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ORGANIZATIONAL RESILIENCE AND FIRM PERFORMANCE

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“It’s not the strongest species that survive, nor the most intelligent, but the most responsive to change.”

(Charles Darwin)

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INTRODUCTION & SUMMARY

WHY RESILIENCE MATTERS – Nowadays, natural disasters and environmental shocks challenge organizations by posing different threats both inside and outside the firm's boundaries. The major innovations in disruptive technology and the changes in government policies and regulations have undermined the stability and security of most of the businesses, making high volatility become the *new normal* (Hirt et al., 2019).

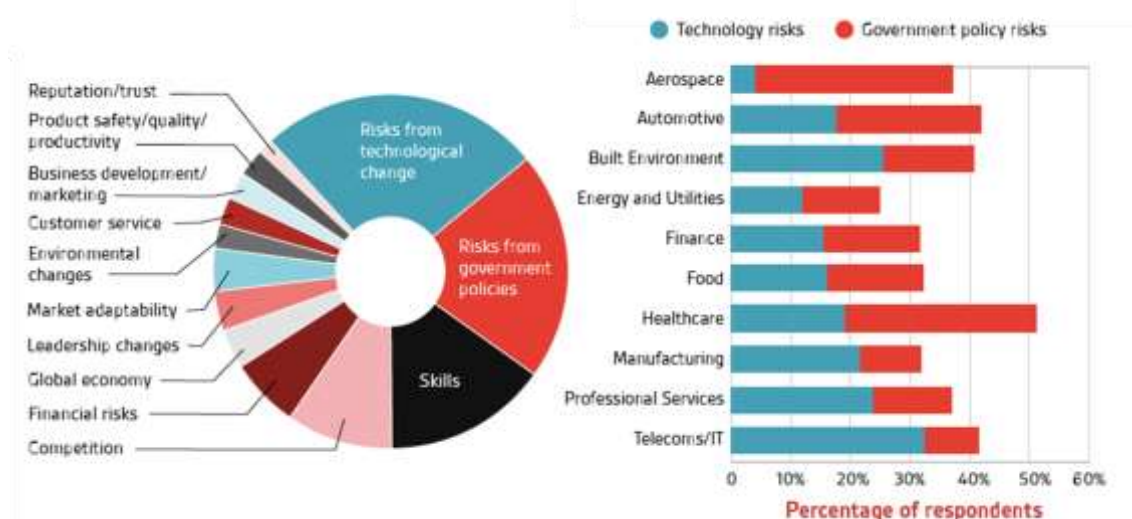
The level of uncertainty is rapidly increasing both in the geopolitical and technological environment. As sustained by the British Standards Institute (BSI) (2018), the shifting geopolitical landscape is compromising decades of globalization and sending tremors throughout international supply chains, as governments in some parts of the world become more stridently nationalistic. As the recent evolutions have demonstrated, the United Kingdom is struggling to maintain stability during the protracted Brexit negotiations which should have been completed by March 29, 2019. The true impact of United Kingdom's withdrawal from the European Union is yet to be quantified, but concerns persist on the access to a skilled workforce and on the impact on currency and cross-border trading relationships within the European Union and with the rest of the world. In parallel, a slew of new tariffs, which has been imposed between China and the United States, is creating trade friction across multiple industries. As a matter of fact, *one out of five United States businesses stating that government policies and geopolitical tensions are posing a challenge to their resilience* (BSI, 2018).

Besides, the inauguration of the new Silk Road, which shortens the journey times of goods to and from the East, is going to modify the trade routes and the destinies of certain countries, and contributes to the uncertainty of the actual business environment.

As a consequence, companies will have to face a growing interest of investors coming from the Far East for the management of large European and Italian commercial ports from Trieste to Venice. Indeed, today, firms are a highly technologically and socially interconnected network and each political and economic event generates a *butterfly effect* on all of them (Annarelli *et al.*, 2016). These challenges are particularly felt within the healthcare and aerospace sectors, as indicated in Figure 1.

Alongside geopolitical instability, there is technological uncertainty, which is caused by the rise of automation and artificial intelligence. This is raising the challenge of how to adapt and realign the workforce to deliver the optimal human-machine partnership (BSI, 2018). Businesses in every sector, not just tech firms, are becoming increasingly data-driven, raising the spectre of cyber-attacks, which pose both financial and reputational risks to organizations. Following years of extraordinary growth among the FANGs (Facebook, Amazon, Netflix and Google), governments are starting to take a more severe approach to regulate their activities, as to traditional utilities. This movement, called the *teclash*, has given rise to tough new measures such as the General Data Protection Regulations (GDPR), designed to safeguard individuals’ privacy. This collision of technology and ethics is a key contributor to an increased focus on Governance and Accountability, which has leapt up in importance in 2018 (BSI, 2018).

Figure 1 Perceived future challenges and sector breakdown



Source: BSI, 2018

RESILIENCE AS “AN ORGANIZATIONAL SKILL” – In this *new world*, resilience becomes an essential capacity for organizations to sustain these threats, to survive the long-term, and to accomplish recovery. Resilience is becoming *a quest* for corporations, that have started to look for new management practices and innovative hierarchy organization to be faster, more flexible and more resilient in the face of a turbulent environment (Valikangas, 2010).

THE AIM OF THIS DISSERTATION – This dissertation aims to measure organizational resilience and its relationship with firm performance. Specifically, we will try to answer to the following research questions: «Are company’s indebtedness and profitability good predictors for organizational resilience?» and «Do economic environmental factors affect the chance to survive the economic crisis?».

CHAPTER 1 – The first chapter illustrates the broad meaning of resilience and its two main different levels: *organizational* and *individual*. At the *organizational level*, the concept of resilience describes the inherent characteristics of the organizations that are able to respond quickly and to recover fastly. At the *individual level*, instead, resilience refers to the ability of organizational members to bounce back and succeed in the face of adversity and problems. Subsequently, some frameworks to measure resilience will be proposed. Indeed, measuring and evaluating companies’ resilience is important because it contributes to key organizational needs. Metrics can be classified in three main categories: those assessed using the features of the organizations, those measured on the organizational outcomes and those based on how the organizational recovers from failure.

The major contribution, related to the measurement of resilience based on organizational outcomes, comes from Markman and Venzin (2014) who have developed and tested a new revelatory measure for resilience: *VOLARE* (VOLatility And RoE), combining financial performance measures with volatility data.

CHAPTER 2 – The second chapter starts considering the influence of the economic and institutional context, in which a company is inserted, on firms’ resistance. It is well-known that the economic environment provides opportunities and poses threats, such as high competition, affecting the performance of companies and placing constraints on organizational goals. Therefore, organizational environments represent one of the major contingencies faced by a firm (Goll et al., 2016).

In this study, we will consider three important context variables: *Credit Crunch*, the *Bank Lending Survey*, and finally the *Gross Domestic Product*.

First, *Credit Crunch*, defined as the sudden reduction in the availability of credit, seems to contribute to lower companies' performance and competitiveness, together with a negative impact also on the level of investments and in the labour markets and productivity. On the other side, the *Bank Lending Survey* can be defined as a financial index that reflects the bank's perception about the economy and the credit market. It is useful to forecast trends in the economic activity and to anticipate potential financial crises. Finally, *Gross Domestic Product* tracks the health of nations and it is resulted to be strictly connected to privately owned firms' performance that, in turn, has a significant positive impact on GDP level and growth.

From an analytical standpoint, the relationship among firm performance and the context variables considered by this research will be discriminated into moderating or mediating.

CHAPTER 3 – In this chapter, we will try to answer to the two research questions of this thesis. In this dissertation, we have tried to understand whether firms' asset and financial position contributes to drive and build resilience. Understanding how the environment plays a role on organizational capacity of survival has been our second objective.

Therefore, we will consider the resilience of a sample of 1554 companies. These organizations will be analysed considering two periods of time: 2004-2009 and 2007-2012. Each period includes a crisis – the financial crisis of 2008-09 and the sovereign debt crisis in 2012 – that can help us to understand whether firms have shown resilience to survive. To study the organizational behavior of companies and their drivers of resilience during these two crises, two *multiple linear regression models and a time series for fixed effect model* will be delineated. Moreover, interactions among performance variables and context factors will be generated to test a possible moderating effect.

CHAPTER 4 – From the statistical analysis emerged that financial resources and profitability are essential for companies to survive and to be ready to fight against any shock. As expected, company's ability to cover its debt through cash flows deriving from

sales influences resilience, since high levels of indebtedness and potential financial tightening can compromise firms' ability to service debt when it is not accompanied by a corresponding increase in earnings. As a result we discovered that firms' management should try to improve firms' effectiveness, operational efficiency, and should keep a few slack financial resources and a low level of debt within the company, trusting and looking at a variety of metrics as return on equity, return on assets and return on sales.

After that, the moderating effect on resilience of environmental factors, as Gross Domestic Product, Credit Crunch and Bank Lending Survey, has been validated. Credit unavailability contributes to weaken firms' resilience, just as a negative growth trend of the economy and a pessimist perception of the future.

ACKNOWLEDGMENTS – Firstly, I would like to express my sincere gratitude to my supervisor Prof. Paolo Gubitta for his continuous support, knowledge and guidance. It was a pleasure to work with him and to be introduced to organizational resilience topic.

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DEFINING RESILIENCE: CONCEPT AND ASSESSMENT TOOLS

1.1 Introduction

Nowadays, the business environment is dominated by geopolitical and technological uncertainty. Indeed, new government policies and leadership changes have a huge impact on the global economy. Moreover, companies are becoming more data-driven, due to the rise of automation and artificial intelligence, changing the way they compete among each other.

Businesses can survive only by being *resilient* in this dynamic and complex environment, and resilience allows organizations to maintain their competitive position over other market players (Annarelli *et al.*, 2016).

Resilience is a term originally stemmed from *resilire* and *resilio*, which in Latin means *bounce* or *jump back* (Alexander, 2013; Klein, Nicholls, & Thomalla, 2003). It is broadly accepted that the first research on resilience was carried out in the field of ecology by Holling (1973). In his popular work, titled *Resilience and Stability of Ecological Systems*, the author referred to resilience as the ability of an ecosystem to respond to disturbances and to return to an equilibrium through damage resistance and rapid recovery (Holling, 1973).

In the last two decades, economics literature has significantly contributed to the development of researches on resilience. The concept of *resilience* has been used in evolutionary economics geography and has also been subject to different interpretations involving a large variety of research fields ranging from engineering, psychology to disaster management and across multi-level analysis (Bhamra *et al.*, 2015).

In this chapter the broad meaning of resilience and its two main different levels, *organizational* and *individual*, will be analysed.

First and foremost, at the *organizational level*, resilience describes the inherent characteristics of the organizations that are able to respond quickly, to recover in a fast way or to develop new ways of doing business.

Then, at *the employee and individual level*, the concept of resilience is also used, as the ability of organizational members to bounce back and succeed in the face of adversity and problems (Linnenluecke, 2017).

As some experts have pointed out, both organizational and individual levels of analysis are closely related to each other, suggesting also multiple connections between the different fields of research (Ruiz-Martin *et al.*, 2018).

Subsequently, some indicators and frameworks to measure resilience will be proposed. Indeed, measuring and evaluating companies' resilience is important because it contributes to key organizational needs. For instance, there is the need to demonstrate progress towards becoming more resilient, to support a business case for resilience investments or to improve organizational resilience to reach a competitive advantage (Lee *et al.*, 2013).

Finally, resilience drivers and their main moderating variables which influence their measures will be shortly delineated.

1.2 What *resilience* is

The concept of resilience is multidisciplinary and multifaceted. Its notion is grounded within ecology and is referred to the capability and the ability of an element to return to a pre-disturbance state after a disruption (Bhamra *et al.*, 2011). This term lends itself to a large number of interpretations that have generated interest in a wide variety of research fields, ranging from ecology to metallurgy, individual and organizational psychology to safety engineering (Annarelli *et al.*, 2017).

The literature based within the context of resilience and related areas can be grouped into three general areas of classification. These correlate to the elements of resilience as identified by Bhamra (2011) and include *readiness and preparedness*, *response and adaption* and, finally, *recovery or adjustment*.

The starting point of our analysis will be resilience, studied at the individual and organizational perspectives.

Table 1 Definition of Resilience in different contexts

AUTHOR	CONTEXT	DEFINITION
Holling (1973)	Ecological systems	The measure of the persistence of systems and of the ability to absorb change and disturbance and still maintain the same relationships between state variables.
Walker <i>et al.</i> (2002)	Socio – ecological systems	The ability to maintain the functionality of a system when it is perturbed or the ability to maintain the elements required to renew or reorganise if a disturbance alters the structure of function of a system.
Luthans <i>et al.</i> (2006)	Psychology	The developable capacity to rebound from adversity.
Coutu (2002)	Individual	Resilient individuals possess three common characteristics. These include an acceptance of reality, a strong belief that life is meaningful and the ability to improvise.
Hamel and Valikangas (2003)	Organisational	Resilience is the fundamental quality to respond productively to significant change that disrupts the expected pattern of event without introducing an extended period of regressive behaviour.
Hollnagel <i>et al.</i> (2006)	Engineering	The ability to sense, recognise, adapt and absorb variations, changes, disturbances, disruptions and surprises.

Source: Bhamra *et al.*, 2011

1.2.1 Insights on Individual Resilience

At the individual level, resilience can be defined as the ability to become strong, healthy or successful again despite challenging or threatening circumstances (Windle, 2011).

Its earliest roots can be traced back to psychopathology and developmental psychology studies in diverse areas such as poverty, response to stress and trauma or schizophrenia. Early studies focused on uncovering personal qualities of resilient children and identifying risk factors (threats to individual functioning) and protective factors, assets or qualities of people and contexts contributing to the growth of the individuals (Suitcliffe *et al.*, 2003).

The first three main characteristics possessed by resilient people have been presented by Coutu (2002):

- a staunch acceptance of reality
- a deep belief, often buttressed by strongly held value that life is meaningful
- an uncanny ability to improvise.

Individuals can bounce back from hardships with just one or two of these qualities, but they will be truly resilient only if they present all the three.

From the vast body of research emerged also two building blocks: *adequate resources* and an *active mastery motivation system* (Sutcliffe and Vogus, 2003). First of all, resilience is more likely when individuals have access to a sufficient amount of quality resources, such as human, emotional, material capital, social assets, in a way that they can develop competence. Then, it is more likely when individuals have experiences that allow them to get into contact with success, to build self-efficacy and motivate them to succeed in their future challenges (Masten, 2002). Mastery experiences are more likely to occur when individuals have the opportunity to learn from their mistakes or to observe from role models. These two factors contribute in promoting individual resilience and reduce stress (Sutcliffe and Vogus, 2003).

Indeed, resilience has become important to personal and job effectiveness, as individuals must be *resilient* in all life aspects. These can range from major events like terrorism and natural disasters to occurrences such as dealing with difficult work colleagues (Coutu, 2002).

In organizational settings, resilience relies on individual training, experience and development of specialized knowledge. As long as individuals gain control over their task behaviours and they have the specific knowledge to make a decision and resolve problems, they increase a sense of competence that allow them to better respond to unfamiliar and challenging situations (Sutcliffe and Vogus, 2003).

However, being resilient doesn't ensure success in every endeavour and does not mean absence of failure: it is a developable positive psychological capacity to recover and to *bounce back* from adversity, conflicts or increased responsibility, self-reinforcing one's own qualities. Individuals are able, through the use of resiliency resources such as traits, adaptation and processes of appraisal, to adapt performance over one's career (William, 2017).

Individual resilience is critical to almost all occupations, even if in different ways. For instance, a qualitative study of elite young athletes as a semi-occupation found out that resilience was one of the four competencies, besides commitment, discipline and social support, that was central to success (Holt and Dunn, 2004; Kossek and Perrigino, 2016).

On this line of thought, Kossek and Perrigino (2016) conducted a review of management studies and content from O*NET for 11 occupations and disciplinary studies to develop an integrated occupational resilience framework. They examined the concept of resilience at the individual level, defining it as a *trait*, a *capacity* or a *process* (Kossek *et al.*, 2016).

Figure 2 Individual resilience types across Selected Occupations

Occupation name (O*NET Code)	Need				Breadth Important task count	Type rated as generally important		
	Occupation rank	Stress tolerance	Persistence	Total score		Cognitive (%)	Emotional (%)	Physical (%)
Dancers (27-2031.00)	1	97	96	193	7	14	0	86
Elementary school teachers, except special education (25-2021.00)	45	90	85	175	21	76	24	0
Child, family, and school social workers (21-1021.00)	65	93	80	173	18	56	44	0
Police patrol officers (35.3051.01)	105	92	78	170	16	88	13	0
Doctors (General) (29-1063.00)	105	94	76	170	15	80	20	0
Fine artists (27-1013.00)	204	76	86	162	4	50	0	50
Nurse practitioners (29-1171.00)	212	84	78	162	22	95	5	0
Municipal firefighters (33-2011.01)	217	84	77	161	26	23	4	73
Accountants (13-2011.01)	307	78	78	156	2	100	0	0
Mechanical Engineers (17-2141.00)	393	74	78	152	5	100	0	0
Models (41-9012.00)	953	24	45	69	6	67	0	33

Source: Kossek and Perrigino, 2016

Many scholars from the psychological literature are used to view resilience as an individual trait. Resilient individuals have a personality structure for which they experience high degrees of stress without falling ill.

Moreover, resilience can be not only a trait, but also a capacity that can be enhanced. It can be a dynamic capacity of a person to modify ego-control levels upward and downward as a function of the demand characteristics of the environmental context, so as to preserve system equilibration (Kossek *et al.*, 2016).

In his paper *How Resilient Works* Coutu (2002), puts forward the idea that employee capacities are the most important element for building resilience. He demonstrated it using Morgan Stanley's response to the 9/11 attacks. After the earlier 1993 World Trade Centre Attack, employees worked on the implementation of a company-wide disaster preparedness program that resulted in a successful evacuation for most of its 2700 employees across 22 floors in the September 2001. From this emerged the capability of individuals to cope with success in the face of adversity, with an increased responsibility, progress and positive change (Linnenluecke, 2017).

Finally, resilience can be seen as the process by which individuals adapt to risk in their environment (Kossek *et al.*, 2016). According to the latter interactionist approach, social work writers sustain that to be resilient, an individual must be exposed to risk and

consequently he develops an ability to respond successfully to uncertainty. Therefore, resilience is a successful adaptation response to high risk and a transactional product of individual attributes and environmental contingencies (Williams, 2017).

In addition, from a management and work perspective, workers are resilient when they are able to maintain higher levels of work engagement, involvement and high level of resources. Similarly, resilience is a quality which belongs to the ones who are able to complete various task requirements when they have to face workplace incivility, discrimination, career disruption in a less than optimal environment.

The characteristics presented by the most of resilient individuals are self-efficacy, risk taking and dependency subdomains such as autonomy, tolerance of uncertainty, internal control and competitiveness. From this standpoint, there is a certain level of abstractness embedded within this conceptualization, since it tries to combine individual, situational characteristics and also career decisions and organizational behaviours (Kossek and Perrigino, 2016). Alongside, many psychological capital studies have found numerous positive outcomes including increased job satisfaction, higher levels of employee well-being over time, better job performance, higher levels of organizational commitment (Walker *et al.*, 2014). As a result of their research, Kossek and Perrigino depicted the multi-level integrated occupational resilience framework, which can be seen as the synthesis of an individual's traits, capacities and strategies, and processes for positively adapting to adversity and risk in ones' occupational and organizational contexts (Kossek and Perrigino, 2016).

Although we have primarily used an individual-level focus, team resilience has been linked to positive team outcomes that include cohesion, reduced conflict, cooperation.

Moreover, in *Promoting Organizational Resilience through Sustaining Engagement in a Disruptive Environment* Walker *et al.*, (2014) have stressed, individual resilience is the basis of organizational resilience, which is not simply the sum of employees' capability to resist to the shocks. He sustained that employee's wellbeing and engagement lead individuals shape the resistance of the company to the shocks, and at the same time the organisation has a powerful influence on the resilience of individual employees. Besides, organizational resilience must be examined and it is important in the creation of positive work contexts in which individuals and organizations can positively bounce back facing with work and life challenges (McEwan *et al.*, 2018).

1.2.2 Insights on Organizational Resilience

In organizational theory literature, resilience term is studied in Enterprise Risk Management, Crisis Management, Disaster Management, High-Reliability Organizations and positive organizational scholarship literatures (Williams *et al.*, 2017).

According to the first studies of Kendra and Watchendorf (2003), who analysed the World Trade Organization disaster, organizational resilience was defined as an emergency response to the failure of common policies, practices and procedures during crisis.

In studying 1993 Mann Gulch fire disaster, Weick (1993) stated that resilience is the ability not only to accept the change and ambiguity and trying to face them, but also to turn these unfavourable conditions into an advantage and about finding ways to deal with them. Accordingly, Weick (1993) suggested that organizational resilience is related to being solution oriented, creative and proactive, in addition to adaptation.

Similarly, Meyer's study (1982) found a link between attempts to restore efficacy through changes in strategy and resilience. In this way, he anchored the theme of organizational resilience to organizational processes aimed at enhancing growth, ability to learn from mistakes, restore efficacy of companies.

Figure 3 Relations between resilience concepts and organizational resilience



Source: Ruiz-Martin *et al.*, 2017

Therefore, historically, organizational resilience has been seen as an ability to bounce back after strategy failure, to make a recovery or to persist during a crisis.

However, Valikangas (2010) contrasts this notion of resilience as a crisis capability and proposes a notion of organizational resilience that begins by taking timely action *before* experiencing the crisis. A resilient company must be alert enough to see irregularities and conscious to make sense of it. Thus, organizational resilience is not about having a highly competitive strategy and executing it faithfully after a shock, but being prepared to take action before it is a final necessity and to change without a lot of accompanying trauma. In this way, an organization can benefit from unlikely events, which could have been threats, and turn them into opportunities (Valikangas, 2010).

Going ahead, three main streams of research in the conceptualization of organizational resilience have been identified:

- Resilience as a *feature* of an organization (i.e., something that an organization has)
- Resilience as an *outcome* of any activity (i.e., something that an organization does)
- Resilience as a *measure of the disturbances* that an organization can tolerate.

All these elements emphasize either on the organization survival, or in dealing with jolts, risks or changes (Ruiz-Martin *et al.*, 2017).

More recent literature has adopted the first approach and has been focused on understanding organizational resilience in terms of its drivers and its relationship with organizational variables to enhance success (Kantur *et al.*, 2015). Bhamra *et al.*, (2011) have reported four major system characteristics that contribute to organizational resilience:

- *Diversity* is the existence of multiple forms and behaviours;
- *Efficiency* can be viewed as the organizational performance characterized by modest resource consumption;
- *Adaptability* is the flexibility to change as a reaction to new pressures;
- *Cohesion* is the existence of unifying relationships and their linkages between system variables and elements (Bhamra *et al.*, 2011).

Several authors, instead, define resilience with a focus on what a resilient organization does. For instance, resilience is defined as *the maintenance of positive adjustment under challenging conditions such that the organization emerges from those conditions strengthened and more resourceful* (Vogus and Sutcliffe, 2007). A resilient organization can return to its performance level at any key performance metric and it is able to achieve

its objectives and realize opportunities in the face of predicted or unpredicted disruptive events (Ruiz-Martin et al., 2017).

Still, there is no consensus among authors on whether resilient firms return to the same point, achieving a state of stability, or they bounce forward, grow and become stronger than before. Woods (2015) identifies four meanings of organizational resilience that bring four interpretations of *surviving*. These four streams are using resilience as:

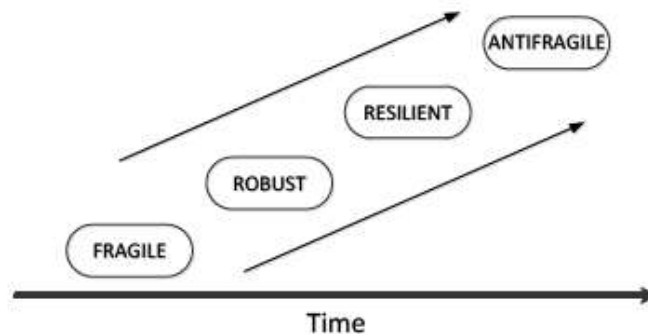
- *Rebound* (i.e. returning to previous or normal activities after a disruption),
- *Robustness* (i.e. absorbing disturbances)
- *Graceful extensibility* (i.e. how to extend adaptive capacity in the face of disruptions)
- *Sustaining adaptability* (i.e. the ability to adapt to future disruptions as the conditions change and evolve) (Martiz-Ruiz et al., 2017).

According to this interpretation, organizational resilience is a dynamic concept, that links the ability of managing disruptions to maximize the organization's speed of recovery to the original or to a new more desirable state (Annarelli et al., 2016). Therefore, the degree of resilience of an organization evolves over time.

Four-Level Maturity Model for Organizational Resilience

Ruiz-Martin et al. (2017) suggest a four-level Maturity Model for Organizational Resilience (MMOR), focusing on how well the organization has developed its abilities to survive in changing or turbulent environments. This model presents the following levels: fragile, robust, resilient and antifragile.

Figure 4 *Four-level Maturity Model of Organizational Resilience*

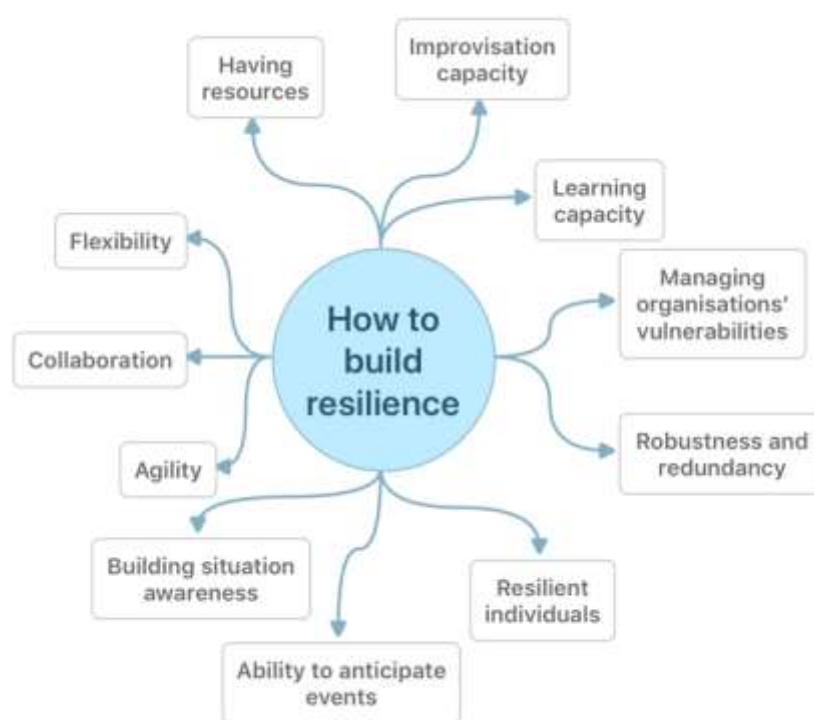


Source: Ruiz-Martin et al., 2017

The term *antifragile* is a new concept that was first introduced by Taleb (2012) as a contraposition to fragile organizations, that result overwhelmed in periods of difficulty. An organization characterized by the property of *antifragility* is able to resist to disrupting events and to overcome the crisis emerging from turbulence strongest than before (Taleb, 2012).

The organization evolves from one level of resistance to another over time based on the improvement of its abilities, characteristics or capabilities to deal with disturbances. The combination of attributes and characteristics that help more a firm to gain resilience are summarized in How to build Resilience. These attributes must be measurable to be able to assess resilience and provide an estimate of the resilience potential.

Figure 5 *How to build Resilience*



Source: Author's elaboration

Analysing the MMOR model, it can be noticed that a fragile organization is not able to withstand changing environments, but it collapses. Similarly, a robust organization is able to survive to some set of changes in the environment and it is designed to cope and absorb a set of known disturbances. However, if these changes are outside the designed parameters, the organization will probably not survive.

Therefore, a resilient organization is not only robust, but it is also able to survive to unforeseen events. By focusing on the type of disruption that the resilient organizations are prepared to face, these organizations should be able to survive to both known and unknown disturbances (Ruiz-Martin *et al.*, 2017).

