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THE IMPACT OF PUBLIC INCENTIVES ON THE BIRTH OF INNOVATIVE START-UPS

by Giuseppe Albanese* and Raffaello Bronzini**

Abstract

We study the impact of a regional policy aimed at increasing the number of innovative start-ups in the second largest Italian region (Lazio). The programme financed the creation of innovative firms, selecting from projects presented in a call for applications open to faculty members, researchers or young graduates. When comparing recipients with similar non-recipient applicants, we find that nearly all the projects funded led to the creation of a new firm, compared with approximatively 50 per cent for non-funded applications. Subsidized firms exhibit a similar survival rate to non-subsidized firms on average but a slower growth in terms of sales, employment and assets. This difference is primarily attributable to a lower incidence of high-growth firms among subsidized projects.

JEL Classification: H2, L5, R0, R3.

Keywords: start-up, young innovative companies, start-up policies, academic spin-offs, regional policies, innovation policies.

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1. Introduction[1]

Innovative start-ups are young or nascent companies characterized by a strong propensity for innovation and high growth potential. They are typically active in high-tech manufacturing industries or knowledge-intensive services and have the capacity to significantly contribute to employment, innovation, and productivity within the economic system (Audretsch et al. 2006; Aghion et al. 2009; Haltiwanger et al. 2013; Criscuolo et al. 2014; Criscuolo et al 2017; Decker et al. 2014; Haltiwanger et al. 2016; Dumont et al. 2016; Alon et al. 2018).[2] Some of these start-ups, particularly those in ICT and social networks, have recently experienced rapid growth, becoming some of the most capitalized firms in the stock market within just a few years. For these reasons, innovative start-ups have attracted significant attention from economists, analysts, and policymakers.

The birth and growth of innovative start-ups heavily depend on the capability of entrepreneurs to raise funds, but for such firms this is particularly challenging because of capital market imperfections (Hall and Lerner 2010). New firms lack sufficient capital to provide as collateral, and reputation that may facilitate the access to external debt. In addition, risky and highly innovative projects are more complex to evaluate and more exposed to failure than traditional activities. As a consequence, the best way to finance innovative start-ups is by firm equity rather by external finance (Hall and Lerner 2010), but unfortunately in several countries private capitals are not able to adequately back innovative projects, especially in Italy that lacks a thick venture capital market (Colombo and Grilli 2007; Bronzini et al. 2020).

Public intervention for innovative start-ups is advocated, primarily, to correct the above capital market imperfections and provide adequate financial support to young or nascent firms. In addition, it is promoted to correct further market failures coming from positive externalities

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[2] According to the OECD in Italy young firms contribute for about the 40 percent of the total new jobs (Criscuolo et al. 2014).

that hit innovative activity, and induce a sub-optimal level of private investment in innovation (Arrow 1962; Acs 2002).

In order to support young innovative companies, several countries have implemented a variety of public policies (European Commission 2010; Osimo 2016). The large diffusion of such policies is accompanied by a wide heterogeneity of these measures, in terms of the criteria used to qualify innovative start-ups, the support given and, finally, the ultimate goal of the policy (Audretsch et al. 2020).[3]

Our paper examines the impact of a regional policy - implemented in 2012 in the second largest Italian region (Latium) - that subsidized the creation of innovative start-ups, primarily founded by academics and researchers (*Research Spin-off*). Since the policy aimed to select innovative projects to be realized through the establishment of new enterprises, we evaluate the policy's effectiveness by assessing its impact on the firms' birth rate. Our empirical strategy relies on multiple samples and estimators. First, we compare the outcome of projects proposed by financed applicants with that of all non-funded ones, controlling for observable characteristics of the projects and their applicants. Additionally, to further minimize potential selection bias, we compare treated and untreated projects that received a similar evaluation by the committee of experts responsible for fund allocation, focusing specifically on projects assessed as having similar quality. In both cases, we consider different estimators - probit, propensity score matching, inverse probability weighting, double Lasso - that leverage observable variables in distinct ways to make causal predictions about the outcome.

