance to become aware of the difficulties that firms face in order to obtain external finance. So, this research could be a useful tool for entrepreneurs, governments, regulators and financial institutions in order to reduce the problems related to obtaining finance, which could help production and welfare in general.

# Chapter 2: Innovation Strategy and Eco-Innovation

## 2.1. The meaning of innovation and eco-innovation

Innovation can play a key role in order to help the world move to a stronger and sustainable growth path following the financial crisis. It plays a vital role not only in the growth of individual businesses but also to a nation's general economic growth (Robinson and Anton, 2012).

Innovation involves the creation and diffusion of new products, processes and methods. Furthermore, as a result innovation provides the foundation for new businesses, new jobs and productivity growth. Innovation can help address, at the lowest cost, pressing social and global issues, including demographic shifts, resource scarcity and the change of climate. Innovative economies are more productive, more resilient and ready to make easier changes, which will contribute to make steps forward.

According to Akgun et al (2007), innovative firms are up to twice as profitable as other firms. This is illustrated in a study of British SMEs, showing that innovative firms had more chances to operate profitably while non-innovators just tried to survive (Gray, 2006). As cited in Robinson and Anton (2012), innovation not only promotes growth but also enhances a variety of capabilities that improve the ability to enter markets and have more customers. Product or service development may be the most familiar form of innovation, but other types include processes, logistics, marketing and business model innovation (Robinson and Anton, 2012).

In many OECD countries, firms invest not only in the knowledge-based assets that drive innovation, such as software, databases, research and development (R&D), firm-specific skills and organisational capital, but also in physical capital, such as machinery, equipment or buildings. Furthermore, billions of people all over the world, both in developed and emerging economies, today have access to the Internet and are connected to one another, enabling

knowledge pervasion and the creation of further innovations. As cited in Robinson and Anton (2012), developments in the internet that have allowed companies to expand their marketing channels are a prime example of marketing innovation. Big changes in bio- and nano- technology and the products that will emerge through these fields of technology, will lead to changes in the processes of production. In addition, we will see changes in job, in the locations of economic activities and the roles that every different sector plays in the economy (OECD, 2015a).

Both technological and non-technological innovations play an important role in economic growth. There are channels through which innovation contributes to growth. Firstly, technological progress is embodied in physical capital; this is illustrated by the fact that OECD studies show that 0.35 of annual average GDP growth (from 1993 to 2013) is attributed to investment in technologies such as information and communication technologies (OECD, 2015b). Secondly, investment in knowledge-based capital, such as R&D and organizational capital can account for around 0.5 percentage points of annual GDP growth in EU countries (from 1995 to 2007) and 0.9 percentage points in the United States of America. Furthermore, according to OECD, increased multi-factor productivity growth, which is linked with process and organizational innovations, accounted for 0.7 percentage points of annual average GDP growth (from 1995 to 2013). Finally, creative destruction that results from innovation plays a vital role in economic growth. Creative destruction is the procedure, through which new innovative firms enter the market and if they grow quickly, they increase their market share and as a result they replace firms with low productivity (Andrews and Criscuolo, 2013). According to OECD (2015c) the above procedure results in reallocation of resources which helps productivity growth.

In order to reclaim innovation, countries should know the main features of innovation today. Initially, social and organizational innovations like new business models complement technological innovation. These kinds of innovations extend beyond technological innovation. Close collaboration between some actors, is a main feature of innovation. Firms, foundations,

entrepreneurs, non-profit foundations, scientific institutes, universities, public sector agencies and consumers often work together in order to underpin innovative mechanisms. In addition, economy has facilitated by expanding the digital economy and by growth of mobile telecommunications. In both advanced and emerging economies the rapid uptake of data is a feature of today's innovation. Furthermore, emerging economies play a vital role in the field of Research & Development (R&D). Production together with innovation can come not only from a global frame but also from unique local and regional strengths (OECD, 2015).

The combination of some of these features, like the increasing importance of knowledge-based capital, the expansion of the digital economy, the technological progress and the spread of global value chains, will lead to the next step in production revolution. The changes will concern not only the production chain but also the jobs associated with it, the environmental impact and the services in the economy. The challenges that innovation has to deal with are not only economic growth and job creation but also 'green growth', well being and fight against poverty (OECD, 2015).

Eco-innovation plays a vital role in the implementation of sustainable economic growth. As cited in Melece (2015), sustainable development is the main goal of policies and strategies not only in Europe but also in many countries globally. Eco-innovation is a main factor for transition to a 'green economy' and it can help economies to overcome the current economic recession (Marin et al (2015)). Furthermore, it can play a major role in order to eliminate problems which are related to environmental disasters. In spite of the fact that eco-innovation plays a vital role in the conservation of the environment, it can also play a key role in sustainable development of enterprises and societies, it can even improve human health, well being and employment through new products and services (Melece, 2015); Urbaniec, 2015). Green growth is one of the most innovative processes of economic evolution (Andersen, 2010).

There is not a precise and unanimous definition for eco-innovation (Melece, 2015; Urbaniec, 2015; Marin et al 2015). According to Melece (2015), eco-innovation has many definitions because of its complex concept and its multi-dimensional meaning. Eco-innovation focuses not only on the developments which are totally related with the environment but also on organizational sustainability. As a matter of fact, eco-innovation deals with technological, social and institutional innovation (Rennings, 2000).

According to Melece (2015), the commonly used definitions of eco-innovation do not include the effect of eco-innovation (e.g. socio-economic, environmental or health effect) and consequently the impact of eco-innovation is difficult to be measured. As cited in Rennings (2000), because of the increasing importance of the social and institutional eco-innovation, their impacts should be measured, but due to the fact that there are no common signs, measurements and indicators of environmental performance it is complicated to measure it. Furthermore, there are no certain methods for the evaluation of the eco-innovation's impacts (Rennings, 2000; Kemp, 2011).

As cited in Melece (2015), most eco-innovation definitions are based on definition proposed by OECD/Eurostat. However although this definition refers to the environmental nature of eco-innovation and refers only to things which are related with the preservation of the environment, it is also related with technologies, products and services that reduce environmental risks and eliminate resource use and pollution. Eco-innovation is a wider term which takes part both in traditional industries and in eco-industries. In addition, according to Melece (2015), eco-innovation also occurs in non-industrial activities and as a matter of fact it includes control policies (like environmental regulations) and market-based industries (like environmental taxes). So these non-industrial activities that eco-innovation deals with can change the corporate environmental strategies or the implementation of new environmental management tools.

As cited in Melece (2015), there are some more recent definitions proposed by politicians, experts and academics which illustrate the broader meaning of

eco-innovation. These definitions are presented in Table 1.1 According to Melece (2015) the best definition of eco-innovation is 'the production, assimilation or exploitation of a product, production process, service or management or business method that is novel to the organisation (developing or adopting it) and through the development of ecological improvements benefits the environment by preventing or reducing the impact, or by more efficient and responsible use of natural resources.'

Table 1.1:

Some of eco-innovation's definitions recently used by officials and scholars

| Definition | Reference |
|---|---|
| "…all measures of relevant actors (firms, politicians, unions,…private households) which develop new ideas, behavior, products and processes, apply or introduce …contribute to a reduction of environmental burdens or to ecologically specified sustainability targets." | K. Rennings (2000: 322) |
| "…are able to attract green rents on the market. …the degree to which environmental issues are becoming integrated into the economic process" | M. M. Andersen (2008: 5) |
| "…a change in economic activities that improves both the economic performance and the environmental performance of society" | G. Huppes et al. (2008: 29) |
| "the creation of novel and competitively priced goods, processes, systems, services, and procedures designed to satisfy human needs and provide a better quality of life for everyone with a life-cycle minimal use of natural resources … per unit output, and a minimal release of toxic substances" | A. Reida and M. Miedzinski (2008: 2) |
| "…the production, assimilation or exploitation of a product, production process, service or management or business method that is novel to the organisation (developing or adopting it) and which results, throughout its life cycle, in a reduction of environmental risk, pollution and other negative impacts of resources use (including energy use) compared to relevant alternatives" | A. Arundel, R. Kemp, (2009: 5); R. Kemp (2011: 2) |
| "…the implementation of new, or significantly improved, products (goods and services), processes, marketing methods, organisational structures and institutional arrangements which, with or without intent, lead to environmental improvements compared to relevant alternatives" | OECD (2009a: 40) |
| "…represents innovation that results in a reduction of environmental impact, no matter whether that effect is intended or not" | OECD (2009b: 2) |
| "…the eco-innovation concept is inherently linked to green competitiveness and the greening of the economy" | M. Andersen, (2010: 15) |
| "…the introduction of any new or significantly improved product (good or service), process, organisational change or marketing solution that reduces the use of natural resources (including materials, energy, water and land) and decreases the release of harmful substances across the whole life-cycle" | EIO (2010: 10) |
| "…any form of innovation resulting in or aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment, enhancing resilience to environmental pressures, or achieving a more efficient and responsible use of natural resources" | EC (2011: 2) |
| "…the production, assimilation or exploitation of a product, production process, service or management or business method that is novel to the organisation (developing or adopting it) and which results, throughout its life cycle, in a reduction of environmental risk, pollution and other negative impacts of resources use (including energy use) compared to relevant alternatives" | R. Kemp (2011: 2) |
| "…refers to all forms of innovation – technological and non-technological, new products and services and new business practices – that creates to creation and development of new business opportunities and benefits the environment by preventing or reducing their impact, or by optimizing the use of natural resources" | N. Sarkar (2013: 172) |
| "…inventions, designs and new solutions for fulfilling human's and nature's needs in ecologically effective ways" | N. Hofstra, D. Huisingh, (2013: 462) |
| "…contribute to a sustainable environment through the development of ecological improvements" | A. Xavier et al. (2014: 2276) |

Source: Melece (2015)

Similarly, according to Urbaniec (2015), we can put the different definitions of eco-innovation into three groups (the definitions come from OECD, European Commission and scientific literature). The first category has to do with the environmental dimension of eco-innovation and it contains definitions which have to do with sustainable development. The second category has to do with the life cycle of products and it contains definitions which have to do with eco-innovation as a process. The third and last category contains the definitions of eco-innovation which have to do with the environmental and economic benefits that derive from the focus on eco-innovation. As cited in Urbaniec (2015), the categorization of the definitions of eco-innovation should not be regarded as the only way to put the definitions into categories but as a way to present the multifaceted meaning of eco-innovation.

The first category has to do with definitions of eco-innovation which perceive eco-innovation as an instrument for the reduction of negative environmental impacts such as environmental pollution. This is illustrated by the fact that Rennings presents eco-innovation as "…all measures of relevant actors (firms, politicians, unions, associations, churches, private households) which: develop new ideas, behaviours, products and processes, apply or introduce them and which contribute to the reduction of environmental burdens or to ecologically specified sustainability targets" (Rennings, 2000, p. 322). Furthermore, according to the Eco-Innovation Action Plan eco-innovations include "… any form of innovation resulting in or aimed at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment, enhancing resilience to environmental pressures, or achieving more efficient and responsible use of natural resources" (European Commission, 2011a, p. 2). As a result, we can conclude that according to these definitions eco-innovation is the tool to succeed sustainable development at the level of businesses.

The second category includes definitions that have to do with the life- cycle of products. More specifically, it contains definitions of eco-innovation which perceive it like a tool for reduction of resources consumption during the entire life-cycle of products. This is illustrated by the fact that Eco-Innovation

Observatory (EIO), defines eco-innovation as "…the introduction of any new or significantly improved product (good or service), process, organizational change or marketing solution that reduces the use of natural resources (including materials, energy, water, and land) and decreases the release of harmful substances across the life-cycle" (Eco-Innovation Observatory, 2010, p. 10). As a result this definition puts emphasis not only to better and cleaner technologies for the environment but also to the reduction of use of raw materials through the entire product life cycle.

The third and last category according to Urbaniec (2015), contains definitions that have to do with the environmental and economic benefits which come from eco-innovation. As an example we can present the definition of Oltra and Jean (2009), who define eco-innovation "...as innovation that consists of new or modified processes, practices, systems and products which benefit the environment and thus contribute to environmental sustainability". There is another definition of eco-innovation which relates it with the economic benefits of eco-innovation. According to Andersen (2010) there are two ways to achieve benefits in the market which are related with eco-innovation practises. The first way has to do with the higher price that every company should put in an eco-friendly product and the other way to have an economic benefit is by reducing production costs due to the fact that these companies use more efficiently the energy and the resources and as a result they reduce the material costs. Urbaniec (2015), concludes that 'Taking into account the wide range of different interpretations, eco-innovation can be defined as a sustainable development tool used during the entire life-cycle of a product or service, contributing to numerous environmental and economic benefits.'(Urbaniec, 2015, p.183)

### 2.2. Factors that enhance innovation

As cited in Samson and Gloet (2014) sustained innovation can be achieved through a business strategy that continuously supports innovation. This is illustrated by the fact that business strategies which support the implementation of innovation contain development and research as well as

creativity, oblique thinking and the willingness to change (Samson and Gloet, 2014). Innovation is also supported by a culture of learning and a commitment to quality philosophy (Lages, Silva and Styles, 2009). Business strategies which focus on sustainable innovation have to include staff training and external projects and partnerships related to innovation. Strategies which are focused on innovation lead to employee recognition and rewards and as a result an innovative culture can be created. This culture transforms employees into creative people who strive for continuous improvement and innovative solutions to complicated problems (Samson and Gloet, 2014).

According to OECD Innovation Strategy 2015 there are certain features which enhance innovation. Skilled employees play a vital role in the creation of new ideas and technologies (Samson and Gloet, 2014; OECD, 2015). Employees can implement these innovative ideas and technologies in the workplace and can be adapted to technological and structural changes across society (OECD, 2015). According to Fallon-Byrne and Harney (2017) employee communication and empowered employees play a vital role in the support of innovation strategies. There is a strong link between employees' collaboration and innovation outcomes (Fallon-Byrne and Harney, 2017).

Furthermore, innovative firms can increase their market share through a business environment which enhances investment in technology and in knowledge-based capital (OECD, 2015). In addition, innovation can be enhanced by an efficient system of knowledge creation and diffusion (OECD, 2015). This is illustrated by the fact that an innovative efficient system diffuses knowledge with the help of the society which uses mechanisms such as human resources and technology sharing (OECD, 2015). According to Fallon-Byrne and Harney (2017), relational capital is a process which relates innovation with knowledge creation and exchange, and as a result there is a strong link between innovation outcomes and relational capital. Cavagnou (2011) argues that 'innovation reflects a process of learning' (p. 122) and according to Fallon-Byrne and Harney (2017) innovative businesses are dynamic living learning organisations. As a result human capital should be developed through workforce training for sustainable innovation to succeed.

Also policies which are needed to eliminate barriers to innovation, they end up enhancing innovation and entrepreneurial activity (OECD, 2015). Well informed consumers who are engaged and updated can help the enhancement of innovation (OECD, 2015). Finally, the success of the implementation of innovation policies depends on the governance which includes government actions (OECD, 2015). In addition the evaluation of policies plays a vital role in the enhancement of innovation (OECD, 2015).

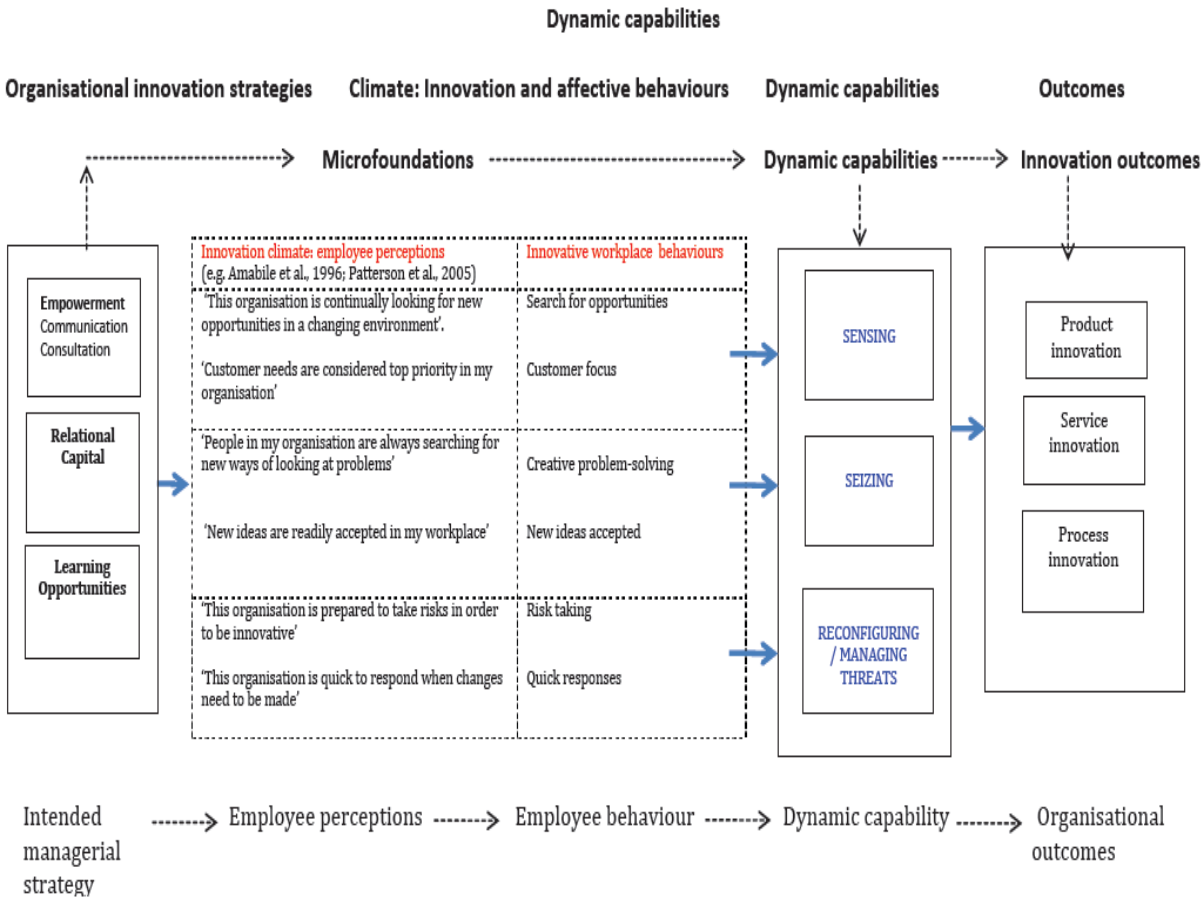
It is important to highlight the role of innovation climate inside every business. As cited in Fallon-Byrne and Harney (2017), in order to put together the needs of every business and the needs of every employee, you have to go beyond the understanding of strategies for innovation. 'The intermediate socio-cognitive environment, resulting from innovative strategies, provides evidence that they are effective to employee innovation behaviour' (Fallon-Byrne and Harney, 2017, p.25). The climate of every business can be influenced by human resource strategies. Human resource practices can influence the perception and the behaviour of every employee by formulating and communicating key organizational values (Fallon-Byrne and Harney, 2017). As a result, an innovative climate indicates that innovative strategies are being enacted. According to Zhou and Hoever (2014), innovation climate plays a vital role for creativity and creativity can help organisations thrive in complicated environments and respond efficiently to challenges by developing new capabilities. In addition, an innovative climate includes positive relationships between supervisors and employees and attention to customers, as well as risk taking and flexibility (Fallon-Byrne and Harney, 2017).

Fallon-Byrne and Harney (2017) argue that dynamic capabilities for innovation are a firm's ability to create new products and markets by combining innovative orientation with innovative behaviour. The innovative climate is the key element that helps innovation strategies to be combined with the perceptions and feelings of employees. According to Montag et al. (2012), an innovative climate indicates how much the innovative strategies have influenced the employees' minds in order to encourage the development of innovative work behaviour. Table 2.1 explains dynamic capabilities for

innovation and illustrates the relation between innovation strategies, innovation climate and employees' behaviour.

Figure 2.1:

From microfoundations to dynamic capabilities organisational innovation strategies climate: innovation and affective behaviours dynamic capabilities outcomes microfoundations dynamic capabilities innovation outcomes




Source: Fallon-Byrne and Harney (2017)

### 2.3. Factors that hamper innovation

As cited in Krause (2016) there are several barriers to innovation which can be grouped in five categories. The factors which hamper innovation are cost factors, market factors, knowledge factors, institutional factors and there are some other reasons for not innovating. According to Krause (2016), cost factors are for example lack of funds not only within the company but also outside the company. Furthermore market factors include barriers due to well

established firms, which dominate the market and uncertain demand for innovative goods. In addition, knowledge factors include lack of information about new technologies and markets as well as the difficulty in finding partners for implementing innovation strategies. Institutional factors have to do with the lack of legislation which protects property rights. Finally as cited in Krause (2016) other reasons which hamper innovation are earlier innovations which deter new innovations to come. Krause (2016) examined small firms (businesses with 10 – 49 employees), medium sized firms (businesses with 50 – 249 employees) and large firms (businesses with 250 or more employees) in the Czech Republic during the period 2010 –2012. All three groups of firms make more innovative activities in the area of technical innovation than in the area non-technical innovation. According to Krause (2016) who conducted research in relation to the factors which hamper innovation activities, the most significant barrier to innovation is insufficient funding. This is illustrated by the fact that not only small companies but also large ones faced the problem of insufficient funding. In addition, small and large enterprises find high costs and the lack of qualified workers as another barrier to their innovation activities, although they are not as important as the insufficient funding. Finally an uncertain demand for innovative products is more significant for large enterprises than for small enterprise.

