LUISS Guido Carli
LIBERA UNIVERSITÀ INTERNAZIONALE DEGLI STUDI SOCIALI

Department of Economics and Finance

Bachelor Thesis

A first approach toward the evaluation of Startup Policy in Italy

Student: Giorgio Parlato – 178261
Email: parlato.giorgio@gmail.com

Supervisor: Professor Giuseppe Ragusa

Abstract

After a long and burdensome period of decreasing productivity, in 2012, the Italian government decided to bet on the country's capacity to innovate and grow once again. It implemented a program that immediately differentiated itself from the usual Italian reforms; it is dynamic, acts quickly and reduces bureaucracy instead of increasing it. The objective of this program, called Crescita 2.0, is to stimulate the birth and growth of highly innovative startups in Italy in order to encourage innovation, employment of qualified personnel and economic growth. Crescita 2.0 adopts a Systemic perspective to innovation policy, a framework that has been developed in the past 10 years and addresses a multitude of factors that could hamper the development of a healthy Innovation System. Even if it is early for drawing definite conclusions on the effectiveness of this reform, these types of policies require to be periodically evaluated in order to assess if there is the need for any modification or improvement. This paper attempts to make a first step toward the evaluation of this program, to provide a number of tools and ideas to those who will undertake a complete evaluation in the future.

Keywords: Innovation policy, program evaluation, startups, entrepreneurship, venture capital, Systems of Innovation

Summary

I. INTRODUCTION

> "Knowledge is the main driver of today's global economy; countries need to harness innovation and entrepreneurship to boost growth and employment. This is the key to a sustainable rise in living standards". This is what the OECD Secretary-General Angel Gurría said at the launch of the OECD Innovation Strategy in Paris (OECD, OECD.org, 2010).

The words "*entrepreneurship", "startups"* and *"venture capital"* have all become buzzwords in today's media and public policy debates, most governments have realized the potential of entrepreneurship and innovation policies and are giving them increasingly higher priority at both national and local level. The rationale behind government intervention is that innovations have been recognized as the chief catalyst behind developed countries' ability to grow, which is usually among the main concerns of policymakers (Lerner, 2010). Some countries started implementing startups-directed policies long time ago, while other governments started experimenting them only recently. For example, during the 90s, Israel designed a program that ended up creating one of the major technological hubs of the world in Tel-Aviv; the United States did it even earlier obtaining astonishing results. The global successes of technology clusters like Silicon Valley and Tel-Aviv persuaded many governments to attempt to emulate the programs implemented in the United States and in Israel, although the results did not always end up being as successful (Lerner, 2010).

Startups are the closest example to the Schumpeterian concept of "*creative destruction*", denoted as the "process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one" (Schumpeter, Capitalism, Socialism and Democracy, 1942). A number of academic papers found out that radical innovations are usually generated by small startup businesses rather than by large corporations (Acs & Audretsch, 1988) and entrepreneurs have a major role in this process, while the most important source of capital for startups is VC.

In Italy, the topics of innovation and entrepreneurship has been left as a secondary issue in policy debates for a long time, behind the huge public debt accumulated, the frightful unemployment rates, the enormous salaries of politicians and the continuous scandals that have been surrounding them. Only recently, in the aftermath of the global financial crisis, when the country's capability to grow was almost extinguished, did the Italian government launch a program, called Crescita 2.0, exclusively dedicated to sparking entrepreneurship and innovation; specifically, the program aims to encourage the birth and growth of innovative startups.

Designing such a policy is an arduous task; as we will see later, in order to obtain tangible results it is not enough to grant subsidies or tax reductions to innovative startups and/or venture capitalists, instead, it is required from policymakers to take a multi-dimensional approach. An extensive literature developed in the past 10 years deals with this issue analyzing the numerous factors that are relevant for developing a performing innovation system; from the quality of institutions and the labor market regulations (ease to hire new personnel to grow) to the supply of capital (usually not provided by banks) and the interactions among the main agents, a great number of factors have been considered to be crucial (Acs, Autio, & Szerb, 2013) (Bleda & Del Rio, 2013) (Woolthuis, Lankhuizen, & Gilsing, 2005).

Another important issue concerning entrepreneurship and innovation policies regards their evaluation (Georghiou, 1998). First, even though a great amount of effort has been put in to find a solution, there is still no agreement on a reliable quantitative measure for innovation (Nagaoka, Motohashi, & Akira, 2010). This makes it very difficult to evaluate a policy whose direct objective is to boost innovations. Secondly, despite the aforementioned extensive literature dealing with the ways in which the government should intervene to boost innovation, the literature on the evaluation of these policies is still in its infancy. This may be a critical problem, considering that usually these policies take some years before showing significant results, and considering that promising initiatives have been abandoned on the basis of some indicators which were not particularly fitting measures of the success of the policy (Lerner, 2010).

This paper attempts to contribute to the innovation-policy analysis methodology by attempting to carry out a general analysis of the program implemented in Italy in 2012 to encourage the development of a national startup ecosystem. Even though it may be still early to evaluate this policy and the datasets available are not exhaustive, the main aim of this paper is to make a first step toward that direction, providing a general analysis of the policy and some guidelines to those who will carry out an evaluation in the coming years.

First, I will address the reasons that drive governments to intervene in order to encourage innovation. There are different schools of thought on this matter; they all recognize the need for the government to intervene because of the positive externalities that innovations generate, though, there are divergences in the type of tools to be implemented in order to encourage innovative activity. I will also address the already introduced issue of policy evaluation and explain why it is so important.

Then, I will describe the situation in Italy that led to the design of Crescita 2.0, the main reasons why the country was not capable to grow anymore and why it decided to bet on startups in order to improve its situation. In order to carry out a comprehensive analysis of the policy I will first detail all the

implications and characteristics of the program, and then I will compare the main features of Crescita 2.0 to the ones of the Israeli Yozma program, which is one of the most popular examples of a successful policy.

Finally, using the data granted by the Italian Ministry of Economic Development I will provide an overall picture of the current Italian startup ecosystem, then, in order to give a more thorough picture of the characteristics of the startups, I will run three regressions using the Ordinary Least Squares model and the logit model. Finally, I will draw some general conclusions on the policy and provide some suggestions for its future evaluation.

II. INNOVATION AND THE ROLE OF GOVERNMENT

Technological innovation, defined as the process of converting inventions, ideas, and knowledge into new products, services, and processes to generate economic returns, has been shown several times to have a significant effect on countries' capability to grow, as it increases the productivity of both workers and capital, giving a boost to output per capita. Nowadays more than ever, developed nations' competitiveness depends on their capacity to innovate, introduce new products, services and processes; policymakers have realized it and this is why governments are playing an increasingly bigger role in stimulating innovation (Weil, 2012). In this chapter, I will analyze how the government should intervene in order to stimulate innovation according to different economic theories, also highlighting the importance of a proper evaluation in designing an effective innovation policy.

i. Market failure and the Neo-classical approach

In the past 100 years, the scope of government intervention has increased hugely; in most developed countries, on average, the ratio of government expenses to GDP has more than doubled (Rosenberg, 2004). Indeed government interventions has not been confined to the provision of public goods as defined by economics (defense, law and order, roads). Rather, governments, pushed by the urgency of economic growth, started intervening also in those private markets that did not supply the related services adequately, as for example education, health and welfare. At a later stage, it was realized that also the market for innovations presented market failures, as innovations are non-excludable, they carry with them positive externalities (increasing general productivity, causing knowledge spillovers) and create situations of asymmetric information.

