

# GOVERNMENT INCENTIVES FOR ENTREPRENEURSHIP

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In the dozen years since the global financial crisis of 2008–2009, there has been a surge of interest on the part of governments in promoting entrepreneurial activity, largely by providing financing. This essay explores these policies, focusing on financial incentives to entrepreneurs and the intermediaries who fund them.

Despite good intentions, many of these public initiatives have ended in disappointment or actually been counterproductive.

- The United States Department of Energy's (DOE) clean energy initiative was created in 2005 but remained unfunded until 2009, when it received financing as part of the American Recovery and Reinvestment Act (also known as the Stimulus Act).<sup>2</sup> The program was to provide loan guarantees and direct grants to risky but potentially rewarding energy projects that may otherwise be too risky to attract private investment. More than US\$34 billion was spent in less than four years, which was almost US\$2 billion more than the total private venture capital (VC) investment in the field. The proposed investments were controversial at the time. As one organization protesting the program noted, "DOE has minimal experience administering a loan guarantee program, and its one test case ended with taxpayers paying a heavy price. In the late 1970s and early 1980s, DOE offered billions in loan guarantees for the development of synthetic fuels. Due in large part to poor administration and market changes, the federal government was forced to pay billions to cover the losses."<sup>3</sup> These worries proved prescient. The enormous scale of the public investment appears to have crowded out and replaced most private spending in this area, as venture capitalists waited on the sideline to see where the public funds would go.

Moreover, in the wake of extensive industry lobbying, the investment decisions of government administrators have led to a number of embarrassing bankruptcies (e.g., Solyndra, A123 Systems, and Beacon Power).<sup>4</sup> Rather than being stimulated, cleantech has fallen from 14.9% of venture investments in 2009 to 1.5% of capital deployed in the first nine months of 2019.<sup>5</sup>

- The government of the Kingdom of Saudi Arabia (KSA) has spent many tens of billions of dollars seeking to promote venture capital activity in the Kingdom.<sup>6</sup> These have included a wide variety of regulatory reforms: creating, for instance, a second-tier market for entrepreneurial listings and facilitating the business registration process; establishing venture funds and regional hubs, often in conjunction with new universities; and making global venture capital investments. In the last regard, the most notable was a commitment of US\$45 billion by the Saudi Public Investment Fund—a Saudi sovereign wealth fund whose stated mission is to be "the engine behind economic diversity in the KSA"—to the SoftBank Vision Fund.<sup>7</sup> Yet the level of venture capital in the KSA has remained very modest. According to the consulting firm MAGNiTT, only US\$50 million of venture capital was raised in 2018 by Saudi firms, and 2019 was on a very similar pace.<sup>8</sup> The 2018 value represented 0.006% of gross domestic product, a level one sixtieth of that of Israel and akin to that of the lowest nations tracked on this measure by the Organisation for Economic Cooperation and Development (e.g., Italy, the Russian Federation, and Slovenia).<sup>9</sup>

- The Chinese government, after a series of adept moves to promote venture capital over two decades, made a major commitment in the middle part of the 2010s to promoting venture capital.<sup>10</sup> Under the Government Guidance Fund program, over US\$231 billion was invested in government-sponsored venture funds in 2015 alone, largely by Chinese government bodies and state-owned enterprises. By way of context, this amount was more than five times the total amount committed to venture funds worldwide by all other investors in 2015. The government stated it had raised US\$1.8 trillion for these funds by the end of 2018.<sup>11</sup> The result appears to have been a significant bubble, followed by a quick collapse and slowdown. Between the fourth quarter of 2016 and the fourth quarter of 2019, fundraising dropped by nearly 90%—a trend that has continued into 2020. As a result, Chinese companies have fallen from a peak of 45% of venture capital invested worldwide to 15% in the second quarter of 2019.<sup>12</sup>

In this chapter of *The Global Innovation Index (GII)*, I argue that these failures have not simply been a matter of bad luck. Instead, the unfortunate outcomes have reflected the fundamental structural issues that make it difficult for governments to launch successful efforts to promote entrepreneurship over sustained periods. I highlight several critical challenges and suggest two principles that might render these efforts more effective.

## The underlying motivation

The motivation for these efforts is clear: the well-documented relationships between economic growth, innovation, entrepreneurship, and venture capital. Financial economists have highlighted the major challenges that entrepreneurial firms pose to their would-be financiers and the way that these are overcome by venture capital firms.

