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PUBLIC ENTREPRENEURIAL FINANCE AROUND THE GLOBE

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ABSTRACT

This paper examines how government funding programs geared towards early-stage companies interact with private capital markets. Using hand-collected data on 755 government programs worldwide, we find that governments' allocations to such funding programs have been comparable to global venture capital disbursements in the past decade. Government programs were more frequent in periods with more private venture activity, a relationship that was stronger in nations with better public governance. The programs' structures often relied on the local private sector. The private sector's involvement was greater when government programs targeted earlier-stage companies and when rankings of government effectiveness were higher. We find that such government funding programs increased local innovation, particularly when the programs focused on early-stage ventures or collaborated with the private sector. These findings are most consistent with the explanation that the reliance on private capital markets enabled governments to mitigate investment frictions and improve capital allocation.

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A data archive (to be completed by end of May 2021) is available at www.public-entrepreneurship.org

1. *Introduction*

In recent decades, governments around the world have been increasingly interested in boosting innovation and the "knowledge economy," as opposed to the manufacturing sectors that were the traditional foci of industrial policies. One manifestation of this trend has been public efforts to boost financing for early-stage ventures. But young high-growth businesses face substantial information problems, and their financing requires significant expertise (see, for instance, Gompers and Lerner 1999; Kaplan and Stromberg 2003).

The skillful allocation of capital to such companies may consequentially be difficult for public officials. First, substantial uncertainty and informational asymmetries surround the selection of new ventures, leading private investors to frequently make decisions based on soft information (Kaplan and Stromberg 2004; Bernstein et al. 2016). Decision-making based on such imperfect information may be difficult for officials in bureaucracies to duplicate (e.g., Stein 2002). Moreover, unlike virtually all government employees, private financiers' compensation is strongly tied to the success of their investments. The latter approach improves investors' incentives to devote substantial effort and make tough decisions (e.g., to shut down an investment despite the pressures associated with career concerns and other agency problems).

This paper assembles the first comprehensive and detailed data on the universe of government funding programs of entrepreneurial ventures around the world. We explore whether government entrepreneurial funding programs can address capital allocation through ties with private capital markets. Consistent with the suggestions of Acemoglu and Robinson 2013, we might anticipate that highly effective governments would anticipate the capital allocation difficulties outlined above and collaborate with private capital markets to address them.

This hypothesis can be contrasted with two alternative views. The first, our null hypothesis, is that government programs' allocation of capital is unrelated to private financing. In fact, government investments may even "crowd out" private capital, as highlighted in a number of analyses of public funding for innovation (e.g., David, Hall, and Toole 2000; Wallsten 2000; Bloom, Griffith, and Van Reenen 2002; Lach 2002).

Alternatively, public funding may follow private funding. But these dynamics may also arise for reasons other than maximizing efficacy and improving capital allocations to early-stage ventures. We highlight two alternative explanations for such a pattern. First, *Trend-Chasing* may explain the positive correlation between private capital markets and public government programs, as both sets of actors pursue investments perceived with promising attractive private returns.[2] Second, the literature has suggested that government financing programs subject to *Rent Extraction* may have a pro-cyclical bias. The abundant revenues during booms may be especially tempting for parties seeking to benefit themselves (Alesina, Campante, and Tabellini 2008, Ilzetzki 2007). Such forces

[2] For instance, public programs are sometimes assessed based on "success stories" (accounts of companies that succeed commercially, regardless of the marginal contribution of public funds) or rely on proceeds from successfully exited investments for additional investment capital. Both these considerations may pressure public managers to in the companies or sectors with the greatest financial prospects.

could generate a positive correlation between private capital markets and government funding programs, but for reasons other than improving capital allocation.

Motivated by the hypotheses articulated above, we seek to understand (1) if public entrepreneurial finance programs rely on private capital, and (2) if so, is it because of an attempt to improve capital allocation to early-stage ventures or instead due to trend-chasing or rent-extraction motives?

Answering these questions is challenging due to data limitations. The earlier academic and practitioner literature provided scanty documentation of the universe of government funding programs geared toward entrepreneurial companies. In this paper, we addressed this gap by using a hand-collected novel data set on nationwide entrepreneurial finance policies around the world active between 1995 and 2019 (755 programs in 66 countries). As discussed in depth below, we focused on national-level programs focused on financing domestic entrepreneurial firms or intermediaries that fund them. We built as comprehensive a dataset as possible of the universe of these programs and their features to explore the relationship between public entrepreneurial finance initiatives and local private capital markets.

Due to the novelty of the data, we first established several stylized facts about public entrepreneurial finance efforts. We found that government funding programs have become prevalent around the globe. Between 2010 and 2019, national governments' entrepreneurial finance programs around the world had on average a cumulative annual budget of $156 billion, as opposed to an average of $153 billion of global disbursements of traditional venture funds.[3] These efforts were geographically dispersed, and not just confined to developed countries. Moreover, such government efforts relied on a host of different financial instruments, from grants and equity funding, to credit guarantees, loans, innovation vouchers, and tax credits. Many public funding programs targeted specific industries and company stages.

Turning to our main analyses, we found that more private venture activity was associated with subsequent government entrepreneurial finance: the two sources of capital were positively correlated. Using panel data, we saw not just a positive correlation but that public policies followed private capital investments. Moreover, increases in venture capital activity in a given industry-country pair were followed by subsequent government funding programs that targeted those industries as well.

To better understand the mechanisms behind the positive correlation between governments' funding programs and local private capital, we then examined the structure of these programs. Consistent with the hypothesis that the complementarity mitigated investment frictions, we found three ways in which government programs frequently structured their programs to rely on private capital markets: the involvement of private sector actors in investment screening, the funding of intermediaries rather than companies directly, and capital matching requirements by private investors. Moreover, we found that government programs were even more likely to rely on private

[3] These estimates are based on our sample, as described below. If we exclude the 42% of public entrepreneurial finance programs that are debt-oriented, the total average expenditure still exceeds $90 billion annually. See Appendix 1 for a discussion of the methodology behind these comparisons.

capital markets when targeting earlier-stage companies, where information asymmetries may be greater.

Consistent with the interpretation that government reliance on the private sector alleviated the information and incentive problems that the public sector may encounter, we found that the positive correlation between private and public activities was more pronounced when governments were more effective. To show this, we used a wide variety of metrics compiled by the World Bank. In addition, more effective governments were more likely to structure their funding programs with greater private sector involvement. These findings were consistent with the hypothesis that highly effective governments foresaw and addressed the information and incentive problems that public programs encountered. By collaborating with private financiers of entrepreneurial firms, public bodies may have been able to head off problems proactively.

We also found consistent evidence when we looked at the impact of neighboring programs. Nations whose neighbors initiated public entrepreneurial finance programs were more likely to do so themselves. More interestingly, the evidence was consistent with knowledge spillovers regarding effective program design: countries with neighboring programs were likely to display a strong correlation between public and private funding.

Finally, we explored the innovation generated following the initiation of government funding programs. We explored four different metrics based on U.S. patent filings, which (as discussed below) were well suited for this assessment. These included the total number of patent applications from residents of a given country, the number of high-quality innovations based on citations, the number of patents in basic technology classes, and the number of patents filed by new patenting entities. Across all innovation measures, we found similar patterns: a meaningful and statistically significant improvement following the initiation of government funding programs. Important for interpreting these results, we found no statistically significant pre-existing trends in the years leading to the government funding programs. Moreover, the improvements in innovations were particularly concentrated among the set of programs that targeted early-stage ventures or required collaboration with the private capital markets.

The results are inconsistent with the alternative interpretations offered above. There was little *a priori* reason why the trend-chasing or the rent-seeking stories would lead to the heavy reliance on private sector actors when structuring public programs. Moreover, we saw that more effective governments were more likely to deploy their public funding in a manner that was both highly correlated with private funding and more likely to rely structurally on private capital markets. The measure of more effective governments was strongly inversely correlated with the level of corruption. If governments were simply engaged in trend-chasing or rent-seeking, we would not expect to find these patterns in the data.

Ultimately, the complementarity between public and private entrepreneurial finance seemed to be most consistent with the hypothesis that such complementarity mitigated frictions that arose in the deployment of capital to early-stage firms. This was also consistent with our finding that innovation increased following government funding programs that either targeted early-stage ventures or required collaboration with private capital investors.

Our paper diverged from most of the earlier literature, which looked in depth at a single program at a time and exploited discontinuities in program design (Bronzini and Iachini 2014, Howell 2017, Le and Jaffe 2017, Myers and Lanahan 2020, Santoleri et al. 2020, and many others). The standard approach allows a well-identified look at a program's efficacy at promoting innovation and/or commercialization but sheds limited light on the interplay of public and private entrepreneurial finance, particularly in relation to program initiation and design.[4] This approach also is subject in some cases to external validity concerns. Our approach allowed us to examine the broader relationship between public and private entrepreneurial finance across the near universe of government funding programs of early-stage ventures.

The plan of this paper is as follows. Section 2 describes the creation of the data set. Section 3 presents some stylized facts about these programs. The results regarding the positive correlation between public and private entrepreneurial finance are presented in Section 4. Section 5 examines program design. We explore the impact of these programs on local innovation in Section 6. The mechanisms behind the results are discussed in Section 7. The final section concludes the paper.

2. Creating the Data Set

2.1. Defining the included programs

This paper examined a broad panel of nations in the spirit of the law-and-finance literature (and in the specific context of innovation policy, Bloom, Griffith, and van Reenen 2003).[5] The first step was the identification of the public entrepreneurial finance programs. A guiding principle was to focus on national programs that involved the provision of capital to entrepreneurs. We also included the many entrepreneurial finance programs that engaged venture capitalists, angel funds, and banks.

These seemingly straightforward criteria, however, required extensive refinement. In Appendix 2, we provided examples of policies that were included and deleted. The key principles that motivated our decisions were as follows:

- Domestic focus: We dropped policies focused specifically on other markets and not on the country in which they were initiated. For instance, we deleted the programs of a number of wealthy nations that were aimed towards promoting entrepreneurship in emerging economies.

- Financial orientation: We wished to focus on programs that involved the financing of entrepreneurs. Thus, we kept policies supporting innovation centers so long as the innovation center itself offered financing of entrepreneurial firms, but not if the emphasis

[4] This paper was also related to efforts to understand examinations of multiple programs in a single nation, such as Kiselev (2020) and Pless (2020). The latter is particularly relevant to this work, as it examines whether the policies are substitutes or complements (i.e., their interaction effect on R&D and productivity).

[5] All data and code from the paper will be posted at www.public-entrepreneurship.org by the end of May 2021.

was solely on training, mentoring, or similar activities. Similarly, we kept policies that involved special economic zones, so long as the program involved the financing of entrepreneurial firms.

- Nation-level policies: Because we focused our analysis on the national level, we dropped programs run by international bodies such as the European Union. We kept policies that were joint efforts between a national government and an international body, as long as the participation of the international body was only for funding purposes and the policy itself was run by a national government. We also dropped policies organized by states, provinces, and municipalities. Our decision to do so was driven not by a lack of interest in or significance of these programs, but because of the difficulty in getting systematic data on these efforts.

- Appropriate program level: Governments were inconsistent about how programs were defined. These situations were quite idiosyncratic and could be complex. In general, we adjusted the definition of what constituted a program in one of three cases. Below are three commonly encountered situations, and how and why we modified the definition of the programs:

    - In some cases, there were "umbrella" policies that encompassed a number of clearly distinct programs with different types of financing provided and/or firms targeted. In many cases, the branding of the umbrella programs changed over time, even as the underlying programs remained constant: for instance, a new administration might announce an initiative, which essentially was a repackaging of already-existing programs. In these cases, we split the umbrella policies up into their clearly defined subprograms.
    - In some cases, policies were announced as separate programs, even though they had the same structure. For instance, in some cases, a government would launch three separate financing programs with identical features, but targeted at three different industries. In these cases, we classified these as a single program and aggregated the budget information. While such a reclassification reduced the number of reported programs, it did not affect most of the analyses using weighted totals.
    - In policies where there was a clear primary financing type but some additional capital provided (e.g., an equity financing program with a small loan component appended), we coded the policy according to the primary financing type.

Sometimes programs changed design or scale over time. We addressed these shifts as follows. If the program design changed radically, we created a second entry with a note that it was a restructured version of the original program. If there were only minor modifications, we used the characteristics as of the end of 2019.

2.2. Identifying and coding the programs

We now describe the process by which we identified and coded the programs. To do this, we first created as comprehensive a list of programs to research as possible.

One concern with the coding was those policies that had terminated might be difficult to observe: they were less likely to be included on current government websites and other directories. We sought to avoid such truncation bias by identifying programs using contemporaneous sources to as great an extent as possible.

In particular, we used 190 sources on public entrepreneurial finance programs published between 1998 and 2020. These documents were prepared by international bodies (especially the Organisation for Economic Cooperation and Development), national governments, and academics. They summarized relevant policies on a national, regional, or international basis, often providing information on their design. Table A-1 in the Internet Appendix summarized the sources used; Appendix 2 provides more details on the criteria used for the selection process.

Many of these directories listed websites for these programs, which were either still active or available through the Internet Archive (www.archive.org). The information that we obtained from these websites caused us to revise the program list in some cases. For instance, we discovered that some of the listed programs were either duplicates of other programs, umbrella designations that encompassed multiple programs, or other problematic cases. In some cases, we also discovered additional programs, which were either not included in the published sources or conflated with another program. Table A-2 described how we created the final sample of 755 programs.

We gathered information on the features of these programs from multiple sources. Many of the reports summarizing the programs had information on the key aspects of these features. In addition, many existing (and terminated) programs had extensive information online on program design, in current or archived sites. Appendix 3 provided definitions of the coded policy-level variables.

Of the measures that we coded, the treatment of annual budgets was particularly challenging. We sought to capture the annual budget flow of the program in US dollars. We used, wherever possible, the amount actually disbursed, not the original appropriation or budget request. In some cases, the flow varied from year to year. The quality of the budget information was generally higher in later years, so we used the average of the most recent three years of the program, if possible. If available budget information was a cumulative amount over a longer period, we took the annual average. Using the recent flows was imperfect for two reasons: in some cases, programs increased in size over time, so this approach may have overstated program size. (Though, as noted above, we sought to address substantial breaks in program design by treating these as two separate programs.) In other cases, equity and debt programs had an evergreen feature, where capital returned from original investments was "recycled" in new deals. In these cases, the budget amounts may understate the economic importance of mature programs.

2.3. Characterizing the countries

We characterized the countries using measures that were similar to those in Bernstein, Dev, and Lerner (2020). We first used a number of explanatory variables that characterized the countries in general. We obtained annual data on population (in millions) and GDP (in billions of 2010 US dollars) from the Economist Intelligence Unit database. In some cases, these data were missing,

so we supplemented this source with data from the *CIA Factbook*, United Nations databases, and the government website of the respective countries. Appendix 4 provided definitions of the country-level variables, including a number of measures used exclusively in Table 1, such as initial public offering activity.

In our analysis, we also explored how entrepreneurial finance was associated with the quality of government. To assess government quality, we used two measures compiled by the World Bank's Worldwide Governance Indicators project: their measures of the effectiveness of government and the rule of law. These aggregate indicators combined the views of a large number of corporate, individual citizen, and expert survey respondents in developed and developing countries, and were based on over 30 individual data sources produced by a variety of survey institutes, think tanks, non-governmental organizations, international organizations, and private sector firms. The data series dated back to 1996. Since these series were initially produced biannually, when data were missing in a given year, we used the information in the immediately subsequent year,

In addition, we used two measures that were more business-focused: the World Bank's ease of doing business score (which measured an economy's performance with respect to a measure of regulatory best practice across 41 indicators that the Doing Business project compiles) and the sub-score for enforcing contracts, which we felt to be particularly relevant for entrepreneurial finance. These measures were compiled annually since 2004; for observations prior to this year, we used the score for 2004.

We also gathered three metrics that we measured entrepreneurial and innovative activity. First, we gathered country-level venture capital investment data from two sources.

The initial source of information was various national and regional associations. These organizations routinely gather data on venture capital investments that should be of high quality due to their close ties to members. Unfortunately, these data had two substantial limitations. First, in much of the world, these associations were quite new and only recently began tracking venture investments. Second, not all groups used the same methodologies.

Consequentially, we also used Refinitiv VentureXpert data (other databases had limited global coverage, especially in the 1990s). The data included 342,832 transactions with an average of 2.16 investors per deal. We removed transactions with missing total investment values, or transactions classified as Buyout, Fund of Funds, Generalist Private Equity, Mezzanine, Other Investor (Non-Private Equity), Other Private Equity, and Real Estate. Our final deal count was 204,446 transactions. We summed the venture capital investment by country and year. Of 6,150 country-year observations between 1990 and 2019, 4,150 had no data from either source, in which case we assumed there were no venture capital investments. Table A-3 summarizes the methodology.

Finally, we gathered information about U.S. patenting activity from Clarivate's Derwent Innovation and the USPTO's PatentsView databases. U.S. patents have several advantages when evaluating these programs:

- First, the use of USPTO awards assured that patents across nations were more directly comparable, thereby facilitating cross-national analyses. Some nations, for instance, were characterized by very narrow patent filings, which may inflate award counts.
- Second, the standards for U.S. patent filings were unaffected by policy changes in the home country (except in the U.S., where a substantial literature suggests that patent policy was shaped by many considerations largely exogenous to entrepreneurship promotion). While it might be objected that many national patents were not filed in the U.S., we expected that more important awards would be filed in the U.S., as otherwise the inventions would not be protected in this important market.
- Finally, unlike initial public offerings, which can take place years or even more than a decade after a company's innovations attract the attention of venture groups, the lag between innovation and patent filing was generally quite short: Hall et al. 1986 highlighted the short lag between R&D spending and patent filings.[6] It should be noted, however, that foreign entities have one year after filing in their home country to file applications directly in the U.S. They may be able to delay their U.S. filings by up to 30 months after the original filing by exploiting features of the Patent Cooperation Treaty, as described at https://www.wipo.int/pct/en/faqs/faqs.html. Thus, even if the public programs had an immediate effect on innovation, there would likely be a delayed response in U.S. patent filings.

We extracted from these patent databases the name and nationality of each inventor, the primary patent class, the application date, the identity of the assignee(s), and the number of citations (through September 29, 2020) for each patent. Following Moretti (2019), we assigned patents to countries proportionately to the number of investors from each particular nation. Appendix 5 provides more details about the construction of the patent database.