Finally, an antifragile organization is able not only to survive, but also to prosper or to thrive in turbulent environments. This type of organization *benefits from shocks, thrives and grows when exposed to volatility, randomness, disorder and love adventure, risk and uncertainty* (Taleb, 2012). The distinction between resilient and antifragile organizations clarifies the open question about whether resilient organization responds just to threats or also to opportunities. If the organization is able to recover or survive to threats, it is resilient. If this same organization takes advantage of the threats and opportunities to become stronger, it is resilient and antifragile (Ruiz-Martin *et al.*, 2017). Thus, the resilient organization resists shocks and stays the same; the antifragile gets better: it presents more upside than downside from random events shocks (Taleb, 2012).

In conclusion, even though there is no universally agreed definition of organizational resilience, resilience can be defined as the dynamic capacity to adjust to challenging conditions, such as environmental shocks, and emerged from them strengthened. This concept can be useful to explore how specific industries and regions differ in terms of vulnerabilities and reaction to these events (Tognazzo, Gubitta and Favaron, 2016).

1.3 Why to measure Resilience and what are the challenges?

Finding a scale to measure and evaluate resilience is important for a company since it helps in demonstrating progress toward becoming more resilient and it highlights the ties between this factor and reaching a competitive advantage (Lee *et al.*, 2013).

A familiar management principle states that any improvement requires measuring and tracking. Companies thrive and improve their performance by tracking progress over time and comparing it to their competitors or to other players outside their industry. Therefore, precise measurement and assessment are the most useful steps in improving outcomes (Porter and Lee, 2014; Venzin, 2014).

However, the reality is that most of the firms measure properly their different outcomes, such as revenues, sales or EBITDA, but they are not able to track resilience level (Markman and Venzin, 2014). This explains why research on resilience drivers is still in

course of development. The major difficulties can arise from the fact that resilience is often influenced by social and cultural factors within organizations. Indeed, it is hard to measure a company's adaptive capacity – the ability to deal with change – since it is composed by psychological, cultural, technical and political factors, which are not easily observable and objective data (Levine, 2014).

In addition, many scholars and managers adopt different and relative perspectives in measuring it because of the variety of theoretical resilience frameworks and the lack of a clear definition of organizational resilience. Some authors are oriented to safety and crisis management in firms (McManus *et al.*, 2008; Patriarca *et al.*, 2017), others are focused on workers' resilience and how it influences the organization (Mallak & Yildiz 2016, Walker *et al.*, 2014) and finally others concentrate their studies on industry or regional level resilience, taking a perspective which is oriented primarily toward economic theory (Markman & Venzin, 2014).

Therefore, there are no clear guidelines on how to reliably and credibly measure resilience. Decision-makers will not be able to make informed choices about which resilience interventions are the most effective (Levine, 2014).

However, measures of resilience are essential because they help scholars and managers to identify drivers of sustained superior performance. It is important that organizations learn how to develop immunity to and rebound from adversity, which is critical also for the economic system in general (Markman and Venzin, 2014).

1.4 Indicators of Individual Resilience

In this section, we focus on the measurement of individual resilience, and we study in which way it can be assessed in practise.

The most reliable model that has been identified, was proposed by Mallak and Yildiz in 2016. First, their research is focused on employees and on their ability to influence the company level of resilience approaching work.

It is well known that a good number of resilient individuals, who are able to overcome and manage stress, can have enormous consequences in the workplace. In United States stress costs are estimated to be \$300 billion annually for businesses and having workers able to overcome stressful situations can be essential. Indeed, stress can cause high

turnover and less self-efficacy within the firms and it can lead to heart diseases, cancer and suicides (Mallak *et al.*, 2016).

Resilience is a key construct in the performance of targeted behaviours for solving problems and taking action in the face of adversity. The increasing need for quicker decision making in complex systems, which can have severe consequences, requires individuals and organizations to have the capacity to make high quality decisions and take effective actions (Walker *et al.*, 2014).

Thus, Mallak and Yildiz (2016) developed an instrument to measure individual resilience in the workplace (WRI), which contained an inventory of workplace resilience, a job stress questionnaire and relevant demographics. Data were obtained in a clinical and counselling setting, involving 3,291 employees of the healthcare sector during two campaigns. Individual resilience seemed to be affected by four main factors, ready for use in subsequent investigations:

- *Active Problem-Solving*: this approach demonstrates the need to act positively to solve a problem, rather than ignoring and hoping an obstacle will disappear. This requires workers to have a bias for action and the ability to concentrate on problems instead of being worried about the reasons why facts are not as hoped.
- *Team Efficacy*: resilient employees work well in team and, at the same time, they present a systematic understanding on the way the team operates and reaches its objectives and goals. In a team, everyone shares goals and guides each team member's actions. There are no assumptions about which mansions each member is supposed to carry out. Nevertheless, resilient individuals discuss about their roles inside the team with other members to better coordinate.
- *Confident Sense-Making*: this is the ability to extract order out of chaos. Making sense of one's reality requires the access to the right resources quickly and doing it confidently is a key factor of individual resilience. Sense-making helps employees to focus on relevant signals and quickly filter unnecessary information.
- *Bricolage*: the *bricoleur* practices are highly applied in the engineering world. These fashioning and creative solutions to address a problem or a situation are a good benefit for resilience. The resilient individual is able to take intelligent risks when confronted with chaotic or dangerous situations, and there is time to "STOP"- stop, think, observe and plan.

The results of WRI (Workplace Resilience Instrument) showed that executives had significantly higher scores than other employees and they were positively and significantly correlated with years of experience and the stress questionnaire. This instrument provides organizations and managers a tool for improving workplace resilience and helping employees achieve their potential (Mallak and Yildiz, 2016).

1.5 Indicators of Organizational Resilience

In addition to the assessment of individual resilience, a study of measurement of organizational resilience can be discussed.

As reported in the previous paragraphs, there is still a lack of consensus about how to measure firms' resilience. However, as Ruin-Martiz *et al.* (2017) suggest, frameworks and researches can be classified in three main categories: those assessed using the features of the organizations, those measured on the organizational outcomes and those based on how the organization recovers from failure.

1.5.1 Assessment using the features of the organization

In 2008, McManus, Seville *et al.* founded the *Resilient Organizations* project as an attempt to identify the factors that could improve organizations' resilience and enhance the resistance of communities after the earthquake in New Zealand in 2007.

Figure 6 Resilience indicators

Resilience Indicators					
Situation Awareness		Management of Keystone Vulnerabilities		Adaptive Capacity	
SA ₁	Roles and Responsibilities	KV ₁	Planning Strategies	AC ₁	Silo Mentality
SA ₂	Understanding of Hazards and Consequences	KV ₂	Participation in Exercises	AC ₂	Communications and Relationships
SA ₃	Connectivity Awareness	KV ₃	Capability and Capacity of Internal Resources	AC ₃	Strategic Vision and Outcome Expectancy
SA ₄	Insurance Awareness	KV ₄	Capability and Capacity of External Resources	AC ₄	Information and Knowledge
SA ₅	Recovery Priorities	KV ₅	Organisational Connectivity	AC ₅	Leadership, Management and Governance Structures

Source : McManus *et al.*, 2008

The authors identified resilience as a function of organization's *situation awareness*, *management of keystone vulnerabilities* and *adaptive capacity* in a dynamic, complex and interconnected environment. Based on these characteristics, they built an evaluation system consisting of 15 indicators (5 for each factors). Their study involved 200 organizations in Auckland, New Zealand and provided a self-assessment questionnaire asking for a score of 1-10 for each question.

Situation awareness

Situation awareness was defined as a measure of an organisation's understanding and perception of its entire operating environment (McManus *et al.*, 2008). This term is usually applied to operational situations. For instance, Masys (cited in McManus, 2008) applied this concept to airline operation and safety, suggesting that situation awareness is distributed across organizations and teams and it is an essential requirement for competent performance in dynamic environments. The absence of situation awareness would lead to dangerous and life-threatening consequences (Lee *et al.*, 2013).

Keystone Vulnerability

After that, McManus *et al* (2008) described *keystone vulnerabilities* as components in the organizational system with the potential to cause exceptional effects throughout the system in case of loss or impairment. This element of resilience can address the field of business continuity management where organizations aim to identify and assess potential points of failure that can originate disasters or bankrupts. These points of failure can be originated by the lack of specific tangible organisational components, as buildings, specialised equipment and individual managers, or the impairment of relationships between the organization and critical stakeholders.

The impacts of keystone vulnerabilities may be either instantaneous (occur suddenly and the failure of only one factor have a significant negative impact) or insidious (small failures of key components lead to a large scale cascading-type failure over time) (Seville, 2017).

Adaptive Capacity

Finally, *adaptive capacity* can be referred to the elements that build organizational culture and that allow the company to make timely and appropriate decisions in a crisis or to

maximise opportunities. As Kendra and Wachtendorf (2003) argue, the idea of resilience as adaptive behaviour is increasingly being applied to the business environment to understand how to manage the balance between stability and change. Organizations often drew on their culture, capabilities of their staff, as opposed to their structures and technology, to develop adaptive responses to emerging situations. A firm presenting a high level of this factor is able to continuously design and develop solutions to match or exceed the needs of its environment as the business context changes.

Taking as a starting point this Relative Organizational Resilience model (ROR), Lee *et al.* (2013) did not support McManus' model (2008) and proposed a new adjusted version composed by 4 factors and 73 items. The innovative factor he added was Resilience Ethos. Resilience Ethos can be defined as:

«A culture of resilience that is embedded within the organisation across all hierarchical levels and disciplines, where the organisation is a system managing its presence as part of a network, and where resilience issues are key considerations for all decisions that are made» (Stephenson, 2010).

Figure 7 Resilience Ethos

INDICATOR	ITEM
Commitment to resilience	Our organization is focused on being able to respond to the unexpected. In our organization, there is an appropriate balance between short and long-term perspectives. Our organization has a culture where it is important to make sure that we learn from our mistakes and problems.
Network perspective	Our organization actively participates in industry or sector groups. Our organization is able to collaborate with others in our industry to manage unexpected challenges. Management sees our organization as having a leadership role in our industry.

Source: Author's elaboration

However, even this adjusted version did not found support with the data of their research, concluding that a new evaluation model is necessary.

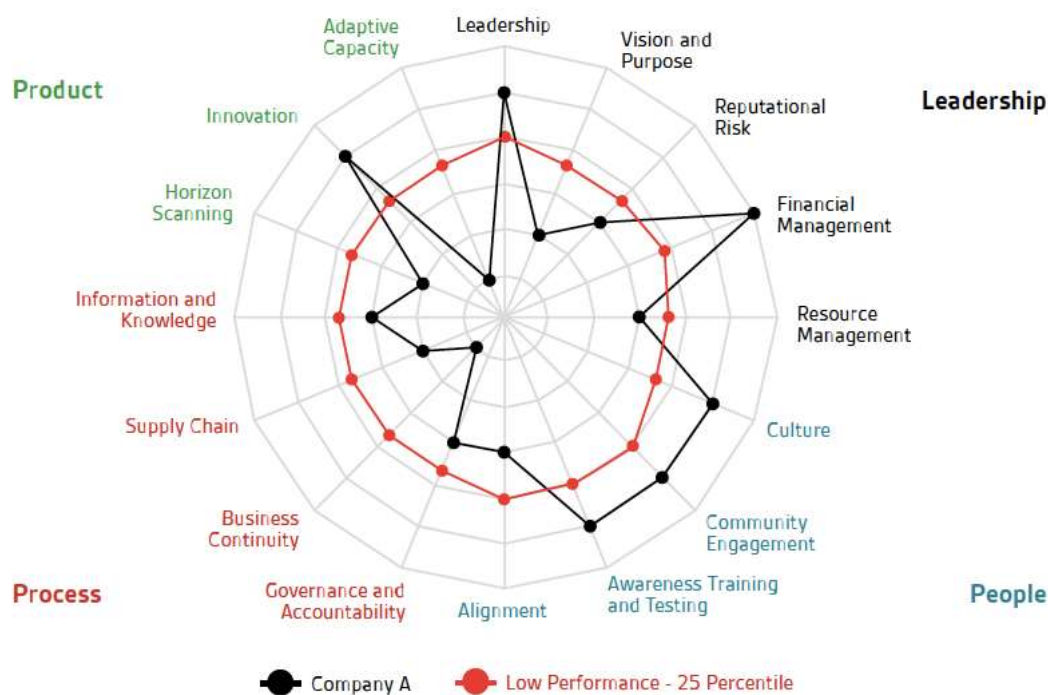
Therefore, Lee and colleagues (2013) suggested a simpler two-factor model, composed by *adaptive capacity and planning*, and thirteen indicators to measure resilience. This model highlights the importance of effective planning strategies, that can allow a business to turn adversity into advantage. As sustained by Sutcliffe *et al.* (2008) systems of organizational controls, processes and checks should be planned and put in place to anticipate and prevent possible crisis from occurring. However, resilient organizations must recognise that is impossible to prevent all disasters all of the time. Thus, resilience

is also about the capacity to adapt to changing environments and to mobilise in response to a threat once it has occurred (Stephenson, 2010).

Organizational Resilience Index

Adaptive Capacity, Leadership, Insurance Awareness have been also confirmed as the most important dimensions that lead an organization to be highly resilient, according to British Standards Institution (2019). Although *BSI Organizational Resilience Index* cannot be considered an academic source, this assessment tool offers a contemporary insight on organizational resilience, suggesting what current companies consider important in their struggling to competitive edge. This instrument highlights sixteen core elements of organizational resilience across four categories: *Leadership, People, Process and Product*.

Figure 8 Organizational Resilience Indexes



Source: BSI, 2018

Leadership identifies business leaders' key roles and responsibilities, who should manage the organizations limiting reputational risk and managing effectively resources and financial aspects. Moreover, people and their values are essential to the business success.

Indeed, individuals' interaction with the environment, civil society and shareholders influences ethical and social responsibility issues.

Going ahead, resilient organizations should also be able to understand and anticipate how their products and services meet customers' needs and conform to regulatory requirements. Truly resilient businesses create new products and markets to stay ahead of competitors through innovation. Finally, it's useful to embed habits of excellence and quality into the development processes of products and services and on the way they are brought to the market: this is a key to face and overcome unexpected events (BSI, 2017).

Resilience Analysis Grid

One last analytic framework to assess organizational resilience has been proposed by Patriarca, Di Gravio and Costantino in a publication in *Safety and Health at Work* (2017). Their focus of analysis are modern socio-technical systems, systems made up of people that produce services using technology, affecting the actions of workers operating. These systems have to be resilient to comply with the variability of everyday activities, the underspecified nature of work and the nonlinear interactions among agents.

Their organizational resilience framework combines the Resilience Analysis Grid (RAG) and the Analytic Hierarchy Process (AHP). The first aims at measuring how resiliently an organization performs in everyday activities, assessing how the organization is able to respond, monitor, learn and anticipate. The second is a multi-criteria decision making technique, whose scope is to reduce complex decisions to a series of comparisons in a user-friendly formulation. At organizational level, resilience can be described as a combination of four cornerstones:

- *Monitoring* underway solutions (addressing the critical)
- *Responding* to any type of events (addressing the actual)
- *Learning* from past failures and successes (addressing the factual)
- *Anticipating* future threats and opportunities (addressing the potential)

The validity of these four cornerstones has been widely recognised for representing successfully how people feel comfortable with unexpected and unforeseen events in everyday work activities and to promote proactive strategies for managing daily operations.

The same cornerstones have been used to define a dedicated framework, which considers legal, institutional, organizational, and procurement aspects of societal resilience.

1.5.2 Measurement based on the organizational outcomes

This stream is not popular, as fewer authors use this approach. First, Watanabe *et al.* (2004) suggested to use the Operating Income to Sales to measure resilience. Then, Dalziell and Mcmanus (2004) proposed to measure resilience based on Key Performance Index (KPIs) defined taking into consideration the organization's strategy. However, these authors did not state the specific items, attributes, components or KPIs to be measured (Martiz-Ruiz, 2017).

The major contribution to this line of research comes from Markman and Venzin (2014) who have developed and tested a new revelatory measure for resilience: *VOLARE* (VOLatility And RoE), combining financial performance measures with volatility data. This composite measure of long-term performance for enumerating firm resilience is inspired by the optimal capital allocation, which reflects the principle that capital allocation must mirror the risk. The authors applied this new measure to the financial industry from 2002 to 2011 to compare highly resilient international financial services firms, such as banks, with less resilience ones.

To calculate *VOLARE*, they measured the average Return on Equity (2002-2011) for each firm of the segment (y-axis) and the adjusted deviation of Return on Equity (ROE) in the same period as an indicator for risk, creating a logarithmic regression: *VOLARE 10 benchmark curve*.

Along this curve all the firms have the same performance and they just differ by their risk-return ratio.

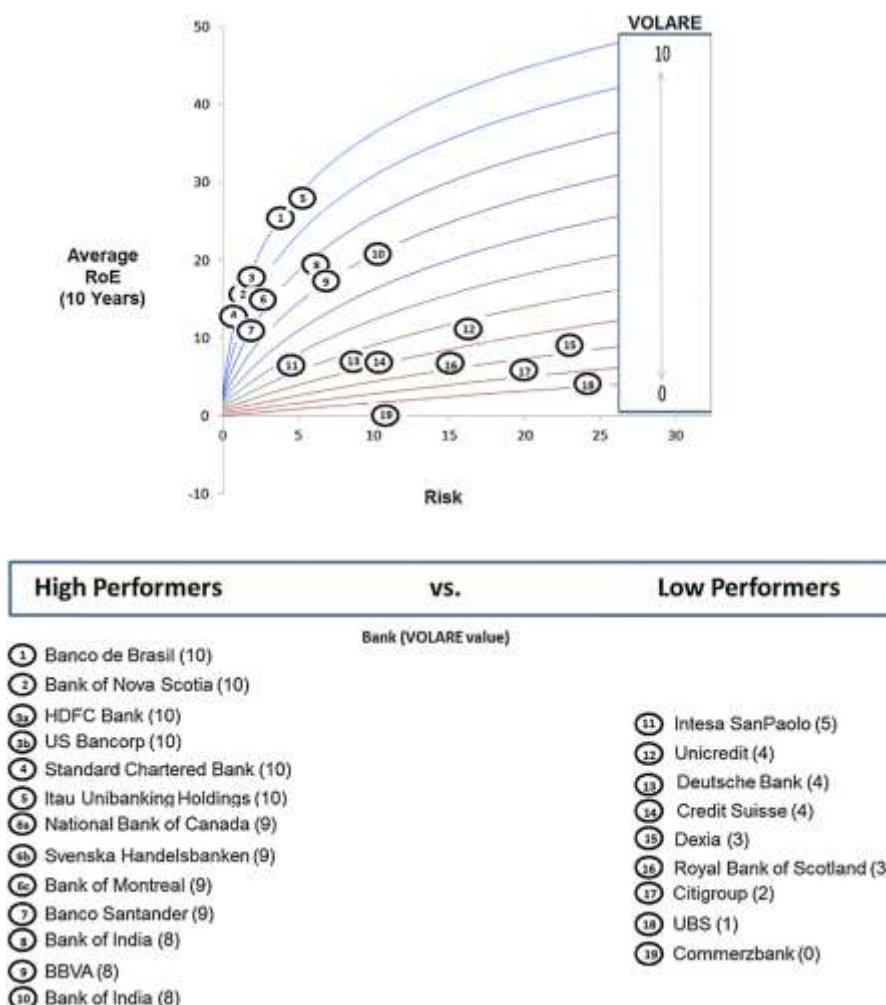
As expected, applying this index to this industry revealed that a higher long-term Return on Equity is correlated with higher volatility and that lower long-term Return on Equity is compensated by lower degree of risk. However, some banks seemed able to break this risk-return ratio, presenting high risk and limited return on equity and vice versa. Some financial firms were also able to exhibit persistent superior performance despite the economic and financial crisis of 2008.

Having established VOLARE as a measure of resilience the authors tried to answer to this question: what distinguishes financial firms that thrived amidst conditions of adversity from those that did not?

To respond to this question, they evaluated three key factors as predictive of performance: *size, home-market solidity and product and market complexity.*

First, as described by management doctrines, *size* seemed a shock-absorber that shields firms against unexpected competitive forces and market turbulence. However, the two researchers learned that large financial firms, in spite of their size, economies of scale and scope advantages, were actually less resilient than small banks.

Figure 9 VOLARE: persistent superior performance in banking sector (2002-2011)



Source: Markman et al., 2014

Firms' underperformance could be attributed to poor economic and market conditions. Additionally, country effects such as GDP are also relevant, but not in a traditional way.

Conducting business out of a stable and growing home market and diversification in foreign countries seem important in general, but if the epicentre of a significant economic storm originates from a firm's location, then proximity and exposure matter more. For instance, some of the least resilient organizations that experienced the greatest decline were localized in countries with robust economics but based on the financial disaster's epicentre (Markman *et al.*, 2014).

Thus, geographic diversification often increases the fragility of an organization, as it makes it more difficult to control all local risks and difficult to overcome any dimensional sub-optimizations in foreign markets.

Resilient companies usually have a strong position in the original market and a maximum of three or four foreign geographical areas in which they have an equally strong position (Pirotti *et al.*, 2014).

Third, firms can *spread their product lines* across geographical markets, thus reducing their overall risk that yields higher performance. However, Markman *et al.* (2014) found there is not a significant link between higher levels of product diversification and resilience.

Therefore, *how a firm is managed* is probably more critical to its resilience than size, location and product diversity (Markman and Venzin, 2014).

In *Resilience*, Pirotti and Venzin (2014) have tried to identify seven concrete drivers of organizational resilience, that can be analysed through a self-assessment and that help to reach a long-term superior performance.

From their research, it has emerged that resilient firms show higher levels of *authenticity*: they deal with their businesses in a way that is consistent with their traditions and values. Moreover, resilient organizations present a high level of *customer centricity*. They take care of customers with sincere dedication and they worry about their needs. Resilient firms are ready to sacrifice profitability goals in the short term to tie customers to their system for the long term. Employees identify themselves with this strategy and are proud to add value to customers (Pirotti *et al.*, 2014).

In addition, resilient organizations have a relatively *simple business model* and they are strongly determined to preserve key skills through their products and services, which are in turn clearly linked to specific resources and capabilities.

Besides, decision makers in resilient companies always take a long-term perspective and have the ability to make strategic decisions by favoring a fast decision-making style and combining it with a good quality of the decisions themselves. Resilient companies are led by CEOs with a strong functional specialist background and by a top management team linked by shared values (Pirotti *et al.*, 2014).

VOLARE doesn't aim to replace any accounting measures of firms today, but only to complement financial metrics and help managers cultivate the longer-term health of companies. VOLARE helps to determine if performance is sustainable for ten years and if the company is taking too much risk. This method keeps into account that most of the common performance measurements are not measuring resilience per se and that improving performance does not coincide with the improvement of resilience. This measure increase awareness about firm's long term financial performance (Markman and Venzin, 2014).

In conclusion, we propose a table that summarize the main organizational outcomes taken into consideration in the measurement of resilience according to this perspective.

Table 2 VOLARE: Organizational Outcomes

PERFORMANCE MEASURES	BENEFITS	CONCERNS
ROE (return on equity)	ROE shows how much return was achieved with shareholders' entrusted resources.	<ul style="list-style-type: none"> - Net income, a component of ROE, can fluctuate greatly due to the application of different accounting standards (IFRS/US GAAP). - As an accounting figure, the ratio has a short-term and historic focus. - Growing debt leverage and stock buybacks can keep a firm's ROE even if profitability is eroding.
TSR (total shareholder return)	It is focused on the shareholder value creation. It is a simple method to monitor the firm's value development by adding the paid dividends to the change in share price over a certain period of time. Unlike ROE and EVA, TSR considers the future performance of a company rather than the past.	<ul style="list-style-type: none"> - It is based on shareholders' perception, so a firm's value depends on the motives of investors. Thus, ownership structure and investment horizons can seriously drive TSR limiting management's influence. - Embedding TSR in the incentive system can misguide management; shareholders might not be interested in the long-term success of a company. -Though long-term TSR might correct for volatility, majority owner groups may influence a firm's strategy. - TSR can only be calculated for publicly traded firms.

PERFORMANCE MEASURES	BENEFITS	CONCERNS
EBITDA (earnings before interests, taxes, depreciation and amortization)	It represents non-accrual operating earnings in the income statement. Since it excludes interests, taxes, depreciation and amortization, EBITDA can be compared within industries. EBITDA multiples are often used to determine the value of a company.	Even though EBITDA is a very useful performance measure to analyse the operations of a company, interests, taxes, depreciation and amortization need to be considered as they can significantly influence the net income of a company and the shareholder value creation.
EVA (economic value added)	This concept is correlated with the stock price and shareholder value creation. If it positive EVA means that capital is available to be reinvested or SH reimbursement are above the level of expected return.	EVA adjustments are costly and time consuming. Eva is difficult to apply to knowledge-intensive firms with many business units and it incentivizes short-term since it is calculated on an annual basis.

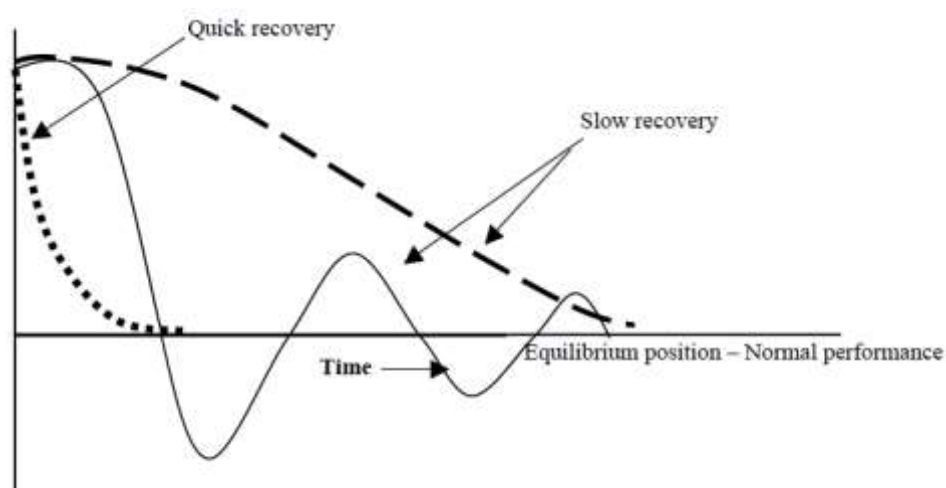
Source: Author's Elaboration

1.5.3 Measurement based on organizational recovery

In this case, resilience is measured based on how the organization recovers from failure. The drawback is that the organization needs to suffer failures to assess its resilience. Therefore, this way to measure resilience is only valid after the organization has been subject to some shocks (Martiz-Ruiz, 2017).

At the 4th International Conference on Building Resilience, Virendra (2014) has proposed a quantitative assessment of performance, time and costs for an organization or system after a shock.

Figure 10 Resilience Recovery Measurement



Source: Virendra, 2014

Starting from the concept of Resilience Efficiency (Output under Stock/Normal Output), the author has introduced the recovery time and the effort required in an attempt to assess resilience.

It is noted that if two similar systems are subject to equal damages, the time it takes to recover back to their normal performance is a measure for resilience. In other words, the slower the recovery is, the less resilient are the organizations. Another measure that can be analysed is the cost (Y) required to build a new system, which can be compared to the effort (X) required to recover to an equivalent system performing before the shock. The effort (cost) resilience could be expressed as $(Y-X)/Y$. However, this last measure of resilience would still give 100 %, when the system – though requiring no cost – takes a significant amount of time to recover to normal performance. It is therefore advisable to use several and meaningful measures of resilience to compare or assess different systems or organizations (Virendra, 2014).

1.6 Conclusion

As the introduction pointed out, over the last decades the concept of resilience has become essential to organizations which have been threatened by geopolitical and technological uncertainty, prompting their inner reaction to the upcoming change in their environment. In order to illustrate all the relevant nuances of resilience and their relatedness with different areas of research, this chapter showed two main perspectives: individual resilience and organizational resilience. Diving deep, the individual framework assumes that resilience can be defined as a trait, a capacity or a process which has an important role in the work-life balance.

Alongside, from an organizational standpoint, the last paragraphs have proposed the Maturity Model for Organizational Resilience framework (MMOR) as a tool to explain how a *resilient* organization is able to deal with both known and unknown threats. Therefore, this kind of resilience can be thought as the full set of reactions through which organizations are able to adjust or adapt to threatening situations which are used to challenge their *status quo*. In the end, through resilience, organizations should end up being at the same time strengthened and more resourceful.