Public bodies have been motivated to undertake these efforts by the perceived relationship between entrepreneurial activity on the one hand and employment opportunities, innovation, and economic growth on the other. The reader, by this point in the *GII*, should be convinced of the importance of innovation to entrepreneurial growth. But the roles that entrepreneurship in general—and venture capital in particular—play in promoting innovation have been much less thoroughly discussed so far.

Initially, economists generally overlooked the creative power of new firms: they suspected that the bulk of innovations would stem from large industrialized concerns. For instance, Joseph Schumpeter, one of the pioneers of the serious study of entrepreneurship, posited that large firms had an inherent advantage in innovation relative to smaller enterprises.<sup>13</sup>

These initial beliefs have not stood the test of time. Rather, today they look like the intellectual by-product of an era that saw large firms and their industrial laboratories—such as IBM and AT&T—replace the independent inventors who accounted for a large part of innovative activity in the late nineteenth and early twentieth centuries.

In today's world, Schumpeter's hypothesis of large-firm superiority does not accord with casual observation. In numerous industries, such as medical devices, communication technologies, semiconductors, and software, leadership is in the hands of relatively young firms whose growth was largely financed by venture capitalists and public equity markets. Think, for example, of Boston Scientific, Cisco, Intel, and Microsoft. Even in industries where established firms have retained dominant positions, such as finance, small firms have developed an increasing share of the new ideas and then licensed or sold them to larger concerns. Large firms are, if anything, cutting back their investments in basic science.<sup>14</sup>

This pattern of new ventures playing a key role in stimulating innovation has been especially pronounced in the past two decades. The two arenas that have seen perhaps the most potentially revolutionary technological innovation—biotechnology and the Internet—were driven by smaller entrants. Neither established drug companies nor computer software manufacturers were pioneers in developing these technologies. Small firms did not invent the key genetic engineering techniques or Internet protocols. Rather, the enabling technologies were developed with government funds at academic institutions and research laboratories. It was the small entrants, however, who first seized upon the commercial opportunities. Even in areas where large firms have traditionally dominated—such as energy research—start-up firms appear to be playing an increasing role.

Not only do Schumpeter's arguments fail the test of experience, but systematic studies have generated little support for his belief in the innovative advantage of large firms. Over the years, economists have tried repeatedly to measure the relationship between firm size and innovation. While this literature is substantial, it is remarkably inconclusive. While this essay will not inflict upon the reader a detailed review of the hundreds, if not thousands, of papers on this subject, it is worth highlighting that they give very little support to the claim that large firms are more innovative.<sup>15</sup> Much of this work has related measures of innovative discoveries—for example, R&D expenditures, patents, or inventions—to firm size. Initial studies were undertaken using the largest manufacturing firms; more recent works have employed larger samples and detailed data, such as studies employing data on firms' specific lines of business. Despite the improved methodology of recent studies, the results have remained inconclusive: the studies seem as likely to find a negative relationship as a positive one, and even when a positive relationship between firms' size and innovation has been found, it has had little economic significance. For instance, one study concluded that a doubling of firm size increased the ratio of R&D to sales by only 0.2%.<sup>16</sup>

Recent studies have also pointed to the special advantage in innovation enjoyed by young entrepreneurs backed by venture capital firms. Considerable evidence shows that venture capitalists play an important role in encouraging innovation. The types of firms that they finance—whether young start-ups hungry for capital or growing firms that need to restructure—pose numerous risks and uncertainties that discourage other investors.

Where, then, does this advantage come from? The financing of young firms is a risky business. A lack of information makes it difficult to assess the potential of these firms and permits opportunistic behavior by entrepreneurs after financing is received. To address these information problems, venture investors employ a variety of mechanisms that seem to be critical in boosting innovation.

The first of these devices is the screening process that venture capitalists use to select investment opportunities. This process is typically far more efficient than that used by other funders of innovation, such as corporate research and development laboratories and government grant-makers. In addition to careful interviews and financial analysis, venture capitalists usually make investments with other investors. One venture firm will originate the deal and look to bring in other venture capital firms. Involving other firms provides a second opinion on the opportunity. There is usually no clear-cut evidence that an investment will yield attractive returns. Having other investors approve the deal limits the likelihood of funding bad deals. The result of this detailed analysis is, of course, a lot of rejections: only from 0.5% to 1% of business plans are funded.<sup>17</sup> Inevitably, many good ideas are rejected as part of the assessment process.