Using these data, we created four patent-based measures:

- The first includes the overall number of U.S. patents applied in a given year and country.
- The second was the number of "top patents", which are patents at the top 10% of citations, relative to other awards in that application year and patent class.
- The third measure was the number of patents in basic technology classes. Following the approach of Akcigit et al. (2020), we define basic patent classes as the patent classes that are in the top 10% in citations to academic journals per patent, relative to other CPC classes in the same year.
- Finally, we counted the volume of patenting by new patenting entities in a given country-year, based on the assignees who were quite new to the patent database.

3. *Stylized Facts about Government Funding Programs of Entrepreneurial Ventures*

We thus assembled a hand-collected data of government funding programs of entrepreneurial ventures around the world. Given the novelty of the data, and the limited information available in the literature about the extent and structure of these programs, in this section, we describe several stylized facts that also guide our main analysis in Section 4 below.

6

Stylized Fact 1: Government funding programs have become increasingly more prevalent, and today are common around the globe.

As illustrated in Table 1, our data covered 755 government funding programs in 66 countries around the world active between 1995 and 2019. On average, governments spent $1.85 billion per year (conditional on having at least one policy). On average, a given country had 11.4 such policies, and the average funding program lasted 11 years.

The tendency to rely on such government funding programs was geographically dispersed, and not just a phenomenon confined to developed countries. For example, Figure 1 illustrated the total number of policies around the world. Countries that had a significant number of different countries include Canada, Germany, and the Netherlands, but also Turkey and a number of Eastern European nations. Figure 2 presented the annual budget in these nations, and Figure 3 captured spending relative to GDP. While Figure 2 illustrated a strong correlation with the size of the nations (such as in the case of Brazil, China, Russia, and the U.S), Figure 3 revealed that a few smaller nations spent significantly on such entrepreneurial funding programs. Canada, China, France, Germany, and Indonesia were in the highest category in both Figures 2 and 3.[7] Finally, Figure 4 explored the stability of these programs, in terms of their length. Overall, it is evident that the use of such programs is widespread.

It is also interesting to note that the importance of these government programs increased over time. Figure 5 illustrated the annual aggregate budgets allocated for government funding programs of entrepreneurial ventures. The figure illustrated the steady and significant increase in global government spending over time, from roughly $50 billion in 1995 to more than $170 billion in 2019.

Stylized Fact 2: The aggregate budget of government funding programs is comparable to the global venture capital market.

It is also interesting to compare these programs to the global venture capital market. As illustrated in Figure 5, over the last decade, the average cumulative annual budget of such government funding programs around the world was $156 billion. In contrast, global annual disbursements of traditional venture funds around the world were on average $153 billion, as tabulated by CrunchBase's *Global VC Reports*.[8]

Stylized Fact 3: Governments rely on a host of different financial instruments.

[7] The reader may be surprised by the inclusion of Algeria among the top nations. Algeria's ranking was driven by the programs for young entrepreneurs run by the Agence Nationale de Soutien à l'Emploi des Jeunes (ANSEJ), which was characterized by BTI as "a massive public investment" (https://www.bti-project.org/en/reports/country-report-DZA-2020.html). For more details on the program, see https://www.imf.org/external/pubs/ft/scr/2014/cr14161.pdf.

[8] https://news.crunchbase.com/news/the-q4-eoy-2019-global-vc-report-a-strong-end-to-a-good-but-not-fantastic-year/ and earlier years.

Panel A of Table 2 illustrated the different types of financial instruments employed by governments. The most prevalent type of government instrument was grants, accounting for 43.8% of all programs, as noted in column 1. The second most popular financing form was equity funding, accounting for 18.2%. But governments utilize a host of other types of financial instruments, ranging from credit guarantees and loans to innovation vouchers to tax credits. It is interesting to note that when accounting for the size of the programs, as illustrated in column 2, tax credits and government loans were more significant, partially because they tended to be utilized by later-stage and larger companies.

Stylized Fact 4: Government funding programs often involve private capital markets.

Government funding programs often relied on private capital investors. Panel B of Table 2 showed that the involvement came in various forms. Column 1 illustrated that the involvement of private investors in the investment committee occurs in 35% of the government funding programs. However, the most popular form of reliance on private investors was through the matching requirements, in which government funding was conditional on the ability of firms to raise matching capital from the private sector. Such requirements existed in 43% of the government programs.

Quite remarkably, in 85% of all government funding programs, private investors were involved. The particular design of government funding programs of entrepreneurial ventures is central to our analyses below.

Stylized Fact 5: Government funding programs often target specific industries and company stages.

Panel C and D of Table 2 highlighted the industries and company stages targeted by programs. In our coding, we allowed programs to highlight multiple categories. In terms of the number of programs, programs focusing on the life sciences and technology firms were the most common, as well as those focusing on early-stage firms. We also tabulate categories that were excluded from coverage in Panel D. Here, agricultural, financial services, and sin industries were the most frequently explicitly excluded.

4. *The Correlation between Private and Public Activity*

We first examined the relationship between national characteristics and the decision to begin these programs. In particular, we focused on whether, as delineated in the introduction, these programs were positively or negatively correlated with private entrepreneurial finance.

Table 3 provided a breakdown of nations along various dimensions, comparing the number of policies active between 1995 and 2019. The number of active programs was highly related to national characteristics. In particular, nations with larger populations, wealthier countries, those with more patenting and venture capital activity, those with greater credit availability and investor protection, and with more public market and IPO activity were more likely to have such programs. These tabulations were corroborated by Figure 6, a bin-scatter plot showing a strong linear relationship between the volume of venture capital investment in 1994 and the dollar-weighted

number of active programs in 2019. Of course, the interpretation of these univariate comparisons must be cautious.

Thus, we turned to an econometric approach. Table 4 exploited the panel nature of the data to examine the decision to begin programs. The dependent variable, $ActiveGovPolicies_{c,t}$, was the budget-weighted number of active policies in each country-year between 1995 and 2019. We included fixed effects for each country c to control for unobserved heterogeneity and a vector of country characteristics $X_{c,t}$. In some specifications, we added year fixed effects α_t.

$$\text{ActiveGovPolicies}_{c,t} = \alpha_c + \alpha_t + \beta \text{ x PrivateVC}_{c,t-1} + \delta \text{ x } X_{c,t} + \varepsilon_{c,t} \quad (1)$$

Even after controlling for each nation, the coefficient on private venture capital investments β was significantly positive. Lagged venture activity was strongly associated with the presence of such policies. A one standard deviation increase in lagged VC investments led to a 60% increase in the number of active programs in a country.

Table 5 presented another robustness check. Some policies targeted particular industries, while others prohibited such investments. We focused on the eight industries most frequently mentioned in these provisions. These sectors were agriculture (including forestry, fishing, and fish farming), extractive (especially mining and oil-and-gas), financial (encompassing as well insurance and real estate), healthcare (including biotechnology, devices, and pharmaceuticals), industrials (such as aerospace, defense, machinery, industrial, and transport), sin (including alcohol, gambling, and sex-related firms), sustainability (especially cleantech and recycling), and technology (such as artificial intelligence, communications, electronics, and software). We identified annual venture investments in these country-industry-year triples based on four-digit Standard Industrial Classification codes. Table 2 highlighted that the most targeted industries were high technology, healthcare, and sustainability, with the addition of a few large programs targeting agriculture-related businesses.

We reported in Table 5 analyses akin to the spirit of those in Table 4. Because the observations were at the country-industry or country-industry-year level, even in the cross-sectional analyses, we were able to use country and industry fixed effects.

In the first three regressions, we used $TargetedIndustry_{i,c,t}$, which denoted as one whether an industry i in country c was specifically targeted in a given period t and zero otherwise, as a dependent variable. We looked at whether a policy targeting that industry was introduced between 1995 and 2019 (in regression 1), or whether such a policy was active in those years (in regressions 2 and 3). More specifically, we estimated in regressions 2 and 3 at the industry-country-year level:

$$\text{TargetedIndustry}_{i,c,t} = \alpha_i + \alpha_c + \alpha_t + \beta \text{ x PrivateVC}_{i,c,t-1} + \delta \text{ x } X_{c,t} + \varepsilon_{i,c,t} \quad (2)$$

In the fourth and fifth regressions, we repeated the analysis, now using the dollar volume of active government policies in a given country and year targeting a given industry.

Lagged venture activity in that industry (the coefficient β) had a powerful explanatory effect in the regressions, even after controlling for country, industry, and year fixed effects, as well as annual

population and per capita GDP. These results supported the view of complementarity between public entrepreneurial finance programs and private activity.

In the appendix tables, we explored additional robustness checks. Table A-4 explored the relationship between venture activity and program initiation in the cross-section. We divided the sample into three classes of programs (as in Table 2): those involving equity investment, those involving loans, mezzanine, and other debt-related instruments, and programs focused on grants (including those employing tax credits). Table A-5 looked at Table 4, now divided into the three categories. The results were generally robust, though the standard errors were substantially nosier when programs were divided by type.

5. The Design of Programs

We next sought to understand how the design of programs differed across nations. As noted in the introduction, there were reasons to expect that the involvement of the private sector would be greater in better- or worse-governed nations. We also examined the impact of program focus. As highlighted in the introduction, challenges to the public sector were particularly acute in efforts to boost early-stage entrepreneurial finance, due to the substantial information asymmetries that surround these ventures.

Before we looked at these questions, however, we revisited the positive correlation between public and private entrepreneurial finance documented in Section 3. We asked whether the extent of these correlations differs with the quality of the governments.

Table 6 repeated the analysis in Table 4. Now we added a measure of the effectiveness of government and the rule of law in each nation, as well as these measures interacted with the volume of venture investment in the previous year. More specifically, we estimated:

$$\text{ActiveGovPolicies}_{c,t} = \alpha_c + \alpha_t + \beta_1 \text{ x PrivateVC}_{c,t-1} + \beta_2 \text{ x GovEff}_{c,t-1} + \gamma \text{ x PrivateVC}_{c,t-1} \text{ x GovEff}_{c,t-1} + \delta \text{ x } X_{c,t} + \varepsilon_{c,t} \quad (3)$$

The coefficients on the government efficiency measures (β_2**)** were of little significance. Much of their impact was presumably subsumed in the country fixed effects. (While these scores changed over time, they tended to be quite stable). However, the coefficients on the interaction terms (γ) were highly positive. While the coefficient on lagged venture activity (β_1) continued to be positive, the only significant coefficients were the interaction between the venture measure and government quality. The positive relationship between high-quality public administration and public-private relationship suggested a positive view of the correlations documented in Section 3.

Figure 7 showed this relationship graphically: the relationship between government programs and private VC funding, split by high and low government effectiveness countries. The figure illustrated the heterogeneity in the relationship along this difference: the association was noticeably stronger for countries with more effective governments. We repeated the analysis in Table A-6, now using scores for the enforcement of contracts and the ease of doing business. The results with ease of doing business were similar; those with the contract enforcement score were much weaker (though directionally similar).

We found additional consistent evidence when we explored the influence of policy activity in neighboring nations. Policies in neighboring countries could matter due to be "policy diffusion," where initiatives in one nation were understood and emulated elsewhere. While this phenomenon has been extensively explored in political science (e.g., Volden, Ting, and Carpenter 2009), it has received less scrutiny in economics. In this case, the experiences nearby might have led to a greater appreciation of the importance of private sector involvement and influenced program design as a consequence.

Table 7 looked at this phenomenon. We used panel data between 1995 and 2019 as before, using the weighted number of new venture policies active in a given year as the dependent variable. We used fixed effects as before, as well as controls for country size. We constructed the weighted average of active policies in neighboring nations in the prior year. To create these measures, we relied on CEPII data (http://www.cepii.fr/cepii/en/bdd_modele/bdd.asp) to create a matrix that identified all neighboring countries for a given country. Merging it with our data allowed us to calculate for each country-year the total weighted number of policies active in all neighboring countries.

In the first and third regressions, we showed that the presence of neighbors with these policies was a strong driver of the initiation or continuation of these programs. A one standard deviation increase in active programs in neighboring countries was associated with 50-70% more active policies in the country. While lagged venture capital activity in the nation in question continued to be significantly positive, policy initiatives by neighbors were significantly associated with active policies.

In the second and fourth regressions, we explored the suggestion above: that the presence of nearby programs might have led to a greater appreciation of the complementarity between public and private entrepreneurial finance. Indeed, the interaction between lagged neighboring programs and private venture financing was strongly positive. In nations where neighbors undertook these programs, the public-private complementarity was greater. Table A-7 re-estimated Table 7 without the venture activity measure.

We then turned to the specific ways in which programs interacted with the private sector. In particular, we examined three mechanisms (tabulated in Table 2) through which governments could so engage:

- The first of these was a matching fund requirement. In these cases, public investment was conditioned on raising capital from another source. Programs differed substantially on the match rate required and in the acceptable range of sources (e.g., whether funds raised from another public body were acceptable for a match). The essential motivation, though, was the same: the willingness of another investor provides a second, independent opinion for the public body.

- The second mechanism was the involvement of the private sector in the investment decision-making process. Often programs included one or more entrepreneurs or venture capitalists on the investment committee that allocated funds. Such members might bring a different perspective to these deliberations.

- A third approach was not to fund entrepreneurs directly, but rather to finance financial intermediaries, for instance, venture capital firms or angel groups, who could invest the funds according to their judgment (subject to various rules, such as restrictions on the industry and the geography of the financed firms). By removing the government from the financing decision, these programs sought to improve the quality of the decision-making and insulate the choices from political pressures.

Table 8 looked at the use of these provisions. The unit of observation in each regression was each public entrepreneurial finance program *p* introduced between 1995 and 2019. We employed a composite measure, $PrivateSector_p$, as the dependent variable, which was the sum of these three elements (each coded from zero to one). The table presented ordered logit and ordinary least squares (OLS) specifications (though the results were robust to others). In Panel A, we used the effectiveness of governance and rule of law scores in the year of the policy introduction as the key independent variables, as well as the natural logarithm of venture capital investment. We controlled for population and per capita GDP:

$$\text{PrivateSector}_p = \beta_1 \text{ x PrivateVC}_{c,t-1} + \beta_2 \text{ x GovEff}_{c,t-1} + \delta \text{ x } X_{c,t} + \varepsilon_{c,t} \quad (4)$$

Panel A of Table 8 showed that nations with better public governance, whether measured through the effectiveness of government or rule of law score, were more likely to incorporate these elements. When designing these policies, these nations seemed to respond to concerns about investor protection, and adjusted the program design accordingly.

In Tables A-8 and A-9, we explored the robustness of these analyses. In Table A-8, we instead used the scores of the ability to enforce contracts and the ease of doing business. We found a strong association between the private sector engagement provisions and these two scores. When we examined the individual program elements in A-9, the results were similar to Table 8, especially for the matching fund and intermediary finding comments.

A final suggestion in the introduction was that whatever the policy of the government, these protections should have been more common in programs facing greater informational asymmetries. We examined this, at least roughly, by repeating the analysis in Panel A of Table 8, now adding a dummy for programs with an early-stage focus, as well as an interaction with the measure of government quality. Panel B was consistent with this suggestion. Programs focusing on early-stage investments were more likely to have private sector involvement in these programs.

6. Innovation and Government Funding Programs

The final analysis of the paper examined the consequences of these government funding efforts for innovation. Any analysis that attempts to establish the causal consequences of these programs had to be approached with caution due to two issues. Before turning to the analysis, we discuss these concerns and how we addressed them.

The first of these issues is that we employed a staggered difference-in-difference analysis. Moreover, as shown in Table 1, countries that undertake a single entrepreneurial finance policy typically initiate multiple subsequent ones. Based on critiques such as Athey and Imbens (2018),

it is widely understood that this setting can lead to biased estimates of average treatment effects unless precautions are taken.

Second, the decision to initiate these programs is non-random. The familiar Manski (1993) reflection problem may hold here: the same underlying considerations that led to a boost in innovation may also have triggered individual nations to start public entrepreneurial finance programs. As we discuss below, the lack of pre-existing trends alleviate this concern.

To address the first concern, we employed four alternative approaches:

- Method 1: We used first public entrepreneurial finance policy introductions only. We included 30 country-year observations for each country (1990-2019, conditional on data availability), and used all countries in the sample. The 139 of the countries that were never treated were used as controls.
- Method 2: We used first policy introductions, as well as subsequent initiations, so long as there were no policy introduction in the five years prior. This added 16 additional initiations to the original 65. We continued to have 30 country-year observations for each country, and used all 204 countries in the sample. But we reset the relevant lead/lag indicators to 1 for the second initiation, as well as for the first.[9]
- Method 3: We used first policy introductions, as well as subsequent initiations, so long as there was no introduction in the five years prior, with the addition of a new independent observation for each additional program. Again, this added 16 additional initiations to the original 65. Using this approach, if Argentina had two clean initiations, we would have 60 country-year observations for Argentina rather than 30. We again used the 139 of the countries that were never treated as controls.
- Method 4: We used the stacked regressions approach implemented in Cengiz et al. (2019) and documented in Baker, Larcker, and Wang (2021). In this case we just used the five years prior to and after each policy initiation as observations for the treated and control nations.

The baseline specifications reported in Tables 9, 10, and A-10 and Figure 8 used the first method. Methods 2 and 3 yielded quite similar results, as Tables A-11 and A-12 illustrated. Method 4 (Table A-13) displayed a similar increase after the policy initiation, though also evidence of a pre-trend in some specifications.

It should be noted that our chosen approach, while more attractive from an estimation perspective, sharply reduced the number of program initiations under study. This was particularly a concern in Table 10, where we sought to distinguish between the relative impact of different types of programs. As discussed below, in light of this concern, we looked at the combined impact of two types of policies whose impact on subsequent innovation was anticipated to be particularly positive.

[9] Note that this method will not include the >=+5 indicator from the first initiation for observations beginning five years before the initiation of the second policy.

To address the second concern, we plotted the effects dynamically in Figure 8. The lack of pre-existing trends provided us with some comfort with respect to the causal interpretation of the results in this section. It should also be noted that, as discussed above, we are examining U.S. patent applications, whose review standards should not be influenced by policy changes in the nation initiating the entrepreneurial finance program.

Our baseline analysis relied on the following specification:

$$\text{Innovation}_{c,t} = \alpha_c + \alpha_t + \beta \text{ x } \text{POST}_{c,t} + \gamma \text{ x } X_{c,t} + \varepsilon_{c,t} \quad (5)$$

where $Innovation_{c,t}$ were the logarithms of (one plus) the four measures of the U.S. patent filings in a given country-year discussed in Section 2.3. $POST_{c,t}$ was a dummy variable denoting that the observation year was after that in which the country initiated its first program. The specification included country and year fixed effects, as well as controls for population, per capita GDP, and lagged venture capital activity. Standard errors were clustered at the country level.