After that, the importance of finding an assessment tool to measure resilience has been discussed. However, this is not an easy task since there is no consensus among researchers

and no clear guidelines on how to reliably measure resilience. Most of the studies use scales based on the features of the organizations, as situation awareness, management of keystone vulnerabilities and adaptive capacity (McManus *et al.*, 2008). Nevertheless, some authors still propose other alternatives reflecting the high variety of theoretical resilience frameworks, as instruments elaborating organizational outcomes or recovery from failure.

The lack of a clear definition of resilience and the presence of social and cultural components make its assessment less objective and more interpretable. However, this challenge is still desirable since it helps organizations in demonstrating progress toward becoming more resilient and reaching a competitive advantage among the players in the industries.

ORGANIZATIONAL RESILIENCE AND ECONOMIC ENVIRONMENT

2.1 Introduction

In the first Chapter, a conceptual framework of individual and organizational resilience and its main assessment tools were presented. The lack of a clear definition of resilience makes its evaluation more interpretable and less objective. However, understanding what drives and influences resilience is still advantageous to organizations to become more resilient when dealing with shocks and to reach a competitive advantage among rivals.

The resilience of a company is conditioned by elements of strategic and organizational nature. From a strategic point of view, companies that focus on customer centricity and product, and at the same time, develop internationalization processes in areas that are consistent with each other are more resilient. Alongside, from an organizational point of view, simplification, speed in decision-making processes, autonomy and incentives based on long-term strategic objectives show a positive correlation with the resilience of the organization (Venzin *et al.*, 2014).

Furthermore, some studies show that resistance depends decisively on the management from the entrepreneur's leadership style, particularly in small and medium-sized companies (Lee *et al.*, 2013).

However, the resilience of a company does not depend only on its strategies. The economic and institutional context in which it is inserted directly influences its degree of resistance (Campagnolo, 2019). Indeed, the economic environment provides opportunities and poses threats, which could be in the form of competition, affecting the performance of companies and placing constraints on organizational goals. Therefore,

organizational environments represent one of the major contingencies faced by a firm (Goll et al., 2016).

From an environmental perspective, the last decade was the protagonist of two deep crises: 2008-2009 and 2012-2013. In real terms, the decrease of Gross Domestic Product was around 1.1% in 2008, 5.5% in 2009, 2.8% in 2012 and 1.7% in 2013. Specifically, in Veneto the number of active organizations diminished of 4 thousand units in 2009 (compared to 2008) and of 8 thousand in 2013 (compared to 2012). As a matter of fact, volatility, uncertainty and complexity still characterize most competitive contexts (Campagnolo, 2019). Consequently, the environmental variability and the impact of major shocks in economic development are likely to influence organizational resilience and success.

Thus, this chapter aims to investigate how the presence of macroeconomic external environmental factors can affect the resilience of a company and its recovery after a shock.

In this study, we consider three important context variables: *Credit Crunch*, the *Bank Lending Survey*, and finally the *Gross Domestic Product*.

First and foremost, a definition of these factors will be presented, and their peculiarities will be discussed, so that their trend can be related to organizational performance.

Then, before diving deep in chapter three with the analytical analysis, an understanding of the potential environmental effects will be introduced.

From an analytical standpoint, the relationship among firm performance and context variables, considered by this research, can be discriminated into moderating or mediating.

2.2 Credit Crunch

2.2.1 Literature Review: Definition of Credit Crunch

Credit Crunch is a term that has been adopted for the first time during the Great Depression of the 1930s and it has been created a milder version denominated “credit squeeze” to refer to the credit crunch of 2007 and early 2008. The concept of “*credit crunch*” has a long history and it was first defined by Bernake and Lown in 1991 in the *Brookings Papers* as “*a significant leftward shift in the supply curve for bank loans, holding constant both the safe real interest rate and the quality of potential borrowers*”.

In order to document whether there has been a credit crunch, the two authors compare the behaviour of bank lending during the severe recessionary episode of 1990 with previous recessions. Total loans at domestically chartered commercial banks grew only 1.7 percent during 1990-1991 period, compared with an average of 7.1 percent in the previous recessions. Alongside, the decline in lending reflects the ongoing shrinkage of the savings and loan industry, due to the lower quality of borrowers' financial health and of the shortage of financial capital (Mizen, 2008). In the end, they conclude that there has been a credit crunch: they demonstrated that reduced credit supply, as well as weak demand effects, played a major role in the recession of 1990. From the supply-side, in case of loan losses a "flight to quality" appears, since banks respond to crisis by shifting their loan portfolio towards more creditworthy borrowers (Bernanke *et al.*, 1996). Nevertheless, it is also normal for credit demand to fall during a recession, reflecting declines in aggregate demand, driven by weaknesses in borrowers' balance sheets. This leads firms to cut investment and working capital and, ultimately, demand for bank credit (Dell'Ariccia *et al.*, 2008). Therefore, borrowers who are more leveraged or possess collateral of lower quality will express lower demand for external finance (Mizen, 2008).

A second definition of credit crunch does not rely on the contraction in lending but on the microeconomic principle of a shortage: there is a shortage if the demand for a good or service at the current market price exceeds the supply. Following this insight, the available supply will be rationed by some means other than pricing. Non-price credit rationing is a method that have the effect of limiting output without price controls and it may occur even if the market is not experiencing the phenomenon of a credit crunch (Owens *et al.*, 1992).

Owens and Schreft (1992), have defined a credit crunch as "*a period of sharply increased non-price rationing*". These two authors have reviewed some non-price rationing episodes and they have observed that credit crunches were accompanied by credit controls, binding interest rate ceilings or coercive behaviours by administrative officials and bank regulators to discourage banks from lending. During the recession of 1990-1991, with high likelihood, non-price rationing was applied to loans secured by real estate and they concluded there was not a general credit crunch, but a "*sector-specific crunch*" in real estate. In case of non-price rationing, borrowers are not able to get a loan at any price and this distinguishes credit crunches from periods of simply tight credit in which

borrowers complain about the cost of credit (Owens *et al.*, 1992). However, Owens and Schreft (1992) sustain that bank credit was not being rationed or constrained alone, but the slowdown in lending was attributed also to the decline of loan demand. In fact, credit activity by non-bank providers did not increase but it also contracted during the 1990-1991 recession.

Clair and Tucker (1993), instead, relate the phrase “*credit crunch*” to the restrictions of the credit supply in response to a decline in the value of bank capital and to conditions imposed by regulators, bank supervisors, or banks themselves that make banks hold more capital than they previously would have held.

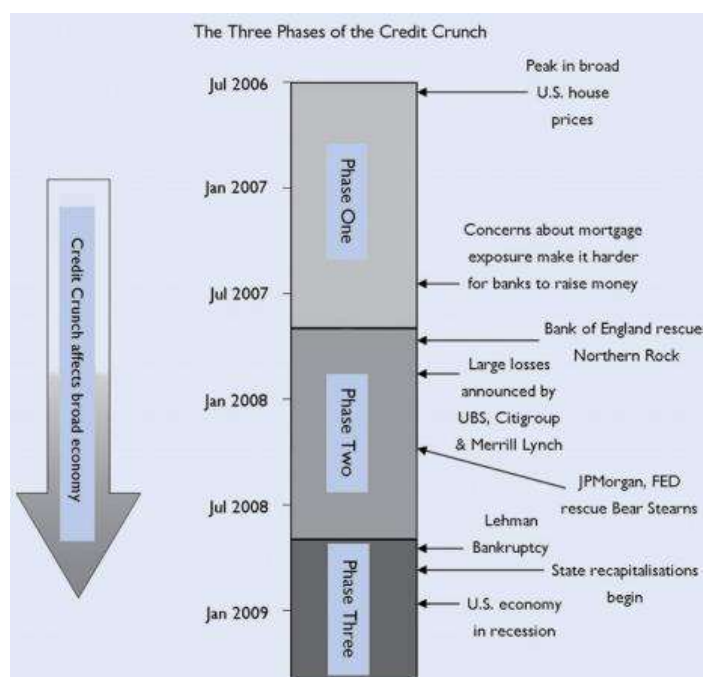
According to O’Brien *et al* (1992), on the contrary, credit crunch must not be read in the sense of a situation characterized by stringent lending criteria, or by limited bank resources that bona-fide borrowers cannot get credit; but in the sense that banks lack enough capital to meet required capital ratios.

In addition, Mizen (2008) affirms that the term credit crunch was already in use well before any serious decline in credit supply was recorded, and it was used for a situation of shortage of liquidity in money markets and effective closure of some capital markets, that could cause a decline in terms and availability of credit for consumers and entrepreneurs. These disorders in financial markets occurred because banks tried to determine the true value of assets which were no longer traded in sufficient volumes in the market to establish a true price. Uncertainty prevailed among financial institutions, which were aware of the need for liquidity, but they were not willing to offer financing except under terms well above risk-free rate. These conditions made the credit crunch started in the past and also in the most recent crisis (Mizen, 2008).

Martin Wolf (2008), in an article of the Financial Times, in 2008, explains how the credit crunch of 2008-09 is similar to the crisis in 1997-98 in emerging markets or to the dotcom boom and bust of 2000. In most of the crisis, the credit crunch has global implications because it involves international investors. Moreover, during the 2007-08 credit crunch, asset-backed securities composed of risky mortgages were packaged and sold to banks, pension funds and investors, just as equities in emerging markets and dotcom companies before them. However, the 2007-08 credit crunch has been far more complex than earlier crunches because financial innovation has allowed these new ways of packaging and reselling assets. These repackaged debt securities received high ratings, were considered

safe and they also provided better returns compared to more conventional asset classes. In reality, they were not safe as they appeared, since they were closely tied to movements in house prices.

Figure 11- Summary Chronology of the Credit Crunch



Source: Murphy, 2009

Therefore, when the decline in house prices started, mortgage defaults increased and losses for investors became large. This marked the first stage of the Credit Crunch (Murphy, 2009). Several financial institutions failed and the demand for liquidity had a serious impact on the operations of the money market. This was another case of crisis generated by the mispricing of the risk of some financial products (Mizen, 2008). Then, the event that changed the nature of the Crunch decisively has been the failure of Lehman Brothers, which caused a loss of confidence in finance as a whole. As a consequence, the third phase of the Credit Crunch was characterized by bailouts and emergency measures (Murphy, 2009). Without debt-market financing, which constitutes about 58% of all credit availability, corporations lacked money to expand and even to pay current expenses. The economy collapsed and the loss of credit availability and financial decline appear to have caused the Financial Crisis (Schwartz, 2017).

2.2.2 Causes of Credit Crunch

Credit Crunch is the result of multiple factors adversely affecting banks' ability to supply credit at a time when bankers' ability to adjust to these elements is limited. Credit Crunch is often the result of a decreasing willingness to take risks by banks due to a financial crisis and recession. It can be caused also by policies addressing bank failures, community development or credit discrimination (Clair *et al.*, 1993).

Borrowers' Balance Sheets and Availability of Banks' Loanable Funds

It is normal for the demand of credit to fall during a recession, considering the lower demand for new constructions, producers' investment goods and consumer durables. However, during Credit Crunches, credit demand is unusually weak: many borrowers are used to significantly increase their leverage and the falling prices for real estate and other assets adversely affect their net worth. As a consequence, borrowers are not much creditworthy and they will present a lower effective demand of finance, at a given value of the safe real interest rate, for an ultimate investment opportunity (Bernanke *et al.*, 1991).

During a downturn, the supply of credit also decreases because loans become riskier and in an atypically severe recession, the ability of banks to lend after the recovery can be hampered. In this case, loan losses can result larger than normal reductions in bank capital and bank failures. Moreover, in the surviving banks, capital may fall below the level desired by bank management or the minimums established by regulatory agencies (Clair *et al.*, 1993). For this reason, banks could not have funds available in order to lend: the bank's capital, its saving and checking deposits, or its managed liabilities as certificates of deposits (Bernanke *et al.*, 1991). As a consequence, the expansion of credit will be limited by the bank capital levels. In addition, banks themselves are contributing to the decline in lending activity through a decreased willingness to extend credit. Therefore, not only loan losses reduce bank capital and willingness of banks to take the risk of lending again, but also the minimum capital standards can rise (Clair *et al.*, 1993).

This slowdown in bank lending has been accompanied by a rise in the *Spread*. This is the natural response to an economic recession and to a deterioration of borrowers' credit quality, with the consequent rising of debt-to-income ratios and reductions in cash flows (O'Brien *et al.*, 1992).

Securitization of Bank Loans and absence of alternative financing

Another supply-side factor that can help to explain the decline in bank lending is the trend in the securitization of bank loans. Loans that are securitized do not appear on banks' balance sheets and would not be counted in standard measures of bank loans. Banks, in general, securitize three different types of assets to sell off all or part of their holdings to investors: consumer credit, mortgages and commercial or industrial loans. The largest category is represented by the value of outstanding securitized mortgages, which is really large. For instance, in 1990 the outstanding pool of mortgages exceeded \$1 trillion, according to Flow of Funds accounts. So, the apparent slowdown in bank lending could also be seen as the result of an innovation in the way that banks finance their lending, a sort of 'mirage' (Bernanke *et al.*, 1991).

When alternative forms of credit are easily substitutable with bank loans, the reduced bank lending has relatively little effect on the cost of credit faced by borrowers and it generates a small economic effect. On the contrary, if the replacement rate with bank loans is high, the economic effect of a slow-down in bank lending on small borrowers and on the macro-economy as a whole would be significant. However, as sustained by Bernanke *et al.* (1991), there has not been much switching to alternative forms of credit in the last recessions. There has been a low growth of substitute commercial paper issuance and of commercial mortgages outstanding either. The most likely explanation is that the recession caused an overall decline in credit demand, that affected alternatives to bank lending as well as bank loans (Bernanke *et al.*, 1991).

Resolution of failed depository institutions

While loan losses directly reduced capital, the resolution of failed banks and thrifts increase the demand for capital. Depository institutions' assets are taken over by the deposit insurers after their failure. Typically, the insurers sell the institution after cleaning the portfolio of the non-performing assets. The acquiring institution must have enough capital in excess of regulatory minimums to be able to increase its total asset holdings without becoming undercapitalized.

Nevertheless, the resolution of failed banks and thrifts is not the only source of assets. Indeed, many banks that did not fail, despite being undercapitalized, are used to reduce their assets to improve their leverage ratios by selling their assets to healthier institution

(Clair *et al.*, 1993). Baer and McElravey (1993) term this process the *recycling of assets*, suggesting that assets are recycled from undercapitalized to well-capitalized financial institutions. However, this failure–resolution process destroys valuable information, reducing the ability of many borrowers to obtain credit. Effective lending involves the ability of bankers to develop specialized information regarding their borrowers to make informed credit decisions at minimal cost. One type of specialized information is the borrower’s commitment to repay a loan under adverse conditions. Many borrowers will face difficulties in repaying during an economic downturn. Some borrowers will be willing to make every reasonable effort to repay their obligations and will make personal sacrifices in the process. Others will not accept any personal sacrifice and will quickly declare bankruptcy or force a bank into losses (Baer *et al.*, 1993). During an economic recession, the repayment by both types of borrowers may appear poor and characterized by late or partial payments and in violation of loan covenants. All these loans may be classified as non-performing, since supervisors consider them unlikely to be repaid given the current economic conditions. These non-performing loans are either placed in a collecting bank or held by the FDIC for liquidation. Therefore, resolving the failed bank destroy the information that distinguish low-risk from high-risk borrowers (Clair *et al.*, 1993).

Bank supervision overreaction

The potential impact of bank examiners on credit decisions is large, but the evidence that an overreaction by bank supervisors caused the credit crunch is mixed. There are different ways with which bank examiners might constrain bank lending trying to enforce safety and soundness guidelines. Examiners could require banks to increase loan loss provisions and charge-offs, and thus reduce their capital. In other cases, examiners could become more conservative in evaluating a bank’s condition, requiring a higher leverage ratio. Moreover, for more troubled institutions, supervisors may be directly setting restrictions on lending activity. Each of these supervisory and regulatory impositions have some effects on bank financial statements (Clair *et al.*, 1993).

According to Bernanke and Lown (1991), however, the examiners have not suddenly imposed new tighter examination standards that have constrained credit, since they have found evidence that the root cause was the lack of loan demand and the deteriorating economic conditions. Even so, there is evidence that bank examiners are enforcing a more

conservative view of what constitutes a healthy bank. In addition, bank supervisors could also affect credit decisions by raising the expected cost of funding the credit. Specifically, the cost of funds is a combination of the cost of the necessary capital and the cost of deposit funds. In the case bankers perceive, even erroneously, that examiners might criticize new credit extensions, then they expect that a larger share of new credits will have to be funded with relatively costly capital, driving up the expected funding cost and discouraging new lending (Bernanke *et al.*, 1991).

New credit standards set by bankers

Severe down-turns alter both bankers and bank supervisors' perception of risk. Indeed, after recessions and after a sharp increase in bank failures, bankers will probably re-evaluate risk and change their risk-taking behaviour, requiring more capital to buffer against it. In the case loans had been correctly priced, banks would have collected sufficient capital during expansions to absorb loan losses during recessions. However, their willingness to supply credit is likely to be reduced and bankers contract it by denying credit to many borrowers and raising credit standards. Some of the rejected applicants could be borrowers who were qualified for loans in the past and who are looking for credit extensions. This change in status from creditworthy to un-creditworthy can damage borrowers' businesses since many of them planned on continued access to credit. Probably the largest difference between borrowers' and lenders' perceptions is that borrowers perceive creditworthiness as an individual characteristic, while bankers view creditworthiness on both an individual basis and on the basis of the entire portfolio of loans (Shoenmaker, 2013).

Hyun and Rhee (2011) show that banks cut lending when economic conditions are poor or when raising new capital is expensive, and that capital constrained banks are more reluctant to advance new lending in an attempt to maintain minimum capital adequacy ratios. Moreover, the two researchers demonstrate that, for a modest increase of the minimum capital ratio, banks may prefer to choose the asset reduction strategy when they hold a relatively small amount of long-term loans or when the economy is in a bad state. However, if banks have a good number of long-term loan relationships, they could be more willing to extend new credit to the corporations in their portfolio in order not to put the existing loans at default risk. When this happens, bank regulation should be enforced with caution (Hyun, 2011).

In other cases, if a bank's condition deteriorates to the point that it is unable to extend credit, the bank would likely want to hide that fact. Otherwise, depositors might demand higher interest rates, and the bank's best borrowers might take their business elsewhere. To create the appearance of financial health, the bank pretends to continue its lending operations, including marketing activities. However, if even high-quality loan proposals are rejected under the pretension that they are too risky, the cost of disguising can be expensive. Indeed, borrowers waste time and resources applying for loans from banks that are not able to lend. In addition, other banks consider the rejection of the loan proposal a sign that the proposal really is too risky. As a result, for borrowers to find a willing lender becomes increasingly more difficult after each rejection (Clair *et al.*, 1993). If banks still find difficulties in selecting credit, even with regard to the best firms, the gap in the development of distinctive capabilities is relevant. Indeed, learning to identify best borrowers and developing good lending relationships can be a benefit for banks and for the economy too. *"There is empirical evidence that a long-term relationship with a bank increases the probability that a firm will run an innovative activity, particularly in terms of R&D"* (Mottura 2014).

Cost of increased legal exposure and lender liability lawsuits

Lender liability is a growing concern and it is an important risk exposure for banks. A big legal problem for banks is that uncertainty in the law makes it difficult to determine which actions can create liability. This raises the risk of extending loans, thus exacerbating problems in credit availability. A major area of concern for bankers is potential liability for environmental clean-up costs of property belongs to the banks' borrowers.

In USA, banks' environmental liability can emerge from a lot of different Federal Environmental Laws. Banking environmental litigation make owners or operators of contaminated properties responsible for environmental clean-up, and banks as a consequence. The size of bank's loan to the owner or operator of the contaminated property does not limit the bank's total exposure to claims. Requiring banks to pay for environmental liabilities has contributed to the credit crunch. Therefore, banks tend to avoid the extension of loans to businesses that utilize hazardous materials. Many of these businesses are small and local such as dry cleaners, gasoline stations and farms.

Banks can face legal liability also in providing many other banking services. With regard to their borrowers, banks can be sued if they exercise excessive control over borrowers

or if they wrongfully terminate credit. This decision has discouraged lending in at least two ways. First, lending is now riskier because banks are more limited in the actions they can take to enhance the probability of repayment and protection of their collateral. Second, the cost of defending against such suits and the possible damages that must be paid, must be taken into consideration in the bank's pricing. As a result, the amount of credit a bank is willing to supply at any given price is reduced (Clair et al., 1993).

Credit Supply during a sovereign debt crisis

The euro area sovereign debt crisis that erupted in 2010 has had a major impact on financing conditions for firms in the affected countries. The rise of country risk on financial intermediaries' balance sheets have had a negative impact on their funding costs and on their capacity to grant credit. Sources of funding become more scarce and costly, as sovereign bonds yield augment and sovereign ratings deteriorate. Moreover, bank profitability may be reduced, in particular if sovereign bonds are held in banks' trading books which are marked-to-market. Credit crunch may occur at a time in which governments may tighten fiscal policy to fight against the sovereign tensions (OECD, 2014).

Bofondi *et al.* (2013) are well known for their research regarding the effect of the increase in Italian sovereign debt risk on credit supply. They used a sample of 670,000 banks from December 2010 to December 2011. They analysed the lower impact of sovereign risk on foreign banks operating in Italy than on domestic banks. They found out that Italian banks tightened credit supply: the lending of Italian banks grew by about 3 percentage points less than that of foreign banks, and their interest rates were 15-20 basis points higher, after the beginning of the sovereign debt crisis. Moreover, they discovered that corporations in Italy were not willing or able to compensate for the curtailment of credit from Italian banks by borrowing more from foreign banks, so that the sovereign crisis led to a significant aggregate effect on credit supply (Bonfondi *et al.*, 2013).

2.2.3 Consequences of Credit Crunch

Macroeconomic impact of bank credit supply shocks

Bernanke and Blinder (1988) explains how fluctuations in the cost of bank credit can affect the economy. Starting from the traditional IS/LM approach, the first assumption is

that bank loans and bonds are not perfect substitutes. The supply side (IS) is affected by the price of bank loans relative to other sources of credit. An increase in the relative cost of bank credit has the effect of an inward shift of the IS schedule: it reduces loans and raises interest rates on loans.

However, as O'Brien et al (1988) affirm, it is important to understand to which extent bank debt is substitutable with alternative sources of credit. If a firm can easily access external capital markets or switch from one source of private capital to another, then its performance should be insensitive to the shocks experienced by its capital providers. But, adverse selection and moral hazard frictions in the market can limit even a profitable and growing firm's ability to raise external capital or to substitute between private sources of capital (Chava *et al.*, 2008).

Moreover, bank credit has some properties that make it advantageous to borrowers. The borrower has to face not only higher credit costs when the bank loans become more expensive, but also lose the benefits of bank relationships. Re-establishing a relationship with a new lender means losing the reputation the borrower had built with the old bank (Bernanke *et al.*, 1988).

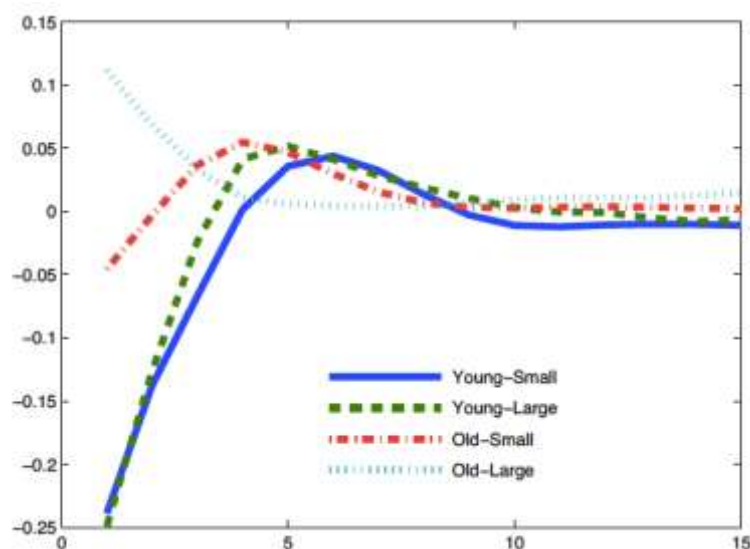
Furthermore, this framework shows that the leftward IS shift can be offset by an easier monetary policy. Indeed, lower interest rates not necessarily act by stimulating bank lending, but they could promote more spending in the sectors of the economy with access to non-bank sources of credit and so reproducing the monetary authorities' desire. A portion of this reduction in interest rates might need to be reversed later, as the economy recovers. However, one obstacle to such a policy would be proper calibration, avoiding inflationary pressures and imprudent lending (O'Brien *et al.*, 1992).

Implications in the labour market

The reduction in credit supply contributes to the decline in labour units and it has a negative impact on labour productivity.

Indeed, financial crises are associated not only to severe economic contractions, but also to lasting deteriorations in labour market conditions. The experiences of the Great Depression and the Financial crisis of 2008 are few dramatic examples of this (Barone et al., 2016).

Figure 12 Credit Crunch for four age-size firms



Source: Barone et al., 2016

The figure below shows the dynamics of net employment growth rates during the Credit Crunch for four age-size firms. Young firms, both small and large, have higher rates of return on capital, but are more likely to be financially constrained. As a consequence, they experienced the sharpest decrease in net employment growth rates during Credit Crunch (Buera et al., 2015), and this is also confirmed by Barone et al (2016).

Indeed, when corporations become more financially tightened, they decrease their labour and capital demand, and the surplus production factors are reallocated to unconstrained producers via the general equilibrium effect of lower factor prices. However, labour market frictions interfere with the labour reallocation. It takes time for the economy to absorb idled and unemployed workers and, as a result, unemployment rates rise and remain high for a prolonged period. Together with a contraction in investment, these effects push the economy into a recession.

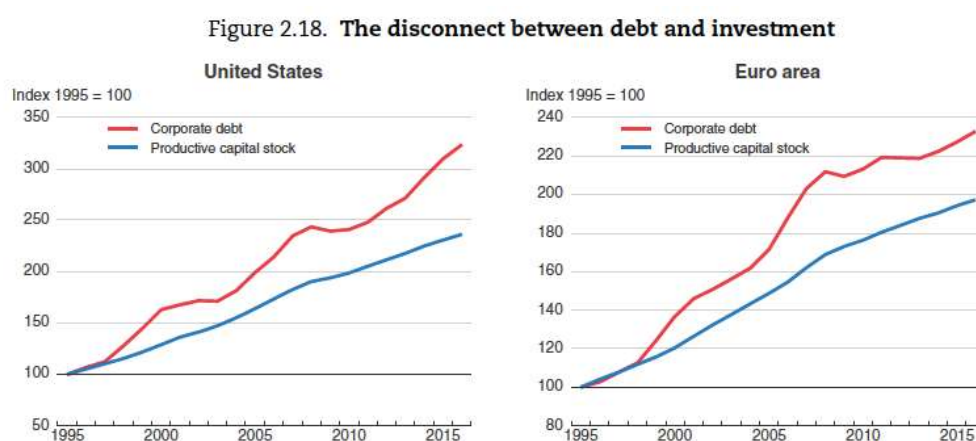
Furthermore, entrepreneurial productivity is higher for large firms than for small firms and, since it is conditional on size, it does not depend on the firms' age. However, age is relevant for wealth: an old business implies that the managing entrepreneur has had enough time to accumulate wealth and collaterals to overcome potential credit and collateral constraints (Buera *et al.*, 2015). Finally, net employment growth rates and productivity of small young firms seem to decline by substantially more than those of large old firms during downturns (Barone et al., 2016).

Credit Crunch and level of investment

Indebtedness of non-financial corporations and households is high in many advanced and emerging market economies. In most of the countries, debt is continuing to rise, undermining the sustainability of their growth in the medium term. This rapid growth of corporate debt has risen questions about *what the funds are used for*. If borrowing is well used, higher indebtedness contributes to economic growth by raising productive capacity or increasing productivity.