When venture capitalists invest, they hold preferred stock rather than common stock.<sup>18</sup> The significance of this distinction is that if the company is liquidated or otherwise returns money to the shareholders, preferred stock is paid before the common stock that entrepreneurs—as well as other less privileged investors—hold. Moreover, venture capitalists add numerous restrictive covenants and provisions to the preferred stock. They may be able, for instance, to block future financings if they are dissatisfied with the valuation, to replace the entrepreneur, and to have a set number of representatives on—or even in control of—the board of directors. In this way, if something unexpected happens, which is the rule rather than the exception with entrepreneurial firms, the venture investor can assert control. These terms vary with the financing round, with the most onerous terms reserved for the earliest rounds.

The staging of investments also improves the efficiency of venture capital funding.<sup>19</sup> In large corporations, research and development budgets are typically set at the beginning of a project, with few interim reviews planned. This contrasts with the venture capital process: once they make a decision to invest, venture capitalists frequently disburse funds in stages. The refinancing of these firms, termed “rounds” of financing, is conditional on achieving technical or market milestones. Proceeding in this fashion allows the venture capitalist to gather more information before providing additional funding, thus helping investors separate investments that are likely to be successful from those that are likely to fail. Managers of venture-backed firms have to return repeatedly to their financiers for additional capital, which allows venture capitalists to monitor that their money is not being squandered on unprofitable projects. Thus, an innovative idea continues to be funded only if its promoters continue to execute well.

Finally, venture capitalists provide intensive oversight of the firms they invest in. Survey evidence suggests that over 25% of venture capitalists interact multiple times per week and an additional one-third interact once a week.<sup>20</sup> These interactions can have profound impacts. One intriguing study shows that when an airline adds a direct flight between the city of a venture capitalist and one of his or her existing portfolio firms, which presumably facilitates face-to-face interactions, the firm is likely to experience a boost in innovative and financial performance.<sup>21</sup>

With support from venture capitalists, start-ups can better invest in the research, market development, marketing, and strategizing they require to attain the scale necessary to go public. The importance of this backing can be illustrated in stylized facts, such as that of the ten most valuable companies in the world in November 2019: fully seven—five based in the U.S. and two in China—were originally venture backed.

The positive impact of venture capital is also corroborated in large-sample research. Especially relevant is the finding that, even after addressing the concern that venture capital investments are highly targeted, venture funding does have a strong positive impact on innovation.<sup>22</sup> The estimated coefficients vary according to the techniques employed, but on average, a dollar of venture capital appears to be *three to four* times more potent in stimulating patenting than a dollar of traditional corporate R&D. While venture capital has historically been small relative to corporate research, it is responsible for a much greater share of U.S. commercial innovations.

## The challenges

Given the apparently strong relationship between entrepreneurship, innovation, and growth, it is not surprising that governments worldwide have sought to promote new ventures. But as the examples in the introduction suggest, many public efforts have gone astray.

In this section, I highlight three aspects of the nature of entrepreneurial ventures that pose substantial challenges to government policymakers. In the final section, I will turn to potential solutions to these challenges.

### The geographic dilemma

The first challenge is the tight geographical focus of entrepreneurial businesses. Entrepreneurial businesses are often clustered geographically;<sup>23</sup> venture-backed businesses are even more so.<sup>24</sup> These patterns characterize such businesses around the world.

The highly skewed distribution of venture capital investment can be illustrated by a tabulation of Pitchbook data between 2015 and 2017.<sup>25</sup> The authors concluded that the top ten urban areas for venture financing—six in the U.S. and three in China, London, and Bangalore—accounted for 62% of venture disbursements worldwide. In comparison, the top 25 urban areas accounted for 75% of all disbursements.

This disbursement is not accidental but rather reflects the nature of investment performance. The Sand Hill Econometrics index of gross (pre-fee) returns from venture capital investments between 1980 and 2019 highlights a substantial discrepancy between Silicon Valley and other U.S. regions. Northern California transactions reported an annualized return of 25.6%, substantially more than other regions, such as New England (14.3%), mid-Atlantic (15.4%), and non-California Pacific States (13.5%).<sup>26</sup> While accurate regional return data is not available worldwide, undoubtedly this pattern would repeat itself elsewhere.

