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Summary: The ability of small firms to access finance is hindered by persistent market failure which creates funding gaps for new businesses, particularly in technology sectors, seeking small amounts of finance. This has prompted various forms of public sector intervention to increase the supply of both debt and risk finance. Intervention is based on the belief that small firms in general, and technology-based small firms in particular, are a key source of innovation, job creation and productivity growth. However, the ability of small firms to access finance is hindered by persistent market failures which create funding gaps. These funding gaps are greatest for new firms seeking external finance for the first time, for firms seeking small amounts of finance. The paper advocates that governments should invest in appropriate methodologies which can accurately measure investment trends in the early stage venture capital market so that the need for public sector intervention can be demonstrated and the impact of such interventions can be measured. The paper also analyse Polish venture capital market and government intervention and its influence for the market trends over the period of 1998-2014. The paper starts with a brief overview of the changing nature of government intervention in small firm finance markets. This provide a context for the main aims of the paper which are, first, to explain the rationale for supporting the informal venture capital market; and second, to describe and critically assess the forms of this intervention and how it has this evolved over time.

Keywords: venture capital, private equity.

Introduction

There is now a significant literature on policy interventions in the institutional venture capital market at both national and EU scales [5]. The financing constraints experienced by small firms arise from imperfections in capital markets which are conventionally attributed to the existence of information asymmetries. This has two dimensions. First, one party to a transaction is in possession of relevant information that is not known by the other party. Specifically, entrepreneurs possess more information about their own abilities and the prospects of their firm than the provider of finance and may misrepresent this in-

formation. This creates the risk of adverse selection by the funder which can only be mitigated by incurring the expense of a lengthy due diligence process to obtain relevant information about the entrepreneur and the business (which because of its private nature may not be available) and interpret it. This is particularly problematic in technology sectors where it is difficult to value the firm's scientific knowledge and intellectual property, the products are likely to be new and untested in the market, and the management may lack commercial skills. Second, one party to a transaction cannot observe relevant actions taken by the other party that might influence the outcome of the investment. Dealing with this problem – moral hazard – is also costly to the investor, requiring complicated contracts that are time consuming to design and negotiate and labour-intensive monitoring systems. Because the costs involved in investment appraisal and monitoring are fixed regardless of the size of investment, this makes small investments uneconomic for funders. One could observed changing nature of venture capital at the Polish market to the extent that fundraising and investment has been dominated by government or quasi government funds investments in some periods.

1. Venture capital investments characteristics

The argument for supporting the venture capital markets starts with standard macroeconomic theory: to produce output, capital and labor need to be available. How capital and labor are combined is central to how much output is produced. To increase output given the inputs, productivity needs to increase through innovations. Innovations are often brought to the market and dissipated through the economy by young entrepreneurial firms. Small firms contributed almost half of the innovation in their sample, but that there was considerable heterogeneity across industries: small firms tended to be more important in less concentrated immature industries. New smaller firms also choose more risky product introduction strategies compared with more established firms. They fail more often, but they also successfully bring riskier high-impact innovations to the market more often. Young entrepreneurial firms with risky product introduction strategies may have trouble raising funding from equity investors and banks because of two imperfections in capital markets. The first one is moral hazard (or agency problems) [6]. Conflicts of interest between entrepreneurs and investors limit the ability of young firms to raise equity funding: the entrepreneur faces excessive incentives to spend the firm's money, as he or she does not bear the full cost of the expenditure. Debt financing from banks may not be available either, because the entrepreneur has incentives to take on excessive risk from the bank's perspective. He or she benefits if the firm is successful, whereas the bank stands to lose if the firm fails. The second imperfection is asymmetric information. Equity investors fear that entrepreneurs would only issue equity when the firm is overvalued. Bank financing might not be available either, as banks fear that for given interest rates, only high-risk entrepreneurs would apply for loans.

Venture capital firms are experts at solving problems of moral hazard and asymmetric information and thereby earn their keep by bridging the gap between financiers and entrepreneurs. They use detailed screening processes to generate information about the firm and the entrepreneur, they make use of financial contracts such as requiring preferred stock and imposing restrictive covenants, they stage funding, and they demand seats on the board to be able to closely monitor the entrepreneur and provide advice on the development of the firm. Moreover, temporary ownership by venture capital firms gives strong incentives to invest in developing the entrepreneurial firm because eventual buyers are willing to pay both to obtain the developed firm and to prevent rivals from obtaining it.