Therefore, the common view in economics has been to implement innovation policy to address a market failure. Non-excludability implies that an inventor cannot prevent others from using his

invention, therefore the inventor, if not supported in some way by the government is not incentivized to keep innovating. Although, the issue of non-excludability has long been recognized and it has been successfully addressed with the introduction of the patent system, which grants to inventors temporary monopoly rights. It is worth of notice that patents also create an inefficiency allowing "legal monopolies", but delving into this issue goes beyond the scope of this paper.

In addition, innovations carry positive externalities, represented by the knowledge spillovers that occur after an invention has been revealed, which increase the overall level of knowledge and eases the introduction of future innovations, this means that the private returns of innovators, are less than the total benefits created by innovations. Further, dealing with innovation, only few agents or sometimes no one has the knowledge of the quality and the economic potential of a certain innovation. This situation, known as Knightian uncertainty, alters the incentives of economic agents, creating an inefficiency in the market. Thus, in an unregulated market, innovators lack the necessary incentives to make an optimal level of investment.

Positive externalities and asymmetric information have usually been addressed by governments through the provision of subsidies and tax incentives directed towards those deciding to invest resources in such an uncertain territory. *Figure 1* below makes clearer why a subsidy would align the inventors' incentives with the ones of society.

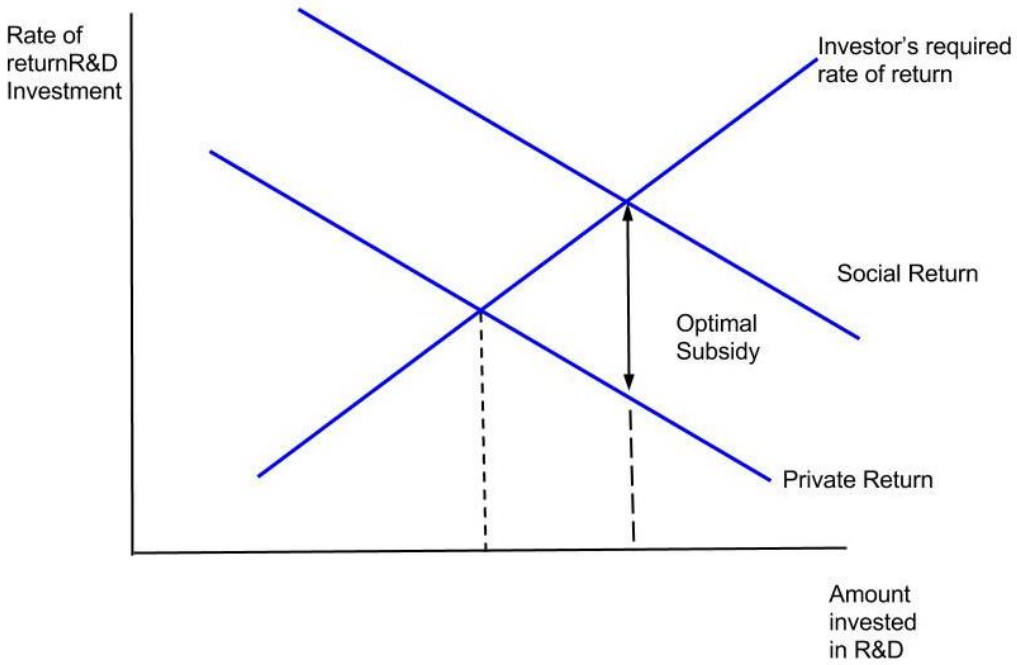

Figure 1

Therefore, the main objective of policymakers dealing with innovation has usually been, to both allow innovators to reap the financial benefits generated from their inventions and to compensate those that invest in the production of new ideas for the missing information. In this way, the private incentives of innovators would be aligned to the socially optimal ones, leading to an optimal amount of production and distribution of new information.

ii. National Systems of Innovation and Entrepreneurship

Over the past 20 years, researchers gradually developed a new concept regarding the role of the government in stimulating innovation, the National System of Innovation, which casted doubts on the general belief that innovation policy should be implemented as a solution to market failures.

According to this framework, the process of innovation needs to be viewed as born out of the interactions of firms, organizations (research institutes, financial organizations) and institutions. The main theoretical underpinning is that knowledge is a fundamental resource that accumulates and that is produced as the result of an interactive and cumulative process embedded in the institutional context (Acs, Autio, & Szerb, 2013). In this view, the focus shifted on the context and on interactions, giving great importance to the institutional structure in which the innovative processes take place. Empirical studies, such as the Community Innovation Survey, confirmed that innovation rarely comes from individual firms that act in isolation; instead, it is essential that they interact with other actors for new ideas and complementary knowledge (Arnold, 2004). Asymmetric information is not seen as a problem in itself anymore, without asymmetric information, there could be no innovation; "these failures are an intrinsic consequence of the process of innovation itself and could only be eliminated if innovation ceased" (Dodgson, Hughes, Foster, & Metcalfe, 2011).

According to this theory, the market failure's perspective is too narrow to provide adequate analytical and empirical basis for innovation policy since it does not take into consideration the totality of interactions that take place in an Innovation System. This approach elaborates on the notion of *system failure*, rather than market failure, a much wider and heterogeneous concept that, is argued, could help policymakers to identify leverage points for enhancing innovative activities and designing a more effective policy (Dodgson, Hughes, Foster, & Metcalfe, 2011).

According to this approach, system failures are essentially problems in the coordination of knowledge, limits in the agents' ability to acquire new knowledge, lack of interaction between actors, limits in their capabilities and absorptive capacities. Failures or imperfections in the system may occur because of several reasons; the literature on NSI has identified the following categories:

1. Infrastructural failures (Communication, Technology and energy)
2. Capability Failures (inability to adapt to new technologies, lack of "*absorptive capacity*")
3. Hard Institutional failures (legal framework)
4. Soft Institutional Failures (culture and social values)
5. Network Failures (lack of linkages between actors) (Woolthuis, Lankhuizen, & Gilsing, 2005).

Although, this perspective does not deny the effectiveness of the traditional approach to innovation (subsidies, tax incentives) (Boadway & Tremblay, 2003), rather it asserts that these measures should be broadened in order to produce significant enhancements to the Innovation System. Indeed, in order to develop an effective Innovation System it is fundamental to enhance capabilities, promote the learning process and encourage experimentation and failure (Bleda & Del Rio, 2013). In other words, facilitating collaboration and networking between different actors in the system needs to become a priority of a proper innovation policy.

The framework of National System of Innovation is still expanding and developing. A recent paper by Acs et al recognized that the NSI literature, with its focus on structure and institutions overlooked the role of entrepreneurship and individual agency in driving innovation in countries (Acs, Autio, & Szerb, 2013). Actually, according to Schumpeter, entrepreneurship was the fundamental element in the innovation process. Although in the NSI, individual action was either not considered or it was assumed to happen automatically. In order to take into account this element, Acs' paper introduced the notion of National System of Entrepreneurship, which deals with both the institutional context and the population level context, meaning with the attitudes, abilities and aspirations. They emphasize the fact that knowledge accumulates through a trial and error process, as entrepreneurs attempt to exploit the opportunities they perceive. The concept of NSI can thus be extended to also include single agents, their interactions and their needs in the innovation process. The implication is therefore, that governments, in addition to encouraging institutions to accommodate innovative activities should allow entrepreneurs to put their ideas into practice, and exploit the opportunities that they recognize in the market. Therefore, in this new viewpoint, human capital acquires even more importance, along with the level of motivation, risk acceptance and failure acceptance of people in a given country. This points out that according to this perspective, in order to really encourage the generation of innovative ideas it is also necessary to induce a shift in the general mindset and culture of a given country.