However, rather than financing attractive investment opportunities, firms often use debt to return funds to shareholders. Especially during downturns, corporations actively reduce investments in order to finance share repurchases and dividend payments. This rise in share buybacks and corporate debt reflect pessimism about future demand and economic growth.

Figure 13 *Disconnection between debt and investment*



Note: Non-financial corporate debt and productive capital stocks are nominal series.
Source: OECD calculations.

Source: OECD, 2017

While finance is necessary to sustain productivity and corporate investment, too much debt relative to investment can also undermine the allocative efficiency of productive capital. High levels of debt, even when the business does not result in default, can be an obstacle to the firms' ability to undertake new borrowing to finance productive investments. Over indebted firms tend to lose competitiveness, failing to keep up with the required investments to remain competitive. As a result, firms with persistently high level of indebtedness and low profits can become chronically unable to grow and to invest and they are called "zombie" firms (OECD, 2017).

2.2.4 Implications of Credit Crunch for SMEs

In the case capital shortage has reduced bank lending below its desirable economic level, two potential concerns for public policy can be risen. First of all, if bank lending is cut back, borrowers with a high level of dependence from financial resources, such as small and medium businesses, may find more costly and difficult to obtain credit to survive and continue to operate. Secondly, this burden on bank-dependent borrowers could also be seen as inefficient for the economy in the long run, since small businesses could lose workers, delay investment plans, reducing output in both the short and the long run (Bernanke *et al.*, 1991).

The Financial Structure of Italian Firms

The analysis of the financial structure of Italian firms shows that historically, compared with other European countries, they are characterised by a peculiar fragility due to their smaller size, lower capitalisation and higher leverage. This occurs because there are relatively few non-financial listed companies and their market value is less than half that of firms in countries such as Germany, France and Spain. In addition, the development of the bond market is quite weak in Italy, since bonds cover less than 10 % of corporate financial debt (Malavasi, 2016).

As a consequence, Italian SMEs are more likely to experience higher operating risks. Moreover, they are likely to face asymmetric information problems and to have difficulties regarding the access to alternative sources of funds (Chava *et al.*, 2008). Such a gap in the funding structure of firms is explained by both operative conditions (low business size, higher presence of family businesses, sectorial specialisation) and institutional factors (different fiscal treatment concerning interest expenses, lower stock market development, higher protection provided to creditors).

During the crisis the problems have been intensified: the competitiveness among firms worsens and the income profitability shrinks, becoming negative for a higher number of Italian SMEs. Furthermore, investments decrease and the organizational capability to allocate funds to R&D is further reduced. From the bank perspective, selection in the credit allocation process intensifies and loan losses in bank portfolios increase (Malavasi, 2016). This impact is concentrated among small and medium firms operating in the manufacturing and service sectors and located in the Centre-North provinces that depend

more heavily on external finance. This finding reflects the lower dependence on external finance of the Italian southern economy (Barone *et al.*, 2016).

Current financing difficulties for SMEs

Small and medium sized firms (SMEs) play an important role in the economy as they generate income and employment, and they drive innovation and growth. SMEs employ more than half of the private sector labour force in OECD economies (OECD, 2014). Small businesses tend to borrow from banks in their local town or city, which present less hierarchical lending procedures, a greater focus on building long-term relationships with clients and more confidence in local courts (ERBD, 2016).

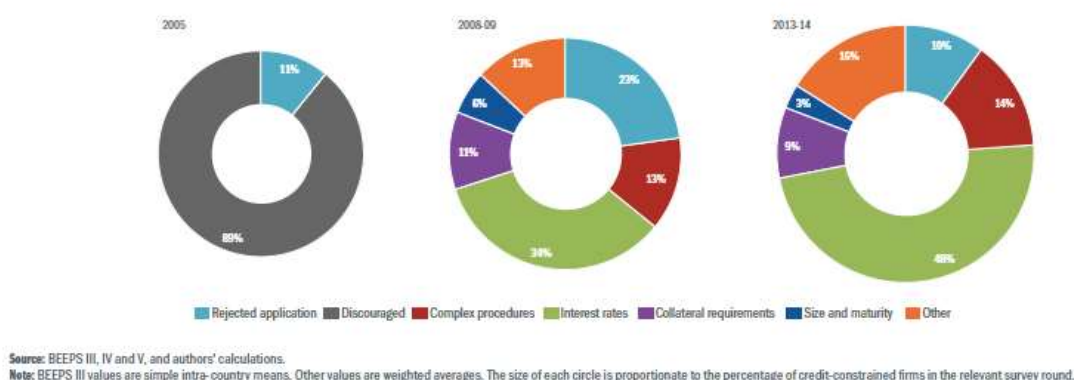
However, the Financial Crisis has had a negative impact on bank lending and, as a consequence, on SMEs. Wolken (2012) has examined the effects of restrictions in credit availability on non-publicly traded small enterprises in the USA over the period going from 2004 to 2008. According to these research, credit-constrained firms were significantly more likely to go out of business than non-constrained firms.

Moreover, Chava and Purnanandam (2011) have found that firms that can only accede capital through banks – which tends to be the case to smaller firms – are most vulnerable to banking crises compared to companies with alternative sources of capital. Therefore, when bank lending is reduced, SMEs become more vulnerable and their credit sources tend to dry up more rapidly than in large companies during economic downturns. Hence, it is important to help SMEs to have access to new types of funding to limit the impairment of loans in the future. SMEs should learn to exploit the recent increased number of alternative funds compared with traditional banking, and the evolution of intermediary models oriented to separately manage the liquid liabilities of banks, together with the securitisation of long-term loans (Malavasi, 2016).

In Europe, despite of government policy support to overcome financing constraints faced by SMEs, the problem of obtaining bank loans is aggravated for some of the weaker economies. One quarter of euro area SMEs faced some sort of financing obstacle when applying for a bank loan during the period from 2009 to March 2013. SMEs from France, Italy, Greece and Ireland are still facing a financing gap above the euro area average.

Figure 14 Reasons why SMEs are credit-constrained

CHART 2.5. Reasons why SMEs are credit-constrained



Source: EBRD, 2016

Both before and after the financial crisis of 2008 around ten per cent of all-credit constrained firms have been rejected by a bank. Some SMEs have been discouraged in applying for a loan and some others have received only a part of the credit requested. During crises, only a limited number of SMEs turned down a loan owing to high borrowing costs (Wehinger, 2014).

However, being small does not necessarily put a firm at a financing disadvantage. Ferrando and Griesshaber (2013), analysing survey data from SAFE with a sample of around 5,000 corporations from euro area countries, do not find firm size to be a significant financing obstacle. Their results show that only age and ownership are robust explanatory variables for firms' facing financing obstacles, while mixed results are found for size and economic branches (OECD, 2014).

2.2.5 Firm Resilience in a Time of High Debt

The current high levels of indebtedness weaken corporations' ability to withstand demand fluctuations and increase their vulnerability to shocks. Indeed, financial tightening can compromise firms' ability to service debt when it is not accompanied by a corresponding increase in earnings.

Finance and debt can support activity and innovation, but they can also undermine firms' growth, financial stability and solvency in the longer term. Highly indebted corporations present a high sensitivity to monetary policy tightening, since high debt enhances the sensitivity to any increase of the interest rate. These vulnerabilities require an integrated

response to enhance *resilience* in the advent of adverse shocks and minimise the risk of low growth. First of all, an enhanced use and co-ordination of prudential policies could be useful to prevent unsustainable credit dynamics. In effect, recent accommodative monetary policies in advanced economies have created very favourable conditions for borrowers and incited investors to take more risk, leading to the current high level of debt (OECD, 2017). Limits on debt-to-income and loan-to-value ratios and limits on credit growth and foreign currency lending can be effective in reducing leverage during boom periods. In corporations, it is a prudent decision to identify high indebtedness and make changes in the composition of financial portfolios, particularly at a time of likely rising interest rates. It is important for the firms which are highly dependent from bank debt to find alternative forms of credit substitutable to bank loans. This can help them not to fall in bankruptcy in case of supply-side restrictions due to their low creditworthiness and high risk. Strengthening equity funding would help reduce corporate leverage, insolvency risks and increase resilience (Mottura, 2014).

2.2.6 Solutions to Credit Crunch

Credit availability is dependent on financial markets as well as banks. Regulation should be designed to protect their viability and the market should offer diversified sources of credit availability to increase financial stability. Besides, regulators should try to identify and correct system-wide flaws in making credit available.

To some extent, financial crisis may be inevitable given the presence of human limitations. Therefore, financial regulation should be designed not only to try to prevent crisis from occurring, but also to *work ex post* to stabilize the financial system after a shock or a crisis (Schwarcz, 2017).

Public interventions

First of all, government central banks have often used liquidity, such as emerging loans, to help prevent banks from default in their countries. For instance, the European Central Bank has helped to recapitalize European banks exposed to sovereign-debt risk. In USA, as a response to post-Lehman Brothers collapse of the commercial paper market, the US Federal Reserve has created the Commercial Paper Funding Facility to purchase commercial paper from highly rated issuers, with the goal to address temporary liquidity distortions (Schwarcz, 2017).

Besides introducing specific emergency programs, governments have maintained or expanded the assistance programmes that they had introduced in late-2008 or early-2009. In many countries, Credit Guarantee Schemes (CGSs) represent a key policy tool to address the SMEs financing gap while limiting the burden on public finances. There is also an important contribution to be made by public financial institutions (PFIs) in fostering SMEs' access to finance. PFIs have been playing an important role after the crisis, addressing short-term financing gaps and mitigating cyclical fluctuations in lending activities of financial institutions, especially to SMEs (Wehinger, 2014)

Diversification of credit sources

Secondly, the diversification of sources of credit availability could increase financial stability.

Firms already in the market, relying highly upon bank lending, need to stop this excessive dependency encouraging recapitalisation and the development of *alternative medium and long-term non-banking sources of funding*. In Italy, the number of Venture capital investors is still low, and the private equity market still appears underdeveloped. The Italian focus should be not only on promoting a general recovery of the economy, reinforcing lending supply, but also on strengthening the bank divisions of certain intermediaries. However, financial intermediaries need an increase in equity to address these changes. New competences and organisational set ups are also required.

As underlined by the Bank of Italy in 2013, this could produce positive effects on the investment capabilities, on the growth and on the innovative activities, enabling the financial system to more efficiently face possible credit crunch periods. Savings from households should be employed—through adequate institutional investors—to fund businesses. This is strongly needed to guarantee the stability of the banking system and the growth and innovation perspectives of the real economy (Malavasi *et al.*, 2016).

Bond issuance

Recently, external financing has switched from bank to bond finance and declining credit quality for new bond issuance. International bond markets have expanded and the share of foreign currency in total bond issuance has increased. The deepening of bond markets can be beneficial for corporations, since they increase funding diversification and lengthening debt maturity, but they also cause a decrease in credit quality. As a

consequence, debt markets are more fragile and bond holders are exposed to significant risks. So, risks have migrated from the banking system to other financial institutions and credit intermediaries.

The broad expansion in debt security markets after the global financial crisis reflects the combination of two factors: a steady retrenchment in bank lending and historically low interest rates. Banks weakened by trading losses and credit provisions during the crisis, as well as affected by stricter prudential regulation and higher capital requirements, decreased their lending, especially to risky borrowers. In contrast, demand for corporate debt securities expanded in a low interest rate environment, offering alternative financing opportunities (OECD, 2017).

Revitalising securitisation is among the most important elements in the effort to strengthen non-bank finance, and it can be tailored to fit the needs of SME finance in particular. As securitisation has been tarnished during the crisis, “new” securitisation needs to be made safer, simpler and more transparent, perhaps also by offering some (initial) government and regulatory support. For mid-sized companies, bonds and private placements may also provide useful alternatives (OECD 2014).

Flexible Borrowing Capacity

There are some firms that primarily rely on banks for capital and which suffered larger valuation losses as compared to firms that had access to the public-debt market. Bank-dependent firms lose 3.94% more of their equity value than their rated counterparts during the crisis period (Chava *et al.*, 2008).

Chava *et al.* (2008) investigated if other sources of funds or financial flexibility mitigate the negative effect of bank dependence during the time of crisis. They found out that bank-dependent firms can weaken their dependence on banks by maintaining higher financial flexibility through free borrowing capacity. The proxy of a firm’s free borrowing capacity can be the extent of unpledged tangible assets available at the time of crisis. These firms can be the first to obtain funding from banks at the time of crisis by offering their collateral. At the same time, these firms also have the potential to offer collateral to non-banking financial institutions or to other private lenders in the event of refusal of credit by their own banks (Chava *et al.*, 2008).

Capital Markets Union

The European commission's proposed a Capital Markets Union (CMU), to reform the European Financial System building an Integrated European Capital Market by 2019. This market is expected to increase business financing and to diversify it beyond bank lending (80% of European corporate debt financing). CMU is focused on securitization as one of the central sources of diversified financing. A sponsor will originate a pool of loans or rights to payment and sell them for cash to a special purpose entity (SPE), which will issue securities to investors. However, this form of credit must not be abused, as it happened during the financial crisis of 2007-08 (Schwarcz, 2017).

Following Mottura (2014), securitisation of those loans related to investments in firms' fixed assets can be a good "market solution" for better availability of credit in Italy. *"If the bank provides a good consulting service to borrowers, the loan will be of a better quality, will be transferred at better conditions and will constitute good quality material for securitisation"*. However, for a good functioning of this model, the banks should select and extract the best projects to finance from the real economy. To this end, banks need analysts and administrators for the analysis and evaluation of firms' needs in a changing environment (Mottura 2014).

Overreliance on Credit Ratings

Finally, regulators should try to identify and correct system-wide flaws to make credit available. One system-wide flow is represented by the overreliance on credit ratings. A credit rating is a formal assessment of a borrower's ability to pay its debts. The higher the ratings, the more likely the borrower is to pay its liabilities. This helps to cover the information gap between borrowers and lenders and it has a sort of "certification" function by allowing investors to compare the creditworthiness of debt securities with different risk characteristics. However, regulators should require "periodic self-awareness and reporting" to highlight the limitations of credit ratings, in particular of novel financial products, and their potential for failure. This approach should help reduce the blind faith that caused overreliance on credit ratings and that brought to financial crisis of 2008, encouraging investors to make use of performing independent credit examinations.

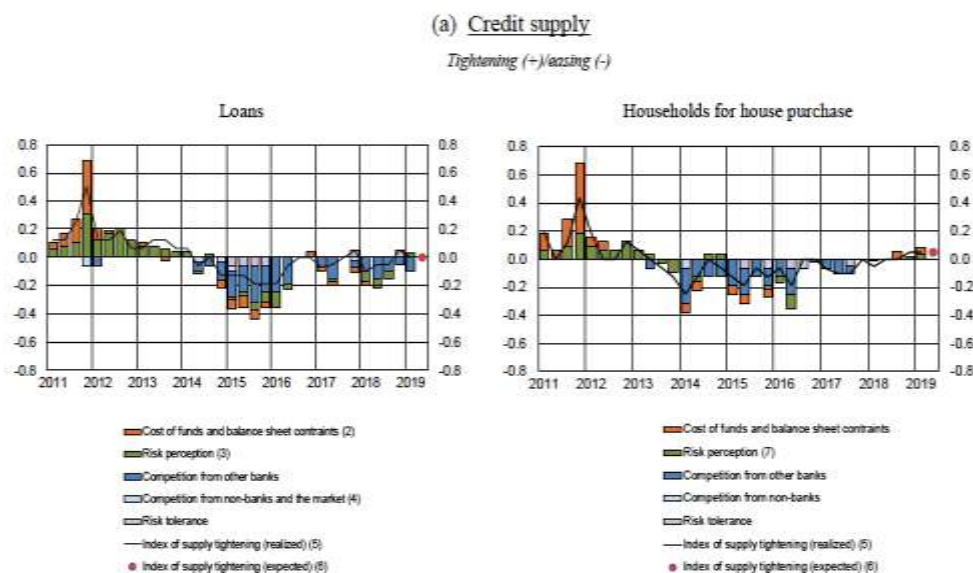
Another type of system-wide flaw is represented by our inherent human limitations. People tend often to simplify the perception of reality as a psychological coping

mechanism, defining future events by the recent past. Prior the Great Depression and financial crisis, banks expected the stock market in the latter and the housing prices in the former to continue rising, as it had for decades. However, their decline caused many defaults and destroyed credit availability (Schwarcz, 2017).

2.3 Bank Lending Survey: questionnaire and results of 2019

The *Eurosystem* has conducted the Bank Lending Survey for the euro area since January 2003. Lending surveys were first born in United States in 1960 under the name of “Senior Loan Officer Opinion Survey”, while they have a shorter history in European countries (Kurul, 2013). The main objective is to improve the Euro area’s knowledge of the factors influencing the supply of credit and the conditions and terms for customers on the one hand, and the developments in the credit demand and market on the other hand (Bank of Italy, 2019). Given the unique source of just-in-time information that it provides, its results are regularly used as an input into the decision making process concerning monetary policy.

Figure 15 BLS trends in Credit Supply



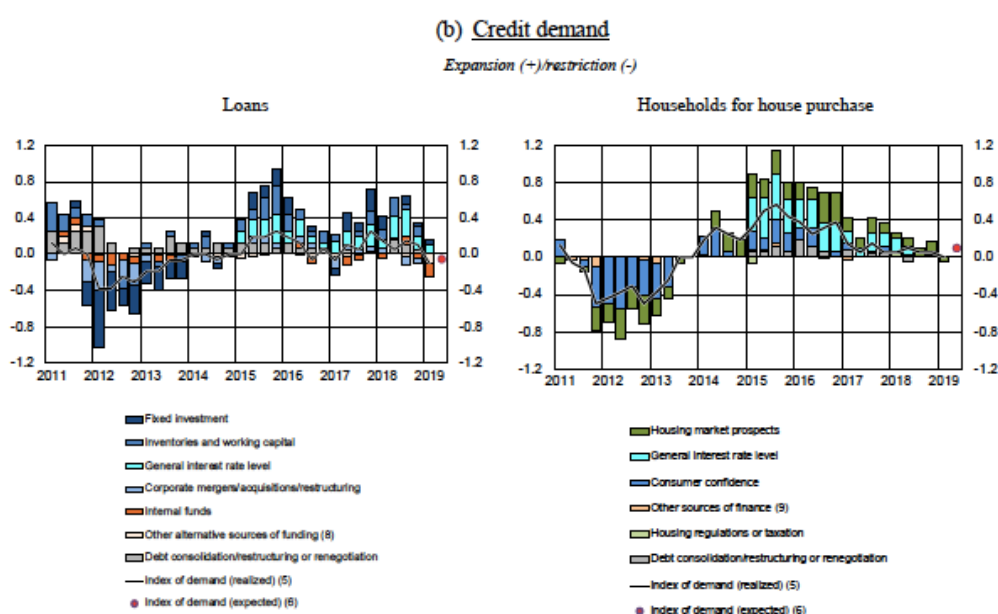
Source: BLS,2019

Moreover, the qualitative nature of the questionnaire is an important complement to Money and Banking statistics on loan growth, interest rates and loan volumes (Kennedy, 2011). The survey is addressed to senior loan officers, e.g. chairmen of credit committees

at or just below Board level, responsible for credit policies of the banks of the Euro-system.

This questionnaire is conducted four times a year. The sample group of banks participating in the survey comprises over 150 banks from all euro-area countries. For Italy the sample includes 10 banking groups, accounting for more than two-thirds of the Italian lending market. The questionnaire asks the respondents to assess the behaviour of banks on issues such as credit standards for approving loans and credit terms and conditions. It also asks for an assessment of the conditions affecting credit demand. The questionnaire consists of 22 questions regarding loans to enterprises and households: the first section refers to loans granted to firms, and the second to the credit to households (for house purchase, consumer credit and other lending). Senior loan officers are asked to express their opinions on both developments in the last quarter and expectations for the next quarter. At the end of the survey, there is an open question to capture credit market developments that may not have been covered by the other questions (Bank of Italy, 2019). The main results for Italian Banks in 2019 have been that credit standards for new loans to firms were unchanged in the first quarter of the year, loans to households for house purchase, instead, were tightened slightly. For the current second quarter, banks expect the same trend.

Figure 16 BLS Trends in Credit Demand



Source: BLS, 2019

In the early months of 2019 the expansion of credit demand stopped for both firms and households. For companies, the expansionary contribution of fixed investment and of low interest rates was counterbalanced by better recourse to alternative sources of funding. In the next quarter, households' demand is expected to strengthen, while firms' demand for loans is expected to decrease (ECB, 2019).

2.3.1 Analysing Bank's Opinions through BLS

The Bank Lending Survey can be seen as a financial index that reflects the bank's perception about the economy and the credit market. Banks report on a quarterly basis whether loan standards or loan demand changed in the previous quarter.

From this standpoint, it is interesting trying to understand whether the banks' opinions in predicting the future behaviour of the loan supply or the loan demand are close to the reality (Kurul, 2013). As reported by Kurul's (2013) statistical analyses, banks tend to expect tighter lending standards, while they are more neutral in evaluating the loan demand. According to the loan demand, some banks report decreasing loan demand but most of them expect it will increase in the future, except for housing loans. Comparing different types of loans, for most of the European countries, the expected standards concerning loans to enterprises seem to be always systematically tighter than those for loans to individuals. In any case, banks report cautious answers about the current lending policies. In addition, they exhibit an asymmetrical behaviour for price (margins and loans) and non-price conditions (size of the loan, collateral requirements, non-interest rate charges) applied by banks in approving loans. Banks apply stricter terms during periods perceived as tightening, whereas they opt to loosen their conditions to a lesser extent during easing periods.

These surveys, in some aspects, provide directional change forecasts, or in other words, they signal for a change in loan supply or loan demand. Banks report an accuracy of the loan supply direction very high, that ranges from 60.0 to 66.2 percent. However, the predictions on the loan demand may be considered as less accurate: some are not significantly greater than 50 percent. Moreover, forecasters' ability differs across periods of recession and progress.

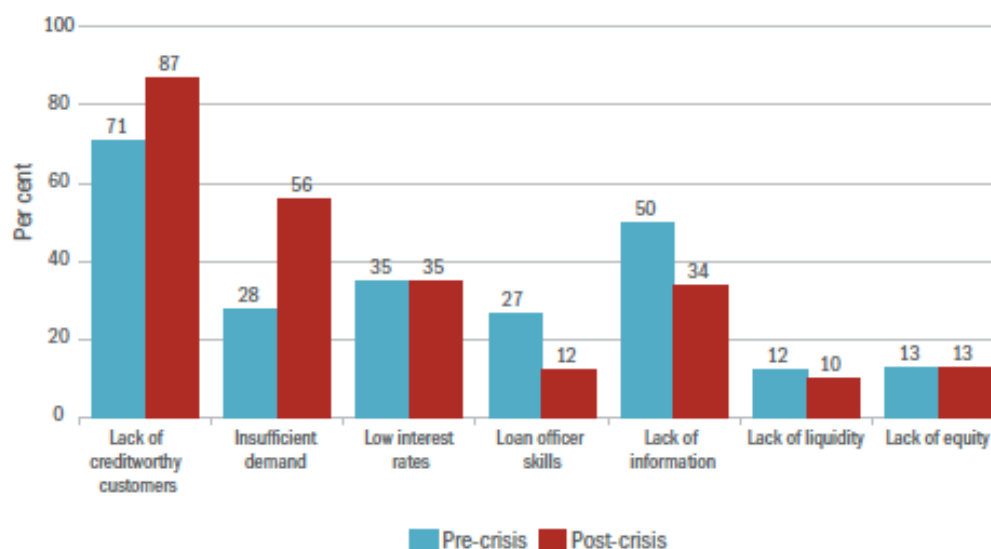
In conclusion, lending surveys can be useful in assessing the change in loan supply and loan demand for policy makers, keeping into account that banks are more successful in forecasting the change in loan supply (Kurul, 2013).

2.3.2 Factors affecting Loan Supply

In the Survey Scheme, the factors affecting loan standards are categorized in three groups: the ability of the banks to lend, the competition effect and the risk perception.

It is seen that factors related to the risk perception are the main reasons for tighter standards. Then, expectations regarding general economic activity appear to have the greatest impact on the loan supply, whereas the creditworthiness of consumers seems to be the major reason for the unwillingness of banks to make a loans. Bank-specific factors (cost of funds and balance sheet constraints) are in the second place; their effect is more pressing for the loan supply to enterprises compared to the loan supply of housing and consumer loans. On the other hand, the overall effect of competition for easier standards for loans to enterprises is on a par with the impact of competition on housing loans. The cost of funds and balance sheet constraints show an asymmetric pattern: these factors are relatively more important when loan standards are tightened and are less important when they are eased. Bank competition seems to be the one and only force for banks to loosen their lending standards; but its magnitude can be considered to be relatively weaker compared to the effects behind loan tightening (Kurul, 2013).

Figure 17 Main Constraints on Bank's ability to increase lending to SMEs



Source: EBRD, 2016

According to EBRD'S second banking environment and performance survey (2016), very few banks indicated that their own liquidity or solvency position was the most relevant factor in their ability to lend. In fact, balance sheet constraints have even become somewhat less important in the wake of the crisis. The 87% of interviewed bank CEOs indicated that a lack of creditworthy customers was the key constraint of their lending. Accordingly, banks have increased the percentage of assets that are held in the form of government bonds, at the expense of loans to the private sector (EBRD, 2016).

2.3.3 Factors affecting Loan Demand

Debt restructuring is the most important factor for enterprises that induce an increase in loan demand. Financing needs related to fixed investment negatively affects the loan demand to a certain extent, while financing needs related to inventories and working capital contribute to the rise in demand, but the effect is not very significant either. In addition, the influence of the use of alternative finance on the loan demand is very limited. Regarding loans to individuals, it is observed that a weak consumer confidence decreases the demand for loans. On the contrary, an increase in spending in durable goods seem to increase consumer demand for loans. For what regards housing loans, instead, deterioration in housing market prospects lower the demand for housing loans, while

improvements in housing market prospects have a lesser influence on increasing the demand (Kurul, 2013).

2.3.4 BLS as leading indicator for Loan Growth and GDP Growth

The responses of the bank lending survey, especially the ones related to loans and enterprises, are a significant leading indicator for euro area bank credit increase and real GDP growth. The BLS outcomes, for instance, lead Monetary Financial Institution loan growth by four quarters for enterprises and by one quarter for households. Therefore, loan growth is not only affected by changes in loan demand in the short term, but also by bank loan supply behaviour in the medium term, as reflected by the bank margins on loans, the size and maturity of the loan, the collateral requirements, the price and non-price and terms of loans (De Bondt, 2010).

There is also a statistically significant relationship between the predictive content of the BLS responses for real GDP and for some of its components: residential and non-residential investment as well as private consumption. Several implications emerge from the recent financial and economic crisis on credit and real GDP growth in the euro area. The BLS responses suggest ultimately 1.3 percentage points lower quarterly bank loan growth to non-financial corporations due to the net tightening in credit standards and on top of conventional demand and interest rate impacts. In addition, the BLS responses and the estimated panel regression coefficients suggest an adverse ultimate impact of the crisis on quarterly euro area real GDP growth of between 0.8 and 1.0 percentage points. The BLS measure (net tightening of credit standards to enterprises or the margins on average or riskier corporate loans) is the only financial variable which has a consistent marginal predictive content for real GDP growth one year ahead. The premium-adjusted term spreads and stock market volatility also significantly helps in predicting real GDP growth. This implies that not only changes in the official interest rate and in loan demand matter for credit and output, but also bank loan supply factors, the balance sheet position of borrowers and the risk perception in the economy are important (De Bondt *et al.*, 2010).

2.3.5 BLS and Financial Crisis

The sharp decline in the growth rate of private sector credit since 2007 coupled with less favourable economic prospects highlights the importance of timely data on credit market

conditions. The Euro Area Bank Lending Survey (BLS) contains valuable information in understanding credit market conditions regarding loans to enterprises as well as to households (Kennedy, 2011).

Focusing on the financial and economic slowdown of 2008-2010, the BLS responses provided an early and reliable signal about the deterioration of financing conditions and economic growth in the euro area. Financial Crisis had its origins in the financial sector, where a combination of excessive leverage increased the recourse to complex financial products, that ended up giving way to a sudden loss of market confidence and triggering a reduction in liquidity and a re-pricing of risk (Kennedy, 2011).