Table 2.3:

Most significant factors hampering innovation activities according to enterprise size

| Enterprise size | Small enterprises | Medium enterprises | Large enterprises |
|---|---|---|---|
| Innovations not required | 14% | 10% | 10% |
| Prior innovation means further innovation not necessary | 5% | 4% | 4% |
| Uncertain demand for new products | 10% | 13% | 15% |
| Monopolised market | 8% | 8% | 5% |
| Problems finding a co-operating partner | 1% | 1% | 1% |
| Lack of information on markets | 0% | 2% | 2% |
| Lack of information on technology | 0% | 0% | 1% |
| Lack of qualified workers | 8% | 14% | 16% |
| High innovation costs | 12% | 16% | 18% |
| Lack of funding outside the enterprise | 4% | 4% | 3% |
| Lack of funding within the enterprise | 38% | 29% | 24% |

Source: Krause (2016)

Guijarro et al. (2009), also point out the lack of financial resources as one of the main barriers to innovation, especially for small enterprises. In addition, Guijarro et al. (2009), relate firm differences in barriers to innovation with the differences in cost, human resources, organizational structure, institutional constraints and government policy that every firm face.

According to Guijarro et al. (2009) cost is one of the main barriers to innovation. This is illustrated by the fact that high monitoring costs as well as the viability of the innovative activity and the uncertainty of the innovation outcomes create conflicts between managers and funders. Small firms face these kinds of conflicts due to their limited financial resources. Furthermore, according to Souitaris (2001), most innovative firms had managers who were risk lovers. Higher risk is being associated with higher financial exposure whereas lower risk is being associated with lower financial exposure. So, innovative activities which increase risk and as a result financial exposure constitute barriers to innovation (Guijarro et al, 2009). Finally, debt financing can lead to lower financial activities. This is illustrated by the fact that transaction costs related with investment in technology could prevent firms from financing innovation with debt.

According to Guijarro et al. (2009), the organisational structure of every firm which does not support the climate of innovation can become a serious barrier of innovation activities. As cited in Mosey et al. (2002), employees often question the usage of innovation strategy due to a management style which is always driven by an owner-management relationship. As cited in Guijarro et al. (2009), employees' negative behaviour towards innovative strategies is influenced by poor communication, weak human resources practises. As a result of employees' negative behaviour, enterprises may miss the opportunity to pursue new market innovative ideas and developments. Hence, adoption of innovation strategies requires employees' commitment and support as well as adequate training and skills (Guijarro et al, 2009). This is illustrated by the fact that managers of small firms usually lack the education and training that are linked with good innovation practices (Hausman, 2005). In addition, many

enterprises cannot hire or train the suitable managers who are qualified appropriately for implementing innovative strategies (Guijarro et al. (2009)).

Finally, as cited in Guijarro et al. (2009), external environment influences the implementation of innovation strategies. The external environment includes government policy, economic uncertainty and global competition. As long as the firm communicates to managers the need of innovation in order to maintain market competitiveness, the firm will be innovative. In order to be competitive firms adopt new technologies which often give cost and competitive advantages. In addition, according to Guijarro et al. (2009), there is a positive relationship between economic uncertainty and innovative practices. This is illustrated by the fact that an uncertain environment pushes firms to become innovatively in order to remain competitive and survive. Knowing customer needs, government policy and changes in technology, can help managers to be more innovative. This information is vital for the enhancement of innovation. Without this kind of information barriers to innovation are being created. According to Guijarro et al. (2009), the uncertainty of government policy is a barrier to innovative strategy. Especially in Europe, it is vital for every innovative firm to have the support of government.

Foxon and Person (2008) tried to specify some factors which hamper innovation and created some categories for the barriers to eco-innovation. According to Foxon and Person (2008), some of the several categories of barriers to eco-innovation are: failures in infrastructure provision and investment, institutional failures or transition failures According to Marin et al (2015), the above barriers have to do with issues which are systematic and not with barriers which concern the internal business. Runhaar et al. (2008), attempted to present barriers to eco-innovation with the help of a case study, particularly, they focus on the barriers to environmental leadership which have to do with the differentiation of incentives and generally the obstacles that every firm faces.

Marin et al. (2015) have dealt with the literature on technological innovation, have made great work to innovation barriers and have compared some factors, which hamper innovation with the factors that hamper eco-innovation. There is availability of data which concern innovation and as a result every researcher has the opportunity to gather empirical data for the subject. The focus of the literature has been on two main categories· the first has to do with the firm characteristics which affect negatively innovation and the second has to do with external factors (not within-firm factors) which affect innovation. Apart from financial barriers there are barriers which hamper innovation and they are non financial. Non-financial barriers have to do with factors which concern the market such as the market structure and regulations, as well as organizational and technological capabilities (Marin et al., 2015). All in all, there is an idea that innovation is hampered by different types of factors and as a result attention has been paid to the investigation of the complementarities that go along with the different obstacles which hamper innovation (Marin et al., 2015). These complementarities have made it difficult for policy instruments to help the reduction of the obstacles which hamper innovation.

According to Marin et al. (2015), researchers should take into account an important issue when dealing with data on barriers to innovation, something that has been revealed by evidence concerning innovation. There is a reverse causality issue between innovation and barriers that hamper innovation. This is perfectly illustrated by Galia and Legreos (2004; p. 1189) «it is plausible that certain problems are not effectively encountered until firms face them. […] Innovative firms face problems and more innovative firms have more problems». As in Marin et al. (2015), it could be a good conclusion that every successful innovative firm is a firm that can overcome innovation obstacles. D' Este et al. (2012) recognized the reverse causality issue of innovation and barriers and as a result they suggested two categories of innovation barriers 'revealed' and 'deterring' barriers. The first type of obstacles has to do with barriers which result when firms are innovative. When firms practise innovative tasks tend to become aware of the difficulties that can be related with innovation. This experiential process can help firms to be aware and deal

easier with factors that hamper innovation (Marin et al., 2015). Revealed barriers are totally different from deterring barriers, because revealed barriers disclose information which helps firms to deal with problems and on the contrary deterring ones prevent firms from practising innovative tasks (Marin, G. et al. (2015).

The analysis of barriers to eco-innovation is totally related to the previous mentioned barriers to innovation. In addition, it relies also on evolutionary economics (Marin, G. et al. (2015). Evolutionary economics found that barriers to eco-innovation are not related with 'environmental-related phenomena'. According to Marin et al. (2015), in order to investigate the barriers of eco-innovation, one has to deal with the heterogeneity of enterprises concerning their eco-innovation profile. In addition, one should take into consideration the fact that enterprises have certain limits of knowledge which come from their bounded rationality. As a result of limited knowledge, the perception of barriers that every firm has is being affected (Marin et al., 2015). In addition, eco-innovation engagement of an enterprise is related with the knowledge of the firm concerning the barriers and the difficulties to eco-innovation. This can also be inferred from the literature that concerns barriers to technological innovations (Marin et al., 2015).

All in all, eco-innovation is one of the main goals of most European countries' policy strategies. According to Marin et al. (2015), many policies which concern the environment oblige firms to comply with the rules that have to do with the preservation of environment along with the need of innovation. Simultaneously, the relation between policy-driven and market-driven eco-innovation strategies is increasingly important for most of the European firms. As a result, barriers to eco-innovation can play a vital role in enhancing or restricting Europe's strategies, the environmental concerned policies of enterprises or finally the policy implementation.

# Chapter 3: Funding of startups and SMEs

## 3.1. Funding of startups and SMEs

Not only venture capital but also seed capital is vital for start ups and SMEs in order to enable enterprises to move from ideas to real action. Entrepreneurs, in order to start their businesses, rely on own and family funds as well as more recently on crowdfunding. The growth of crowdfunding shows that the financial market underfunctions. However there is need to improve startups' access to financing sources in order to help sustainable development and well-capitalised SMEs. In addition, well financed firms by diverse funding sources beyond bank financing, create financial stability and broad-based economic growth.

This chapter presents the basic sources of funding for an enterprise in order to deal with its financial needs. Every firm needs funding for its current needs, contingent expenses and fixed costs. There are several ways for enterprises to deal with their financial needs. They can use their equity, as well as borrowing facilities and bank loans.

**A.** Initially, the bank funding will be presented. The type of bank funding that will be used by enterprises depends on the aim or the needs of every firm. There are two categories of funding:

- The first category covers the needs for working capital that helps current needs. These current needs come from the daily operations of the enterprises. Short term funding can cover the working capital. Enterprises use joint accounts in order to repay the short term funding.
- The second category covers the needs for capital expenditures, machinery and emergency needs. These needs are covered by long term funding because they have long duration. Loans are used for the disbursement and the repayment of the dept.

Loans are one of the most common ways of funding. Furthermore, they are most commonly used for long term lending. **According to the way of repayment there are five kinds of loans:**

1. Simple loans: enterprises are obliged to pay this kind of loans, not only the capital but also the interest, in a certain future time. Interests are calculated at the time period that the contract mentions.
2. Fully amortised loan: enterprises repay this kind of loans in equal mortgage payments (installments) and the amount of interest can be changed during the time period that the loan is paid. Every mortgage payment includes not only interest but also part of the principal.
3. Amortised loan: enterprises repay this kind of loans in equal payments at regular intervals. Payments of principal are equal and come from the division of the total amount of loan with the number of the installments. The amount of interest is different at every installment as long as it is applied to different and lower amount of the loan.
4. Interest loans: These kinds of loans are long term loans and their interest does not show fluctuations.

- American system: Enterprises do not pay interest at regular intervals. The principal together with the interests are paid at the end of the contract.
- Sinking fund: Enterprises pay only the interest at regular intervals. The principal is fully paid back at the end of the contract. The amount of the final deposit is the installment of the loan.

Furthermore, **according to the loans' carrier there are three kinds of loans:**

1. Bank loans, one creditor
2. Debenture bonds, creditors are more than one: These kinds of loans are issued by public companies. The loans are divided in bonds, which represent the rights of the bondholders, according to the terms of the contract. Debenture bonds can cover the financial needs of a country or the financial needs of enterprises. In order to work they have a

coupon rate that is paid or collected every interest period and the face value is paid at the maturity of the debenture bond.

3. Syndicated loans, creditors are two or more credit institutions: Institutions take a specific percentage of the funding, usually to cover investments and needs of working capital of a more permanent nature. Syndicated loans can be big and are used not only by big enterprises, funds and group of companies but also by developing countries which need to support way high growth rates. The contract and the terms of the loan is being formed by the credit institutions, which initially operate as underwriters of the loan. Afterwards, underwriters sell parts of the loan in other institutions. The contractor takes over the management of the syndicated loan and the coordination of the credit institutions which take part at this loan. The contractor, for this management, usually takes an extra fee from the other credit institutions and the borrower. The terms and the characteristics of the syndicated loans depend on the different situations that they have to deal with.

Finally, the **overdraft account** is one of the most widespread ways of bank funding, especially for enterprises. Together with bank loans, overdraft accounts constitute the most important ways of funding.

The contract that is signed between the bank and the borrower assumes that the counterparties will have series of transactions. These transactions are integrated in an undivided account, so they lose their individuality.

The balance of the account fluctuates continuously. As a matter of fact, this situation allows enterprises to cover their short term financial needs such as working capital or other financial needs which occur during the production.

**B.** In addition, apart from bank funding, there are several alternative ways of funding. **Leasing** is an alternative way of funding with which enterprises manage to acquire assets and equipment. According to this way of funding, the owner of the asset is the lesser who grants to the lessee the use of the asset for a particular time period and in exchange for a certain amount of money. The lease payment is agreed at the beginning of the transaction and is paid at the beginning of every time period. The contract of the leasing

consists of the terms for the time period of the leasing, the counterparty who covers the expenses for the insurance and the maintenance of the asset and the payment of possible taxes. Furthermore there are several criteria in order for a funding to be characterized as leasing: 1. First of all, the lesser should be the owner of the asset at the end of the leasing. 2. The present value of the rental should cover at least the 80%-90% of the acquisition value of the asset or the present value of the market. 3. The obligation of the lessees to pay the rentals whether they use the asset or not.

**There are different forms of leasing:**

1. Financial Leasing: It is the main form of leasing. The leasing company in order to acquire an asset from the constructor pays an amount of money and then it rents it to the lessee. At the end of the rental period the lesser takes back the asset.
2. Sale and Lease back: The leasing company buys the asset from the constructor company by paying an amount of money and soon after the leasing company rents the asset to the constructor for a rental that is related to the value of the market.
3. Leveraged Lease: The participants of the leasing are three or more as long as there are one or more participants who pay an amount of money for the leasing. In particular, the leasing company pays a part of the amount of money which is required for the asset. The rest of the capital that is needed for the acquisition of the asset is paid by a bank or another financial institution. There is also a chance for the bank or the financial institution to take the credit risk and as a result they evaluate the creditworthiness both of the lesser and of the lessee. Finally the financial institutions cover the funding with collateral.
4. Vendor leasing: The lesser acquires the asset and the leasing company takes over the obligation to deal with the contract of the two parts of the procedure. In addition, the leasing company guarantees to the lesser the right at the end of the transaction.
5. Cross-Border Leasing: The lesser and the lessee of the transaction come from different countries.

6. Sub Leasing-Operating Leasing: The leasing company rents the asset from the constructor and sooner after it rents the asset to the lessee.

Another alternative way of funding is factoring. **Factoring** is a contract between a factoring company or alternatively between a factor and a company which plays the role of the supplier to possible buyers. The supplier assigns to factor the buyers' receivables which concern contracts of selling products. Factoring is not only one service but a package of services. The supplier company which assigns to a Factor Company the buyers receivables can choose from a combination of services.

There are several forms of factoring:

**Domestic Factoring:** It concerns domestic credit, when the supplier and the debtor can be companies whose remit is retailing or wholesale:

Factoring with reduction:

The Factor Company funds, manages and collects money without taking over the credit risk. The supplier takes over the credit risk and the factor company funds deposits in exchange for receivables, keeps to the ledger of the clients whose receivables have been delegated, manages the receivables and evaluates the credibility of the clients of the supplier.

Factoring without reduction:

The Factor Company funds, manages and collects money by taking over the credit risk when debtors are unable to pay. The Factor Company covers the credit risk and additionally deposits in exchange for receivables, keeps to the ledger of the clients whose receivables have been delegated, manages the receivables and evaluates the credibility of the clients of the supplier.

Discounting Invoices:

The Factor Company does not take over the credit risk and does not manage suppliers' receivables. In that case the supplier collects the receivables that

have been delegated. However, the supplier is obligated to pay the receivables according to the agreed time and way of paying.

International Factoring: It concerns enterprises which trade products internationally.

Export Factoring:

Factor companies collaborate with foreign factor companies all around the world and fund enterprises in exchange of foreign receivables that have been delegated. Usually, factor companies take over the credit risk (without reduction). It works with the collaboration of two agents, the one is from the domestic factor company and the other is from the foreign factor company which comes from the importer's country. The factor company takes over importer's collateral through the foreign agent.

The Import factoring concerns companies from abroad which export to a country and need factoring from an agent of their country. By using this procedure the importer ensures favorable market terms and bargaining of the value of the imported goods.

Consumer Factoring

Consumer factoring concerns enterprises which sell goods or provide services to consumers. By consumer factoring enterprises have the opportunity to offer to their clients another way of paying apart from consumer loans or credit cards. This way of funding offers flexibility and low burden as long as it does not obligate consumers and sellers to deal with time consuming processes like the issuance of a credit card or the use of property as collateral in case of lending.

Finally, at no financing factoring the supplier does not have financing needs but this enterprise needs coverage of credit risk and management of covered receivables. The factor company offers the coverage of credit risk and the assessment of buyers' credibility, the management and the collection of the receivables which are delegated and the yield of the collected receivables.

In addition, **forfeiting** is used for transactions which have to do with mechanical equipment or equipment in general. Forfeiting is used by exporters in order to receive their clients' debts quickly. The exporters sell their medium-term receivables to the forfeiter at a discount in order to eliminate the risk because after the selling the exporter has no liability regarding possible default by the importer on paying the receivables. As a result the importer pays the receivables to the forfeiter who is a bank or a financial firm.

**Crowdfunding** is a widespread way of fundraising, usually via the Internet, whereby start ups or mature companies raise money, more often small individual contributions, in order to support the companies. Nowadays there is increased attention in crowdfunding by regulators, investors, founders and policy makers. Small investors are often the first target of start ups in order to raise money, but small investors have not the ability to research and assess potential investments. As a result companies which want to raise money through an equity crowdfunding platform should find ways to signal their value to the investors.

According to Graham (2016), crowdfunding is a practice of gathering a large number of small financial contributions in order for a common project of a start up or mature company to be supported, usually via the Internet. By gathering many small amounts of money from a large number of donors, project initiators have the opportunity to finance a project, which otherwise they could not deal with (Graham, 2016). Project initiators use either a website or a platform in order to gain attention and convince their potential investors for their project's worthiness. Through the website or the platform, companies have the opportunity to give information about their project and as a result potential donors can assess the projects in the funding platform in order to decide which one of them to support and for how much (Graham, 2016). Only truly worthy ideas will receive donations from a large amount of donors and as a result will be fully funded. According to Graham (2016), the 'the wisdom of the crowd' will decide which project is worth funding.

As cited in Graham (2016), the idea of funding a project through a large number of small donors has started since 18th century in Germany. Praenumaration was a common practise of funding an unpublished newspaper or an unpublished book. The idea behind that type of crowdfunding, was that publishers wanted to see the potential subscribers of the newspaper before they printed it. Another example of early crowdfunding is the funding of a pedestal for the Statue of Liberty. According to Graham (2016), Joseph Pulitzer in order to raise a large amount of money, he made a campaign through newspaper advertisements with which he managed to receive funds from 160.000 donors. Crowdfunding via the internet began more recently. Particularly, in 1997, a British rock band Marillion started an internet campaign in order to raise money for a band tour and some years later the same band managed to raise money for the production of a studio album. The same practice of funding was followed by many artists in order to finance several projects. The first website which was dealing with crowdfunding, was first introduced in United States in 2003 and its name was ArtistShare. The site has the aim to raise money for artists who want to fund projects. Artistshare was a successful website and as result it showed the way for new crowdfunding platforms such as Indiegogo in 2008 and Kickstarter in 2009 which support a broader range of projects. Many artists, film producers, musicians and small enterprises have used crowdfunding campaigns in order to fund artistic endeavours and new products (Graham, R. (2016)).

According to Graham (2016), there is an 'All- Or-Nothing' (AON) system, by which the start-ups or the mature companies which require funds from crowdfunding platforms receive funds only if they reach their funding target. As a result of this system, the total amount of money that is gathered through the platform is transferred to the company only if the amount of money has reached a certain level. Otherwise, the gathered funds are returned to the donors and the company does not take any of the funds. In addition, donors take back their donated funds but they do not receive rewards for their contributions.
Furthermore, project initiators should rely on successful promotional campaigns in order to receive funds from a crowdfunding platform. It is vital

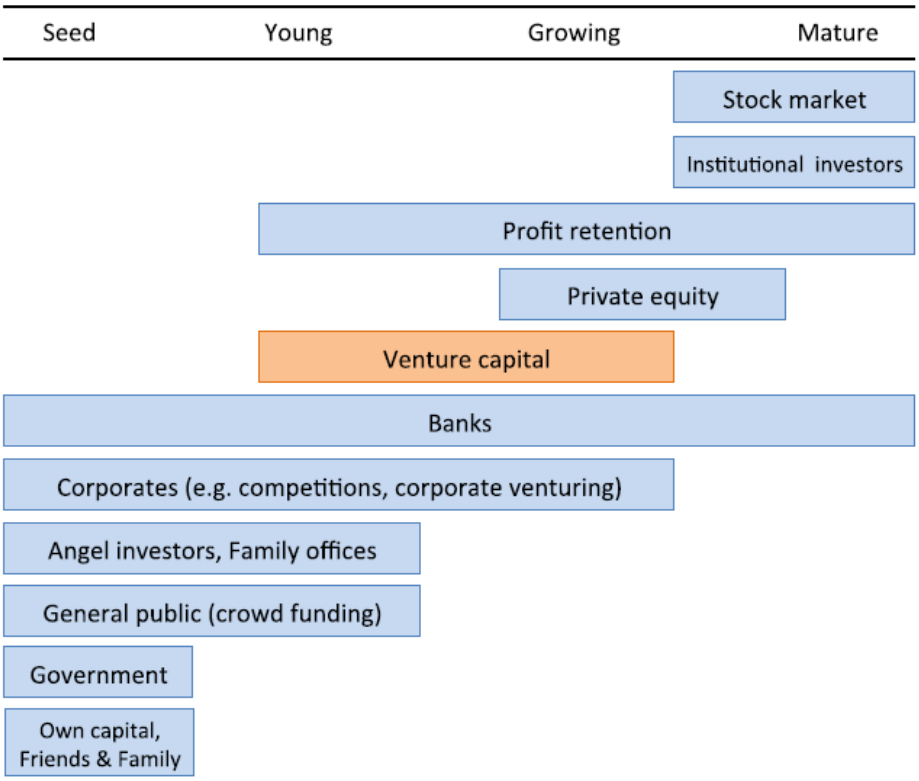
for the companies to gain the trust of the donors, and as a result to become famous in order to be funded. A safe way for a crowdfunded project to be promoted is through social media or word of mouth, because large advertising campaigns are expensive. The initial donors of the project try their best in order to promote the project to other donors and as a result to get the reward as long as the project will be fully funded. So initial donors do their best in order to get the reward and as a result a pyramid effect is generated which influences successfully a larger number of people. Initiators of the project will do their best in order to promote it but the committed donors of the project may do most of the work of the promotion.