The results of this specification are presented in Table 9. In column (1), the dependent variable was the log number of patent applications. We found that the coefficient of the *POST* variable equaled 0.344 and was statistically significant at the 1% level. The coefficient suggested a 41% (=*exp*(0.344)) increase in patenting activity following the introduction of the first government funding program.

Of course, the number of patents may not necessarily reflect the volume of high-quality innovations. Therefore, in column (2), we focused on the number of "top patents," that is, those in the top 10% of citations of all those with the same application year and technology class. Following the initiation of government funding programs, the number of top patents filed increased significantly by 32%.

It is also interesting to note that government programs seemed to induce patenting activity in more basic technologies, as noted in column (3), which may reflect more fundamental discoveries. Moreover, column (4) illustrated that government funding programs seemed to increase the likelihood of patenting by new patenting entities by 24%.

These results suggested that government funding programs were associated with subsequent increases in innovation. As noted above, a natural concern about the interpretation of the results was that government funding programs and the increases in local innovation activity arose due to an unobserved third factor. To explore whether this was the case, we plotted the innovation dynamics in the five years before and after the initiation of initial government entrepreneurial fiannce programs. Specifically, we estimated the following specification at the country-year level, following the suggested approach of Clarke and Schythe (2020):

$$Innovation_{it} = \alpha_c + \alpha_t + \delta \cdot 1\{t \leq Year_{init} - 5\} + \sum_{j=-4}^{j=4} \beta_j 1\{t = Year_{init} + j\} + \theta \cdot 1\{t \geq Year_{init} + 5\} + \gamma X_{ct} + \epsilon_{ct} \quad (6)$$

where we included indicator variables for the years before and after the program initiation. Again, the specification included country and year fixed effects, as well as the same set of country-specific controls as described above. Standard errors were clustered at the country level. The omitted baseline was the year prior to policy initiation, which was normalized to zero. The effects were thus identified from the differences between treated countries and never-treated countries, as well as differential timing of introduction of such programs within the treated countries.

Figure 8 illustrated the coefficients on the time dummies for the years surrounding the program initiations with 95% confidence intervals. In Panel A, we saw a gradual increase in the number of patent applications following the initiation of government funding program. The effect became statistically significant in the third year after the funding program's initiation. We found similar patterns when we focused on the number of top patent applications (Panel B), the number of patents in basic research (Panel C), and the number of applications by new patenting entities (Panel D).[10] It is important to note that in all figures, we did not find any evidence for the existence of statistically significant pre-trends, which helped alleviate concerns about pre-trends and reverse causality issues.

We then looked at the differential impact of program initiations on innovation. In particular, we hypothesized that these programs were more impactful when the information asymmetries that surrounded the funded companies were greater, which should be associated with programs with a focus on early-stage investments. We also hypothesized that the programs that involving the private sector should have been more efficacious, for the reasons delineated earlier in the paper.

In addition to the relatively small number of program initiations that we examined, we also grappled with the fact that programs with an early-stage focus or matching provisions became more frequent over time. In particular, the correlation coefficient in programs initiated between 1990 and 2019 between the program start date and the probability that the program had an early-stage focus was +0.28. The correlation in the same sample between the start date and a dummy variable denoting the presence of at least one matching requirement was +0.53. Thus, the early programs that dominated the initiation sample were less likely to have an early-stage focus and (especially) matching requirements.

As a result, in Table 10, we looked at programs that had either of these two features. We compared the impact on innovation of the initiation of programs with either an early-stage focus or matching requirements on the one hand and the remaining programs on the other (or both features). Both the early-stage and matching requirements programs might be anticipated to have a higher impact on innovation. This approach allowed us to create pairs of regressions with roughly equal sample sizes.

The results in Table 10 were consistent with our hypotheses. In column (1), we explored the effect on the number of patent applications. We found statistically significant positive effects in the years following program initiations. In contrast, when we explored the effects of other programs on patenting activity, as illustrated in column (2), we found less consistently significant effects.

[10] The regressions behind these figures are provided in Table A-10.

Similar contrasts also emerged when exploring other dependent variables, such as the number of top patents, number of basic patents, and the number of new patenting entities.

We tested the differences in the coefficients across the pairs of regressions by estimating a pooled regression that stacked the observations from the two estimations. We estimated separate coefficients of the ten observation periods (as in equation (6)), as well as separate annual coefficients for the marginal differences between programs that were focused on early-stage projects or had matching requirements on the one hand and the remaining programs on the other hand. The final line of the table reports the tests of the null hypothesis that the sum of the coefficients for the five interaction terms between period 0 and period 4 were equal to zero.[11] In three of the four cases, the sum of the coefficients in the two equations were significantly different from zero at least at the ten percent confidence level.

Taken together, the results provided suggestive evidence that government funding programs improved high quality and basic innovation. These effects took place particularly in the set of programs that either targeted early-stage companies or required matching funding from the private capital markets.

7. Mechanisms

The main contributions of our paper were two-fold. First, we shed light on the scale and design of government funding programs tailored to boost entrepreneurial activity around the world. Second, we explored how public entrepreneurial finance interacted with private capital markets. We found that government funding was positively correlated with the local availability of venture capital funding, a result that held both at the country and the industry level.

In this section, we considered four potential mechanisms that may have driven this complementarity. The evidence compiled above helped distinguish between the various explanations.

7.1 Trend-Chasing

One possible interpretation of the positive correlation between private capital markets and public government programs was that both sets of actors were pursuing investments perceived as promising attractive private returns. Such a strategy could lead to crowding out, where firms that would have raised private capital instead receive the equivalent amount in subsidies (see Lach 2002 and Wallsten 2000, as well as Lerner 2009 for a more general discussion).

Such a scenario may be a consequence of the criteria by which many public firms were evaluated or structured. For instance, Wallsten (2000) suggested that in its first decades, the Small Business Innovation Research (SBIR) program in the US was largely evaluated through compilations of "success stories": accounts of companies that received public funding and then achieved success in the product and/or financial markets. As he noted, such schemes were problematic as they led

[11] We exclude the binned period 5 and after indicator from this joint test as any subsequent program initiations during the sample period may have had different features from the first.

program managers to focus on "measurable private returns and anecdotes, largely ignoring the difficult-to-estimate expected returns and spillovers." Such an evaluation scheme may have led program administrators to target sectors that were contemporaneously the focus of intense investor interest.

Meanwhile, many equity programs in the sample featured an "evergreen" structure, where program administrators could reinvest the proceeds from their investments. Obtaining appropriations for additional investment capital was frequently challenging. This program design may have again driven officials, eager to sustain their programs and their own positions, to select transactions promising the highest private returns.

However, this interpretation of the results was inconsistent with the two findings documented above. First, government programs frequently relied on private capital markets through the involvement of private sector actors in investment screening, the funding of intermediaries rather than direct companies, and capital matching requirements. The frequent reliance of government programs on private capital markets suggested that the public funding was doing more than "chasing" private funding.

The second relevant set of findings related to where the correlations between private and public funding were the strongest. Under the trend-chasing hypothesis, we might have expected that a wide range of governments would have followed local venture capital activities. Alternatively, if trend-chasing was a manifestation of the "gaming" of evaluation criteria or program design, such behavior might have been especially common in settings where government effectiveness was lower. Instead, more effective governments were more likely to deploy their public funding in a manner that was highly correlated with private funding. Similarly, effective governments, whom we would expect to allocate capital more efficiently, were more likely to rely on private capital markets when structuring their funding programs.

7.2 Rent Extraction

Many government policies seek in principle to stabilize business cycle-fluctuations, such as lowering interest rates and easing credit constraints during economic downturns. We might have anticipated that public entrepreneurial finance programs would have displayed the same pattern. Instead, government programs geared to funding entrepreneurial ventures were pro-cyclical, positively correlated with the availability of venture capital funding.

A second explanation for this timing was rent-seeking. The literature has suggested that financing programs of rent-extracting governments have had a pro-cyclical bias, in order to appropriate the abundant revenues during booms for the benefit of special interests (Alesina, Campante, and Tabellini 2008, Ilzetzki 2007).[12] Public programs around the world to subsidize firms (Shleifer and Vishny 1998), and entrepreneurial entities specifically (Lerner 2009), have fallen prey to influence

[12] Similarly, Calderón, Duncan, and Schmidt-Hebbel (2012) argue that the ability of countries to adopt such counter-cyclical policies largely depends on countries' quality of institutions: countries with stronger institutions can more creditability commit to pursuing such cyclical policies.

activities. Such forces could thus explain the positive correlation we found between private capital markets and government funding programs.

However, this channel was inconsistent with our findings. In contrast to the literature mentioned above, we found that the positive correlation between public and private sources of capital was greater among countries with stronger institutions: i.e., countries with more effective governments (a measure strongly inversely correlated with the level of corruption).

7.3 Variation in Fiscal Policy

Another potential interpretation was that the documented complementarity between private and public entrepreneurial finance simply reflected pro-cyclical government spending, and thus could be viewed primarily as a fiscal issue. One initial piece of evidence inconsistent with this possibility, however, was the frequent reliance of public programs on private capital markets, which suggested that government programs were not merely a product of fiscal cyclicality. Our data allowed us to further test this potential interpretation. In particular, if this explanation were true, we might have expected government expenditures in a given year to be significantly positively correlated with active government venture programs in the next. We could also assess the importance of government spending as a share of GDP for program initiation across nations.

We obtained country-year level data on government expenditures to examine this possibility. The results of this analysis did not support this potential interpretation. Table A-12 reproduced the cross-sectional analysis of Table A-4, adding initial government expenditures as a share of GDP on the right-hand side. The dependent variable was the budget-weighted number of policies introduced between 1995 and 2019 in a given nation. The coefficient on the government expenditure share was positive but statistically insignificant. Meanwhile, being in the top quartile of initial VC activity remained a highly significant predictor of program initiation. Table A-13 replicated the panel analysis of Table 4 while including the natural logarithm of government expenditures in the prior year as an explanatory variable. Once again, lagged government expenditures had little effect, while lagged private venture activity continued to be strongly associated with the presence of government policies.

Overall, the results showed that the findings of the complementarity between private and public activity were robust to controlling for government spending. Coupled with our documentation of a structural reliance on the private sector, this evidence was inconsistent with public-private complementarity being a primarily fiscal phenomenon.

7.4 Mitigating Investment Frictions

The fourth potential channel was that government funding programs relied on private capital markets to mitigate potential frictions associated with the allocation of capital to early-stage ventures, therefore driving pro-cyclicality. There were several reasons for which private capital allocation may have been more efficient. First, private financiers' compensation was strongly tied to the success of their investments. Second, private investors developed careful approaches to identify promising firms and provide effective governance and informal mentoring (as documented, for instance, in Kaplan and Stromberg 2004 and Gompers et al. 2020). Replicating the level of compensation and skillful due diligence and governance may have been difficult for

public sector bureaucrats. For instance, public officials might have found it hard to use the "soft information" that has been shown to be so important in the contractual arrangements of independent venture firms (Kaplan and Stromberg 2003).

We documented several findings consistent with this channel. First, as we discussed earlier, many funding programs relied on private investors to allocate capital. Moreover, more effective governments were more likely to rely on such investors when structuring these programs and responded more strongly to the local availability of venture capital when deploying funds. We also found that government programs that targeted earlier-stage ventures, where information asymmetries were likely to be greater, were more likely to rely on private capital markets. Finally, the increased correlation between public and private funding in countries with neighboring programs was consistent with learning about effective program design.

This mechanism was consistent with Acemoglu and Robinson 2013, who argued that highly effective governments foresee and address information and incentive problems that public programs encounter. In our setting, by collaborating with private financiers of entrepreneurial firms, the public bodies may have been able to mitigate these problems proactively.

8. Conclusion

This paper examined government efforts to promote entrepreneurial finance, which collectively represented a source of financing rivaling independent venture funds. We examined 755 programs in 66 countries active between 1995 and 2019. These programs were more frequent in nations and periods with more private venture activity. The positive correlation between private and public activities was more pronounced when governments were more effective. When we looked at the interactions between government programs and private capital markets, we found that these mechanisms were more frequent when the government programs targeted earlier-stage companies—where information asymmetries were likely greater—and the effectiveness of government was higher. The initiation of these programs was associated with an increase in patent filings from that nation, particularly for programs that focused on early-stage ventures or required matching from the private sector. Together, the results suggested a socially beneficial complementarity between the private and public sectors in this arena.

The analysis suggested a wide variety of questions for future research. Foremost among these was the need for better understanding of the mechanisms employed in these programs and their implications. These programs had a wide variety of provisions that lent themselves to theoretical and empirical economic analysis. Examples included the differing sharing rules in the equity programs (e.g., the capping of the return to the public sector, as was the case in the Israeli Yozma initiative and a number of subsequent programs) and the extent that governments attempted to use these programs to achieve multiple goals. For instance, the SBIR program simultaneously attempted to promote technological innovation, to use small businesses to meet Federal R&D needs, and to encourage diversity.

In short, despite the proliferation and size of public programs to promote entrepreneurial finance, many questions remain about their design and implementation. It is our hope that this analysis will encourage work on the open questions identified above, as well as related questions.

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Figure 1. The count of distinct entrepreneurial finance policies active between 1995 and 2019 inclusive by nation.

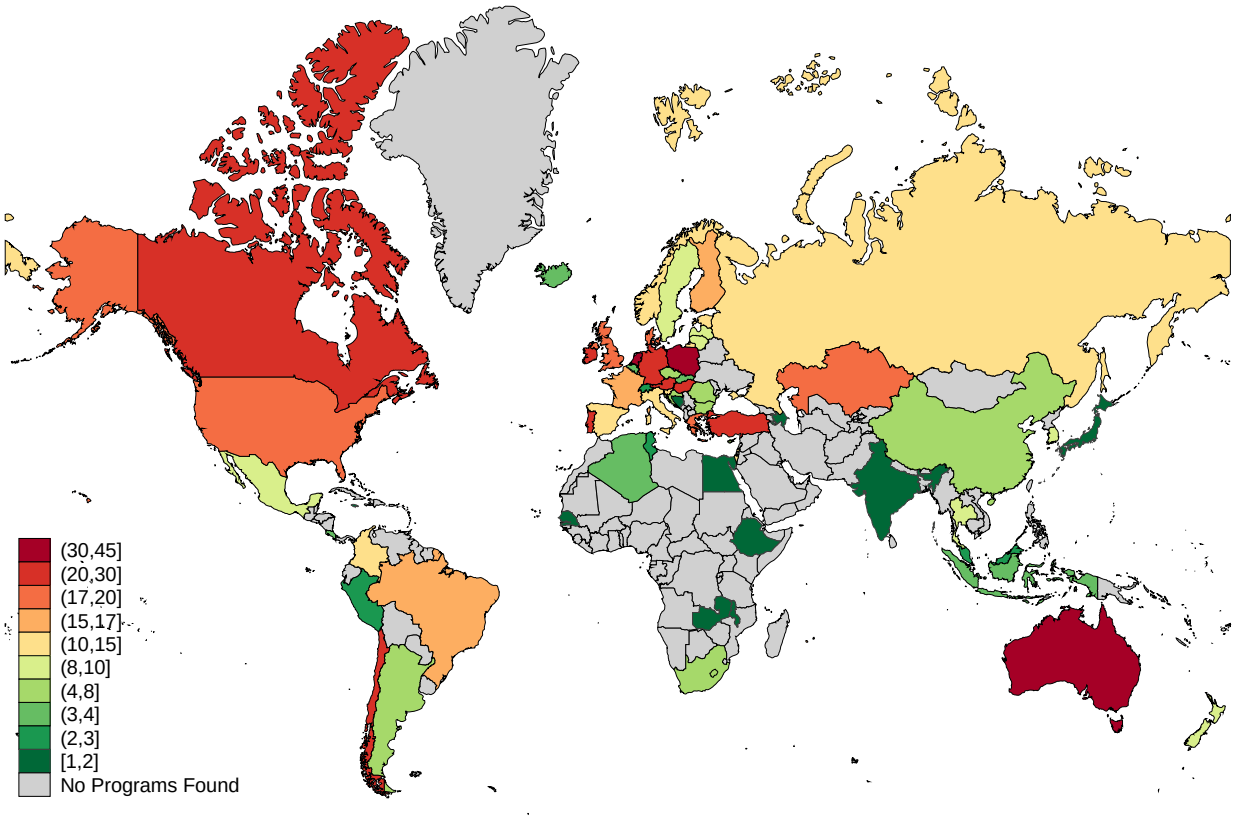


Figure 2. Average of annual budget (in billions of US dollars) of entrepreneurial finance policies active between 1995 and 2019 inclusive by nation.