One of the most visible signs had been the strong net tightening of credit standards and the increases in margins on average and riskier loans to enterprises during the crisis. In fact, the growth rate of credit aggregates which dropped from 13.5 per cent and 8 per cent in the case of loans to enterprises and households during the second quarter of 2007 to -2 per cent and 2 per cent respectively in the final quarter of 2010 (De Bondt et al., 2010).

2.3.6 Using the Bank Lending Survey to understand the disruption to Financial Markets

The second half of 2007 showed a sudden disruption to financial markets throughout the euro area, and in the United States as well. This was characterized by the decrease in banks' willingness to lend and an increase in inter-bank lending rates. This disturbance was immediately registered in the responses to the October 2007 round of the BLS, where an unexpected tightening of credit standards on loans to enterprises and households was displayed. The tightening of credit was attributed to banks funding and liquidity constraints – showing how the financial market tensions had been transmitted into banks' lending policies (Kennedy, 2011).

Figure 18 Actual and Expected Changes in Credit Standards on Loans to Enterprises and Households 2007-08



Source: ECB, 2011

The reliance of euro area businesses on bank lending as a source of external financing was reflected by the sharp drop in loan growth to Non-Financial Corporations during 2008. Smaller businesses encountered greater challenges to have access to external sources of funding compared to larger enterprises, in particular they faced lower levels of available collaterals, higher information barriers, and limited bargaining power. However, from 2007 to 2009, since banks had closer relationships with larger enterprises and credit standards on loans were tightened, large enterprises suffered the new price and non-price terms and conditions more than SMEs, in terms of cost of funds and balance sheet constraints. One of the first signs of money market tensions and lower levels of liquidity was the acceleration in the proportion of banks reporting, in the bank lending survey and the need to fund draw-downs on commitments to asset backed commercial paper programmes during 2008. After that, the bankruptcy of Lehman Brothers on the 15th September 2008 and the deterioration in market access were reflected in a lower quantity of loans banks were willing to make available. During the first three quarters of 2009, the majority of euro area banks reported that government initiatives regarding recapitalisation support and state guarantees greatly facilitated access to wholesale funding markets. At the same time, the proportion of banks reporting a tightening of credit standards started to decelerate. In the case of loans to enterprises, the net percentage of banks reporting a tightening of credit standards decreased from 43 per cent to 3 per cent

between the first and final quarter of 2009. By the end of 2009, the responses to the BLS suggested that the pattern of credit standards tightening, which extended back to the third quarter of 2007, was coming to an end.

This slowdown in loan growth and less favourable economic prospects throughout the euro area from 2007 to 2010 has highlighted the importance and value of timely data on credit market conditions across loan size. As the amount of data associated with the BLS increases over the coming years, the opportunities to use the survey responses for empirical research such as testing for the different transmission channels of monetary policy is certain to improve (Kennedy, 2011).

2.4 Gross Domestic Product (GDP)

2.4.1 Concept of GDP

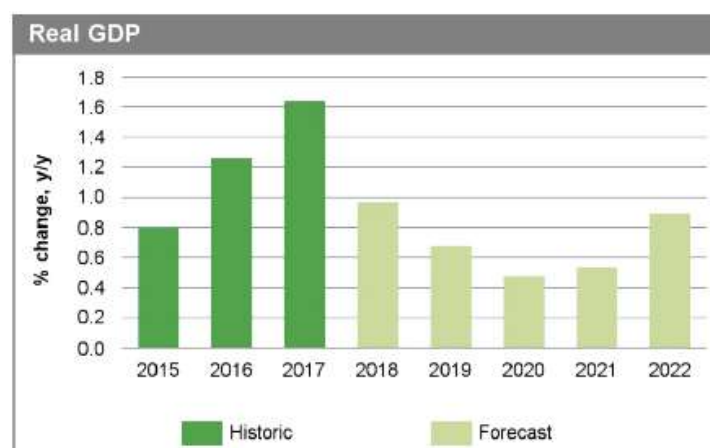
Gross Domestic Product is one of the most common indicators to track the health of a nation's economy. It represents the monetary value of all the finished goods and services produced over a specific time period within country's borders. This indicator is useful both for economists to determine if an economy is growing or it is experiencing a recession, and also for investors to make decisions about their investments: a healthy economy brings higher earnings and higher stock prices. GDP is usually calculated adding together personal and public consumption, public and private investment, government spending and exports fewer imports (Kramer, 2019).

The economy in Italy is the 3rd-largest national economy in the eurozone, the 8th-largest by nominal GDP in the world, and the 12th-largest by GDP (PPP). GDP by sector can be divided into:

- agriculture: 2.1% (2017 est.)
- industry: 23.9% (2017 est.)
- services: 73.9% (2017 est.) (ISTAT, 2018).

In Italy, according to IHS Markit and December 2018 forecasts, real GDP is expected to grow slowly at 0.7% in 2019 to an 0.9% in 2022.

Figure 19 Key Indicators and Forecasts in Italy



Source: IHS Markit, 2019

In effect, the Italian economy is broadly distressed and consumer spending growth is limited by political instability, financial market stress, a squeeze on real wage growth and still-difficult labour market conditions. Political turmoil and financial market stress for Italy represent a tangible risk also to households' discretionary spending (Ihs, 2018). The Italian financial market stress injects greater caution into households and firms. Residential households consumption expenditure is expected to grow only by 0.5 percent in 2019 (Zurli, 2019). A notable rise in personal savings rate is expected during most of 2019, with households ramping up their precautionary savings (IHS Markit, 2019).

Figure 20 Real GDP in Italy

Italy: Key indicators and forecasts								
	Historical	2016	2017	2018	2019	2020	2021	2022
	data edge							
Real GDP (percent change)	2017	1.3	1.6	1.0	0.7	0.5	0.5	0.9
Nominal GDP (billion USD)	2017	1,870	1,946	2,076	1,996	2,007	2,065	2,214
Nominal per-capita GDP (USD)	2016	31,464	32,785	35,020	33,700	33,944	34,981	37,558
Consumer price index (percent change)	2017	0.0	1.3	1.3	1.4	1.6	1.8	1.9
Exchange rate (year end, per USD)	2017	0.95	0.83	0.89	0.91	0.91	0.89	0.85

Source: HIS Markit, 2019

The Italian business environment is dominated by small family-owned firms, which are popular for their strategic trade location in the Mediterranean routes to Europe and they enjoy high skilled and educated workforce, together to a strong protection of intellectual properties. However, they are often characterized by slow growth, high debt, low

productivity and weak competitiveness. The fragile Italian banking sector, corruption and risk of political reversals add to these weaknesses, contributing to a declining rate of firms' investment and recruitment decisions. Firms are likely to delay or cancel some investment projects. The less the households spending, firms' investment and the consumer spending are, the less the GDP growth is.

Italy's largest problem remains its dismal public finances, with its public debt now estimated at 131% of GDP in 2017. Several items contribute to high levels of government spending, particularly the excessive cost related to the pension system. Future budgets will need to curtail more aggressively the large transfers to both local government and the health system, while reducing the high cost of the public sector employment (IHS, 2018). Specifically, in 2019, Italian GDP is expected to increase by 0.3 percent in real terms. The domestic demand will provide a contribution of only 0.3 percentage points while foreign demand and inventories will provide a null contribution.

In 2019, exports will grow by 1.7 percent and imports will increase by 1.8 percent. Investment are expected to decelerate (+0.3%).

Labour market conditions will stabilize over the forecasting period. Employment growth is expected to increase at 0,1 percent in 2019. At the same time, the rate of unemployment will slightly increase at 10.8 percent in the current year (Zurli, 2019).

Table 1 Forecast for the Italian Economy 2016-2019

(% change on previous year)				
	2016	2017	2018	2019
Gross Domestic Product	1.1	1.7	0.9	0.3
Imports of goods and services (fob)	3.6	5.5	2.3	1.8
Exports of goods and services (fob)	2.1	5.9	1.9	1.7
DOMESTIC DEMAND (INCLUDING INVENTORIES)	1.5	1.4	0.9	0.3
Residential households consumption expenditure	1.3	1.6	0.6	0.5
Government Consumption	0.1	0.3	0.2	-0.2
Gross fixed capital formation	3.5	4.3	3.4	0.3
CONTRIBUTION TO GDP				
Domestic demand (net of Inventories)	1.4	1.7	1.0	0.3
Foreign balance	-0.3	0.3	-0.1	0.0
Inventories	0.0	-0.4	0.0	0.0
Households consumption expenditure deflator	0.2	1.1	1.1	0.9
Gross domestic product deflator	1.2	0.5	0.8	0.8
Compensation of employees per full-time equivalent	0.6	0.3	1.7	0.9
Full time equivalent employment	1.3	0.9	0.8	0.1
Unemployment rate	11.7	11.2	10.6	10.8
Trade balance (level as % of GDP)	3.2	2.9	2.5	2.4

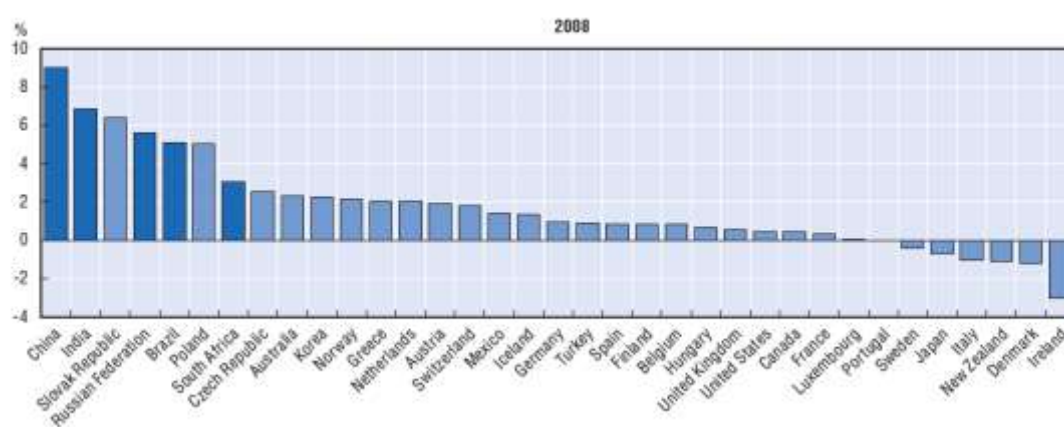
Source: Zurli, 2019

2.4.2 GDP and Financial Crisis

Each business cycle is characterized by recurrent expansions and contractions that are common to large parts of the economy. A significant decline in economic activity spreads across economy, lasting several months and normally it leaves its most visible sign on the variance of Real Gross Domestic Product (Drautzburg, 2018).

Therefore, GDP reflects the economic trends, as shown by the financial crisis of 2008. First of all, most OECD countries recorded positive economic growth and GDP growth in 2007. However, in 2008, overall economic growth was still positive during the first quarter but then it turned negative in several countries, as showed by Ireland, Denmark, New Zealand, Italy, Japan and Sweden due to the incoming recession (OECD, 2010). During the great recession the sharp reduction in GDP went hand in hand with a large decrease in credit extended to the economy. A pressing concern for policy makers has been to what extent credit supply depressed GDP growth or the latter led to a subdued credit growth (Barone *et al.*, 2016).

Figure 21 GDP by Country during Financial Crisis of 2008



Source: OECD, 2010

The international consequences of the financial crisis are particularly evident in 2009. Emerging countries continued to record strong economic growth in 2008, but growth was significantly lower than in 2007 since they also were affected by the crisis.

In the last quarter of 2009, the number of OECD countries recording positive GDP growth increased significantly, although the recovery remained limited (OECD, 2010).

Moreover, as Guzman (2013) sustained, there is a strong relationship between GDP growth expectations and Financial Crises. Expectations are central for borrowing and

lending decisions: perceptions of higher future income lead to a higher rate of borrowing and lending in the present. When realizations of income are significantly lower than previous expectations, there could be promises which cannot be consistent with the satisfaction of credit constraints. Therefore, sovereign default and banking crises are led by large-scale broken promises. The severity of banking and debt crises resulted negatively related to the volatility of GDP growth expectations: higher degree of confidence in its forecasts leads to higher borrowing and lending. Hence, when a financial crisis comes, the magnitude of the disruption of financial contracts is reflected by higher losses in the real output growth. However, a higher volatility of GDP expectations, makes governments' borrowing more costly, leading to more severe inflation and currency crises. Therefore, macroeconomic policies must monitor the excessive volatility of expectations and at the same time prevent excessive debt and leverage when there is expectations' stability (Guzman, 2013). Following the long and deep recession associated first to Great Depression and then to sovereign debt crisis in Italy, the real GDP gradually has returned positive, while the dynamics of loans to non-financial firms has remained weak. At the beginning of 2018, the stock of loans was severely below the level of end recession (Eramo et al., 2018). The decline in lending has been severe, especially for small companies, while development in value added have been similar across groups of firms. The monetary policy is really important, in the current Italian recovery the high degree of monetary accommodation has sustained GDP and economic activity, helping to strengthen companies' balance sheets and reducing their riskiness. It has also improved banks' funding conditions, even if loan supply and lending capacity are still a bit limited (Eramo et al., 2018).

2.4.3 GDP and employment relationship

The labour market recovery is crucial for the strength of confidence and consumption after a crisis. Before the crisis, between the first quarters of 1999 and 2008 respectively, euro area employment and GDP growth had moved closely. During that period, total European employment increased by around 18 million – 13 % - linked to an increase of output in real terms of around 23%, yielding a ratio of around 0.55. However, this relationship broke down during the Great Recession, with a subsequent weak job creation and persistent job losses (ECB, 2016).

Only in the late 2013, this underlying relationship between GDP and employment seemed to start reconnecting, but euro area employment remained slightly below the pre-crisis levels. The recovery had a high sectoral concentration in services like the trade and transport sector and the business and administrative services. The rebound in euro area employment was driven mainly by two large countries: Germany and Spain. These countries have accounted for around two-thirds of the increase employment after the recession. Italy and France have contributed much less to the employment expansion, accounting for just 13% of the expansion in employment since the first quarter of 2013. Structural changes, structural reforms and fiscal stimuli helped to boost employment creation over recovery, altering the reaction of growth in employment to output growth. So, product and labour market reforms will facilitate output and employment growth, improving the capacity of European firms to adjust and be more resilient to shocks (ECB, 2016).

2.4.4 GDP growth and firms' aggregate performance

There are not many studies on the literature seeking to identify the direct relationship between firm's aggregate performance and economic growth. The main assumptions are that cross-country differences in privately held firms' performance have been linked to divergences in economic performance at national level, for example, in terms of new job creation or in terms of growth in productivity per worker. At the same time, it is known that countries' output is primarily the result of the activity of corporations. As a consequence, it is a natural conjecture that privately owned companies' performance is a key component of countries' economic growth.

Ferreira and Costa (2011) have proposed a model which represent the countries' macroeconomic indicator of GDP and its key aggregated determinants: capital, labour, and finally firms' aggregate performance. With a sample constituted by 362 observations from 26 OECD countries for the period 1970-2008 and data aggregated on a country basis from World Bank and OECD databases. The issues are endorsed in an unbalanced panel data model estimated using Fixed Effects Weighted Least Squares method (WLS), where countries population is the weighting factor. This analysis tries to evaluate the firms' performance on the basis of its level of efficiency, market and financial competition, ownership and funding or budget constraints.

The factors underlying economic growth which have been identified are:

- capital increase (liquid investment) and labour
- human capital, referred to workers' acquisition of skills and know-how to training, other than main source of output
- innovation and R&D
- openness to trade
- foreign direct investment
- economic policies and macroeconomic conditions
- institutions

The final observations have been that “privately owned firms” have a significant positive impact in the GDP level (an increase in 1% induces an increase in GDP per capita of 0,27) and a positive (although statistically no-significant) impact on growth (Ferreira *et al.*, 2011)

2.5 Moderating or Mediating Factors?

After presenting these economic environment factors, their effect on Organizational Resilience can be investigated.

In the last forty years an extensive body of research that explores environmental influences on organizational strategies, processes, structures and outcomes has been collected (Goll *et al.*, 2016). Given the differences in the characteristics of the environment from industry to industry and firm to firm, it seems natural to suggest that the relationship between economic or organizational variables and firm performance may also vary from one environment to another. Most of the literature has empirically demonstrated the context dependence of the relationship between firm performance and a large range of factors, as outsourcing, corporate behaviour and decision process rationality. Therefore, authors found evidence of a moderating role played by environmental variables (Goll *et al.*, 2016).

Going back to our dissertation, the focus shifts towards the understanding of the role played by Gross Domestic Product, Credit Crunch and Bank Lending Surveys.

Do they play a *moderating* role, as sustained by most literature, or do they play a *mediating* role on Organizational Resilience?

Baron & Kenny (1986) highlighted the importance of not using the terms moderator and mediator interchangeably.

In general terms, a moderator is a qualitative (e.g., sex, race and class) or quantitative (e.g., level of reward) variable that alters the direction and/or strength of the relation between an independent variable or a dependent one (Baron et al., 1986).

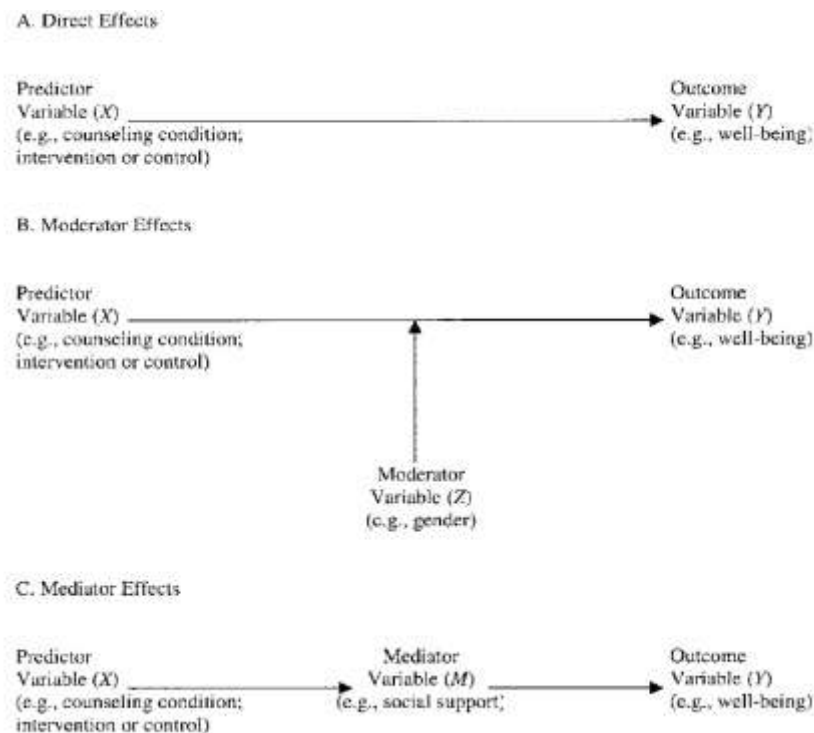
Questions involving moderators address *when* and for *whom* a variable most strongly predicts or causes an outcome variable (Frazier *et al.*, 2004).

Thus, a *moderator* effect is nothing more than an interaction whereby the effect of one variable depends on the level on another. Moderators are important because they indicate the maturity and the sophistication of a field of inquiry (Frazier *et al.*, 2004).

On the contrary, mediators establish how or why one factor predicts an outcome variable. Specifically, a mediator is defined as a variable that explains the relation between a predictor and an outcome. Therefore, a *mediator* is the mechanism through which a predictor influences an outcome (Baron et al., 1986).

A given variable may function as either a moderator or a mediator, depending on the theory being tested (Frazier *et al.*, 2004).

Figure 22 Moderator and Mediator Effects



Source: Frazier *et al.*, 2004

Both moderator and mediator factors involve three main variables:

- Dependent variable (endogenous)
- Independent variable (exogenous)
- Moderator (exogenous) or mediator (endogenous).

Kenny (2016) sustains that an effect could be mediated when the following conditions are met. First of all, the dependent variable must be predicted by the independent one. Then, the mediator needs to be, at least, predicted by the independent variable. Indeed, the relationship between the independent variable and the mediator should be collinear. Third, the dependent variable must be predicted by the mediating factor net of the independent variable. The main techniques to demonstrate these condition altogether are Sobel test, Boostrap test and Monte Carlo method [simulation] (Kenny, 2016).

The moderation model, instead, holds if the moderator variable is able to change the intensity of the effect between the predicted variable and the independent one. Moreover, the moderator is generally not caused by dependent variable (Little *et al.*, 2007).

In the regression, to test the changeover it is sufficient to insert a new variable calculated as the product between the moderator and independent variable (interaction term) and calculate the standard multiple regression (Goll *et al.*, 2016). Another way to measure the moderating effect is the simple slope analysis in SPSS.

Clearly, at this point of the research we do not possess the instruments to support any hypothesis economic environment factors are moderators or mediating. We will be able to answer to this question in the following chapter, through a statistical analysis.

2.6 Conclusions

In this chapter, some context factors have been identified and defined to understand whether they have a moderating or mediating effect on the firm performance after a shock. First, credit crunch, defined as the sudden reduction in the availability of credit, seems to represent a threat to SMEs, which often do not have access to alternative sources of funds. This tightening contributes to lower their performance and competitiveness, together with a negative impact also on the level of investments and in the labour markets and productivity.

On the other side, the Bank Lending Survey can be defined as a financial index that reflects the bank's perception about the economy and the credit market. It is useful to forecast trends in the economic activity and to anticipate potential financial crisis.

Finally, Gross Domestic Product tracks the health of nations and it is resulted to be strictly connected to privately owned firms' performance, which has significant positive impact on GDP level and growth.

In the next chapter, these variables will be analysed statistically to understand their role and effects on firm performance and organizational resilience. The study will be longitudinal and will cover many years from 2004 to 2017.

MEASURING ORGANIZATIONAL RESILIENCE IN *MADE IN ITALY* SMES

3.1 Introduction

In the previous two chapters, the concept of resilience was presented and it was addressed with a particular focus on organizations. Briefly summarizing, resilience can be defined as an organization's ability to resist to turbulences and return to its initial stage or an even more advantageous one.

Then, the most relevant frameworks to measure resilience have been proposed and, subsequently, a few context and environmental factors that could influence resilience assessment have been taken into consideration.

First, *Credit Crunch*, defined as the sudden reduction in the credit availability, seems to represent a threat to SMEs, which often become vulnerable and do not have access to alternative sources of funds during crises.

On the other side, *Bank Lending Survey* can be defined as a financial index that reflects the bank's perception about the economy and the credit market.

Finally, *Gross Domestic Product* tracks the health of nations and it is resulted to be strictly connected to firms' performance and growth.

In this chapter, the previously carried out studies will be combined to understand which drivers allow companies to survive and to have greater performance. Moreover, we will study whether organizations' context factors have a moderating effect on Organizational Resilience in the face of shocks. To this end we started from two hypotheses that suggested us to formulate as many research questions.

The first hypothesis is based on the fact that, in periods of difficulty, a balanced assets and financial position of a company allows to respond more efficiently to shocks. To

better understand the attributes related to the resilience's drivers, we can focus on the profitability of an organization and on its level of indebtedness.

A highly leveraged company will carry a great deal of risk and may increase its likelihood of default or bankruptcy during a crisis, thus not showing a high degree of resilience. Moreover, an organization which is good at using investments to generate earnings growth could have greater potential to be resilient and to return to its initial stage or an even more advantageous one after a shock. Taking into consideration what has been said, the first research question is:

Does firms' asset and financial position influence the companies' capacity of survival? Are company's level of indebtedness and profitability good predictors for resilience?

To understand how far Credit Crunch, Gross Domestic Product, or the Bank Lending Survey can influence an organization, it was also decided to consider the performance of the companies over the years. It is fair to think that a high level of gross domestic product, or a positive banks' perception of the economy leads to a better firm performance. At the same time, it seems legitimate to suppose that a tightening in the credit availability could hinder firms' resilience. Therefore, the second research question is:

Do context factors have a moderating effect on Organizational Resilience?

To answer to these questions, the resilience of a sample of 1554 companies must be analysed considering two periods of time: 2004-2009 and 2007-2012.

Each period includes a crisis that can help us to understand whether firms have shown resilience to survive.

First, we will take into account the financial crisis of 2008, which began in 2007 with a crisis in the subprime mortgage market in the United States, and was developed into a full-blown international banking crisis with the collapse of the investment bank Lehman Brothers on September 15, 2008.

After that, it is important to investigate the European Debt Crisis of 2011-12, when several Eurozone member states, included Italy, were unable to repay or refinance their government debt.

To study the organizational behavior of companies and their drivers of resilience during these two crises, we will need to develop two *multiple linear regression models* and a *time series for fixed effect model*.

In order to fully understand them, in Paragraph 3.2 the necessary information about the sample of companies and the variables used in this research will be provided.

In Paragraph 3.3 there will be an explanation about how the regression models are built and a brief discussion of the results.

More detailed explanations with the relative discussion will, instead, be given in the fourth chapter relative to the main findings and managerial implications.

3.2 Sample Development

The empirical analysis of this dissertation is built on a database which comprises 1554 companies.

This database was created as an extension of the one utilized for the book *Lepri che vincono la crisi. Storie di aziende (quasi medie) vincenti nei mercati globali* (Gubitta, Tognazzo and Favaron, 2013). The authors' goal was to understand what kind of business characteristics, measured in terms of growth (revenues) and performance (profitability), allowed some small and medium size companies to perform better than their competitors in the market in the following three-year period (2008-2010). The research was focused on companies that belonged to the manufacturing Made in Italy industry that on the eve of the financial crisis that broke out in September 2008, whose revenues, in 2007, fell within the 10 – 12,9 million Euros range.

According to the geographical location of the companies, the Italian territory was divided into four main areas: North-West, North-East, Center and South and Islands. The North-West includes Valle d'Aosta, Piemonte, Liguria and Lombardia; the North-East includes Trentino-Alto Adige, Veneto and Friuli-Venezia Giulia; Central Italy comprehends Emilia-Romagna, Tuscany, Marche, Umbria and Lazio; the macro-area South and Islands comprises Abruzzo, Apulia, Molise, Campania, Basilicata, Calabria, Sicily and Sardinia.

Data were retrieved from the database AIDA of Bureau van Dijk, which is widely used to get comprehensive commercial, financial and legal information on Italian companies.

Moreover, these companies were categorized as part of the manufacturing Made in Italy industry, which is divided in four parts: Fashion & Apparel, Food & Beverage, Furniture & Home Appliances, Automation & Mechanics. The choice fell on companies active in the Made in Italy industry, thanks to the important role the industry has been playing globally, which secured Italy success and competitiveness around the world. To isolate Made in Italy companies, the ATECO codification was utilized.

Being the database subject of this dissertation built on a previously created one, the same interpretation of medium-sized firms was taken into account, which considers the minimum limit of revenues to be comprehended in this category equal to 13 million Euros.

The analysis subject of this research is set as a longitudinal study that covers years from 2004 to 2017. For this reason, the most recent financial data were incorporated in the original database.

The database has been also transformed in a time series to carry out a successive analysis to measure fixed effects and to catch possible moderating effects on the dependent variable.

Table 3 Breakdown by geographical area

MACRO-AREA	ABSOLUTE VALUE
North-East	320
North-West	609
Cente	447
South-Islands	137
TOTAL SAMPLE	1513

Source: Author's elaboration

Table 4 Breakdown by macro-industry

MACRO-INDUSTRY	ABSOLUTE VALUE
Fashion&Apparel	329
Food&Beverage	194
Furniture&Home Appliances	200
Automation&Mechanics	790
TOTAL SAMPLE	1513

Source: Author's elaboration

Table 5 Breakdown by revenues stream

REVENUES STREAM	ABSOLUTE VALUE
Revenues over 13 mil.	453
Revenues between 10-12,99 mil.	209
Revenues between 5-9,99 mil.	326
Revenues under 5 mil.	129
Firms in liquidation, dissolved or merged	333
N.D.A	104
TOTAL SAMPLE	1554

Source: Author's elaboration

3.3 Time lags pre-crisis

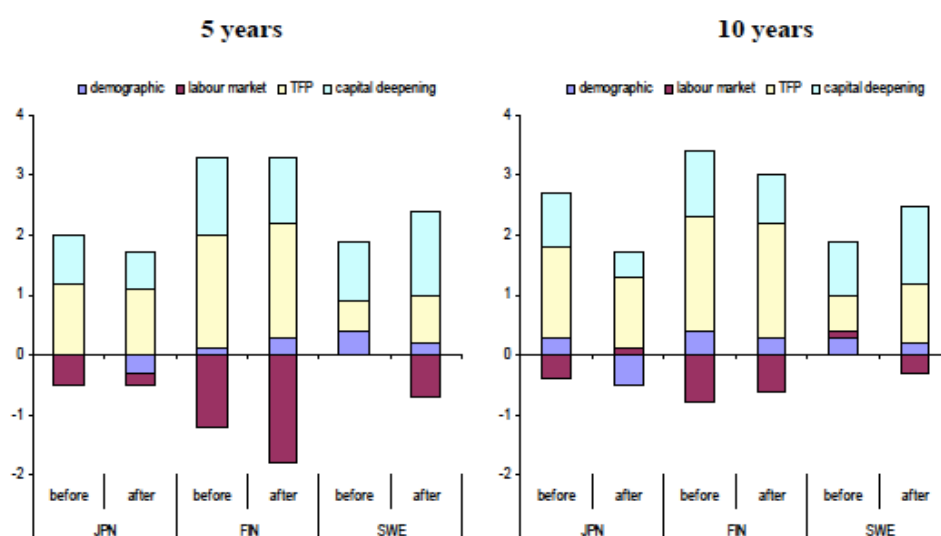
The Organizational Resilience analysis subject of this dissertation is set as a longitudinal study that covers years from 2004 to 2017.

