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**Fekete Zsolt Gergő**

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**Corvinus University of Budapest**

**The Jeremie Program in Hungary: A Meta-Analysis of its Impact on the  
Startup Ecosystem**

**A Jeremie Program Magyarországon: Egy Metaelemzés annak Hatásáról a  
Startup Ökoszisztémára**

**Fekete Zsolt Gergő**

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**Supervisor: Milos Milicsevsics**

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# 1 Introduction

The importance of venture capital firms in entrepreneurial processes cannot be understated. These financial intermediaries focus on financing innovative early-stage firms are associated with many operational challenges. Banks and conventional investors are reluctant to invest in early-stage firms, so venture capital firms are the main source of finance, especially in the technology-intensive sectors. However, the operating reality of venture capital firms full of information asymmetry and moral risks. Despite these problems, venture capital firms are quite successful in financing technology-intensive early-stage firms.

The aim of this study is to examine the efficiency of the European Union's Jeremie program in Hungary. This study provides meta-analysis to effectively summarise and integrate the results of previous studies in this subject. The results show that those funds backed by public resources were not successful in building self-sustaining Hungarian startup ecosystem. In this study I discuss causes of the lack of efficiency of the programs.

My motivation for this study is based on importance of venture capital firms and startup management in the economy. I strongly believe that for those who want to start their own company and have all the skills and knowledge to become successful entrepreneurs, financing presents a critical challenge. Understanding venture capital processes is essential. Following my initial research, I found that the Jeremie program was not successful in Hungary, despite the fact that billions of forints were spent on it. I was curious, how can a European Union initiative with the aim to develop the Hungarian startup ecosystem go wrong. What could be the reasons for it?

This study begins with a literature review of venture capital scholarship that provides an understanding about how venture capital firms work. What is their short history, how were they established and what are their aims. Then the study provides an overview about the Hungarian venture capital and startup ecosystem.

Following the theoretical chapter, I define the problem. Fast growing early-stage firms cannot operate without venture capital firms; they are essential in financing them. But the Jeremie program was not efficient creating this placement in startup processes in Hungary. The problem definition part describes that I am searching for the reasons for the suboptimal performance of the Jeremie program.

In the methodology part, I explain what a meta-analysis is, and how will I use it to provide answers to my research question.

In the problem analysis part, I have collected relevant studies about the Jeremie program in Hungary. I have identified the main reasons of the low performance of those hybrid funds that have participated in the Jeremie program.

## 2.1 Theoretical chapter

### 2.2 What is a venture capital firm?

“Venture-capital organizations raise money from individuals and institutions for investment in early-stage businesses that offer high potential but high risk” (Sahlman, 1990). An early-stage firm is a company that is in its earliest stages of development. It was founded within 10 years, has not yet raised any significant capital, and is making minimal investments in its own operations (Faster Capital, 2024).

The word “hybrid fund” is frequently used in this study. Judit Karsai defined with this word those venture capital firms that receive capital from both private and public sources to manage and invest it. Later in this study I will write in detail about the Jeremie hybrid funds.

As Lerner (2002) writes, public venture capital initiatives are “programmes that make equity or equity-like investments in young firms or encourage other intermediaries to make such investments”. The first reaction of a financial economists is scepticism when they hear that governments should invest in promising, fast-growing firms. There are many articles about the importance of financial intermediaries in lowering agency risk, moral hazard and information asymmetries associated with investing in early-stage firms. High-technology early-stage firms (companies with high R&D and product development expenditures) are often characterised by not sharing all the information, which allows the entrepreneurs opportunistic behaviour. Why should the public sector invest, when we can encourage specialised financial intermediaries (venture capital firms) to act as a source of capital (Lerner, 2002)?

Overall, investing in early-stage firms is risky. They usually have no or early-stage business plan, they have no product, no customers. The team has no management experience, their market research does not guarantee their success. The risk in investing in these firms is high, the return on investment is uncertain.

When a company raises external capital from investors, the managers are more likely to engage in wasteful expenditures (for example: lavish offices), because they are not the only one bearing the costs, but also the investors. Also, when the firms raise capital, the manager can also raise risk to an unwanted level. The investors realise these problems, so they are asking for a high rate of return (Jensen and Meckling, 1976). It also signals that there are challenges associated with financing early-stage firms.

Financial intermediaries that are specialised in financing early-stage firms are called venture capital firms (VCs). The first modern venture capital firm, the American Research and Development (ARD) was founded in 1946 by Karl Compton, MIT president, Georges F. Doriot, professor of Harvard Business School and local business leaders. This small group of venture capitalists invested in such high-risk companies that were created after World War II to commercialise the technology developed during the war. ARD was structured as a close-end fund, as institutional investors were reluctant to invest (Liles, 1977). The venture capital firms founded after the ARD were also created with this structure. The first limited partnership venture capital firm was established in 1958. There were a few followers, but during the 60s and 70s, most of the venture capital firms functioned as a close-end fund. During the first three decades the capital deployment never exceeded a few hundred millions of dollars. The activity in the venture industry increased in the 80s, when pension funds were allowed to invest in high-risk asset classes. (Lerner, 2002).

The following years were very lucrative for the venture capitalists. During the 80s and 90s, venture capital firms provided financial support for the most successful technological startups (Apple, Cisco Systems, Genetech, Netscape and Sun Microsystems. Many service provider company also received funds from venture capital firms (Staples, Starbucks, TCBY) (Lerner, 2002).

Fenn et al. (1995) write that only 1% of those firms are founded that submit business plans. Venture capitalists know that at the end, many promising technology early-stage firms will not fill the market needs. As a result, most of the venture capital firms place an emphasis on the experience, flexibility and talent of the management team and the size of the potential market, not on the business plan. If the first plan goes wrong, and the company cannot fulfil the needs of the market, with the right management they can find new attractive opportunities. Many investments are dependent on whether the investor can find another investor partner who also describes it as a good investment (Lerner, 1994).

After an investment decision was made, venture capital firms providing funds in rounds. It means that those firms that received funds from venture capital firms are forced to go back to the venture capital firms to discuss the terms of the next financing round (funding rounds provide outside investors the opportunity to invest cash in a growing company in exchange for equity) and to show them that the money is not spent on unworthy projects. The venture capital firms monitor the management teams intensively, they expect weekly or even daily reports from

them, and they always have a monthly meeting where they can look deeply into the processes (Lerner, 2002).

It is important to mention that even with these safety mechanisms, the most likely outcome of an investment is a failure. Gompers (1995) conducted a research and found that out of 794 venture capital investment (during a 30 years period) only 22.55% reached going public, which can be considered a successful investment.

To sum up, venture capital firms operate in an extremely difficult environment, in which they specialize to invest in high-risk firms. Because of the above-mentioned difficulties, banks and traditional investors are deterred from engaging in similar activities. Mechanisms that can cope with these conditions are bundled with the venture capital firms. These tools enabled venture capital firms to emerge as the main investors of technology intensive early-stage firms (Lerner, 2002).

## 2.3 The importance of public venture capital

Himmelberg and Petersen (1994) write that technology intensive early-stage firms cannot get enough funds in their early stages, because the information problem discussed in the previous part. If public venture capital firms could provide a validation that serves as a proof of quality, the early-stage firms and venture capital firms could come over the information barriers, and investors could invest confidently in these early-stage firms.

Venture capitalists fund only a small fraction of early-stage firms each year. Remarkably, in 2000 which was a record year in venture capital financing (Lerner, 2002), more than 2200 US firms received funds, although 1 million firms were founded. In that year venture capital firms concentrated on only a few industries. In 2000, 46% of the funds went to internet related early-stage firms. Many promising firms in other industries cannot get funds because those industries are not as attractive as technology or healthcare. If government programmes could approve high potential neglected firms that could help them find sophisticated investors (Lerner, 2002).

If government officials have to solve these problems, then they should be capable of overcome the challenges resulting from information asymmetries and identifying the most promising companies. De Meza (2002) argues that otherwise these actions can be counterproductive. Is it possible that government officials can solve these problems, while private investors cannot? It is not impossible. Specific branches of the government, like Ministry of Defense or Ministry of Education have a deep knowledge in the given industry, their knowledge is more useful than the bank's ability to read balance sheet and cash-flow statements. "In general, the certification hypothesis suggests that these signals provided by government awards are likely to be particularly valuable in technology-intensive industries where traditional financial measures are of little use" (Lerner, 2002).