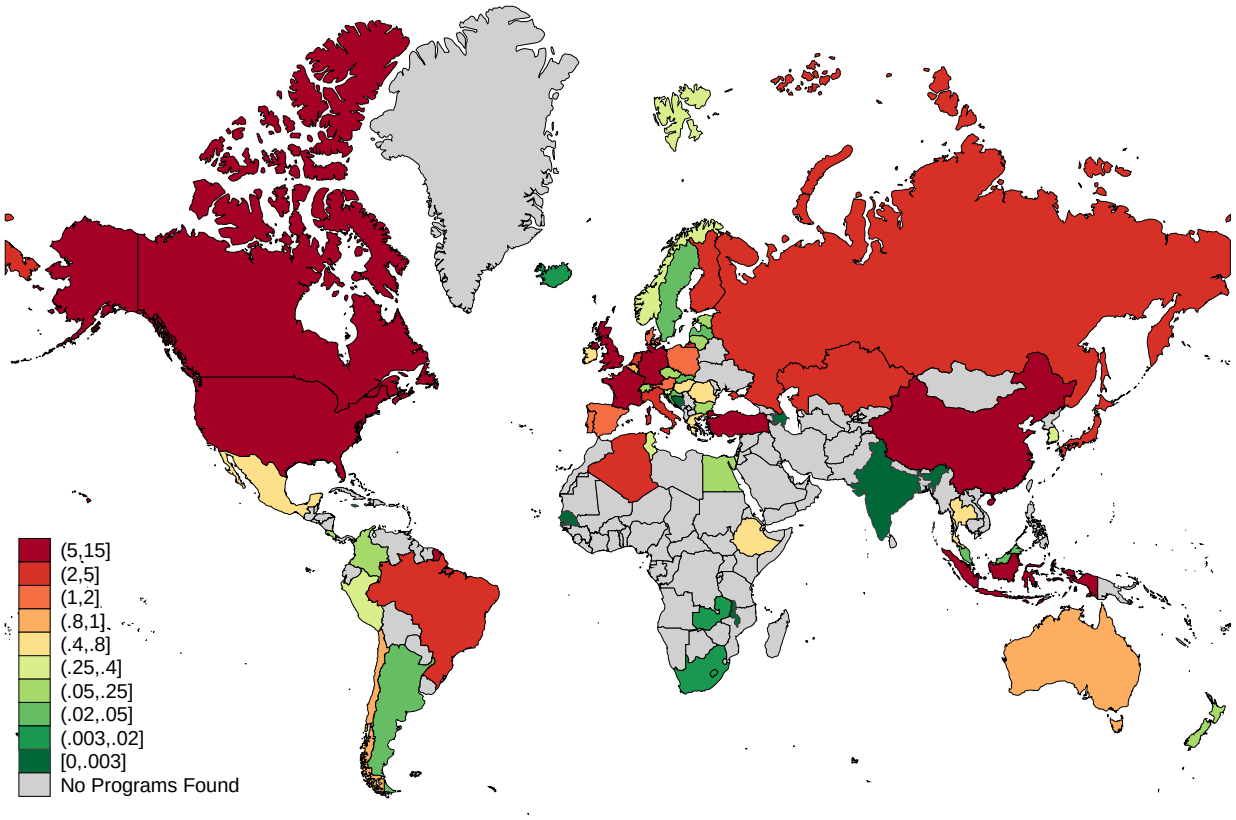


Figure 3. Average of annual budget/GDP (in percent) of entrepreneurial finance policies active between 1995 and 2019 inclusive by nation.

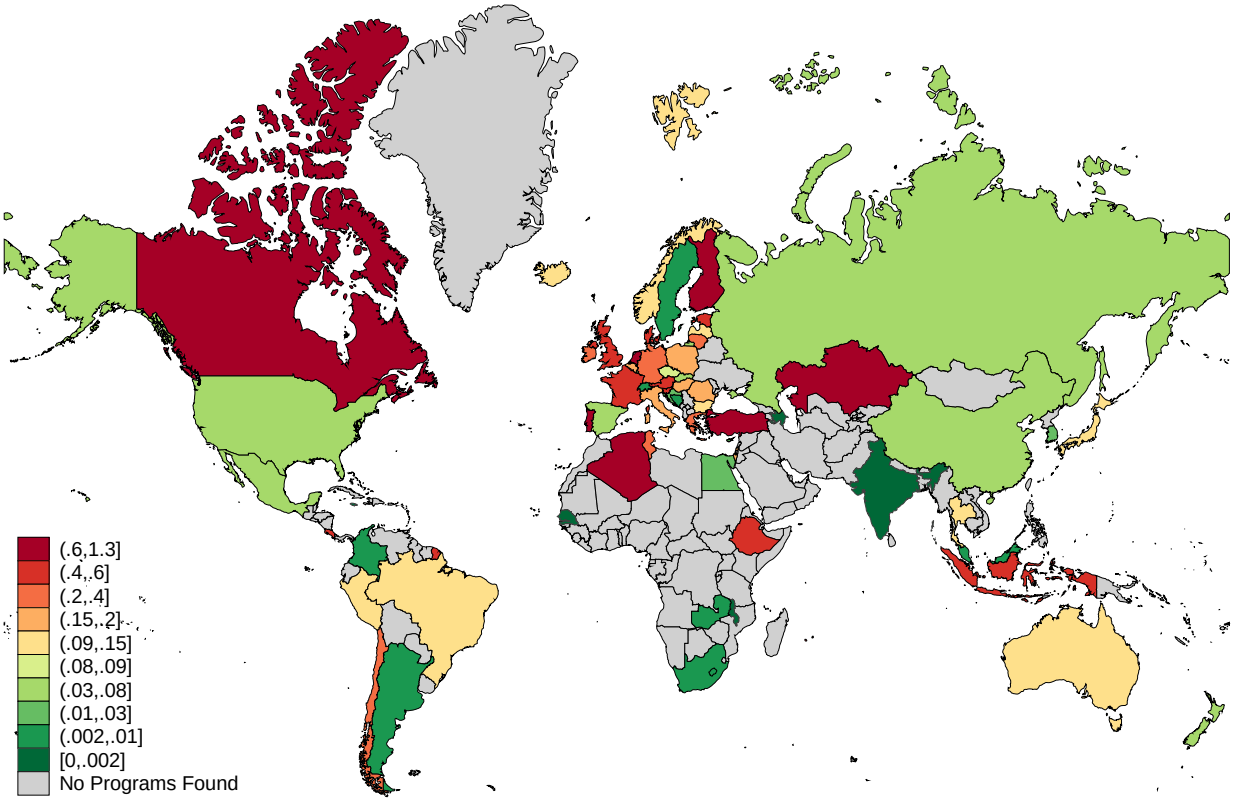


Figure 4. Average length (in years) of entrepreneurial finance policies active between 1995 and 2019 inclusive by nation.

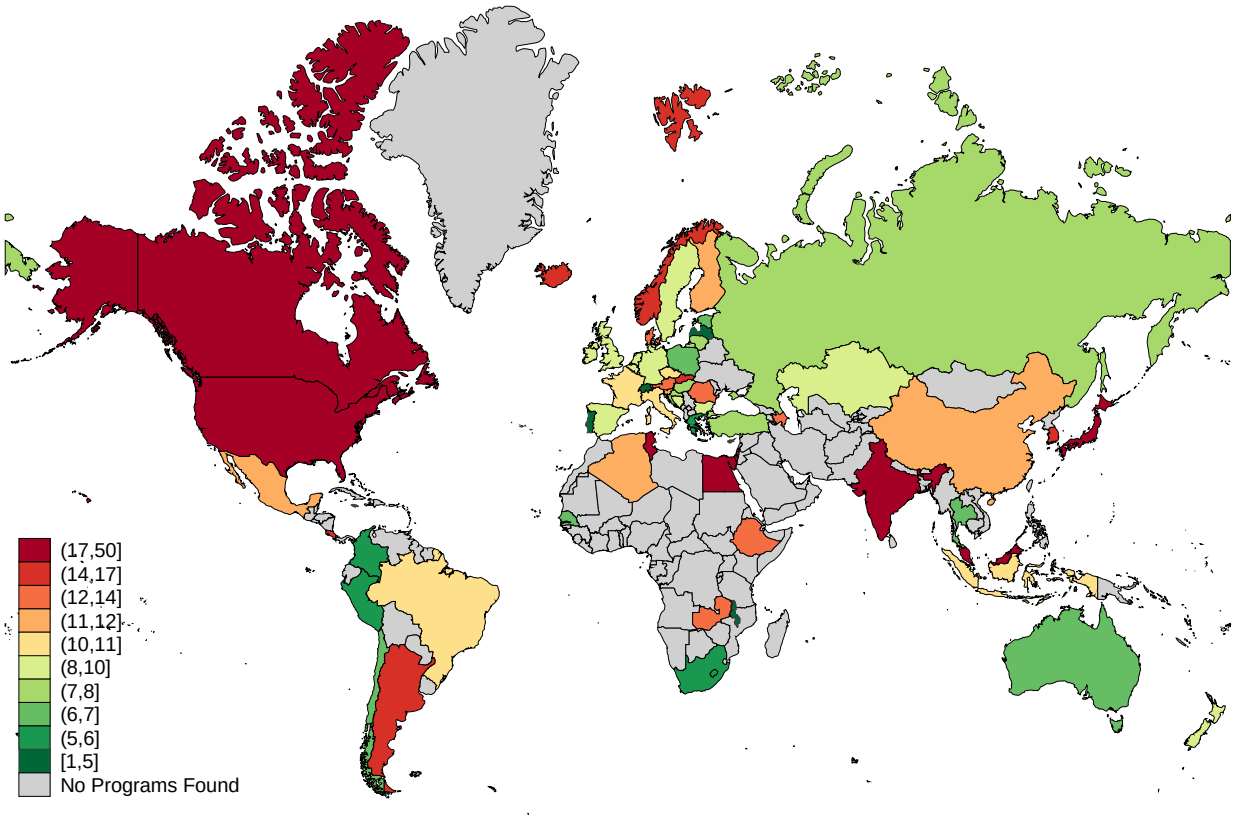


Figure 5. The figure indicates the aggregate spending on all active programs by year between 1995 to 2019.

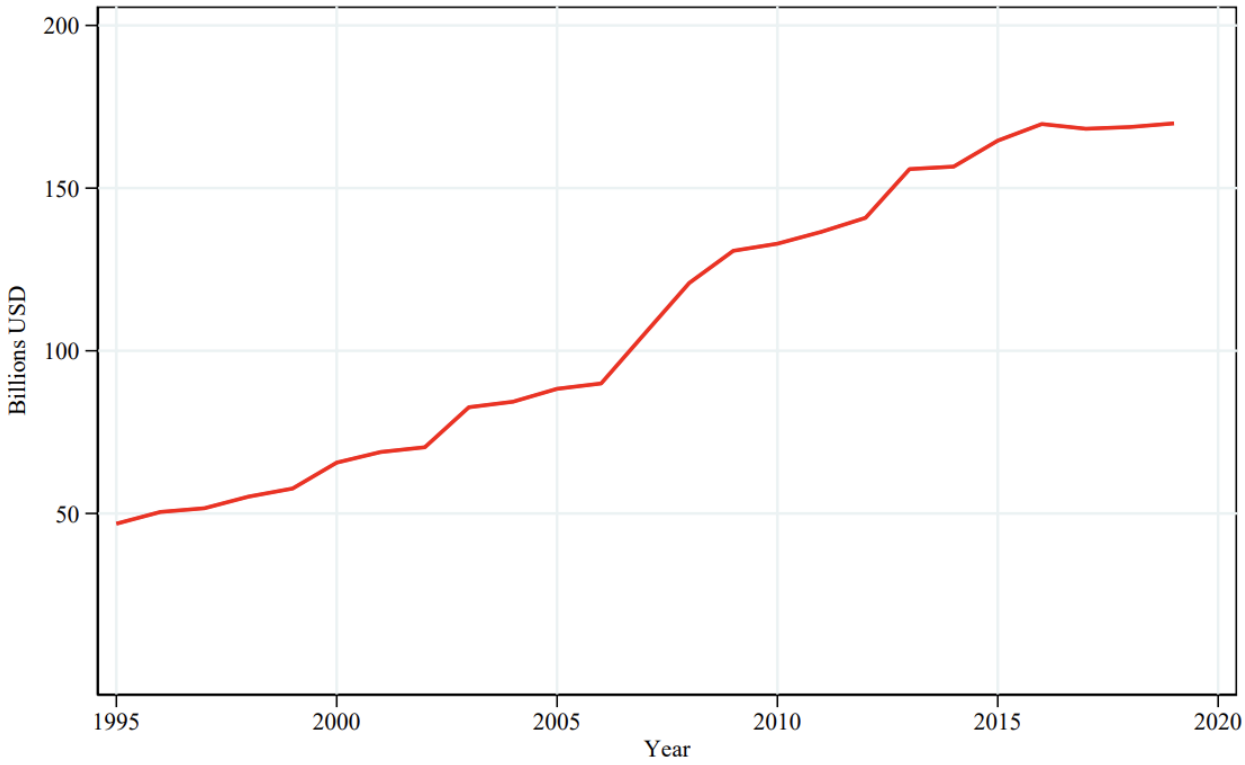


Figure 6. The bin-scatter plot depicts the average number of active policies in 2019. Initial ln (VC investment) is the natural logarithm of one plus a country's venture capital investment in 1994 (in millions of US dollars). Policy counts are weighted by the policy's annual budget.

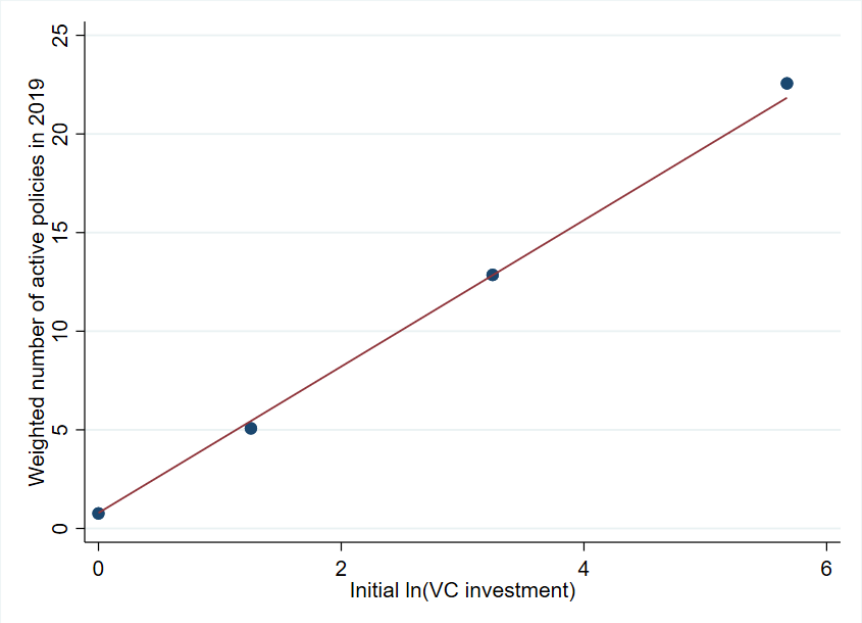


Figure 7. This figure is a binned scatter plot of the weighted count of active policies versus the natural logarithm of lagged VC activity split by government effectiveness, that is, above and below the median level of the government effectiveness measure. The binscatter controls for population and GDP per capita, and includes country and year fixed effects. Observations are at the country-year level from 1995 to 2019. The figure corresponds to Table 6.

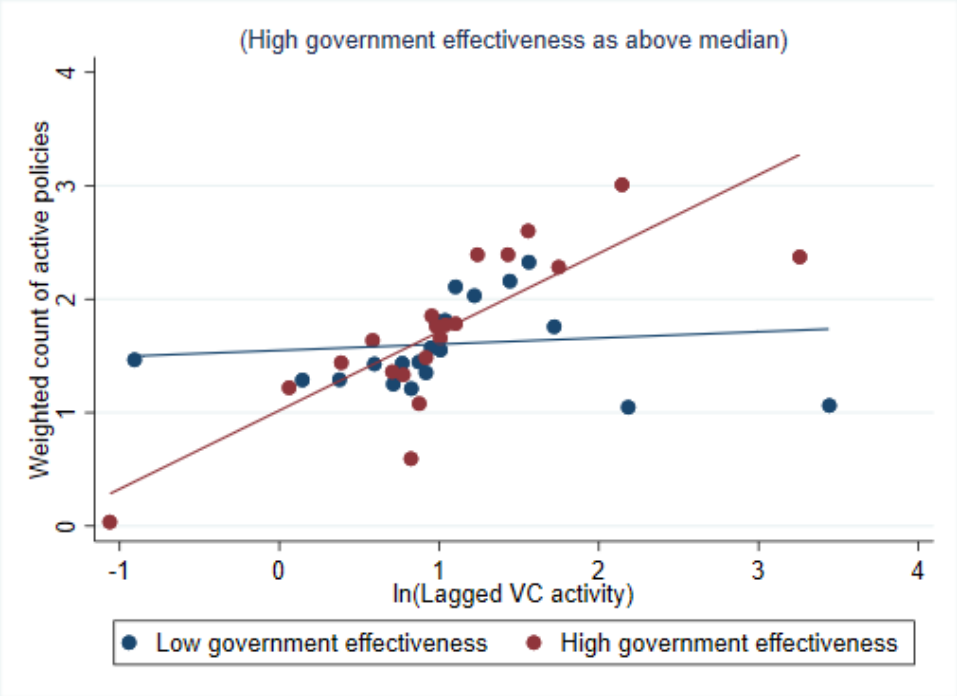
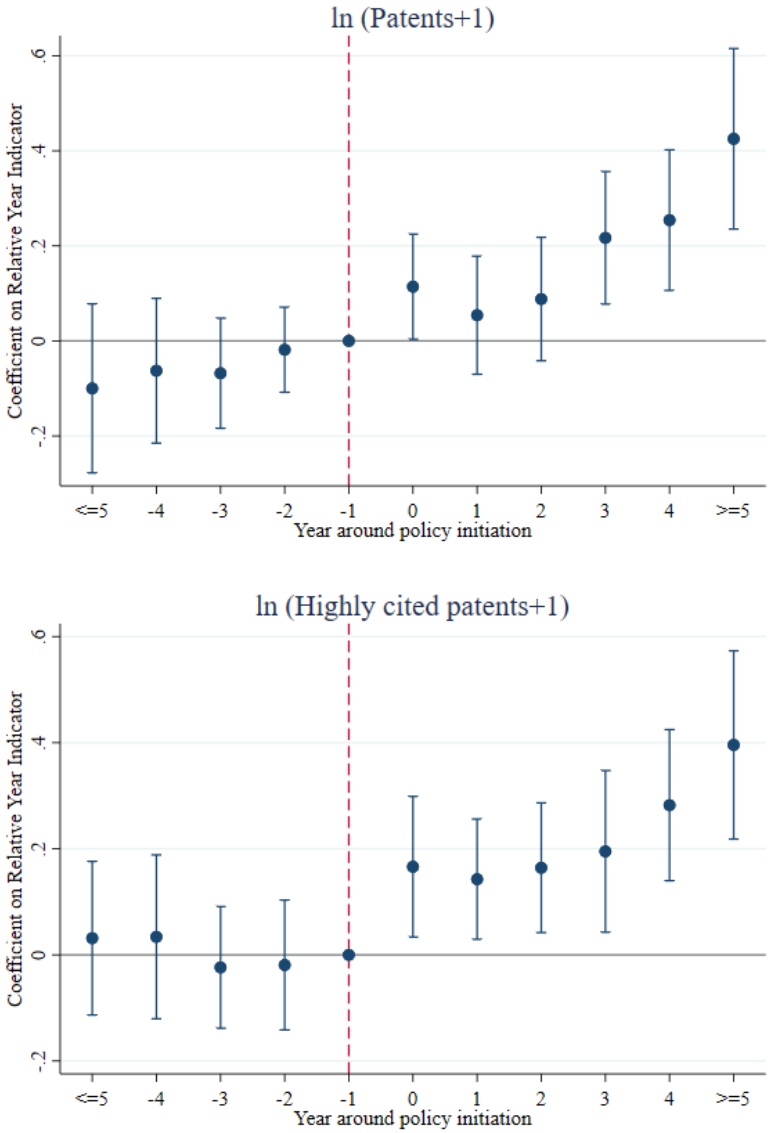
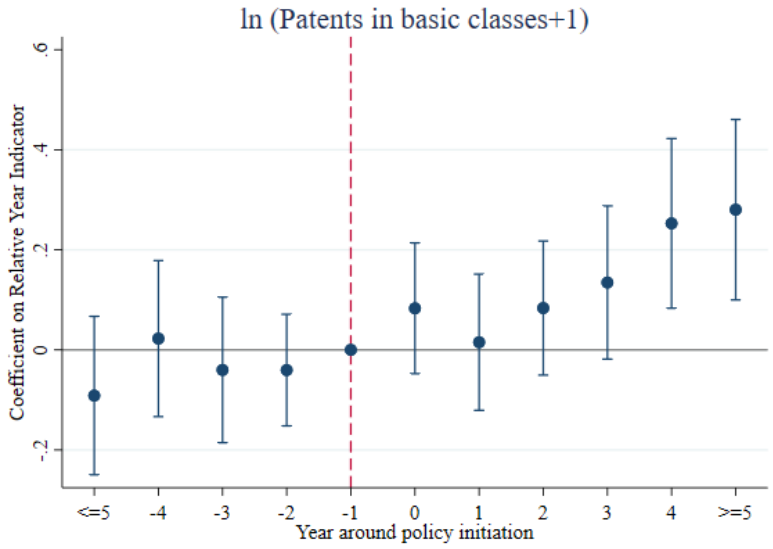