In research, a common issue is to identify the period of time that must be taken into consideration before and after a recession or crisis, thus avoiding biases and being sure to catch the main effects of the events on the dependent variable studied.

According to the European Commission (2009), there are two main possibilities studying the structural and financial characteristics of firms and economies before the crisis and after their recovery:

- Medium-run period: 5 years.
- Long-run period: 10 years (Haugh *et al.*, 2009)

Figure 23 Potential output growth before and after financial crisis (Periods of 5 and 10 years before and after the start of recession (SWE and FIN 1991, Japan 1997))



Source: Haugh et al., 2009, European Commission calculations

In European Commission's analysis (2009), the main objective was to understand the effects of labour market components, demographic characteristics and capital on economies, like Finland, Japan and Sweden during the crisis.

From the macroeconomic perspective, the medium run is sufficient to make the economy return to the level of output determined by supply factors: the capital stock, the level of technology and the size of the labour force; while, in the long period, over a decade or so, these factors move sufficiently slowly that we can take them as given (Blanchard *et al.*, 2018).

Therefore, both these two periods of time are meaningful and appropriate in calculating output growth, even if the medium-run analysis is not as precise as a 10 years long analysis. However, to choose the most appropriate time lag pre-crisis to measure Organizational Resilience in this dissertation, another research presented by Lee, Chen and Ning (2017) can be useful.

In "Why did some firms perform better in the global financial crisis?" Lee *et al.*, (2017) analysed the Chinese macroeconomic environment and sustained that during the pre-crisis periods, the macroeconomic environment is stable. This also applies to Europe and to the rest of the world.

The authors explain how data and financial indicators taken from a stable period are reliable and unbiased when explaining the state before and during the crisis.

By analogy, as regards the Italian country, the financial market has been subject to uncertainty and volatility between the end of the 20th century and the beginning of the 21th century.

One of the first relevant crisis that has hit Italy, has been the Argentine Great Depression (1999-2002) that had a huge impact on almost half a million small savers who, enticed by high returns, had invested in Argentine bonds (Malavasi *et al.*, 2016).

After that, the Asian Financial Crisis, started in Thailand in July 1997 and spread across East Asia, has had spill-over effects all around the world, and in particular on Italy. Due to the economic level of Italian exports and imports, which were very unbalanced towards South East Asia and United States, Italy had been negatively affected both by the Asian monetary and banking crisis of 1997-1998 and by the US dot com bubble in 2001 (Lee *et al.*, 2017).

Furthermore, the unification of the euro area with a single currency and the stability of the money market has come only after 2002, when interest rates have fallen considerably and inflation for the first time has dropped to low levels (Malavasi *et al.*, 2016).

Figure 24 Long-term interest rates, Sept 1998 - Jun 2019, Italy



Source: OECD, 2019

Figure 25 Inflation rate in Italy, Aug 2000-Aug 2019



Source: National institute of statistics (ISTAT), tradingeconomics.com (2019)

For these reasons and with the objective to exclude any bias due to macro-economic factors and to instability, this dissertation, to explain the resilience of companies during the economic crisis of 2008-2009, will consider a medium-run period starting from 2004, one of the first year characterized by the stability of the Italian market.

Moreover, the same medium-run approach will be applied to study firms' resilience during the crisis of Italian Sovereign Debt in 2011-2012, using available data from 2007. However, it must be kept into consideration that these pre-crisis years are characterized by a high variability and market instability and results could be less significant.

3.4 Resilience Index Development

This section explains the development of a composite measure of organizational resilience and the quantification of a persistent superior performance of firms to shocks. As explained in the first chapter, there are three main categories of measurement:

- those assessed using the features of the organizations
- those measured on the organizational outcomes
- those based on how the organization recovers from failure (Ruin-Martiz et al., 2017).

In this dissertation, the Resilience Index will be calculated adopting the measurement based on organizational outcomes. Following this methodology, resilience will be computed using *VOLARE (VOLatility And RoE)* method, which combines financial performance outcomes with volatility data (Markman and Venzin, 2014).

However, it is important to acknowledge a few limits and strengths of this technique. First of all, some performance drivers cannot be parameterized adequately, or not quantified at all. For instance, companies vary in terms of their cultures and managerial leadership, and there is no doubt that individual differences impact firm-level performance (Markman and Venzin, 2014).

Unfortunately, research has not adequately parameterized management processes, culture, personalities yet, and their independent and aggregate effect on corporate performance.

Consequently, these relevant factors will be excluded and the focus of this analysis, instead, will be based on financial indicators of performance and volatility – such indicators are well-validated by years of empirical research in diverse disciplines, including economics, finance, accounting and marketing (Markman and Venzin, 2014).

The exploratory measure of resilience is a promising step towards the creation of a composite measure because it considers both volatility (a risk measure) and long-term ROE (a profitability measure). VOLARE was first inspired by the *optimal capital allocation* model, which follows the principle that capital allocation must reflect the risk it is being attained to. Such symmetry encourages more objective resource-allocation processes, where risky expenditures or strategies are penalized, whereas less risky initiatives are rewarded.

To calculate VOLARE, an homogeneous industry segment that allows for a fair comparison of financial performance must be chosen. In this dissertation, the industry segment is represented by Made in Italy manufacturing industry, which secures Italian success and competitiveness around the world.

Next there will be an assessment of the average RoE (2004–2009) and RoE (2007-2012) for each firm in the segment (y-axis) as an indicator for return and the adjusted standard deviation of RoE in the same period (x-axis) as an indicator for risk.

Specifically, VOLARE technique requires the following steps to obtain the Organizational Resilience Index:

- Collection of ROE from the database comprises 1554 companies with data ranging from 2004 to 2017.
- Calculation of ROE average for the five years long analysis. This average will be labelled LtRoE.

- To account for performance fluctuations, the difference between yearly ROEs will be measured. The sum of all positive changes was labelled (P), the sum of all negative changes was labelled (N).
- Then the adjusted standard deviation of ROE is calculated during the five years as measure of risk.

$$\text{ADJUSTED STANDARD DEVIATION} = \text{ST. DEV.} * [(N + 1)/(P + 1) - 1].$$

Finally, the Resilience Index is represented by the ratio between the long term ROE and the Adjusted Standard Deviation of ROE for the 5-year period of time (Markman and Venzin, 2014).

$$\text{RESILIENCE INDEX} = \text{LT ROE} / \text{ST. DEV.} * [(N + 1)/(P + 1) - 1].$$

In conclusion, according to VOLARE framework introduced by Venzin (2014), this Resilience Index will take into consideration the weighted average of shareholders returns across the previous 5 years and its volatility during the period.

This approach then focuses on rewarding those firms with continuous positive returns while penalizing companies that experienced more negative than positive results.

In the end, the Resilience Index could be considered as a coefficient of variation of the previous 5 years returns.

3.5 Estimation strategy - General Considerations on the Models

The Ordinary Least Squares (OLS) regression model, based on the minimization of the sum of the squares of the differences between the observed and predicted values of the dependent variable in a given dataset, is among the most widely used vehicle for empirical analysis in economics and other social sciences (Wooldridge, 2012).

After a first OLS analysis, a Generalized Linear Model (GLM) will be introduced to provide consistent results while relaxing OLS assumptions, so to provide more reliable estimators. Generalized Linear Models (GLMs) represent a set of regression models which are able to generalize the approach presented with linear regression to model the response variables as continuous, count, binary and proportions distributions, among the others (Hoffmann, 2003).

The advantage of a GLM over an OLS model is that some assumptions are widely considered as relaxed. Indeed, type I error on the fit improvement is calculated from a χ^2 distribution, which assumes homogeneous, normal, and independent deviations centered on zero (Dobson and Barnett, 2008). Therefore, it is reasonable to consider these as the key assumptions for GLM. On GLMs there is a general agreement regarding the assumptions of homogeneity and independence of residuals despite some statisticians (McCullagh, 1989) arguments that the independence assumption can be relaxed to “at least uncorrelated”. Furthermore, following the insights by Gill, the importance of the residuals normal distribution can be relaxed so that it simply becomes a description of model behaviour (Gill, 2000).

The GLM is composed by a Random Component, which refers to the probability distribution of the response variable, by a Systematic Component, which specifies the explanatory variables in the model, and by a Link Function, which specifies the link between random and systematic components. In summary, a GLM is a linear model for a transformed mean of a response variable that has distribution in the natural exponential family. Accordingly, the GLM uses a Maximum Likelihood Estimation (MLE) rather than Ordinary Least Squares (OLS) to estimate the parameters (Agresti, 2012).

All the studies are carried out with a Robust Estimation of the Standard Errors to deal with the intrinsic heteroscedasticity of the dataset. The results obtained through a Robust Estimation are valid, at least in large samples, whether or not the errors have constant variance (Wooldridge, 2012). However, where applicable, a non-robust estimation is performed in order to allow formal tests for heteroscedasticity, as the Breusch-Pagan test, and for homoscedasticity as the White test. Then, once heteroscedasticity has been assessed, a second estimation is run with heteroscedasticity-robust statistics and the results presented in the tables throughout this chapter are all obtained with Robust Estimation.

3.6 Building up Regression Models

In this dissertation, two main statistical analyses will be carried out to understand the validity of the hypotheses regarding organizational resilience. The resilience of the sample of 1554 companies will be measured for the recent financial crisis of 2009 and for the Italian Sovereign Debt Crisis of 2012.

First of all, an Ordinary Least Squares (OLS) regression model will be used to predict the resilience of firms during the financial crisis of 2009. This financial crisis was characterized by the breakdown of trust that occurred between banks the year before the 2008 financial crisis. It was caused by the subprime mortgage crisis, which itself was caused by the unregulated use of derivatives.

Secondly, another multiple linear regression (OLS) will be introduced to analyze the effects of independent variables on resilience during the Italian Sovereign Debt Crisis of 2012, when Italy was unable to repay or refinance its government debt.

Both these models will be transformed in Generalized Linear Models (GLM) to provide consistent results while relaxing OLS assumptions. These two models will help us to answer to the first hypothesis: *Does firms' asset and financial position influence the companies' capacity of survival? Are company's level of indebtedness and profitability good predictors for resilience?*

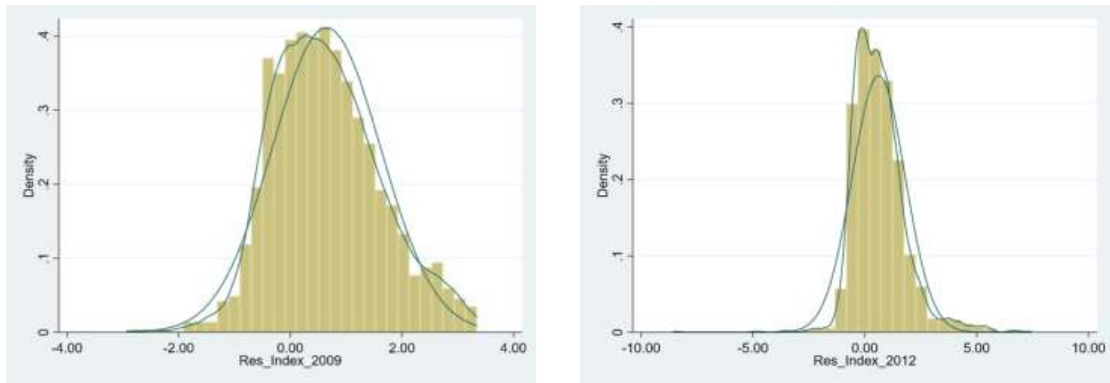
After that, to analyze the moderating effect of some environmental factors, as Credit Crunch, Gross Domestic Product and finally, Bank Lending Survey, the longitudinal database will be transformed in a cross-sectional time series database. Indeed, inserting these context factors in a multiple linear regression model induces to a problem of collinearity among these type of variables, which are omitted by the model as a consequence.

Therefore, a *time series analysis for fixed effects* will be carried out. This analysis will allow us to observe the effect of environmental fixed variables, like GDP, which change over time but not across companies.

3.6.1 Distribution of Dependent Variable Resilience Index

First and foremost, before proceeding with the statistical analysis, some graphical diagnostics tools are needed in order to understand whether or not the Resilience Index behaves as a phenomenon that can be modelled with a Gaussian distribution. Please take into consideration that measures falling outside the area delimited by the mean and two standard deviations were considered as outliers.

Figure 26 Histograms of Resilience Distribution

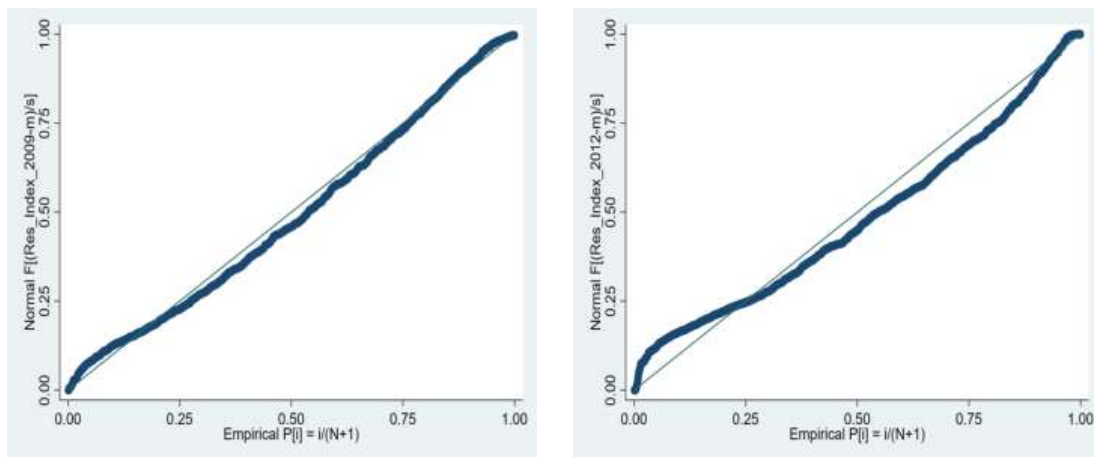


Source: Author's elaboration

These two histograms from the fit can provide a clear picture of the shape of the distribution. Since data are approximately normally distributed, with a peak in the middle and fairly symmetrical, the assumption of normality has been met.

Then, in the normal Q–Q plot randomly generated, independent standard normal data on the vertical axis are compared to a standard normal population on the horizontal axis. The scatter lies close to the line with no obvious pattern coming away from the line for the data to be considered normally distributed. The linearity of the points suggests that the data are normally distributed.

Figure 27 Normal distribution of errors and Errors quantile-quantile plot



Source: Author's elaboration

These graphs provide a good representation of the distribution of the Resilience index, and the assumption of normal distribution of the sample holds, thus making Ordinary

Least Squares (OLS) regression a good tool to study the relationships among the variables.

3.6.2 Variables within the models

In this section, the variables used to elaborate the statistical models of this dissertation will be presented and explained. Most of these factors are long term variables for the assumption that organizational resilience is not a firm characteristic given by a single year point indicator, but by the combination and trend that the indicators have over time (see Table 6).

Table 6 Variable within the models

NAME	MEANING	SUMMARY STATISTICS
Res_Index	Resilience Index	The Resilience Index is a composite measure, built using VOLARE Method. It is the dependent variable in the multiple regression model and it is useful to understand which companies have been able to survive and to return to their balanced financial and assets position after a shock. Its formula is: Resilience Index = Lt Roe / Adj. St. Dev.
Company_Status	Company Status	It derives from companies' legal status. It is presented as a dummy variable and takes the values 0 and 1. When companies are active after a crisis, they take the value 1. When they fail or they are in a state of liquidation and insolvency, they take the value 0.
LT_ROE_2009 and LT_ROE_2012	Long term ROE	The Return on Equity measures the profitability of a business in relation to the shareholder equity found on the balance sheet. It is calculated as: $ROE = \frac{NET\ INCOME}{EQUITY}$. This is the average ROE over the last five years. High ROE sustained over the long term may indicate a company has a 'sustainable competitive advantage' and it may be resilient.
LT_ROA_2009 AND LT_ROA_2012	Long term ROA	The Return on Assets measures how profitable a company is in relation to its total assets. It is calculated as: $ROA = \frac{NET\ INCOME}{TOTAL\ ASSETS}$ ROA over the last 5 years gives an idea as to how efficient management is at using its assets to generate earnings.

Measuring Organizational Resilience

NAME	MEANING	SUMMARY STATISTICS
LT_EBITDAonREVENUE S_2009 AND LT_EBITDAonREVENUE S_2012	Long Term EBITDA/Revenues	It is a financial metric used to assess a company's profitability over five years as a percentage of its total revenue. Since EBITDA excludes interest, depreciation, amortization and taxes, EBITDA margin can provide an investor, business owner or financial professional with a clear view of a company's operating profitability and cash flow. It is useful because it factors out decisions related to financing and accounting, and more specifically, the margin does not include in the impact of the company's capital structure, non-cash expenses, and income taxes.
LT_NFP_on_EBITDA_20 09 AND LT_NFP_on_EBITDA_20 12	Long Term Net Financial Position/EBITDA	The net debt-to-EBITDA (earnings before interest depreciation and amortization) ratio is a measurement of leverage, calculated as a company's interest-bearing liabilities minus cash or cash equivalents, divided by its EBITDA. This ratio is a debt ratio that shows how many years it would take for a company to pay back its debt through cash flows deriving from its ordinary operations, if net debt and EBITDA are held constant. If company has more cash than debt, the ratio is negative.
LT_NFP_on_REVENUE S_2009 AND LT_NFP_on_REVENUE S_2012	Long Term Net Financial Position/Revenues	This debt ratio expresses the company's ability to cover its debt through cash flows deriving from sales
LT_PRODUCTIVITY_IN DEX_2009 AND LT_PRODUCTIVITY_IN DEX_2012	Long Term Productivity Index	It is calculated as a company's total revenue divided by its current number of employees. It measures the average revenue generated by each employee of a company. It is a measure of how efficiently a company is utilizing and managing its employees.
GDP_IT_CurrentYear	Gross Domestic Product of the current year	GDP is a monetary measure of the market value of all the final goods and services produced in a specific time period, often annually. When the economy is expanding, the GDP growth rate is positive. If it's growing, so will businesses, jobs and personal income.
LoansFlow_CurrentYear	Credit Crunch	The difference between loans flows over years can show the presence of a tightening in credit availability from banks, called Credit Crunch
BLS_Q1_CurrentYear	Bank Lending Survey – Question 1	Question 1: How does the share of loans to households secured by real estate contracted over the last 12 months for purposes other than the acquisition of a principal residence compare with the share of such loans in the previous 12-month period? (Kennedy <i>et al.</i> , 2017)
BLS_Q6_CurrentYear	Bank Lending Survey – Question 6	Question 6: As a result of the situation in financial markets has your market access changed when tapping your usual source of wholesale funding and/or has your ability to transfer credit risk changed over the past three months, or are you expecting this access/activity to change over the next three months? (Kennedy <i>et al.</i> , 2017)

NAME	MEANING	SUMMARY STATISTICS
BLS_Q8_CurrentYear	Bank Lending Survey – Question 8	Question 8: To what extent have (will) needs to fund draw-downs on commitments to asset-backed commercial paper programmes issued by conduits or Structured Investment Vehicles affected (affect) your lending policies over the past (next) three months? (Kennedy <i>et al.</i> , 2017)
BLS_Q9_CurrentYear	Bank Lending Survey – Question 9	Question 9: To what extent have the events in financial markets affected the costs related to your bank's capital position and has this constrained your willingness to lend over the past three months and could this constrain your willingness to lend over the next three months? (Kennedy <i>et al.</i> , 2017)
Res_Index_Year_minus1	Resilience index of the previous year	In the time series analysis for fixed effects, it can be interesting to measure if there is correlation between resilience over years.
Res_Index_Year_minus2	Resilience index of the previous two years	In the time series analysis for fixed effects, it can be interesting to measure if there is correlation between resilience over years.

Source: Author's elaboration

3.6.3 Ordinary Least Squares - Regression 2009

Economic and Financial Crisis 2008-09

After having delineated the main variables that will be inserted in the next analyses, we will carry out the first analysis using the Ordinary Least Squares Model (OLS). For the purpose of this study, we have tried to analyse whether the Return on Equity and Return on Asset have influenced the survival capacity of the companies of the sample, and whether the Net Financial Position On Turnover or on EBITDA is a good predictor of resilience.

The multiple linear regression can be described by:

Resilience Index

$$\begin{aligned}
 &= \beta_0 + \beta_1(\text{Company Status}) + \beta_2 \text{LT ROA}_{2009} + \beta_3 \text{LT ROE}_{2009} \\
 &+ \beta_4 \text{LT EBITDAonREVENUES}_{2009} + \beta_5 \text{LT NFP_on_REVENUES}_{2009} \\
 &+ \beta_5 \text{LT NFP_on_EBITDA}_{2009} + \beta_6 \text{LT Productivity_Index}_{2009}
 \end{aligned}$$

Source	SS	df	MS	Number of obs	=	844
Model	474.693148	7	67.8133068	F(7, 836)	=	146.83
Residual	386.098646	836	.461840485	Prob > F	=	0.0000
				R-squared	=	0.5515
				Adj R-squared	=	0.5477
Total	860.791793	843	1.02110533	Root MSE	=	.67959

Res_Index_2009	Coef.	Std. Err.	t	P> t	[90% Conf. Interval]	
Company_Status	.1317723	.0590465	2.23	0.026	.0345418	.2290029
LT_ROE_2009	4.079215	.2518678	16.20	0.000	3.66447	4.493961
LT_ROA_2009	1.63271	.6879964	2.37	0.018	.4998013	2.765619
LT_ROS_2009	2.399014	.5795221	4.14	0.000	1.444728	3.353301
LT_NFP_on_EBITDA_2009	-.6387932	.385874	-1.66	0.098	-1.274204	-.0033829
LT_NFP_on_REVENUES_2009	-.3097205	.1020381	-3.04	0.002	-.4777444	-.1416966
LT_Prod_Index_2009	.0232198	.0074289	3.13	0.002	.0109867	.0354529
_cons	.1279967	.0688014	1.86	0.063	.0147028	.2412905

Source: Author's elaboration

The R-squared of this model shows how this estimation strategy explains 55% of the variance for the dependent variable Resilience. Indeed, most of the independent variables are statistically significant.

As expected, Company Status (p-value 0.026), which reflects the state of firm survival and failure and Long Term ROE (p-value 0.000), the measure of business profitability in relation to shareholder equity are statistically relevant in the model.

At the same time, the index of profitability of the company in relation to its total assets (ROA) and the Long term Return on Sales (ROS), used to evaluate a company's operational efficiency, are statistically meaningful. We can remember that ROS is important in the model: an increasing one indicates that a company is growing more efficiently, while a decreasing ROS could signal impending financial troubles. Moreover, Long Term Net Financial Position on Revenues (p-value 0.002), the debt ratio which expresses the company's ability to cover its debt through cash flows deriving from sales, together with Long term Productivity Index (p-value 0.002), which reflects how efficiently a company is utilizing and managing its employees, are reliable estimates.

Therefore, these predictors with low p-value are likely to be meaningful to this model, since changes in their value are related to changes in the response variable resilience.

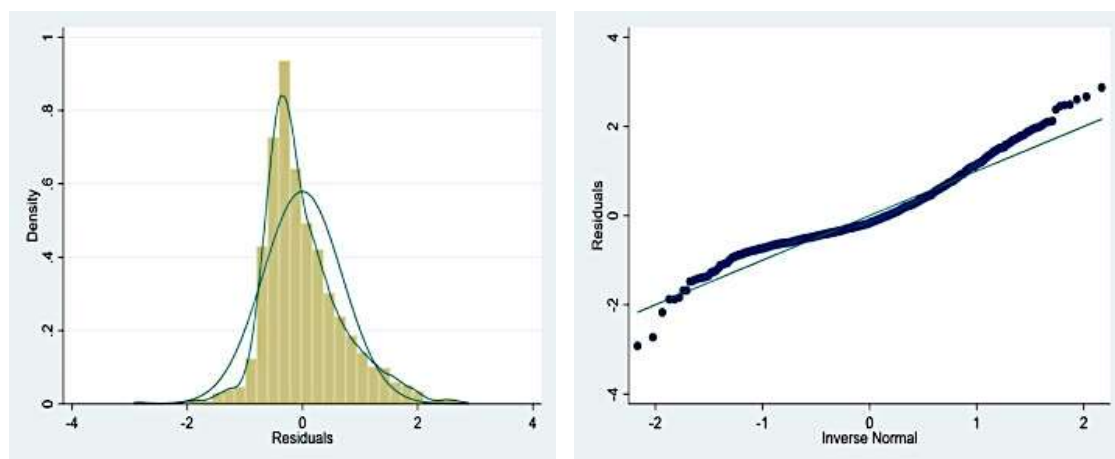
At the same time, Long Term Net Financial Position on EBITDA show a certain trend towards significance (P-value<0.10) but, they just slightly miss the significance level.

Post estimation: residual plots

The linear regression model assumes there is a straight-line relationship between the predictors and the response. However, fitting a linear regression model to a specific data set, many problems may occur, just like correlation of error terms, outliers and non-linearity of the response-predictor relationships.

Residual plots are a useful graphical tool for identifying non-linearity. In the case of a multiple linear regression, residuals can be plotted versus the predicted (or fitted) values. The presence of a pattern may indicate a problem with some aspects of the linear model.

Figure 28 Residual plots: Histogram and Inverse Normal Plot

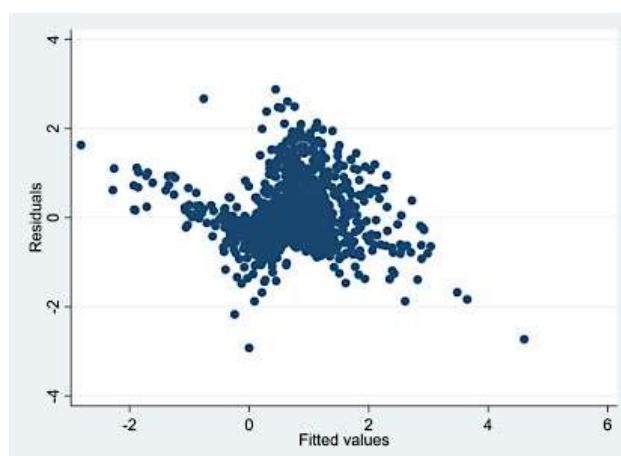


Source: Author's elaboration

The histogram, a frequency plot, shows an approximately normal distribution of residuals, despite of the presence of a few outliers.

The normal probability plot shows an approximately straight line in the normal probability plot. In this graph small departures from the main line are common.

Figure 29 Residual Plot: Fitted Values



Source: Author's elaboration

Plotting residuals versus the value of a fitted response produces a distribution of points scattered randomly around 0, regardless of the size of the fitted value. Quite commonly, however, residual values increase as the size of the fitted value increases.