Finally, there are two categories of crowdfunding: reward-based crowdfunding and credit-based crowdfunding. Reward-based crowdfunding is the most prevalent way of growdfunding. By this way of crowdfunding donors receive small rewards for their contribution to a project and the reward depends on the level of contribution. Donors may receive back their contributions if the project fails to become fully funded. Credit-based crowdfunding is a way of funding which grows rapidly after the first launch of the platform Lending Club in 2007. Trough crowdfunding platforms lenders can often get a higher return than a treasury security or junk bond might offer, and borrowers can often get funds for a lower interest rate than they get on a typical loan. Donors who choose either reward-based or credit-based crowdfunding do not have the option of a continuing ownership stake in the project they have chosen to support. Equity-based crowdfunding allows donors to get larger rewards as long as they function like small-scale venture capitalists. In addition, equity-based crowdfunding allows many people to invest in growing business at an early stage. So, equity-based crowdfunding allows businesses to communicate directly with potential investors and as a result they do not need a fund manager to intervene (Graham, 2016).

Finally, another way of financing start ups and SMEs is **venture capital**. According to Bocken (2015), especially for the emergence of a business, venture capital is the key. This is illustrated by the fact that venture capital can make start ups grow faster, generate new jobs, create more value and help

businesses to become more innovative. According to Marcus et al. (2013), venture capitalists have the role to select venture ideas which are presented to them by entrepreneurs. Venture capitalists identify and select investments which fit their investment portfolio. As cited in Bocken (2015), venture capitalists invest in riskier businesses and tend to support start ups by using their networks and expertise. Usually, venture capitalists invest in start ups after 'friends and family', angel investors or crowdfunding who are the first to contribute in the new business, and before banks, stock market or private equity (Table ).

Figure 3.1:
The role of venture capital and emerging roles of other actors in growing businesses.




Source: Marcus et al. (2013)

The main aim of venture capitalists is to sell their shares in ventures, through mergers or initial public offering (Bocken, 2015). As a result the relationship between venture capitalists and businesses is long term and vital for the survival of their companies (Marcus et al., 2013). As cited in Bocken (2015)

there is a timeline of ten years between raising money and leaving the business by venture capitalists. So, venture capitalists invest in sustainable businesses, because they have the opportunity to deal with businesses which have bottom line returns.

In more detail, venture capitalists have to identify the businesses which have the potential to create economic growth while at the same time they create positive environmental and social impacts. As a result, capital investors in order to evaluate in the right way their potential investment, they set boundaries and integrate a heterogeneous range of factors such as social and environmental. All in all, venture capitalists prefer businesses which display an overall positive behaviour. According to Bocken (2015), the line with venture capitalists' vision of what fits their portfolio is the investment thesis which refers to how a specific investment will create impact.

### 3.2 Funding of startups and SMEs nowadays

According to Jagtiani and Lemieux (2016), in the United States of America, community banks which are the main lenders for small businesses loans face tough competition. The competition comes from large banks as well as ‘nonbank lenders’ which is a fast growing field (Jagtiani and Lemieux, 2016). Community banks showed a decline in small business loans before the crisis too but according to Jagtiani’s and Lemieux’s research, the crisis along with technological developments helped further the decline in community banks’ share in small business loans. Furthermore, according to Jagtiani’s and Lemieux’s research, ‘nonbank lenders’ become partners with banks. When banks do not provide the appropriate loan for their business clients, they refer customers to alternative lenders which assess the client is credibility. In addition, many loans have originated by banks and then are sold back to the ‘nonbank lenders’ (Jagtiani and Lemieux, 2016). This is illustrated by the fact that Paypal assesses the credibility of a client who asks for a loan by leveraging the proprietary sales transaction data. Regulators are trying to monitor these trends in order to deal with possible risks. All in all, alternative lenders can become both a challenge and an opportunity for community

banks as long as they use technology in order to offer to borrowers, faster processing times, automatic applications and small demands for financial documents. As a result, alternative lenders fund their clients' business within a day in contrast to community banks that need longer for the approval of a loan (Jagtiani and Lemieux, 2016).

According to the 17th round of the Survey on the Access to Finance of Enterprises (SAFE) which covers the period from April to September 2017 and consists of a total euro area sample size of 11,202 enterprises, of which 10,210 (91%) had fewer than 250 employees, there are several issues which deserve to be mentioned and most of them concern the finance of companies. One of the main issues that the survey asked entrepreneurs was to address the most pressing problem, which their enterprise had. The problem of finding customers was the main concern for the largest share of SMEs and the second closest concern was the availability of skilled labour. Access to finance was one of the least important problems of SMEs apart from Greece where entrepreneurs continued to find it one of their biggest problems (from 27% to 23%).

More generally, according to the Survey on the Access to Finance of Enterprises, euro area SMEs reported better state in their overall situation during the period from April to September 2017. Particularly, an 27% of SMEs from 19%, reported higher turnover than the previous examined period without taking into consideration the size, the class or the country of the company. Furthermore, in Greece, a positive net percentage of SMEs (5%, from -13%) indicated an increase in turnover since 2009 when the first survey was conducted. There was also a positive turnover in profits (5%, from 0%), which was observed for the first time since 2009 when the first SAFE was conducted. Labour costs were reported to remain constant from 49% net firms. In addition, other costs declined slightly as reported from entrepreneurs (48% from 50%). The debt-to- total asset ratio declined (-10% from -8%) which is a fact that shows deleveraging efforts. Furthermore a slight increase was reported in fixed investments (17% from 16%).

The need for external financing increased over the period from April to September 2017. In particular, euro area SMEs indicated no changes according to their bank loans needs (0%, from 3%) and 4% (from 6%) reported demand for bank overdrafts. In addition the 9% (from 8%) of SMEs indicated the need for trade credit and 11% (from 10%) reported demand for leasing or hire-purchase. The bigger the size of the company the larger the amount of money which is spent for fixed investments, inventory and working capital. As a result all SMEs used their total internal and external financing for fixed investments, inventory and working capital. An increase in availability of bank loans and bank overdrafts was reported which is a fact that is consistent with the euro area bank lending survey for the third quarter of 2017. The survey reported an easing of bank lending standards, which is a fact that coincides with the answer of entrepreneurs who claimed an increase of availability in bank loans and bank overdrafts. On the one hand, the availability of bank loans mostly improved in Spain and Portugal, Greece was the only country where SMEs reported a net deterioration in the availability of bank loans but in reduced extent. SMEs attribute the increase in the availability of bank loans and bank overdrafts to the improvement in the willingness of banks to provide credit (18% from 16%) and the positive effect from the general economic outlook (Italy and France have indicated positive net effects for the first time since 2009). In addition the net percentage of the euro area SMEs indicated improvements in their firm-specific outlook (22%, from 18%), capital position (22%, from 19%) and credit history (21%, from 20%). External financing gap is the difference between the need for external financing and the access to external funds. The external financing gap, according to the SAFE (2017) was negative something that means that the increase in the need for external financing is smaller than the improvement in the access to external funds. Financing gap was negative in the euro area countries apart from Belgium, France and Greece. Greece had the biggest financing gap but recorded the biggest improvement compared with the previous Survey. Furthermore, euro area SMEs reported a decline in financing obstacles and the percentage of SMEs which applied for bank loan declined from 32% to 27%. In addition, the amount of SMEs, which received a full loan funding remained the same with the previous report, around 74%

percent and the 5% of the applications were rejected (5%, from 6%). Financing obstacles increased only in Austria, Portugal and Slovakia.

Entrepreneurs (the net percentage) reported that the terms and conditions related to the bank finance improved and the interest rates declined. On the contrary, a positive net percentage of SME reported a tightening in the collateral and other requirements of banks in order for a company to get full loan funding. The 30% of entrepreneurs reported increased charges, fees and commissions which are related with the costs of financing.

**Large enterprises** reported better financial condition than that of SMEs, as they indicated marked increases in both turnover and profits. In addition, the amount of large companies which succeeded to get full loan funding was around 85% and the 1% of the applications was rejected. The success rate was higher and the rejection rate was lower than those of SMEs. According to the SAFE results, the average interest rate charged to large enterprises on credit lines and bank overdrafts was lower than that paid by SMEs. Large companies therefore benefited from better access to finance than SMEs.

All in all, according to the Survey on the Access to Finance of Enterprises euro area firms reported further improvements in their external financing conditions, which support the ongoing economic growth.

According to the same Survey, loans related with banks were for this period the most relevant financial source for entrepreneurs. In particular, bank based instruments and other sources of finance remained for a continued period the most relevant financing source.
During the period examined, from April to September 2017, SMEs mostly reported bank overdrafts as a relevant financial tool (53%), and after that 52% bank loans. In addition, leasing or hire-purchase was a potential source of finance for 46% of SMEs. But 36% of SMEs considered as potential source of finance grants or subsidised loans which are supported by public sources in the form of guarantees. The 31% of entrepreneurs considered trade credit as a relevant source of finance and 25% considered internal funds as the most relevant financial tool. Furthermore, 20% of SMEs considered as potential

source of finance other loans such as family loans, friends' loans or related companies' loans. On the contrary, equity, debt securities and factoring, which are considered market based instruments were reported by fewer firms as a relevant source of finance (12%, 3% and 9% respectively). According to SAFE, the bigger the size of the firm the greater the use of all financial instruments. Large firms also reported having used whatever financial source it was given to them. All in all, short term bank finance such as bank overdraft and credit lines are the most popular ways of finance among SMEs. Leasing and long term bank loans are the next most popular ways of funding for entrepreneurs who took part in the survey. On the contrary, equity and debt securities were the least popular sources of finance for SMEs. These results concern not only SMEs but also large firms.

According to the same Survey, except for bank loans the need for external finance has increased slightly. In particular, demand for bank loans remained the same for enterprises (around 3%), but demand for bank overdrafts increased from 4% to 6%. Furthermore, a higher percentage reported a higher demand for instruments which are not banking related instruments. So, 9% of SMEs reported a higher need for trade credit and 11% reported an increase in their need for leasing or hire-purchase. SMEs which reported a higher demand for other loans such as family loans, friends' loans or related companies' loans were around 4% (from 8%) . Large firms demanded more often external funding than SMEs. 5% net percentage of large enterprises demanded bank loans (from -1%) and 8% (from 6%) reported higher demand for bank overdrafts. In addition, the net percentage of firms that increased the demand for trade credit, other loans and leasing was12%, from 8%, 3%, from 4%, 15%, from 9%, respectively. All in all, most of the large firms reported increased demand for external financing from April to September 2017 in comparison to the previous period, apart from the demand for other loans. There are differences across euro area countries concerning demand for bank finance. Spain and Germany reduced the need for bank loans, but in France and Italy the need for bank loans increased (9%, from 12% and 4%, from 8% respectively). In addition, German firms reduced the need for bank overdrafts, on the other hand the demand for bank overdrafts increased in France (12%,

from 17%), Italy (5%, from 10%) and Spain (5%, from 11%). Furthermore, all large firms reported increased needs for trade and leasing in contrast to SMEs which reported lower need for these financial instruments. In Greece, there was a strong demand for bank loans and bank overdrafts (19% and 23% respectively), something that indicates high demand for external financing. Compared to the previous survey on the Access to Finance of Enterprises, there was weaker demand for external financing in Greece from April to September 2017.

According to the same Survey, firms mainly used external finance for fixed investments, inventory and working capital. Particularly, fixed investments were reported as the main purpose of external and internal funds and after the fixed investments, inventory and working capital were the most frequently mentioned purpose of funding. Around 40% of SMEs used financial instruments for fixed investments and 33% reported inventory and working capital as the main aim of external finance. Fixed investments were higher in large enterprises then in SMEs. The 59% of large firms reported use of funds for fixed investments, on the other hand only the 30% of SMEs reported the use of external finance for fixed investment. In addition, the use of external finance in working capital and inventories was also correlated with firm size. Particularly, SMEs reported the use of external finance in order to hire employees (16%, from 15%), develop new products (15%) and refinance obligations (12%, from 13%). According to SAFE, German is the country which used the biggest amount of money from external finance in fixed investment, among large euro area countries. 54% of German SMEs used external finance for fixed investments; on the other hand only 32% of SMEs used funding for that purpose. Spanish enterprises reported the use of finance for inventory and working capital (43%). In addition, German SMEs frequently use funds for the development of new products, hiring of employees and refinancing of obligations, while SMEs in the other large euro area economies do not use so frequently external funds for these purposes.

# Chapter 4: Literature review of researches related to funding start ups and SMEs

## 4.1 Cowling et al. (2015)

A factor that plays a role in funding of SMEs is innovation. Cowling et al. (2015) with their research tried to investigate at which level innovation can influence the funding of a SME. Sources of funding find it difficult to assess innovative firms because, according to Cowling at al. (2015), innovative firms have more risky business plans than other firms. On the one hand risky business plans help firms to gain market share in new markets but on the other it is difficult for financial sources to evaluate the risky business plans of a firm. In addition, innovative firms depend on intangible assets and as a result this fact makes it difficult for innovative firms to offer collateral in case of funding by loans.

Cowling et al. (2015) used for their research data from the government: 'Research for small firms in the United Kingdom'. The sample consisted of 10.708 employers of SMEs and it was derived from the data base Dun and Bradsheet. Three groups of data were used for the research: before the financial crisis of 2007/2008, after the financial crisis of 2010 and after the financial crisis of 2012. In the sample that was used, innovative firms were those that had provided in the market a new product in the last twelve months. The product should be new not only for the firm but also for the market. The 11% of the sample is innovative firms (1.381 innovative firms out of 10.708 firms).

The dependent variable is the submission of the application for funding or one of the four levels of difficulty of access to funding. The first three levels of difficulty of access to funding answer to the question: 'Did you have difficulties in getting funding from the first funding source?'. The three first levels are the following:

1) Enterprises that found difficulties in getting funding from the first source of funding.

2) Enterprises that did not take full funding from the first source of funding.

3) Enterprises that did not get funding from the first source of funding.

The fourth level of difficulty in getting funding consists the absolute 'credit rationing' is the following:

4) At which level enterprises cannot get funding from any source of funding.

The independent variables that were used in the research consist of many characteristics of the enterprises. Some independent variables are the size, the age and the sector of the firm. In addition, some other independent variables were the gender, the nationality and the qualifications of the owners as well as the number of the managers and the changes in the turnover of the firms.

Particularly, the dummy variable 'innovator' takes the value 1 if the firm has imported a new product in the market the last twelve months and 0 if has no. This dummy variable is the centre of some more independent variables which enrich the regressions. These variables are dummy variables: 'Non Innovator (2010/2012)' which concern the non innovative firms for the years 2010 and 2012 and 'Innovator (2010/2012)' which concern the innovative firms for the years 2010 and 2012. In addition, there is the dummy variable '2010/2012' which concern the innovative and non innovative firms of these two years (after crisis) and 'Innovator (2007/2008)' which concern the innovative firms for the years 2007 and 2008. In order for researchers to check if the size of the firm plays a role in access to funding, they entered three dummy variables: 'micro (1-9)' when firms occupy 1 to 9 employees, 'small (10-49)' when firms occupy 10 to 49 employees, while big firms occupy 50 plus employees which is the base category. In order for the researchers to check if the gender or the nationality of the owners play a role in access to funding, they entered the dummy variables: 'Female led' takes the value 1 if the firm has a female owner and 'Ethnic led' takes the value 1 if the firms' owner has a nationality of the minority, respectively. These two dummy variables take the value 0 for the opposite situations. The qualifications of the managers, the number of the managers and the aims to grow of the enterprises described

from the variables: ‘Qualified’, ‘Number of directors’ and ‘Aims to grow’ respectively. For the firms’ work cycles two variables were used: ‘Turnover increasing’ if the work cycle increases and ‘Turnover decreasing’ if the work cycle decreases. The age of the firms concerns the years of operation from the beginning of their operation, and is expressed with the use of two dummy variables: ‘Age 5-9’ was the first dummy, ‘Age 10+’ was the second dummy and firms which operate less than five years was the base category. Furthermore, researchers used 13 more dummy variables in order to express the different sector that every firm works in. Table 4.1 shows every variable that was used in the research.

Cowling et al. (2015) used a probit econometric model in order to conduct their research. They run ten regressions. We can see from table 4.1 that the regressions (1) and (2) had as dependent variable: if the enterprises had applied for access to funding and regressions (3) until (10) had as dependent variable: one of the four levels of difficulty in getting access to funding. In addition, models (1), (3), (5), (7) and (9) contain all the innovative firms but models (2), (4), (6), (8) and (10) discriminate innovative and non innovative firms before and after crisis.

Probit models (1) and (2) represent the probability of firms to apply for finance. In the statistical model (1), the coefficient of dummy variable ‘Innovator’ is positive and statistically significant; something that means that it is more possible for innovative firms to apply for finance than for non innovative firms. The coefficient of dummy variable ‘2010/2012’ is positive but statistically insignificant. In the statistical model (2), the sample is divided in categories of the innovative firms before and after the crisis. The coefficients of the dummy variables ‘Innovator (2007/2008)’ and ‘Innovator (2010/2012)’ are positive but statistically insignificant. Innovative firms are influenced a little more, concerning the access to finance, because their coefficient is a little bigger than those of non innovative firms.

In addition, in regressions (1) and (2) we can see that ‘micro’ and ‘small’ firms are more likely to apply for finance because their coefficients are positive and statistically significant. Furthermore, ‘Qualified’ owners, enterprises with more

managers ‘Number of directors’ and enterprises with the aim to grow ‘Aims to grow’, are more likely to apply for finance. Both firms, which had ‘Turnover increasing’ and firms with ‘Turnover decreasing’ have positive and statistically significant coefficients. This fact indicates that both categories are equally likely to apply for finance (as their coefficients have same values too).

The coefficient of dummy variable ‘Innovator’ is positive and statistically significant for models (1), (3), (5), (7) and (9), something that indicates that innovative firms find it more difficult to get access to finance. Particularly in regression (9), the coefficient is statistically significant only for the 10% level of significance; firms are more likely to face rejection to finance from all the possible sources of finance. In addition, the difficulties of innovative firms to get access to finance show a great structural problem. In the statistical models (3), (5), (7) and (9) the coefficient of dummy variable ‘2010/2012’ is positive and statistical significant; this fact shows that firms were more likely to get funding in 2010/2012 than in 2007/2008.

In statistical models (4), (6), (8) and (10) it is easier to see the discrimination between innovative and non innovative firms before and after crisis. The coefficient of the dummy variable ‘Non Innovator (2010/2012)’ is positive and statistically significant in all models. In addition, its value is bigger than the value of the coefficient of the dummy variable ‘Innovator (2007/2008)’, something that indicates that access to finance became more difficult for non innovative firms after the crisis. In addition, the coefficient of innovative firms during 2010/2012 (‘Innovator (2010/2012)’) is positive, statistically significant and bigger than the coefficient of non innovative firms during 2010/2012; this fact indicates that it was more possible for innovative firms to face bigger difficulties in access to finance than for non innovative firms in 2010/2012.

Furthermore, we can draw from the regressions some further conclusions about the characteristics of firms that face difficulties in access to finance. Particularly, only in regressions (1) and (2) we can see that the coefficients of small and micro firms are positive and statistically significant. This fact indicates that was more possible for micro and small firms to face difficulties in access to finance. In addition, the coefficient of the variable ‘Female led’ is

positive and statistically significant in regression (5); we can conclude from this fact that enterprises with a female manager face more difficulties in getting full funding. Furthermore, enterprises with the characteristics ‘Qualified’, ‘Number of directors’ and ‘Aims to grow’ face more difficulties in access to finance because their coefficients are positive and statistically significant in most regressions. Finally, enterprises with declining turnover face more difficulties in getting access to finance because the coefficient of the dummy variable ‘Turnover decreasing’ is positive and statistically significant in all statistical models.

All in all, we can conclude that innovative firms face more obstacles in their access to finance, especially in the period after financial crisis.