Figure 8. New venture policy introduction and innovation outcomes. The figure shows the coefficients on the relative year indicators from the following specification:

$$Y_{it} = \alpha_i + \alpha_t + \delta \cdot 1\{t \leq Year_{init} - 5\} + \sum_{j=-4}^{j=4} \beta_j 1\{t = Year_{init} + j\} + \theta \cdot 1\{t \geq Year_{init} + 5\} + \gamma X_{it} + \epsilon_{it}$$

which includes country and year fixed effects as well as country-year specific controls, specifically ln(Population), ln(Per capita GDP), and ln(Lagged venture capital activity). The construction of the patent outcome variables is described in the Section 2.3 of the text. All patent variables are log transformed. $Year_{init}$ is the year of the first introduction of an entrepreneurial finance program observed in the sample period of 1990-2019 by country *i*. The vertical line is positioned at the year prior to program initiation. Standard errors are clustered at the country level. 95% confidence intervals are shown.




ln (Patents in basic classes+1)
Coefficient on Relative Year Indicator
-.2
0
.2
.4
.6
<=5
-4
-3
-2
-1
0
1
2
3
4
>=5
Year around policy initiation

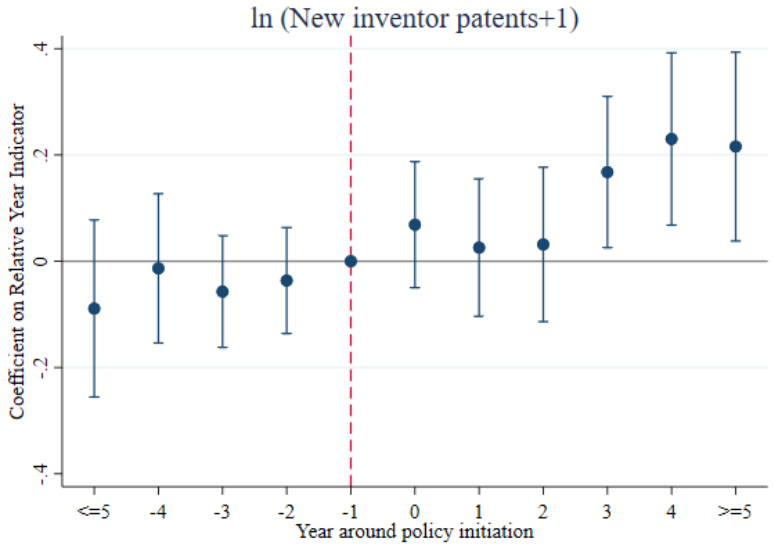

ln (New inventor patents+1)
Coefficient on Relative Year Indicator
-.4
-.2
0
.2
.4
<=5
-4
-3
-2
-1
0
1
2
3
4
>=5
Year around policy initiation

Table 1. Distribution of the budget and number of government entrepreneurial finance policies active between 1995 and 2019. Observations are at the country-year level. The table presents the sum of distinct policies active in this period, the count of years in which individual programs were active, and the annual national budgets, as well as measures of the distribution of these variables (total program as a share of GDP and policy age through time of termination or 2019). Distribution measures are computed only for the 66 nations with at least one active policy between 1995 and 2019.

	Sum	N	Mean	P10	Median	P90
Total Policy Count	755	66	11.4	1	9	23
Total Policy-Years	7,368	66	111.6	17	83.5	234
Average of Annual Budget (USD Billions)	122.10	66	1.85	0.002	0.34	8.54
Average of Annual Budget/GDP (%)		66	0.227	0.001	0.106	0.662
Average length of policies (years)		66	11.2	5	10.08	18

Table 2. Characteristics of programs initiated, 1995-2019.

	Program counts	*Share of* Budget-weighted programs
Panel A: Program type		
Debt		
Credit Guarantee	5.12%	11.59%
Loan	10.23%	22.90%
Mezzanine	1.75%	7.98%
Equity		
Business Angel	5.41%	1.89%
Equity	18.27%	6.87%
Grant		
Grant	43.86%	16.02%
Innovation voucher	5.85%	0.39%
Tax Credits	9.50%	32.37%
Panel B: Private sector involvement		
Role on Investment Committee	34.69%	21.22%
Funding Intermediaries	7.02%	12.58%
Matching Fund Requirement	43.63%	26.91%
Panel C: Industry Targeting		
Included industries		
Healthcare	10.67%	8.00%
Technologies	15.94%	11.89%
Industrials	8.19%	5.28%
Sustainability	9.21%	7.31%
Sin	0.15%	0.01%
Agriculture	5.99%	11.04%
Extractive	1.90%	0.33%
Financial	0.58%	0.31%
Excluded industries		
Healthcare	10.38%	7.37%
Technologies	7.02%	3.87%
Industrials	12.72%	7.40%
Sustainability	11.99%	8.04%
Sin	17.69%	11.13%
Agriculture	19.15%	9.54%
Extractive	16.96%	11.03%
Financial	18.57%	11.77%

Panel D: Stage and Alternative Objectives		
Stage focus		
Early-Stage/Seed	81.87%	92.84%
Venture	47.60%	71.96%
Growth	20.76%	40.40%
Additional stated objectives		
Diversity	0.90%	0.06%
Meeting government needs	0.20%	0.08%
Other goals	1.51%	0.52%

Table 3. Public entrepreneurial finance programs active between 1995 and 2019 and country characteristics**.**

		No. of countries	Policy count	Policy count (weighted)	Average no. of policies per country	Avg. no. of policies/ country (wtd.)
GDP	(Above)	102	675	550.47	6.62	5.40
	(Below)	102	80	16.53	0.78***	0.16***
Population		103	588	546.01	5.71	5.30
		102	167	20.99	1.64***	0.21***
Annual patent applications		41	487	430.07	11.88	10.49
		164	268	136.93	1.63***	0.83***
Annual VC funding		28	375	421.99	13.39	15.07
		177	380	145.01	2.15***	0.82***
Annual IPO Proceeds		45	579	495.38	12.87	11.01
		160	176	71.62	1.10***	0.45***
Domestic credit to private sector / GDP		64	535	449.92	8.36	7.03
		64	79	72.34	1.23***	1.13***
Stock market capitalization to GDP		50	459	356.96	9.18	7.14
		155	296	210.04	1.91***	1.36***
Protecting minority investor index		88	559	425.86	6.35	4.84
		99	196	141.14	1.98***	1.43**
Income group		66	554	356.19	8.39	5.40
		128	201	210.81	1.57***	1.65***
Legal origin - Common law		66	270	139.85	4.09	2.12
Legal origin - Civil law		107	361	330.70	3.37	3.09

Notes: The table explores the differences in active program counts between 1995 and 2019 among countries above and below median levels of eight country-level characteristics: gross domestic product, population, annual patent applications, annual venture capital funding, annual IPO proceeds, domestic credit to private sector as a percentage of GDP, stock market capitalization to GDP, and protection of minority investors. We also divide nations by income group and legal origin. The medians of all variables are taken using 1994 data with the exception of the protecting minority investor index, for which we use the earliest year available, 2006. The Protecting minority investor index ranges from a score of 0 to 100, from lowest to highest economy on this measure. Patent applications are the total applications filed by nationals, as compiled by the World Intellectual Property Office. Income groups are low and lower-middle vs. upper-middle and high. No. of countries denotes the number of countries above or below the median or in each group. Weighted policy counts are weighted by the annual budget of the relevant policy. ***, **, and * (displayed in the second row of each measure) indicate the statistical significance of the difference in means between the above and below median samples at the 1%, 5%, and 10% levels, respectively.

Table 4. Panel analysis of active weighted venture policies. Observations are annual ones of each country in the sample between 1995 and 2019. The dependent variable is the budget-weighted number of policies active in that year in a given nation. The independent variables include the natural logarithm of population, per capita GDP, and lagged venture capital investment, as well as country and year fixed effects. The standardized beta ln(VC investments in prior year) measures the percent change in the dependent variable relative to its mean with a one standard deviation increase in ln(VC investments in prior year).

	(1)	(2)	(3)	(4)
ln (VC investments in prior year)	0.628**	0.565**	0.511**	0.511**
	(0.245)	(0.228)	(0.232)	(0.232)
ln (Population)	0.516	-0.0168	-2.155*	-2.206*
	(0.394)	(0.450)	(1.150)	(1.137)
ln (Per capita GDP)		0.812**		-0.0802
		(0.337)		(0.279)
Constant	0.254	-0.566	3.331**	3.516**
	(0.585)	(0.830)	(1.385)	(1.460)
Adjusted R^2	0.781	0.784	0.789	0.789
Std. beta ln(VC investments in prior year)	77.71	69.85	63.22	63.16
Country FE	YES	YES	YES	YES
Year FE			YES	YES
Observations	5,125	5,112	5,125	5,112

Robust standard errors in parentheses; clustered at the country level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5. Cross-sectional and panel analyses of industry-targeted new venture policies. Observations in column 1 consist of each country-industry in the sample; in columns 2 through 5, annual observations of each country-industry pair in the sample between 1995 and 2019. The dependent variable in column 1 is a dummy indicating whether policies introduced between 1995 and 2019 in a given nation targeted one of eight industries; in column 2 and 3, whether a policy targeting that industry was active in that nation and year; and in columns 4 and 5, the cumulative dollar value of policies active in a given country and year targeting a given industry. The independent variables in column 1 include the budget-weighted number of policies active targeting that industry in 1994, an indicator if the country-industry was in the top quartile of VC activity in 1994, and country and industry fixed effects; in column 2 through 5, the natural logarithm of venture capital investment in the country and industry in the year prior to the observation, population, and (in some regressions) per capita GDP, and country, industry, and year fixed effects. The standardized beta measures the percent change in the dependent variable relative to its mean with being a top VC industry-nation indicator in column 1 and a one standard deviation increase in ln (VC investments in prior year in industry-nation) in columns 2 through 5.

	(1) Cross-section	(2) Panel	(3) Panel	(4) Panel	(5) Panel
	Targeted industry	Active program in industry-nation	Active program in industry-nation	ln (Policy expenditures in industry-nation)	ln (Policy expenditures in industry-nation)
Initial top VC industry-nation indicator	0.182**				
	(0.083)				
Initial weighted programs in industry-nation	-0.024				
	(0.032)				
ln (VC investments in prior year in industry-nation)		0.045***	0.045***	0.173***	0.173***
		(0.010)	(0.010)	(0.045)	(0.045)
ln (Population)		-0.087**	-0.092**	-0.316**	-0.343**
		(0.043)	(0.041)	(0.155)	(0.150)
ln (Per capita GDP)			-0.007		-0.038*
			(0.005)		(0.021)
Constant	0.096***	0.148***	0.165***	0.581***	0.673***
	(0.016)	(0.056)	(0.054)	(0.211)	(0.208)
Adjusted R^2	0.407	0.299	0.299	0.284	0.285
Std. beta	221.30	117.51	117.45	106.65	106.59
Country FE	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES
Year FE		YES	YES	YES	YES
Observations	1,640	41,000	40,896	41,000	40,896

Standard errors in parentheses; panel regressions clustered at country level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6. Panel analysis of active weighted venture policies, with quality of public governance measures. Observations are annual ones of each country in the sample between 1995 and 2019. The dependent variable is the budget-weighted number of policies active in that year in a given nation. The independent variables include the natural logarithm of population, per capita GDP, and lagged venture capital investment, scores of the effectiveness of government (alone and interacted with the venture capital measure), and country and year fixed effects.

	(1)	(2)	(3)	(4)
ln (VC investments in prior year)	0.345	0.323	0.299	0.269
	(0.213)	(0.223)	(0.193)	(0.204)
Effectiveness of government score	0.122	0.334		
	(0.573)	(0.563)		
ln (Lagged VC activity)* Govt. effectiveness	0.301**	0.275**		
	(0.147)	(0.138)		
Rule of law score			0.431	0.666
			(0.422)	(0.449)
ln (Lagged VC activity) * Rule of law			0.320*	0.277*
			(0.180)	(0.166)
ln (Population)	-0.093	-2.152*	0.185	-1.760*
	(0.571)	(1.121)	(0.461)	(1.025)
ln (Per capita GDP)	1.029***	-0.114	0.976**	-0.084
	(0.390)	(0.412)	(0.411)	(0.367)
Constant	-0.906	3.823**	-1.150	4.050**
	(1.042)	(1.716)	(1.093)	(1.611)
Adjusted R^2	0.786	0.791	0.821	0.824
Country FE	YES	YES	YES	YES
Year FE		YES		YES
Observations	4,924	4,924	4,196	4,196

Robust standard errors in parentheses; clustered at the country level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7. Panel analysis of active weighted venture policies, with a focus on the impact of nearby nations. Observations are annual ones of each country in the sample between 1995 and 2019. The dependent variable is the budget-weighted number of policies active in that year in a given nation. The independent variables include the sum of the budget-weighted number of policies active in the immediately prior year in neighboring nations, the natural logarithm of population and per capita GDP, the logarithm of venture capital investment in the immediately prior year, and country and year fixed effects.

	(1)	(2)	(3)	(4)
Weighted policies active in bordering countries (prior year)	0.075**	-0.012	0.056*	-0.020
	(0.030)	(0.027)	(0.029)	(0.028)
Weighted policies active in bordering countries (prior year) # ln (VC investments in prior year)		0.021**		0.021**
		(0.010)		(0.010)
ln (VC investments in prior year)	0.475**	0.157	0.442*	0.159
	(0.231)	(0.160)	(0.235)	(0.176)
ln (Population)	0.274	-1.328	-2.559**	-2.357**
	(0.916)	(1.264)	(1.028)	(1.064)
ln (Per capita GDP)		1.049*		0.488
		(0.565)		(0.592)
Constant	0.035	-0.007	5.274***	3.677**
	(1.726)	(1.537)	(1.750)	(1.541)
Adjusted R^2	0.776	0.787	0.779	0.788
Country FE	YES	YES	YES	YES
Year FE			YES	YES
Observations	4,325	4,325	4,325	4,325

Robust standard errors in parentheses; clustered at the country level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8. The determinants of private sector participation in public entrepreneurial finance programs. The observations are public entrepreneurial finance programs introduced between 1995 and 2019 with the requisite data. The dependent variable is a composite, measuring whether the program had a matching fund requirement, the involvement of the private sector in the investment decision-making process, and if it financed financial intermediaries. In Panel A, the independent variables include the natural logarithm of population, per capita GDP, and venture capital investment in the year immediately prior to the program introduction, and measures of the effectiveness of government and rule of law in the year of the policy introduction. The first two specifications employ an ordered logit specification; the remainder, an ordinary least squares one. Panel B adds a measure of whether the program was early-stage and an interaction of this dummy with the effectiveness of government or rule of law score.

Panel A: Basic analysis.

	(1) Ordered logit	(2) Ordered logit	(3) OLS	(4) OLS
ln (VC investments in prior year)	-0.010	-0.020	-0.006	-0.010
	(0.036)	(0.035)	(0.014)	(0.013)
Effectiveness of government score	0.681***		0.245***	
	(0.189)		(0.065)	
Rule of law score		0.718***		0.265***
		(0.160)		(0.053)
ln (Population in prior year)	-0.010	0.053	0.007	0.030
	(0.089)	(0.085)	(0.034)	(0.032)
ln (GDP in prior year)			0.017	0.005
			(0.049)	(0.051)
Constant			0.401**	0.392*
			(0.195)	(0.203)
Adjusted R^2			0.063	0.085
Observations	583	539	583	539

Robust standard errors in parentheses; clustered at the country level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Panel B: With early-stage measure and interaction.

	(1) Ordered logit	(2) Ordered logit	(3) OLS	(4) OLS
ln (VC investments in prior year)	-0.001	-0.011	-0.003	-0.007
	(0.033)	(0.033)	(0.014)	(0.013)
Early-stage focus	0.661***	0.946***	0.209***	0.285***
	(0.249)	(0.221)	(0.073)	(0.065)
Effectiveness of government score	0.437**		0.148**	
	(0.207)		(0.069)	
Effectiveness of government * Early-stage focus	0.231		0.099*	
	(0.176)		(0.055)	
Rule of law score		0.555***		0.188***
		(0.176)		(0.054)
Rule of law * Early-stage focus		0.071		0.060
		(0.148)		(0.046)
ln (Population in prior year)	-0.020	0.033	0.006	0.023
	(0.086)	(0.083)	(0.032)	(0.031)
ln (GDP in prior year)			0.020	-0.001
			(0.051)	(0.050)
Constant			0.319	0.314
			(0.200)	(0.205)
Adjusted R^2			0.116	0.147
Observations	583	539	583	539

Robust standard errors in parentheses; clustered at the country level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9. New venture policies and innovation outcomes. This table reports the coefficients from the following specification:

$$Y_{it} = \alpha_i + \alpha_t + \beta POST_{it} + \gamma X_{it} + \epsilon_{it}$$

where $POST_{it}$ is a dummy variable equal to one the year of nation *i's* first program initiation, and every year thereafter. The specification includes country and year fixed effects as well as country-year specific controls X_{it}, specifically ln(Population), ln(Per capita GDP), and ln(Lagged venture capital activity). The construction of the patent outcome variables is described in the Data section of the text. All outcome variables are log transformed.

