

An Integrated Approach to VC Financing Policy: “The Plumber’s Model of Entrepreneurial Finance”

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Abstract

It is widely accepted by both practitioners and academics that in modern economies entrepreneurship in general and innovation based entrepreneurship in particular are maybe the most important drivers of economic growth and that economic success is highly correlated with the existence of an entrepreneurial infrastructure and a social culture supporting innovative entrepreneurs. Policy makers are interested to learn from the experience of advanced entrepreneurial economies such as USA and Israel and replicate successful models in their countries.

This paper proposes a holistic policy model for formation of entrepreneurial capital. The model identifies three actions domains that determine the total investment flow capacity of the system which is equal to the minimum between the local flow capacities of each domain. Since the policy goal is to maximize the total investment capacity, the optimal marginal effort shall be invested in releasing the system temporary bottleneck at the given time.

The model is tested in the Israeli innovative entrepreneurial environment in comparison with the Avnimelech and Teubal model predictions. The model proposed in this paper complements the Teubal model and is based on a causal rather than temporal approach. It also provides a tool that allows for adaptation of the Israeli methodology to the local context.

JEL Codes: D82, G24, G32, O16, O18

Keywords: Venture Capital, Entrepreneurial Policy, Entrepreneurial Finance

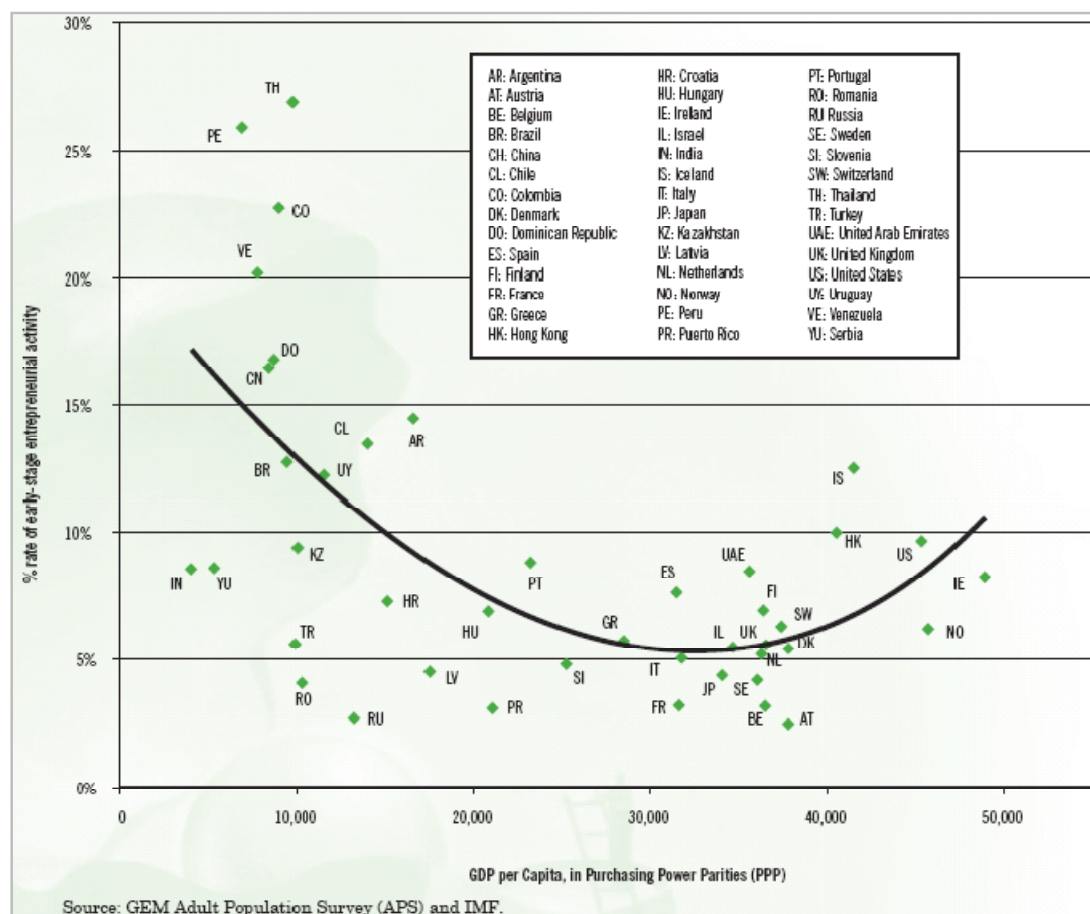
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Introduction