Even if government officials can identify the promising early-stage firms, these efforts cannot solve all difficulties with the financing. There are much research within the fields of political economy and public finance that emphasise the distortions resulting from government subsidies, because specific political and interest groups will try to direct the funds in a way that will benefit themselves as well (Lerner, 2002). In the old but still relevant research of Olson (1965) and Stigler (1971) the authors claim that capturing the subsidies by political activity or lobbying is not hard.

The threat of lobbying and corruption can be avoided with the right program design. The Small Business Innovation Research program (a fund provided by the US government) was effective

due to the fact that the decision-making processes and centres were dispersed. Federal program managers were scattered in many sub-agencies and they were responsible for several other tasks. This way, the cost of identifying and influencing the decision makers were high. In a system, where one group can decide over the whole fund, the appearance of political distortions are more likely (Lerner 1999).

Gompers and Lerner (1999) highlighted four key recommendations which are applicable to public venture capital programs. Firstly, there is a strong need for government officials to put effort in building relationship with private venture capital firms. Financing small firms means a real challenge. Venture capital firms are capable of using special mechanisms to face these challenges, quite effectively. Because of the success of venture capital financing, it is important that government officials see and get familiar with these mechanisms.

The result of the first point is that the public venture capital firms will have a narrow focus on technological intensive firms. As it was mentioned above, investments are focused such technological areas that has a huge potential. This can result in the increase of transaction costs, as most of the investments target the same segment, while with a wide variety of investment, the cost of investing in a firm is lower. Public venture capital firms have the opportunity to target not so popular industries and provide them funds that can be followed by private investments.

Thirdly, government officials should realise that flexibility is pivotal in the investment process. Venture capital firms invest in an environment that contains many technological, product market and management uncertainties. It is impossible to deal with all the uncertainties, so they choose to remain an active member of the investment even after the first financial round, by using their right to control specified in the investment contract. The changes in the product market strategy and the management are important parts of the investment.

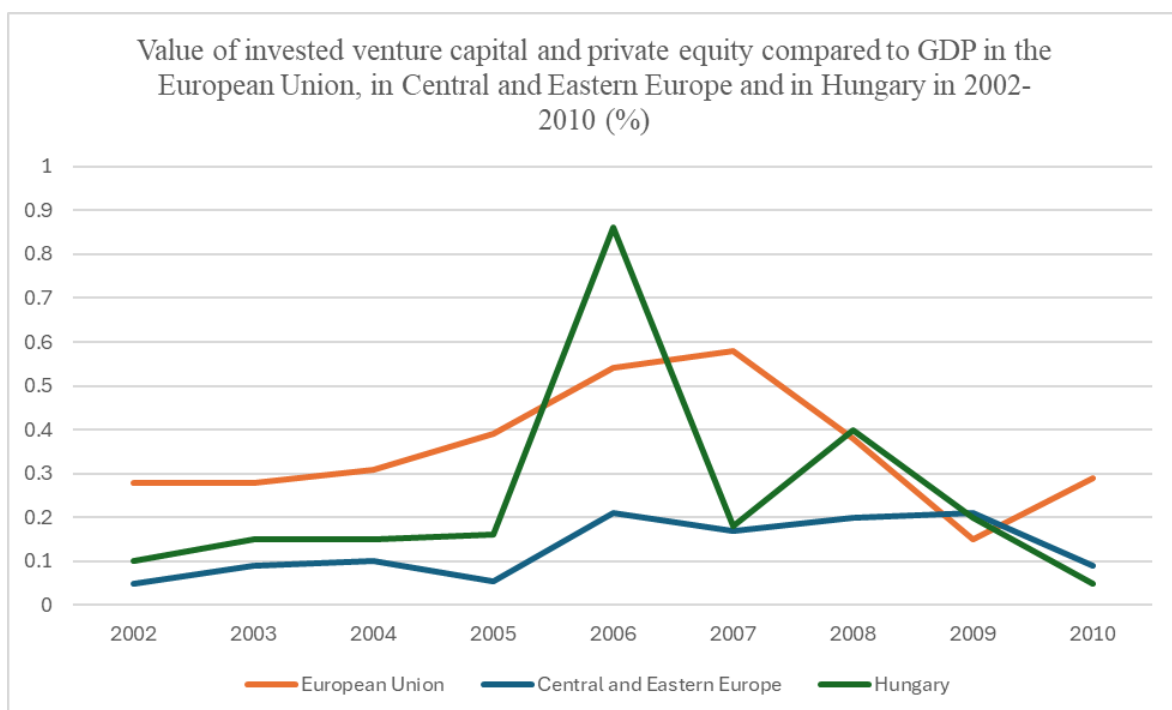
Fourth, as venture capital firms examine the track record of the entrepreneur they might finance in the future, government officials should also examine the past performance of the companies that might get public venture capital. It seems that the performance of the publicly financed firms many times do not meet the expectations. In particular, specific characteristics are in strong relationship with the low performance of the firm, like the experience of the management team, specific product market strategy and the desire to seek private financing. With new methods, government officials might be able to filter these factors and distinguish between potential and low performing firms.

## 2.4 Venture capital market in Hungary

The venture capital sector plays a vital role in the capital market. Individual and institutional investors are interested in this sector. The importance of the venture capital industry depends on the lifecycle of the financed company. An important measure is to what extent they are financing the start, expansion and acquisition of a company. This factor determines whether the venture capital promotes innovation, contributes to the establishment of international, participates in privatisation and restructures large enterprises (Karsai, 2013).

In order to compare the performance of the Hungarian venture capital and private equity (VC & PE) with other venture capital firms within the EU, Karsai (2013) compared the percentage of the value of the investments into companies with a headquarter in Hungary as a proportion of the country's GDP. Hungary was in the top tier not just among the Central and Eastern European countries, but also within the European Union. The venture capital and private equity investments compared to the GDP was higher than the average within the region between 2002 and 2009. Thanks to a few large investments, the Hungarian activity was higher than the EU venture capital and private equity activity in 2006 and 2008. The investment/GDP ratio made Hungarian market the fifth in 2006, sixth in 2008 and tenth in 2009 in Europe (see Chart 1) (Karsai, 2013).

Chart 1 – Value of invested venture capital and private equity compared to GDP in the European Union, in Central and Eastern Europe and in Hungary in 2002-2010



Source: Karsai, 2013

As a consequence of the economic crisis, after 2010 the volume of the investments were so low that Hungarian investment /GDP ratio was only the 22<sup>nd</sup> in Europe. It is worthy to mention that the high ranking in the previous years was due to the individual high buyouts, which managed to raise the aggregated value of investments, but it does not have the same effect on the change of GDP. The reason for that can be not just due to the difference in the amount of investments, but also to the fact that the owners of the companies receiving investments were not based in Hungary (Karsai, 2013).

The Hungarian venture capital investments to GDP exceeded the half of the EU average only in 2001 (at the time of the dotcom fever) between 1998 and 2009. It was typically below 10% of the EU average (Karsai, 2013). Between 1989 and 2004 900 firms received venture capital and private equity investments (EVCA, 2005). Since then, the number of firms receiving funding grow by 1000, by the end of 2010 this number was close to 2000. We can estimate that the quarter of the total investment in the region during the 20-year period was implemented in Hungary (EVCA 2007-2011).

Even though Hungary achieved a prominent rang within the region, the number of Hungarian firms receiving investment from venture capital or private equity lacks behind the European average. Due to the late start of the sector and the less developed capital market, it is not surprising that only 0.2% of the Hungarian small and medium enterprises were affected by venture capital activity, while in the EU the same ratio was 6%. This results in an insignificant number of firms that had access to venture capital and private equity (Karsai, 2013).

In a survey conducted in 2008, only 0.25% of the Hungarian SMEs are suitable to partner up with a venture capital firms (Szerb, 2009). Szerb assumed that the market of SMEs for venture capital investors and business angels are consist of 400-600 companies. Researchers dealing with the field of venture capital in Hungary agree that the problem with the access to venture capital is not with the supply, but with the demand factors (Karsai, 2003; Szerb, 2009). The broader spread of venture capital is hampered by the low information about the market, the lack of intermediary firms, the early stage of potential fund receiving firms, the low competitiveness of fund seeking companies and the low level of innovation (Havas, 2009).

A survey conducted by Szerb (2009) examined the impact of venture capital on 680 firms in 2008. The results showed that the companies that received funds were more competitive than those firms that not received funds. At the same time, there was almost no difference in the growth in the number of employees among firms that received venture capital and those that

did not. The turnover was also higher. The companies receiving funds gained advantage in the most important factors of competitiveness, like uniqueness of their product, technological development, and continuous innovation.