Figure 30 White Test

White's test for Ho: homoskedasticity
against Ha: unrestricted heteroskedasticity

chi2(26) = 94.29
Prob > chi2 = 0.0000

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	94.29	26	0.0000
Skewness	75.68	6	0.0000
Kurtosis	19.32	1	0.0000
Total	189.29	33	0.0000

Source: Author's elaboration

Nevertheless, some assumptions of the OLS regression model are not met. Firstly, the White test for homoscedasticity fails to accept the null hypothesis at the expenses of an unrestricted heteroscedasticity in the residuals. This conclusion is also confirmed by the Residuals versus Fitted plot presented.

For this reason, it is better to adopt a Generalized Linear Model (GLM) with Gaussian link function to go on with the analysis.

GLM Regression

This model, while maintaining the same results of OLS model, will relax the OLS assumption which are not perfectly met, just as the need of homoscedasticity, absence of significant outliers or the normal distribution of residuals.

```

Generalized linear models           No. of obs   =      844
Optimization      : ML             Residual df  =      836
                                   Scale parameter = .4618405
Deviance          = 386.0986458    (1/df) Deviance = .4618405
Pearson          = 386.0986458    (1/df) Pearson  = .4618405

Variance function: V(u) = 1        [Gaussian]
Link function     : g(u) = u       [Identity]

                                   AIC           = 2.074775
                                   BIC           = -5246.997
Log likelihood    = -867.5549713
    
```

Res_Index_2009	OIM					[90% Conf. Interval]	
	Coef.	Std. Err.	z	P> z			
Company_Status	.1317723	.0590465	2.23	0.026	.0346496	.2288951	
LT_ROE_2009	4.079215	.2518678	16.20	0.000	3.66493	4.493501	
LT_ROA_2009	1.63271	.6879964	2.37	0.018	.5010567	2.764364	
LT_ROS_2009	2.399014	.5795221	4.14	0.000	1.445785	3.352243	
LT_NFP_on_EBITDA_2009	-.6387932	.385874	-1.66	0.098	-1.2735	-.004087	
LT_NFP_on_REVENUES_2009	-.3097205	.1020381	-3.04	0.002	-.4775582	-.1418828	
LT_Prod_Index_2009	.0232198	.0074289	3.13	0.002	.0110003	.0354394	
_cons	.1279967	.0688014	1.86	0.063	.0148284	.2411649	

It is important to underline that the GLM runs with a Maximum Likelihood estimator of the Resilience Index.

Additionally, given that the assumptions of the OLS regression are at least relaxed, there's no need for a post estimation analysis to evaluate this estimation strategy.

3.6.4 Ordinary Least Squares - Regression 2012

Italian Sovereign Debt Crisis 2011-2012 (Data from 2007 to 2012)

Similarly to the first analysis regarding Resilience in 2009, a second multiple linear regression following the Ordinary Least Squares method for estimating the unknown parameters, will be executed.

Resilience Index

$$= \beta_0 + \beta_1(\text{Company Status}) + \beta_2 \text{LT ROA}_{2012} + \beta_3 \text{LT ROE}_{2012} + \beta_4 \text{LT EBITDAonREVENUES}_{2012} + \beta_5 \text{LT NFP_on_REVENUES}_{2012} + \beta_6 \text{LT NFP_on_EBITDA}_{2012} + \beta_7 \text{LT Productivity Index}_{2012}$$

Source	SS	df	MS	Number of obs	=	945
Model	680.316995	7	97.1881422	F(7, 937)	=	109.47
Residual	831.899979	937	.887833489	Prob > F	=	0.0000
				R-squared	=	0.4499
				Adj R-squared	=	0.4458
Total	1512.21697	944	1.60192476	Root MSE	=	.94225

Res_Index_2012	Coef.	Std. Err.	t	P> t	[90% Conf. Interval]	
Company_Status	-.0272867	.0941075	-0.29	0.772	-.1822329	.1276595
LT_ROE_2012	5.073828	.3651101	13.90	0.000	4.472681	5.674975
LT_ROA_2012	1.428432	.8989677	1.59	0.112	-.0517017	2.908566
LT_ROS_2012	2.772448	.5557283	4.99	0.000	1.857452	3.687445
LT_NFP_on_EBITDA_2012	-.6209998	.4502721	-1.38	0.168	-1.362364	.1203649
LT_NFP_on_REVENUES_2012	-.2089275	.1123748	-1.86	0.063	-.3939505	-.0239044
LT_Prod_Index_2012	.0061144	.006667	0.92	0.359	-.0048627	.0170914
_cons	.3577614	.0936549	3.82	0.000	.2035603	.5119624

Source: Author's elaboration

While the estimates for the 2009 regression were prompting an overall significance of 55%, the R-squared of this model shows how this estimation strategy explains almost the 45% of the variance for the dependent variable Resilience. Despite similar conclusions can be drawn for 2012 too, some variables are struggling to explain the behaviour of the resilience due to their low significance.

As a matter of fact, during this analysis Company Status showed not to be statistically relevant (p-value 0.772) and, at the same time, Long Term Net Financial Position on EBITDA has lost its borderline significance (p-value 0.168). Similarly, Long term Productivity Index, which was able to reflect how efficiently a company is utilizing and managing its employees in the 2009 regression model, is now not relevant anymore (p-value 0.359).

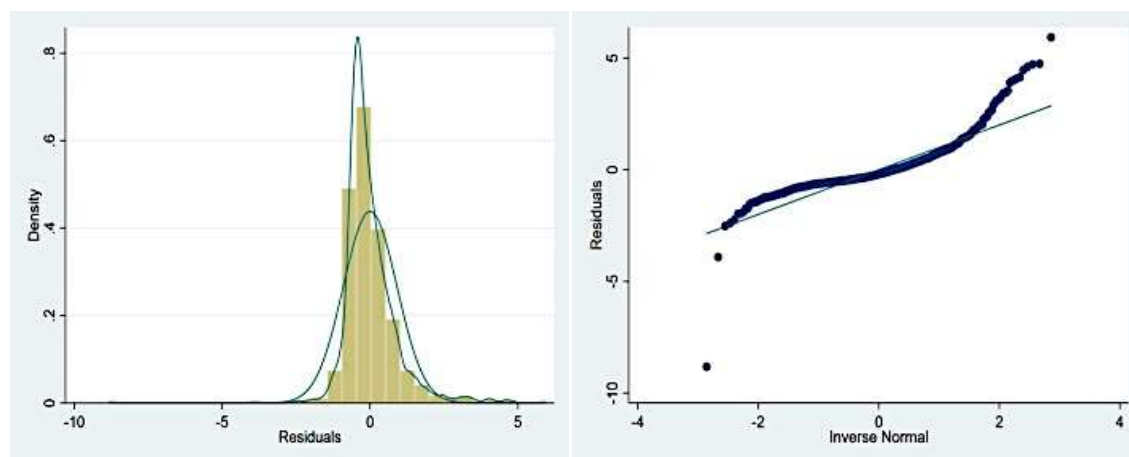
However, despite some just outlined drawbacks, Long Term ROE indicator is still able to drive conclusions on resilience based on a measure of business profitability in relation to shareholder equity (p-value 0.000). A very strong relationship is also highlighted for Long term Return on Sales (ROS), which confirms its statistically meaningful estimates (p-value 0.000). Alongside, the Long Term Net Financial Position on Revenues – the KPI

which tracks the company's ability to cover its debt through cash flows deriving from sales – is showing a good convergence towards significance (p-value 0.068).

Besides, the total assets profitability index (ROA) is showing a certain trend towards significance, with its estimate p-value at 0.112.

Post estimation: residual plots

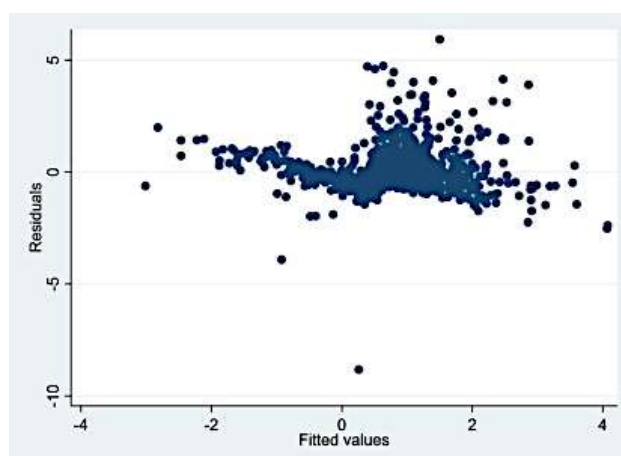
Figure 31 Residual Plots: Histogram and Inverse Normal



Source: Author's elaboration

The histogram and the normal probability plot are used to check whether or not it is reasonable to assume that the random errors inherent in the process have been drawn from a normal distribution. The normality assumption is needed for the error rates we are willing to accept when making decisions about the process. The histogram and the normal probability plot show a few small departures that suggest the presence of a few outliers.

Figure 32 Residuals Plot: Residuals versus Fitted Values



Source: Author's elaboration

This plot shows the spread of residuals is not constant and changes with the increasing of the fitted values, supposing the presence of heteroscedasticity.

Figure 33 White Test

```
White's test for Ho: homoskedasticity
against Ha: unrestricted heteroskedasticity

chi2(26) = 46.95
Prob > chi2 = 0.0071
```

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	46.95	26	0.0071
Skewness	4.71	6	0.5809
Kurtosis	3.40	1	0.0651
Total	55.07	33	0.0093

Source: Author's elaboration

Residuals seems to meet the assumption related to their normal distribution, while as can be seen through the residuals versus fitted graphs and thanks to White's test, there seems to be heteroscedasticity. As a consequence, it is better to use a Generalized Linear Model with Gaussian link function to go on with the analysis.

Generalized Linear Model

As explained before during the 2009 regression model and given that OLS assumption which are similarly not perfectly met in the just presented 2012 analysis, the switch towards a GLM regression model is able to relax the main OLS assumptions such as the need of homoscedasticity, the absence of significant outliers or the normal distribution of residuals.

```

Generalized linear models
Optimization      : ML
Deviance          = 831.8999788
Pearson           = 831.8999788

Variance function: V(u) = 1
Link function     : g(u) = u

No. of obs       = 945
Residual df      = 937
Scale parameter  = .8878335
(1/df) Deviance  = .8878335
(1/df) Pearson   = .8878335

[AIC]
[Identity]

Log likelihood    = -1280.666058
AIC               = 2.727336
BIC               = -5587.66
    
```

Res_Index_2012	OIM					[90% Conf. Interval]
	Coef.	Std. Err.	z	P> z		
Company_Status	-.0272867	.0941075	-0.29	0.772	-.1820797	.1275063
LT_ROE_2012	5.073828	.3651101	13.90	0.000	4.473275	5.674381
LT_ROA_2012	1.428432	.8989677	1.59	0.112	-.0502383	2.907102
LT_ROS_2012	2.772448	.5557283	4.99	0.000	1.858356	3.68654
LT_NFP_on_EBITDA_2012	-.6209998	.4502721	-1.38	0.168	-1.361631	.119632
LT_NFP_on_REVENUES_2012	-.2089275	.1123748	-1.86	0.063	-.3937675	-.0240874
LT_Prod_Index_2012	.0061144	.0066667	0.92	0.359	-.0048519	.0170806
_cons	.3577614	.0936549	3.82	0.000	.2037128	.5118099

In conclusion, given that the assumptions of the OLS regression are at least relaxed, there's no need for a post estimation analysis to evaluate this estimation strategy.

However, it is cristal clear that some variables that were showing some significance in the 2009 analysis are now not anymore able to explain the variability in the 2012 Resilience index. This could be driven by the fact that the 2009 Resilience is influencing somehow the 2012 Resilience, and this can be proved with a correlation analysis.

Figure 34 Correlation between Res_Index_2009 and Res_Index_2012

```

. correlate Res_Index_2009 Res_Index_2012
(obs=1,393)
    
```

	Res~2009	R~x_2012
Res_Ind~2009	1.0000	
Res_I~x_2012	0.6467	1.0000

Source: Author's elaboration

As it can be seen, there exists high correlation between the two Resilience index: almost 65% of the variability in the 2012 Resilience index can be represented by the 2009 figures. To increase the accuracy of this analysis, a simple OLS regression model is now introduced to show how the 2009 Resilience index drives an increased accuracy in the regression (Adj. R-squared increasing to 54%) while also lowering the significance of the other variables already presented before.

Source	SS	df	MS	Number of obs	=	945
Model	821.84131	8	102.730164	F(8, 936)	=	139.28
Residual	690.375664	936	.737580838	Prob > F	=	0.0000
				R-squared	=	0.5435
				Adj R-squared	=	0.5396
Total	1512.21697	944	1.60192476	Root MSE	=	.85883

Res_Index_2012	Coef.	Std. Err.	t	P> t	[90% Conf. Interval]
Company_Status	.0247102	.0858576	0.29	0.774	-.1166529 .1660732
LT_ROE_2012	3.776623	.3457099	10.92	0.000	3.207418 4.345829
LT_ROA_2012	-.0176677	.8259996	-0.02	0.983	-1.377662 1.342327
LT_ROS_2012	2.34678	.5074571	4.62	0.000	1.51126 3.1823
LT_NFP_on_EBITDA_2012	-.188277	.4115936	-0.46	0.647	-.8659589 .489405
LT_NFP_on_REVENUES_2012	-.0506935	.1030605	-0.49	0.623	-.2203809 .1189939
LT_Prod_Index_2012	.0025386	.0060822	0.42	0.676	-.0074756 .0125528
Res_Index_2009	.4947316	.0357157	13.85	0.000	.4359264 .5535369
_cons	.0528617	.0881552	0.60	0.549	-.0922843 .1980077

Source: Autholar's elaboration

To improve the analysis of the Resilience index in both 2009 and 2012, it needs to be introduced a Time Series analysis. Indeed, this kind of estimation strategy is able to provide a more effective way to represent the drivers of resilience while differentiating and isolating the effects among different periods.

3.6.5 Time Series Analysis for Fixed Effects

The objective of this analysis is to observe the impact of context or environmental factors on organizational resilience. This model will help us to answer to the second hypothesis of this dissertation regarding the presence of a moderating effect on resilience due to Gross Domestic Product, Credit Crunch and Bank Lending Survey.

A dataset based on cross-sectional times series data will be used to carry out this analysis. This model will allow us to observe the effect of fixed variables that change over time but not across companies.

The reasoning is that each organization has its own individual characteristics (ROA, ROE, EBITDA) that may or may not influence the predictor variable of resilience. These characteristics are unique to the individual firm and should not be correlated with other companies. The fixed-effects model controls for all time-invariant differences between the individuals, so the estimated coefficients of the fixed-effects models cannot be biased because of omitted time-invariant characteristics.

Substantively, this fixed-effect models are designed to study the causes of changes within an entity. In effect, this fixed effects analysis contains a time coefficient that allows the regression function to shift over time to capture changes in external influences (Torres-Reyna, 2007).

Resilience Index Current Year

$$\begin{aligned} &= \beta_0 + \beta_1 \text{GDP}_{\text{Current Year}} + \beta_2 \text{Loans Flow}_{\text{Current Year}} + \beta_3 \text{BLS_Q1}_{\text{Current Year}} \\ &+ \beta_4 \text{BLS_Q6}_{\text{Current Year}} + \beta_5 \text{BLS_Q8}_{\text{Current Year}} + \beta_6 \text{BLS_Q9}_{\text{Current Year}} \\ &+ \beta_7 \text{Resilience_Index}_{\text{Year minus 1}} + \beta_8 \text{Resilience_Index}_{\text{Year minus 2}} \end{aligned}$$

Therefore, the output of the fixed effects regression model is the following one.

```

Fixed-effects (within) regression      Number of obs   =   10,522
Group variable: Num_Encoded          Number of groups =    1,413

R-sq:                                Obs per group:
    within = 0.0378                  min =           1
    between = 0.5326                 avg =           7.4
    overall = 0.0729                 max =           8

corr(u_i, Xb) = 0.1978                F(8,9101)      =   44.66
                                        Prob > F        =    0.0000
    
```

Res_Index_CurrentYear	Coef.	Std. Err.	t	P> t	[90% Conf. Interval]	
GDP_IT_CurrentYear	.0000166	5.37e-06	3.09	0.002	7.77e-06	.0000254
LoansFlow_CurrentYear	-1.23e-11	5.36e-12	-2.30	0.021	-2.12e-11	-3.53e-12
BLS_Q1_CurrentYear	1.980176	2.064815	0.96	0.338	-1.416488	5.376841
BLS_Q8_CurrentYear	3.471324	7.597123	0.46	0.648	-9.026104	15.96875
BLS_Q6_CurrentYear	-4.653051	1.619489	-2.87	0.004	-7.317144	-1.988957
BLS_Q9_CurrentYear	7.534461	2.949483	2.55	0.011	2.6825	12.38642
Res_Index_Year_minus1	.1117477	.0081304	13.74	0.000	.098373	.1251224
Res_Index_Year_minus2	-.0501115	.0056694	-8.84	0.000	-.0594378	-.0407852
_cons	-26.6106	8.808644	-3.02	0.003	-41.101	-12.12019
sigma_u	2.3376908					
sigma_e	4.1441432					
rho	.24139165	(fraction of variance due to u_i)				

F test that all u_i=0: F(1412, 9101) = 2.29 Prob > F = 0.0000
 Source: Author's Elaboration

Looking at the results of this analysis, the *R squared overall* explains about 7,2% of the variation of organizational resilience within the sample of companies belonging to our dataset. Therefore, this analysis explains a 7% more of the variability of the response variable, that was already explained for about 44% in the 2012 analysis and 55% in the 2009 analysis.

The *R squared within* groups, instead, is only the 3%, showing a low correlation among companies, considering the fixed effects.

Finally, we can study the *R squared between*, which is around 53%. The changes of organizational resilience inside each company are often related to and explained by the evolution over time of context factors.

P-value, instead, determines the significance of most of the variables in the model, indicating strong evidence against null hypothesis. Gross Domestic Product seems to have a strong impact on the resilience of the sample of company each year. The same results are evident for Credit Crunch, and the questions 8 and 9 of the Bank Lending Survey.

It is also interesting to observe how resilience of previous years has a strong effect on the resilience of the current year. From this we can assume there is a strong learning effect over years: companies learn to be resilient and improve their resistance to the shocks over time.

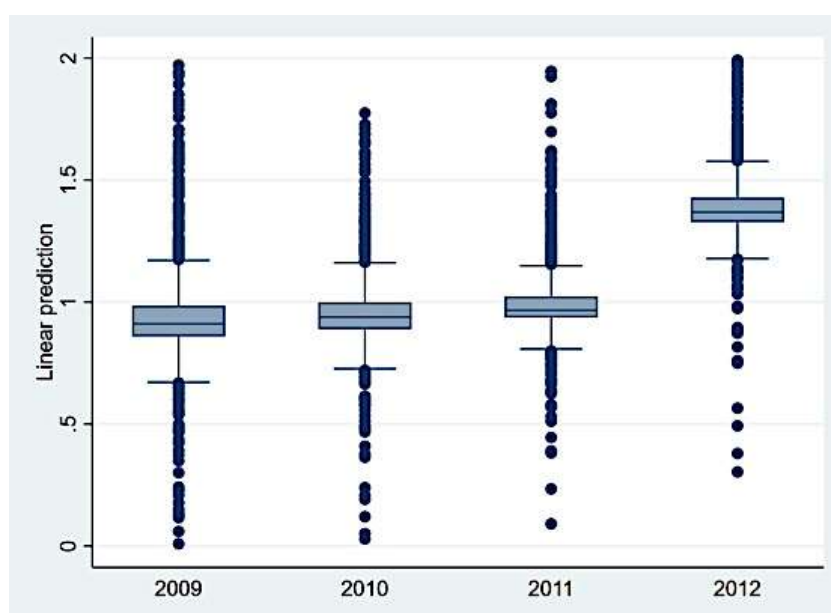
Alongside with the just presented analytical analysis, a box-plot can help the reader to understand the effects of context factors. In fact, it is interesting to analyse separately those effects on the two crises of 2009 and 2012.

The graph below presents the predicted values of Resilience using fixed effects in the y axis and the years 2009-12 in the x axis. All the boxes presented are short, meaning their data points consistently hover around the center values and that there is not much variability.

However, they clearly indicate, through the median, that the overall effects of fixed effects in 2009 are completely different compared to those of 2012. Indeed, the values around the median suggest that the fixed effects in 2009 take a different distribution and are centered on different values than 2012: the predicted value of Resilience in 2009 is balanced around 0.9, while in 2012 around 1.4.

It can therefore be said that the fixed effects in 2012 had a greater influence on the index of resilience than in 2009.

Figure 35 Box Plot



Source: Author's Elaboration

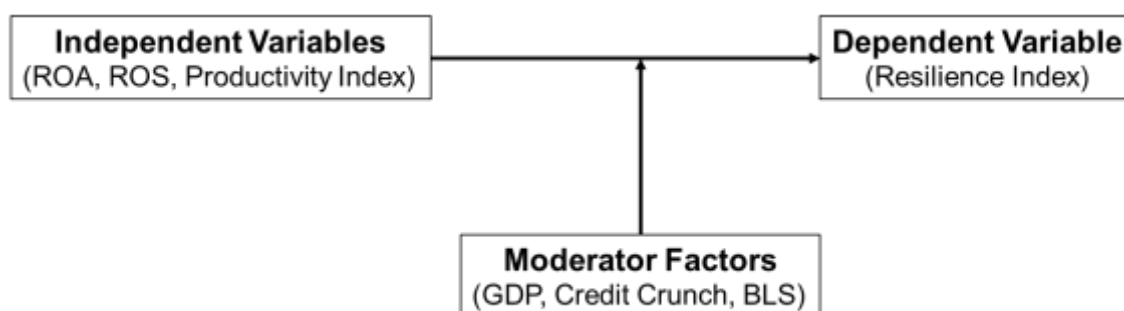
3.6.6 Do context factors have a *mediating* or *moderating* effect on Organizational Resilience?

Once reached this point of the analysis, it is worth to address our main research question: *Do context factors have a mediating or moderating effect on Organizational Resilience?* As we have seen in the previous chapter, a mediator needs to be, at least, predicted by the independent variable. However, the mediators taken into consideration are fixed, and as a consequence, they cannot be predicted by independent variables which change over time. Thus, we can exclude a possible mediation effect and we can proceed testing moderation.

In the context of this research, a moderator is a qualitative or quantitative variable that affects the direction and the strength of the relationship between a predictor variable and an outcome variable. In research, in order to infer that a factor is a moderating variable, there must be a significant statistical interaction between the independent variable and the moderator (P-Value < 0.10).

To test moderation, some new variables have been calculated as the product between the environmental factors and the previous independent variables (interaction term) in the multiple linear regression. In this way, it is possible to evaluate how much the value of an independent variable varies when the moderator changes (Frazier *et al.*, 2004).

Figure 36 Our Model



Source: Author's Elaboration

Interactions with Gross Domestic Product

At this point of this dissertation, interactions between GDP and firm-specific KPIs are introduced with the goal to assess the moderating effect of GDP on organizational resilience.

In the figure presented below, only few selected variables were kept as being significant in the regression model. Overall, the other variables introduced before in the OLS regression estimates were considered, but their low significance in predicting a moderating effect with GDP was suggesting to drop them out of the analysis.

```
Fixed-effects (within) regression      Number of obs   =   10,490
Group variable: Num_Encoded           Number of groups =    1,413

R-sq:                                  Obs per group:
  within = 0.0799                       min =          1
  between = 0.3625                       avg =          7.4
  overall = 0.1593                       max =          8

corr(u_i, Xb) = 0.0974                  F(17,9060)      =   46.26
                                          Prob > F        =   0.0000
```

Res_Index_CurrentYear	Coef.	Std. Err.	t	P> t	[90% Conf. Interval]	
GDP_IT_CurrentYear	.0000157	5.29e-06	2.96	0.003	6.95e-06	.0000244
LoansFlow_CurrentYear	-1.19e-11	5.26e-12	-2.27	0.023	-2.06e-11	-3.30e-12
BLS_Q1_CurrentYear	1.821122	2.026594	0.90	0.369	-1.512669	5.154913
BLS_Q8_CurrentYear	-1.105636	7.489371	-0.15	0.883	-13.42582	11.21454
BLS_Q6_CurrentYear	-3.58805	1.599826	-2.24	0.025	-6.2198	-.9563011
BLS_Q9_CurrentYear	4.958935	2.92467	1.70	0.090	.147789	9.770081
Res_Index_Year_minus1	.097037	.0080427	12.07	0.000	.0838065	.1102675
Res_Index_Year_minus2	-.0521533	.0055861	-9.34	0.000	-.0613426	-.042964
INT_GDP_ROE_CurrentYear	1.68e-08	1.70e-09	9.84	0.000	1.40e-08	1.96e-08
INT_GDP_ROE_Year_minus1	8.90e-09	1.64e-09	5.43	0.000	6.21e-09	1.16e-08
INT_GDP_ROE_Year_minus2	1.07e-08	1.65e-09	6.46	0.000	7.95e-09	1.34e-08
INT_GDP_ROA_CurrentYear	9.67e-10	1.36e-09	0.71	0.479	-1.28e-09	3.21e-09
INT_GDP_ROA_Year_minus1	1.86e-09	1.50e-09	1.24	0.216	-6.12e-10	4.33e-09
INT_GDP_ROA_Year_minus2	3.00e-09	1.75e-09	1.71	0.088	1.10e-10	5.88e-09
INT_GDP_ROS_CurrentYear	4.44e-11	7.59e-12	5.85	0.000	3.19e-11	5.69e-11
INT_GDP_EBITDA_CurrentYear	1.59e-12	3.90e-13	4.09	0.000	9.53e-13	2.24e-12
INT_GDP_NFP_Year_minus2	2.82e-11	1.59e-11	1.78	0.076	2.07e-12	5.44e-11
_cons	-26.01179	8.67889	-3.00	0.003	-40.28876	-11.73483
sigma_u	2.0208325					
sigma_e	4.0588474					
rho	.19864592	(fraction of variance due to u_i)				

F test that all u_i=0: F(1412, 9060) = 1.80 Prob > F = 0.0000

As the regression model highlights, the interaction between GDP and ROE across the entire period selected is able to predict a moderating effect of GDP on organizational Resilience. Indeed, the p-values of the interaction variables with ROE are all significant at all levels of confidence (p-value 0.00). This is also true for the interaction terms between GDP and ROS (p-value 0.00) and EBITDA (p-value 0.00) in the current year, and Net Financial Position during the previous two years (p-value 0.08).

The interaction between GDP and ROA, instead, is ambiguous: in the current and precedent year there seems to be no moderating effect, while it is present for year minus two.

Interactions with Credit Crunch

After that, interactions between Credit Crunch and financial and performance indicators are introduced in order to establish the moderating effect of Credit Crunch on organizational resilience.

With the same logic presented in the previous GDP analysis, only few selected variables were kept as being significant in the regression model with a special focus on Net Financial Position and EBITDA.

```

Fixed-effects (within) regression          Number of obs   =   10,418
Group variable: Num_Encoded              Number of groups =    1,413

R-sq:                                     Obs per group:
  within = 0.0467                          min =          1
  between = 0.4299                          avg  =         7.4
  overall = 0.0958                          max  =          8

                                           F(16,8989)     =    27.53
corr(u_i, Xb) = 0.2308                     Prob > F       =    0.0000
    
```

Res_Index_CurrentYear	Coef.	Std. Err.	t	P> t	[90% Conf. Interval]	
GDP_IT_CurrentYear	.0000164	5.45e-06	3.01	0.003	7.44e-06 .0000254	
LoansFlow_CurrentYear	-1.72e-11	8.99e-12	-1.92	0.055	-3.20e-11 -2.46e-12	
BLS_Q1_CurrentYear	1.967514	2.070461	0.95	0.342	-1.438443 5.37347	
BLS_Q8_CurrentYear	1.005234	7.974608	0.13	0.900	-12.11318 14.12365	
BLS_Q6_CurrentYear	-2.306252	3.225278	-0.72	0.475	-7.611909 2.999405	
BLS_Q9_CurrentYear	4.961687	4.221855	1.18	0.240	-1.983361 11.90674	
Res_Index_Year_minus1	.1088488	.0081573	13.34	0.000	.0954299 .1222677	
Res_Index_Year_minus2	-.0519584	.0056974	-9.12	0.000	-.0613308 -.042586	
INT_CC_ROE_CurrentYear	-.0070046	.001966	-3.56	0.000	-.0102387 -.0037705	
INT_CC_ROE_Year_minus1	-.0018411	.001961	-0.94	0.348	-.0050669 .0013847	
INT_CC_ROE_Year_minus2	-.0049493	.0019156	-2.58	0.010	-.0081006 -.0017981	
INT_CC_ROS_CurrentYear	-.0000186	.0000104	-1.80	0.072	-.0000357 -1.58e-06	
INT_CC_ROS_Year_minus1	-2.00e-06	.0000124	-0.16	0.872	-.0000224 .0000184	
INT_CC_ROS_Year_minus2	.0000321	.0000106	3.02	0.002	.0000146 .0000496	
INT_CC_NFP_CurrentYear	-.0000386	9.61e-06	-4.02	0.000	-.0000545 -.0000228	
INT_CC_EBITDA_CurrentYear	-9.82e-07	3.47e-07	-2.83	0.005	-1.55e-06 -4.11e-07	
_cons	-26.06904	8.916267	-2.92	0.003	-40.73651 -11.40158	
sigma_u	2.3255319					
sigma_e	4.1377402					
rho	.24005061	(fraction of variance due to u_i)				

F test that all u i=0: F(1412, 8989) = 2.12 Prob > F = 0.0000

As the regression estimate shows, the interaction between Credit Crunch and ROE in the current year and in year minus two suggests that a moderating effect of Credit Crunch on organizational Resilience exists. Similar conclusions hold for ROS.