	(1)	(2)	(3)	(4)
VARIABLES	Patents	Highly cited	Basic class	New inventor
Post Policy	0.344***	0.276***	0.244***	0.212**
	(0.0946)	(0.0734)	(0.0749)	(0.0823)
ln (Population)	0.186	0.0869	0.166	0.292*
	(0.179)	(0.0722)	(0.104)	(0.165)
ln (Per capita GDP)	0.0902*	0.0404	0.0445	0.0835*
	(0.0509)	(0.0270)	(0.0282)	(0.0440)
ln (VC investments in prior year)	0.0609**	0.0528**	0.0550***	0.0208
	(0.0253)	(0.0229)	(0.0189)	(0.0230)
Constant	1.137***	0.454***	0.639***	0.689**
	(0.301)	(0.140)	(0.166)	(0.270)
Observations	5,928	5,928	5,928	5,928
R-squared	0.958	0.941	0.948	0.948
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Robust standard errors in parentheses; clustered at the country level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10. Heterogeneity analysis: matching or early-stage versus other programs. The table employs the following specification:

$$Y_{it} = \alpha_i + \alpha_t + \delta \cdot 1\{t \leq Year_{init} - 5\} + \sum_{j=-4}^{j=4} \beta_j 1\{t = Year_{init} + j\} + \theta \cdot 1\{t \geq Year_{init} + 5\} + \gamma X_{it} + \epsilon_{it}$$

separately (a) for nations whose initiations had either a matching requirement or targeted early-stage companies and (b) for nations whose initiations had neither of these characteristics. The specification includes country and year fixed effects, as well as country-year specific controls, specifically ln(Population), ln(Per capita GDP), and ln(Lagged venture capital activity). The construction of the patent outcome variables is described in the text. All outcome variables are log transformed. $Year_{init}$ is the year of the first introduction of an entrepreneurial finance program observed in the sample period of 1990-2019 by country *i*. The final three lines present joint tests within regressions and across pairs of regressions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Match/Early	Other	Match/Early	Other	Match/Early	Other	Match/Early	Other
VARIABLES	Patents	Patents	Highly cited	Highly cited	Basic	Basic	New inventor	New inventor
Year = 0	0.220***	0.0235	0.220*	0.110*	0.195**	-0.0284	0.131	0.0135
	(0.0693)	(0.0848)	(0.120)	(0.0656)	(0.0843)	(0.0980)	(0.0847)	(0.0856)
Year = +1	0.223***	-0.0769	0.189**	0.0988	0.166	-0.118	0.160*	-0.0811
	(0.0658)	(0.0958)	(0.0925)	(0.0691)	(0.101)	(0.0919)	(0.0826)	(0.0949)
Year = +2	0.201***	0.00385	0.257**	0.0862	0.226**	-0.0387	0.203**	-0.100
	(0.0719)	(0.106)	(0.102)	(0.0727)	(0.0973)	(0.0919)	(0.0797)	(0.116)
Year = +3	0.309***	0.157	0.248**	0.155	0.299***	0.000401	0.249**	0.114
	(0.0848)	(0.108)	(0.120)	(0.0971)	(0.0985)	(0.115)	(0.0981)	(0.105)
Year = +4	0.349***	0.193	0.361***	0.226***	0.447***	0.0978	0.376***	0.126
	(0.0960)	(0.117)	(0.119)	(0.0835)	(0.124)	(0.115)	(0.101)	(0.126)
Year >= +5	0.456***	0.418***	0.468***	0.342***	0.392***	0.175	0.242*	0.192
	(0.134)	(0.143)	(0.152)	(0.107)	(0.130)	(0.130)	(0.131)	(0.131)
Observations	4,884	5,087	4,884	5,087	4,884	5,087	4,884	5,087
R-squared	0.953	0.943	0.941	0.927	0.943	0.930	0.941	0.929
Lag indicators	YES	YES	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
p-Value, Joint F-test (0-2)	0.0076	0.6277	0.0952	0.3724	0.0487	0.4743	0.0857	0.4414
p-Value, Joint F-test (3-5)	0.0021	0.0269	0.0082	0.0113	0.0057	0.1688	0.0020	0.4969
p-Value, Sum of interaction coeffs. (0-4)	0.0617		0.2723		0.0204		0.0745	

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses; clustered at the country level

Appendix 1: Comparing Public and Private Entrepreneurial Finance Activity

Compiling data on traditional venture investment globally is difficult, due to the limited reporting. Probably the best regarded set of estimates over the past decade have been compiled by Crunchbase, Crunchbase compiles the total amount of capital into venture-backed firms, and exclude "private equity rounds in non-venture-backed startups, undisclosed funding rounds, secondary market transactions, post-IPO transactions, debt financings, grants, non-equity assistance, initial coin offerings, and … investments in companies not part of the technology ecosystem" (https://news.crunchbase.com/methodology/). Their compilation does include investments into venture-backed firms by investors who are not venture capitalists, such as corporations and sovereign wealth funds.

It should be acknowledged that this methodology is likely to lead to some double-counting. The Crunchbase funding includes equity invested directly by governments into companies already backed by venture capitalists (including by international organizations not included in our analysis, such as the International Finance Corporation and European Investment Fund). Some of the capital of the venture groups will come from governments acting as limited partners as well.

The analysis focuses on the period from 1995 to 2019. The choice of the start date was associated data availability, as discussed in the body of the paper. It should also be noted that the level of public funding doubtless increased sharply in 2020, as many tens of billions of dollars allocated to support entrepreneurial firms and venture funds across major industrialized nations in the months after the onset of the COVID-19 crisis.[13]

[13] See, for example, https://www.cnbc.com/2020/04/02/coronavirus-europe-races-to-rescue-tech-startups.html; https://betakit.com/bdc-launches-matching-investment-program-for-canadian-vc-backed-companies/; https://www.scribd.com/document/455681169/Letter-to-the-Chancellor; and https://www.businessinsider.com/uk-future-fund-government-loans-startups-coronavirus-2020-4.

Appendix 2: Examples of Criteria for Selecting Projects

Policies in advanced economies focused on emerging markets

We drop policies focused specifically on emerging markets and not on the country in which they are initiated.

Examples:

- (Credit Guarantee) US Development Finance Corporation
    - Description: The US DFC assists in financing projects in emerging market economies. The program offers both direct equity into projects in the developing world as well as debt financing in the form of loans and loan guarantees to support investment projects in developing countries.
    - URL: https://www.dfc.gov/
    - Status: Dropped from sample

Policies supporting innovation centers

We keep policies supporting innovation centers so long as the innovation center itself offers financing activities aimed towards SMEs or entrepreneurial firms.

Examples:

- (Grant) Norway Centers for Research-Based Innovation
    - Description: The Centers for Research-Based Innovation focus on fostering collaboration between R&D-performing companies and research institutions. The Norwegian Research Council allocates an annual budget to the 24 active centers in the form of grants. The centers recruit doctoral students and encourage research output in the form of academic publications and commercial innovation. There do not appear to be any notable restrictions (other than that the business is involved in R&D) on companies that can participate. There is no emphasis on direct financing activities of the centers themselves to support SMEs or entrepreneurial firms.
    - URL: https://www.forskningsradet.no/en/about-the-research-council/programmes/sfi/
    - Status: Dropped from sample
- (Credit guarantee) Swiss Innovation Parks
    - Description: The Swiss Innovation Parks offer support initiatives ranging from building networks, providing working space, and fostering collaboration with research institutes. While the Parks assist businesses in applying for grants and funding instruments, they do not specialize in financing activities for SMEs, but rather in mentorship-style support. The Swiss government supports the Innovation Parks with loans and loan guarantees.
    - URL: https://www.parkinnovaare.ch/innovation-park
    - Status: Dropped from sample

Policies that participate in international or joint initiatives

We keep policies that participate in international or joint initiatives so long as the participation is only for funding purposes and the policy itself is a national government policy financing SMEs or entrepreneurial firms.

Examples:

- (Grant) Norway BIA Competition Arena
    - Description: The BIA program provides funding for research-based innovation projects across Norwegian industries. The program contributes to EUROSTARS, a joint initiative of EUREKA and the European Commission to strengthen research performance in SMEs. As a result, the BIA benefits from EUROSTARS and project financing is shared by the Norwegian Research Council and the EU. However, the policy provides support for Norwegian businesses only.
    - URL: https://www.forskningsradet.no/om-forskningsradet/programmer/bia/
    - Status: Kept in sample

Policies for special economic zones

We keep policies that are special economic zones so long as the zone emphasizes financing activities aimed towards SMEs or entrepreneurial firms that fit the relevant policy type. There are few zones that meet these criteria, however.

Examples:

- (Grant) Thailand Eastern Economic Corridor of Innovation
    - Description: The Thai government aims to turn eastern provinces into a leading economic zone. Planned investment projects in the EEC include developing transportation infrastructure, promoting tourism, and developing business hubs. The Corridor of Innovation would involve establishing science parks to foster R&D. Overall, the emphasis of the policy is not on financing policies for SMEs but on creating a hub for innovation.
    - URL with information: https://www.aseanbriefing.com/news/thailand-eastern-economic-corridor/
    - Status: Dropped from sample
- (R&D tax credit) Russia Special Economic Zones for Technological Innovation
    - Description: Russian companies in any of the 26 Special Economic Zones can enjoy reduced profit and property tax rates. While a subset of the Zones are aimed at encouraging innovation activity and businesses in these Zones are allowed tax benefits, the reductions are for all profits and not specifically for R&D activities.
    - URL with information: https://www2.deloitte.com/content/dam/Deloitte/ru/Documents/tax/Tax_incentives_in_Russia.pdf
    - Status: Dropped from sample

Policies with subprograms

Some policies have many subprograms that are labelled separately by the government. These can become quite complex, though they generally fall into one of three categories. We address policies in each category as follows:

- Umbrella policies that encompass a number of clearly distinct programs with different types of financing. In this case, we split the policy up into its defined subprograms.
    - Example: The Danish Growth Fund (https://vf.dk/)
        - The Danish Growth Fund offers financing in the form of equity, loans, and matching for business angel investments, where these are clearly presented as separate programs, each with detailed criteria and structure:
        - Loans for Entrepreneurs (https://vf.dk/en/financing/loans-for-entrepreneurs/), Business Angel Matching Fund (https://vf.dk/en/products-for-partners/eaf-denmark-business-angel-matching-fund/), VF Venture (https://vfventure.com/da/)
        - Thus, we code each program separately in each sheet
- Policies with subprograms that have the same structures but with minor differences (e.g. each subprogram is separated by industry): we classify these together and aggregate any budget information for the individual subprograms. Moreover, we only include programs with an explicit provision geared towards SMEs, entrepreneurs, VCs, or angels. If the program only funds innovation by firms or universities in general, we do not include it.
    - Example: (Grant) Innovate UK Funding Competitions (https://apply-for-innovation-funding.service.gov.uk/competition/search)
        - Description: The Biotechnology and Biological Sciences Research Council (BBSRC) and Innovate UK jointly fund a number of competitions to support collaboration between academia and businesses with the aim of developing innovative technologies and processes. The rules of the individual competitions vary, with some being geared to SMEs, some to all businesses, and others to any institution (including non-profit and academic)
        - We code any programs that fit our criteria together (which in this case, turns out to be only the Biomedical Catalyst Competition) and exclude the other competitions
- Policies where there is a clear primary financing type (e.g., equity programs with a small loan piece attached or loan programs that mention a guarantee). In these cases, we classify and code the policy where the primary financing is
    - Example: (Loan) US Small Business Investment Company (https://www.sba.gov/partners/sbics)
        - SBICs use their own capital, together with funds borrowed with an SBA guarantee, to make investments in small businesses. Since the guarantee is not a distinct credit guarantee scheme or guarantee fund, however, we include this policy in loans but do not additionally code it as a credit guarantee

Appendix 3: Definitions of the Entrepreneurial Finance Policy Variables

	Variable	Description	Value
1	Policy ID	Unique ID assigned to each program.	ID
2	Policy Country	Country implementing the program.	Country
3	Agency Name	Name of the government agency implementing the program.	Name
4	Policy Name	Name of the policy.	Name
5	Policy Type	Form of financing to the program's targeted companies.	Credit Guarantee, Loan, Grant, Equity, Mezzanine, Angel Investment, R&D Tax Credit, Innovation Voucher
6	Website	Website of the policy (if available).	Website
7	Drop	We focus on national government policies that aim to finance SMEs or entrepreneurial firms. Policies with a regional, transnational, or municipal reach, as well as non-financing policies (such as policies that provide mentorship services only) are dropped. If a policy does not satisfy these criteria, we mark it as "drop" and provide the reason.	Drop; non-finance, regional, non-SME/Ent targeted, non-government
8	Start Year	The year the program was initiated. If the policy existed in multiple phases, we use the earliest year.	Year
9	End Year	The year the program ended. We code a "not ended" if the program has not ended, or a future year if the program states the expected year of completion.	Year; not ended

10	Screener	The level of private sector involvement in screening the application. Indicates whether the screening entity is fully public, fully private (i.e., government outsources to private board), or public-private (i.e., committee comprised of representatives from both private and public parties).	Public, private, public-private
11	Due Diligence	The level of private sector involvement in the appraisal of an application or investment.	Public, private, public-private
12	Investment Committee	The level of private sector involvement in the final investment or application decision.	Public, private, public-private
13	Disbursed Budget	Disbursed program budget.	Amount
14	Allocated or Appropriated Budget	Allocated or appropriated program budget if actual disbursement is not available.	Amount
15	Min Budget	If the available budget information is a range only, report the lower end of the range; otherwise NA.	Amount
16	Max Budget	If the available budget information is a range only, report the upper end of the range; otherwise NA.	Amount
17	Years Budget	The years associated with the allocated budget, disbursed budget, or min/max budget.	Year
18	Currency	The currency in which the program's monetary amounts are quoted from the available sources. All monetary amounts are ultimately converted to inflation-adjusted US dollars.	Currency
19	Budget USD	Annual budget flow of the program in US dollars. Average of the most recent three years of the program, if possible. For policies for which this information is not available, we use the average of the two most recent years or, failing that, the most	Amount in USD

		recent year. If available budget information is a cumulative amount over a longer period, we take the annual average.	
20	Max Budget per Project	The program's maximum possible disbursement of funds per company or project, if available.	Amount
21	Objective	The purpose of the program as stated by the government agency. Most objectives within a program type have similar goals, e.g. to facilitate access to financing for small businesses, or similarly to boost exports, competitiveness, or job growth. Programs that have less common objectives, such as those that service specific government needs, or those aimed at entrepreneur diversity, are additionally flagged (see below).	Text
22	Objective - Diversity	An indicator for whether the program's goal is to boost diversity. Coded as partial (0.5) if this is one of multiple goals or full (1) if diversity is the primary or sole goal.	0/0.5/1
23	Objective - Government Need	An indicator for whether the program's goal is to meet the government's direct need. A program's objective is not included under Government Need or Non-Traditional unless there is an explicit alternative goal; programs solely focused on an industry from which there may be positive social spillovers (e.g., cleantech) are not counted. Coded as partial (0.5) if one of multiple goals or full (1) if primary goal.	0/0.5/1
24	Objective - Non-Traditional	An indicator equal to 1 if the program goal is neither diversity nor a direct government need, but also not traditional. Coded as partial (0.5) if one of multiple goals or full (1) if primary goal.	0/0.5/1

25	Intermediary	An indicator for whether the program involves a non-governmental intermediary. This includes loan guarantees to banks, funds of funds, loans to PE groups, and subsidies to non-government owned VCs or incubators. Takes a value of 0 if the program involves government funds to companies as direct investments or co-investments, or if the government (or government-owned corporation) operates a VC fund or incubator that directly funds companies. Takes a value of 0.5 if the program has elements of both direct and intermediated investments.	0/0.5/1
26	Matched	An indicator equal to 1 if the program involves a co-investment with the private sector or contains an explicit matching requirement. Takes a value of 0 if the program involves a direct investment or loan to companies with no matching requirement. Requirements on minimum levels of net worth or employee numbers are not counted as matching requirements.	0/1
27	Size	A categorical variable indicating whether the program is aimed at SMEs only, require an SME as a partner in a collaboration, or allows for both SMEs and larger businesses. Also indicates if a policy is aimed at individual entrepreneurs. Exact thresholds to qualify as a small business may vary by country.	SME only, SME partner, individual, any
28	Targeted Sectors	Sectors that are explicitly targeted by the program, if applicable.	Healthcare, technology, industrials, extractive, agriculture, sustainability, sin, financial
29	Excluded Sectors	Sectors that are explicitly excluded from the program, if applicable.	Healthcare, technology, industrials, extractive,

			agriculture, sustainability, sin, financial
30	Foreign Partnership	Does participation in the program require partnership with foreign companies?	Y/N
31	Export/Import oriented	Does the target company have to be import/export-oriented to be eligible? If yes, also indicates whether it should be focused on import or export.	Y/N; Export/import
32	Academia Partnership	As part of eligibility, does the program require partnership with academic institutions?	Y/N
33	IP sales restrictions	Does the program have restrictions on the sale of any IP to be eligible for the program?	Y/N
34	Age	Maximum age of the entrepreneur for program eligibility, if applicable.	Age, NA
35	Gender	Gender of the entrepreneur for program eligibility, if applicable.	Male, female, NA
36	Income	Maximum income of the entrepreneur for program eligibility, if applicable.	Amount, NA
37	Targeted Stage	Targeted stage of the program's investment.	Seed, venture, growth
38	Sources	List of sources containing program information. For cases where the primary website and its sub-pages have all the information, only the main page is listed.	Link