The desire of policymakers to share the wealth and boost venture capital in economies where it has not traditionally thrived—from Australia to Saudi Arabia—is understandable. Yet many efforts to boost high-potential entrepreneurship end up directing far too much funding to unpromising areas. Much of the funding ends up in areas where it is not useful.

## The timing dynamic

The second challenge stems from the boom and bust cycles that frequently characterize entrepreneurial markets. The venture market is extraordinarily uneven, moving from cycles of feast to famine and back again. In some periods, far too many firms can get access to financing, while in others, worthy companies languish unfunded. Policymakers have too often added “fuel to the fire,” by intervening at precisely the times when the market is overheated.

It is natural to wonder why pensions and others seem to put most of their money to work almost inevitably at the wrong time. Why don't venture groups pull back from investing in market peaks, rather than continuing to invest capital? While much remains uncertain about these cycles of boom and bust, several drivers of these patterns have been documented.

At least some of the deterioration of performance stems from the phenomenon of “money chasing deals.” As more money flows into their funds from institutional and individual investors, venture capitalists' willingness to pay more for deals increases: a doubling of inflows into venture funds led to between a 7% and 21% increase in valuation levels for otherwise identical deals. These results do not reflect improvements in the venture investment environment. When we look at the ultimate success of venture-backed firms, the success rates do not differ significantly between investments made during periods of relatively low inflows and valuations and those of the boom years. The findings, while suggesting how these cycles work, do not explain why they come about.

Whatever the precise mechanisms behind these cycles, their impact on innovation is most worrisome. Skeptical observers of the venture scene frequently argue that these cycles can lead to the neglect of promising companies. For instance, during the deep venture trough of the 1970s—in 1975, no venture capital funds at all were raised in the U.S.—many companies seeking to develop pioneering personal computing hardware and software languished unfunded. Ultimately, these technologies emerged with revolutionary impact in the 1980s, but their emergence

may have been accelerated had the venture market not been in such a deep funk during the 1970s.

Nor is the overfunding of firms during booms necessarily a good thing. While it can stimulate creativity,<sup>27</sup> it can also lead to wasteful duplication as multiple companies pursue the same opportunity, with each follower often being ever more marginal. Often, the initial market leader's staff is poached by the me-too followers, disrupting the progress of the firm with the best chance of success. As a result, these periods are incredibly disruptive to all firms within the affected industries.

In many cases, however, political leaders interpret these surges in activity as a signal that it is appropriate to intervene with new subsidies. Public funds can have the effect of pouring gasoline on an already overheated market. Many illustrations over time highlight such ill-timed interventions: The decision of the Chinese government to subsidize venture activity after the boom in the first half of the 2010s is one recent example.

## The human dimension

The final challenge reflects the nature of people who often are associated with the greatest entrepreneurial success. Government officials may have many valuable talents and play incredibly important roles, but the skill sets associated with successfully identifying and funding entrepreneurial businesses are very different from those encountered in their typical daily work. The ambiguity, complexity, and specialization associated with these ventures make these tasks quite challenging.

In many instances, officials may be manifestly inadequate to selecting and managing entrepreneurial or innovative firms. Many examples can be offered of government leaders who did not think carefully about realistic market opportunities, the nature of the entrepreneurs and intermediaries being financed, and how the subsidies they offered would affect behavior. Whether they affect the ability of firms to accept outside financing, offshore routine coding work, or the response to shifts in customer demand, well-intentioned officials can make rules that prove to be very harmful to those they mean to help.

But beyond the inability of governments, much of economists' attention has been focused on a darker problem that affects these and similar programs: the theory of *regulatory capture*. This hypothesis suggests that entities, whether part of government or industry, will organize to capture the direct and indirect subsidies that the public sector hands out. Subsidies geared towards entrepreneurial firms are no exception.<sup>28</sup>

These issues are exacerbated by the fact that the most creative entrepreneurs are often outsiders. For instance, extensive literature has documented the disproportionate representation of immigrants in U.S. entrepreneurship, both in general and among high-potential enterprises.<sup>29</sup> These may be people who are less likely to be well connected or less able to lobby successfully for public grants.

## The search for solutions

How can these seeming disconnects be addressed? In the final part of this essay, I offer two suggestions that can address some, though not all, of these issues: the need for independence and the reliance on matching funds.