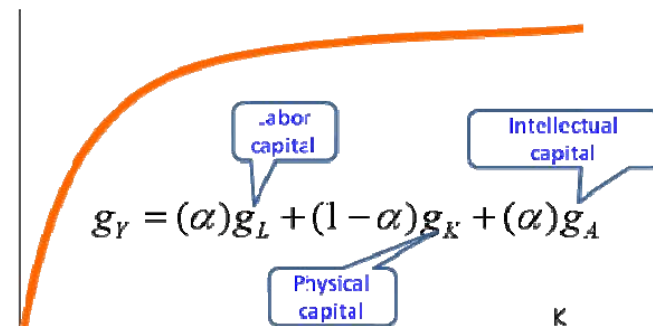
Today it is widely accepted by both practitioners and academics that in modern economies entrepreneurship in general and innovation based entrepreneurship in particular are maybe the most important drivers of economic growth and that economic success is highly correlated with the existence of an entrepreneurial infrastructure and a social culture supporting innovative entrepreneurs. Innovation and entrepreneurship are not only the key drivers of economic growth, but increase also the survivability rate during economic downturns.

GEM (Global Entrepreneurship Monitor) indicates the consistent existence of a U-shaped correlation function between GDP per capita and the entrepreneurial activity



rate on a global perspective. Within this context, economic development policy in modern economies must necessarily address the entrepreneurial element.

How does entrepreneurship impact economic growth? The answer to this question resides in the 50-year old seminal paper of Solow and his fellows, known as the “Solow model for economic growth.” One of the main conclusions of the Solow model was that the traditional physical and labor capital factors did not explain much of the variation in economic growth and the identification of the residual component, reflecting technological change, as “intellectual capital”. The last factor is the result of the accumulated “knowledge capital” times the “knowledge exploitation rate,” or the “entrepreneurial capital”. An important property of intellectual capital is that, in contrast to physical and labor capital that depreciates in time (machine and human productivity decrease with age), intellectual capital accumulates. Thus, the marginal contribution of intellectual capital is higher if investments are sustained for longer periods.



$$g_Y = (\alpha)g_L + (1 - \alpha)g_K + (\alpha)g_A$$

An interesting paradox that characterizes entrepreneurial capital formation is that the desired outcome of this process, that is the creation of successful enterprises by entrepreneurs, also determines the partial cannibalization of the accumulated capital. This happens because successful entrepreneurs shift, at least for a while, their profile from “entrepreneurial capital” to “labor capital” (since they now become managers in their own firms). They continue to contribute to economic growth through their enterprises but in order to achieve long-term sustainability of entrepreneurial capital formation we shall compensate for this partial cannibalization. This implies that the “entrepreneurial capital formation function” shall have a convex shape.

The entrepreneurial mindset and perspective is critical not only for entrepreneurs themselves and their firms but for society at large and consequently became important items on the agenda of policymakers. Following the recognition that innovation and

entrepreneurship are important driving forces of economic growth, the policy debate focused increasingly on formation and management of entrepreneurial capital, in the forms of academic research, R&D, education and entrepreneurial finance. Governmental and international bodies launched numerous research and educational programs, providing direct financing for academic works in these fields and encouraging global cooperation among researchers as key economic strategies for the future.

The United States leads the worldwide ranking of entrepreneurial development and extraction of economic value from innovative entrepreneurial activities. In order to maintain its position, US government encourages official bodies and NGO to join forces in recommending entrepreneurial supporting measures. The Kauffman Foundation and the International Economic Development Council (IEDC) convened on April 1, 2008 a meeting of forty experts representing economic development organizations, entrepreneurship support programs, and foundations and associations that focus on entrepreneurship to discuss the US policy in the field of entrepreneurship.

Romano Prodi, during his term as President of the European Commission, declared the promotion of entrepreneurship a central cornerstone of European economic growth policy: "Our lacunae in the field of entrepreneurship need to be taken seriously because there is mounting evidence that the key to economic growth and productivity improvements lies in the entrepreneurial capacity of an economy." The 2000 Lisbon Proclamation of the European Council set the goal for Europe to become the world's entrepreneurship leader by 2020.

The development of a well functioning venture capital (VC) industry is regarded as a significant component of the entrepreneurship development policy. While accounting for a relatively modest part of overall corporate investments, Venture Capital investments play the dominant role in financing high-risk, high-return projects. VCs are highly specialized financial intermediaries who invest in new firms in their area of expertise on behalf of their investors, thus facilitating and reducing the cost of "search and match" efforts between investors and entrepreneurs. VC funds attempt to find

good companies and invest intensively in the early stages of the fund, monitor and support portfolio firms in the mid-stage, and accelerate the exit in the last stages.