In the second stage of the analysis, to understand which types of firms the policy supported, we compare the firms created under the policy with similar firms not financed by it. The comparison focuses on metrics such as survival rate, size (turnover, assets, employees), profitability (EBITDA, ROA, ROE), financial costs, leverage, and innovation. This part of the

[3] The policies for innovative start-ups can differ in several respects. First, because the definition of *start-up* is not unambiguous: it can consider nascent (pre-entry) or young firm (incumbents). Moreover, the criteria to define a start-up *innovative* vary across policies: some take into account the level of R&D expenditure or the sector of activity (high-tech enterprises), whereas others look at the patent propensity or the level of education of entrepreneurs; moreover, certain measures classify as innovative the start-ups born as academic spin-offs. Second, the policies differ for the type of support provided, which can take the form of hard measures – e.g., subsidies for R&D and entry costs, or fiscal and financial incentives – or soft measures – such as consulting vouchers, mentoring, coaching or business advices services. Finally, the goals of the policy are also heterogeneous. They range from increasing the birth rate or enhancing firm growth, to spurring firm innovation or R&D investment.

analysis aims to assess whether the firms established through the policy have exhibited economic performance comparable to, or distinct from, that of other similar firms created during the same period in the same region. Implicitly, it evaluates whether the policy fostered the creation of robust firms capable of competing in the market or merely short-lived, weaker ventures.

Although the evaluation literature that estimated the impact of the policies for innovative start-ups is rather vast, it is prominently focused on variables that measure the firm's economic performance, such as R&D expenditure, productivity, employment, turnover, profitability or growth. Koga (2005) shows that research and development (R&D) incentives increased the private R&D expenditure of new innovative companies in Japan. Colombo et al. (2011) illustrate how selective R&D incentives have had positive effects on the total factor productivity growth of a sample of Italian innovative start-ups, and Colombo et al. (2013) find a positive impact on employment growth. Autio and Ranniko (2016) show that a policy implemented in Finland to strengthen new innovative companies has had positive effects on the turnover growth. Ayoub et al. (2017) study the effect of a program that targeted innovative academic spin-offs in Germany (enterprises founded by students, graduates, or scientists from universities or research centers), and find that recipient firms show lower growth and profitability than untreated firms. Ramaciotti et al. (2017) study the effect of a regional Italian policy (implemented in Emilia-Romagna) which supported new technology firms with hard measures (such as financial aid), and soft measures (e.g. mentoring and consulting services). They show that soft measures were effective in increasing sales growth, whereas hard measures did not have an impact. Zhao and Ziedonis (2020) find that a local program for technological start-ups, implemented in Michigan (USA), was effective in increasing the survival rate and in stimulating following venture capital investment. De Stefano et al. (2018) and Manaresi et al. (2021) show how the "*Start-Up Act*", an Italian policy that supports new innovative firms with tax incentives and other financial and non-financial measures, favored an increase in turnover, added value, survival rate, and the probability of receiving venture capital funds.[4] Finally, Santoleri and Russo (2025) evaluate the overall impact of 136 local

[4] On the impact of "*Start-up Act*", see also Finaldi Russo et al. (2016), Giraudo et al. (2019), and Biancalani (2022).

policies for innovative start-up implemented in Italy in the period 2012-21, finding no effects on firms' innovation, investment, and firm size, but a positive impact on the firms' ability to obtain further public subsidies later on.[5]

Conversely, to the best of our knowledge, only a few studies have estimated the impact of policies on firm entry, yielding contrasting results. Jung and Kim (2018) examine the determinants of university spin-offs in Korea, and find that government funding had a negative impact on the probability of creating university spin-offs, or the number of spin-offs created, by using a panel econometric model. More recently, Accetturo (2022) evaluates the effects of the incentive policies implemented in northern Italy (the Provinces of Trento and Bolzano), which encouraged the entry of new and technologically advanced companies, using a regression discontinuity approach. He finds that the subsidies increased the probability of creating a new innovative company, and generated an expansion of the added value produced in the territory in the first three years, but did not increase innovation.