I will now turn to the second important step in the design of innovation policy, program evaluation.

iii. The role of evaluation and its challenges

As in past years policy-makers have been struggling trying to improve the performance of their innovation systems, in particular trying to help firms in their countries become more innovative, it should not be surprising that there is an increasingly stronger desire to figure out what instruments work and what do not (Georghiou, 1998). To address this issue, it is necessary to conduct a comprehensive and data-based evaluation of the policy. The aim of evaluation policy should be to determine the effectiveness and the efficiency of the policy and to provide useful information that can be incorporated into the decision-making process (OECD, 2002).The practice of policy evaluation has traditionally been used to deal with individual interventions. A typical example could be a program whose objective was to reduce unemployment. In this case, the evaluation approach was relatively unambiguous, measure unemployment before and after the program and then figure out (if there was a significant change in unemployment) if there was causality (Arnold, 2004).

The mechanism is different when talking of innovation policy, especially because innovation is now seen as a dynamic and systemic process. This implies that the cause-effect relationships are much more complex in the field of innovation; therefore, the traditional ex ante ex post comparison is inadequate and needs to be extended. Consequently, also policy evaluation needs to evolve "from being static pieces of information about policies' effectiveness towards being integrated, dynamic learning processes that interact with policy-making" (Magro & Wilson, 2013). Thus, ideally innovation policy should be improving and adapting according to the results of a proper policy evaluation.

Unfortunately, evaluating innovation policy is an extremely difficult task for a number of reasons. First, the measurement of innovation has always been an uncertain and debated topic, it is possible to find a vast literature dealing with how to measure it correctly, but no definite agreement has been found yet. The indicators could be either innovation inputs, such as R&D expenditures, or innovation outputs as the number of patents and the number of new products or processes. The most commonly used indicator is the number of patents. Although it has also been stressed several times that measuring the number of patents does not give an acceptable measure. First, only half of the patents owned by a firm are used, while the remaining half of the patents are taken out for strategic and other reasons (Nagaoka, Motohashi, & Akira, 2010). Moreover, among the commercialized patents not all have the same economic value; it would be a colossal mistake to consider equally contributing to innovation the newly invented automatic toilet seat closer (Ross, 2015) and a new Internet of Things software. Moreover, even if we found a reliable and measurable indicator for innovation, since it is

such a complex process, it would be very difficult to show the causality of a specific policy tool on the results obtained.

One important source of information are innovation surveys, which gather data from individual firms on their R&D expenditures, and other innovation inputs and outputs. From the perspective of National Innovation Systems, these type of data are the most comprehensive, as they include the sources of information relevant to innovation of each firm, so for example we would know if the most important information sources comes from within the firm, from suppliers, consultants or from public research. Therefore, they provide information about the interactions that firms have in the innovation process. The problem of these data is that they are mainly qualitative type of data, which means that they make it harder to conduct an appropriate econometric analysis.

A step forward in dealing with this issue was made in the paper previously cited by Acs et al that introduced the concept of National System of Entrepreneurship, where the authors designed an index, called the GEDI index, that measures the health of the entrepreneurship ecosystems in each country and allows an easy comparison among countries. The GEDI methodology collects data on the entrepreneurial attitudes, abilities and aspirations of the local population and then weights these against the social and economic 'infrastructure' – this includes aspects such as broadband connectivity and the transport links to external markets. Even though the GEDI is widely recognized as a reliable indicator, to evaluate a policy this index does not allow showing the causality between the policy and the change in the index.

One alternative to measuring innovation directly when evaluating an innovation policy is to determine if the ultimate objectives of the policy have been achieved. Indeed, "innovation is rarely a goal in itself, but a means to achieve broader political goals like economic growth, increased employment, environmental protection, military capacity or public health" (Borràs & Edquist, 2013). Therefore, if the goals of the policy were explicitly stated, it could be possible to evaluate the policy by the achievement of those ultimate goals, even though the problem of causality persists. In chapter IV, I will elaborate more on the problem of program evaluation attempting to provide some suggestions to evaluate Crescita 2.0.

The important role that innovation plays in economic growth, development and the well-being of countries has long been understood. The large literature on NSI thoroughly explained that innovation is a process that depends on a number of factors and interactions, and that a simple subsidization of innovative activities may be ineffective. The approach that needs to be taken is much broader and includes human capital, labour mobility, knowledge spillovers and many other factors. With these multi-dimensional policies, the need for evaluation becomes even more urgent. The ability to identify

what instruments have effect and which ones do not is essential in order to provide policy makers with strong analytical tools, policy learning and guidance.

III. THE ITALIAN CASE

Contrarily to what one may think today, Italy has a great history of innovation. Between the 1950 and 1973, its GDP per capita grew by an average of 5.3% per year and industrial production grew by 8.2% per year (Toniolo, 2011). This was, among other reasons, due to the introduction of several innovations "made in Italy". Italy was indeed among the pioneers in the development of microprocessors and of the first personal computer, thanks to innovative firms like Olivetti and Società generale Semiconduttori who led the way into the computer technology. Although, Italy's history of innovation is not confined to science and technology, over the years the country has been able to exploit its greatest strengths as clothing and food thanks to the development of firms that continuously export their products around the world, often becoming global leaders (Di Camillo, et al., 2012).

Although from the end of the 80s onwards, Italy experienced a huge decline both in economic growth and in productivity. The reasons for this big slowdown are various, among which, the high public debt accumulated that drove up interest rates and required higher taxation and the peculiarity of the Italian firms' ecosystem, being the colossal majority of (non-innovative) SMEs compared to bigger firms which restrained the country's ability to invest in R&D and to introduce innovations (Toniolo, 2011). In short, because of characteristics very specific to the country, Italy was not able to adapt to the great shock caused by the technological revolution that occurred in the past 25 years.

Towards the end of 2011, as the consequences of the global financial crisis were still intense, in the midst of the Euro sovereign debt crisis, Italy was recording a major recession, had a constantly increasing unemployment rate and a debt over GDP ratio of 122%.

"*The downturn started earlier and lasted longer than in most of the euro area (EA) countries. It was exacerbated by the economy's long-standing structural problems and reliance on international trade. Per capita GDP and productivity in 2010 were lower than in 2000, with Italy experiencing the largest per capita GDP contraction among OECD member countries over a decade*" (IMF, 2011).

As the situation became critical, following Berlusconi's resignation, it was deemed necessary, in order to rescue Italy from the abyss, to elect a government of technocrats led by Mario Monti. In an

official document where Monti explained the reform plan of his government, he also highlighted the three main factors responsible for the decrease in Italian productivity:

i. The decrease of the relative weight of the manufacturing sector, and the increase of the services' sector, characterized by a higher use of labor, by lower efficiency levels and a lower display in the international competition
ii. A development model based principally on manufacturing SMEs that show a smaller capability of absorbing new technologies and of penetrating international markets, in particular those of the developing countries.
iii. A low level of human capital (Monti, 2012)

The problems highlighted by Monti, clearly pointed out that Italian firms, and more in general Italian people did not move forward at the same pace at which technology did. Instead, they lagged behind, unable to absorb new technologies or generate new ideas, mostly depending on the manufacturing sector and with an underdeveloped human capital.

The OECD country report for Italy of 2011 confirmed the critical picture of the country's capacity to innovate. It showed that the Italian efforts to engage in innovative activities were minimal; the GERD (Gross domestic expenditure on R&D) was only 1.26% of GDP, about half of the OECD average, more in line with emerging economies (OECD, 2012). Of this amount, only around half was performed by the business sector, indicating very weak linkages between businesses and science. The main reason behind the underinvestment by businesses in R&D, though, is the huge prevalence of SMEs in Italy, which constitutes the 99.9% of the totality of the firms (ConfCommercio, 2009), the majority of which do not undertake any innovative activity at all (InfoCamere, 2015).The problem of this situation is that it creates a self-reinforcing mechanism that keeps worsening; the scarcity of innovative firms in Italy causes the already few Venture Capitalists that want to invest in Italy to not find any profitable innovative firm to finance and to end up looking for investment opportunities abroad. *Figure 2* illustrates this.