Venture capital funds has emerged as the dominant source of finance for entrepreneurial and early stage businesses. Academic literature reveals that venture capital funded companies show superior performance to non venture capital funded companies. Many of the successful businesses that we know today such as Cisco, eBay, Apple, Microsoft and Google received venture capital funding at one point or the other. An active venture capital market can boost economic growth. Economic growth is driven by innovation, spearheaded by young entrepreneurial firms, where financing of these firms can be difficult because of moral hazard and asymmetric information. Venture capitalists specialize at solving these problems, thereby connecting idea-rich entrepreneurs with cash-rich investors. Ensuring funding for innovative firms has positive externalities on the economy, so it makes sense for governments to promote an active venture capital market. Venture capital backed firms contribute to the economy through the creation of jobs, an exceptional growth rate, their high level of investments, and their global experience and expansion. The proportion of companies that receive venture capital funding, however, is very small. Despite that, there has been a growth in the availability of VC over the years in the different branches and economies. Venture capitalists focus on identifying innovative industries in which they will endeavor to assist companies wishing to commercialize unique innovations most often of a highly technological. Companies powered by venture capital are innovation leaders in specific sectors of the economy and it is this factor that distinguishes the strongest segment of the financial market. Financing of venture capital on non-public nature of the financed company. As a rule, the companies that operate under venture capital funds are not listed on stock exchanges. During recent years, we have seen an increase in initiatives by governments around the world toward encouraging entrepreneurship to spur growth and job creation. Part of these efforts has been oriented toward trying to generate an active venture capital market either through direct participation in the form of government venture capital programs or through indirect efforts aimed at creating the right institutional environment.

2. Government intervention in the venture capital industry

Rapidly growing entrepreneurial enterprises are thought to be important sources of innovation, employment, and productivity growth. Thus it is not surprising that many governments have provided financing to entrepreneurial ventures. The public sector's commitment to venture capital is substantial, including forgone taxes, outright subsidies, preferential regulation, and public provision of investment capital. Government support appears to raise investment returns, but too much government support has the opposite effect. Modest amount of Government VC finance seems to improve the performance of entrepreneurial ventures relative to ventures supported purely by private venture capitalists [1]. The authors also find that there are significant differences between government ownership and government support of venture capital firms, broadly suggesting that support outperforms ownership. A healthy venture capital market can spur economic growth through helping innovative entrepreneurial firms find funding. But simply allowing venture capital firms to emerge may not be enough. Their activities are associated with significant positive externalities in the economy. First, there is an inherent virtuous cycle in venture capital activities. Once a critical level of activities has been established, it is much easier to keep the industry going and growing. Structures and experience have been established, peers and intermediaries such as lawyers and accountants are available, and investors and entrepreneurs have obtained experience with, and confidence in, how the industry works. At the start, a venture capital market might require help getting off the ground. Second, research and innovation activities have spillovers on the rest of the economy. Thus, venture capital firms may not internalize the effect they have on the economy as a whole. This suggests that an active government policy to promote venture capital activities is warranted, and that creating the right institutional environment matters.

Government interventions to increase the supply of early stage venture capital have evolved over time in Western European countries as well as in Poland. Initially, governments established their own venture capital funds. However, this approach was quickly seen as being inappropriate. Investment decisions were potentially subject to political influence. Government bureaucrats lacked investment skills. The market was distorted because of lower return expectations. And there was the risk of crowding out private sector investors. As a result governments now typically adopt a capital participation approach. This can take two forms: providing some or all of the investment funds and appointing private venture capital fund managers to make the investments or investing in existing privately managed venture capital funds (a fund-of-funds approach). However, a capital participation approach does not address the fundamental risk, cost and return factors which have discouraged private sector venture capital funds from making small, early stage investments. Governments have therefore had to en-

hance the risk-reward ratio in order to attract private investors as co-investors in their funds. Governments can provide private investors with downside protection, for example, by assuming a disproportionate share of failures. The impact of this intervention is questionable. Some researchers are critical of the funds that have been created as a result of public sector intervention for being too small and hence ultimately non-viable on account of the high proportion of their funding that is absorbed by running costs and their limited ability to provide follow-on funding [8] These factors combine to depress investment returns, which severely hampers the fund's ability to attract follow-on funds from private sector investors. Public sector funds are often further constrained by having an upper limit on how much they can invest in any business. This prevents such funds from making follow-on funding which, in turn, leads to a dilution of the fund's investments, which further depresses returns.