NVCA reports that US venture capital backed companies employed in 2005 over 10.0 million American workers in high-quality jobs and generated \$2.1 trillion in revenue representing 16.6 percent of the nation's gross domestic product (GDP) and 9.0 percent of U.S. private sector employment. Venture capital backed companies outperformed their non-ventured counterparts in job creation and revenue growth. Employment in venture backed companies jumped by 4.1 percent, while national employment grew by just 1.3 percent, between 2003 and 2005. At the same time, venture capital backed company sales grew by more than 11.0 percent, compared to an overall rise in U.S. company sales of 8.5 percent during the same period.

In Europe, between 1991 and 1995, employment at venture-backed companies grew by an yearly 15% and sales by an yearly 35%, as compared to 2% and 14% for the 500 largest European listed firms (EVCA, 1996). In UK, according to BVCA reports, British venture-backed companies increased between 1993 and 1997 the employment by an yearly rate of 24%, and sales by 40%. By comparison, employment at the hundred largest British listed companies grew by 7% and sales by 15% during the same period.

In Israel, IVA estimates the contribution of the VC sector to the country economic growth between 1995-2005 to 40% of GDP growth and 15% of employment growth. Reports consistent with these findings were published by various official organizations in Finland, Ireland, Brazil, Korea, etc.

The understanding that the Venture Capital sector, or more generally the entrepreneurial financing infrastructure, is an important factor of any entrepreneurial policy development, led to an unprecedented effort by national as well as international policy bodies to understand and replicate the best practice methods in creating and maintaining an effective VC system. Although much progress was made in identifying and explaining the structure, mode of operation and the success/failure factors that govern the VC world, the real life application of these findings did not produce yet

consistent recommendations that can be easily adopted and implemented as national policy. This raises the question to what extent does the VC industry similar role in different countries, and how large is its real impact in a particular geo-economic context.

Some researchers consider that the supply of entrepreneurs, the knowledge level, efficient technical transfer of innovations from universities to industry, the ability of entrepreneurs to monetize their inventiveness, etc. drive the level of VC investment in technology related industries. Others regard the financial system and the supply of risk capital as being the critical factors for a well developed entrepreneurial economy. Some believe that policies that encourage investors to invest in private equity and determine financial institutions to adopt a less risk-averse investment strategy form the foundations of a successful VC segment. Gompers and Lerner (1998) argue that the rapid growth of US VC segment in the 90's is the result of the "prudent man" rule relaxation at the end of the 70's. So appears to be the series of R&D investment taxation rules and the creation of the government Yozma fund in the 90's for the Israeli VC industry. However, the exact replication of the US or Israeli measures in other countries did not produce in most cases the expected results, which suggests that additional factors shall be considered when defining an effective policy. This is the research question of the present paper: can we combine the results of the various research works in a unique, coherent model that provides better way for an effective policy design than its parts?

I propose an integrated model combining knowledge from three different disciplines: entrepreneurship, intermediate finance and macroeconomics. The structure of the model itself reveals the reason for the only partial results so far: due to the very different methodologies of these three scientific disciplines, the idea of integrating them in one unique model doesn't come "naturally" to the typical scholar in any of them.

Entrepreneurial policy literature

The issues of innovations, entrepreneurship, economic growth and VC financing have been largely discussed in the academic literature. In addition, over that last ten years an impressive number of data, reports and recommendations have been produced by various industry and governmental organizations. We cover only a small part in this section.

On the side of those emphasizing the role of entrepreneurs, entrepreneurial education and entrepreneurial culture on the firm performance and the social wealth of an economy, Audretsch and Thurik, (1997, 2000) describe the fundamental shift away from a managed economy and toward an entrepreneurial economy in developed countries and indicate that that countries and industry segments lagging behind this trend report lower growth and productivity and higher unemployment levels. The model of the managed economy is the political, social, and economic response to an economy dictated by the forces of large scale production, reflecting the predominance of the production factors of capital and (mostly unskilled) labour as the sources of competitive advantage. By contrast, the model of the entrepreneurial economy is the political, social, and economic response to an economy increasingly dominated by knowledge as production factor, but also by a different, yet complementary, factor that had been overlooked: entrepreneurship capital, or the capacity to engage in and generate entrepreneurial activity. Dimensions of entrepreneurship are smallness, competition, deregulation, innovation, co-operation, variation, turbulence and motivation (Audretsch and Thurik, 1999). Lowering entry market barriers and increasing diversity in terms of products, processes, forms of organization and targeted markets lead to a selection process where entrepreneurs seek for better products, processes, forms of organization and markets can only thrive under enabling rather than constraining public policies. The essence of the entrepreneurial economy is not just creating knowledge, but also exploiting it. While developed economies switch slowly from the managed to the entrepreneurial economy, emerging economies face an even more challenging task (Thurick, 2008).