On the other hand, the few innovative firms trying to start in Italy are confronted with many roadblocks and difficulties in finding financing and either abandon their project or decide to look for capital in other countries, reducing even further both the number of innovative firms in Italy and the investment opportunities for Venture capitalists. This will reduce VC supply and innovative firms even further as the cycle continues. Actually, there are some examples of Italian entrepreneurs who struggled to find capital in Italy, then went to the US and gained a huge success thanks to innovative startups (Mashape.com).

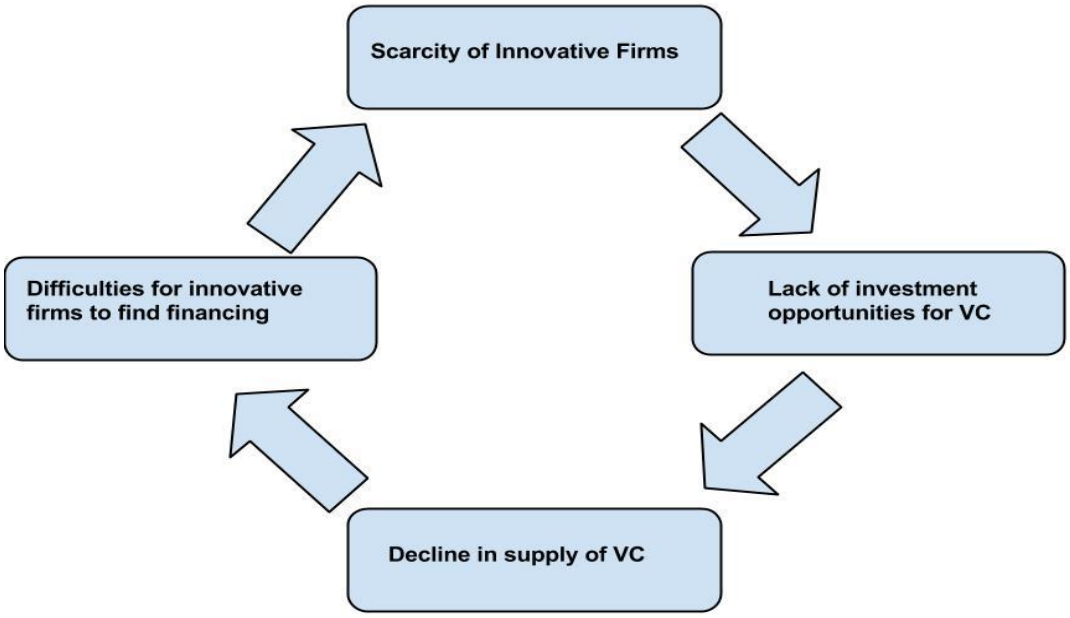

Figure 2

The OECD research found out that indeed Italy had the lowest supply of VC capital of all the OECD countries (OECD, 2012). It is clear that the scarcity of innovative firms does not only depend on this cycle, as already said it has been an intrinsic characteristic of the Italian firms' ecosystem for a long time. Although, this cycle shows how important it is for the government to intervene in a situation like this one, as in absence of intervention, this cycle fuels itself completely eliminating any opportunity for the creation of innovative firms.

Another finding of the OECD report was that the level of human capital in Italy was well below the OECD average; in addition, the lack of attractive career prospects pushed the most qualified individuals to search for better opportunities abroad reducing the already limited amount of human capital (OECD, 2012). This is evidently a capability failure, which reduces both the country's capacity to innovate and to adapt to new technologies.

A research by the Global Entrepreneurship Monitor pointed out instead that the Italians' capacity to start businesses is hampered by fear of failure. The percentage of Italians whose main cause for not founding a business is the fear of failing is 58%, the second largest in Europe (GEM, 2014). The NSI framework would identify this as a failure in culture and social values, namely a soft institutional failure.

Finally, making a quick research on the internet it is possible to see that Italy is quite well known all over the world for its slow and inefficient bureaucratic system, which according to the NSI framework

is considered as a hard institutional failure. This inefficient bureaucracy is surely a huge burden for any entrepreneur who wants to start a new business and is obliged to go through several complicated and time-consuming administrative steps. Moreover, the name that Italy has made of itself about its bureaucracy around the world surely contributes to discouraging any potential foreign investor or entrepreneur interested in making business in Italy.

Let us now see the measures that the government was implementing before the introduction of Crescita 2.0 to increase innovation. Innovation policy in Italy was mainly driven by Regional policy that aimed at reducing the technological and economic gap between Northern and Southern regions through subsidies given to the poorer regions in specific sectors relevant for innovation. An example of this is the High-Tech Fund, established in 2005, whose objective was to finance private funds that were investing in southern high-tech companies, up to 50% of the private investment. Unfortunately, this program encountered many difficulties; it took eight years before the capital provided by the government reached the businesses. Further, of the 80 million provided by the government, 20 million were "lost" during the collapse of the private fund that received it, which was later incriminated for fraud (Santelli, 2014).

In addition, there was an SME policy (Potì & Reale, 2011), an example of which is Industria 2015, which aimed to support SMEs' expenditures in R&D and Innovative projects. Although, six years after its implementation, of the 303 projects that were presented, only three managed to get through the necessary red tape to obtain the funding, moreover in order to receive the capital, businesses had to wait between 23 and 25 months (Ferro, 2014). This clearly made the policy much less effective.

Therefore, the innovation policy designed up to 2011 did not work properly because of the presence of overly complicated bureaucratic steps, slowness in the implementation and little judgement in allocating the funds. Moreover, many of the systemic failures previously cited were not addressed at all; instead, the policy was based mostly on pecuniary incentives. As we have seen in the previous chapter, these type of tools alone are not enough to create a continuously innovating environment in which actors interact and collaborate, especially if there are various system failures hampering innovation from different sides. The Israeli experience, before the introduction of the Yozma program, demonstrates indeed that VC-directed incentives and tax reductions cannot represent the core of a policy directed to the creation of a new high tech sector (Avnimelech & Teubal, 2003).

As the situation was so critical, it was evident that there was the need for the Italian government to intervene to give a boost to innovation and productivity; this could be achieved by implementing an all-around innovation policy that took into consideration all the impediments to the birth of innovative firms in the country.

i. Betting on Startups

Among the several reforms made by Monti's government, in October 2012 the Italian government approved a decree (Law 221/2012), proposed by the Minister of Economic Development Corrado Passera, that aimed at stimulating innovation by encouraging the birth of innovative startups, turning Italy into a friendly place for the creation of startups and finally increasing the country's competitiveness. The reform includes the proposals contained in "Restart Italia!" a report drafted by a task force of 12 experts set up by the Minister, composed of entrepreneurs, managers and academic professors. As I will explain, this reform did not limit itself to giving pecuniary incentives to new startups or VCs but took an all-around approach. The choice of focusing on startups in order to boost innovation and employment seems to be appropriate for several reasons.

Startups have long been recognized (Since Schumpeter's work in 1947) as playing a relevant role in driving economic growth through innovation. Actually, startups are the most fitting example to the Schumpeterian concept of "creative destruction" (Adelino, Ma, & Robinson, 2014). Think of Uber, a transportation business that owns no vehicles, and that completely disrupted the market for urban transportation all around the world. In several industries, big firms have been succeeding over the years thanks to the exploitation of incremental innovations, until a small new entrant introduced a radical innovation that allowed it to disrupt the incumbents and enter the market (Christensen & Rosenbloom, 1993). Academic research has highlighted numerous times the role of startups and venture capital in stimulating innovation. A study estimated that "a single dollar of venture capital generates as much innovation as three dollars of traditional corporate research and development" (Lerner, 2010). Moreover, the birth of innovative businesses would consequentially also increase the demand for highly qualified people in Italy, thus reducing the issue of human capital scarcity. Innovative startups may be useful in helping the country to keep its most talented minds in Italy, and increase the general level of innovative activities and absorptive capacity.