Looking more specifically at the interaction between Credit Crunch and Net Financial Position and EBITDA, two main financial KPIs of firm performance, the regression model shows up a strong significance of the estimates, driving the conclusion that a moderating effect of Credit Crunch exists on organizational resilience.

Interactions with Bank Lending Surveys

Alongside GDP and Credit Crunch statistical analysis, a similar analytical framework has been adopted to understand whether or not Bank Lending Surveys are likely to moderate the effect of organizational resilience.

Bank Lending Survey questions n.6 and n.9 are the ones considered, since they were the only ones to have an impact on resilience in the fixed effects regression model.

The regression model introduced to address our research question for Bank Lending Survey n. 6 is the following one.

```

Fixed-effects (within) regression      Number of obs   =   10,522
Group variable: Num_Encoded          Number of groups =    1,413

R-sq:                                Obs per group:
  within = 0.0468                    min =          1
  between = 0.4906                   avg =          7.4
  overall = 0.1069                   max =          8

                                F(16,9093)      =   27.88
                                Prob > F           =   0.0000

corr(u_i, Xb) = 0.2623
    
```

Res_Index_CurrentYear	Coef.	Std. Err.	t	P> t	[90% Conf. Interval]	
GDP_IT_CurrentYear	.0000259	6.07e-06	4.27	0.000	.0000159	.0000359
LoansFlow_CurrentYear	-2.33e-11	6.27e-12	-3.72	0.000	-3.36e-11	-1.30e-11
BLS_Q1_CurrentYear	5.538743	2.306876	2.40	0.016	1.743882	9.333603
BLS_Q8_CurrentYear	1.096852	7.647415	0.14	0.886	-11.48331	13.67701
BLS_Q6_CurrentYear	-3.040287	1.714718	-1.77	0.076	-5.861035	-.2195386
BLS_Q9_CurrentYear	7.671384	2.962676	2.59	0.010	2.79772	12.54505
Res_Index_Year_minus1	.1082702	.0081554	13.28	0.000	.0948544	.1216861
Res_Index_Year_minus2	-.0512041	.0056748	-9.02	0.000	-.0605393	-.0418689
INT_BLS6_ROE_Year_minus1	-.0039573	.0012875	-3.07	0.002	-.0060752	-.0018393
INT_BLS6_ROE_Year_minus2	-.003796	.0013698	-2.77	0.006	-.0060493	-.0015427
INT_BLS6_EBITDA_CurrentYear	-1.14e-06	2.37e-07	-4.81	0.000	-1.53e-06	-7.52e-07
INT_BLS6_EBITDA_Year_minus1	-2.84e-07	2.72e-07	-1.04	0.297	-7.32e-07	1.64e-07
INT_BLS6_EBITDA_Year_minus2	7.15e-07	2.85e-07	2.51	0.012	2.46e-07	1.18e-06
INT_BLS6_NFP_CurrentYear	.0000265	.0000128	2.07	0.038	5.48e-06	.0000475
INT_BLS6_NFP_Year_minus1	-.0000395	.0000165	-2.40	0.016	-.0000666	-.0000124
INT_BLS6_NFP_Year_minus2	.0000116	.0000142	0.82	0.415	-.0000118	.000035
_cons	-42.15083	9.977236	-4.22	0.000	-58.5636	-25.73807
sigma_u	2.2345351					
sigma_e	4.1265604					
rho	.22673812	(fraction of variance due to u_i)				

F test that all u i=0: F(1412, 9093) = 2.02 Prob > F = 0.0000

Given the relevance of the Bank Lending Survey question for organizations, this regression suggests that question 6 along with ROE is significant to determine a moderating effect on organizational resilience (p-values < 0.01 for the preceding two years). Besides, looking at EBITDA, question 6 is able to influence organizational resilience as a moderator given that estimates for the current year and year minus two interactions are statistically significant (p-value < 0.01).

Lastly, question 6 of Bank Lending Survey studied together with Net Financial Position of current and previous year is driving a moderator effect on organizational resilience, with p-values lower than 0.05.

Then, the analysis switches to question 9 of Bank Lending Surveys, a more lenders-oriented question and the related model is presented below. For this analysis, however, only the interaction between question 9 and Net Financial Position was held in the model given its direct link with banks.

```

Fixed-effects (within) regression
Group variable: Num_Encoded

Number of obs   =    9,252
Number of groups =    1,413

R-sq:
  within = 0.0428
  between = 0.4213
  overall = 0.0712

Obs per group:
  min =    1
  avg =    6.5
  max =    7

F(11,7828) =    31.86
Prob > F =    0.0000

corr(u_i, Xb) = 0.1693
    
```

Res_Index_CurrentYear	Coeff.	Std. Err.	t	P> t	[90% Conf. Interval]	
GDP_IT_CurrentYear	.0000604	.0000264	2.29	0.022	.0000169	.0001038
LoansFlow_CurrentYear	-2.72e-11	1.04e-11	-2.60	0.009	-4.44e-11	-9.99e-12
BLS_Q1_CurrentYear	17.44169	9.307283	1.87	0.061	2.130765	32.75263
BLS_Q8_CurrentYear	-69.70357	43.58613	-1.60	0.110	-141.4049	1.997721
BLS_Q6_CurrentYear	-3.96942	1.704649	-2.33	0.020	-6.773649	-1.16519
BLS_Q9_CurrentYear	-3.000516	6.971183	-0.43	0.667	-14.46845	8.467416
Res_Index_Year_minus1	.1150181	.0085728	13.42	0.000	.1009155	.1291208
Res_Index_Year_minus2	-.051801	.0060409	-8.58	0.000	-.0617387	-.0418634
INT_BLS9_NFP_CurrentYear	2.06e-06	5.77e-06	0.36	0.721	-7.43e-06	.0000116
INT_BLS9_NFP_Year_minus1	.0000152	7.39e-06	2.06	0.039	3.06e-06	.0000274
INT_BLS9_NFP_Year_minus2	-.0000163	5.38e-06	-3.04	0.002	-.0000252	-7.48e-06
_cons	-97.58155	42.82789	-2.28	0.023	-168.0355	-27.1276
sigma_u	2.330824					
sigma_e	4.1718321					
rho	.23789283	(fraction of variance due to u_i)				

F test that all u_i=0: F(1412, 7828) = 2.00 Prob > F = 0.0000

Therefore, it can be said that question 9 of Bank Lending Surveys along with Net Financial Position is able to predict a moderating effect on organizational resilience when introduced before the current period.

3.7 Conclusions

As mentioned in the Paragraph 3.1, the objective of this research was to understand how the assets, liabilities and financial position has influenced the resistance and performance of organizations during the 2009 and 2012 crises. In addition, it was interesting to discover whether context and environmental factors have a moderating effect on firms' resilience.

Therefore, a paragraph related to the methodological note, two regression models and a time series for fixed effects were carried out to allow us to answer to these research questions.

What emerged from the analysis is that financial resources and profitability are essential for companies to survive and to be ready to fight against any shock.

As expected, company's ability to cover its debt through cash flows deriving from sales influences resilience, since high levels of indebtedness and potential financial tightening can compromise firms' ability to service debt when it is not accompanied by a corresponding increase in earnings (OECD, 2017).

The analysis of Resilience during the crisis of 2009 shows a high significance also for the company status. Companies that have failed and have fallen in a state of insolvency or liquidation do not present resilience, since they have not been able to resist to the pressure of the markets, to the tightening of credit availability or to the loss of profitability.

After that, the moderating effect on resilience of environmental factors, as Gross Domestic Product, Credit Crunch and the Bank Lending Survey, has been validated. Credit unavailability contributes to weaken firms' resilience, just as a negative growth trend of the economy.

FROM THE PAST FOR THE FUTURE **HOW MADE IN ITALY SMEs OVERCAME ECONOMIC CRISIS**

4.1 Introduction

In this chapter, the main findings of this research will be summarized and the two hypotheses presented in the previous chapter will be answered and confirmed.

Each finding has some managerial implications that can be useful for entrepreneurs to take the right decisions and to be aware of organizational resilience drivers, thus facilitating their company survival during hard times.

It is important to remember that Organizational Resilience is driven by quantitative, but also qualitative parameters, as organizational culture, customer centricity, authenticity or leadership that are difficult to measure. However, in this dissertation the effects of objective financial drivers and of measurable environmental factors will be analyzed, representing an useful tool to understand Resilience and its components in depth.

First, if we look at the multiple linear regressions (OLS) and at the their evolutions (GLM) executed before, the models are significant with an Adjusted R-squared that explains respectively 55% and 45% of the variance for the dependent variable Resilience during the financial crisis of 2008 and the crisis of 2011-12. Coefficients are significant at 90% of the confidence interval and being a research with a limited sample in the database it represents a good result.

Moreover, each year the 7,2% of the variation of organizational resilience within the sample of companies belonging to our dataset is explained by the moderating effect of Gross Domestic Product, Credit Crunch and Bank Lending Survey.

In the next paragraphs, we will start answering to the first hypothesis regarding the firms' influence of asset and financial position, and in particular of company's level of indebtedness and profitability on resilience.

Moreover, we will deepen the discussion about the moderating effects of context factors on resilience and their implications on decision-making.

4.2 The importance of Profitability

IN THE THIRD CHAPTER, WE HAVE DEMONSTRATED HOW LONG TERM RETURN ON EQUITY (ROE), LONG TERM RETURN ON ASSETS (ROA) AND LONG TERM EBITDA ON REVENUES (RETURN ON SALES) ARE STATISTICALLY SIGNIFICANT FOR BOTH THE ANALYSES OF RESILIENCE IN 2009 AND 2012.

It is well-known that ROE measures the profitability of a business in relation to the shareholder equity found on the balance sheet and that many investors tend to focus on this metric as their primary measure of company performance. Therefore, it shows how good the company's management is in generating returns from the cash it received from its shareholders.

However, ROE can hide many potential problems, since it can divert investors' attention from business fundamentals.

Indeed, it often happens that companies can resort to financial strategies to artificially maintain a healthy ROE: growing debt leverage and stock buybacks funded through accumulated cash can help to maintain a company's ROE even though operational profitability is eroding. However, excessive debt leverage can be dangerous for companies, especially when market demand for their products drops during the economic downturns (Hagel, Brown & Davison, 2010).

The most clever thing management can do to maintain a high ROE is to increase profit margins. There are multiple ways to raise profits, as raising the price of products sold, negotiating with suppliers to reduce costs, reducing operating expenses or labor costs.

According to Lelièvre, Radtke, Rohr, and Westinner (2019), by the first quarter of 2008, resilient companies had cut their operating costs by 1 percent, while those of their peers continued to grow. That decisive action meant resilient organizations had access to more cash, and they used it wisely: maintaining their relationships with key customers through

the recession and acquiring assets and companies from distressed rivals as the upturn began (Lelièvre, 2019).

Profitability can also be generated by innovation, by the possession of a strong competitive advantage or by managerial efficiency in reinvestments due to a competent leadership, which are other well-known drivers of Organizational Resilience.

An interesting issue for the management can be to understand whether cash and financial resources generated by the company are better to be reinvested or to be maintained within the firm to be more resilient in facing shocks.

In previous researches, Tognazzo *et al.* (2016) have sustained how the ability of organizations to overcome challenges period is affected by the use of slack resources. The authors took the Resource-Based View (RBV) as a starting point for the analysis regarding the slack resources. Valuable, Rare, Inimitable and Non-Substitutable (VRIN) resources can determine the success of organizations over challenge periods and gain competitive hedge over their competitors.

However, despite financial resources do not belong to the category of VRIN resources because they miss some of the attributes (i.e. rarity), they are essential. Prior researches have highlighted the importance of financial slack resources due to their ability to be readily transferred and used during challenges periods (Tognazzo *et al.*, 2016). Furthermore, Kraatz and Zajac (2001) suggest financial slack resources provide a sense of certainty about the future. In their study about the US airlines companies that survive after the terrorist attack of 9/11, Gittel *et al.*, (2006) found that the organizations that were better able to absorb the shock and performed efficiently their activities were those with the highest slack financial resources.

Therefore, management's objective should be to maintain a high ROE, trying always to increase profitability and efficiency, and at the same time, keep some slack financial resources that are essential for companies to survive, being resilient and being ready to fight against any shock.

However, return on assets (ROA) avoids the potential distortions created by financial strategies like those mentioned above. The long term ROA reveals how effective a company is, over time, at harnessing business opportunities in a highly uncertain environment. ROA can be seen as the most effective measure to assess company performance, since it captures the fundamentals of business performance, looking at both

income statement performance and the assets required to run a business (Hagel, Brown & Davison, 2010).

ROA explicitly takes into account the assets used to support business activities. It determines whether the company is able to generate an adequate return on these assets rather than simply showing robust return on sales.

Asset-heavy companies need a higher level of net income to support the business relative to *asset-light* companies where even thin margins can generate a very healthy return on assets.

Many companies outsource *asset-intensive* manufacturing and logistics operations to more specialized providers in an effort to create *asset-light* businesses. Even though, also intrinsically *asset-light* businesses have some limited current assets and fixed assets required to support the business.

Using Return on Assets as a key performance metric quickly focuses management attention on the assets required to run the business. Executives have more degrees of freedom today to outsource management of these assets and related business operations to more specialized companies.

The key question is: who is in the best position to earn the highest return on those assets? Thus, executive teams should focus their own operations more tightly on the activities and assets they are best qualified to manage and to spin out other activities and assets to more specialized companies (Hagel, Brown & Davison, 2010).

This behaviour contributes to increase organizational resilience and firm performance.

After that, we can try to analyse EBITDA on revenues, known as ROS and used to assess a company's profitability over five years as a percentage of its total revenue.

Return on sales reflects the company's operational efficiency: how effectively a company is producing its core products and services and how its management runs the business. Investors, creditors, and other debt holders rely on this efficiency ratio because it accurately communicates the percentage of operating cash a company makes on its revenue and provides insights into potential dividends, reinvestment potential, and the company's ability to repay debt.

Its decrease may be indicative of poor financial management or waste. On the contrary, a high Return on Sales reflects how well the company manages costs, responds to difficulties and comfortably survives to minor economic downturns and sales lapses.

Therefore, operational efficiency must be one of the main management goals running the firms, since it makes the company more resilient and able to overcome crises.

In the end, we can conclude that there are not single perfect metrics, but entrepreneurs and managers have to keep all these metrics into consideration to make their firm resistant to shocks. Indeed, ROA, ROE and ROS are different, but together they provide a clear picture of management's effectiveness (McClure, 2019).

4.3 Is a resilient company able to pay back its debts?

After that, the influence of firm level of indebtedness on organizational resilience has been observed.

As we have seen in the second chapter, high indebtedness may generate firms' vulnerabilities to financial and real shocks, but may also undermine growth and inclusiveness in the longer term. While finance and debt can support activity and innovation, there are potential trade-offs between growth and financial stability (OECD, 2017).

AS EXPECTED, THE LONG TERM NET FINANCIAL POSITION ON TURNOVER, THE DEBT RATIO WHICH EXPRESSES THE COMPANY'S ABILITY TO COVER ITS DEBT THROUGH CASH FLOWS DERIVING FROM SALES, RESULTS STATISTICALLY SIGNIFICANT IN OUR ANALYSIS, THUS INFLUENCING THE RESISTANCE OF FIRMS TO SHOCKS.

Indeed, the high levels of indebtedness weaken corporations' ability to withstand demand fluctuations and increase their vulnerability to shocks. Moreover, potential financial tightening can compromise firms' ability to service debt when it is not accompanied by a corresponding increase in earnings (OECD, 2017).

According to Lelièvre, Radtke, Rohr, and Westinner (2019), during the financial crisis of 2007-2008, the most resilient companies were able to clean up their balance sheets reducing debt, while most companies were accumulating it and selling off underperforming businesses (Lelièvre, 2019).

Therefore, excess leverage requires to the management particular vigilance, especially if it comes from rapid growth of private credit. Too much debt relative to investment can undermine the allocative efficiency of productive capital and hamper the ability of corporations to undertake new borrowing to finance productive investments.

As a result, firms with persistently high level of indebtedness and low profits can become chronically unable to grow and *zombie* firms (OECD, 2017).

Hagel, Brown and Davison (2010) confirm that excessive financial leverage becomes a “*large and inescapable burden in an economic downturn*”, sustaining there is a powerful alternative form of leverage: capability leverage. Capability leverage supports a business through all phases of the economic cycle. It is noted that specialized outsourcing providers, can provide key assets and capabilities quickly and more profitably to help companies ramp up rapidly during an economic upturn.

Finally, Long Term Net Financial Position on EBITDA, the other measure of repayment of debt, slightly misses the significance level, meaning that its predicting power on Resilience is weaker and subject to errors.

However, in this section, the two mentioned debt indexes highlight the importance for the management of monitoring the firms’ level of debt, cultivating resilience and using financial resources carefully.

4.4 The relationship between workers’ productivity and organizational resilience

In this section we will discuss about workers’ productivity, an index which measures the average revenue generated by each employee of a company.

This KPI reflects how efficiently a company is utilizing and managing its employees, increasing their motivation and efficiency.

FROM THE STATISTICAL ANALYSIS, WORKERS’ PRODUCTIVITY PLAYED AN IMPORTANT ROLE TO GENERATE RESILIENCE DURING THE CRISIS OF 2008, WHILE IT DID NOT CONTRIBUTE TO RESILIENCE IN 2012.

Seville *et al.*, (2013) already tried to provide a few important suggestions on how to manage workers to have a resilient company.

Figure 37 Resilience Pyramid



Source: Seville *et al.*, (2013)

The authors highlighted that staff productivity is fundamental for the firms to be resilient, but at the same time, organizations should be aware of workers' limitations during a crisis and in some cases should provide the availability of additional human resources to help the staff in difficulty. The four main pillars to generate resilience are the following:

- *Staff Engagement*: The engagement and involvement of staff who understands the link between their own work, the organization's resilience, and its long term success. Staff use their skills to solve problems and they are empowered.
- *Situation Awareness*: Staff is encouraged to be vigilant about the company, its performance and potential problems. Staff is rewarded for sharing good and bad news about the organization including early warning signals, which are quickly reported to organizational leaders.
- *Strong crisis leadership* to provide good management and decision making during times of crisis, as well as continuous evaluation of strategies and work programs against organizational goals.
- *Innovation and Creativity*: Staff is encouraged and rewarded for using their knowledge in novel ways to solve new and existing problems, and for utilising innovative and creative approaches to develop solutions (Seville *et al.*, 2013).

Organizations, to be resilient, need people who can respond quickly and effectively to change while enduring minimal stress.

Workers today face changes and challenges constantly in the work they do, in how they perform it, and with whom and where the work is performed.

As employees become empowered, their decisions are made under pressure and without an immediate approval. Indeed, meeting customers' needs on the spot, assessing situations quickly and taking fast decisions are fundamental in today's service economy. Sometimes, workers are placed in these situations without adequate training, preparation or resources. They need to learn how to be *resilient*, which means to design and implement positive adaptive behaviors quickly that match to situations, while enduring minimal stress.

Resilient behaviors help workers to meet customers' needs on the spot, to capture opportunities that may otherwise be lost and to act effectively and fast in crisis situations. A resilient organization should allow and encourage members to share decision-making power, leading to timely and effective responses to advance the organization and increase the probability of its survival.

Resilient employees expend less efforts in assimilating organizational change and therefore have greater potential to improve productivity and quality (Mallak, 1998).

Thus, an organization's capacity for resilience is developed through strategically managing human resources to create competencies among core employees, that when aggregated at the organizational level, make it possible for organizations to achieve the ability to respond in a resilient manner when they experience severe shocks (Lengnick-Hall *et al.*, 2011).

Finally, to improve workers' productivity and, resilience as a consequence, the increased intensity of work driven by the demands of technological pace and change that characterize the global information technology and all the industries should be taken into consideration.

Digitalization and information technology are changing rapidly the way employees work and putting it simply, yesterday's bold moves may be too timid in the face of tomorrow's challenges. Moreover, the steady annual productivity improvements that have become the norm in many manufacturing plants may not be enough to keep a company ahead in a

world where digital tools are delivering improvements ten times faster (Hagel *et al.*, 2010).

Flexible work, also, is becoming common in modern economies. Flexibility accommodates employees' needs and health, changing the concept of the workplace dimensions (Clarke *et al.*, 2017).

Therefore, managers should be able to keep up with the latest technology, artificial intelligence and work-life balance, and at the same time, encourage and motivate individuals, improving their resilience and the resilience of the company.

4.5 Environmental Factors as organizational resilience moderators

Organizational environment represents one of the major contingencies faced by a firm and it influences companies' strategies, structures and outcomes (Goll *et al.*, 2016).

In the following section, the moderating effect of environmental factors, as Gross Domestic Product, Credit Crunch and the Bank Lending Survey, can be discussed, answering to the second hypothesis of this dissertation.

RESILIENCE SEEMS TO BE MODERATED BY BOTH CREDIT CRUNCH AND GROSS DOMESTIC PRODUCT.

It is well-known from previous researches regarding Credit Crunch, that a sudden reduction in the availability of credit, seems to represent a threat to SMEs, which often do not have access to alternative sources of funds. This tightening contributes to lower SMEs' performance and competitiveness, together with a negative impact also on their level of investments and in the labour markets and productivity (Barone *et al.*, 2016). For this reason, the companies which have to face this phenomenon have more difficulties in being resilient, and this is supported by the quantitative analysis presented before.

At the same time, Gross Domestic Product is related to employment and tightly to firms' aggregate performance: when the economy shows a positive growth trend, firms grow too and they have more possibilities to be profitable and resilient.

As Krishnan and Teo (2011) sustain, a nation cannot grow unless its macro-economic environment is stable. Macro-economic stability means a situation in which a country has low inflation accompanied by falling budget and trade deficits and a low rate of expansion of money supply. The advanced countries with stable macro-economic environment will

have resources and policies for the business development and will have more positive growth trend, influencing the resilience of firms in a positive manner (Krishnan *et al.*, 2011).

The results related to Bank Lending Survey, instead, are more interpretable. Bank's perception about the events in financial market (*BLS Question 9*), that affects the costs related to their bank's capital position and constrains their willingness to lend, compared to the previous months, influences resilience.

INDEED, IF BANKS CONSTRAIN THEIR CREDITS BECAUSE THEY HAVE A NEGATIVE VISION OF THE ECONOMIC TREND OF THE MARKET, THE SMALL AND MEDIUM SIZE COMPANIES WILL SUFFER, THUS MAKING THEIR RESILIENCE ON TROUBLE.

Moreover, companies' market access when tapping their usual form of wholesale funding and the ability to transfer credit risk (*BLS Question 6*), as a result of the situation in financial markets, incides on resilience.

As highlighted by Chava and Purnanandam (2011), firms that can only accede capital through banks are most vulnerable to banking crises compared to companies with alternative sources of capital. Hence, it is important to help SMEs to have access to new types of funding to limit the impairment of loans in the future.

According to the other two questions 1 and 8 of Bank Lending Survey about the change of share of loans to households secured by real estate and the needs to fund draw-downs on commitments to asset-backed commercial paper programmes issued by conduits, there is not statistical significance.

FINALLY, IT IS ALSO INTERESTING TO OBSERVE HOW RESILIENCE OF PREVIOUS YEARS HAS A STRONG IMPACT ON RESILIENCE OF THE CURRENT YEAR. INDEED, COMPANIES TEND TO LEARN TO BE RESILIENT AND TO IMPROVE THEIR PRACTICES TO RESIST TO THE SHOCKS OVER TIME, THE SO CALLED *LEARNING EFFECT*.

4.6 Navigation Map to Resilience

Companies can't avoid volatility and uncertainty, but they can, and should, take specific actions to build greater resilience into their value chains. Resilience can be defined in this

context as an organization's ability to keep generating economic profit through cyclical and structural changes in supply and demand (Lelièvre et al., 2019).

In this dissertation, we have tried to understand whether firms' asset and financial position contributes to drive and build resilience. Understanding how the environment plays a role on organizational capacity of survival has been our second objective.

These two research questions have allowed us to develop a Road Map that can be useful to improve firms' effectiveness and to plan the resources to be resilient in the future.

Build the Business on solid ground by focusing on long term profitability

Profitability can be generated by innovation, by a strong competitive advantage or by managerial efficiency in reinvestments. Profitable organizations have access to more cash, and according to Lelièvre *et al.*, (2019) they use it wisely when they are resilient: maintaining their relationships with key customers through the recession and acquiring assets and companies from distressed rivals as the upturn begin. Moreover, an highest slack financial resources help organizations to absorb shocks and to maintain their efficiency.

Right Metrics can save the Business

ROA, ROE and ROS are different, but together they provide a clear picture of management's effectiveness (Mcclure, 2019). Return on Assets focuses management attention on the assets required to run the business, while Return on sales reflects how effectively a company is producing its core products and services and how its management runs the business. Therefore, metrics can support management to increase operational efficiency and to make company stronger and more resilient.

Debt level must be monitored

Highly indebted corporations present a high sensitivity to monetary policy tightening and to Credit Crunches, since high debt enhances the sensitivity to any increase of the interest rate and weakens organizations' ability to withstand demand fluctuations.

Thus, management should always cultivate the company's ability to cover its debt through cash flows deriving from sales, avoiding over-indebtedness.

Diversify firms' credit sources

As Chava and Purnanandam (2011) have sustained, firms that can only have access to capital through banks are more vulnerable to banking crises compared to companies with alternative sources of capital. Hence, SMEs should learn to exploit the recent increased number of alternative funds compared with traditional banking, and the evolution of intermediary models oriented to separately manage the liquid liabilities of banks, together with the securitisation of long-term loans (Malavasi, 2016).

Workers' engagement and motivation to drive productivity

Organizations, to be resilient, need people who can respond quickly and effectively to change while enduring minimal stress. Engagement and involvement of staff is the best way to help workers to be productive and to keep up with external world changes.

Economy's perception counts

In the previous sections, it was assessed a moderating effect of the environmental factors on organizational resilience. Therefore, it is well-known that Gross Domestic Product, Credit Crunch and the bank's and company's perception of the economy (Bank Lending Survey) can incide and influence the firms' resistance to shocks. Of course, it is noted that if GDP grows and the perception of economy is positive, businesses will grow too and will be able to develop capabilities that will be useful in downturns. With the same logic, if the economy faces a negative trend and is dominated by a huge Credit Crunch, companies will face more difficulties and will be less resilient.

Resilient companies in the past will be more resilient in the future

It has been demonstrated that resilience of previous years has a strong effect on the resilience of the current year. From this it can be assumed there is a learning effect over years: companies that have faced a shock, learn how to overcome it and develop some inherent characteristics that will allow them to better resist to new threats.

In conclusion, firms' management should be able to invest in firms' effectiveness, operational efficiency, and should keep cash, a few slack financial resources and a low level of debt within the company, trusting and looking to a variety of metrics as return on equity, return on assets and return on sales. Therefore, despite uncertainty and the

moderating impact of economic environment on firms' resilience, management must be ready to improve resistance and to change, developing the right capabilities.

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