### The need for independence

Policymakers must emulate central banking and seek to insulate entrepreneurial policymaking from day-to-day political pressures. A long list of economists has extolled the need to separate monetary policy from political pressures, lest the temptation to “do the wrong thing” prior to an election be too strong. Establishing an organization to implement new venture policies where the leadership has independence from day-to-day political pressures can similarly lead to longer-term decisions that can address some of the challenges delineated above. Such a step may also make it easier to terminate a program when it is no longer needed. Small experiments along these lines have been reasonably successful in the entrepreneurial promotion business, such as the New Zealand Venture Investment Funds program,<sup>30</sup> and it is my hope that these can be expanded. Another advantage of independence is more flexibility in setting pay. Setting competitive compensation is even harder for public institutions in Western democracies, where the media may be overeager to engage in sensationalism.

While independence does not guarantee effective policymaking, it can increase the likelihood that decisions avoid political fads, relying instead on rules-based approaches and experimental evidence. All too often, in a rush to boost entrepreneurship, policymakers make no provision for the evaluation of programs. In an ideal world, the future of initiatives should be determined by their success or failure in meeting their goals, rather than considerations such as the vehemence with which supporters argue for their continuation. Independent governance can facilitate better decisions.

An added benefit of such efforts has to do with time frames. Democracies worldwide are shaped by the ebb and flow of election cycles. This inevitably leads to a short-term orientation. Even leaders in office for life are often anxious to display progress and look for quick fixes. But building a venture capital industry is a long-term investment, which takes many years until tangible effects are realized. To cite one example, historians date the birth of the modern U.S. venture capital industry to 1978, a full twenty years after the enactment of the Small Business Investment Company (SBIC) program. This is not a process that can be accomplished overnight.

As a result, an entrepreneurship or venture capital initiative requires a long-term commitment on the part of public officials. The one certainty is that there will be few immediate returns. If programs are abandoned after a few months or years, they are highly unlikely to bring any benefits. There has to be a commitment to be undaunted by initial failures—for example, the low rate of return that early publicly-subsidized investments or funds garner—and instead to fine-tune programs in the face of

early discouragements. An independent governance structure can limit these distorting effects.

### Matching funds

Far too often, decisions about fund allocation are distorted by a lack of understanding of how the market works or by political, rather than economic, considerations. Policymakers may make decisions based on “buzz” or incomplete information. By requiring that matching funds be raised from the private sector, the dangers of uninformed decisions and political interference can be greatly reduced.

The vast majority of efforts by the public sector to target particular industries seem to have not been successful. If dozens of PhDs poring for years over econometrics models with mountains of historical data have been unable to show how to target industries, how can the typical government leader identify good prospects in a compressed time period and with limited information?

But there is a way to address this problem—at least partially. The most direct way is to insist on matching funds. If venture funds or entrepreneurial firms need to raise money from outside sources, organizations that will ultimately not be commercially viable will be kept off the playing field. To ensure that these matching funds send a powerful signal, the matching should involve a substantial amount of capital—ideally, half of the funding or more should be from the private sector. These stipulations can limit the temptation to impose geographic diversity requirements that direct funds into non-viable areas.

The power of matching funds was clearly demonstrated in what has been considered the gold standard of public venture capital initiatives—the Israeli Yozma Venture Capital fund.<sup>31</sup> Intriguingly, the key goal of this effort was the desire to bring foreign venture capitalists’ investment expertise and network of contacts to Israel. The need for this assistance was highlighted by the failure of the nation’s earlier efforts to promote high-technology entrepreneurship. One assessment concluded that fully 60% of the entrepreneurs in prior programs had been successful in meeting their technical goals but nonetheless failed because the entrepreneurs were unable to market their products or raise capital for further development.<sup>32</sup> Foreign expertise was seen as the key to overcoming this problem. Accordingly, Yozma actively discouraged Israeli financiers from participating in its programs. Rather, the focus was on getting foreign venture investors to commit capital for Israeli entrepreneurs. While involving foreign venture groups may not always be the answer, it does create an intriguing alternative to the normal domestic focus of these efforts.

While matching funds is a powerful idea, the devil is in the details. For example, in the government guidance funds initiative in China, the central government imposed matching fund requirements. In several top cities, the government funds were matched with capital from legitimate investors. However, in many second- and third-tier cities, where many of the funds were set up, the requirements for matching funds were relaxed. Much of the capital came not from informed private sector

actors but from provincial and state governments eager to boost the local economy, or else from state-owned enterprises under these officials' control. Thus, the informative quality of the matching funds was much reduced.