Appendix 4: Definitions of Country-Level Variables

Variable	Units	Level	Description	Source
GDP	USD billions	Country-Year	The total of all economic activity in one country, regardless of who owns the productive assets.	Primarily Economist Intelligence Unit. Supplemented with data from the CIA Factbook, UN Data, and the government website of the respective country.
Region	Dummy	Country	United Nations' continent classification: Africa, Americas, Asia, Europe, Oceania	UN Stats Geographic Regions
Population	Millions	Country-Year	Total population of a country	Primarily Economist Intelligence Unit. Supplemented with data from the CIA Factbook, UN Data, and the government website of the respective country
Income group	Category	Country-Year	The income grouping measured using gross national income per capita in US dollars. The economics are divided into four income groups: low, lower-middle, upper-middle, and high. Income groups for a year are determined using the income from the fiscal year. For the year 1994, the income per capita cutoffs for the four categories were $725 or less; between $726 and $2,895; between $2,896 and $8,955; and $8,956 and above, respectively.	World Bank's World Bank Country and Lending Groups Historical Database for the year 1994
Patent applications	Count	Country-Year	The total number of patent applications filed annually by the country of residence of the applicant.	World Intellectual Property Organization's Intellectual Property Statistics Database
VC funding	USD Millions	Country-Year	Venture capital investment in a country by both domestic and foreign VC firms across all industries. Excludes Buyout, Fund of Funds, Generalist Private Equity, Mezzanine, Other Investor (Non-Private Equity), Other Private Equity, and Real Estate investments	National and regional associations & SDC Platinum's VentureXpert
VC funding by industry	USD Millions	Country-Year-Industry	Venture capital investment in a country by both domestic and foreign VC firms across eight industries based on 4-digit sic industry classification. The eight industry categories are: 1. Healthcare: Life sciences, Bio-, Medical, Pharma 2. Manufacturing: Aerospace, Defense, Machinery, Industrial, Transport, Aviation 3. Extractive: Mining, Energy 4. Agriculture: Agriculture, Forestry, Fishing, Agri-food, Aqua-culture, Agri-business 5. Technology: Electronics, Software, AI, IT, TMT, Blockchain, Digital tech 6. Financial, insurance, and real estate	SDC Platinum's VentureXpert

			industries 7. Sin: Gambling, Betting 8. Sustainability: Sustainable tech, Climate, Environment, Clean energy, Renewables, Clean-tech Note that we exclude Buyout, Fund of Funds, Generalist Private Equity, Mezzanine, Other Investor (Non-Private Equity), Other Private Equity, and Real Estate investments	
Government effectiveness and rule of law indices	Index	Country-Year	Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. The data are composite governance indicators based on over 30 underlying data sources. The six aggregate indicators are reported in two ways: (1) in their standard normal units, ranging from approximately -2.5 to 2.5 , with higher values corresponding to better outcomes.	World Bank's Worldwide Governance Indicators 2019
Ease of doing business and enforcing contracts	Index	Country-Year	The ease of doing business score helps assess the absolute level of regulatory performance over time. It captures the gap of each economy from the best regulatory performance observed on each of the indicators across all economies in the Doing Business sample since 2005. The enforcing contracts indicator measures the time and cost for resolving a commercial dispute through a local first-instance court, and the quality of judicial processes index, evaluating whether each economy has adopted a series of good practices that promote quality and efficiency in the court system. The scores scaled from 0 to 100, where 0 represents the lowest and 100 represents the best performance.	World Bank's Doing Business 2020
Number of IPOs	Count	Country	Initial public offerings with non-zero global proceeds across all markets. Excludes IPOs that were withdrawn, rejected, or postponed. Also excludes ADRs, unit offerings, offers with warrants, closed-end funds, and REITs, spin-offs, investment trusts, private placements, and financial firms.	SDC Platinum's Platinum Global New Issues Database, Bloomberg, and S&P Capital IQ

Total proceeds	USD Millions	Country	Global proceeds raised in IPOs across all markets, excluding those that were withdrawn, rejected, or postponed. Also excludes ADRs, unit offerings, offers with warrants, closed-end funds, and REITs, spin-offs, investment trusts, private placements, and financial firms. Also excludes offerings with zero or missing proceeds.	SDC Platinum's Platinum Global New Issues Database, Bloomberg, and S&P Capital IQ

Appendix 5: Details on Construction of the U.S. Patent Dataset

To implement the methodology, we identified all U.S. utility patents awarded between 1976 and 2019 that were both in Clarivate's Derwent Innovation and PatentsView databases. While there are other classes of patents, such as design and plant awards, utility patents represent about 90% of the awards and are typically the focus of economic analyses.

We explain first why we used both databases. It should be noted that approximately 25 thousand patents were in Derwent and not in PatentsView. These appear to overwhelmingly have been "withdrawn patents," and not included in many other patent compilations either, such as Google Patents.[14] (In addition, a small number of non-withdrawn patents may be missing from PatentsView because they were apparently omitted from the bulk files provided by the USPTO, as discussed at https://community.patentsview.org/forum/8/topic/127.)

We extracted from PatentsView the name and nationality of each inventor and the patent class. (In general, the PatentsView data regarding assignee location was considerably cleaner than that of Derwent, which had much missing or miscoded information.) We assigned patents to countries based on the location of the inventor denoted in the patent. In cases of where nations no longer existed, we used the successor countries, such as assigning patents from the German Democrat Republic to the Federal Republic of Germany. We used the WIPO mapping schemas at https://www.wipo.int/export/sites/www/pct/guide/en/gdvol1/annexes/annexk/ax_k.pdf to help identify these shifts. In 1944 of the 7.4 million patent-assignee pairs, the assignee nations were missing from PatentsView or assigned an abbreviation unassociated with the current or former codes used by WIPO. These cases where not included in the analysis.

Also using the USPTO's PatentsView database, we also identified the primary four-digit patent class associated with the patent using the Combined Patent Classification scheme, which the U.S. adopted in 2013 (henceforth referred to as CPC class). For patents awarded prior to 2013, we again used the CPC class, as determined by the USPTO concordance between the new and earlier (U.S. Patent Classification) scheme. We also used PatentsView to identify all citations to these patents, as of the end of September 2020.

We accessed from Derwent the patent number, application and award date, and assignee name. We wanted to identify new patentees, whether public or privately held, and thus compilations such as the NBER Patent Database and the UVA Darden Global Corporate Patent Dataset (both of which focus on publicly traded firms) were insufficient. We instead used Derwent's standardized version of the assignee names at issue. This standardized version of the name is applied by Derwent editors and seeks to ensure that names are applied consistently.

[14] These patent numbers are listed at https://www.uspto.gov/web/offices/ac/ido/oeip/taf/data/misc/data_cd.doc/custom_extract_dvd/BASIC_BIB_15/DOC/WITHDRAWN_63_15_PN.TXT. Allowed U.S. patent applications may be withdrawn prior to issue by either the applicant or the USPTO. Common reasons for withdrawal requests include the discovery of new prior art, an error in the application or an interference. The procedures are described in detail here: https://www.uspto.gov/web/offices/pac/mpep/s1308.html#sect1308.

Derwent data, like PatentsView, sometimes appends the inventors' names to the list of assignees, even when they are not assigned the patent (see the discussion of this issue in Lerner et al. 2021). So we focus on the identity of the first-listed assignee to minimize this issue. We define awards to "new" inventors in a given year as those issued to Derwent-cleansed first assignees that did not have an award (a) granted between 1976 and 2019 and (b) filed before the end of the fifth calendar year prior to the filing of the year of the observation.

We determine academic citations in patents using Marx and Fuego (2019).

References Not Cited in the Paper:

Josh Lerner, Amit Seru, Nicholas Short, and Yuan Sun, "Financial innovation in the 21st century: Evidence from U.S. patents," Unpublished working paper, Harvard University, 2021.

Matt Marx and Aaron Fuegi, "Reliance on science: Worldwide front-page patent citations to scientific articles." Research Paper No. 3331686, Boston University Questrom School of Business, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3331686, 2019.

Table A-1. Key summary statistics of sources that were used to identify policies.

Panel A: Year of publication of the academic papers or the reports.

Year of publication	Count of sources	Percent
1998	1	0.5%
1999	1	0.5%
2001	1	0.5%
2003	2	1.1%
2004	1	0.5%
2005	3	1.6%
2006	2	1.1%
2007	11	5.8%
2008	5	2.6%
2010	20	10.5%
2011	8	4.2%
2012	6	3.2%
2013	25	13.2%
2014	17	8.9%
2015	15	7.9%
2016	12	6.3%
2017	41	21.6%
2018	13	6.8%
2019	6	3.2%
Total	190	100.0%

Panel B: Year of publication of the academic paper or the report in five-year buckets.

Year of publication	Count of sources	Percent
1995-1999	2	1.1%
2000-2004	4	2.1%
2005-2009	21	11.1%
2010-2014	76	40.0%
2015-2019	87	45.8%
Total	190	100.0%

Panel C: Publisher of the report. If it is an academic paper.

Publisher of the Report	Count of sources	Percent
Organisation for Economic Cooperation and Development	139	73.2%
Academic papers	21	11.1%
European Union	5	2.6%
World Bank	3	1.6%
MTI	2	1.1%
United Nation	2	1.1%
African Development Bank Group and OECD	1	0.5%
CapGemini Consulting	1	0.5%
ERIA	1	0.5%
European Civil Society Platform	1	0.5%
European Investment Bank	1	0.5%
Finnish Ministry of Trade and Industry	1	0.5%
Foster Care Work Group	1	0.5%
Government of the United Kingdom	1	0.5%
Inter-American Development Bank	1	0.5%
International Monetary Fund	1	0.5%
Institut zur Zukunft der Arbeit	1	0.5%
Institute for Public Policy Research	1	0.5%
Manpower Group	1	0.5%
Migration Policy Institute	1	0.5%
Price Waterhouse Coopers	1	0.5%
Swedish Entrepreneurship Forum	1	0.5%
The Finance Project	1	0.5%
World Economic Forum	1	0.5%
Total	190	100.0%

Panel D: Type of source.

Type of source	Count of sources	Percent
Country-level reports	127	66.8%
Cross-national reports	42	22.1%
Academic	21	11.1%
Total	190	100.0%

Panel E: Country of focus for the reports. Note the count here is 140 (this includes 127 reports by country type and 13 academic papers with a country focus).

Country of focus (if any)	Count of sources	Percent
United States	11	7.9%
Italy	10	7.1%
Mexico	10	7.1%
Poland	9	6.4%
Canada	8	5.7%
Germany	8	5.7%
Russia	8	5.7%
Indonesia	7	5.0%
Hungary	6	4.3%
Israel	5	3.6%
Netherlands	5	3.6%
United Kingdom	5	3.6%
Portugal	4	2.9%
Thailand	4	2.9%
Bulgaria	3	2.1%
Denmark	3	2.1%
Ireland	3	2.1%
Kazakhstan	3	2.1%
Spain	3	2.1%
Sweden	3	2.1%
Belgium	2	1.4%
Chile	2	1.4%
China	2	1.4%
Finland	2	1.4%
Greece	2	1.4%
Slovenia	2	1.4%
Austria	1	0.7%
Czech Republic	1	0.7%
Estonia	1	0.7%
France	1	0.7%
Libya	1	0.7%
Malaysia	1	0.7%
Nigeria	1	0.7%
Slovak Republic	1	0.7%
Switzerland	1	0.7%
Tunisia	1	0.7%
Total	140	100.0%

Table A-2. Construction of the final sample of programs. This table describes the specifics of the construction of the final sample of programs that were active between 1995-2019. We identify public entrepreneurial finance programs from 190 sources published between 1998 and 2020, summarized in Table A-1. We keep programs implemented at the national level only, dropping policies with a solely local or regional focus within a country, as well as programs implemented by international bodies such as the European Union, unless the international body is involved for funding purposes only. Similarly, we drop policies focused specifically on other markets and not on the country in which they are initiated, such as programs initiated by wealthy nations to promote entrepreneurship in emerging economies. We exclude any policies that provide non-financing support only, such as training, mentoring, or similar activities, as well any programs without a focus on SMEs or entrepreneurial firms. Listed programs that are either duplicates of other programs or umbrella designations that encompass multiple programs already included in the sample are dropped as well. We exclude programs for which no details on program design or implementation can be found, as well as any programs started in 2020 or with designated future start years.

	Equity		Debt		Grant		Total	
	Dropped	Remaining	Dropped	Remaining	Dropped	Remaining	Dropped	Remaining
Starting Sample	--	351	--	315	--	660	--	1326
Regional	63	288	33	282	39	621	135	1191
International	36	252	8	274	24	597	68	1123
Non-Financing	2	250	15	259	28	569	45	1078
Non-SME/Ent targeted	12	238	25	234	67	502	104	974
Non-Government	24	214	10	224	0	502	34	940
Duplicate or Subprogram	13	201	48	176	45	457	106	834
Insufficient Information	10	191	15	161	5	452	30	804
Not Active during 1995-2019	17	174	8	153	22	430	47	757
No Country Data	0	174	2	151	0	430	2	755
Final Sample							--	**755**

Table A-3. Construction of venture capital activity by nation and year. This table describes the specifics of the construction of the sample of venture capital activity from Refinitiv VentureXpert used in the analysis, which is used in conjunction with the data from national and regional venture capital associations., Columns (1) and (2) characterize the number of deal-investor pairs, while Column (3) reports the number of associated deals.

	(1)	(2)	(3)
	Deal-Investor Pairs		Associated
	Dropped	Remaining	Deals
Starting Sample		741,650	342,832
Missing investment	99,117	642,533	
Zero investment	13	642,520	
Buyouts	85,824	556,696	
Fund of Funds	5,816	550,880	
Generalist Private Equity	46,375	504,505	
Mezzanine	3,516	500,989	
Other Investor (Non-Private Equity)	2,509	498,480	
Real Estate	2,206	496,274	
Final Sample (VC)		496,274	204,446

Table A-4: Cross-sectional analysis of weighted new venture policies. Observations consist of each country in the sample. The dependent variable is the budget-weighted number of policies introduced between 1995 and 2019 in a given nation. The independent variables include the natural logarithm of population and per capita GDP in 1994, the budget-weighted number of policies active in 1994, and an indicator if the country was in the top quartile of VC activity in 1994. The standardized beta of the initial top VC nation indicator measures the percent change in the dependent variable relative to its mean with being a top VC nation.

	(1)	(2)
Initial top VC nation indicator	9.190***	8.562***
	(2.914)	(2.957)
Initial ln (Population)	0.605***	0.687***
	(0.208)	(0.214)
Initial ln (Per capita GDP)		0.334
		(0.288)
Initial weighted programs	0.0655	0.0498
	(0.224)	(0.227)
Constant	0.0285	-0.448
	(0.203)	(0.413)
Adjusted R^2	0.285	0.284
Std. beta Initial top VC nation indicator	437.5	407.6
Observations	205	204

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A-5. Panel analysis of active weighted venture policies. Observations are annual ones of each country in the sample between 1995 and 2019. The dependent variable is the budget-weighted number of policies active in that year in a given nation. The independent variables include the natural logarithm of population, per capita GDP, and lagged venture capital investment, as well as country and year fixed effects. Policies are divided by whether they are equity, debt, or grant in orientation. The standardized beta ln(VC investments in prior year) measures the percent change in the dependent variable relative to its mean with a one standard deviation increase in ln(VC investments in prior year).

	(1) Equity	(2) Grant	(3) Debt	(4) Equity	(5) Grant	(6) Debt
ln (VC investments in prior year)	0.041	0.400*	0.188**	0.029	0.353*	0.129
	(0.027)	(0.210)	(0.093)	(0.025)	(0.206)	(0.086)
ln (Population)	0.035	0.076	0.405	-0.238	-1.021*	-0.948*
	(0.044)	(0.089)	(0.344)	(0.159)	(0.595)	(0.520)
ln (Per capita GDP)				-0.005	0.098	-0.173
				(0.042)	(0.256)	(0.113)
Constant	0.009	0.218	0.027	0.337	1.376	1.803***
	(0.060)	(0.201)	(0.494)	(0.209)	(0.835)	(0.658)
Adjusted R^2	0.605	0.751	0.762	0.611	0.756	0.766
Std. beta ln(VC investments in prior year)	88.58	117.20	49.87	62.59	103.37	34.32
Country FE	YES	YES	YES	YES	YES	YES
Year FE				YES	YES	YES
Observations	5125	5125	5125	5112	5112	5112

Robust standard errors in parentheses; clustered at the country level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A-6. Panel analysis of active weighted venture policies, with alternative quality of government measures. The panel is the equivalent of Table 6 but now using scores for the ability to enforce contracts and the ease of doing business rather than the effectiveness of governance and rule of law scores. See the table in the paper for a detailed description.

	(1)	(2)	(3)	(4)
ln (VC investments in prior year)	0.379	0.368	-2.549**	-2.278**
	(0.439)	(0.419)	(1.147)	(1.061)
Score-Enforcing contracts	-0.005	-0.006		
	(0.024)	(0.024)		
ln (Lagged VC activity) * Enforcing contracts	0.001	0.000		
	(0.008)	(0.008)		
Score-Ease of doing business			0.019	-0.003
			(0.029)	(0.030)
ln (Lagged VC activity) * Ease of doing business			0.043**	0.038**
			(0.019)	(0.017)
ln (Population)	-0.504	-4.163***	-0.445	-2.702***
	(0.492)	(1.497)	(0.353)	(0.983)
ln (Per capita GDP)	0.851**	-0.494	0.564**	-0.257
	(0.346)	(0.378)	(0.230)	(0.201)
Constant	0.818	8.577**	-0.513	5.068**
	(1.527)	(3.463)	(1.680)	(2.564)
Adjusted R^2	0.880	0.885	0.886	0.889
Country FE	YES	YES	YES	YES
Year FE		YES		YES
Observations	3940	3940	4340	4340

Robust standard errors in parentheses; clustered at the country level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A-7. Panel analysis of active weighted venture policies and neighboring country activity. The table is the equivalent of Table 7 of the paper, without the venture capital independent variable. See the tables in the paper for detailed descriptions.

	(1)	(2)	(3)	(4)
Weighted policies active in bordering countries (prior year)	0.085**	0.070**	0.062**	0.061**
	(0.033)	(0.032)	(0.030)	(0.031)
ln (Population)	0.788	-1.395	-2.507**	-2.677**
	(0.850)	(1.284)	(1.047)	(1.227)
ln (Per capita GDP)		0.947		0.226
		(0.581)		(0.587)
Constant	-0.599	0.456	5.299***	4.941**
	(1.685)	(1.542)	(1.809)	(1.908)
Adjusted R^2	0.771	0.774	0.775	0.775
Std. beta Weighted policies active in bordering countries (prior year)	81.11	67.34	59.27	58.20
Country FE	YES	YES	YES	YES
Year FE			YES	YES
Observations	4,325	4,325	4,325	4,325

Robust standard errors in parentheses; clustered at the country level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A-8. The determinants of private sector participation in public entrepreneurial finance programs, with alternative quality of government measures. The panel is the equivalent of Panel A of Table 8 but now using scores for the ability to enforce contracts and the ease of doing business rather than the effectiveness of governance and rule of law scores. See the table in the paper for a detailed description.