There is an entire class of literature indicating that increased levels of entrepreneurship can be reached through education (European Commission, 2006) and especially entrepreneurship education (Van der Sluis et al., 2006; Karlan and Valdivia, 2006; Van der Sluis and Van Praag, 2007). Such education is promoted and implemented into school curricula in many of the European member countries (European Commission, 2006) and the United States (Kuratko, 2005). A key assumption underlying these programs is that entrepreneurship skills can be taught and are not fixed personal characteristics. America owes much of its economic success to its enviable record in providing universal primary and secondary education to its citizens, and perhaps even more importantly, to the development of its widely admired university system (Kauffman Foundation, 2007). A strong education system—primary, secondary, college, and post-college— play a vital role in the development of the human capital necessary to ensure a steady stream of entrepreneurial activity. Some scholars try to identify specific endogenous characteristics of entrepreneurs such as optimism, etc. (Puri and Robinson, 2006).

On the other end of the entrepreneurial development models spectrum are the believers in market efficiency; that is: enough supply of funding and incentives facilitate the entrance of new entrepreneurs and consequently the formation of entrepreneurial capital. A useful comparison of some research works and their findings, in particular regarding entrepreneurs utility is provided by Praag and Versloot, 2007. Aghion et al., 2007 analyze the effect of knowledge spillover and innovation incentives in a multi-segment Schumpeterian growth model using UK micro data. Hellman and Perotti, 2005 describe the trade-off between markets and firms in protecting the rights of invention and the best implementation of ideas. They find that an environment that allows ideas to cross ...firm boundaries enhances the rate of innovation and creates a symbiotic relationship between markets and ...firms. Wallsten (2000) finds in the US that the public R&D subsidies have a strong crowding-out effect on private investment and no effect on employment. A quite comprehensive comparative review of policy initiatives seeking to improve the financing environment for innovative firms in the early stages of

their development was published in 2007 by UNECE. Santarelli and Vivarelli, 2007 discuss the firm formation and the growth of new-born firms from the perspective of microeconomic entrepreneurial foundations of industrial dynamics (entry and exit).

The third perspective is the role of entrepreneurial finance such as VCs and “angels” in the development of a viable entrepreneurial infrastructure. Since almost all research works indicate a clear positive correlation between the presence of a well functioning VC segment and the entrepreneurial level, most policy makers focus on developing this infrastructure.

From the vast academic and professional literature available in this area (see Phalippou, 2007 for an updated and elegant survey of academics work in this field) the most relevant for this paper are the following:

BOTTAZZI and DARIN (2003) provide a systematic analysis of venture capital in Europe arguing that venture-backed companies do not grow and create jobs faster than non venture-backed companies.

Mayers, Schoors and Yafeh (2002) compare the VC structures and specially their investors profile in four representative countries: Germany, Israel, Japan and UK. This work is important because the fundamental differences between the financial systems (banks, markets, etc.) in these countries.

Avnimelech and Teubal (2008) propose a three phase evolutionary policy, inspired by the successful Israeli experience in establishing a viable VC infrastructure as well as the Chilean and Korean experience.

Getz and Segal (2008) examine the Israeli national policies and cultural aspects that created and maintain the spectacular Israeli achievements in creating an innovation based economy.

United Nations Economic Commission for Europe, 2007 published a comparative review of policy initiatives in the UNECE countries seeking to improve the financing environment for innovative firms development. The report discusses the specific

financing problems of innovative enterprises the major trends in financing provided by financial intermediaries like VCs and angels. The comparative review allows the identification of good practices in the different countries and suggests policy recommendations concerning the early-stage equity financing.

Kauffman Foundation, 2008 study the behavior and decision-making that firms make at their very earliest stages of life and provides a first-time glimpse into the capital structure decisions of truly nascent firms.

“The plumber’s model for entrepreneurial finance”

A quick screening of existing and past entrepreneurial capital formation programs and their ex-post results allow us to identify three basic domains of activities:

1. Programs aiming to increase and diversify the quantity and quality of active entrepreneurs in the economy through education, community programs and direct financial assistance;
2. “Entrepreneurship friendly” financial governance including specific tax and credit allocations to encourage investments and mitigate risk aversion of institutional investors;
3. Creation and support of a functioning intermediary finance infrastructure with entrepreneurial orientation, namely the VC sector.

Examples of such policies are numerous and have been adopted sooner or later over the last twenty years in various forms by almost any country. Herby is just an illustrative list:

- The EXIST program in Germany has established 20 extensive regional networks of cooperation among educational, research, economic, and political institutions to motivate, develop, and support entrepreneurship.
- The Science Enterprise Challenge program in the U.K. has established 64 enterprise centers at U.K. universities to foster the commercialization of high quality research and new ideas, help stimulate a culture of scientific entrepreneurship within British universities, and incorporate entrepreneurship education across all curriculum areas.
- The VentureLab initiative in Switzerland is organized at a regional level and provides customized education tools to promote innovative young entrepreneurs and inspire entrepreneurship among students at universities and institutes of technology.
- The “Oslo Agenda for Entrepreneurship Education”, an outcome of the Conference on “Entrepreneurship Education in Europe: Fostering Entrepreneurial Mindsets through Education and Learning” held in Oslo on 26-27 October 2006, aims to step up progress in promoting entrepreneurial mindsets in society, systematically and with effective actions.