Table 4.1: Probit regression results: Problems accessing finance.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Applied for finance | | Had trouble accessing finance from first source | | Didn't get all finance needed from first source | | Didn't get any finance from first source | | Didn't get any finance from a source | |
| Innovator | 0.125** | | 0.266*** | | 0.289*** | | 0.258*** | | 0.183* | |
| | (0.0605) | | (0.0785) | | (0.0870) | | (0.0947) | | (0.0995) | |
| 2010/12 | 0.0315 | | 0.357*** | | 0.354*** | | 0.374*** | | 0.254*** | |
| | (0.0448) | | (0.0568) | | (0.0624) | | (0.0675) | | (0.0694) | |
| Non-innovator (2010/12) | | -0.00171 | | 0.366*** | | 0.380*** | | 0.396*** | | 0.237*** |
| | | (0.0511) | | (0.0608) | | (0.0671) | | (0.0726) | | (0.0750) |
| Innovator (2007/8) | | 0.112 | | 0.287*** | | 0.349*** | | 0.311*** | | 0.139 |
| | | (0.0710) | | (0.0948) | | (0.105) | | (0.115) | | (0.126) |
| Innovator (2010/12) | | 0.154 | | 0.589*** | | 0.543*** | | 0.552*** | | 0.501*** |
| | | (0.110) | | (0.134) | | (0.148) | | (0.158) | | (0.160) |
| Micro (1-9) | 0.272*** | 0.280*** | 0.0818 | 0.0822 | 0.0797 | 0.0808 | 0.0238 | 0.0250 | 0.0842 | 0.0836 |
| | (0.0375) | (0.0366) | (0.0505) | (0.0505) | (0.0556) | (0.0556) | (0.0609) | (0.0609) | (0.0639) | (0.0640) |
| Small (10 – 49) | 0.438*** | 0.447*** | -0.0766 | -0.0757 | -0.0322 | -0.0287 | -0.0648 | -0.0617 | -0.102 | -0.104 |
| | (0.0508) | (0.0502) | (0.0730) | (0.0731) | (0.0798) | (0.0799) | (0.0881) | (0.0881) | (0.0989) | (0.0992) |
| Female led | -0.0299 | -0.0375 | 0.0668 | 0.0663 | 0.144* | 0.142 | 0.103 | 0.102 | -0.00236 | -0.00107 |
| | (0.0631) | (0.0619) | (0.0817) | (0.0817) | (0.0870) | (0.0869) | (0.0924) | (0.0923) | (0.101) | (0.101) |
| Ethnic led | -0.0244 | -0.0240 | 0.117 | 0.117 | 0.162 | 0.160 | 0.110 | 0.107 | 0.0714 | 0.0725 |
| | (0.0810) | (0.0810) | (0.0973) | (0.0972) | (0.102) | (0.102) | (0.111) | (0.111) | (0.115) | (0.115) |
| Qualified | 0.110** | 0.113** | 0.198*** | 0.199*** | 0.211*** | 0.213*** | 0.224** | 0.225** | 0.100 | 0.0993 |
| | (0.0480) | (0.0479) | (0.0698) | (0.0698) | (0.0796) | (0.0795) | (0.0881) | (0.0881) | (0.0937) | (0.0937) |
| Number of directors | 0.0347*** | 0.0366*** | 0.0361*** | 0.0360*** | 0.0218* | 0.0212 | 0.0110 | 0.0104 | 0.0417** | 0.0421** |
| | (0.0115) | (0.0112) | (0.0139) | (0.0139) | (0.0130) | (0.0130) | (0.0155) | (0.0155) | (0.0172) | (0.0172) |
| Aims to grow | 0.312*** | 0.316*** | 0.252*** | 0.252*** | 0.222*** | 0.223*** | 0.237*** | 0.237*** | 0.272*** | 0.272*** |
| | (0.0477) | (0.0475) | (0.0667) | (0.0667) | (0.0730) | (0.0730) | (0.0794) | (0.0795) | (0.0847) | (0.0847) |
| Turnover increasing | 0.0838* | 0.0862* | -0.0239 | -0.0241 | 0.00876 | -0.102 | -0.0458 | -0.0461 | -0.149* | -0.148* |
| | (0.0468) | (0.0467) | (0.0656) | (0.0656) | (0.219) | (0.0728) | (0.0807) | (0.0809) | (0.0845) | (0.0845) |
| Turnover decreasing | 0.142*** | 0.143*** | 0.283*** | 0.283*** | 0.304*** | 0.305*** | 0.377*** | 0.376*** | 0.272*** | 0.273*** |
| | (0.0544) | (0.0541) | (0.0702) | (0.0702) | (0.0762) | (0.0761) | (0.0825) | (0.0824) | (0.0874) | (0.0873) |
| Age 11 + | -1.094*** | -0.653*** | -1.866*** | -1.765*** | -2.007*** | -2.017*** | -2.364*** | -2.372*** | -2.187*** | -2.182*** |
| | (0.108) | (0.141) | (0.150) | (0.188) | (0.222) | (0.222) | (0.266) | (0.265) | (0.244) | (0.244) |
| Age 5 – 10 | -0.194*** | 0.0187 | -0.266*** | -0.293*** | -0.0488 | -0.0497 | 0.0756 | 0.0750 | 0.0212 | 0.0223 |
| | (0.0507) | (0.0780) | (0.0670) | (0.0926) | (0.108) | (0.108) | (0.120) | (0.120) | (0.128) | (0.128) |
| Obs | 10,560 | 10,560 | 10,476 | 10,476 | 10,476 | 10,476 | 10,476 | 10,476 | 10,497 | 10,497 |
| Pseudo $R^2$ | 0.0397 | 0.0397 | 0.0638 | 0.0638 | 0.0718 | 0.0723 | 0.0745 | 0.0749 | 0.0612 | 0.0614 |

Probit model estimated with standard errors 13 sector dummies included. Age = Less than 5 years and ACT = Agriculture, hunting and forestry. For innovator / year variables, reference category = non-innovator, 2007/8. Weights applied. Regressions 1 and 2 also include variables for legal status.

Source: Cowling et al. (2015)

### 4.2 Beck et al (2008)

Beck et al. (2008) conducted a research in order to find out how economic growth can influence the finance of enterprises. The research uses data from 48 countries around the world based on the Word Bank Enterprise Surveys. The most interesting statistical model in the research is the following:

$$\text{Financing source} = a_0 + a_1\text{Government} + a_2\text{Foreign} + a_3\text{Exporter} + a_4\text{Subsidized} + a_5\text{Manufactoring} + a_6\text{Services} + a_7\text{Firm growth} + a_8\text{Small} + a_9\text{Medium} + a_{10}\text{Corporation} + a_{11}\text{Financing obstacle} + a_{12}\text{Interaction terms } \varepsilon + u$$

This econometric model investigates how different characteristics of an enterprise or enterprise's environment can affect the financial source. Where $a_0$ is the constant of the model, $a_1$- $a_{12}$ are the estimated coefficients of the independent variables and u are the residuals of the regression.

The dependent variable is the 'Financing source'. Particularly, dependent variable is the percentage of investments which is funded by external finance, bank loans, equity, leasing, supplier credit, development bank or other sources (informal). Bank finance includes not only domestic banks but also foreign banks. Development banks include not only finance from development banks but also from public sector's banks. Informal sources of finance include different borrowers (except from banks) and other informal sources of finance. A dummy variable 'Government' and 'Foreign' show if a firm has government or foreign ownership. A dummy variable 'Exporter' and 'Subsidized' show if a firm exports goods and if a firm gets subsidies, respectively. In addition, dummy variables 'Manufacturing', 'Services', 'Small', 'Medium' and 'Corporation' show if an enterprise is active in the field of manufacturing or in the field of services, if the firm is small or medium sized and if the firm belongs to a corporation or not, respectively. The variable 'Firm Growth' expresses the growth of sales of a company and the variable 'Financing Obstacle' is an index which counts how doubtful is financing in a firm.

The variables that are used in the interaction terms are separated in three panels. Panel A refers to ‘Private Credit’ which is the following:

$$\text{Private Credit} = \frac{(0{,}5)*\left[\frac{F(t)}{P_{e(t)}}+\frac{F(t-1)}{P_{e(t-1)}}\right)}{GDP(t)/P\_\mathrm{a(t)}}$$

Where F is credit from deposit money to banks and other financial institutions in the private sector, P_a is the average CPI (Consumer Price Index) of the year and P_e is the consumer index at the end of the period.

Panel B refers to ‘Value added’ which is the value of stocks that are dealing in the stock market to GDP (market to GDP).

Finally, panel C refers to ‘Property Rights’ graded from one to five. ‘Property Rights’ show the level at which the property rights are being protected in a nation.

All regressions are estimated as tobit regressions and take into account country effects. So they are estimated as Fixed Effect models, which check or leave outside the effects of stable variables.

Initially, from table 4.2 we can see that Private Credit increases the use of external sources of finance, especially banks and development banks as terms of interaction are statistical significant in the related regressions. While, small companies are benefiting more by leasing and development banks and less by informal financial sources. Medium sized enterprises prefer to use more informal financial sources as the coefficient of the variable is positive and statistical significant.

Table 4.2: Determinants of financing patterns: impact of firm size.

**Panel A: Private Credit**

| | External Finance | Bank | Equity | Lease | Supplier Credit | Development Bank | Informal |
|---|---|---|---|---|---|---|---|
| Small | -9.707 | -13.543 | 5.112 | 13.91 | 9.627 | 13.251 | 57.051 |
| | [8.896] | [8.087] | [13.906] | [9.790] | [8.649] | [14.802] | [25.469]* |
| Medium | -2.85 | -5.748 | -11.618 | 2.212 | 19.137 | 7.859 | 45.759 |
| | [8.282] | [7.372] | [13.322] | [9.287] | [7.960]* | [13.306] | [25.473] |
| Financing Obstacle * Small | 3.761 | 1.79 | -1.251 | -0.052 | 2.934 | -0.266 | 5.483 |
| | [1.817]* | [1.730] | [2.887] | [1.830] | [1.768] | [3.149] | [2.911] |
| Financing Obstacle * Medium | 6.285 | 4.054 | 5.796 | 3.261 | 1.285 | 5.811 | 9.307 |
| | [1.694]** | [1.539]** | [2.747]* | [1.710] | [1.566] | [2.641]* | [3.310]** |
| Financing Obstacle * Large | 8.479 | 7.272 | 5.216 | 4.771 | 5.78 | 8.567 | 23.28 |
| | [2.403]** | [2.126]** | [3.872] | [2.725] | [2.325]* | [3.735]* | [7.255]** |
| Private Credit * Small | 5.636 | 5.02 | -0.731 | 6.618 | 2.366 | 5.653 | -2.828 |
| | [1.936]** | [1.702]** | [3.778] | [2.702]* | [1.777] | [3.053] | [2.182] |
| Private Credit * Medium | 4.195 | 3.634 | 1.186 | 1.329 | 0.672 | 2.212 | 2.826 |
| | [0.000] | [1.412]* | [3.492] | [2.131] | [1.518] | [1.836] | [2.267] |
| Private Credit * Large | 3.8 | 5.577 | 3.354 | 3.124 | -0.592 | 0.585 | 18.203 |
| | [2.280] | [1.867]** | [4.240] | [3.001] | [1.973] | [2.503] | [7.771]* |
| Observations | 2935 | 2935 | 2935 | 2935 | 2935 | 2935 | 2935 |
| Number of country | 48 | 48 | 48 | 48 | 48 | 48 | 48 |
| Chi-squared | . | 163*** | 55*** | 46*** | 38*** | 159*** | 38*** |
| Small-Large | 0.440 | 0.797 | 0.296 | 0.284 | 0.178 | 0.191 | 0.009*** |
| Small-Large (GCF) | 0.110 | 0.041** | 0.170 | 0.135 | 0.321 | 0.067* | 0.021** |

**Panel B: Value Traded**

| | External Finance | Bank | Equity | Lease | Supplier Credit | Development Bank | Informal |
|---|---|---|---|---|---|---|---|
| Small | -6.694 | -11.877 | 5.887 | 11.886 | 11.268 | 11.007 | 48.399 |
| | [9.301] | [8.452] | [14.254] | [10.026] | [9.140] | [15.348] | [25.453] |
| Medium | -4.231 | -6.421 | -15.485 | -1.344 | 18.763 | 7.272 | 35.538 |
| | [8.797] | [7.850] | [13.750] | [9.562] | [8.539]* | [14.082] | [25.481] |
| Financing Obstacle * Small | 4.244 | 2.141 | -0.821 | 0.31 | 3.108 | -0.124 | 5.477 |
| | [1.831]* | [1.731] | [2.883] | [1.864] | [1.771] | [3.157] | [2.916] |
| Financing Obstacle * Medium | 5.889 | 4.023 | 5.112 | 2.933 | 0.962 | 5.416 | 9.167 |
| | [1.663]** | [1.512]** | [2.722] | [1.691] | [1.564] | [2.621]* | [3.315]** |
| Financing Obstacle * Large | 8.629 | 6.825 | 5.481 | 5.034 | 6.083 | 8.718 | 20.553 |
| | [2.362]** | [2.083]** | [3.863] | [2.697] | [2.282]** | [3.650]* | [7.002]** |
| Value Traded * Small | 1.762 | 0.092 | 5.34 | 5.939 | -0.269 | 1.065 | 0.689 |
| | [1.415] | [1.133] | [2.131]* | [1.294]** | [1.097] | [1.351] | [1.230] |
| Value Traded * Medium | -0.506 | -1.395 | 3.926 | 2.377 | -1.786 | -0.156 | 2.431 |
| | [1.304] | [1.099] | [1.983]* | [1.130]* | [1.063] | [1.067] | [1.307] |
| Value Traded * Large | 0.16 | -0.854 | 6.647 | 4.715 | -1.693 | -0.349 | 7.51 |
| | [1.456] | [1.225] | [2.389]** | [1.479]** | [1.215] | [1.461] | [2.751]** |
| Observations | 2935 | 2935 | 2935 | 2935 | 2935 | 2935 | 2935 |
| Number of country | 48 | 48 | 48 | 48 | 48 | 48 | 48 |
| Chi-squared | 152*** | 160*** | 71*** | 62*** | 40*** | 158*** | 40*** |
| Small-Large | 0.178 | 0.375 | 0.553 | 0.425 | 0.199 | 0.448 | 0.020** |
| Small-Large (GCF) | 0.135 | 0.078* | 0.182 | 0.142 | 0.294 | 0.063* | 0.044** |

**Panel C: Property Rights**

| | External Finance | Bank | Equity | Lease | Supplier Credit | Development Bank | Informal |
|---|---|---|---|---|---|---|---|
| Small | -55.976 | -47.278 | -9.842 | 21.671 | -31.33 | -12.118 | 78.296 |
| | [16.420]** | [15.010]** | [28.788] | [19.785] | [15.771]* | [26.724] | [38.540]* |
| Medium | -4.315 | -13.984 | 16.588 | 29.92 | 12.593 | -2.253 | 48.32 |
| | [15.957] | [14.171] | [27.645] | [19.332] | [15.100] | [24.853] | [39.438] |
| Financing Obstacle * Small | 4.823 | 2.762 | -0.457 | -0.047 | 3.413 | 0.022 | 5.55 |
| | [1.833]** | [1.748] | [2.887] | [1.841] | [1.772] | [3.183] | [2.940] |
| Financing Obstacle * Medium | 5.376 | 4.233 | 4.79 | 3.148 | 0.761 | 5.642 | 9.063 |
| | [1.692]** | [1.542]** | [2.730] | [1.730] | [1.568] | [2.654]* | [3.359]** |
| Financing Obstacle * Large | 7.774 | 6.4 | 4.636 | 5.428 | 5.551 | 8.548 | 19.327 |
| | [2.370]** | [2.098]** | [3.854] | [2.737]* | [2.278]* | [3.675]* | [6.944]** |
| Property Rights * Small | 15.584 | 13.398 | 16.304 | 3.309 | 6.236 | 4.473 | -3.991 |
| | [4.927]** | [3.205]** | [5.923]** | [4.140] | [3.784] | [4.438] | [4.141] |
| Property Rights * Medium | 5.013 | 7.545 | 5.396 | -0.09 | -1.981 | 1.853 | -0.902 |
| | [4.948] | [3.023]* | [5.620] | [3.861] | [3.676] | [3.683] | [4.317] |
| Property Rights * Large | 4.585 | 5.102 | 12.101 | 6.334 | -3.703 | -0.375 | -1.575 |
| | [5.136] | [3.432] | [6.670] | [4.669] | [4.097] | [4.559] | [7.301] |
| Observations | 2935 | 2935 | 2935 | 2935 | 2935 | 2935 | 2935 |
| Number of country | 48 | 48 | 48 | 48 | 48 | 48 | 48 |
| Chi-squared | 171*** | 163*** | 56*** | 41*** | 46*** | 158*** | 35*** |
| Small-Large | 0.002*** | 0.011** | 0.497 | 0.477 | 0.004*** | 0.398 | 0.755 |
| Small-Large (GCF) | 0.315 | 0.175 | 0.281 | 0.092* | 0.451 | 0.076* | 0.065* |

*, **, *** indicate significance levels of 10, 5, and 1 percent respectively.

Source: Beck et al. (2008)

In addition, according to the empirical results better ‘Property Rights’ favor more the use of external funding, especially bank funding because the interaction terms of Property Rights and Size are positive and statistical significant. From the positive correlation of Property Rights and Size we can conclude that small firms are benefiting more than medium sized firms. Big firms are benefiting less than small and medium sized firms.

The results differ for the different sizes of enterprises when financial obstacles are being examined. Big financial obstacles increase the external funding for big firms more than medium sized firms and even more than small firms. This is illustrated by the fact that the coefficients of Financial Obstacles * Size are positive and statistical significant for big enterprises in Panel A, B and C respectively.

The increase of financial obstacles drives medium sized and large sized enterprises to informal sources of financing. This is illustrated by the fact that the coefficients of interaction terms in seventh regression were more positive and bigger.

When financial sources are being examined it seems that there is a monotone increase in the relation of financial obstacles and banking finance. In addition, constrained big firms use more leasing, supplier credit and informal financing. Estimations show that enterprises with bigger financial needs are more possible to count on different sources of external financing.

All in all, the size of a firm plays vital role in the understanding of funding standards. Small firms use less external financing, mainly banking finance, but they are benefiting from better protection of Property rights.

### 4.3 Costa et al. (2014)

According to Costa et al. (2014), lending conditions are an issue of great interest, especially after the beginning of the financial crisis because they can influence the real economy and as a result through the lending conditions the crisis can be spread to the real sectors of the economy. Particularly, in Italy this case is true because banking credit is the main channel of financing for enterprises. Because of the above considerations, since March 2008 in the

Italian ISTAT Confidence surveys an additional section was added. The section contains information on enterprises' perceptions (enterprises which are active in Manufacturing and Services sector) about access to finance. Since May 2009, the Construction sector was included into the survey. Surveys contain enterprises' perceptions about their access to financial sources, which are data that are related with credit demand. In addition, data are derived from the Bank Lending Survey, which are data that are related with credit supply.

According to Costa et al. (2014), the aim of the research is to analyze what influences the probability for a firm to face worsened conditions in access to finance, credit restrictions or credit rationing. In order to achieve the above mentioned goal, researchers chose to use several firms' characteristics derived from the surveys. The characteristics that were used are the size of the firm (which is related with the number of employees), the sector that the firm operates and the location of the activity, the demand and production activity of a firm, the amount of exports and off-shoring of a firm. In particular, according to Costa et al. (2014), the research has the aim to estimate the probability that a healthy firm with good economic conditions will receive in the future credit supply or not. According to Costa et al. (2014), their research is a first attempt to provide a timely analysis for the relationship between bank lending and firms from a borrower perspective in Italy. Researchers did not fail to take into consideration the important role of SMEs in the Italian economy and the 'effects of the crisis on their credit conditions and perspectives'.

The research is based on monthly ISTAT Confidence surveys' data related to Manufacturing, Construction and Services sector. The samples consist of 4000, 500 and 2000 enterprises from Manufacturing, Construction and Services sectors respectively. Particularly, the survey about manufacturing sector covers the whole sector, the Construction survey covers the whole construction industry and finally the survey about Services sector covers the whole sector apart from financial services. Every survey contains qualitative data on the characteristics of the firms such as number of employees, sector

and location of activity. In addition, the survey for the manufacturing sector consists of information on pro productive internationalization.

The research estimates three models:

$Pr(y_{it}=1|x_{it},\beta)= F(\beta' x_{it})$ (1)

$Pr(q_{it}=x|x_{it},\beta)= F(\beta' x_{it})$ (2)

$Pr(z_{it}=1|x_{it},\beta)= F(\beta' x_{it})$ (3)

In the first model $y_{it}$ is a binary dependent variable. When the dependent variable takes the value 1, enterprises evaluate that credit conditions are becoming worse and when the dependent variable takes the value 0 enterprises estimate that credit conditions are 'getting better' or are 'stable'. In order to take into consideration the replies of the actual granting of the credit, researchers used two different labels 'credit restriction' and 'credit rationing'. For the first label 'credit restriction' we consider as dependent variable the ordinal dependent variable $q_{it}$ which takes values from 1 to 4. According to Costa et al. (2014), when $q_{it}$ takes the value 1 the firm has received credit at the same conditions as before. When $q_{it}$ takes the value 2 the enterprise had access to a finance source but with worsening conditions. When $q_{it}$ takes the value 3 the firm has refused the credit because the credit conditions were not good. Finally, when $q_{it}$ takes the value 4 the financial source has refused the funding of an enterprise. The last model consists of another dummy dependent variable the $z_{it}$ which takes values 1 and 0. The dummy credit variable takes the value 1, if the firm gets access to finance and value 0 if the firm does not get access to finance.

For models (1) and (3) researchers used Probit models and for model (2) they used an Ordered Probit model. In addition, researchers had to deal with the problem of heteroskedasticity in the data. In each model F is the cumulative distribution where i= 1,2,.. N is each firm which is part of the sample and t = 1,2,… T is the month in which the survey took place.