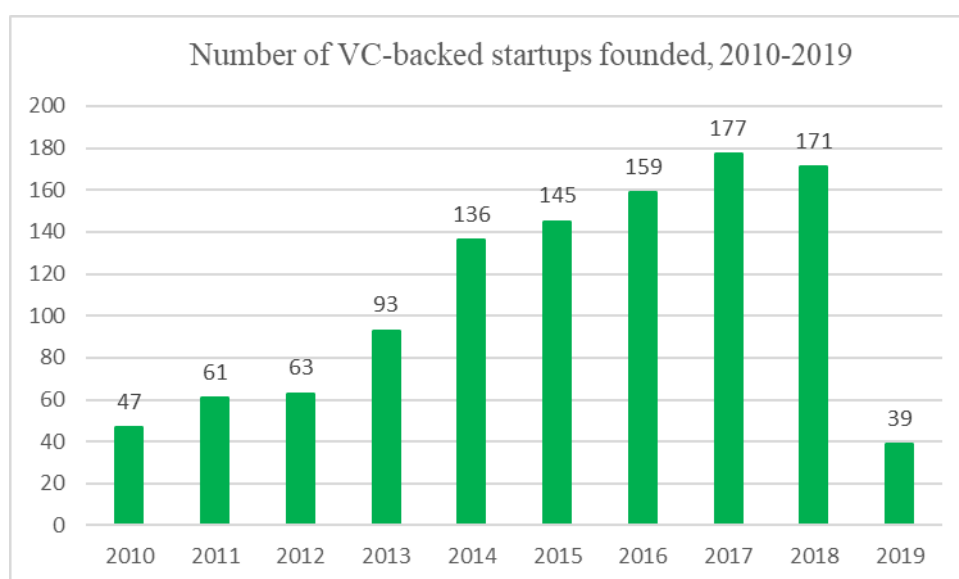
The volume of venture capital and private equity investments were fluctuated according to the international capital market cycles and to the change in the Hungarian economic growth. The Hungarian market became attractive to foreign capital investors in the last third of the 1990s. The country's position became more favourable after the accession to the European Union in 2004. The EU membership led to an increasing trust and an expansion of regional funds. In the golden years of the second half of the 2000s, a few global fund also appeared. Until the economic crisis in 2008 the capital provided to the Hungarian market was increasing. In 2007 and 2008, the Hungarian market profited, similarly to the other markets in the region, at the beginning of the crisis, when there were investment problems in Western Europe, but not yet in the Central and Eastern European region (Karsai 2010). After 2009 the crisis also reached CEE and lowered capital allocation, which hurt the Hungarian economy more than the other economies in the region. "Global economic slowdown and heightened financial market stress pushed the already fragile and indebted Hungarian economy towards recession, while controversial domestic policies were hurting consumer, business and market confidence" (Karsai, 2013).

Between 1989 and 2010 126 investor organisation (government owned investors and private funds) allocated 50% of their potentially available capital of 8 billion USD. During 416 transactions, companies based in Hungary received 3.7 billion USD from venture capital and private equity. The transition to market economy of the country was completed with the EU accession in 2004. The development of the market economy between 1990 and 2010 was more likely cyclical rather than a smooth transformation. This cyclical transition also appears in the volume of venture capital and private equity investments. The volume of these investments was the lowest in election years, in 1994, 1998, 2002 and 2010, the only exception being 2006. The volume of these investments was always bigger in the year after the election. This cyclical nature can be detected in both the number of the investments and both in the average amount of the investments (Karsai 2013).

## 2.5 Hungarian Startup Ecosystem

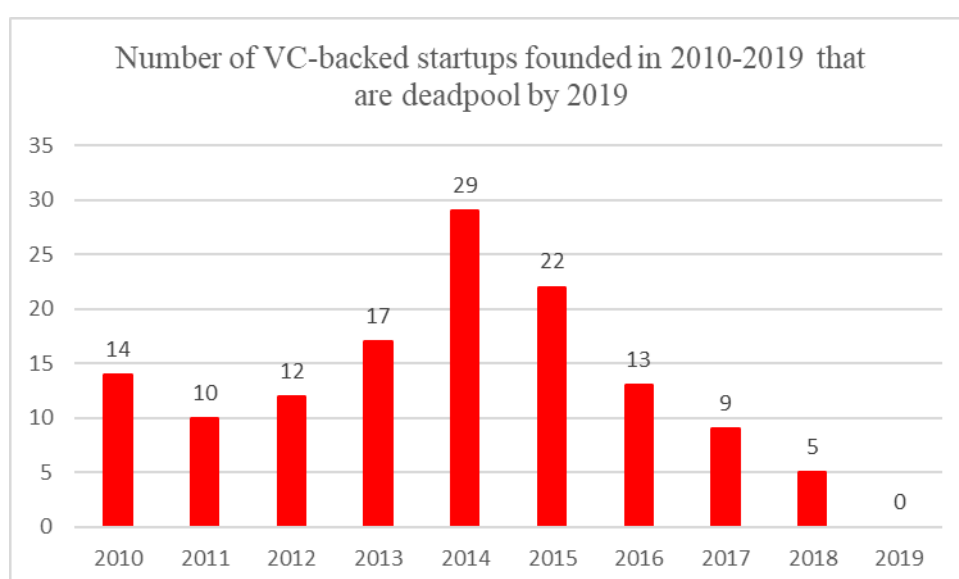
Rocket Shepherds most recent data (2019) shows that on yearly average 109 venture capital-backed early-stage firms were founded between 2010 and 2019. Until 2019, 84% of all Hungarian early-stage firms that were funded were founded since 2010. As we can see on Chart 2, the number of early-stage firms backed by venture capital increased from year to year, while the number of deadpool early-stage firms that were funded decreased from 2014 (see Chart 3).

Chart 2 – Number of VC-backed startups founded, 2010-2019



Source: Rocket Shepherd, 2019

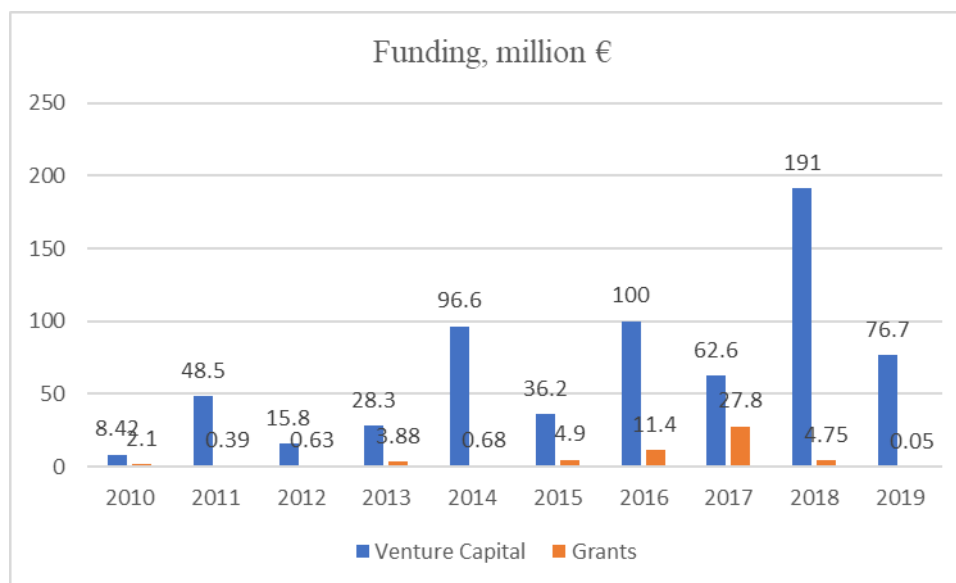
Chart 3 – Number of VC-backed startups founded in 2010-2019 that are deadpool by 2019



Source: Rocket Shepherd, 2019

Between 2010 and 2019, €722,000,000 were received by early-stage firms, €57,000,000 were in form of grants and €665,000,000 from venture capital (see Chart 4). The majority of Hungarian venture capital firms use EU funds, in 2019 on the average the 70% was EU fund and 30% of the money was from private investors, so we can claim that approximately €598,500,000 were provided by the EU to the early-stage firms through venture capital firms.

Chart 4 – Funding, million €



Source: Rocket Shepherd, 2019

It is worthy to mention that out of the venture capital firms, the Széchenyi Tőke Alapok (SZTE) provided €38,500,000. SZTE gives funds that are provided ‘indirectly from EU funds through the decision process of the Hungarian government directly’ (Rocket Shepherd, 2019).