Our paper contributes to the existing literature in three respects. First, as mentioned above, we look at the impact of the policy on the birth rate, a target that has been scantly studied in the existing literature. Second, given that regional policies are very widespread but their effects are largely under-investigated, we believe that to provide empirical evidence on their impact can be useful to increase the awareness of local policymakers.[6] Moreover, the regional focus offers a methodological advantage, as it allows us to compare applicants who are in principle more homogeneous, given that they come from the same region or intend to establish a firm within a specific, restricted area. Finally, with our investigation we aim to provide a useful contribution and helpful insights for policymakers of all countries where the

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[5] For an extended review of the main empirical contributions on public policies for innovative start-ups, see also Audretsch e al. (2020) and, for a critical discussion on the public intervention spurring entrepreneurial activity, Lerner (2010). Notice that in our review we did not discuss the related literature on the performance of academic spinoffs compared to other types of start-ups (Mathisen and Rasmussen 2019), on public venture capital (see e.g. Cumming et al. 2017; Alperovych et al. 2020), and finally on the impact evaluation of R&D grants for small innovative business firms (e.g.: Howell 2017, Santoleri et al 2022, Fini et al. 2023), which is to some extent linked to our paper, but has different focus or aim.

[6] Italy experienced a proliferation of regional policies for innovative start-ups. Albanese et al. (2019) identify approximately 75 regional measures implemented between 2012 and 2018, with a total budget of 340 million euros. In the same period, the main Italian national policy for start-ups, the so-called "*Start-up Act*", allocated around 300 million euros. Santoleri and Russo (2025) extend the analysis to 2021, uncovering 135 measures with an overall budget of approximately 500 million euros.

capital market is limited, and the funds to new innovative companies are inadequate, as in the case of Italy.

Our analysis reveals a positive impact of the policy on firm creation: approximately half of the financed firms would not have been established without the policy. Additionally, we find that firms created through the policy exhibit a survival rate comparable to those in the control groups but display slower growth, primarily due to a lower proportion of high-growth firms among the treated. Finally, we observe only a marginally higher innovative performance of treated firms, as measured by patenting activity.

The remainder of the paper is structured as follows. The next section illustrates the program. Section 3 describes the empirical strategy used to assess the policy's impact on firm entry, the data employed, and presents the evaluation results. Section 4 focuses on the economic performance of the firms created through the policy compared to similar firms, analyzing survival rates and other economic indicators. Section 5 compares the policy's costs with its economic benefits, while the final section summarizes the main findings and discusses policy implications.

2. The Program

The object of this study is the program launched in 2012 by the Latium Region called "*Supporting research spin-off*" (Source: BUR 2012 n. 42 - POR FESR 2007/2013). The objective of the policy was to encourage the birth of new innovative firms (limited companies) in the region, operating in some specific branches of industry and service sectors. The eligible applicants were academics, researchers, young graduates in scientific fields, or scholarship recipients who were willing to fund new innovative enterprises. As regards the type of support, the program was based on incentives for tangible and intangible investment and other start-up costs, such as those for headquarters or for personnel. The incentives could cover up to 80% of the eligible costs. The amount of economic support was between 35k and 150k euros per project. The total amount of the financial aid was about 14 million euros. Finally, the procedure for the allocation of funds was based on the assessment of the project's applications. The auction was opened from August 2012 to June 2013. In this period, 307 projects were submitted. After a check of compliance with the program rules, 25 projects were rejected/retired.

The selection process and the assignment of the funds were implemented in two steps: firstly, a panel of independent experts assessed each project according to five criteria: project idea, market potential, technical quality of the team, financial sustainability and feasibility of the business plan; in this step, the committee of experts gave a qualitative assessment of each project by each profile. Next, the authority ("Nucleo di valutazione") made by representatives of the Region and independent experts took the final decision, by and large confirming the evaluation proposed by the committee of experts in the first step (as pointed out exponents of LazioInnova during our consultation). The number of projects approved for financing at the end of the selection process was 134.

Summarizing, in our analysis we consider 270 projects: 134 treated and 136 untreated applications, from which we construct the main control groups. In particular, from a total of 307 projects, we excluded 25 rejected or retired projects and 12 non-treated projects due to the duplication in the promoter pools.