	(1) Ordered logit	(2) Ordered logit	(3) OLS	(4) OLS
ln (VC investments in prior year)	0.081**	0.042	0.023	0.010
	(0.038)	(0.041)	(0.018)	(0.017)
Enforcing contracts score	0.019**		0.007**	
	(0.008)		(0.003)	
Ease of doing business score		0.035***		0.013***
		(0.013)		(0.005)
ln (Population in prior year)	-0.095	-0.082	-0.019	-0.016
	(0.086)	(0.081)	(0.035)	(0.032)
ln (GDP in prior year)			0.051	0.040
			(0.055)	(0.063)
Constant			0.045	-0.338
			(0.306)	(0.363)
Adjusted R^2			0.026	0.029
Observations	533	536	533	536

Robust standard errors in parentheses; clustered at the country level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A-9. The determinants of private sector participation in public entrepreneurial finance programs. The observations are public entrepreneurial finance program introduced between 1995 and 2019 with the requisite data. The dependent variable in the three panels are measures of whether the program had a matching fund requirement, the involvement of the private sector in the investment decision-making process, and if it financed financial intermediaries. The independent variables include the natural logarithms of venture capital investment, population, and per capita GDP in the year immediately prior to the program introduction, and scores for the effectiveness of government and rule of law. The first two specifications in each panel employ a probit specification; the second two, an ordinary least squares one.

Panel A: Did the program have a matching fund requirement?

	(1) Ordered logit	(2) Ordered logit	(3) OLS	(4) OLS
ln (VC investments in prior year)	-0.002	-0.024	-0.010	-0.011
	(0.053)	(0.053)	(0.014)	(0.014)
Effectiveness of government score	0.715***		0.125***	
	(0.191)		(0.044)	
Rule of law score		0.713***		0.141***
		(0.177)		(0.038)
ln (Population in prior year)	-0.025	0.018	0.009	0.013
	(0.109)	(0.116)	(0.026)	(0.028)
ln (GDP in prior year)			0.111**	0.075*
			(0.043)	(0.045)
Constant			-0.044	0.071
			(0.145)	(0.161)
Adjusted R^2			0.064	0.067
Observations	683	636	683	636

Robust standard errors in parentheses; clustered at the country level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Panel B: Did the program finance financial intermediaries?

	(1) Probit	(2) Probit	(3) OLS	(4) OLS
ln (VC investments in prior year)	0.034	0.026	0.014*	0.009
	(0.042)	(0.045)	(0.007)	(0.007)
Effectiveness of government score	-0.346**		-0.021	
	(0.148)		(0.021)	
Rule of law score		-0.159		-0.003
		(0.144)		(0.017)
ln (Population in prior year)	-0.123*	-0.076	-0.030**	-0.017
	(0.073)	(0.081)	(0.011)	(0.011)
ln (GDP in prior year)			-0.089**	-0.062*
			(0.034)	(0.032)
Constant	-0.934***	-1.298***	0.416***	0.285**
	(0.225)	(0.254)	(0.122)	(0.117)
Adjusted R^2			0.028	0.006
Observations	684	637	684	637

Robust standard errors in parentheses; clustered at the country level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Panel C: Did the program involve the private sector in the investment decision-making process?

	(1) Probit	(2) Probit	(3) OLS	(4) OLS
ln (VC investments in prior year)	-0.110***	-0.094***	-0.020**	-0.018**
	(0.035)	(0.035)	(0.008)	(0.009)
Effectiveness of government score	0.646***		0.162***	
	(0.178)		(0.045)	
Rule of law score		0.541***		0.144***
		(0.167)		(0.041)
ln (Population in prior year)	0.128**	0.130*	0.033*	0.037*
	(0.062)	(0.067)	(0.019)	(0.021)
ln (GDP in prior year)			-0.007	-0.007
			(0.033)	(0.031)
Constant	-1.026***	-0.948***	0.050	0.063
	(0.222)	(0.214)	(0.127)	(0.124)
Adjusted R^2			0.060	0.066
Observations	584	540	584	540

Robust standard errors in parentheses; clustered at the country level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A-10. New venture policy introduction and innovation outcomes. This table reports the coefficients from the following specification:

$$Y_{it} = \alpha_i + \alpha_t + \delta \cdot 1\{t \leq Year_{init} - 5\} + \sum_{j=-4}^{j=4} \beta_j 1\{t = Year_{init} + j\} + \theta \cdot 1\{t \geq Year_{init} + 5\} + \gamma X_{it} + \epsilon_{it}$$

The specification includes country and year fixed effects, as well as country-year specific controls X_{it}, specifically ln(Population), ln(Per capita GDP), and ln(Lagged venture capital activity). $Year_{init}$ is the year of the first introduction of an entrepreneurial finance program observed in the sample period of 1990-2019 by country *i*. This analysis corresponds to Method 1 described in Section 6 of the text. The year prior to initiation is the omitted baseline, normalized to 0. The construction of the patent outcome variables is described in the Data section of the text. All outcome variables are log transformed.

	(1)	(2)	(3)	(4)
VARIABLES	All patents	Highly cited	Basic class	New inventor
<=5	-0.1000	0.0314	-0.0913	-0.0890
	(0.0902)	(0.0734)	(0.0803)	(0.0845)
-4	-0.0627	0.0340	0.0226	-0.0134
	(0.0772)	(0.0783)	(0.0791)	(0.0712)
-3	-0.0680	-0.0236	-0.0401	-0.0572
	(0.0587)	(0.0581)	(0.0738)	(0.0533)
-2	-0.0185	-0.0191	-0.0404	-0.0364
	(0.0454)	(0.0621)	(0.0566)	(0.0506)
0	0.114**	0.166**	0.0831	0.0687
	(0.0561)	(0.0672)	(0.0663)	(0.0601)
1	0.0541	0.143**	0.0153	0.0257
	(0.0630)	(0.0575)	(0.0690)	(0.0656)
2	0.0881	0.164***	0.0836	0.0316
	(0.0659)	(0.0620)	(0.0680)	(0.0737)
3	0.217***	0.195**	0.135*	0.168**
	(0.0707)	(0.0773)	(0.0776)	(0.0722)
4	0.254***	0.282***	0.253***	0.230***
	(0.0750)	(0.0723)	(0.0860)	(0.0822)
>=5	0.425***	0.396***	0.280***	0.216**
	(0.0963)	(0.0900)	(0.0915)	(0.0901)
ln (Population)	0.243	0.126	0.202*	0.317*
	(0.185)	(0.0773)	(0.111)	(0.170)
ln (Per capita GDP)	0.0905*	0.0406	0.0444	0.0832*
	(0.0507)	(0.0271)	(0.0282)	(0.0439)
ln (VC investments in prior year)	0.0463*	0.0429*	0.0460**	0.0144
	(0.0247)	(0.0223)	(0.0184)	(0.0222)
Observations	5,928	5,928	5,928	5,928
R-squared	0.959	0.942	0.949	0.948
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Robust standard errors in parentheses; clustered at the country level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A-11. New venture policy introduction and innovation outcomes. This table reports the coefficients from the following specification:

$$Y_{it} = \alpha_i + \alpha_t + \delta \cdot 1\{t \leq Year_{init} - 5\} + \sum_{j=-4}^{j=4} \beta_j 1\{t = Year_{init} + j\} + \theta \cdot 1\{t \geq Year_{init} + 5\} + \gamma X_{it} + \epsilon_{it}$$

The specification includes country and year fixed effects as well as country-year specific controls X_{it}, specifically ln(Population), ln(Per capita GDP), and ln(Lagged venture capital activity). $Year_{init}$ is the initiation year of an entrepreneurial finance program, including all first initiations as well as initiations without an introduction in the five years prior, observed in the sample period of 1990-2019 by country i. This analysis corresponds to Method 2 described in Section 6 of the text. The year prior to initiation is the omitted baseline, normalized to 0. The construction of the patent outcome variables is described in the Data section of the text. All outcome variables are log transformed.

VARIABLES	(1) All patents	(2) Highly cited	(3) Basic class	(4) New inventor
<=5	-0.0948	-0.0138	-0.0973	-0.0777
	(0.0835)	(0.0688)	(0.0705)	(0.0769)
-4	-0.0101	-0.0370	0.0219	0.0261
	(0.0711)	(0.0731)	(0.0601)	(0.0718)
-3	-0.0564	-0.0512	-0.0328	-0.0291
	(0.0531)	(0.0546)	(0.0617)	(0.0504)
-2	0.0169	-0.0607	-0.0383	0.00153
	(0.0427)	(0.0536)	(0.0509)	(0.0480)
0	0.0963*	0.114*	0.0662	0.0693
	(0.0511)	(0.0599)	(0.0528)	(0.0534)
1	0.0610	0.0908*	0.0294	0.0383
	(0.0503)	(0.0482)	(0.0567)	(0.0525)
2	0.106*	0.123**	0.109*	0.0748
	(0.0549)	(0.0582)	(0.0597)	(0.0595)
3	0.241***	0.192***	0.163**	0.178***
	(0.0679)	(0.0732)	(0.0679)	(0.0633)
4	0.262***	0.251***	0.221***	0.224***
	(0.0637)	(0.0711)	(0.0724)	(0.0690)
>=5	0.383***	0.312***	0.218***	0.189**
	(0.0879)	(0.0807)	(0.0719)	(0.0762)
ln (Population)	0.229	0.115	0.185*	0.306*
	(0.182)	(0.0745)	(0.108)	(0.167)
ln (Per capita GDP)	0.0918*	0.0416	0.0452	0.0840*
	(0.0509)	(0.0272)	(0.0283)	(0.0441)
ln (VC investments in prior year)	0.0506**	0.0463**	0.0504***	0.0175
	(0.0250)	(0.0225)	(0.0184)	(0.0224)
Observations	5,928	5,928	5,928	5,928
R-squared	0.959	0.942	0.949	0.948
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Robust standard errors in parentheses; clustered at the country level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A-12. New venture policy introduction and innovation outcomes. This table reports the coefficients from the following specification:

$$Y_{it} = \alpha_i + \alpha_t + \delta \cdot 1\{t \leq Year_{init} - 5\} + \sum_{j=-4}^{j=4} \beta_j 1\{t = Year_{init} + j\} + \theta \cdot 1\{t \geq Year_{init} + 5\} + \gamma X_{it} + \epsilon_{it}$$

The specification includes country and year fixed effects as well as country-year specific controls X_{it}, specifically ln(Population), ln(Per capita GDP), and ln(Lagged venture capital activity). $Year_{init}$ is the initiation year of an entrepreneurial finance program, including all first initiations as well as initiations without an introduction in the five years prior, observed in the sample period of 1990-2019 by country i. Countries with I such "clean" initiations appear in the data I times. This analysis corresponds to Method 3 described in Section 6 of the text. The year prior to initiation is the omitted baseline, normalized to 0. The construction of the patent outcome variables is described in the Data section of the text. All outcome variables are log transformed.

VARIABLES	(1) All patents	(2) Highly cited	(3) Basic class	(4) New inventor
<=5	-0.142**	-0.0535	-0.121*	-0.0848
	(0.0672)	(0.0620)	(0.0645)	(0.0647)
-4	-0.0353	-0.0577	0.00736	0.0145
	(0.0701)	(0.0742)	(0.0593)	(0.0717)
-3	-0.0690	-0.0616	-0.0412	-0.0346
	(0.0521)	(0.0541)	(0.0612)	(0.0506)
-2	0.00648	-0.0674	-0.0453	-0.00368
	(0.0424)	(0.0536)	(0.0513)	(0.0486)
0	0.103**	0.119**	0.0698	0.0731
	(0.0496)	(0.0591)	(0.0524)	(0.0533)
1	0.0690	0.0966**	0.0305	0.0420
	(0.0487)	(0.0477)	(0.0555)	(0.0520)
2	0.112**	0.123**	0.0962*	0.0761
	(0.0533)	(0.0565)	(0.0550)	(0.0594)
3	0.231***	0.200***	0.139**	0.173***
	(0.0633)	(0.0723)	(0.0635)	(0.0618)
4	0.258***	0.256***	0.224***	0.220***
	(0.0608)	(0.0689)	(0.0692)	(0.0683)
>=5	0.425***	0.347***	0.253***	0.215***
	(0.0894)	(0.0799)	(0.0732)	(0.0798)
ln (Population)	0.227	0.121	0.204*	0.321*
	(0.185)	(0.0800)	(0.115)	(0.170)
ln (Per capita GDP)	0.0935*	0.0378	0.0413	0.0850*
	(0.0501)	(0.0275)	(0.0283)	(0.0433)
ln (VC investments in prior year)	0.0419*	0.0364*	0.0485***	0.0149
	(0.0233)	(0.0212)	(0.0173)	(0.0206)
Observations	6,392	6,392	6,392	6,392
R-squared	0.961	0.945	0.950	0.950
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Robust standard errors in parentheses;
clustered at the country level
*** p<0.01, ** p<0.05, * p<0.1

Table A-13. New venture policy introduction and innovation outcomes. This table reports the coefficients from the following "stacked" specification:

$$Y_{itg} = \alpha_{ig} + \alpha_{tg} + \sum_{j=-4}^{j=4} \beta_j 1\{t = Year_{init} + j\} + \gamma X_{itg} + \epsilon_{itg}$$

Country and year fixed effects are interacted with indicators for treatment cohort, where each cohort *Gg* is comprised of units first treated in period *g*. Only country-year observations within the -5 and +5 event window are included. The analysis stacks, for each cohort, the treated countries and clean control countries for the relevant event window. Clean controls consist of both never-treated countries and pre-treatment countries, so long as the pre-treatment countries have no program initiation within a 10-year window. $Year_{init}$ is the initiation year of an entrepreneurial finance program, including all first initiations as well as initiations without an introduction in the five years prior, observed in the sample period of 1990-2019 by country *i*. This analysis corresponds to Method 4 described in Section 6 of the text. The year prior to initiation is the omitted baseline, normalized to 0. The construction of the patent outcome variables is described in the Data section of the text. All outcome variables are log transformed.

	(1)	(4)	(3)	(2)
VARIABLES	Patents	Highly cited	Basic class	New inventor
-5	-0.190***	-0.0994*	-0.132***	-0.125**
	(0.0522)	(0.0573)	(0.0502)	(0.0550)
-4	-0.0770	-0.101*	-0.0675	-0.0359
	(0.0507)	(0.0600)	(0.0522)	(0.0559)
-3	-0.0982**	-0.0750*	-0.103*	-0.0788*
	(0.0458)	(0.0414)	(0.0545)	(0.0439)
-2	0.00736	-0.0723*	-0.0827*	-0.0298
	(0.0337)	(0.0404)	(0.0444)	(0.0412)
0	0.156***	0.153***	0.0687	0.0854*
	(0.0528)	(0.0511)	(0.0486)	(0.0479)
1	0.143***	0.146***	0.0405	0.0706
	(0.0500)	(0.0422)	(0.0485)	(0.0494)
2	0.204***	0.195***	0.128**	0.117**
	(0.0535)	(0.0527)	(0.0539)	(0.0560)
3	0.325***	0.251***	0.167***	0.211***
	(0.0632)	(0.0614)	(0.0615)	(0.0596)
4	0.341***	0.310***	0.218***	0.248***
	(0.0685)	(0.0641)	(0.0657)	(0.0683)
5	0.354***	0.345***	0.168**	0.223***
	(0.0745)	(0.0671)	(0.0651)	(0.0669)
ln (Population)	0.0539	0.0285	0.0253	0.0838
	(0.115)	(0.0438)	(0.0642)	(0.111)
ln (Per capita GDP)	-0.00557	-0.00580	-0.00355	-0.0167
	(0.0205)	(0.00460)	(0.00824)	(0.0141)
ln (VC investments in prior year)	0.0168*	0.00784	0.0273***	-4.92e-05
	(0.00855)	(0.00763)	(0.00923)	(0.00893)
Observations	40,943	40,943	40,943	40,943
R-squared	0.957	0.957	0.946	0.941
Country x Cohort FE	YES	YES	YES	YES
Year x Cohort FE	YES	YES	YES	YES

Robust standard errors in parentheses; clustered at the country level
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A-14. Cross-sectional analysis of weighted new venture policies, with a control for government expenditures. Observations consist of countries in the sample, akin to Table A-4. The dependent variable is the budget-weighted number of policies introduced between 1995 and 2019 in a given nation. The independent variables include the natural logarithm of population and per capita GDP in 1994, the budget-weighted number of policies active in 1994, government expenditures as a fraction of GDP (multiplied by 100) in 1994, and an indicator if the country was in the top quartile of VC activity in 1994.

	(1)	(2)
Initial top VC nation indicator	9.311***	8.539***
	(2.953)	(3.049)
Initial ln (Population)	0.822***	0.907***
	(0.286)	(0.283)
Initial ln (Per capita GDP)		0.457
		(0.326)
Initial (Government expenditure / GDP)	0.00743	0.00774
	(0.00649)	(0.00577)
Initial weighted programs	0.0368	0.0172
	(0.227)	(0.229)
Constant	-0.621*	-1.280**
	(0.365)	(0.540)
Observations	178	178
R-squared	0.315	0.319

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A-15. Panel analysis of active weighted venture policies, with a control for government expenditures. Observations are annual ones of countries in the sample between 1995 and 2019, akin to Table 4. The dependent variable is the budget-weighted number of policies active in that year in a given nation. The independent variables include the natural logarithm of population, per capita GDP, lagged venture capital investment, and government expenditures in the prior year, and country and year fixed effects.

	(1)	(2)	(3)	(4)
ln (VC investments in prior year)	0.598**	0.594**	0.538**	0.538**
	(0.243)	(0.245)	(0.260)	(0.260)
ln (Population)	-1.434	-1.189	-2.382	-2.727*
	(1.048)	(1.145)	(1.461)	(1.482)
ln (Per capita GDP)		0.309		-0.370
		(0.425)		(0.233)
ln (Govt expenditure in prior year)	1.172**	0.938	-0.0233	0.201
	(0.499)	(0.623)	(0.714)	(0.755)
Constant	0.701	0.224	3.684*	4.383**
	(1.050)	(1.223)	(2.068)	(2.020)
Observations	4,386	4,386	4,386	4,386
R-squared	0.786	0.786	0.791	0.791
Country FE	YES	YES	YES	YES
Year FE			YES	YES

Robust standard errors in parentheses; clustered at the country level

*** p<0.01, ** p<0.05, * p<0.1