3. Evolution of government support of venture capital investment in Poland

The published data on venture capital could be used to distinguish several phases of market development and give significant link between the shape of the market (investment preferences funds) and the general state of the economy in Poland. You can also speak with a clear market segmentation by type and size of funds, as well as the origin of the capital. Five distinct venture capital and private equity phases can be observed within Poland. Each phase lasted between 4 and 6 years and is reflected in the fundraising, investing, and exiting dynamics. All those phases rely on capital market and economic conditions as well as on legal development during the years in Poland. The first phase (5 years; 1990– 1994), also known as the development phase, represents the foundational period of the Polish private equity industry (fundraising: \$0.8 billion; investing: \$0.3 billion; exiting: \$0.2 billion). The origins of the venture capital market are connected with the creation in May 1990, the Polish-American Enterprise Fund (\$ 240 million) in total capital based on the US government (as part of a broad program of assistance for the countries of Eastern Europe, the so-called SEED Act). The fund, despite the assistance of origin, was entirely commercial in nature. In the same year, investment activities in Poland started (created in the previous year) Danish Fund for Central and Eastern Europe (The Investment Fund for Central and Eastern Europe – IO). Just as the previous fund in this case as a whole was based on government capital (approx. 900 million DKK). Another public initiative was related to the adoption of the 1993National Investment Fund program, whose primary objective was to carry out mass privatization and restructuring of the 512 companies covered by the program. After this introductory phase, the Polish private equity industry entered into a strong period of ex-

pansion (4 years; 1995–1998) where it continued to work through its initial developmental problems (fundraising: \$1.2 billion; investing: \$0.8 billion; exiting: \$0.3 billion). Encouraged by the initial success of early entrants, new private equity firms began to develop local operations or pursue market opportunities from as far away as London, Paris, Frankfurt, or New York – a reflection of the desire of limited partners to achieve the same satisfactory returns generated by early entrants. Most of the funds were private and fully commercial. The third phase of development represents a protracted phase of stagnation and structural adjustment (6 years; 1999–2004). The fourth phase (5 years; 2005–2009) represents a strong rebound by the private equity industry spurred on mostly by leveraged transactions (fundraising: \$3.3 billion; investing: \$3.1 billion; exiting: \$0.6 billion). The last fifth phase (6 years 2010–2015) represent sharp drop in PE investments from record level in 2008 (727mln EUR) to 337 million EUR in 2014 however the number of invested companies become relatively stable for PE but has increased substantially for venture capital segment. However despise slowdown in private equity investment at the Polish market government agencies were very active in terms of supporting venture capital investments. Most active on the venture capital market in this phase was Krajowy Fundusz Kapitałowy (NCF - The National Capital Fund). The NCF was established by the Polish Government on July 1st, 2005 in accordance with the National Capital Fund Act with the aim of filling in the equity gap on the Polish SME market. In April 2010 NCF signed the first agreement with venture capital funds. The NCF manages more than EUR 200 million that comes from the Polish Budget, European Union's Structural Funds and the Swiss Government. The development of the venture capital market in Poland from the beginning was stimulated by a foreign public agent provenance, which subsequently led to the creation of commercial funds, financed mostly from private sources(from foreign domination). As indicated earlier, the commitment of public factor in countries with developed markets, venture capital, however, be subject to transformation, most often accompanied by changes in the ideology of the presence of the state and its agencies in economic life in general. In line with the scenario of development in Poland should therefore appear phase of liberalization and the withdrawal of public factor, but only when the roles will be able to take funds privately funded.