3. The impact of the policy on firm entry

Data and empirical strategy. Our analysis aims to assess the impact of the policy on the birth of new innovative firms. We use the data provided by the Region Latium (LazioInnova) and those on the firms created sourced by Italian Business Register (Infocamere). More specifically, from LazioInnova we obtained information on the promoters of the projects (names, tax codes, job), the qualitative assessments received by the project, and other information on the projects and the procedure. For those approved we also have the name of the company to be established. For our evaluation exercise we associate the name of the applicants (financed and non-financed) with the name of founders of new firms, using an exact matching of the information sourced from LazioInnova with those contained in the Infocamere database. More specifically, we keep the companies that were born within five years after the policy was launched (i.e. from 2012 to 2017), and were founded by the leading applicant (contact person) of the proposed project, or have at least 50% of the members of the proposed project as shareholders.[7]

After having associated the new firms with the name of applicants, we can compare the firm birth rate for the 134 treated projects with that of 136 untreated ones (controls). The group of untreated applicants is certainly a better control group than the eligible, since the applicants self-select in the procedure and thus are more homogeneous to treated than the eligible. Nevertheless, this evidence cannot be considered an unbiased estimation of the impact of the policy because the treated applicants could have presented better projects than untreated ones, therefore, their higher firm birth rate, with respect to that of untreated applicants, would be affected by a selection bias. In order to clean the potential selection bias and obtain an unbiased estimation of the impact of the policy, we take advantage of the information on the assessment of the projects made by the committee of experts, together with the observables characteristics of the applicants. Namely, we compare only treated and untreated projects that received a similar judgments of the independent experts in the procedure of allocation of the funds. Unfortunately, the projects are not ranked by a score, so we can classify them only on a qualitative basis. In order to gauge the (unobservable) quality of the projects, we have conducted a textual analysis of the written judgments expressed by the independent experts. In particular, we have examined each sentence of each final verdict and classified the projects according to the prevalence of positive/negative statements as: very positive, positive, and negative. Table 1 gives some examples of this step. Then, we can split our sample of all projects (treated and untreated) into three groups according to the prevalence of very positive (high-rating), positive (medium-rating) or negative statements (low-rating). As shown in Table 2, all high-rating projects are treated, while all low-rating projects are untreated. Meanwhile, we observe 82 medium-rating treated projects that can be compared with the 35 untreated applicants who received a similar assessment.

As a first descriptive step, we contrast the observable characteristics of various groups of treated and untreated applicants (Table 3). For all treated and untreated projects, we find that three characteristics are not well balanced: the mean differences in the number of

[7] In cases of multiple matched firms, we kept the first one created. The results are qualitatively unchanged to alternative threshold shares.

shareholders, the proportion of academics/researchers among the shareholders, and the proportion of projects with a university as a shareholder are statistically significant. However, when we restrict the comparison to projects that received similar assessments, these differences diminish substantially, and no statistically significant disparities remain among the groups. This finding supports the use of these groups as benchmarks for our impact evaluation exercise. Nevertheless, some differences, albeit statistically non-significant, still persist. To address this point, our empirical analysis leverages the available information using the observables as controls. Specifically, we employ a probit model to test the statistical significance of the differences between treated and control groups in the percentage of projects (applications) that resulted in new firms, controlling for the observable characteristics at the project level:

$$\Pr(E_{jT}) = \alpha + \beta Treat_j + \gamma X_j + \varepsilon_j \tag{1}$$

where the unit of observation is the project j, E_{jT} is a dummy equals to one if the project j became a firm, X is a set of controls and $Treat_j$ is the treatment status indicator (taking value of one for approved projects). As controls, we use the number of project applicants, a dummy variable for the presence of a major shareholder, the proportion of female, young, non-local, [8] and academic/researcher individuals among the proponents, dummy variables for the presence of a manager/entrepreneur, university, or a firm among the shareholders, and the type of project (manufacturing, ICT or professional/technological/scientific service).