- In the Netherlands, a special commission on 'entrepreneurship and education' has been created at national level by the Minister for Economic Affairs and the Minister for Education, with the role of stimulation and coordination of entrepreneurship curricula in schools.
- Young Enterprise Europe as an international organization was established in 1993, including non-profit organizations from 20 countries throughout Europe and the Mediterranean area. Since September 2002, it has merged with another international network that promotes entrepreneurship education, 'Junior Achievement'. The new organization is now called 'JA-YE Europe' and represents 37 European member nations. The aim of the new organization is to help further diffuse a mentality for entrepreneurship among young students.
- The 'Junior' project in Germany provides a special framework for running an enterprise for young students above 15 to 20 years of age. They operate like a real enterprise: selling shares, conducting market research and developing products or services.
- The Marco Polo project, put in place by the chamber of commerce in Padua, Italy, in conjunction with national, regional and local authorities, has introduced a range of instruments for promoting the teaching of entrepreneurship.
- The aim of 'science enterprise challenge' is to establish a network of centers in U.K. universities, specializing in the teaching and practice of commercialization and entrepreneurship in the field of science and technology. Twelve science enterprise centers were established in U.K. universities in the first round, supported by funding from the government, and another was created during the second round of funding.
- The 'Temporary Entrepreneurial Positions' program (TOP) at University of Twente, the Netherlands, offers potential/starting entrepreneurs a variety of different facilities without charge to keep start-up and operating costs as low as possible during the first critical year.
- At Ireland's Dundalk Institute of Technology, entrepreneurship as a module in its own right appears in more than 12 different courses, at certificate, diploma, degree and postgraduate levels, and is offered across five different academic departments.

Despite the extended efforts made by policy makers, an ex-post analysis of the results does not lead to a clear and coherent cross country model of success.