In a research conducted by Dealroom (2022), we can see that the value of the Hungarian Startup Ecosystem managed to grow from €1.4 Billion to €7.6 Billion from 2017 to 2022, making it the 6th fastest growing ecosystem in the Central and Eastern European region (CEE). In 2022, Hungary was only the 9th country on the list of CEE countries receiving €132 Million from venture capital firms. Estonian firms managed to get 10 times more fund from venture capital firms in 2022. In the past few years, the gap in venture capital funding between CEE and Europe decreased, mainly due to the fact that since 2021, the funds provided for European countries decrease, but since 2020 there is a sharp increase in the funds provided to the CEE region. Venture capital funds became a powerful job creation engine in CEE. Jobs created per Million Euro in Hungary (combined funding 2015-2022) is 30, while in Germany this number is around 5.

A study written by Havas et al. (2023) states that Hungary is at a step disadvantage to the regional countries and the gap is widening due to the lack of successful international early-stage firms. The authors claim that Hungary could be the perfect hub for startups, because of the wide range of scientific innovation opportunities, the availability of skilled workforce, and proximity to large European markets. If the country could combine its strengths with the best international practices that could also increase the productivity and competitiveness of the whole economy. Based on data from 2021, they compared the Hungarian startup ecosystem with other regional ecosystems.

Table 1 – Startup metrics, 2021

| Startup metrics, 2021                                             |          |         |         |        |         |          |
|-------------------------------------------------------------------|----------|---------|---------|--------|---------|----------|
|                                                                   | Bulgaria | Czechia | Hungary | Poland | Romania | Slovakia |
| <b>Finance</b>                                                    |          |         |         |        |         |          |
| - VC funds per capita, EUR                                        | 60       | 80      | 45      | 48     | 116     | 29       |
| <b>R&amp;D</b>                                                    |          |         |         |        |         |          |
| - R&D expenses in proportion of the GDP                           | 0.9      | 2.0     | 1.6     | 1.4    | 0.5     | 0.9      |
| <b>Skilled workforce</b>                                          |          |         |         |        |         |          |
| - Number of STEM institutes among the best 500                    | 0        | 5       | 2       | 6      | 3       | 0        |
| - Number of universities among the best 500 business universities | 0        | 0       | 1       | 4      | 1       | 0        |
| <b>Startup activity</b>                                           |          |         |         |        |         |          |
| - Number of startups                                              | 1 949    | 3 315   | 2 977   | 7 949  | 3 413   | 1 292    |
| - Number of startups per 1 million resident                       | 281      | 310     | 305     | 209    | 177     | 237      |
| - Average value of startups (as of February, 2022, million EUR)   | 1.6      | 6.9     | 2.0     | 5.4    | 7.5     | 0.8      |
| - Number of unicorns                                              | 0        | 4       | 1       | 11     | 1       | 0        |

Source: Havas et al., 2023

As we can see on Table 1, although both the number of startups per million resident and R&D expenses in proportion of the GDP are the second highest, the venture capital fund per capita is the second lowest and the average value of the startups is also just the 4<sup>th</sup> (Poland on the 3<sup>rd</sup> place has more than 2,5 times higher value for the average startup). The number of unicorns is also low, therefore it sets a low number of good examples for Hungarian entrepreneurs (Havas et al., 2023).

### 3 Problem definition

In technology intensive start-ups the business model heavily depends on the specific knowledge of the engineers and the success of the start-ups are determined by the ability to finance the research of cutting-edge technologies that enables them to remain competitive (Braguinsky et al., 2012). Besides that, they also have to finance the development of products and processes in order to make new products and services from their research. Unlike well-established big companies with revenue, the internal resources of start-ups for research and development are limited, therefore they need huge investments compared to the equity. The owners cannot finance it from their own assets, they need external finance (Evans D. S., Jovanovic B., 1989).

As Hottenrott and Richstein (2020) state, the literature about entrepreneurial finance emphasises the role of challenges related to external finance, because of the results of R&D projects and the uncertain success of the investment. Information asymmetries are high between the founders and capital providers, especially in the knowledge-intensive sectors (Carpenter, R. E., Petersen, B. C., 2002), where the new products and services means that the founders have a deeper understand into the technology than the potential investors. In many cases, the entrepreneurs are reluctant to share all the information, because they are afraid that it will get in the hands of their competitors. The not shared information results in the mis-valuation of the company from the investors point of view.

“To counteract these problems and attract capital, founders can pledge collateral to signal their quality and ensure that they do not engage in opportunistic behavior after receiving funding”, writes Hottenrott and Richstein (2020). But the ability of the tech early-stage firms to provide collateral is limited, as most of their assets are immaterial or industry specific. It means that these asset’s volume to use them for another purpose in another industry is limited. In case the firm fails, these assets cannot serve as a proper collateral (Berger, A. N., Udell, G. F., 2006).

Early-stage firms face financial barriers because capital providers face challenges on the debt and equity markets. It negatively affects their risky R&D processes (Colombo et al., 2013). Debt providers are especially affected by the uncertainty related to the finance of high-tech firms. As debt providers do not benefit from the revenue and profit, only the interest cannot compensate for the unbalanced risk-return rate (Carpenter, R. E., Petersen, B. C., 2002). Banks, the most common debt providers, are not participating in the control processes that can balance the information asymmetries. While investors in the equity capital market gain experiences and controlling skills within the industry, banks do not specialise for one industry, they cannot form

strategic decisions of the firm, therefore they rely on quality signals before lending money (Hottenrott et al., 2018).

Research conducted by Carpenter and Petersen (2002) shows that from 2400 US high-tech firm none of them received debt financing (or not significantly) before their public offering. According to Colombo and Grilli (2007) only the minority of Italian tech start-ups received bank loans. Among German tech start-ups, it was not likely to receive bank loans either, mostly because they faced difficulties when they asked for loans (Brown et. al. 2012). Although private investors are not as risk averse like the banks, they are also reluctant to invest in R&D projects that have uncertain results (Gompers, 1995). Howell (2017) states that those new businesses that received funds from the SBIR funds (Small Business Innovation Research, a government subsidy in the USA), after the risky R&D phase they attracted venture capital.

To overcome the financial barriers, to foster innovation, employment, and economic growth, providing direct grants become a popular policy instrument. There are several research on the influence of grants on R&D by well-established firms, the reviews on government funds granted to early-stage firms is scarier (Hottenrott, H., Richstein, R.,2020). Howell (2017) found that early-stage firms that received benefits from SBIR later performed better in the next financial round, and they are also better at innovation than others. This statement is also true to the Swedish government funds (Söderblom et al., 2015). In case of Italian new businesses, government funds had a positive effect on the R&D expenses and on the employment (Colombo et al. 2011). Canter and Kösters (2015) found that early-stage firms supported by the government have 2.8 times more patent and the increase of employees increases 66% faster.

Based on the above-mentioned research, finance is essential to the success of the early-stage firms. As it seems, they cannot apply for a bank loan, they have no internal resources, private investors are hard to convince. Government backed hybrid funds is a popular option for those early-stage firms who do not operate in technology intensive industries.

The study aims to assess the efficiency and impact of the Jeremie program on the Hungarian venture capital and startup ecosystem. The program was launched in 2009 in order to provide capital to venture capital firms in order to increase the volume of investments in the European Union. Specifically, the study seeks to answer whether the program helped to enhance startup activity, whether it was successful in Hungary and what factors contributed to the success or failure of the program. It analyses the implementation of the program, its impact on early-stage

firms and venture capital investments, the added value to the Hungarian economy. It also provides lessons that can be learned from the program.

Table 2 shows a PEST Analysis of the Hungarian venture capital market. It helps to understand the problem definition. The Jeremie program was launched in those circumstances. Expectations were great, the impact of the Jeremie program should have influenced several factors on the market.

Table 2 - PEST Analysis of the Hungarian venture capital market

| PEST Analysis                       |                                                                          |                                           |                                                |
|-------------------------------------|--------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------|
| Political Factor                    | Economic Factor                                                          | Social Factor                             | Technological Factor                           |
| Stabil political environment        | Fluctuating VC activity according to international capital market cycles | Low information about VC market           | Hybrid funds promote technological development |
| Intention to provide capital to VCs | Economic crisis lowered VC financing                                     | Low level of innovation                   | Firms gain competitive advantage               |
| Intervention into market policies   | Jeremie aimed to increase the number of hybrid funds                     | Low number of potential early-stage firms | Firms develop unique products                  |
| Threat of lobbying and corruption   | Increasing VC activity can boost the economy                             | Low number of success stories             | Continuous innovation                          |

## 4 Methodology

To find out how the Jeremie program influenced the Hungarian venture capital and startup ecosystem, I will apply meta-analysis on the articles published in this topic.