Further, creating a startup-friendly environment would also encourage the formation of a market for venture capitalists and angel investors. This reform can indeed increase the country's attractiveness to both international and domestic investors, setting in motion a path-dependent feedback loop, the opposite of what explained before (Avinmelech G., 2004). Indeed, the activities associated with entrepreneurship and venture capital usually have positive spillover effects on each other. This is exactly what happened in Israel during the 90s following the implementation of the Yozma program, whose objective was to stimulate domestic and foreign investments in local startups; this fueled further the birth of startups. Furthermore, many studies have acknowledged the importance that startups have in the job creation process (Parker, 2009) (Kane, 2010), usually providing good

opportunities for people with high education (Adelino, Ma, & Robinson, 2014) (Kane, 2010). Working in startups, can also have the effect of increasing even more the level of human capital through knowledge spillovers. Finally, other studies have shown the important role that startups play in enhancing productivity (Van praag, 2007) and in facilitating knowledge spillovers among research and industry (Terjesen & Wang, 2013) (Plummer & Acs, 2012).

In the next chapter, I will examine the characteristics and implications of Crescita 2.0.

IV. "CRESCITA 2.0": POLICY ANALYSIS

In the field of startups, Italy is a latecomer; as said, many countries implemented policies directed at encouraging startups and venture capitalists long time ago, Israel did it successfully during the 90s and the United States did it even earlier. Although, being late is not necessarily a disadvantage. The Italian government, in drafting the policy, could take into consideration the past experiences in other countries and distinguish between the measures that worked properly and those that turned out to be ineffective.

i. The Traits of the policy

Because of the peculiarity of Italian firms, being that most firms (even the newborns) do not have any innovative nature, there was the need to introduce a specific definition for startups, with some clear-cut requirements. Otherwise, many of the new firms that would receive the funding would be non-innovative firms, thus not stimulating innovation, economic growth and demand for qualified human capital. In order to qualify as an innovative startup, first, firms must be *"companies with shared capital, which are not listed on a regulated market nor on a multilateral negotiation system"* (Ministry of Economic Development, 2014).

In addition, they have to meet all the following requirements:

- have been operational for less than 4 years;
- have their headquarters in Italy;
- have a yearly turnover lower than 5 million euros;
- do not distribute profits;
- develop and commercialize innovative products or services of high technological value;
- are not the result of a merger, split-up or selling-off of a company or branch;

Moreover, they must have at least one of the following criteria, which is needed to assess that the startup has an innovative nature:

1. At least 15% of the company's expenses is allocated to research and development activities;

2. At least 1/3 of the total workforce are PhD students, the holder of a PhD or researchers; alternatively, 2/3 of the total workforce must hold a Master's degree;

3. The enterprise is the holder, depositary or licensee of a registered patent (industrial property) or the owner of a program for original registered computers (Ministry of Economic Development, 2014).

In describing the main implications of the reform, for simplicity, I divided the effects of the measure in three macro areas: capital provision, cuts in bureaucracy and tailor made labor regulations.

a) <u>Capital provision</u>

One of the most fundamental elements for the birth and development of a startup is capital, which is necessary in order to commercialize an innovative idea or technology. Financing startups in their early stage is usually a highly risky investment because, being very innovative ideas, it is nearly impossible to predict how the market is going to react to their introduction. This situation is known in entrepreneurial theory as Knightian Uncertainty and is defined as a situation in which "no agent in the system can possess accurate knowledge of the future owing to the fact that much knowledge relevant to the prediction of the future has not yet been created by any economic agent" (Dew, Velamuri, & Venkataraman, 2004). Reducing this specific type of uncertainty is impossible, thus to encourage investments in startups, what can be reduced is the potential burden of investing. This is what the Law 221/2012 provides in order to grant more startups the necessary amount of capital to start their activities successfully.

- Fiscal incentives for both corporate (20% off corporate income tax) and private (19% off income tax) investments
- Equity Crowdfunding (introduction of regulations and certified web portals of crowdfunding)
- Fast and free-of-charge access to the Fondo Centrale di Garanzia (a Government Fund that provides a guarantee of 80% of bank loans, making it easier to access debt capital) for both startups and incubators.

The reform, though, is not only providing pecuniary benefits to those who decide to invest in innovative startups (as VCs or Angel investors). It also contributes to increasing the potential sources

of start-up capital, creating a dedicated web portal for crowdfunding and giving access to a free-of charge Government fund. It is worth to note that the Fondo Centrale di Garanzia provides access not only to startups but also to incubators[1]. This measure is a great tool to improve both the network and the ecosystem in which startups develop and grow.

b) <u>Cuts in bureaucracy and practical facilitations</u>

Creating a new business is already quite a complicated and stressful task in itself everywhere in the world, the exhausting red tape burdens typical of the Italian system can be a huge deterrent to entrepreneurship, especially for novices and foreigners. Thus, it was fundamental for this decree to include some simplifications of the bureaucratic requirements, at least for innovative startups. Moreover, the Italian system imposes oppressive regulations on firms that report systematic losses and on the ones that are failing; this surely is a great impediment for who wants to start an innovative business. The measures of the reform diminish the burden of the bureaucratic system and introduce some simplifications in the following ways;

- Exemption from payment of stamp duty and fees, when registering in the company register (for both startups and incubators)
- Possibility to register online
- Flexible Corporate Management (even if registered as limited companies they can assign non-voting or preferred stocks)
- Exemption from oppressive regulations on companies reporting systematic losses (allow startups to complete the launch stage and later recover from the losses incurred)
- Fail Fast Mechanism (avoids that the entrepreneur of a failing company remains stuck in the liquidation procedure, instead allows him to start a new venture without suffering reputational and financial costs).
- Support in the Internationalization process (legal, corporate and fiscal assistance and participation free of charge to selected international fairs).
- Italy Startup Visa, a rapid and simplified mechanism for granting visas to foreign innovative entrepreneurs that intend to create a startup (introduced on June the 24th of 2014 to attract investments and highly qualified human capital).

[1] Incubators have to meet the following requirements to enjoy the benefits of the reform: 1) Availability of appropriate structures to accommodate startups 2) Availability of adequate equipment for the startups' activities (as ultra wideband) 3) Has to be directed by people of recognized competence in innovation and business 4) Has collaboration relationships with university, research centers, public institutions and financial partners that undertake activities related to innovative startups 5) Has adequate and demonstrated experience in the activities of support to startups

Therefore, once again, we can see that the reform is working on the whole innovation system, making it easier for people to start a business and also trying to force a shift in the general beliefs of the Italian culture about starting a business and failing. Not only it facilitates the birth of startup firms, it also sparks their development and growth by allowing them to incur in systematic losses in their early stage. Finally, the introduction of the Fail Fast mechanism, which corrects the harsh Italian bankruptcy regulations that punish entrepreneurs whose companies fail, helps in stimulating the birth of startup firms even more. The intention of this mechanism is also to inspire a change in the culture of Italian people who have been accustomed to considering those who fail as "losers".

c) Tailor-made Labour Law

This macro-area includes the measures that ease the development and growth of innovative startups, aimed at encouraging the hiring process through a more flexible and less burdening labor regulation. These supporting measures consist of:

- Possibility of stipulating easily renewable contracts of different lengths (minimum of six months)
- Possibility of stipulating a fixed-term contract lasting up to the end of the fourth year of the startup's life
- Flexible remuneration system (salaries can depend on the overall performance or on the achievement of pre-set targets) including stock options and work for equity schemes, which are tax deductible (true for both startups and incubators)
- Tax-credit of 35% for the cost of hiring high-qualified personnel (in possession of a PhD or a Master's degree in scientific areas) with an open-ended contract (true for both startups and certified incubators).