Results. Table 4 presents the number of projects submitted and the number of firms created across various categories of applicants. We observe that only 164 firms were established out of the 270 innovative projects for which a subsidy was requested. However, the birth rate varies substantially between treated and untreated projects. Table 5 shows the differences in the percentage of projects that became new firms and the related t-test of the mean differences. Column 1 reveals that 96 percent of selected projects generated a new enterprise, compared to only 27 percent of excluded projects. To rule out the confounding variation due to the different quality of the pools, column 2 focuses on treated and untreated medium-rating projects; in this case, the difference of the entry rate drops substantially but

[8] Non-local applicants are people born in other regions or countries.

remains sizeable and significant: it is 52 percent points higher for selected projects. In order to control for the available observable characteristics of the project, we next estimate the probit model (1) in Table 6. The results confirm previous findings. Using the probit with controls, we notice only a slight increase of the differences in the birth rate but their size remains by and large very comparable.

To assess the robustness of our results, Table 7 presents some alternative treatment-effect estimators that leverage observable variables in different ways to make causal predictions about the outcome. Panel A employs a propensity score approach to create a matched set of controls based on our baseline covariates, discarding units outside the common support. Compared to the probit model with controls, this approach has the advantages of being independent of the model's functional form and allowing for a rigorous check of the similarity between treated units and their controls, although it can face several challenges when applied to small sample sizes. Panel B uses an inverse probability weighting estimator, which utilizes the entire dataset by assigning weights to all observations based on the propensity score. Lastly, Panel C implements a double adaptive Lasso regression as proposed by Belloni et al. (2014), incorporating an extended set of 117 covariates that include baseline variables along with their quadratic, cubic, and interaction terms. Despite variations in the magnitude of effects across models, the overall pattern of results remains consistent with our main findings.

Overall, we interpret these results as evidence of the policy's positive impact, which successfully increased the creation of new innovative start-ups. According to our findings, at least half of the financed projects would not have resulted in the establishment of a new firm without the policy, while the remainder would have done so regardless of the intervention. We now turn to an analysis of the economic performance of the firms created under the policy over time.

4. The economic performance of funded start-ups over time

The purpose of this section is to examine the economic performance over time of the firms born thanks to the policy in terms of survival rate, size (employment, assets, and turn over), profitability (EBTDA, ROA, ROE), leverage, financial costs (ratio of net financial costs to financial debt), and innovation (patents). We also investigate the ability of firms to obtain further public support.

The aim is to assess whether the supported projects were robust and capable of competing in the market, or, conversely, weaker than those that emerged without public support. To this end, we compare the outcomes of firms created through the financed projects with those of similar firms over a period of up to five years from the firms' establishment. More specifically, we compare treated firms with: a) 36 firms born from the projects that were not financed by the policy (untreated applicants); and b) 271 firms belonging to Business Register of the innovative start-ups which are born in the years 2012-14 and located in the same region as the treated new-born firms (Latium).[9] As further refinements, in the case a) we limit the analysis to the sample of projects with similar (medium) quality. In the case b) we restrict the comparison among the treated firms that are also in the Register of innovative start-ups (82 out of 128) with the other innovative firms of the Register, since in this case both the groups of firms benefit from the policy of the "*Start-Up Act*".

Data come from different sources. From Infocamere we extracted the information on the survival of the company, and the information on the associates of the companies (gender, age, place of birth); in particular, we exploited the information on the termination of the company or the presence of insolvency proceedings. Next, we use firm balance sheet data sourced by Cerved Group, employment data sourced from the National Institute for Social Security (INPS), and patent data sourced by the European Patent Office (Patstat). Finally, the data on public subsidies are obtained from OpenCup, a large database on the firms that have received subsidies from Italian authorities.

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[9] In Italy, the so-called "*Start-up Act*" (Law n. 221/2012) has introduced the first national wide-ranging intervention to support innovative start-ups (Osimo 2016). The "*Start-up Act*" targets newly established companies (less than five years old) with a strong propensity for innovation. Specifically, these are defined as new firms operating in high-tech industries and knowledge-intensive services that meet at least one of the following requirements: a) their R&D expenditures exceed 15% of revenues (or operating costs, if higher); b) they employs highly qualified personnel (at least 1/3 with PhD degree, PhD students or researchers, or at least 2/3 with master's degrees); c) the firm is a holder, depositary, or licensee of a patent or the owner and author of registered software. Young companies in possession of these requisites can register in a specific section of the Business Register dedicated to innovative start-ups, and benefit from various concessions. Among them, the reduction of administrative burdens, more flexible corporate and labor regulations, tax incentives, and simplified procedures for accessing public guarantees for SMEs. See De Stefano et al., 2018, and Manaresi et al., 2021, for the impact of the policy.