Even for seasoned researchers, the volume of data produced in research is becoming too much to handle. New and new research appear every day, and it is hard to follow even in our own research field. In order to understand all these articles, more and more review articles that contain the results of several articles are needed. When certain principles are followed, and the data are quantitatively analysed, it is called meta-analyses. Combining the available information and creating integrated results seems logical and it can save a lot of energy and time. Nowadays meta-analyses are used to plan future research, provide evidence in regulatory phases and to modify practices (Hernandez, 2008).

“The main objectives of a meta-analysis are to: summarize and integrate results from a number of individual studies, analyze differences in the results among studies, overcome small sample sizes of individual studies to detect effects of interest, and analyze end points that require larger sample sizes, increase precision in estimating effects, evaluate effects in subsets of patients, determine if new studies are needed to further investigate an issue, generate new hypotheses for future studies” (Hernandez, 2008).

The result of the meta-analysis depends on the articles we are taking into account. The method of choosing the right research to the analysis consists of two phases. The first phase is the literature search, in which potential studies are identified. In the second phase, further criteria are applied to create the list of final studies. There are three mistakes that can be committed while the list of studies is created: search bias and publication bias in the first phase, and selection bias in the second phase (Hernandez, 2008).

Databases usually contain studies that have a “positive” outcome. This is called publication bias. Key words used for searching among the available studies are also a critical step. Search engines are also critical in finding the right studies. This one is the search bias. In the identification phase, there is a list of potential studies that can be chosen for the meta-analysis after considering several criteria. This step is needed to find studies those results are slightly different in order to enhance the quality of our results. When dissimilarities are large, it is called the selection bias (Hernandez, 2008).

In my study the problem analysis part will analyse the efficiency and results of the Jeremie program by collecting relevant studies and applying the meta-analysis to them. To combat the above-mentioned biases that can strongly influence the outcome of my analysis, I consulted with authors relevant in the topic, who managed to recommend me relevant articles and research. My list of studies is containing not “positive” research. I relied not just on search engines, where the right key words determine the results. Thanks to my consultations, I managed to collect research with quite similar outcome, so I will be able to look for patterns and causes.

I have chosen this method because it is useful to get a comprehensive understanding of the topic and the problem. By reviewing and examining the existing literature on the topic, the meta-analysis will provide an overall estimate of the effect size of the Jeremie program. Because this process involves the examination of several relevant studies, the results will be more reliable than any single study.

Table 3 shows the relevant studies that are included in the problem analysis part.

Table 3 – Literature review

| Literature review                                                                  |                        |                                     |                                                            |
|------------------------------------------------------------------------------------|------------------------|-------------------------------------|------------------------------------------------------------|
| Study                                                                              | Data collection method | Data source                         | Sample                                                     |
| Új Széchenyi Kockázati Tőkeprogramok Közös Növekedési Alap Alprogramja (2009-2014) | Archival analysis      | 6 tender                            | 6 tender content                                           |
| Karsai (2013)                                                                      | Database               | Investment deals of 126 VC&PE funds | 416 transactions                                           |
| Bucsky (2016)                                                                      | Database               | 353 funded firms                    | Balance sheet and financial statements of 249 funded firms |
| Kállay and Jáki (2019)                                                             | Database               | 353 funded firms                    | 1305 annual balance sheets and financial statements        |
| Milicsevics (2020)                                                                 | Database               | 824 funded firms                    | Longitudinal dataset of investee firms                     |

## 5.1 Problem Analysis

In 2009 the Jeremie program was launched. The government, beside the direct venture capital investment, planned to indirectly participate in venture capital investments in form of hybrid funds, a tested and regularly applied form of funds on the international market. In the first year of the program, the Jeremie funds were as successful on the market as the investments of the private sector. Due to the crisis and increasing economic uncertainty, the interest of players of the private sector of the Hungarian projects started to shrink. The Hungarian government tried to influence the capital of the private sector to the innovative project preferred by the government through the Jeremie funds. The main goal of the new funds was to finance innovative, early-stage firms that were neglected by the private and public venture capital investors until then. The government tried to motivate the private sector through financial incentives, for example by sharing the expenses and the yields of investments unproportionally (Karsai, 2013).

Although the presence of many investors on the venture capital and private equity market enhanced the opportunities of the companies, it did not mean that the problem with the availability of venture capital and private equity funds were solved. Bigger companies could choose between investors with their many projects, but it was hard for early-stage firms to find investors, especially if they did not want to enter international markets or promised lower returns on the investments than it was expected by the venture capital firms. As private investors followed their own regional strategy in financing rapidly growing firms, the financing of early-stage firms remained the goal of government owned venture capital firms. Unfortunately, the government owned venture capital firms were reluctant to invest in technology or knowledge intensive companies that carried a higher risk. The result was that the financing of innovation was less dominant. From this context, the hybrid Jeremie funds were expected to enhance the opportunities of these early-stage firms (Karsai, 2013).

## 5.2 Characteristics of the rounds

When the program started in 2009, the planned budget available for the years 2009-2015 amounted for 36.5 billion HUF. In the first program, early-stage firms with a headquarter in the Central Hungarian region could also apply. The target firms were SMEs founded within 5 years and their yearly revenue could not exceed 1.5 billion HUF. Venture capital firms could invest maximum 1.5 million EUR within 12 months and maximum only in 3 continuous years (the tender contains values in HUF and EUR, I did not convert them to stick to the exact value). The form of invest were capital financing and loan. These funds could not be used to pay back debt, for real estate development and acquisition of shares in existing firms. SMEs that were engaged in shipbuilding, agriculture, finance, coal or steel industry could not apply for these funds (GOP-2009-4.3/2, 2009).

The second round started on June 2012. The available fund in this tender for the period 2011-2015 was lower, 6 billion HUF. In contrast to the first round, only companies with a headquarter outside the Central Hungarian region could apply. SMEs founded within 3 years could apply to these funds if their yearly revenue did not exceed 200 million HUF. Venture capital firms could invest maximum 150,000 EUR within 12 months, and they could lend an additional 150,000 EUR, but only once. The form of investment were also capital financing and loan. Like in the first round, these funds could not be used to pay back debt, for real estate development and acquisition of shares in existing firms and SMEs that were engaged in shipbuilding, agriculture, finance, coal or steel industry could not apply for these funds (GOP-2012-4.3/A, 2012).

The next four rounds were issued in 2012, 2013 and 2014. The terms and conditions of these rounds were quite the same. The available fund for the four rounds together between 2011 and 2015 were 43.2 billion HUF. Again, companies with a corporate seat outside the Central Hungarian region could apply. A huge difference was that SMEs founded within 5 years could apply to these funds if their yearly revenue did not exceed 5 billion HUF. Venture capital firms could invest maximum 2.5 million EUR within 12 months, and it could be repeated multiple times. The form of investment were also capital financing and loan. SMEs could not use these funds to pay back debt, for real estate development and acquisition of shares in related firms. SMEs that were engaged in shipbuilding, agriculture, finance, coal or steel industry could not apply for these funds (GOP-2012-4.3/B, 2012, GOP-2013-4.3/B/2, 2013, GOP-2013-4.3/B, 2013, GOP-2014-4.3/B, 2014,).

70% of the fund was provided to the venture capital firms by the Jeremie program, 30% was given by private investors. The fund management cost of the venture capital firms could reach 3%, and operation costs could reach up to 5% of the fund. As these venture capital firms managed billions of forints, their revenue from managing these funds were also high if their investments were not successful. The salary of the investment experts were dependent only partially from the success (GOP-2012-4.3/A, 2012).

If we compare the different rounds of the Jeremie program, we can see that the terms and conditions of providing funds became loose by the end. The number of the target companies became higher, and the available funds also became higher. The number of venture capital firms were 8 at the beginning, by the end it became 32. It seems that the goal of the regulators was to provide as much money as they can to as many companies through a high number of venture capital firms as possible. Loose regulations can attract venture capital firms that are not as sophisticated as the first 8 that took part in the program, and also new venture capital firms with no experience.

Table 4 provides a clear comparison of the financial rounds through the years.