Otherwise, such action may result in a widening of the equity gap occurring in the market, especially for small and medium-sized enterprises. In summary reflections on the current evolution of the Polish venture capital market, it is therefore tempting to anticipate possible scenarios of its development, especially with regard to the involvement of public factor. An interesting research problem is the attempt to answer the question of whether funds operating in Poland, created on the initiative of foreign governments, Polish public institutions or financed with the proceeds from aid programs, subject to European trend of transformation in this regard. Do not disregarding the specifics of a Polish funds created in the 90s

that the creation and financing methods and the nature of its investment policies do not fully coincide with the solutions used in Western Europe. Probably the issue of transformation fund financed from public funds towards commercial funds primarily will focus on the emerging group of companies.

4. Methods and data

Analyzing venture capital data is quite demanding because the lack of regular reports and private character of those investments. Not all funds also reports their activity and performance. However our sample covers venture capital investments in Poland in the period of 1998–2014 conducted by local funds. Data covers investments on 2.6 bln EURO which was conducted on almost 1000 entities.

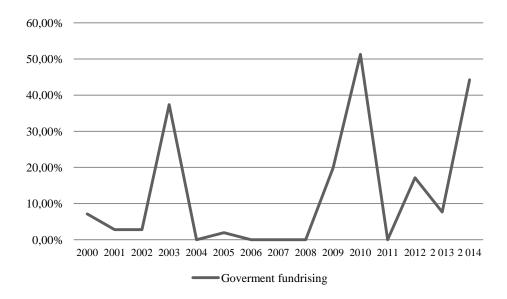
5. Analysis of venture capital fundraising and investments over 1998–2014 in Poland

Venture capital and private equity investments into Poland over 1998–2014 was average equivalent of 0,11% GDP. EVCA data provide information that over the period of 2000–2014 fund of funds were the primary source which accounted for almost 29% of all funds. Second source for given period were pension funds with 20,76% and third position is for banks which provided 13,67% of capital. Despite an overall better macroeconomic and financial environment 2014 saw sharp decrease in fundraising. As a result fundraising levels decreased to 10,63 million EUR in 2014 far below the 2007 peak of 570 million EUR. It is worth to point that commitments from government agencies in the period of 2010–2014 accounted for over 24%. And was the second primary source for venture capital funds for a given period which rose rapidly thanks to the launch of one large government fund of funds. This data you may find in the table 1.

Analysing data in the table 1 we can find that commitments from different sources is not stable for a given period. One of the main reason is often law changes and that investment decisions are taken out from Poland. Irregularity in raising funds through funds may testify constantly developing the venture capital market in Poland as well as laws restricting investment. One of the most important changes is the share of government investment in the venture capital sector. After the first phase of investment in the years 2002–2003 its share dropped to 0% in the period of 2004–2007. After launching government fund of funds named KFK its share went up to 44% in 2014. This situation presents graph 1.

Investments by venture capital funds have evolved rapidly since the occurrence of the first funds at the Polish market. In the early years venture capital funds invested in companies in the early stages of development or in the start-up

phase. This trend changed when the funds are no longer funded aid, as it did in the early '90s, and began to be commercial in nature as source of capital has changed for commercial banks, insurance companies and corporate investors. Those investors change the nature of venture capital investments into private equity. In Poland now they begin to dominate investments made in the companies in subsequent phases of development and buyouts. This is because the providers of capital are mainly foreign entities, and such trends now dominate the Western European markets. However as we can observe, Poland has become a booming market for venture capital funds over 1998–2015.



Graph 1. Share of the government fundraising in the venture capital industry in Poland over 2000-2014 (in %)