Costa et al. (2014) conducted the estimation for models (1) and (3) for Manufacturing, Services and Construction sectors together and separately for each one of them. Model (2) is estimated only for the Manufacturing and Services sectors again together and separately. Estimations for models (1)

and (3) were conducted from March 2008 to September 2011 for Manufacturing and Services sectors and from May 2009 to September 2011 for Construction. Estimations for model (2) were conducted from August 2009 to September 2011 only for the Manufacturing and Services sectors. The set of $x_{it}$ independent variables contains information which has to do with the firms' characteristics and the lending policies over the operation's cycle. **In the first category** of variables there are firm-specific and sector-specific variables. Particularly, there are variables which concern the sector, the region and the size of the firm (related to the number of the employees). In addition, there are variables which concern the firms'-specific opinions on production, demand and employment. The firms' opinions on the above issues can be favourable, neutral or unfavourable. When the models are estimated separately for the manufacturing sector there are some more variables which are taken into consideration. The first group includes variables which concern firm-specific opinions on the financial situation and labour costs. The second group includes variables which concern firm-specific opinions on production capacity and finally the third group includes variables which concern firm-specific opinions on competitive position and internationalisation. The following table (4.3.a) shows analytically the variables which concern the firms' characteristics:

Table 4.3.a:

Regression Variables.

| | Manufacturing | Services | Constructic |
|---|---|---|---|
| Structural information on the firm | | | |
| North-West | X | x | x |
| North-East | x | x | x |
| Center | X | x | x |
| South | x | x | x |
| Small firms (<50 employees) | x | x | x |
| Medium-size firms (50-249 employees) | x | x | x |
| Large size firms (250 and more) | x | x | x |
| Firm-specific opinions on production, demand and employment | | | |
| Level of orders | x | x | x |
| Level of Production | x | x | x |
| Order expectations | x | x | x |
| Employment expectations | x | x | x |
| Firm-specific opinion on financial situation and labour costs | | | |
| Cash availability (wrt. Operative needs) | x | | |
| Cash availability expectations | x | | |
| Assessments on Unit labour costs | x | | |
| Firm-specific opinions on production capacity | | | |
| Obstacles to production: yes | x | | |
| Capacity utilisation | x | | |
| Firm-specific opinion on competetive position and internationalisation (3) | | | |
| Export turnover (in % of total turnover) | x | | |
| Competitive position | x | | |
| Delocalized abroad: yes | x | | |
| Number of employees abroad | x | | |

Source: Costa et al. (2014)

For sector specific information researchers defined business sectors according to the Italian version of the standard Classification of Economic Activity adopted at the European level. In addition, in order to find a way to represent credit worthiness at the sectoral level they used Confidence Climate Indicators (CCI) which is the same for all the firms of a given sector but vary across sectors. So CCIs are different across sectors and over time, and as a result they are a 'possibly significant indicator of sector-specific factors

influencing credit quality of the firms comprised in that sector'. Finally, T-1 time dummy variables (T is the number of time periods which take part in the analysis) are included in the regressions. Concerning the results of the estimations in the three models there are some conclusions which are worth to be mentioned. In model (1) (see table 4.3.b), where the dependent variable is enterprises' evaluation for credit conditions, joint estimation for the three business sectors is based in 145.000 observations and coefficients are generally statistically significant. Particularly, the probability of evaluating negatively credit conditions is higher in the South compared to the Northern areas of the country and for small firms compared to the medium size and large firms (medium or a large-size firm reduces the probability of evaluating negatively the credit conditions by 4 and 7% respectively). In addition, enterprises' evaluations on credit conditions worsening according to the current and expected demand, production and employment (positive and statistically significant coefficients). Also, the coefficients of the time dummies are statistically significant and follow a clear cyclical pattern (see figure 4.3.a). The pattern implies that access to finance has been evaluated well in 2009-2010 compared to mid-2008 and to recent months (for a given quality of the firm and for a given condition of the sector that the firm belongs to).

The results that emerge when the sectors are considered separately are similar to the results when we have joint estimation. Particularly, large firms evaluate positively credit conditions in the construction sector but the coefficient is not statistically significant in the Manufacturing sector. In addition, firms evaluate better the credit conditions in the North West compared to the South in all sectors Firms related to the Manufacturing sector which are in the Centre consider credit conditions worse compared to any other region. Furthermore, there is a strong relationship between firms' opinions on production, demand and employment and their evaluation of credit conditions (most of the coefficients are positive and statistically significant). Some conclusions can be drawn from the additional variables of the Manufacturing sector. Initially, if a firm has cash problems and if it has higher unit labour costs, it is more possible to have a negative opinion on credit conditions. In the same way firms are negatively influenced about the

credit conditions because of obstacles to production activity and low production capacity. A surprising result is that the higher the exports are the more negative the opinion on credit conditions is. Finally the number of employees abroad does not affect firms' opinions on credit conditions (statistically insignificant coefficient). The coefficients of time dummy variables show similar results for each and every sector. Firms' evaluations about credit conditions worsen for the last periods of the research (see figure 4.3.a).

Table 4.3.b: Results of the probit estimation of Model (1)

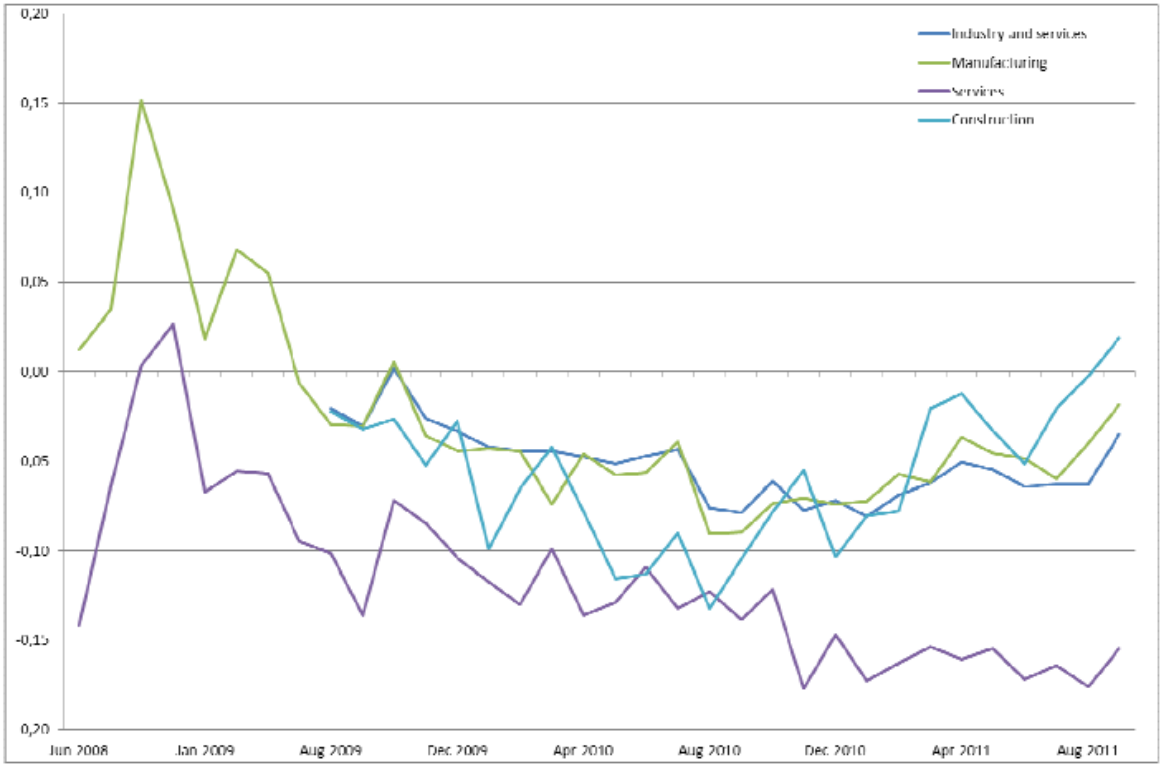
| | Industry and services | | | Manufacturing | | | Services | | | Construction | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | coeff dF/dx | z | | coeff dF/dx | z | | coeff dF/dx | z | | coeff dF/dx | z | |
| Time dummies (Joint significance. dof) | | 458.8 (26) | (***) | | 930.27 (34) | (***) | | 1038.8 (34) | (***) | | 85.0 (26) | (***) |
| North-West | -0.03 | -8.08 | (***) | -0.027 | -6.39 | (***) | -0.03 | -5.67 | (***) | -0.062 | -4.18 | (***) |
| North-East | -0.02 | -6.43 | (***) | -0.001 | -0.36 | | -0.01 | -2 | (**) | 0.013 | 0.87 | (***) |
| Center | 0.00 | -0.03 | | 0.020 | 5.02 | (***) | -0.02 | -3.89 | (***) | -0.022 | -1.37 | (**) |
| Medium-size firms | -0.04 | -11.21 | (***) | 0.000 | 0.02 | | -0.05 | -5.8 | (***) | -0.020 | -1.57 | |
| Large size firms | -0.07 | -11.94 | (***) | 0.000 | 0.63 | | -0.04 | -3.13 | (***) | -0.125 | -5.32 | (***) |
| Firms specific opinions on the situation of demand. production and employment | | | | | | | | | | | | |
| Level of orders | 0.06 | 20.97 | (***) | 0.023 | 5.69 | (***) | 0.06 | 8.18 | (***) | 0.115 | 9.93 | (***) |
| Level of Production | 0.02 | 7.72 | (***) | 0.004 | 1.22 | | 0.04 | 6.17 | (***) | 0.065 | 5.65 | (***) |
| Order expectations | 0.02 | 13.10 | (***) | -0.001 | -0.44 | | 0.03 | 7.8 | (***) | 0.066 | 6.36 | (***) |
| Employment expectations | 0.06 | 22.43 | (***) | 0.048 | 12.17 | (***) | 0.03 | 4.52 | (***) | 0.065 | 5.27 | (***) |
| Firms specific opinions on financial situation and labour costs | | | | | | | | | | | | |
| Cash availability (wrt. Operative needs) | | | | 0.103 | 41.76 | (***) | | | | | | |
| Cash availability expectations | | | | 0.057 | 18.76 | (***) | | | | | | |
| Assessments on Unit labour costs | | | | 0.007 | 12.77 | (***) | | | | | | |
| Firms specific opinions financial on productive capacity | | | | | | | | | | | | |
| Obstacles to production: yes | | | | 0.036 | 11.75 | (***) | | | | | | |
| Capacity utilisation | | | | 0.000 | -4.28 | (***) | | | | | | |
| Firms specific opinions on competitive position and internationalisation | | | | | | | | | | | | |
| Export turnover (in % of total turnover) | | | | 0.031 | 3.8 | (***) | | | | | | |
| Competitive position | | | | 0.015 | 4.43 | (***) | | | | | | |
| Delocalized abroad: yes | | | | 0.000 | -0.11 | | | | | | | |
| Number of employees abroad | | | | 0.002 | 0.85 | | | | | | | |
| Sector Specific Confidence Climate | 0.00 | -3.32 | (***) | -0.001 | -3.6 | (***) | 0.00 | 1.47 | | | | |
| Number of obs. | 143919 | | | 89442 | | | 54100 | | | 8545 | | |
| $R^2$ | 0.0356 | | | 0.0814 | | | 0.0487 | | | 0.0968 | | |
| Parameter tests (degrees of freedom) | | $c^2$ (dof) | Prob. | | $c^2$ (dof) | | | $c^2$ (dof) | | | $c^2$ (dof) | |
| Geographical Areas (3) | | 114.92 | (***) | | 135.87 | (***) | | 38.2 | (***) | | 43.06 | (***) |
| Size (2) | | 248.97 | (***) | | 0.42 | | | 42.27 | (***) | | 29.53 | (***) |
| Firm-specific opinions production. demand and employment (4) | | 3110.46 | (***) | | 271.82 | (***) | | 963.9 | (***) | | 608.94 | (***) |
| Firm-specific opinion on financial situation and labour costs (3) | | | | | 2273.14 | (***) | | | | | | |
| Firm-specific opinions on production capacity (3) | | | | | 176.99 | (***) | | | | | | |
| Firm-specific opinion on competetive position and internationalisation (4) | | | | | 34.54 | (***) | | | | | | |

Legenda: (*): p=0.10; (**): p=.05; (***): p=.001

Source: Costa et al. (2014)

Figure 4.3.a:

Coefficients on time dummies – Model (1)




Source: Costa et al. (2014)

According to Costa et al. (2014), the Ordered Probit estimation of Model (2) evaluates 'the probability of a progressive restriction of credit conditions' (of Manufacturing and Services sectors) (see table 4.3.c). The joint estimation for the two business sectors is based in 42.000 observations and coefficients are generally statistically significant. The probability not to have access to finance is higher for small firms which are in the South, being respectively equal to 12 and 15% in Manufacturing and Services (which are higher percentages than these of Model (1)). Results are similar when we consider sectors separately, apart from the fact that size has statistically insignificant coefficient only for Manufacturing. For Services firms, the probability of being credit constrained is 30% lower if they are medium size and 15% lower if they are large. In the Manufacturing sector, it will be less probable for firms to have access to finance when it is not facing obstacles in production, with higher levels of capacity utilization and higher export turnover. In model (2), the coefficient of the variable 'number of employees in foreign countries' is statistically

significant and shows a negative influence on access to finance. Concerning the time dummy variables we can observe (see figure 4.3.b) that refusal to access to finance becomes weak from the third quarter of 2009 until the half of 2010, while it becomes stable until the first months of 2011.

Table 4.3.c:

Results of the ordered probit estimation of Model (2).

| | Manufacturing and services | | | Manufacturing | | | Services | | |
|---|---|---|---|---|---|---|---|---|---|
| | coeff dF/dx | z | | coeff dF/dx | z | | coeff dF/dx | z | |
| Time dummies (Joint significance. 25 dof) | | 117.23 | (***) | | 69.17 | (***) | | 78.31 | (***) |
| North-West | 0.161 | -8.91 | (***) | -0.100 | -3.74 | (***) | -0.145 | -4.16 | (***) |
| North-East | -0.143 | -7.97 | (***) | -0.081 | -3.15 | (***) | -0.090 | -2.26 | |
| Center | -0.091 | -5.09 | (***) | -0.025 | -1.01 | | -0.174 | -4.52 | |
| Medium-size firms | -0.121 | -7.19 | (***) | 0.006 | 0.27 | | -0.301 | -6.09 | (***) |
| Large size firms | -0.155 | -5.23 | (***) | 0.059 | 1.38 | | -0.155 | -2.18 | (***) |
| Firms specific opinions on the monthly situation of demand. production and employment | | | | | | | | | |
| Level of orders | 0.201 | 12.98 | (***) | -0.032 | -1.57 | | 0.267 | 6.48 | (***) |
| Level of Production | 0.119 | 8.37 | (***) | 0.068 | 3.81 | (***) | 0.070 | 1.63 | (**) |
| Order expectations | 0.065 | 6.65 | (***) | -0.009 | -0.67 | | 0.127 | 6.47 | (***) |
| Employment expectations | 0.255 | 15.78 | (***) | 0.133 | 5.95 | (***) | 0.140 | 4.35 | (***) |
| Firms specific opinions on financial situation and labour costs | | | | | | | | | |
| Cash availability (wrt. Operative needs) | | | | 0.596 | 39.09 | (***) | | | |
| Cash availability expectations | | | | 0.172 | 9.68 | (***) | | | |
| Assessments on Unit labour costs | | | | 0.016 | 4.79 | (***) | | | |
| Firms specific opinions on productive capacity | | | | | | | | | |
| Obstacles to production: yes | | | | 0.200 | 10.75 | (***) | | | |
| Capacity utilisation | | | | -0.002 | -4.63 | (***) | | | |
| Firms specific opinions on competitive position and internationalisation | | | | | | | | | |
| Export turnover (in % of total turnover) | | | | -0.118 | -2.46 | (**) | | | |
| Competitive position | | | | -0.001 | -0.06 | | | | |
| Delocalized abroad: yes | | | | 0.031 | 1.42 | | | | |
| Number of employees abroad | | | | 0.070 | 4.64 | (***) | | | |
| Sector Specific Confidence Climate | -0.007 | -7.83 | (***) | -0.005 | -3.27 | (***) | 0.000 | -0.08 | |
| Number of obs. | 42777 | | | 21413 | | | 13027 | | |
| $R^2$ | 0.0311 | | | 0.087 | | | 0.031 | | |

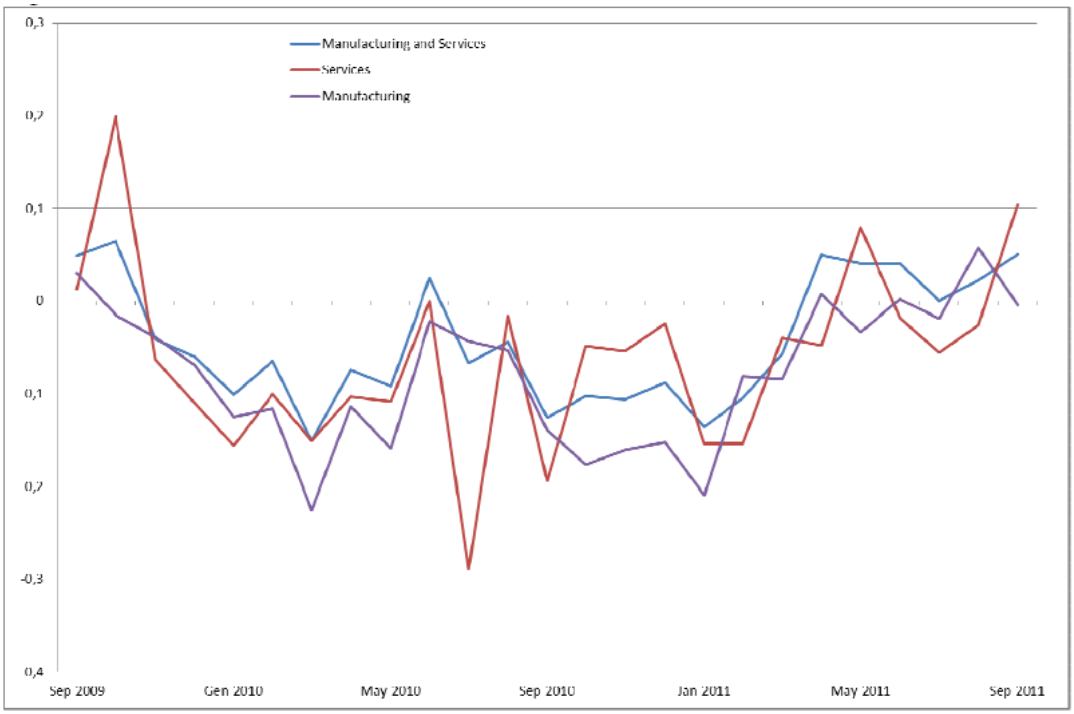
| Parameter tests (degrees of freedom) | $c^2$ | Prob. | $c^2$ (dof) | | $c^2$ (dof) | |
|---|---|---|---|---|---|---|
| Geographical Areas (3) | 93.53 | (***) | 19.22 | (***) | 24.34 | (***) |
| Size (2) | 72.09 | (***) | 1.9 | | 37.06 | (***) |
| Firm-specific opinions on production. demand and employment (4) | 1477.85 | (***) | 54.07 | (***) | 408.8 | (***) |
| Firm-specific opinion on financial situation and labour costs (3) | | | 1651.65 | (***) | | |
| Firm-specific opinions on production capacity (2) | | | 156.85 | (***) | | |
| Firm-specific opinion on competetive position and internationalisation (3) | | | 26.71 | (***) | | |

Legenda: (*): p=0.10; (**): p=.05; (***): p=.001

Source: Costa et al. (2014)

Figure 4.3.b:

Coefficients on time dummies – Model (2).




Source: Costa et al. (2014)

According Costa et al. (2014), Model (3) includes the dependent variable $z_{it}$ which takes value 1, if a firm has access to finance and value 0 if firm does not have access to finance. In this model coefficients are statistically significant most of the times too (see 4.3.d). Again firms which are in the South and are small, do not have access to finance. The size of the firm plays a role in the access to finance of enterprises which are active in Construction and Services in contrast to Manufacturing where the size of the firm does not play a vital role in access to finance. In addition, the financial situation as well as the production capacity of a firm which is active in Manufacturing plays a vital role in access to finance. Furthermore, the higher the number of employees who work abroad is the harder the access to finance for the firm. According to the figure 4.3.c, we can conclude from the coefficients of time dummy variables that conditions have began to get worse, but the number of firms which did not receive the finance has not increased significantly. However, there is some first evidence of refusal to access in the very last month, especially in the Services sector.