Table 4 – Comparison of financing rounds

| Comparison of financial rounds |                                                                                                          |                                     |                                                                                |                                                                                                  |
|--------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Capital program                | Új Magyarország Kockázati Tőkeprogram                                                                    |                                     | Új Széchenyi Kockázati tőkeprogram                                             |                                                                                                  |
| Subprogram                     | Co-Investment Alprogram                                                                                  | Közös Alap Alprogram                | Közös Magvető Alap Alprogram                                                   | Közös Növekedési Alap Alprogram                                                                  |
| Rounds issued                  | July 2009                                                                                                |                                     | June 2012                                                                      | June 2012, March 2013, June 2013, September 2014                                                 |
| Number of VCs                  | 1                                                                                                        | 7                                   | 4                                                                              | 19                                                                                               |
| Target companies               | Headquarter in Central Hungary                                                                           | Headquarter outside Central Hungary |                                                                                |                                                                                                  |
|                                | SMEs, founded within 5 years, max. 1.5 billion HUF revenue                                               |                                     | Micro or small enterprise, founded within 3 years, max 200 million HUF revenue | SMEs, founded within 5 years, max. 5 billion HUF revenue                                         |
| Investment                     | max 1.5 million EUR within 12 months, in 3 continous years                                               |                                     | max. 150,000 EUR within 12 months, and 150,000 EUR loan                        |                                                                                                  |
| Form of investment             | Equity financing, loan                                                                                   |                                     |                                                                                |                                                                                                  |
| Prohibited use of funds        | Debt payback, Real estate development for commercial use, acqusition of equity in existing firms         |                                     |                                                                                | Debt payback, Real estate development for commercial use, acquisition of equity in realted firms |
| Barriers for investment        | Struggling businesses, businesses engaged in shipbuilding, agriculture, finance, coal or steel industry. |                                     |                                                                                |                                                                                                  |

Source: GOP-2009-4.3/2, 2009, GOP-2012-4.3/A, 2012, GOP-2012-4.3/B, 2012, GOP-2013-4.3/B/2, 2013, GOP-2013-4.3/B, 2013, GOP-2014-4.3/B, 2014

One of the problems was the time period of the Jeremie program. In Hungary there was not so many examples of early-stage firm

s. There was a few success stories, but not enough to educate the young entrepreneurs on how to make a unicorn company. A good early-stage firm has to be innovative, unique, it should be able to grow fast, has a good team, should be a money maker and should be able to go international. In Hungary there was no history of startups and within such a short time period, entrepreneurs could not develop early-stage firms that met all the criteria for a lucrative business. This means that the money the venture capital firms invested was also invested in companies that could not become a success story. Normally it is not a problem, as venture capital firms follow a spray and pray strategy, meaning that they invest in many companies and only a few will succeed, failure is calculated in their system. But the percentage of success stories were a bit low in the Jeremie program.

On Chart 5 we can see that there is a sharp increase in the number of investments in 2014.

Chart 5 - Number and amount of investment within the Jeremie program

| <b>Number and amount of investment within the Jeremie program</b> |                              |                                           |
|-------------------------------------------------------------------|------------------------------|-------------------------------------------|
| <b>Year</b>                                                       | <b>Number of Investments</b> | <b>Amount of investment (billion HUF)</b> |
| 2010                                                              | 17                           | 6.7                                       |
| 2011                                                              | 27                           | 13.3                                      |
| 2012                                                              | 29                           | 11.4                                      |
| 2013                                                              | 35                           | 8.1                                       |
| 2014                                                              | 100                          | 24.4                                      |
| 2015                                                              | 44                           | 11.1                                      |
| Sum                                                               | 252                          | 75                                        |

Source: Karsai, 2018

### 5.3 Where did the public fund go?

The goal of the European Union was to develop venture capital market in the member states that are as sophisticated as the ones in the USA or Izrael. The new venture capital firms were supposed to help the fast growing, mainly technological early-stage firms. In Hungary the program was launched, and venture capital firms could apply to the new funds. As I have already mentioned, private investors had to provide 30% of the fund, the remaining 70% was provided by the EU and the Hungarian government (Bucsky, 2016). They expected that the funds will be invested in innovative companies, so these firms can grow rapidly to return the governments investment.

The time the Jeremie program was launched, only a few sophisticated venture capital firms operated on the Hungarian market. The new funds also attracted new venture capital firms. The Jeremie program gave criteria on who could applied to receive funds. The venture capital firms had to employ minimum 2 senior institutional investment expert, their planned portfolio should have included innovative and early-stage firms (GOP-2012-4.3/A, 2012).

During the Jeremie program, only 1071 jobs were created, it means that 81,000,000 HUF was spent on the creation of one job. At that time the government also supported the Hungarian factory of Audi in Győr, in contrast to the Jeremie program, the government have spent “only” 60,000,000 HUF on one job in this project. Bucsky (2016) examined the operations of 25 venture capital firms between 2010 and 2015. He found that the operating profit was 3 billion HUF and  $\frac{3}{4}$  of it was paid out as a dividend and 4.7 billion HUF was spent on salaries (Bucsky, 2016).

Many venture capital firms asked for 50+% equity in return of the investments. It potentially lowers the opportunities of further investors, who might want to invest in further rounds. But the 50+% equity let the venture capital firms to influence the expenses of the early-stage firms (Bucsky, 2016). It is also dangerous to the venture capital firms. A firm that lets 50+% of the equity to be owned by the venture capital firm does not trust in their success, and they plan to lead some kind of project from the venture capital firm’s money. Furthermore, with 50+% of equity, the venture capital firms bare high risk. Private venture capital firms risk their own money, but in case of hybrid funds, where 70% of the fund comes from the Jeremie program, the consequence of losing public money is minimal, as it is normal in this industry to invest in firms that will not generate profit in the future. It is easy to explain that the fund managers simply made bad decisions, these acts were not intentional.

Based on the above given information, we can see that the profit was not reinvested in a sustainable venture capital ecosystem, it was rather put into the pockets of the venture capital firm owners. Spending 81 million HUF on the creation of one job also indicates that there were problems with the money management. It was not hard to spend the money on a research project that did not exist in reality or to tell the early-stage firms to use a part of their investments to rent an office from a given company. Consulting services are also a great solution to put the money into our own pocket from the Jeremie funds.

## 5.4 Performance of the Jeremie program in Hungary

The economic crisis in 2008 was a turning point in the Hungarian venture capital market. The global economic recession resulted in lower venture capital financing and it affected negatively the entrepreneurial sector (Karsai 2013). The European Union tried to face this challenge with new policies to compensate the low volume of investments. At first, these policies were successful, the political involvement also showed some negative results. The Hungarian and Central and Eastern European policy responses were characterised by inefficiency, high agent costs, small-scale funds, administrative burdens, high information asymmetry (Karsai, 2018).

One of the EU interventions was the Jeremie intervention. “The ‘Jeremie’ initiative provided a framework for government be an investor in the funds managed by private venture capitalists” (Milicsevics, 2020). The main objective of the Jeremie was to provide the opportunity to private investors to raise finance from government sources. The Jeremie made it possible for EU member states to allocate a portion of the EU’s structural funds to domestic firms through equity schemes (Milicsevics, 2020).

By providing public money to private venture capitalists, the European Union wanted to enhance the finance within the European Union. This intervention, featuring market principles, attracted private investors, who wanted to invest in hybrid funds, managed by private venture capitalists. The Jeremie resulted in an increasing number of hybrid funds and an increasing activity of private venture capitalists. After the global financial recession, the Hungarian government allocated the highest amount of public money to venture capital financing among the CEE countries. Between 2007 and 2013, 46.2% of the public sources allocated for the CEE region was allocated to Hungarian venture capital funds (Karsai, 2018).