Descriptive statistics at startup year. Before looking at the performance over time, we first show some descriptive statistics. Table 8 shows the composition of the firm-level sample. In particular, we observe that, by construction, both treated firms and control firms from the innovative start-ups Register were born in the years 2012-2014, whereas a few control firms generated by unselected projects were started later. Analogously, both treated and control firms from the innovative start-up Register were created only in a region (Lazio), while only a few unselected projects have subsequently generated enterprises in other Italian regions. We also note in each sub-sample a stronger presence of service sector firms than industrial ones.

Table 9 presents the available information on the firms' initial shareholders. No differences are significant at the 5% level between treated firms and the control group comprising unselected projects. When compared to other firms from the innovative start-up Register, universities are more frequently observed among the shareholders of treated firms, which is unsurprising given the academic spin-off nature of many projects. This aligns with a higher number of shareholders and a lower likelihood of a majority shareholder among treated firms. Finally, we analyze the balance sheet data available for the firms' startup year, including the number of employees, company assets, and leverage. Table 10 reveals no significant differences between treated firms and the two comparison groups with respect to this basic set of covariates.[10]

Survival rate. We investigate the firm performance starting from the survival rate. A shorter survival rate of the supported firms can be interpreted as a failure of the policy in inducing the birth of competitive enterprises for the market. For the survival analysis we exploit information at firm level and run the following probit model:

$$\Pr(S_{iT}) = \alpha + \beta Treat_i + \gamma Z_i + \varepsilon_i \tag{2}$$

where the unit of observation is the firm *i*, S_{iT} is a dummy equals to one if the firm *i* is alive after 2 or 5 years from startup (T=2 or 5), Z is a set of controls (including the characteristics of firms' shareholders introduced above[11], along with fixed-effects for sector,

[10] Table A1 in Appendix shows the corresponding descriptive statistics.

[11] In the firm-level analysis, shareholders' characteristics are measured at startup year.

startup year and region, and $Treat_i$ is the treatment status indicator (taking value of one for approved projects).

Table 11, columns 1-2, compares the percentage of firms surviving after 2 or 5 years, distinguishing between (treated) firms financed by the program with those related to projects excluded from it. The results show no significant difference in survival rates for either the full sample or the subsample of medium-rating projects. Table 11, columns 3-4, use the other innovative start-ups born in Lazio during the same period as the control group. Again, no significant differences in survival rates are observed, even when we excluded treated firms not present in the special Register of innovative start-ups, to rule out the effect of this status on firms' survival rate. In Table 12 we use a probit model to predict the probability of survival accounting for observable firm characteristics, obtaining similar results. Taking all the evidence together, we can conclude that the policy was effective in increasing the probability of creating new competitive firms and that, at the aggregate level, the stimulus to the pool of innovative enterprises has persisted at least for five years, since it was not reversed by different survival rates.

Balance-sheet variables. Next, we analyze the firm economic performance considering measures of company growth (turnover, employees, assets) and other indicators of economic-financial balance. For each dependent variables, we consider the average over 5 years after the start-up.[12] Accordingly, we estimate the following linear model:

$$Y_{iT} = \alpha + \beta Treat_i + \gamma Z_i + \varepsilon_i \tag{3}$$

where we consider as outcomes the following balance sheet indicators Y_{iT} for firm *i* (measured as an average over the 5 years after startup): turnover, assets, employees, EBITDA, ROA, ROE, financial costs, and leverage[13], and Z include our baseline controls (see above).

Table 13 shows that treated firms grew less than those of the control group (this is particularly true in columns 3-4, when we compare treated firms with the other innovative start-ups). These results are qualitatively confirmed when we consider year-by-year

[12] Descriptive statistics are shown in Table A2 in Appendix.