Source: Based on EVCA Yearbook 2000-2015

Regarding investment it could be pointed that 749 companies received financing for almost 892 million EUR from venture capital funds over the period of 1998–2014. A total of 74 companies in seed phase were financed. Adding to that 228 companies in start up phase were financed as well as 447 in expansion phase. We can also observed that in the period of 2005 and 2010 there was sharp drop in the number of investment. However it does not correspond with the value of invested capital as in the years 2007–2008. The amount of 105 million EUR supported only 79 companies and on the period of 2010–2014 there was 175 investment for only 96 million EUR. To conclude the number of investment increased in the last 5 years but the average value of it has dropped significantly. Record year in terms of the number of investments was 1999 with 111 invest-

ment. In the following years, and especially since 2003, followed by decline in the number of investments. With a slight increase in the value of investments in 2003–2005, it should be emphasized an increase in average transaction value. This is because the change in the trend of investments made by the funds, with investments in the initial phase of the development of enterprises in the phases of expansion and development of the Polish economy and thus, increase the size of potential investment targets. This trend is confirmed by the results of fund investments made in 2005–2008. With a slight increase in the number of investment is a significant increase in their value, as evidenced by the investments in large mature companies with established market position.

The branch structure of venture capital investments on the Polish market between 2000–2014 was not stable as market trend, investors and industries has changed. However, you may notice a clear domination of investments in several industries. First of all, high interest funds attracted telecommunications. In two years (2000 and 2005) fairly large investments were also made in the computer industry as well as in consumer goods. The larges three sectors of venture capital industry in Poland in the period of 2000–2014 was telecommunication with 23% of total invested amount, consumer goods with 21% and medicine with almost 10% which came on a pair with financial services.

6. Results and discussion

Basing on the analysed data we can point that a specific feature of the Polish market against the markets of other EU countries is quite large scope of investments in industries classified as high-tech. Relatively large investments were made by venture capital funds in companies producing consumer goods, other industrial products and for several years also in financial services. In general it can be said that the branch structure of venture capital investments in Poland does not come essentially from occurring on other European markets. In Poland, they are reproduced investment strategies of investment funds operating in the area, which is understandable considering that over 60% of the capital came from European Union countries. Future research that could be conducted on the basis of this article is to analyze performance of venture capital funds supported by the government agencies in Poland.

Conclusion

Theoretically, state intervention gives an opportunity to remedy the deficiencies of the venture capital market. In order to do so, first and foremost precise information is needed on unsatisfied demand, that is, the extent and place of occur-

rence of the so-called *capital gap*. Analysing data from the Polish market of venture capital industry we can observe that the state can have a positive role in increasing the provision of early stage venture capital in a market characterised by difficulties of significant risks and uncertainties, low investment returns and high illiquidity. By co-investing with private investors and using the specialist competencies of professional venture capitalists, it is possible to increase the supply of risk capital finance available for high potential young firms via quasi venture capital funds. A clear lesson from the experience of advanced Western economies is that supply-side measures alone cannot create a viable VC industry. In addition, there have to be major changes to the entrepreneurial ecosystem that also allow for significant improvements in the quality and prospects of the firms seeking VC finance. The state has a multitude of options to achieve its goals. It may establish a central fund whose investments raise the sources of the private capital funds, or invite private sector investors to its funds, or reduce the costs/risks incurred by the latter. Co-operation between the state and private sector investors can be lubricated, so to say, by arrangements based on asymmetric risk assumption, or the uneven distribution of preferences, to make joint investment more attractive to private sector investors. The engagement of the private sector in the selection, mentoring and monitoring of projects to be financed is important to ensure the long-term development of the venture capital market and also as the exclusive means ensuring the appropriate, politically neutral, selection of viable projects with good prospects, the identification of financing terms irrespective of the election cycles, and the appropriate professional expertise and stimulation of managers commissioned to administer the investments concerned.

Table 1. Source of funds for private equity and venture capital funds in Poland over 2000-2014 in million EUR