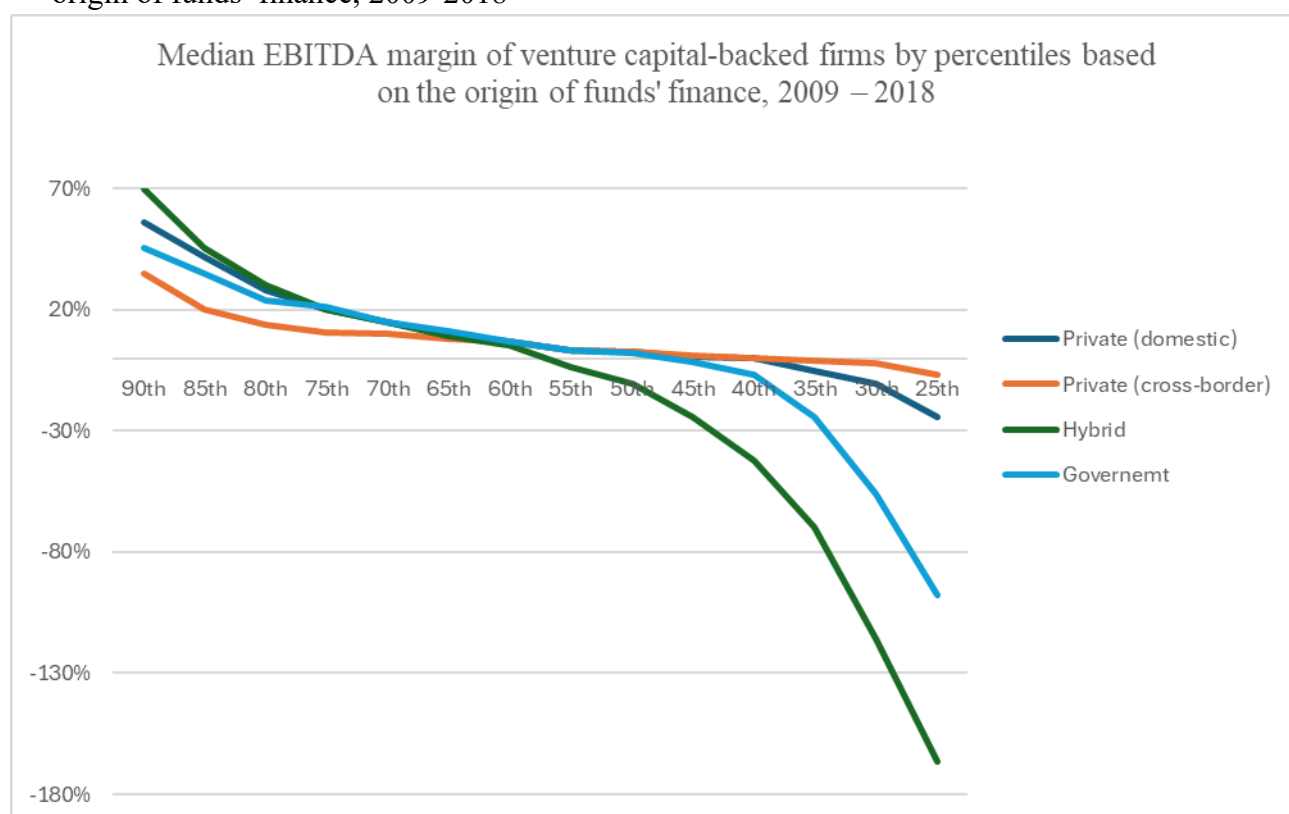
Because of many requirements and restrictions set by the government, including specific geographical scope of the financing activity, restriction on domestic financing activity, the volume of financing, investment strategy and the number of selected projects undermined the “market principles” in the decision-making process of the venture capitalists managing the hybrid funds (Milicsevics, 2020).

The selecting method of the projects financed from these hybrid funds were often associated with poor project valuation, poor selection and inefficient investment, but the market principle intervention attracted private investors and contributed to the emerge of new venture capital firms. Venture capital investments rose from 10 billion HUF to 181.5 billion HUF between 2009 and 2018 at the annual pace of 37.8%. The increase in the supply of venture capital led to

a growth in the investments in Hungarian based firms, and the number of firms that received investments also increased (from 71 to 824, at an annual pace of 31.3%) (Milicsevic et al., 2020).

From these studies, we can see that the Jeremie program was operating as it was planned, the volume of investments increased, and new venture capital firms were founded. As it was mentioned earlier, venture capital firms were founded because the regulations became less and less strict, here we can see that the market principle intervention was also attractive for those who were planning on becoming a venture capitalist. If we take a look at the Chart 6, we can see that the median EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortisation) of venture capital-backed firms by percentiles based on the origin of funds' finance shows that especially the companies backed by hybrid funds managed to reach the lowest median EBITDA margin. This indicates the mismanagement and inefficiency of the investment projects.

Chart 6 – Median EBITDA margin of venture capital-backed firms by percentiles based on the origin of funds' finance, 2009-2018



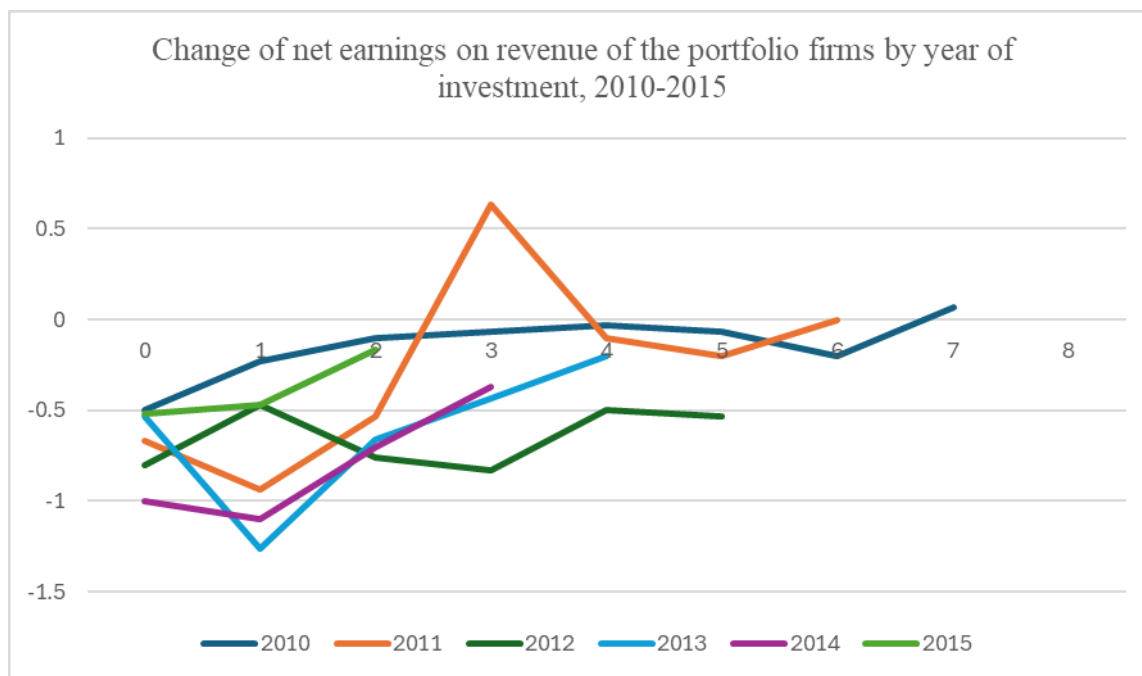
Source: Milicsevic et al. 2020

## 5.5 Portfolio management of hybrid funds

The expected and actual return on invested capital determines the venture capital market dominated by private investors. In the long run, the return on venture capital funds is close to the return on other kind of investments because market mechanisms narrow the differences; investors would relocate their assets into investment assets with a higher return. On a venture capital market with a high share of public money and with fix dates and regulations the decisions made by the venture capital funds are strongly influenced. On the private market, a venture capital investor would not invest in a firm with a low expected return, because the portfolio would not perform well with such investment. The venture capital fund, under the pressure of government regulations can accept such an investment, because their main measure is to invest all the funds before the deadline, even if the portfolio performs worse. They would continue investing in new companies, even though there are no more firms with high potential. The only way to spend all the fund is to build up a portfolio with a low return on investment (Kállay & Jáki, 2019).

Kállay and Jáki (2019) examined the companies that received investment from venture capital firms backed by the Jeremie. Companies from the first two years (2010-2011) managed to achieve the highest change of net earnings on revenue. Companies that received venture capital investments produced lower figures. On Chart 7, we can see that the total net earnings of the portfolio were still negative in 2017, only the 2010 portfolio managed to produce positive value. The outstanding value of the 2011 portfolio is thanks to a 140,000 EUR grant received from the European Research Council.

Chart 7 – Change of net earnings on revenue of the portfolio firms by year of investment, 2010-2015



Source: Kállay & Jáki, 2019

Until 2017, 53 poorly performing firms had been closed and eliminated from the portfolio, but there was no significant improvement in profitability. The cumulated loss of the portfolio reached 50 billion HUF by the end of 2017, which equals 70% of the total capital investment provided by venture capital funds. This means that most of the resources needed for development has already been spent. Profitability of later years' portfolio shows lower figures, the tendency is deteriorating. These portfolios are almost over their developing period, no growing profit can be expected from these firms (Kállay & Jáki, 2019).