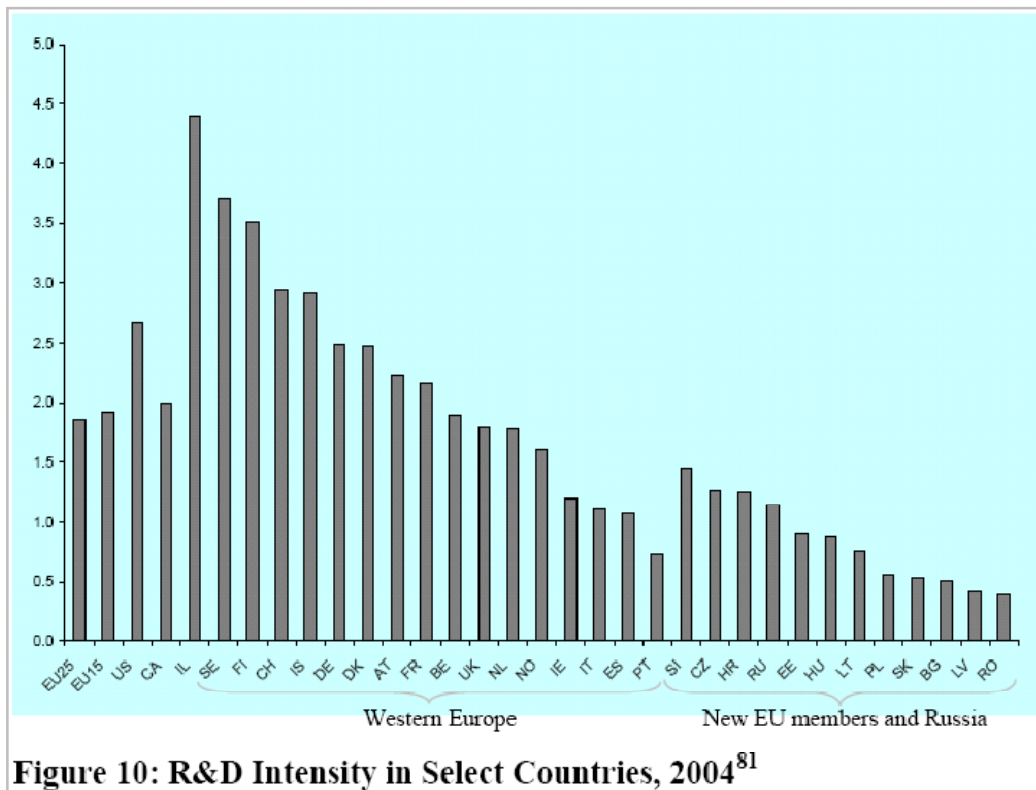


Figure 10: R&D Intensity in Select Countries, 2004⁸¹

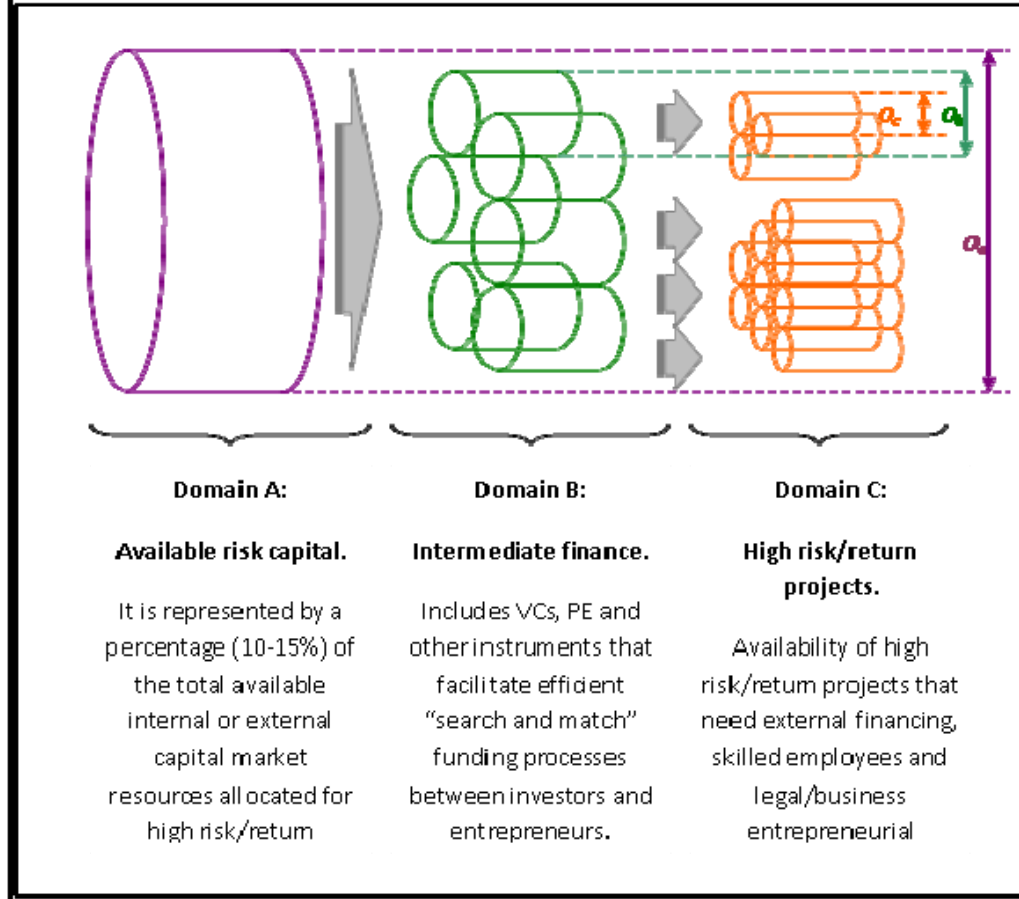
(Source: UNECE)

One cause of this situation is the fact that policy makers have had implemented the programs without taking into account the holistic approach of investment flow system and the interaction between boosting activities bellowing to the three disciplines described earlier. Intuitively, it is easy to understand that investing in the establishment of an efficient intermediary financing infrastructure will not produce results if there are not sufficient good entrepreneurial projects to absorb the supply of money handled by these institutions. Same conclusion holds if the risk mitigation through tax or equivalent policies won't convince institutional investors to invest directly in such project due to the huge information asymmetry that characterize this environment (thus, the existence of well functioning network of highly specialized intermediaries such as VCs or "angels" are necessary to facilitate the "search and match" process between entrepreneurs and investors.

This segmented approach of policy makers to the entrepreneurial investments flow can be explained by the parallel segmentation in the academic and professional disciplines classification (macroeconomics, intermediate finance, entrepreneurship) that creates the illusion of independent processes.

In contrast, in this paper I propose an integrated model that takes into account all three different domains and identifies the “weakest link” as the temporary bottleneck that must be released in the chain of entrepreneurial investment flow.