Investor	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Corporate investors	2,38	56,70	44,06	1,40	2,85	0,00	36,50	0,00	0,00	0,00	3,83	1,23	0,00	0,00	0,00
Individual investors	2,25	20,80	14,49	2,40	0,45	5,85	170,40	00,00	3,00	8,60	1,10	1,06	25,06	20,20	0,00
Government agencies	25,86	4,96	3,34	9,62	0,11	1,17	0,00	00,00	0,00	25,00	58,83	0,00	80,00	20,00	4,70
Banks	98,43	47,20	33,45	8,03	109,50	2,34	33,70	133,00	101,00	34,00	00,00	25,00	0,00	0,00	0,00
Pension funds	77,51	0,00	0,00	0,00	159,20	0,00	199,40	142,00	157,00	0,00	0,00	75,00	74,06	62,00	0,00
Insurance companies	69,72	9,92	69'9	0,00	28,47	0,00	41,18	188,60	25,00	38,00	0,00	5,00	12,02	10,20	0,00
Funds of funds	23,39	8,31	5,57	3,04	0,00	0,00	430,60	36,00	271,00	20,00	50,00	223,73	130,17	99,75	5,93
Academic institutions	0,00	0,79	1,11	0,00	0,00	0,00	18,72	0,00	0,00	0,00	0,00	80,48	5,10	0,00	0,00
Sovereign wealth funds	00.00	6,54	4,46	0,00	0,00	0,00	0,00	0,00	32,00	1	00,00	29,99	30,30	12,54	0,00
Unclassified	2,37	2,63	0,00	0,50	0,34	2,34	3,74	70,90	152,00	0,00	1,00	1,10	110,011	36,56	0,00
Total new funds	301,90	158,00	113,20	24,80	301,00	11,70		00,00	1		I				
Capital gains	61,27	17,80	5,49	0,93	2,91	47,30		00,00	1		I				
Total	363,20	176,00	118,70	25,73	303,90	59,05	936,00	570,50	741,00	126,00	114,76	442,59	466,72	261,25	10,63

Source: own calculation on EVCA Yearbooks 2000-2015.

Table 2. Investments of the venture capital and private equity funds in Poland over 1998-2014 in mln EUR

Stage focus	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Seed	0	1,81	2,87	2,25	0	0,16	0	0	0	2,182	3,87	1,1	0	0,48	2,54	1,56	1,62
Start-up	38,54	16,3	38,89	22,7	9,81	2,05	0	0,51	0	0,2	11,36	0	1,29	5,18	2,71	4,87	8,24
Later stage venture	52,77	130,91	157,9	73,9	53,72	40,41	26,1	4,32	15	63,1	22,26	0,4	13,3	19,78	3,06	16,00	16,19
Total venture	91,31	149,02	199,6	6,86	63,53	42,62	26,1	4,83	15	65,48	37,49	1,5	14,43	25,45	8,32	22,43	26,02
Growth	0	0	0	0	0	0	0	0	0	8,1	191,2	65,8	127,7	183,28	118,65	77,27	70,67
Rescue/Turnaround	0	0	0	0	0	0	0	0	0	1,25	89	6,1	4,57	1,92	3,10	0,00	0,00
Replacement capital	10,78	24,27	1,95	47,8	34,65	42,69	70,2	5,66	2	1,18	0	0,99	16,14	0,00	26,70	25,22	1,20
Buyout	0	10,66	0	3,81	5,61	47,86	33,7	49,7	276	495,4	496,1	411	341,6	481,51	481,51 383,82	226,60	238,18
Total Investment	102,1	183,95	201,6	150	117,7	133,2	130	154	294	571,4	792,8	485,4	504,5	692,16	540,59	692,16 540,59 351,52 337,02	337,02

Source: own calculation based on EVCA Yearbooks 1998-2015.

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Interwencja instytucji publicznych na rynku funduszy venture capital w Polsce w latach 1998–2014

Synopsis: Dostęp do tradycyjnego finansowania małych, szybko rozwijających się firm jest stosunkowo utrudniony ze względu na funkcjonowanie tzw. luki finansowania dla nowych przedsiębiorstw, w szczególności w sektorach technologicznych. Sytuacja taka skłoniła instytucje sektora publicznego do podaży zarówno długu, jak i finansowania projektów związanych z podwyższonym ryzykiem. Interwencja ta opiera się na przekonaniu, że małe firmy są kluczowym źródłem innowacji, tworzenia miejsc pracy i wzrostu produktywności. W artykule przeanalizowane zostały działania inicjujące funkcjonowanie funduszy kapitału podwyższonego ryzyka i ich wpływ na trendy rynkowe w zakresie tworzenia się mających innowacyjny charakter małych i średnich przedsiębiorstw w okresie 1998–2014 na rynku polskim.

Slowa kluczowe: venture capital, private equity.