Table 4.3.d:

Results of the probit estimation of Model (3).

| | Industry and Services | | | Manufacturing | | | Services | | | Construction | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | coeff dF/dx | z | | coeff dF/dx | z | | coeff dF/dx | z | | coeff dF/dx | z | |
| Time dummies (Joint significance, dof) | | 294,93 (26) | (***) | | 77,68 (34) | (***) | | 336,9 | (***) | | 24,43 | |
| North-West | -0,030 | -7,97 | (***) | -0,024 | -4,30 | (***) | -0,02 | -3,45 | (***) | 0,04 | 3,88 | (***) |
| North-East | -0,029 | -7,68 | (***) | -0,026 | -5,06 | (***) | -0,02 | -2,86 | (***) | 0,05 | 5,1 | (***) |
| Center | -0,019 | -4,87 | (***) | -0,017 | -3,41 | (***) | -0,03 | -3,62 | (***) | 0,03 | 2,3 | (**) |
| Medium-size firms | -0,038 | -10,47 | (***) | -0,030 | -5,74 | (***) | -0,05 | -6,08 | (***) | -0,01 | -0,93 | |
| Large size firms | -0,066 | -10,11 | (***) | -0,046 | -4,83 | (***) | -0,04 | -2,71 | (***) | -0,08 | -4,95 | (***) |
| Firms specific opinions on the situation of demand, production and employment | | | | | | | | | | | | |
| Level of orders | 0,038 | 10,72 | (***) | -0,003 | -0,70 | | 0,03 | 3,38 | (***) | 0,031 | 4,8 | (***) |
| Level of Production | 0,024 | 7,32 | (***) | 0,010 | 2,33 | (*) | 0,03 | 3,23 | (***) | 0,017 | 2,65 | (***) |
| Order expectations | 0,007 | 3,30 | (***) | 0,001 | 0,40 | | 0,02 | 4,69 | (***) | -0,001 | -0,13 | |
| Employment expectations | 0,057 | 15,45 | (***) | 0,030 | 6,43 | (***) | 0,03 | 3,97 | (***) | 0,066 | 9,68 | (***) |
| Firms specific opinions on financial situation and labour costs | | | | | | | | | | | | |
| Cash availability (wrt. Operative needs) | | | | 0,126 | 36,16 | (***) | | | | | | |
| Cash availability expectations | | | | 0,033 | 8,98 | (***) | | | | | | |
| Assessments on Unit labour costs | | | | 0,002 | 2,43 | (***) | | | | | | |
| Firms specific opinions on productive capacity | | | | | | | | | | | | |
| Obstacles to production: yes | | | | 0,020 | 5,05 | (***) | | | | | | |
| Capacity utilisation | | | | -0,001 | -5,73 | (***) | | | | | | |
| Firms specific opinions on competitive position and internationalisation | | | | | | | | | | | | |
| Export turnover (in % of total turnover) | | | | -0,0008 | -0,66 | | | | | | | |
| Competitive position | | | | 0,00032 | 0,07 | | | | | | | |
| Delocalized abroad: yes | | | | 0,01118 | 2,42 | (**) | | | | | | |
| Number of employees abroad | | | | 0,00554 | 1,58 | (*) | | | | | | |
| Sector Specific Confidence Climate | 0,001 | 7,82 | (***) | -0,001 | -3,19 | (***) | 0,0006 | 1,58 | | | | |
| Number of obs. | 52765 | | | 29918 | | | 16240 | | | 8447 | | |
| $R^2$ | 0,0543 | | | 0,141 | | | 0,0888 | | | 0,0761 | | |

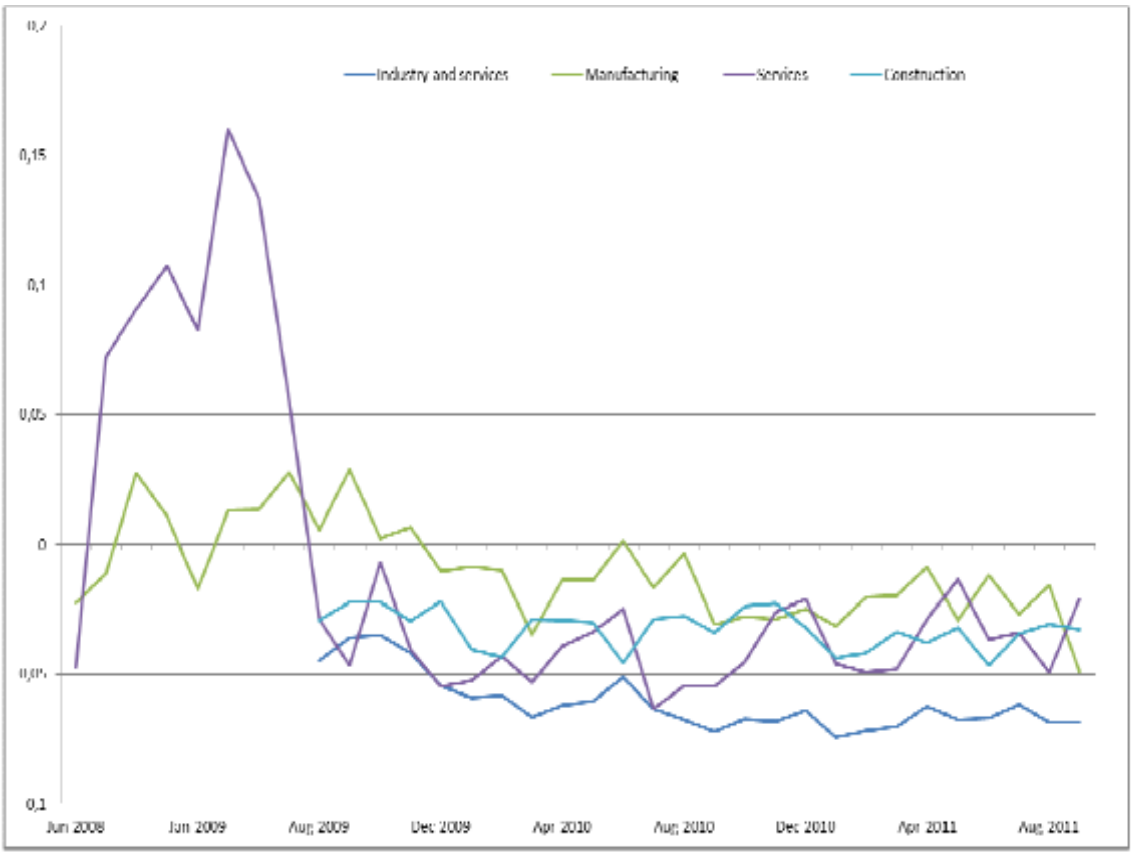
| Parameter tests (degrees of freedom) | $c^2$ | Prob. | $c^2$ (dof) | | $c^2$ (dof) | | $c^2$ (dof) | |
|---|---|---|---|---|---|---|---|---|
| Geographical Areas (3) | 79,88 | (***) | 29,65 | (***) | 15,19 | (***) | 28,71 | (***) |
| Size (2) | 196,99 | (***) | 47,25 | (***) | 43,34 | (***) | 24,97 | (***) |
| Firm-specific opinions on production, demand and employment (4) | 1105,12 | (***) | 51,96 | (***) | 266,6 | (***) | 263,49 | (***) |
| Firm-specific opinion on financial situation and labour costs (3) | | | 1402,46 | (***) | | | | |
| Firm-specific opinions on production capacity (2) | | | 68,34 | (***) | | | | |
| Firm-specific opinion on competetive position and internationalisation (3) | | | 8,33 | (*) | | | | |

Legenda: (*): p=0.10; (**): p=.05; (***): p=.001

Source: Costa et al. (2014)

Figure 4.3.c:

Coefficients on time dummies – Model (3).




Source: Costa et al. (2014)

All in all, for Italian firms access to finance is easier in the North compared to the South. Furthermore, when a firm which activates in Services or Construction has better access to finance than those firms which are active in Manufacturing. The size of the firm does not play a significant role in the access to finance of Manufacturing firms. The crisis has hit the Manufacturing sector much harder, and as a matter of fact all the firms of this sector have been affected either they are big, medium or small (concerning the number of employees). In addition, easier access to credit depends on the credit worthiness of a firm (concerning demand, production and employment). Furthermore, firms which have number of employees abroad seem to face more difficulties to access credit. A possible reason why these firms face credit rationing is that firms tend to have a number of employees especially in Eastern European countries, which have been hit by the crisis.

According to the sector-specific variables, results show that more “confident” markets can help firms to have positive access to financial sources.
Finally, the research also provides estimations which contain time dummy variables. The results of these estimations give information about credit conditions. In particular, credit conditions are negative during the financial crisis, and have improved in 2009-2010. The situation started to worsen again since the beginning of 2011, ‘when both firms’ perceptions on the credit situation and the probability of being restricted in one way or the other started to worsen again’. However, firms’ perceptions about negative assessment and of being restricted to access finance are becoming worse, but not the actual denial to finance.

### 4.4 Botrić and Božić (2017)

According to Botrić and Božić (2017), innovators perceive obstacles in a different way than non-innovators do. However, enterprises manage to overcome obstacles which are distinguished in obstacles that are related to absence of innovation and those that make innovation difficult. In addition, access to finance is an issue that is important not only for academic literature but also for public discussions. As a result policy actions have been made in order to deal with obstacles of access to finance (especially for SMEs and innovative firms). According to Botrić and Božić (2017), obstacles of access to finance are common across Europe, especially for SMEs; researchers focus the analysis on post transition EU member countries, due to the fact that these countries have to catch up with other EU countries. According to Botrić and Božić (2017), perceived access to finance influences decisions which concern business expansion and innovation. The researchers with their paper ‘try to identify if a gap in perceptions on access to finance between innovating and non-innovating firms in post-transition economies exists’. The understanding of this gap can help researchers to understand why firms are not innovative. In order to indentify this gap, researchers tried to find whether characteristics of firms such as size of the firm or educational attainment of the employees play a role in the differences in access to finance perceptions between innovative and non innovative firms.

The sample that was used in the research consists of 3,393 firms from eleven central and eastern European countries which are EU members. Researchers analysed the period 2012-2013, when the consequences of economic crisis were still present, and distinguished innovative and non-innovative firms. According to Botrić and Božić (2017) (p.132), Innovative firms are 'those that during the last 3 years have successfully developed new or significantly improved product, production/supply practice, organisational/management practices or structures, marketing methods and logistical or business process, and/or have invested in (R&D and and/or gave employees time to develop or try out a new approach or new idea about products or services, business process, firm management or marketing'. Non-innovative firms are those that do not attempt an innovative action. The variables of the regression are the following (see also table 4.4.a): The size of the firm is represented by a dummy variable for micro, medium and large firms. The type of the firm is another dummy variable which includes firms which became private but they previously were public, originally private firms, and a private subsidiary of a formerly state-owned firm.

In addition joint ventures with foreign partners or state owned firms have been taken into consideration. Another dummy variable of the regression is the one for the activity of the enterprise. The dummy variable for the sector of activity of the firm contains manufacturing, retail and services sector. Furthermore, there are two dummy variables the first one concerns female or male manager and the other dummy variable concerns the share of female employees in the enterprise. The gender has relation to access to finance according to previous researches so it is worth to be researched again in post-transition economies. Also, the age of the firm and the education of employees have been included in the research because both of them play role in access to finance.

According to Botrić and Božić (2017), young firms face more frequently difficulties on getting finance because they are not experienced in getting access to financing sources. Furthermore, firms with educated employees can prepare the documentation (related to access to finance) properly and easier than firms with less educated employees. Firms that have experienced growth

(when the last three years have increased their employees) or firms which expect an increase in their sales are less likely to face difficulties in their access to finance. These variables have been included in the research too.

Table 4.4.a:

Regression variables.

| Variable | Definition |
|---|---|
| Finance obstacle | = 1, if a firm perceives access to finance as major or severe obstacle |
| Manufacture | = 1, if a firm's main activity is within manufacturing sector |
| Services | = 1, if a firm is operating within wholesale; Hotel and restaurants; Services of motor vehicles; Construction Section; Transport ; Supporting transport activities or Post and telecommunications |
| Retail | = 1, if a firm's main activity is retail |
| Micro | = 1, if this is a micro firm (less than 5 employees) |
| Small | = 1, if this is a small firm (more than 5, less than 19 employees) |
| Medium | = 1, if this is a medium firm (more than 20, less than 99 employees) |
| Large | = 1, if this is a large firm (more than 100 employees) |
| Segment | = 1, if establishment is part of a larger firm |
| Privatization | = 1, if the firm was established by privatization |
| Subsidiary | = 1, if the firm was established as subsidiary of formerly state-owned firm |
| Joint | = 1, if firm was established as a joint venture with foreign partners |
| State | = 1, if firm was established as state-owned |
| Private | = 1, if firm was established from time of start-up as private |
| Age of firm | = years since establishment (until the time of interview) |
| Female share | = number of female employees/total employees |
| Female management | = 1, if top manager is female |
| Employment delta | = number of workers last fiscal year/number of workers 3 years ago |
| University share | = share of employees with university degree in total |
| Positive expectations | = 1, if a firm expects its sales to increase next fiscal year |
| Country dummies | = 1, if a firm is located in specific country |

Source: Botrić and Božić (2017)

Researchers, in order to estimate the gap in perceptions on relative difficulties in access to finance between innovators and non-innovators, used the Fairlie procedure which uses logit model to perform one to one matching. The dependent variable is the dummy variable 'perceptions related to access to finance'. According to the results of the estimations (see table 4.4.b.), the female management dummy variable is an important predictor for access to finance. This is illustrated by the fact that the coefficient is negative and statistically significant. The meaning of the coefficient is that female managers

are less likely to perceive access to finance. In addition some country dummies are statistically significant which means that are important contributors to the gap and reflects different financing conditions in the countries. This fact is related to the perceptions of micro firms that might have difficulties in getting finance especially during crisis.

Table 4.4.b:

Contributions to the gap: estimated coefficients and percentage of total gap.

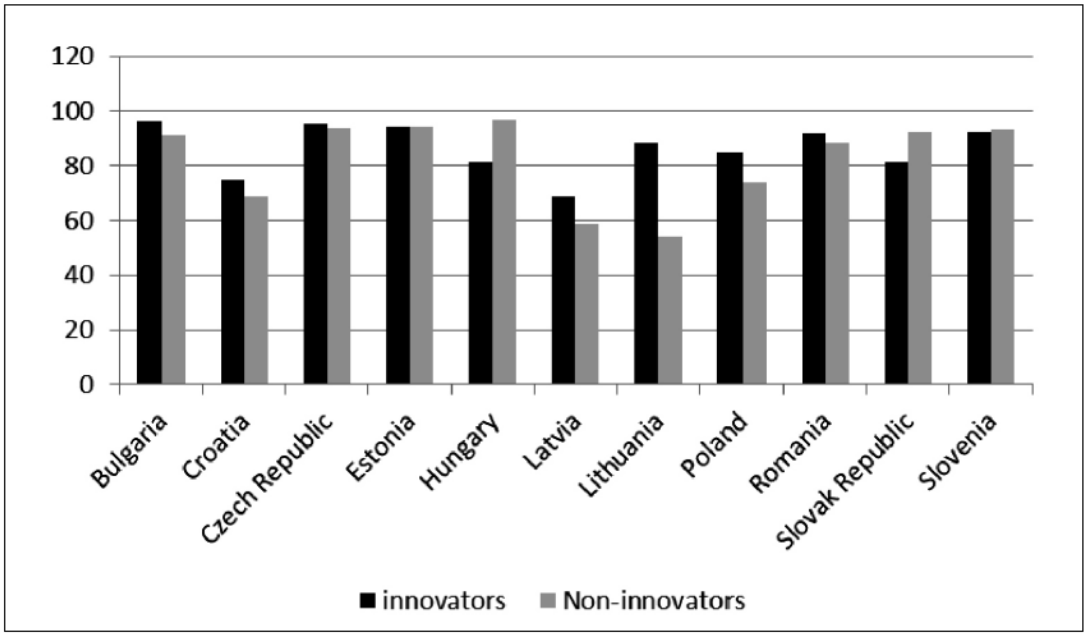
| | Estimated coefficients*100 (standard errors*100) | |
|---|---|---|
| | **Output innovation** | **R&D innovation** |
| **Type of activity** | | |
| -Manufacture | -0.103 (0.202) | -0.068 (0.199) |
| -Services | 0.002 (0.036) | 0.003 (0.059) |
| **Size of enterprise** | | |
| -Micro | 0.234 (0.224) | 0.394 (0.254) |
| -Small | 0.022 (0.159) | 0.109 (0.229) |
| -Large | -0.149 (0.349) | -0.499 (0.449) |
| Segment | 0.050 (0.059) | 0.052 (0.081) |
| **Establishment origin** | | |
| -Privatization | 0.029 (0.080) | -0.015 (0.089) |
| -Subsidiary | -0.008 (0.021) | -0.006 (0.042) |
| -Joint | 0.029 (0.049) | 0.58 (0.081) |
| -State | 0.030 (0.036) | 0.010 (0.030) |
| Age of firm | -0.030 (0.105) | 0.077 (0.124) |
| **Employees** | | |
| -Female management | -0.212* (0.115) | -0.217* (0.120) |
| -Employment delta | -0.053 (0.077) | -0.017 (0.047) |
| -University share | -0.007 (0.045) | 0.002 (0.039) |
| Positive expectations | -0.255 (0.288) | -0.087 (0.318) |
| **Country dummies** | | |
| -Bulgaria | 0.065 (0.171) | 0.161 (0.240) |
| -Croatia | -0.310 (0.304) | -0.410 (0.379) |
| -Czech Republic | -0.172 (0.200) | -0.042 (0.171) |
| -Estonia | -0.083 (0.092) | -0.060 (0.105) |
| -Hungary | -0,084 (0,155) | -0.119 (0.171) |
| -Latvia | 0.763* (0.450) | 0.899 (0.585) |
| -Lithuania | 0.393 (0.278) | 0.334 (0.308) |
| -Poland | 0.149 (0.357) | 0.288 (0.493) |
| -Romania | -3.340*** (0.795) | -2.854*** (0.812) |
| -Slovenia | 0.003 (0.259) | -0.498 (0.390) |

Notes: *** denotes significance at 1%, ** denotes significance at 5%, * denotes significance at 10%. The percentages of total contribution of all covariates to the gap calculated based on unrounded data.

Source: Botrić and Božić (2017)

According to the results of the estimations only female management and country dummies are statistically significant, most of the variables which represent characteristics of the firms are statistically insignificant. Thus, we could expect that a micro firm, or start ups or even the firms, which are activate in the manufacturing sector face more difficulties in getting proper financial resources for their projects, but the results show that most important factor relates to the country where the firms are active. As a result, innovative firms which are active in countries that have a better business environment expect less financing difficulties. The previous experience of a firm plays also a vital role in expecting access to finance. Researchers explored if there are differences in the approval rate of prior loan requesting attempts in innovative and non-innovative firms across country. The outcome is that innovative firms have higher approval rates. The results show that previous denial of credit does not affect the continuation of a project.

Figure 4.4.a:
Approval of finance rate to innovators vs non-innovators (in percent).




Source: Botrić and Božić (2017)

All in all, the aim of the research is to investigate the gap in perceptions on access to finance difficulties in post-transition economies. We can conclude that country differences and female management play an important role in

explaining the gap between innovative and non-innovative firms in relation to their perceptions about access to finance. Particularly, female managers are less likely to perceive access to finance as a difficulty. In addition several other variables which represent several characteristics of firms such as size and age of the firm, sector of activity, growth prospects, and education of employees were found statistically insignificant, this finding indicates that difficulties in access to finance is an important obstacle for every enterprise (regardless the characteristics of the firms and whether they are innovative or not). Finally, the gap which is related with the access to finance perceptions between innovative and non-innovative firms comes from 'the national policy in promoting available financing sources'. This fact reveals the need of rescheduling the national policies in order to enhance the access to finance of innovative projects.

### 4.5 Ardic et al. (2012)

According to Ardic et al. (2012), small and medium sized enterprises find access to finance challenging, especially after the global financial crisis. In most countries small and medium sized enterprises are the largest amount of the total number of enterprises and as a result they play a vital role in growth of countries and job creation. According to Ardic et al. (2012), there are not common indicators in order to achieve a cross-country analysis about access to finance of SMEs. Ardic et al. (2012) tried to eliminate this problem with a supply-side dataset, which they used for their research.

According to Ardic et al. (2012), there is a need to harmonize the definitions of SMEs within each country, because across countries maybe this goal is unfeasible. In order to monitor SMEs' lending route financial institutions and regulators should collect and maintain information about SMEs' employees and sales volume.

In the data set, data were provided from 50 out of 142 regulators on the total value of outstanding loans to SMEs. In particular, 30 are middle income and 14 are high income countries. It is common for regulators to collect data on

the value of outstanding loans to SMEs. According to Ardic et al. (2012), regulators do not collect frequently data on the number of outstanding loans to SMEs or the number of SMEs with loans. In addition, 26 countries provided data on the number of outstanding loans to SMEs and 16 countries provided data on the number of SMEs with outstanding loans. From the countries that provided data on the number of SMEs with outstanding loans 4 are high income countries, 8 middle income countries and 4 low income countries.

The cross-country data were derived from the Financial Access database and researchers used the standard cross-country regression framework. With this framework researchers have the ability to investigate SME lending volume across the world but they cannot take into consideration within-country variations in SME lending. According to the researchers, after a data analysis that they conducted, it is right to perform cross-country analyses of SME finance data using national definitions. Even if there is a degree of heterogeneity in the data, it does influence the volume of SME financing reported by countries in order to prevent cross-country comparison (see table 4.5.a).

Table 4.5.a:

*Small and medium enterprise (SME) lending volume and definition*

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Dependent variable | SME loans/GDP (log) | | | | SME loans/total loans (log) | | | |
| GNI per capita (log, 2008) | | 0.436*** (0.157) | | 0.253 (0.205) | | −0.005 (0.134) | | −0.068 (0.128) |
| Maximum number of employees (log) | 0.258 (0.217) | 0.040 (0.216) | | | 0.235 (0.154) | 0.261 (0.195) | | |
| Maximum sales volume (log) | | | 0.290*** (0.104) | 0.157 (0.165) | | | 0.112 (0.070) | 0.164 (0.101) |
| Constant | −4.103*** (1.095) | −6.832*** (1.326) | −7.269*** (1.700) | −7.363*** (1.790) | −3.207*** (0.830) | −3.319*** (1.113) | −3.674*** (1.204) | −3.924*** (1.238) |
| *N* | 46 | 44 | 34 | 33 | 46 | 44 | 34 | 33 |
| Adjusted $R^2$ | 0.001 | 0.159 | 0.151 | 0.149 | 0.012 | −0.007 | 0.029 | 0.023 |

Robust standard errors are in parentheses, ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. GNI, gross national income.