The following drawing illustrates the principles of the proposed model:



In this model optimizing the financing flow of the entrepreneurial infrastructure is basically a capacity planning problem, where the overall end-to-end throughput is determined by:

$$O_{total} = \min \left\{ \sum_i O_a(a_1, a_2, \dots, a_i), \sum_j O_b(b_1, b_2, \dots, b_j), \sum_k O_c(c_1, c_2, \dots, c_k) \right\}$$

Each of the above programs aims to maximize O_a , O_b or O_c independent of the actual location of the bottleneck which determines in fact the overall throughput of the system O_{total} . Entrepreneurial education increases O_c without consideration if the capacity of O_b and O_a to can sustain the increase in O_c .

An effective policy shall, therefore, maximize under a certain set of constraints like budgets, social priorities, etc. the O_{total} value. Within this context would be useful to describe the function form of O_{total} .

Since O_{total} is actually the minimum between the O_a , O_b and O_c it behaves like one of these particular functions within the domain defined by the minimal value of it in rapport to the other two. Consequently, if we know the forms of O_a , O_b and O_c and the crossing points between them, we could determine the form of O_{total} . However, even knowing the forms of O_a , O_b and O_c and the crossing points is not enough because the actions taken in order to boost the investment flow at any moment change the equilibrium between the forms of O_a , O_b and O_c . As result of it, the precise development of the analytic expression of O_{total} becomes a complicated process therefore would have no real value for policy makers.

Fortunately development of the analytic form of O_{total} is not the only way to solve the problem. Alternative methods of approximation such as numerical estimation, “trial and error”, etc. would lead to similar practical results.

Two interesting questions for policy makers are:

1. are O_a , O_b and O_c monotonic in invested effort?
2. are O_a , O_b and O_c limited/truncated at $+\infty$?

This paper will not deal with these questions.

The Israeli experience

Israel is considered a global success story and a model to follow in the area of innovation and entrepreneurship. The 100th smallest country in the world by area, with less than a thousandth of the world's population, it had remarkable global innovative and entrepreneurial achievements. Against all odds, and in the face of turbulent geopolitical surroundings, Israel has demonstrated consistent economic growth over long periods and leads the rank across a range of global economic benchmarks. Israeli engineers and visionaries are routinely involved at the very core of global decision making on the most promising technologies:

Israel has some of the world's finest universities, pioneering basic and applied research in medicine, the life sciences, agriculture, electronics, robotics, computer science, engineering, and energy as well as in emerging disciplines such as nanotechnology. Around 30% of the total R&D carried out in Israel and 45% of civilian R&D takes place at the country's universities, colleges and R&D centers. The Hebrew University of Jerusalem was ranked by The Times of London survey in 93rd place among the top 100 universities in the world. Other Israeli universities listed in the ranking included the Technion-Israel Institute of Technology, ranked 109th, and Tel Aviv University, ranked at 114th. Israel produces more scientific papers per capita than any other nation by a large margin, and boasts one of the highest per capita rates of patents filed. Relative to its population, Israel possesses the highest percentage of university degrees and the largest number of startup companies in the world. All seven universities have their own technology transfer companies, which take out thousands of new international patents each year. Most Israeli universities have holdings in technological incubators for start-up companies and have ties with nearby high-tech industrial parks. Many of the world's leading IT and medical equipment companies have set up R&D centers and laboratories in Israel, either on or close to Israeli academic campuses. Many of the world's largest companies have established R&D centers in Israel, including Microsoft, Google, Intel, IBM, Motorola, Applied Materials, BMC, Creo, Marvell, Cisco, HP and Nestlé.

In absolute terms, Israel is home to more startup companies than any other country in the world outside the US. About one third of the Israeli high-tech firms are start-ups. More that 40% of the Israeli start-ups are financed by VCs.

Figure 2: Overall entrepreneurship ranking in 2007²⁰

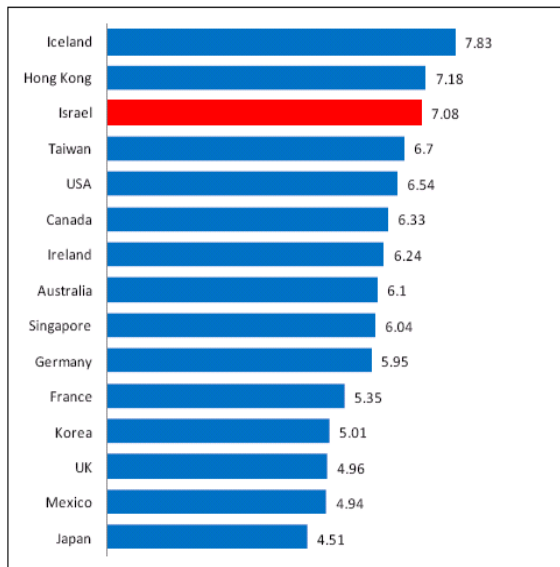
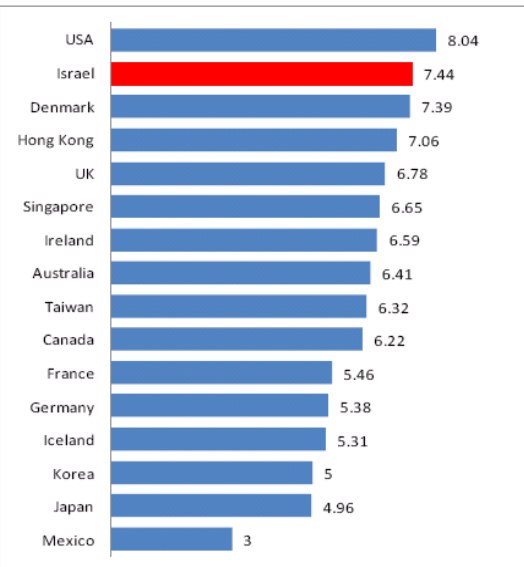