This part of the reform shows the intention of policy makers not only to stimulate job creation, especially of highly qualified people, but also to aid startups grow by making it easier and less burdensome for startups to hire.

In designing this reform, a serious effort has been put in to eliminate the obstacles that were hindering the birth and development of startups from several different sides. Crescita 2.0 goes against the tide of the usual slow and cluttered Italian legislation. The red tape facilitations reduce the typical time-consuming and costly burdens of the Italian bureaucratic system. In addition to simplifying the process of doing business, these measures may reduce the concerns of foreign entrepreneurs wanting to create new ventures in Italy. The measures aiding investments on startups, instead, should increase the probability of startups receiving early stage investments and should ideally encourage the

development of a startup-friendly ecosystem able to also attract foreign capital. Startups tax reductions allow entrepreneurs to plow back more of the cash flow generated into the business, which is suggested to be one of the most important sources of financing for entrepreneurs (Lerner, 2010). The introduction of a regulation for crowdfunding can also be an important source of capital for startups and may allow them to raise capital from abroad. The ad-hoc labour regulations, if effective, should both aid startups' development and encourage job creation.

In addition, this reform is trying to stimulate an actual shift in culture, by encouraging young educated people to develop their ideas without being intimidated by the terror of failing. Indeed, if many startups fail, we should not interpret it as a bad sign for the success of the reform; it would mean that they are actually taking risks, trying to implement that "creative destruction" Schumpeter was talking of. Moreover, an experience founding a startup even if ended up with a failure, would anyway give a huge boost to the human capital of all the founders. A study of September 2012 on 2,000 companies that received venture capital funding found out that the failure rate of Silicon Valley's startups is approximately around 75%. This can be a shocking figure because usually the media portrays only the successful cases of startups. Although this figure shows that really innovative startups carry with them a high risk of failure, therefore it becomes important to assess if the startups supported by the government are really taking risks that they otherwise would not have taken. In other words, we need to be sure that the startups that benefit from government's funding are attempting to create something disruptive, or if they are only average risk-taking firms.

Finally, when implementing a reform like this one, with tax reductions and subsidies, it is important to remember to be very careful in the allocation of these "subsidies", as private and public institutions may organize to capture a share of the subsidies handed out by the policy. For example in Norway in the 70s and 80s a large part of government funds were wasted in the supply of capital to ill-conceived new businesses started by relatives of parliamentarians (Lerner, 2010).

ii. Crescita 2.0 vs. Israeli "Yozma Program"

One of the most successful examples of innovation policy directed to startups and venture capitalists is the already mentioned Israeli 'Yozma Program', which was implemented in the mid-90s and led to the creation of one of the most successful hubs of entrepreneurial activity in Tel Aviv. The reason for focusing on the Israeli startup hub, rather than on the one formed in the United States, is that the emergence of the VC industry in the United States was much more market-led (as opposed to government-led) than it was in Israel.

The effort of the Government in the US was not as focused on the creation of a VC industry, indeed there was no targeted policy directed to this objective (Avnimelech & Teubal, 2003). The main program in the US prior to the development of the VC industry was the SBIC, which is still working today, and provides financial assistance to SMEs in general, rather than on businesses with high technological value. Other events have been notably important for the emergence of the VC industry and the subsequent technology cluster; the creation of NASDAQ (born as a capital market for entrepreneurial technology companies), was particularly relevant as it provided exit possibilities for VC investments. Military R&D expenses, which were massive with the onset of the Cold War, had significant spillovers into American universities (Avinmelech, Kenney, & Teubal, 2004). Therefore, the government had a marginal role in the process of formation of the technology sector in the United States; indeed the process was significantly longer in the US than in Israel. Moreover, while the US pioneers had to discover it, Israel, as a follower, knew that it was achievable to have a VC industry, and implemented a policy exclusively dedicated to achieve this objective (Avnimelech, Kenney, & Teubal, 2004).

Before delving into the details of the Yozma program, it is worth to briefly analyze the different existing conditions (called the "*Pre-Emergence* Phase" in the VC industry life cycle developed by Gil Avnimelech) of the two countries prior to the implementation of the policy. In the third chapter, I already described exhaustively the existing conditions in Italy prior to Crescita 2.0, the situation was critical, the country was in a deep recession, its ability to innovate was almost null, human capital was underdeveloped, there was no VC market and the R&D expenses were approximately half of the OECD average. The implementation of a startup policy in Italy was considered as a tool to come out of that disastrous situation.

The *Pre-emergence phase* was extremely different in Israel. The development of VC and the implementation of a startup-policy in Israel were both subsequent to a pre-existing well-developed high technology sector that promoted a huge amount of innovative capabilities during the two decades prior to the Yozma Program (Avnimelech, Kenney, & Teubal, 2004). In the 1970s, a series of events led to the decision to increase domestic military R&D spending significantly. The decision to leverage Israeli science capabilities extending R&D grants to businesses attracted multinationals to invest in Israeli R&D laboratories (Motorola, IBM, and Intel); in addition, during the 90s a massive amount of engineers immigrated to Israel from the former Soviet Union, further increasing the level of human capital and the innovative capacity of the country. The situation evolved rapidly; Israel and in particular Tel Aviv experienced a huge expansion of highly-innovative activities, *"The software industry had grown from less than $1 million in 1980 to $350 million in 1990"* (Avnimelech, Kenney,

& Teubal, 2004) and the startup-scene was in progression, with an increasing number of startups being established each year. However, of all these new firms, more than 60% failed quickly after formation, reportedly because of their inability to raise additional capital (Jerusalem Institute of Management, 1986).

The government realized that despite the massive R&D funding, there was a systemic failure that was hampering the proper development of a healthy startup ecosystem; therefore, it started implementing a shift from R&D subsidization to startups' development enhancement. This shift induced the government to establish the Inbal Program in 1992 and the Yozma Program one year later. The first consisted of a government insurance on publicly traded VC funds, which would guarantee up to 70% of the initial capital. This program was soon recognized to be reasonably unsuccessful, mostly because it required lengthy bureaucratic procedures and time-consuming practices, which made Venture Capitalists unwilling to take advantage of it.

The second program, implemented starting from 1993, is often recognized as one of the most successful VC policies, largely because of the considerable amounts of foreign VC funds that it attracted and because of the international fame of the Israeli technology cluster. What is generally overlooked is that the pre-existing conditions in Israel were already very favorable to the formation of a successful high-technology cluster and of a substantial VC industry. The rationale behind Yozma was simple, the program relied on a $100M Government owned fund to be allocated in two different ways; 80% was destined to be invested in ten private VC funds that met a number of specific requirements, the remaining 20% was directly invested in high technology startups. In order to receive funding (up to $8M), each VC fund had to attract a foreign VC fund or a foreign institution to invest as well (Avnimelech, Kenney, & Teubal, 2004). This last feature has been considered as the key of the success of Yozma as it strongly encouraged a connection with foreign experienced venture capitalists who already possessed expertise of the industry and provided an important opportunity to learn for Israeli VCs. In addition, the requirement to attract a foreign institution operated as a quality check on the VC funds and on the startups that were to receive funding. In this way, the government also ensured on the quality and reliability of the funds it invested in. On the demand side, the program was supported by the 'R&D support & Technological Incubators Programs', which provided an additional aid for startups' growth (Avnimelech, Schwartz, & Raphael, 2007).