Source: Ardic et al. (2012)

Furthermore, there are factors which are associated with higher levels of SME financing. Researchers found a positive correlation between 'the overall levels of economic development which was measured by income per capita with the

level of SME lending as a share of GDP'. SME loans to GDP are negatively correlated but statistically insignificant (see table 4.5.b).

Table 4.5.b:

*Pairwise correlations*

| | SME loans/GDP (log, 2009) | SME loans/total loans (log, 2009) |
|---|---|---|
| SME credit/GDP (log, 2009) | 1 | 0.75** |
| SME loans/total loans (log, 2009) | 0.75** | 1 |
| GNI per capita (log, 2008) | 0.44** | 0.06 |
| Offshore financial centre: Dummy | –0.12 | –0.44** |
| Inflation (2008) | –0.31** | –0.03 |
| Maximum inflation (during 1999–2008) | –0.28 | –0.01 |
| Interest spread (2008) | –0.33 | –0.07 |
| Lending rate (2008) | –0.32 | 0.03 |
| Real interest rate (2008) | –0.11 | 0.02 |
| Share of rural population (2008) | –0.15 | 0.14 |
| Domestic credit/GDP, growth (avg, 2004–2008) | –0.09 | 0.27 |
| Domestic credit/GDP (2008) | –0.05 | 0.14 |
| Legal rights index (2008) | 0.22 | –0.07 |
| Credit information index (2008) | 0.25 | 0.05 |
| Credit registry coverage (2008) | 0.17 | –0.07 |
| Closing business: Days (log, 2008) | –0.32** | 0.02 |
| Contract enforcement: Procedures (log, 2008) | –0.19 | 0.24 |
| Contract enforcement: Time (log, 2008) | –0.19 | 0.02 |
| Starting a business: Time (log, 2008) | –0.46** | –0.24 |
| Market capitalization/GDP (log, 2008) | 0.06 | –0.38** |
| Self-employed % (2007) | –0.48** | –0.17 |
| Fuels and mining/GDP (2007) | 0.03 | –0.07 |
| Foreign owned banks, share of assets | –0.14 | –0.06 |
| Government owned banks, share of assets | –0.15 | 0.13 |
| Banking concentration (2004) | –0.13 | –0.19 |
| Branches per 100 000 adults (log, 2009) | 0.30** | –0.02 |
| Overhead costs/total assets (avg, 2004–2008) | –0.49** | –0.07 |
| Net interest margin (avg, 2004–2008) | –0.54** | –0.17 |
| Bank Cost/Income (avg, 2004–2008) | –0.18 | 0.18 |

GNI, gross national income. SME, small and medium enterprise. $^{**}p < 0.05$.

Source: Ardic et al. (2012)

In addition, the legal framework as well as the business environment play a vital role for SME financing and especially for young and small enterprises. Particularly, some factors of business environment such as 'number of days it takes to start and close a business' are statistically significant and negatively correlated with SME financing as a percentage to GDP. Furthermore, credit information index and the creditor legal rights index have positive coefficients (concerning the correlation with SME financing to GDP) but they are not

statistically significant. Net interest margins as well as overall costs to total assets which indicate features of banking structure have statistically significant and negative correlations with SME financing to GDP. In addition, researchers did not find statistically significant correlation between SME funding and the share of state owned and foreign owned banks as well as with the level of bank concentration like in Beck et al. (2005).

Researchers after the above estimations proceeded in a specification in order to use the explanatory variables to estimate the SME financing. The variables were: private credit to GDP ratio, the number of days to start a business and a control for offshore financial centres. The first variable, private credit to GDP ratio can capture the macroeconomic conditions that affect the extension of credit in a country. The second variable, number of days to start a business can show whether the beginning of a business is easy, a factor that indicates high levels of access to finance for SMEs. The last variable, control for offshore financial centres can indicate whether there are 'high levels of credit as a percentage of GDP' but low access to finance for SMEs. After the estimation of this model researchers found the following coefficients:

$$\ln \frac{\text{SME loans}}{\text{GDP}} = -5{,}27 + 0{,}90 \ln \frac{Dom.credit}{GDP} - 1{,}18\ \text{Offshore} - 0{,}38\ \text{Indays\_start\_bus.}$$

(0,87) (0,18) (0,68) (0,15)

Thus, when it is more difficult to start a business the dependent variable is lower. In addition, the coefficient of domestic credit indicates that developed financial markets can cause higher levels of SME loans to GDP. Finally, offshore centres indicate low access to finance for SMEs.

All in all, according to Ardic et al. (2012) since 2009 the most developed economies in the world (G-20) have stressed financial inclusion in order to achieve economic growth and better quality of life. Access to finance for SMEs plays a vital role in the agenda of these countries. Survey by CGAP and WBG was the first attempt to collect data on access to finance for SMEs.

According to Ardic et al. (2012), initially, with their paper, they tried to analyze the data of the survey. The first outcome of the analysis was that SME definitions vary around the world. There are several factors which can influence SMEs' access to finance such as private credit to GDP, income per capita, efficiency of the banking system and finally legal and business environment. According to the data, SME loans are predicted as $US10tn in 2009 and 70% is given in countries with high income. In addition, the ratio of SME loans to GDP is only 3% in developing countries in contrast to high income countries where the respective ratio is 13%. Finally, according to Ardic et al. (2012) there are some issues that have to be improved in their study. The collected data are gathered by regulators who should harmonize the SME definition which is not unified. In addition, the collected data on SME lending come only from financial institutions (especially from commercial banks) and as a result the volume of lending from other informal institutions is not taken into account. Finally, Ardic et al. (2012), suggest that an analysis should be made with differentiated loans in two categories of long term loans and short term loans because they behave in a different way in financial crisis and business cycles.

# Chapter 5: Comparative analysis

## 5.1. Firms' access to finance in countries around the world

### 5.1. World Bank (2014)

This research examines the influence of banking competition to access to finance. Banking competition can influence enterprises as well as financial markets and as a result for governments and researchers it is a very interesting issue. In addition, this interest multiplied due to the financial crisis (after 2008). Furthermore, due to the financial crisis banking sector faced mergers, recapitalization, and rescues and as a result there are impacts on the access to finance for enterprises which are worth to be examined.

In the research of World Bank data from surveys which were conducted for many years have been used. In particular, data from 53 countries were included and almost 70.000 firms were been used for the 2002–10 period.

The regressions' model of the research is:

$Access_{i,c,t} = a_c + b_1 Bank\ Competition_{c,t-1} + b_2 F_{i,c,t} + b_3 X_{c,t-1} + e_{i,c,t}$

'Access' is the dependent variable which is a dummy variable. It represents whether an enterprise i in country c at moment t has a bank loan, line of credit, or overdraft (access to finance). The independent variable 'Bank Competition' concerns the Lerner Index or Boone indicator. Variable F represents the size of the firm, the sector that is active and the exports. In addition, variable X represents the inflation and GDP of countries. Furthermore, $a_c$ is the constant of the model which represents the not observable differences between countries. Coefficients $b_1$-$b_3$ are estimated for the independent variables and $e_{i,c,t}$ are the residuals of the regressions. We assume that indexes of banking competition (at country level) are exogenous to the measures which are related to access to finance (at enterprise level). In other words every single enterprise cannot influence the indexes of banking competition at country level. In order to deal with possible reverse causality a

lag is used to the variables that concern countries and the variables that concern banking competition. The variables are presented on table 5.1.a and the results of the linear regression on table 5.1.b.

Table 5.1.a:

Regression Variables.

| Variable | Description and Data Source |
|---|---|
| *Firm-Level Variables* | |
| Access to finance | Dummy variable equal to 1 if the firm has access to bank finance (loan, overdraft or line of credit) from World Bank Enterprise Surveys. |
| Firm size (employees) | Number of permanent full-time employees from World Bank Enterprise Surveys. |
| Manufacturing | Dummy variable equal to 1 if the firm is in the manufacturing sector from World Bank Enterprise Surveys. |
| Exporter | Dummy variable equal to 1 if 10 percent or more of sales are exported directly or indirectly by the firm from World Bank Enterprise Surveys. |
| Foreign-owned | Dummy variable equal to 1 if 50 percent or more of the firm is owned by foreign organizations from World Bank Enterprise Surveys. |
| Government-owned | Dummy variable equal to 1 if 10 percent or more of the firm is owned by the government from World Bank Enterprise Surveys. |
| Firm age | Age of the firm in years from World Bank Enterprise Surveys. |
| *Country-Level Variables* | |
| Lerner index | Lerner index constructed using variables from Bankscope (see Appendix 2). |
| Lerner index (alternate) | Lerner index as calculated by Clerides et al. (2013) using semi-parametric estimation methodology. |
| Boone Indicator | Boone indicator is the profit elasticity (percentage decrease in profits resulting from a 1 percent increase in the marginal cost) as calculated by Clerides et al. (2013). |
| Concentration 3 | Fraction of total assets held by top three banks from Bankscope. |
| Herfindahl index | Herfindahl index calculated as the sum over all banks in the country of the squared market share (in terms of assets) of each bank from Bankscope. |
| Inflation rate | Inflation calculated as the annual change in the GDP deflator from the World Development Indicators (WDI) World Bank. |
| GDP per capita | Gross Domestic Product per capita (constant US dollars) from WDI. |
| Depth of credit information | Depth of credit information is a measure of the coverage, scope and accessibility of credit information available through either a public credit registry or a private credit bureau, both by law and in practice. (0–6) Obtained from Doing Business Indicators. |
| Public credit registry coverage | The public credit registry coverage indicator reports the number of individuals and firms listed in a public credit registry's database as a percentage of the adult population. Obtained from Doing Business Indicators. |
| Private credit bureau coverage | The private credit bureau coverage indicator reports the number of individuals and firms listed in a private credit bureau's database as a percentage of the adult population. Obtained from Doing Business Indicators. |
| Stock market capitalization | Total value of all listed shares in a stock market as a percentage of GDP. Obtained from GFDR. |

Source: World Bank (2014)

Table 5.1.b:

Results of the estimations of model.

| | Access to finance | | | | | |
|---|---|---|---|---|---|---|
| Variables | (a) | (b) | (c) | (d) | (e) | (f) |
| Lerner index | −0.543** | −0.595** | | | | |
| | [0.263] | [0.254] | | | | |
| Lerner index (alternate) | | | −0.546** | −0.543** | | |
| | | | [0.245] | [0.250] | | |
| Boone indicator | | | | | −0.808*** | −0.786*** |
| | | | | | [0.303] | [0.297] |
| Concentration 3 | −0.081 | | −0.118 | | −0.092 | |
| | [0.147] | | [0.145] | | [0.147] | |
| Herfindahl index | | −0.004 | | −0.028 | | −0.015 |
| | | [0.139] | | [0.145] | | [0.142] |
| Log firm size | 0.087*** | 0.087*** | 0.086*** | 0.086*** | 0.085*** | 0.086*** |
| | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] |
| Manufacturing | 0.030*** | 0.029*** | 0.035*** | 0.035*** | 0.030*** | 0.030*** |
| | [0.011] | [0.011] | [0.011] | [0.011] | [0.011] | [0.011] |
| Exporter | 0.031*** | 0.031*** | 0.031*** | 0.031*** | 0.031*** | 0.032*** |
| | [0.008] | [0.008] | [0.008] | [0.008] | [0.008] | [0.008] |
| Foreign owned | −0.080*** | −0.079*** | −0.085*** | −0.083*** | −0.084*** | −0.083*** |
| | [0.011] | [0.011] | [0.011] | [0.011] | [0.011] | [0.011] |
| Government owned | −0.134*** | −0.136*** | −0.133*** | −0.136*** | −0.133*** | −0.135*** |
| | [0.031] | [0.031] | [0.031] | [0.031] | [0.031] | [0.031] |
| Log firm age | 0.013*** | 0.013*** | 0.012*** | 0.012*** | 0.012*** | 0.012*** |
| | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] |
| Inflation rate | −0.332** | −0.330** | −0.492** | −0.493** | −0.464*** | −0.457*** |
| | [0.141] | [0.144] | [0.197] | [0.201] | [0.166] | [0.167] |
| Log GDP per capita | 0.198* | 0.236*** | 0.200** | 0.245*** | 0.147 | 0.188** |
| | [0.101] | [0.089] | [0.089] | [0.077] | [0.099] | [0.089] |
| Constant | −0.793 | −1.198* | −0.769 | −1.289** | −0.861 | −1.323** |
| | [0.888] | [0.718] | [0.801] | [0.639] | [0.775] | [0.611] |
| Observations | 67,720 | 68,353 | 66,723 | 67,356 | 66,723 | 67,356 |
| R-squared | 0.213 | 0.211 | 0.209 | 0.207 | 0.211 | 0.209 |
| No. of countries | 53 | 53 | 51 | 51 | 51 | 51 |

Source: World Bank (2014)

According to the results of the linear regression, the exporting firms of manufacturing sector are more possible to have access to finance because coefficients are positive and statistically significant. In addition, foreign owned firms are less possible to have access to finance because their coefficient is negative and statistically significant. The explanation of this finding is that foreign firms can get funding from their countries. The same result was found for government owned firms too. This is illustrated by the fact that government owned firms are less possible to have access to finance because their coefficient is negative and statistically significant. In addition, countries' GDP which represents the growth level of a country, and is related to a higher probability of having access to finance (the coefficient is positive and statistically significant). The inflation rate of a country is a negative factor in the access of enterprises to finance.

Lerner and Boone indexes are measures of banking competition so they are of great significance. The coefficients of Lerner and Boone indexes are negative and statistically significant which indicates that lower competition (higher concentration) means lower access to finance. Thus, we can infer that banking competition is good for the access to finance.

There is also one more table (5.1.c) which contains interaction terms for measures for competition and measures for credit information. In every country there are three measures for credit information, the first one is the depth of credit information, the second is the public registry coverage and the third is the private bureau coverage. The depth of the variable 'depth of credit information' is an index which measures the rules which influence the coverage, the size and the access of the available information.

In regressions d, e and f interaction term concerns private bureau coverage and the coefficients are positive and statistically significant. These results show that private credit bureaus can eliminate asymmetries of information in credit markets and the negative influence of low competition to the access of finance.

In regressions a, b, c Lerner and Boone indexes have negative and statistically significant coefficients. In addition, the coefficients of interaction terms are positive and statistically significant. So, we can conclude from these results that better credit information can influence positively the bad effects of the low banking competition and as a matter of fact the possibility of access to finance increases.

In regressions g, h, I interaction terms are not statistically significant. So, public registry coverage does not influence the effects of low banking competition. The results of the regression are in accordance with the fact that public registries cannot give credit information of good quality in order to eliminate the asymmetries of information between banks and borrowers.

All in all, the results of the regressions show that higher banking competition has positive outcomes because it increases the access to finance. In addition, we can conclude that the effect of banking competition in relation to access to

finance depends on the exchange systems of credit information. In particular, better systems of credit information can justify the effects of low banking competition.

Table 5.1.c:

Regressions Including the Interaction of Competition with Credit Information.

| | Access to finance | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Variables | (a) | (b) | (c) | (d) | (e) | (f) | (g) | (h) | (i) |
| Lerner index | −2.567*** | | | −1.367*** | | | −1.023** | | |
| | [0.781] | | | [0.398] | | | [0.396] | | |
| Lerner index (alternate) | | −2.162*** | | | −1.142*** | | | −0.656* | |
| | | [0.648] | | | [0.376] | | | [0.379] | |
| Boone indicator | | | −1.732** | | | −1.064*** | | | −0.432 |
| | | | [0.671] | | | [0.382] | | | [0.398] |
| Lerner X Depth of credit information | 0.504*** | | | | | | | | |
| | [0.176] | | | | | | | | |
| Lerner (alt) X Depth of credit information | | 0.396*** | | | | | | | |
| | | [0.132] | | | | | | | |
| Boone X Depth of credit information | | | 0.258* | | | | | | |
| | | | [0.139] | | | | | | |
| Lerner X Private bureau coverage | | | | 0.025*** | | | | | |
| | | | | [0.009] | | | | | |
| Lerner (alt) X Private bureau coverage | | | | | 0.027** | | | | |
| | | | | | [0.011] | | | | |
| Boone X Private bureau coverage | | | | | | 0.014** | | | |
| | | | | | | [0.007] | | | |
| Lerner X Public registry coverage | | | | | | | 0.036 | | |
| | | | | | | | [0.027] | | |
| Lerner (alt) X Public registry coverage | | | | | | | | 0.003 | |
| | | | | | | | | [0.021] | |
| Boone X Public registry coverage | | | | | | | | | −0.053 |
| | | | | | | | | | [0.039] |
| Log firm size | 0.087*** | 0.086*** | 0.087*** | 0.088*** | 0.086*** | 0.086*** | 0.088*** | 0.088*** | 0.087*** |
| | [0.004] | [0.004] | [0.004] | [0.004] | [0.003] | [0.003] | [0.004] | [0.004] | [0.004] |
| Manufacturing | 0.022** | 0.024*** | 0.020** | 0.022** | 0.026*** | 0.021** | 0.021** | 0.027*** | 0.024** |
| | [0.009] | [0.009] | [0.009] | [0.009] | [0.009] | [0.009] | [0.009] | [0.010] | [0.010] |
| Exporter | 0.032*** | 0.032*** | 0.032*** | 0.032*** | 0.031*** | 0.031*** | 0.032*** | 0.031*** | 0.031*** |
| | [0.008] | [0.008] | [0.008] | [0.008] | [0.008] | [0.008] | [0.008] | [0.008] | [0.008] |
| Foreign owned | −0.080*** | −0.083*** | −0.083*** | −0.080*** | −0.084*** | −0.084*** | −0.080*** | −0.084*** | −0.085*** |
| | [0.011] | [0.011] | [0.011] | [0.011] | [0.011] | [0.011] | [0.011] | [0.011] | [0.011] |
| Government owned | −0.175*** | −0.170*** | −0.174*** | −0.177*** | −0.172*** | −0.176*** | −0.178*** | −0.177*** | −0.174*** |
| | [0.027] | [0.029] | [0.027] | [0.027] | [0.029] | [0.028] | [0.027] | [0.028] | [0.028] |
| Log firm age | 0.010*** | 0.009** | 0.010*** | 0.010*** | 0.009** | 0.010*** | 0.011*** | 0.010** | 0.010*** |
| | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] |
| Inflation rate | −0.351** | −0.478*** | −0.474*** | −0.320** | −0.500*** | −0.473*** | −0.322** | −0.513** | −0.388** |
| | [0.147] | [0.175] | [0.163] | [0.144] | [0.172] | [0.163] | [0.146] | [0.203] | [0.158] |
| Log GDP per capita | 0.163** | 0.190*** | 0.133 | 0.196*** | 0.208*** | 0.144* | 0.199*** | 0.238*** | 0.223** |
| | [0.076] | [0.066] | [0.082] | [0.074] | [0.066] | [0.081] | [0.075] | [0.065] | [0.088] |
| Constant | −0.092 | −0.497 | −1.296*** | −0.675 | −0.875 | −1.113** | −0.804 | −1.213** | −1.435*** |
| | [0.717] | [0.576] | [0.442] | [0.618] | [0.549] | [0.492] | [0.615] | [0.542] | [0.520] |
| Observations | 65,428 | 64,431 | 64,431 | 65,428 | 64,431 | 64,431 | 65,428 | 64,431 | 64,431 |
| R-squared | 0.222 | 0.218 | 0.217 | 0.221 | 0.217 | 0.217 | 0.219 | 0.214 | 0.217 |
| No. of countries | 52 | 50 | 50 | 52 | 50 | 50 | 52 | 50 | 50 |

Source: World Bank (2014)

## 5.2 Firms' access to finance in United Kingdom and United States

### 5.2 Mina et al. (2013)

According to Mina et al. (2013) access to finance is considered to be one of the obstacles to growth; however the empirical research has not concluded it yet. In addition, empirical research has not concluded yet whether innovation is a barrier to access to finance or not. Researchers in this paper try to investigate whether innovation influences the will of enterprises to seek external finance and the likelihood to obtain this finance.

Researchers used the data of a survey of UK and US firms which was conducted by the Centre for Business Research of the University of Cambridge and the Industrial Performance Center of MIT in 2004 and 2005. Dun and Bradsheet database was used and the sample contained 1540 US enterprises and 2129 UK enterprises.

Mina et al. (2013) estimated two different models. The first one is to investigate the likelihood of enterprises to seek external finance and the second one the likelihood to obtain access to finance. Table 5.2.a contains the variables of the models. The 'first block of variables' includes firm characteristics, the sector and the country base of the firms.

Moreover, there are variables about the intensity of competition and the level of internationalization. There is also a dummy variable which indicates whether the firm is independent or not. The 'second block of variables' includes variables which are related with financial perspectives of the firm and its growth opportunities. So, researchers included to the estimation variables such as government support, replacement investments (which are indicators for capital requirements), firm's growth ambition, leverage and profit margins. In addition, in order for the researches to investigate the influence of innovation to external funding, they included variables which are related with firms' innovation process. R&D expenditure, human capital and number of patents are some of the variables which are related with firms' innovation process. Enterprises with large number of employees may have fewer tangible assets something that indicates that these firms will face more

problems with access to finance. Moreover, forms of technology acquisition, collaborations and long pay-off periods for innovation investments indicate the need of firms to have access to financial sources.