Figure 3: Venture capital ranking in 2007^{23,24}



Source: IMD (2007), Getz & Segal (2008)

How can we explain this success and to what extent can the Israeli policy be replicated in other countries?

There are numerous opinions expressed both by academics and practitioners in this matter. Between the factors considered the driving force behind the innovative entrepreneurship capital formation in Israel: education (in particular technology education), defense spending on innovative equipment, cultural factors, adaptability, social networking, and government R&D favorable fiscal policy. However, there is little scientific evidence that these opinions reveal indeed the dominating Israeli success factors. Thus, the extent to which these models may be effectively replicated to other countries is doubtful.

The newest and most comprehensive analysis of the Israeli entrepreneurial phenomenon is Avnimelech and Teubal, 2008. In essence, Avnimelech and Tubal propose a three phase evolutionary model summarized in the following table:

Box 2: Israel's ITP Cycle: policies and impacts⁴.

<p>Phase 1: Diffusion of R&D & Generation of Innovation Capabilities (1969–1984) Horizontal grants to business sector R&D → <i>Creation of R&D performing companies, of R&D/Innovation capabilities; and creation of civilian high-tech industry & first SU companies</i></p>
<p>Phase 2: Strengthening of Business Sector R&D and SU/VC Experiments (1985–1992)</p> <ul style="list-style-type: none"> - Business experiments & informal VC activity → <i>New model of SU ('born global' with links to global capital/product markets)</i> - ITP: Sharp increase in business sector R&D grants, Incubator and magnet program (supporting cooperative, generic R&D); First VC support program (Inbal) → <i>Business sector R&D expansion → Increased rate of SU formation → Increased demand for VC services → Learning from Inbal's failure and from business experiments → Identification of system failure (absence of significant VC) & selection of limited partnership form of VC organization</i>
<p>Phase 3: Targeting VC and Accelerated Growth of R&D and High Tech (1993–2000) Targeted support of VC (Yozma program); continuation of all ITP programs, R&D grants peaked in 2000 → Emergence of a VC industry → Accelerated growth of SU segment and high-tech; large numbers of IPOs and M&A, etc.</p>

*The names of the phases reflect the main objectives of ITP.

Source: Avnimelech and Teubal, 2008

The model of Avnimelech and Teubal tackle the problem from a temporal perspective, where events are sequential in time. Consequently, results are explained by the fact that certain actions followed certain others, thus creating the conditions for further certain actions to be effectively implemented.

This paper proposes a complementary interpretation of these facts, based on “The Plumber’s Model”: the sequence of the actions is not important as long as their effect is the release of the real bottleneck in the system. In other words this paper argue that the Avnimelech and Teubal model explains the Israeli experience not because its temporal sequential attribute but because the sequential release of bottlenecks in the system. This interpretation is consistent with Avnimelech and Teubal model but explains also additional facts: why the Yozma program succeeded while Inbal failed; the role of the defense apparatus in development of the entrepreneurial culture; and most important: the attraction of foreign capital into the Israeli VC segment, a phenomenon not explained by any other model proposed so far. The latest suggests also that the Israeli experience can be replicated in other countries if planned according to “The Plumber’s Model” requirements.

Conclusions

This paper proposes a holistic policy model for formation of entrepreneurial capital. The model identifies three actions domains that determine the total investment flow capacity of the system which is equal to the minimum between the local flow capacities of each domain. Since the policy goal is to maximize the total investment capacity, the optimal marginal effort shall be invested in releasing the system temporary bottleneck at the given time.

The model is tested in the Israeli innovative entrepreneurial environment in comparison with the Avnimelech and Teubal model predictions. The model proposed in this paper complements the Teubal model and is based on a causal rather than temporal approach.

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