## Final thoughts

Many of the same policies that have driven governments to promote innovation, in general, have led to a public policy focus on entrepreneurship. The bulk of these efforts have been well-intentioned. But the substantial challenges associated with the promotion of entrepreneurial businesses have meant that the success rate is not as high as desired.

At the same time, the numerous efforts around the globe suggest some clear principles for maximizing the success of these funds. In particular, I highlight here two clear lessons. First, rather than distributing public funds haphazardly, a requirement for matching funds can ensure market validation for the ideas. Second, placing the key actors responsible for disbursing capital under the aegis of an independent body can help buffet these long-term initiatives from the ebbs and flows of political fashion.

### Notes:

- 1 Harvard Business School and National Bureau of Economic Research. Parts of this essay were adapted from Lerner (2009), Lerner (2012) and Ivashina and Lerner (2019). I thank Ben Jones and Ralph Lerner for helpful comments, and thank Susan Woodward of Sand Hill Econometrics for access to data. I have received compensation from advising institutional investors in private capital funds, private capital groups, and governments designing policies relevant to private capital. All errors and omissions are my own.
- 2 See, for instance, Gold, 2009; Kao, 2013; Kirsner, 2009; Mullaney, 2009; Sposito, 2009.
- 3 Taxpayers for Common Sense, 2010.
- 4 Evaluating the return from these start-up investments is very difficult. The numerous evaluations of these programs by government agencies and academics have not attempted to compute one. Much of the difficulty stems from the fact that payments were made under a variety of programs (e.g., the 1705 Loan Guarantee Program and the Advanced Technology Vehicle Manufacturing Loan Program) and payment to start-ups were funded were mingled alongside those to established entities like Goldman Sachs and NRG Energy, where the bankruptcy risk was presumably much lower (though the rationale for public funding may have been so as well (Lipton and Krauss, 2011)). But given that public funding went to some of the most spectacular start-up bankruptcies in the sector, and that even independent venture capital investments in this sector between the beginning of 2008 and the third quarter 2019 have yielded (according to Sand Hill Econometrics) an annualized loss of -2.6% (before accounting for fees), it is hard to be optimistic about the performance of the investments in entrepreneurial firms as part of this initiative.
- 5 Based on the author's analysis of data from Sand Hill Econometrics.
- 6 This paragraph is based on Seoudi et al., 2016; Sindi, 2015; and assorted press accounts.
- 7 Kingdom of Saudi Arabia, 2019.

- 8 MAGNITT, 2019.
- 9 OECD, 2019.
- 10 This paragraph is based in part on Oster & Chen, 2016; Feng, 2018; and Yang, 2019.
- 11 Based on the author's compilation of Preqin data.
- 12 Rowley, 2019.
- 13 Schumpeter, 1942.
- 14 See the evidence in Arora et al., 2015.
- 15 The interested reader can turn to surveys by Azoulay et al., 2012 and Cohen, 2010.
- 16 Cohen et al., 1987.
- 17 Kaplan et al., 2004.
- 18 Kaplan et al., 2003.
- 19 Gompers, 1995; Neher, 1999.
- 20 Gompers et al., 2020.
- 21 Bernstein et al., 2016.
- 22 Kortum et al., 2000.
- 23 Glaeser et al., 2010.
- 24 Chen et al., 2010.
- 25 Florida et al., 2018.
- 26 Based on the author's compilation of Sand Hill Econometrics data.
- 27 Ewens et al., 2018.
- 28 Akcigit et al., 2018.
- 29 Kerr et al., 2017.
- 30 For a detailed history and analysis of the program, see Lerner et al., 2005.
- 31 The discussion of Yozma is based on Avnimelech et al., 2004; Organisation for Economic Cooperation and Development, 2003; Senor et al., 2009; and Trajtenberg, 2002.
- 32 Jerusalem Institute of Management, 1987.

### References:

- Akcigit, U., Baslandze, S., & Lotti, F. (2018). Connecting to Power: Political Connections, Innovation, and Firm Dynamics (National Bureau of Economic Research Working Paper No. 25136).
- Arora, A., Belenon S., & Pataconi, A. (2015). Killing the Golden Goose? The Decline of Science in Corporate R&D, 1980-2007 (National Bureau of Economic Research Working Paper No. 20902).
- Avnimelech, G., Kenney, M., & Teubal, M. (2004). Building Venture Capital Industries: Understanding the U.S. and Israeli Experiences (BRIE Working Paper No. 160).
- Azoulay, P., & Lerner, J. (2014). Technological Innovation and Organizations. In R. Gibbons & J. Roberts (Eds.), *Handbook of Organizational Economics*. Princeton: Princeton University Press.
- Bernstein, S., Giroud, X., & Townsend, R. (2016). The Impact of Venture Capital Monitoring. *Journal of Finance*, 71, 1591–1622.