It is coded in hybrid funds, therefore the venture capital funds participating in the Jeremie program that they are more prone to make irrational decisions, when they make their portfolio. They need to invest on time, they cannot wait until the high potential companies appear, they also settle for firms with low expected return on investment. In case of the Jeremie program we can see that the fund managers did not have to be successful, they could also get their salaries and continue their operations even after making bad investments and losing public money provided by the European Union. After meeting the technical requirements of the Jeremie, they were not motivated to build up a portfolio with high return. From another perspective, the sudden increase in the money supply was too much for the demand. Those early-stage firms

that normally would not receive investments could find a venture capital fund that was eager to take them into their portfolio. The choosing strategy became less strict.

These factors resulted in low performing portfolio. From the analysis of Kállay and Jáki (2019) we can see that the quality of the portfolios are deteriorating.

## 6 Conclusion

The Jeremie program was designed to provide capital to venture capital organizations in order to boost investment to early-stage firms in the European Union. The Hungarian government planned to indirectly participate in venture capital investments in form of hybrid funds in order to finance innovative, early-stage firms that were neglected by the private and public venture capital investors until then.

The program faced challenges. During the period of the program, there was only a few startups with the potential of becoming successful. The rate of success stories is low among those firms who received funding thanks to the Jeremie program. However, the volume of investments increased, and new venture capital firms were founded.

The Hungarian venture capital market is influenced by historical events, and unique cultural, institutional, and economical settings. These factors have an influence on entrepreneurial processes, leader skills, education, availability of financing opportunities and information.

There are major differences between private and hybrid funds in Hungary. Private venture capital firms are more superior in promoting innovation, competition, management skills and HR resources. The performance of companies supported by private venture capital firms are in average better than those who are supported by hybrid funds.

This is mainly due to the fact that private venture capital firms are operating according to market principles. Their investment decisions are driven by anticipated the return on investment and years of accumulated experience from investing in early-stage firms. They highly specialise themselves in one or two sector and they invest in firms within that industry. Beside the financial support they also provide help in developing the business.

Those Jeremie hybrid funds that got 70% of the funds raised from government sources mainly focused on building a portfolio, rather than investing in high performance firms, as the managers of the funds got their salary either way. Instead of developing the company, the program was used to “privatise” public money. The design of European Union programs should have been based on market principles, awarding top performance, and not giving the opportunity to venture capital firms managing hybrid funds to rely on public sources to finance their operations. The government's strict regulations like the specific geographical scope of the financing activity, the restriction on domestic financing activity, investment strategy, and the

number of selected projects undermined the "market principles" in investment decisions and resulted in over-engineered public actions.

The results of this study indicate that the Jeremie was not successful in creating self-sustaining startup ecosystem in Hungary. A high portion of companies that received billions of forints of public support, underperformed private venture capital-backed companies, creating small amount of jobs, and showed low return on investment. There was also lack of transparency and accountability, many companies benefited from this program without fulfilling the necessary requirements.

The findings suggest that bad management, lack of skills and loose filtering of the applicants resulted in the suboptimal performance of the program. The Hungarian government should implement stricter evaluation and monitoring of applicant requirements and their performance.

The results show that the Jeremie program did not contribute significantly to the development of the Hungarian venture capital and startup ecosystem, despite the considerable public funds that were injected into venture capital firms. Developing a sustainable venture capital and startup ecosystem should have been the main goal of the program. The Jeremie program mainly focused on increasing the volume of venture capital investments in Hungary, but it did not prioritise sustainable continuity. The focus was on providing public money to private venture capital firms to invest in early-stage firms, but there was no intention to develop such a system. If the Jeremie and similar programs had focused on developing a sustainable venture capital and startup ecosystem, the program's impact would have been far more significant.

The efficiency of the Jeremie program was affected by a supply shock and it changed the market approach of key market players, making the selection process less strict. As a result, the quality of the portfolios continued to deteriorate, and it became easier for early-stage firms, who would normally not receive investments, to secure financing.

The level of state intervention should depend on the state of the current market environment. Instead of government assisted programs like the Jeremie, governments should focus on building market-based venture capital firms and enable them to manage international capital, providing assistance in the form of training to firms that want to access foreign capital could go a long way in promoting entrepreneurship as this venture capital tends to target early-stage firms and brings invaluable connections and market insights.

Funds should be allocated wisely. It is important that early-stage firms receiving funds should be able to generate high return on investment. Therefore, the program should allocate funds more strategically to the promising and realistic ventures and not just to all early-stage firms that apply. The program should require for early-stage firms to present a detailed plan on how they are planning to use the funds, their business and revenue model. This will provide a better sense on the use of funds, and whether or not the early-stage firm is likely to generate return on investment.

Future government or European Union programs should examine the capacity and structure of the market, those are important aspects of efficient operations. Providing help for venture capital firms are important and should be prioritised, but policymakers should be cautious when they engage in state-led programs. Government officials should work on building relationship with private venture capital firms, to get a deeper knowledge about the mechanism they use to deal with the challenges of financing early-stage firms. It would help them to identify promising early-stage firms and help investors to confidently invest in those firms.

Programs that focus on innovation can create an incentive for the private sector to invest in early-stage firms. To signal their potential success, these programs can provide a validation that serves as a proof of quality. Moreover, the government can also set up an evaluation system to track and reward early-stage firms based on their progress.

It should be kept in mind that receiving government subsidies by political activity or lobbying is not hard, so these programs should be designed to minimise the threat of corruption. By decentralising the decision-making process, the cost of identifying the decision makers and influencing them is high.

Programs like Jeremie should connect to an international network connecting similar programs to learn best practices and develop efficient strategies that have visible impacts. By joining such a network, the program would gain access to new resources, expertise and funding opportunities. These could significantly enhance the impact.

Further research can be conducted on the financial status of those venture capital firms and firms that participated in the Jeremie program. The information on this topic is still limited, mainly due to the fact that participants are not willing to share information. Beside these limitations, there are several research opportunities to consider. For example, a case study focusing on specific early-stage firms that received funds from the Jeremie program can show

the impact of this kind of hybrid venture capital financing more detailed. It would show not only the success/failure of the program but would also show how the individual early-stage firms were able to benefit from it.

This study focuses on the Jeremie program in Hungary. It is important to understand the specific effects in this region, the findings of this study cannot be applicable in other countries. A comparison between the effects of venture capital financing targeting SMEs between countries and regions in order to identify the best practices and to enhance future government programs can be a topic of further research.

In addition, an analysis on the impact of the program on job creation and economic growth could provide us a broader understanding of the efficiency of the program. It would not only help to evaluate the program but would also create a benchmark for future programs and how they aim to support the growth of the economy.

Finally, a comparison between the Jeremie program and other government or private sector investment program in Hungary could provide a comprehensive insight into best practices within the field of supporting early-stage firms. Understanding how other programs worked could help to create future programs and to enhance their efficiency.

## 7 Summary

The research question of the study “The Jeremie Program in Hungary: A Meta-Analysis of its Impact on the Startup Ecosystem”, is to analyse the effectiveness of the Jeremie program in Hungary, especially its impact on the Hungarian startup ecosystem. The aim of this study is to evaluate the program’s effect by conducting a meta-analysis of selected articles and literature.

For this analysis, the study applies the meta-analysis method that collects the available information and creates integrated results to provide new insights and improve precision in estimating effects. The study acknowledges the biases that can arise from search and selection processes. The study treats these biases with consultation with relevant authors, including those who recommend relevant studies.

The study provides an overview of venture capital and startup financing, including the challenges that venture capital firms and early-stage firms face, while they are trying to secure financing, such as information asymmetries. The study also discusses the importance of venture capital, emphasising its potential benefits it can provide to early-stage firms and investors.

The study evaluates the effectiveness of the Jeremie program in Hungary, discussing the impact of the 2008 economic crisis on Hungarian venture capital market and how the Jeremie program tried to compensate the decreasing volume of venture capital financing. The study also examines the program’s impact on job creation and economic growth, highlighting the limitations on measuring the success of early-stage firms and the challenges on measuring program’s impact.

The study concludes that the Jeremie program in Hungary had limited success. Several factors influenced the program, like the lack of reinvestment into the venture capital ecosystem and lack of efficient capital market processes. Bad management, lack of skills and loose filtering of the applicants resulted in suboptimal performance of the program. Fund receiving firms underperformed and did not create many jobs. While public venture capital has potential benefits, this study highlights the importance that these programs should be reevaluated and improved to enhance their effectiveness. Further potential research topics include studies that examine the individual performance of those early-stage firms that received funds from the Jeremie program. A comparison between government and private sector investments in order to identify best practices.

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