Researchers used probit models in order to estimate their models. Dependent variables are two. The first one is a dummy variable 'external finance sought' which takes value one when the firm answers 'Yes' to the question 'Have you made attempts to attain additional external finance' in 2002-2004 period. The second variable is dummy too and is 'external finance obtained'. It takes value one if the firm obtains any amount of external finance during 2002-2004 period. Researchers run a set of estimations for each one of the questions with control variables R&D and financial variables and a second set of estimations with control variables intermediate and final innovation output.
In addition, researchers estimated two models both for UK and for United States in order to find out the differences between the samples of both countries. Moreover, researchers run estimations to detect if there are country effects.

Table 5.2.a: Variable Definitions.

| Variable name | Definition |
|---|---|
| External finance sought | A dummy variable equal to one if the firm answered "yes" to the question "Have you made attempts to obtain additional external finance (i.e. additional to retained earnings and depreciation)?" in the 2002–2004 period |
| External finance obtained | A dummy variable equal to one if the firm obtained any amount of external finance in the 2002–2004 period |
| Firm age | The natural log of the number of years from incorporation until 2005 |
| US firm | A dummy variable equal to one if the firm is located in the United States and zero otherwise |
| Firm size | The natural log of the average number of employees 3 years ago |
| Independent firm | A dummy variable equal to one if the firm is independent |
| Manufacturing | A dummy variable equal to one if the firm is in the manufacturing sector (ISIC Rev. 3.1 codes 15–37) |
| Profit margin 2001 | Pre-tax profits/Turnover; both 3 years before the survey |
| Debt/Assets | Debt/total assets in 2002; available for UK firms only |
| Replacement investment need (%) | Replacement investments as a percentage of total capex |
| Replacement investment need n/a | A dummy equal to one if the value for replacement investments is missing |
| Government support | The natural log of (amount of financial assistance received in the past 3 years in GBP thousands + 1) |
| Internationalization | The number of world regions in which the firm does business; coded numerically 1 = national to 7 = global |
| Foreign competitors | The proportion of the firm's main competitors that are overseas firms |
| Growth ambition | Expected turnover in 10 years, coded 0 = "A lot smaller" to 4 = "A lot larger" |
| Human capital staff | Approximate number of workforce that have a university degree as a percentage of the total number of employees |
| R&D expenditures/Assets 2001 | Total R&D expenditure/total assets 3 years before the survey |
| Product innovation | The firm developed a novel manufacturing or service product innovation, which is new to the industry; dummy variable. |
| Process innovation | The firm developed a novel manufacturing or service process innovation, which is new to the industry; dummy variable. |
| Organizational innovation | The firm developed novel supply chain methods or a new method of supply, storage or delivery, which is new to the industry; dummy variable. |
| Log (Number of patents) | The natural log of the firm's number of patents plus one |
| Breadth of IP protection | Number of innovation protection methods used (registration of design, trademarks, patents, confidentiality agreements, copyright, secrecy, complexity of design and lead-time advantage on competitors) |
| Forms of technology acquisition | Number of technology acquisition forms used |
| Collaborations | Number of collaborative or partnership arrangements |
| Pay-off period of innovation | The firm perceives long pay-off periods of innovation as a barrier to innovation, coded 0 = Insignificant barrier to 4 = Crucial barrier, treated as cardinal. |

Source: Mina et al. (2013)

The initial set of models estimates the likelihood of enterprises to seek for external finance Models (1-6). Table 5.2.b contains models 1 and 2 for subsamples from the UK and the United States and model 3 contains the whole sample.

Younger firms seek more external finance, especially in the US because the coefficient of firm age is negative and statistically significant. In addition, independent firms are more likely to seek finance compared to affiliated firms as well as manufacturing firms compared to services because their coefficient is significant except for the US subsample. Enterprises with higher levels of internationalization do not tend to look for access to finance. UK enterprises which face foreign competition will be more likely to seek external capital.

The human capital coefficient indicates that the need for external finance of firms with more human capital is lower than firms with less human capital. Coefficients of growth ambition, technology acquisition, collaborations and long pay-off periods are positive and statistically significant. Furthermore profit margins have negative and statistically significant coefficients something that indicates that firms with low profit margins do not seek access to finance. Debt to Assets (leverage) (estimated only for the UK because it was missing for the US) of firms and government support have positive and significant. Moreover, firms with higher R&D to Assets are not more likely to seek external finance compared to firms with lower R&D to Assets. Commonly other innovative characteristics such as the number of patents, the breadth of IP protection and firms' innovative activities have statistically insignificant coefficients. Finally, the coefficients of the UK sample which are statistically significant are statistically significant for US too.

All in all, the researchers point out that the research data that were used were derived in a time period before the beginning of financial crisis in 2008. As a result the consequences of financial crisis may not be reflected in the results. However, researchers can conclude that both R&D intensive enterprises and R&D less intensive enterprises demand the same external finance. In addition there are some indications that innovative activities can influence negatively

the access to external finance.  However, Mina et al. (2013) who tried two types of variables for innovation concluded that product and process innovation have positive effects on access to external finance, but organizational innovation does not. In addition, Mina et al. (2013) concluded that larger firms can have easier access to external finance because there are not information asymmetries for these firms as well as there is informational transparency for large firms. External technology acquisition has a positive relation with the access to finance which is another fact that information transparency plays vital role in obtaining finance. The coefficients of IP protection mechanisms indicate that high tech firms might face difficulties in access to finance compared to firms with tangible assets.

Table 5.2.b: Seeking finance.

| | UK (1) | US (2) | All (3) | UK (4) | US (5) | All (6) |
|---|---|---|---|---|---|---|
| Firm age | −0.072 (0.04)* | −0.180 (0.06)*** | −0.113 (0.03)*** | −0.069 (0.04)* | −0.168 (0.06)*** | −0.109 (0.03)*** |
| Firm size | 0.041 (0.03) | 0.049 (0.04) | 0.045 (0.02)* | 0.025 (0.03) | 0.015 (0.04) | 0.024 (0.02) |
| US firm | | | 0.234 (0.06)*** | | | 0.237 (0.06)*** |
| Independent firm | 0.445 (0.08)*** | 0.585 (0.12)*** | 0.473 (0.07)*** | 0.455 (0.08)*** | 0.588 (0.12)*** | 0.482 (0.07)*** |
| Manufacturing | 0.171 (0.08)** | 0.000 (0.10) | 0.103 (0.06)* | 0.203 (0.08)** | 0.031 (0.11) | 0.141 (0.06)** |
| Internationalization | −0.060 (0.03)** | −0.077 (0.03)*** | −0.071 (0.02)*** | −0.065 (0.03)** | −0.079 (0.03)** | −0.074 (0.02)*** |
| Foreign competitors | 0.321 (0.10)*** | 0.123 (0.14) | 0.287 (0.08)*** | 0.306 (0.10)*** | 0.106 (0.15) | 0.263 (0.08)*** |
| Profit margin 2001 | −0.792 (0.23)*** | −1.458 (0.28)*** | −1.066 (0.18)*** | −0.762 (0.22)*** | −1.424 (0.28)*** | −1.036 (0.19)*** |
| Debt/Assets | 0.153 (0.08)* | | | 0.156 (0.08)* | | |
| Replacement investment need (%) | −0.077 (0.12) | −0.428 (0.13)*** | −0.243 (0.09)*** | −0.055 (0.12) | −0.390 (0.13)*** | −0.216 (0.09)** |
| Replacement investment need n/a | −0.201 (0.08)** | −0.476 (0.10)*** | −0.333 (0.06)*** | −0.180 (0.09)** | −0.450 (0.10)*** | −0.310 (0.06)*** |
| Growth ambition | 0.109 (0.04)*** | 0.072 (0.05) | 0.099 (0.03)*** | 0.104 (0.04)*** | 0.065 (0.06) | 0.091 (0.03)*** |
| Government support | 0.094 (0.02)*** | 0.090 (0.02)*** | 0.093 (0.01)*** | 0.083 (0.02)*** | 0.079 (0.02)*** | 0.081 (0.02)*** |
| Human capital staff | −0.082 (0.13) | −0.348 (0.14)** | −0.186 (0.09)** | −0.162 (0.14) | −0.456 (0.15)*** | −0.269 (0.10)*** |
| R&D expenditures / Assets 2001 | 0.008 (0.02) | −0.017 (0.03) | 0.002 (0.01) | 0.007 (0.02) | −0.017 (0.03) | 0.000 (0.01) |
| Product innovation | | | | −0.067 (0.07) | 0.001 (0.09) | −0.037 (0.06) |
| Process innovation | | | | 0.118 (0.09) | 0.038 (0.09) | 0.082 (0.06) |
| Organizational innovation | | | | −0.071 (0.11) | 0.124 (0.10) | 0.029 (0.07) |
| Log (Number of patents) | | | | −0.069 (0.05) | −0.027 (0.06) | −0.053 (0.04) |
| Breadth of IP protection | | | | 0.016 (0.01) | 0.012 (0.02) | 0.015 (0.01) |
| Forms of technology acquisition | | | | 0.038 (0.02) | 0.049 (0.03)* | 0.041 (0.02)** |
| Collaborations | | | | 0.041 (0.02)* | 0.054 (0.02)** | 0.047 (0.02)*** |
| Pay-off period of innovation | | | | 0.043 (0.02)* | 0.074 (0.03)*** | 0.057 (0.02)*** |
| Intercept | −1.193 (0.26)*** | −0.005 (0.33) | −0.731 (0.19)*** | −1.349 (0.26)*** | −0.222 (0.34) | −0.912 (0.20)*** |
| Observations | 1795 | 1300 | 3095 | 1795 | 1300 | 3095 |
| LR test | 131.534 | 149.152 | 285.130 | 151.400 | 173.252 | 326.224 |
| *P*-value | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Log-likelihood | −1064 | −809 | −1886 | −1054 | −797 | −1865 |
| McFadden $R^2$ | 0.058 | 0.084 | 0.070 | 0.067 | 0.098 | 0.080 |

The dependent variable in these probit models is equal to one if a firm sought finance over the survey period and zero otherwise. Debt is observed for UK firms only. Standard errors are shown in parentheses.

Significance levels: ***$P<0.01$; **$P<0.05$; *$P<0.1$.

Source: Mina et al. (2013)

The second set of models estimates the likelihood of enterprises to get access to finance (Models 7-12, Table 5.2.c). Researchers used probit models for their estimations. The results of the estimations reveal that the size of the firm, in contrast to the age of the firm, has positive and statistically significant coefficients something that indicates that the bigger the firm the easier to have access to finance. In addition, companies with high competition inside their base country face difficulties in getting access to funding. Healthier firms get easier access to external finance (debt to assets has

negative and statistically significant coefficients). Government support does not has positive effect on access to finance for enterprises and past profits do not have statistically significant coefficients and as a result they do not play a role in getting access to finance. R&D expenditures coefficients are negative something that indicates that lenders are risk averse but simultaneously it is statistically insignificant. However, pay-off period for innovation has statistically significant and negative coefficients something that indicates again that lenders are risk averse. In addition, the number of patents does not have a statistically significant coefficient but process innovation and product innovation have statistically and significant coefficients which indicates that lenders receive innovation as 'a signal of future returns'. As we can see from the results most statistically significant coefficients are those of the US samples (lenders can value innovation in US) in contrast to the coefficient of technology acquisition which is statistically significant for the UK sample (UK is more likely to get access to finance when firms outsource technology). Moreover, breadth of IP protection has negative and statistically significant coefficient something that indicates that these mechanisms influence negatively the access to finance. Researchers conclude that there is no relation between seeking and obtaining finance.

Table 5.2.c: Obtaining Finance.

| | UK (7) | US (8) | All (9) | UK (10) | US (11) | All (12) |
|---|---|---|---|---|---|---|
| Firm age | 0.061 (0.08) | −0.167 (0.09)* | 0.041 (0.07) | 0.063 (0.10) | −0.067 (0.13) | 0.016 (0.08) |
| Firm size | 0.204 (0.07)*** | 0.152 (0.07)** | 0.207 (0.05)*** | 0.203 (0.08)** | 0.261 (0.09)*** | 0.222 (0.06)*** |
| US firm | | | −0.161 (0.13) | | | −0.172 (0.15) |
| Manufacturing | 0.016 (0.17) | 0.067 (0.15) | 0.104 (0.13) | 0.137 (0.21) | 0.225 (0.21) | 0.195 (0.14) |
| Internationalization | 0.006 (0.06) | −0.063 (0.04) | 0.008 (0.04) | −0.011 (0.08) | 0.051 (0.07) | 0.022 (0.05) |
| Foreign competitors | −0.473 (0.20)** | −0.544 (0.27)** | −0.591 (0.15)*** | −0.371 (0.23) | −0.920 (0.31)*** | −0.578 (0.16)*** |
| Profit margin 2001 | 0.399 (0.44) | −0.629 (0.58) | 0.550 (0.38) | 0.323 (0.53) | 0.716 (0.86) | 0.455 (0.42) |
| Debt/Assets | −0.408 (0.16)** | | | −0.403 (0.17)** | | |
| Replacement investment need (%) | 0.125 (0.24) | −0.442 (0.19)** | −0.033 (0.18) | 0.191 (0.27) | −0.219 (0.30) | −0.080 (0.19) |
| Replacement investment need n/a | 0.288 (0.19) | −0.346 (0.19)* | 0.193 (0.15) | 0.307 (0.23) | 0.065 (0.27) | 0.147 (0.17) |
| Growth ambition | −0.030 (0.09) | −0.017 (0.09) | −0.049 (0.07) | 0.005 (0.11) | −0.147 (0.12) | −0.066 (0.08) |
| Government support | 0.026 (0.05) | 0.108 (0.03)*** | 0.033 (0.03) | 0.048 (0.06) | 0.033 (0.05) | 0.039 (0.04) |
| Human capital staff | 0.221 (0.27) | −0.444 (0.21)** | 0.054 (0.20) | 0.208 (0.33) | 0.159 (0.31) | 0.153 (0.22) |
| R&D expenditures / Assets 2001 | −0.035 (0.03) | −0.043 (0.04) | −0.037 (0.03) | −0.039 (0.03) | −0.032 (0.06) | −0.040 (0.03) |
| Product innovation | | | | −0.060 (0.18) | 0.362 (0.19)* | 0.117 (0.12) |
| Process innovation | | | | 0.049 (0.19) | 0.646 (0.22)*** | 0.353 (0.14)** |
| Organizational innovation | | | | 0.240 (0.25) | −0.504 (0.21)** | −0.209 (0.15) |
| Log (Number of patents) | | | | −0.117 (0.13) | 0.007 (0.10) | −0.062 (0.08) |
| Breadth of IP protection | | | | −0.049 (0.03) | −0.103 (0.05)** | −0.057 (0.03)** |
| Forms of technology acquisition | | | | 0.114 (0.06)* | 0.110 (0.07) | 0.116 (0.05)** |
| Collaborations | | | | 0.082 (0.07) | −0.086 (0.05)* | −0.019 (0.04) |

Source: Mina et al. (2013)

Table 5.2.c (continued):

| | UK (7) | US (8) | All (9) | UK (10) | US (11) | All (12) |
|---|---|---|---|---|---|---|
| Pay-off period of innovation | | | | −0.057 (0.06) | −0.261 (0.07)*** | −0.128 (0.04)*** |
| Intercept | 1.187 (0.56)** | 0.704 (0.52) | 0.951 (0.44)** | 0.768 (0.89) | 1.859 (0.70)*** | 1.021 (0.55)* |
| Observations, second stage model | 486 | 521 | 1007 | 486 | 521 | 1007 |
| Observations, selection model | 1701 | 1276 | 2977 | 1701 | 1276 | 2977 |
| Pseudo $R^2$, second stage model | 0.077 | 0.083 | 0.061 | 0.114 | 0.196 | 0.107 |
| Pseudo $R^2$, selection model | 0.081 | 0.104 | 0.096 | 0.081 | 0.104 | 0.096 |
| Pseudo $R^2$, full model | 0.081 | 0.102 | 0.091 | 0.086 | 0.121 | 0.098 |
| Wald test full model | 38.780 | 48.676 | 52.988 | 40.660 | 53.522 | 74.282 |
| *P*-value | 0.000 | 0.000 | 0.000 | 0.006 | 0.000 | 0.000 |
| Rho (indep. models) | −0.656 | 0.851 | −0.483 | −0.294 | −0.663 | −0.307 |
| *P*-value for LR-test on Rho | 0.137 | 0.061 | 0.177 | 0.604 | 0.405 | 0.432 |
| Log-Likelihood full model | −1110 | −944 | −2077 | −1104 | −924 | −2060 |

This table shows results for bivariate probit models with selection for the likelihood of obtaining finance. The dependent variable is equal to one whenever a firm obtained any amount of finance. Coefficients for the selection equation that is estimated simultaneously are not shown but are highly similar to the results in Table 4. Rho is the error term's correlation between the selection and main equations with the associated test of the null hypothesis that both equations are independent. Standard errors are shown in parentheses.

Significance levels: ***$P<0.01$; **$P<0.05$; *$P<0.1$.

Source: Mina et al. (2013)

## Chapter 6: Conclusions

The current economic environment, due to the international financial crisis, has affected SMEs and especially innovative firms. As a result SMEs' financial needs are of great importance. Particularly, the tight credit supply to SMEs is the outcome of the low ability and eagerness of banks to provide funding. In addition, banks need more collateral in order to supply to SMEs credit. Banks' credit supply constraints have influenced innovation, growth and employment.

One of the most common sources of funding SMEs is debt financing and it is used much more frequently compared to venture capital and other common sources of financing. In order for SMEs to avoid cyclical fluctuations, SMEs (both innovative firms and non-innovative firms) should use more venture capital and other sources of finance.

In this dissertation I examined the literature related to funding SMEs and start ups. Particularly, I examined seven relevant and interesting papers with respect to the factors that play role in access to finance in order to understand in depth the characteristics of firms which have access to external finance.

Following the studies that have been presented some conclusions can be drawn. Initially, according to Cowling et al. (2015), innovative firms face more obstacles in their access to finance, especially the period after the financial crisis. In addition, as cited in Beck et al. (2008), the size of a firm plays a role in the understanding of funding standards. Small and medium sized firms use less external financing, mainly banking finance whereas firms with higher financial needs (which are big firms) are more possible to count on different sources of external financing such as leasing, supplier credit and informal financing. Moreover, according to Costa et al. (2014), firms which are activate in Services or Construction sectors have better access to finance than those which are active in Manufacturing. Easier access to credit depends on the credit worthiness of a firm (concerning demand, production and employment). In addition, according to Botrić and Božić (2017), female managers are less likely to perceive access to finance as a difficulty. Finally, as cited in Ardic et

al. (2012), there are some factors, which facilitate access to finance such as private credit to GDP, income per capita, efficiency of the banking system and finally legal and business environment.

Also, interesting outcomes were derived from the two studies that have been examined in the comparative analysis. Particularly, two researches were examined with dependent variable a dummy variable which represents whether an enterprise has an external finance source.

The World Bank's research included data from 53 countries and almost 70.000 firms for the 2002–10 periods whereas Mina's et al. data included UK and US firms for years 2004 and 2005 and contained 1540 US enterprises and 2129 UK enterprises. Focusing on access to finance or not as a dummy variable in both studies interesting conclusions were drawn. Both Word Bank (2014) and Mina et al. (2014) concluded that government related firms do not have easier access to finance. In particular, Word Bank (2014) concluded that government owned firms (foreign owned firms too) are less possible to have access to finance and Mina et al. (2013) found that Government support does not have positive effect to access to finance for enterprises. In addition, both studies concluded that transparency in information can play a vital role in access to finance. Particularly, World Bank (2014) concluded that better credit information can influence positively the negative effects of the low banking competition and as a matter of fact the possibility of access to finance increases. Mina et al. (2013) concluded that larger firms have easier access to external finance because there are not information asymmetries for these firms as well as there is informational transparency for large firms. Moreover, World Bank (2014) concluded that exporting firms of manufacturing sector are more possible to have access to finance and Mina's et al. (2013) found that companies with high competition inside their base country face difficulties in getting access to funding. In relation to competition World Bank (2014) concluded that banking competition is good for the access to finance.

Finally, an important outcome in World Bank (2014) was that countries' GDP which represents the growth level of a country is related to higher probability of having access to finance. Another important outcome in Mina et al. (2013)

was that product and process innovation have positive effects on access to external finance, but organizational innovation does not.

All in all, we can conclude that transparency of information can facilitate access to finance whereas government related firms are less possible to have access to finance. Furthermore, product and process innovation affect positively access to external finance. Finally, the data showed that high competition within a market and inside firms' base country causes difficulties in getting access to funding whereas banking competition inside a country facilitates access to finance.

Finally, policy suggestions could be made at this point. Economies that want to enhance the growth of their SMEs and innovative firms have to implement measures facilitating financing programs and entrepreneurship financial environment. In addition, dialogue between governments, SMEs and financial institutions should be enhanced. In order for SMEs to overcome the hard conditions effective short-term measures and long- term structural improvements are being required. Therefore, the right broader framework conditions are the key for SME financing.

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