- Chen, H., Gompers, P., Kovner, A., & Lerner, J. (2010). Buy Local? The Geography of Venture Capital. *Journal of Urban Economics*, 67, 90–110.
- Cohen, W. (2010). Fifty Years of Empirical Studies of Innovative Activity and Performance. In B. Hall & N. Rosenberg (Eds.), *Handbook of Economics of Innovation, Volume 1* (129–213). Amsterdam: North Holland Elsevier.
- Cohen, W., Levin, R., & Mowery, D. (1987). Firm Size and R&D Intensity: A Re-examination. *Journal of Industrial Economics*, 35, 543–63.
- Ewens, M., Nanda, R., & Rhodes-Kropf, M. (2018). Cost of Experimentation and the Evolution of Venture Capital. *Journal of Financial Economics*, 128, 422–442.
- Feng, E. (2018, December). China's state-owned venture capital funds battle to make an impact. Financial Times. Retrieved from <https://www.ft.com/content/4fa2caaa-f9f0-11e8-af46-2022a0b02a6c>
- Florida, R., & Hathaway, I. (2018). *The Rise of the Startup City*. Washington: Center for American Entrepreneurship.
- Glaeser, E., Kerr, W., & Ponzetto, G. (2010). Clusters of Entrepreneurship. *Journal of Urban Economics*, 67, 150–168.
- Gold, D. (2009, September). Cleantech Stimulus Not Very Stimulating. GreenGold Blog. Retrieved from <http://www.greengoldblog.com/2009/09/cleantech-stimulus-not-very-stimulating.html>
- Gompers, P. (1995). Optimal Investment, Monitoring, and the Staging of Venture Capital. *Journal of Finance*, 50, 1461–1490.
- Gompers, P., Gornall, W., Kaplan, S., & Strebulaev, I. (2020, January). How Do Venture Capitalists Make Decisions? *Journal of Financial Economics*, 135(1), 169–190.
- Ivashina, V., & Lerner, J. (2019). *Patient Capital: The Challenges and Promises of Long-Term Investing*. Princeton: Princeton University Press.
- Jerusalem Institute of Management. (1987). *Export-led Growth Strategy for Israel*. Jerusalem: Jerusalem Institute of Management and the Telesis Group.
- Kao, H. (2013). Beyond Solyndra: Examining the Department of Energy's Loan Guarantee Program. *William and Mary Environmental Law and Policy Review*, 37, 425.
- Kaplan, S., & Stromberg, P. (2003). Financial Contracting Theory Meets the Real World: An Empirical Analysis of Venture Capital Contracts. *Review of Economic Studies*, 70, 281–315.
- Kaplan, S., & Stromberg, P. (2004). Characteristics, Contracts, and Actions: Evidence from Venture Capitalist Analyses. *Journal of Finance*, 109, 2173–2206.
- Kerr, S., & Kerr, W. (2017). Immigrant Entrepreneurship. In J. Haltiwanger, E. Hurst, J. Miranda, & A. Schoar (Eds.), *Measuring Entrepreneurial Businesses: Current Knowledge and Challenges* (187–249). Chicago: University of Chicago Press.
- Kingdom of Saudi Arabia. (2019). Vision 2030. Retrieved from <https://vision2030.gov.sa/en/programs/PIF>
- Kirsner, S. (2009, August). Does Lobbying Always Pay? Innovation Economy Blog. Retrieved from [http://www.boston.com/business/technology/innoeco/2009/08/does\\_lobbying\\_always\\_pay.html](http://www.boston.com/business/technology/innoeco/2009/08/does_lobbying_always_pay.html)
- Kortum, S., & Lerner, J. (2000). Assessing the Impact of Venture Capital on Innovation. *Rand Journal of Economics*, 31, 674–692.
- Lerner, J. (2009). *Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital Have Failed—and What to Do About It*. Princeton: Princeton University Press.
- Lerner, J. (2012). *The Architecture of Innovation*. Boston and London: Harvard Business Press and Oxford University Press.
- Lerner, J., Moore, D., & Shepherd, S. (2005). *A Study of New Zealand's Venture Capital Market and Implications for Public Policy: A Report to the Ministry of Research Science and Technology*. Auckland: LECC.