The total amount raised by the funds was about $250 million with $100M of government capital. Further, 20% of government funds was invested in over 200 startup companies. The outcome was that these funds turned out to be very profitable, acquired international fame and later attracted an even larger number of foreign investors. The VC industry expanded exceptionally after Yozma, a

huge number of VC funds entered the market in those years even if they were not supported by the program, this was triggered by the astonishing profits recorded by Yozma funds.

Therefore, even if Crescita 2.0 and Yozma programs were both designed to obtain the same objective, they pursue it in very different ways. Yozma focused mostly on the supply side of capital, granting incentives to VCs and encouraging the formation of a skilled base of VCs through interactions with foreign and experienced investors. Crescita 2.0, instead operates primarily on the demand side, it includes a number of incentives and benefits to encourage the birth and to facilitate the development and growth of innovative startups. The reasons for this difference are to be found in the 'Pre-emergence conditions' of the countries explained earlier. In Israel, the level of R&D expenses and of early-stage startups was already remarkably high, just like the level of human capital. What was missing, instead, was the capital to be invested in startups; which was successfully provided by the Yozma program.

In Italy, the situation was very different to say the least; the idea of focusing mainly on the supply side would have probably failed miserably. It would not make sense to attempt to encourage VC investments if there are no profitable investment opportunities for them. First, it was necessary to generate a radical change both in the mindset of Italian people and to reduce the bureaucratic steps and the burdens required to start a business. Clearly, the supply side is also of crucial importance for the success of these kinds of program, indeed Crescita 2.0 also does provide incentives for those that decide to invest in Italian SUs. What is not clear is if these measures are enough to promote the creation of a solid VC industry in Italy and to attract capital from foreign countries; this primarily depends on the quality and the attractiveness of the startups that compose the Italian ecosystem. Therefore, it would be very important for Crescita 2.0 to ensure the quality and the innovativeness of the startups it supports.

iii. Startup data and empirical methodology

In this section, I will try to give a general idea of the results obtained up to now by Crescita 2.0. As explained above, no general methodology for evaluating VCs-Startups policies has been developed yet (Avnimelech & Teubal, 2003), secondly the data available in Italy are not as extensive and thorough to allow performing a complete analysis. In addition, since it may still be early to judge the effectiveness of the program I will elaborate on potential ways in which the program may be evaluated, given that the necessary data will be available. In this way, future researchers with the intention of performing an accurate econometric analysis of the program will have some ideas to start with.

Let us first analyze a few figures about the Italian startups that are being supported by the program. To date, the number of registered startups that enjoy the benefits of the program are 4,079 and they are constantly growing at an average rate of 17% each trimester; they hire on average 2 employees and are composed of 4.1 members on average (InfoCamere, 2015). In terms of employment, these are surely positive indicators, considering that most of the employees are highly educated. In any case, we are not able to show the causality of the program for the birth of all these startups, meaning that we cannot assess if without the program these startups would have been created anyway.

As it could have been predicted, the majority of startups, which, for definition are still in their first four years of operations, are recording losses. On average, the profitability indicators as the ROI and ROE of registered startups result to be negative (InfoCamere, 2015), this may be a factor in keeping foreign VCs away from the Italian startup ecosystem. According to a KPMG research in the last ten years, the return of VC investments in early stage businesses in Italy has been almost null (KPMG, 2013); it is not surprising then that the market for Venture capital in Italy is one of the most underdeveloped. In addition, a research by AIFI (Italian Association of Private Equity and Venture Capital) reported that despite the introduction of Crescita 2.0, the yearly amount invested by VCs in Italy decreased from 135 million in 2012 to only 43 million in 2014 (Bechi, 2015). An interview to the most popular names in the Italian VC-scene revealed that the main problem for VCs in Italy is the difficulty in making exits (Santelli, 2013). Easing this process is surely a route that the government should consider undertaking, given the high number of startups that are being founded and the still underdeveloped market for VCs.

Regarding my regression analysis, I had data on the 3723 companies registered as innovative startups up to April 2015; therefore, in this case the sample corresponds to the total population. The dataset provides information about each startup: the origin, the number of employees, the number of foreign people, the sector in which it operates, the presence of young people in the team and the founding date. Given the data that I had available, I was not able to perform an analysis that assesses the effect of the reform, though I limited myself to run three regressions to gather some additional descriptive statistics on the startups supported by Crescita 2.0.

The first regression I ran is a simple OLS that regresses the number of employees on the following dummy variables:

- *South* (takes the value of 1 if the startup is from the south; 0 otherwise)
- *North* (takes the value of 1 if the startup is from the north; 0 otherwise)
- *Serv* (takes the value of 1 if the startup operates in the services sector; 0 otherwise)

- *Ind* (takes the value of 1 if the startup operates in the industrial sector; 0 otherwise)
- *Comm* (takes the value of 1 if the startup operates in the commerce sector; 0 otherwise)
- *Agri* (takes the value of 1 if the startup operates in the agricultural sector; 0 otherwise)

I dropped from the regression the variables *center* (takes 1 if the startup is from the center of Italy) and *tour* (takes 1 if the startup works in tourism) to avoid perfect multi-collinearity. I then ran two regressions with the same independent variables; this time using a binary dependent variable and a logit model. First, I tested the probability of the startup having at least a foreign employee or founder (*foreign*) and then the probability of startups of having a member under 35 of age (*young).*

Table 1 in the page below shows the results for all three regressions. As said, these regression do not intend to show any causality, rather they are a mean to describe further the situation of the Italian startup ecosystem. From the results, we immediately see that the majority of the coefficients are not significant and that the R^2 is very low. The only significant values that we have, are that startups in the north have a higher probability of being composed of foreign people and startups in the south tend to hire more than in the center or north, and have a higher probability of having a young team member. Although, since we are only using the coefficients as descriptive and since the population corresponds to the sample we can also take in consideration the other coefficients, but merely to describe the characteristics of the Italian startup ecosystem.

From the first regression, we can see that startups in the industry sector are the ones who hire the most, on average. From the logit regressions, instead, we cannot interpret the coefficients but only its signs, in order to interpret the coefficients we need to have the marginal effects, which I calculated and displayed in *Table* 2 in the next page. We can see, for example, that a northern startup has 17% higher probability than one in the center of having a foreign member in its team and that a startup from the south has 5.5% higher probability of having at least a young member.

As said, these results do not intend to have any important implication for the policy, rather they only mean to help in giving a broader picture of the characteristics of Italian startups.

	Dependent variable:		
	Number of employees hired	Probability of having at least a foreigner in the team	Probability of having at least a member under 35
	OLS	*logistic*	*logistic*
	(1)	(2)	(3)
South	0.250**	-0.046	0.295***
	(0.125)	(0.431)	(0.114)
North	0.153	0.856***	-0.016
	(0.101)	(0.317)	(0.096)
Services	0.505	-0.585	0.061
	(0.452)	(1.031)	(0.415)
Industry	0.683	-0.615	-0.413
	(0.460)	(1.054)	(0.425)
Commerce	0.446	-2.014	0.189
	(0.491)	(1.434)	(0.448)
Agricultre	-0.135	-12.507	-13.365
	(0.827)	(399.839)	(244.827)
Constant	0.272	-3.646***	-1.191***
	(0.454)	(1.049)	(0.417)
Observations	3,722	3,722	3,722
R^2	0.003		
Adjusted R^2	0.001		
Log Likelihood		-411.266	-2,031.934
Akaike Inf. Crit.		836.533	4,077.868
Residual Std. Error	2.498 (df = 3715)		
F Statistic	1.603 (df = 6; 3715)		
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 1

```
Call:
logitmfx(formula = forl, data = startups, atmean = FALSE)

Marginal Effects:
             dF/dx  Std. Err.       z     P>|z|
south -0.0010453  0.0097029 -0.1077  0.914212
north  0.0179437  0.0063116  2.8430  0.004469 **
serv  -0.0164206  0.0352256 -0.4662  0.641104
ind   -0.0124370  0.0192066 -0.6475  0.517282
comm  -0.0220672  0.0067752 -3.2571  0.001126 **
agri  -0.0240703  0.0025198 -9.5523 < 2.2e-16 ***

Call:
logitmfx(formula = youngl, data = startups, atmean = FALSE)

Marginal Effects:
             dF/dx  Std. Err.       z   P>|z|
south  0.0558038  0.0224853   2.4818 0.01307 *
north -0.0029579  0.0174261  -0.1697 0.86522
serv   0.0109598  0.0736507   0.1488 0.88171
ind   -0.0694551  0.0662590  -1.0482 0.29453
comm   0.0357188  0.0879792   0.4060 0.68475
agri  -0.2410006  0.0069979 -34.4392 < 2e-16 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

Table 2

As for the ways to evaluate Crescita 2.0, one possibility is to perform a series of regressions that test the effect of being registered as an innovative startup as opposed to being an innovative startup that did not register to take advantage of the reform (because did not meet the requirements or for other reasons). Being registered would be a dummy independent variable, while the dependent variable could be either startup's growth or the investments that it received; we could test what is the effect of being registered on growth or investments, keeping all the other variables constant (number of employees etc...). Clearly even if we have a control group (innovative startups that do not benefit from the reform), this type of analysis is not a quasi-natural experiment because the conditions for which startups register or not are not random at all. Therefore, for example, we could not test if the amount of innovative activities tends to be higher in registered or non-registered SUs, because there is the possibility of having reverse causality. Being registered may imply that startups invest more in R&D because of the advantages they get from the reform; on the other hand, SUs who invest a lot in R&D have a higher probability of satisfying the necessary requirements to being registered.

Contrary to what one may initially think, the rate of failure of funded startups may be even more significant in order to assess the performance of the program. Comparing the rate of failure of "subsidized" startups with a control group would shed light on the riskiness of the startups that the government is funding (in this case there should not be any problem of reverse causality). As already mentioned, the failure rate should not be seen as a negative indicator, actually, it is quite the contrary; if the Italian government is funding average risk-taking businesses that would have been created independently of the reform, than the efforts are not really worth it. We could say that the program is really having an impact if it allows the birth of startups so risky and innovative that they would not have been founded otherwise. In Italy, the fear of failing has a huge impact on people's willingness to take risk (GEM, 2014) and thus undermines the quality of startups. For future assessments of Crescita 2.0, researchers should take into consideration that the rate of failure is a figure to keep an eye on to determine the riskiness, and thus innovativeness of funded startups. The problem with the evaluation methodology just described is that the data on non-registered startups (control group) is not available, therefore I was not allowed to test any difference that there may be between registered and non-registered startups. Another potential way to evaluate the policy would have been testing the probability of Italian startups receiving funds from foreign venture capitalists. In such a model, the independent variables could have been the sector in which startups operate, the percentage of young people involved, the number of employees and a dummy indicating if the startup is registered or not as innovative. Hence, we would have been able to test if startups supported by the reform have a higher chance of receiving foreign funds. This could be very interesting considering that attracting foreign VCs to invest in Italy is one of the main successes that the policy can achieve.

V. CONCLUSION

In this paper, I provided a first general analysis of the recent Italian reform that aims at boosting the country's economic growth and innovation through the encouragement of the birth and development of startups.

First, I briefly explained what, according to theory, drives governments to intervene in encouraging innovation and then I described the two different approaches that could be taken to design an innovation policy. The "*market failure"* approach whose focus is on providing financial incentives to those who innovate or invest in innovation, and the *"system failure"* approach which instead is much broader, taking in consideration institutions, interactions, human capital and other factors. I also explained that program evaluation acquires an even more important role, with the adoption of the systemic framework, as it can help policy makers in understanding if the tools used are working or not.

Secondly, I analyzed the Italian situation before the implementation of the reform. What came out is that the country had almost totally extinguished its ability to innovate. The great majority of small non-innovative firms in Italy was, and still is a major factor in keeping VCs away from the country. Low education levels, migration of talented minds, fear of failure and a complex bureaucratic system all contributed to hamper the growth of both entrepreneurship and innovation. In addition, the reforms made up to that point all had terrible results, taking a long time to be effective and sometimes allocating capital to untrustworthy actors.

The enactment of Crescita 2.0 is surely a sign that something is changing, that Italy wants to bet on its capacity to innovate once again. The intrinsic features of the reform immediately make it distance itself from the usual Italian legislation; Crescita 2.0 is a dynamic reform that has effect fast and simplifies the bureaucratic passages entrepreneurs have to deal with to start a business. It is evident that in the design of the reform it was adopted a System of Innovation framework. The program acts mainly on three aspects; easing the provision of initial capital to startups, simplifying the bureaucratic procedures (also for foreigners) to start an innovative business and to invest in it, and alleviating the burdens that startups have in hiring new personnel. One of the most interesting features of the reform is the Fail-Fast mechanism, which, in addition to easing the complicated and burdensome bankruptcy procedures, tries to enforce a shift in the aforementioned Italian failure-adverse mindset. A comparison with the Israeli Yozma program, made clear that unfortunately, Crescita 2.0 cannot hope to obtain results similar to its Israeli counterpart in the same amount of time. As we have seen, the features of the Israeli Innovation System at the time of implementation were totally different from

those in Italy. This, though, does not deny the possibility that the Italian startups ecosystem will flourish, only, if it does, it will take some time and some additional reforms more oriented on the supply side, for example increasing and simplifying the exit possibilities for VCs and putting an additional effort in attracting foreign experienced VCs should both be taken in consideration.

Even though it is still be early to draw conclusions on the effectiveness of the reform, we can already see some tangible progress. Since its implementation, more than 4,000 startups have been established, the word "*startup"* is now continuously mentioned in the Italian media and in policy debates (while it was not like this two years ago), startups incubators and accelerators are proliferating everywhere in the country and universities are becoming more involved in stimulating entrepreneurship. This reform was surely a very important first step toward the creation of important startup hubs in Italy, although the indicators that we should look at to judge its effectiveness are others. The amount of foreign capital invested in the startups supported by the government rather than in non-registered startups is a fairly good indicator. Further, a high failing rate could be a signal of the good functioning of the reform. If of all the registered startups only few failed, knowing that in the Silicon Valley more than 75% startups fail, it would signal that the startups that the government is financing are not that innovative after all. Indeed, a mistake that could be made in the implementation of this reform would be to register the highest number of startups possible, as one may think that the success of the reform is judged by the number of startups. Although, doing so would only reduce the overall quality of the startups that the government is helping, making it more difficult and time-consuming for investors to select profitable startups in which to invest.

In my regression analysis, I found some additional information on the Italian startups ecosystem; while startups in the south tend to have more employees and more young (under 35) members, the ones in the north tend to have a higher concentration of foreign people. As for the sectors, the one that hires the most is the industry sector, while the ones that has the highest presence of young people is the commerce sector. These results do not have any direct policy implication, but they may be interesting to those interested in knowing more of the characteristics of Italian startups.

For future research, a crucial piece of data that may help in evaluating the program is data on the new innovative businesses who did not or could not register to enjoy the benefits provided by the government, which may be used as a control group to test all the relevant differences with registered startups. In addition, data on domestic and foreign VC investments paired with the startups control group may provide additional information on the attractiveness of Italian startups and on the impact that the reform has in attracting investments.

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