- Lipton, E., & Krauss, C. (2011, November). A Gold Rush of Subsidies in Clean Energy Search. The New York Times. Retrieved from [http://www.nytimes.com/2011/11/12/business/energy-environment/a-cornucopia-of-help-for-renewable-energy.html?\\_r=1&nl=todaysheadlines&emc=th2](http://www.nytimes.com/2011/11/12/business/energy-environment/a-cornucopia-of-help-for-renewable-energy.html?_r=1&nl=todaysheadlines&emc=th2)
- MAGNiTT (2019). *Q3 2019 MENA Venture Investment Summary*. Dubai.
- Mullaney, T. (2009, March). Lobbyists Are First Winners in Obama's Clean-Technology Push. Bloomberg Business News. Retrieved from <http://www.bloomberg.com/apps/news?pid=20601109&sid=aNH.vsk2D.IQ&refer=home>
- Neher, D. (1999). Staged Financing: An Agency Perspective. *Review of Economic Studies*, 66, 255–274.
- Organisation for Economic Cooperation and Development (OECD). (2003). *Venture Capital Policy Review: Israel* (STI Working Paper No. 2003/3). Paris: OECD.
- . (2019). *Financing SMEs and Entrepreneurs 2018: An OECD Scoreboard*. Paris: OECD.
- Oster, S., & Chen, L. (2016, March). Inside China's Historic \$338 Billion Tech Startup Experiment. Bloomberg Business News. Retrieved from <https://www.bloomberg.com/news/articles/2016-03-08/china-state-backed-venture-funds-tripled-to-338-billion-in-2015>
- Rowley, J. (2019, July). Chinese Startups Net Smallest Share of Global VC Investment in Years. Crunchbase News. Retrieved from <https://news.crunchbase.com/news/chinese-startups-net-smallest-share-of-global-vc-investment-in-years/>
- Schumpeter, J. (1942). *Capitalism, Socialism, and Democracy*. New York: Harper & Brothers.
- Seoudi, I., & Mahmoud, S. (2016). Public Policy for Venture Capital: A Comparative Study of Emirates, Saudi Arabia and Egypt. *Review of Business & Finance Studies*, 7, 19–42.
- Senor, D., & Singer, S. (2009). *Start-up Nation: The Story of Israel's Economic Miracle*. New York: Twelve.
- Shen, L. (2016, March). China is the Biggest Venture Capital Firm in the World. Fortune. Retrieved from <https://fortune.com/2016/03/09/investors-venture-capital-china/>
- Sindi, H. (2015). Building the Entrepreneurial Ecosystem in Saudi Arabia and the Middle East. In D. Jamali and A. Lanteri (Eds.), *Social Entrepreneurship in the Middle East, Volume 2* (63–88). London: Palgrave Macmillan.
- Sposito, S. (2009). A123 Gets \$249m in Stimulus Funding. Boston Globe. Retrieved from [http://archive.boston.com/business/articles/2009/08/06/a123systems\\_receives\\_249m\\_in\\_stimulus\\_funds/](http://archive.boston.com/business/articles/2009/08/06/a123systems_receives_249m_in_stimulus_funds/)
- Taxpayers for Common Sense. (2010, December). Oppose Wasteful \$10 Billion Increase for DOE Nuclear Loan Guarantee Program. Retrieved from [https://cei.org/sites/default/files/Oppose%20wasteful%20\\$10%20billion%20increase%20for%20DOE%20nuclear%20loan%20guarantee%20program%20in%20continuing%20resolution.pdf](https://cei.org/sites/default/files/Oppose%20wasteful%20$10%20billion%20increase%20for%20DOE%20nuclear%20loan%20guarantee%20program%20in%20continuing%20resolution.pdf)
- Trajtenberg, M. (2002). Government support for commercial R&D: Lessons from the Israeli experience. *Innovation Policy and the Economy*, 2, 79–134.
- Yang, J. (2019, November). China's Venture Capital Boom Is Over, Leaving Investors High and Dry. Wall Street Journal. Retrieved from <https://www.morningstar.com/news/dow-jones/201911144209/chinas-venture-capital-boom-is-over-leaving-investors-high-and-dry>