[13] Leverage is measured by Debt-to-Equity ratio.

regressions, which reveal a diverging pattern where the size gap of treated firms increases over time.[14] The overall advantage of the untreated units could be evenly distributed across all firms or could be concentrated in a bunch of high-growth (untreated) firms. Table 14 show the results obtained excluding from the complete sample the outlier observations: in particular, the observations are trimmed if the dependent variable exceeds p75+1.5*(p75-p25), where pX is the Xth percentile. The findings support the second interpretation: there is a small groups of high growth untreated firms that mainly drives the results. This suggests that the more ambitious ideas were not among the start-ups financed by the policy, consistently with the possibility that the policymaker could be more risk adverse than the market: it might have not awarded riskiest but also more profitable ideas.[15]

Finally, Table 15 shows that there is no noteworthy difference in the economic and financial condition of treated and untreated firms in the 5 years after start-up. In particular, there is no clear evidence of differences in firm profitability: two out of three indicators (EBITDA to sales ratio and ROE) show no significant differences, while the results for ROA are inconsistent and inconclusive.

Overall, our results indicate that the median firm supported by the policy has followed a similar trajectory to comparable (control) firms; however, the policy failed to promote high-growth firms. Several explanations could account for this. On the one hand, research ideas with the greatest potential could more easily attract private funding, reducing the need for public support. On the other hand, the selection process by the public administration might be less prone to finance riskiest projects that could potentially be highly valuable.[16] Lastly, as suggested by Accetturo (2022), firms supported by the policy might have a smaller incentives to growth to reimburse the debts with respect to firms born without the public subsidies.

Innovation. We also examine the innovative performance of companies measured by patent applications. We use two outcomes from the European Patent Office (EPO) dataset provided by Patstat: a dummy variable indicating whether the firm applied for a patent at the

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[14] See Table A3 in Appendix.

[15] Results are similar if we use a median regression estimator (see Table A4 in Appendix).

[16] As anecdotal evidence, Table A2 in the Appendix shows that the fastest growing among the firms born from the project applicants was generated by an unselected one.

EPO in the five years after birth (the extensive margin), and the total number of applications for a patent (the intensive margin). Our empirical model for innovation is analogous to equation (2).

Table 16 shows that the share of patenting firms is significantly higher among the treated sample (this is trivial in the comparison with control firms generated by unselected projects, since none of those firms applied for a patent). However, the probit estimates in Table 17 indicate that this higher propensity to patent is, at least in part, related to firm characteristics. Yet, we do not find a significant effect on the number of patent applications. Overall, our evidence is not robust in finding differences in the innovation performance among the groups of start-ups examined.

Other public subsidies. Firms that receive public subsidies can improve their ability to obtain further public supports later, either through a learning process or by gaining a reputation among public institutions. Santoleri and Russo (2025) demonstrate that securing local subsidies increases start-ups' probability of obtaining additional local public subsidies in the future, suggesting that subsidy-taking enterprises can build a reputation over time; however, this could also lead to a dependence on public support for survival, a phenomenon termed "subsidy entrepreneurship" by Gustafsson et al. (2020). To analyze this issue within our setting, we estimate the probability of a recipient firm to obtain additional public subsidies in subsequent years. Accordingly, also in this case our empirical model is analogous to equation (2).

The evidence presented in Tables 18-19 confirms that treated firms had a significantly higher probability of receiving additional public subsidies in the five years following their establishment, with this effect specifically attributable to support from local governments. This finding aligns with the hypothesis of a reputation or learning effect, as suggested by Santoleri and Russo (2025).

5. Discussion of the costs and economic benefits of the policy

According to our results, the policy was effective in increasing the birth of new innovative start-ups. A little more than half (52%) of the financed proposals would not have given birth to a new firm without the public support. We are now able to provide a back-of-the-envelope calculation of the costs and the economic benefits of the policy. In particular, we can calculate the cost per firm and per employee created by the public intervention, together with the output generated by the public measure, proxied by the valued added. For such computation we use: the estimate of the impact of the policy on the start-ups' birth ($\beta=0.52$), the number of the financed firms (128), the amount of euros directly disbursed by the policy (14 million euros), the employees of financed firms averaged over five years after the policy (0.9; see Table A2 of the Appendix), the average of the firms' value added calculated in the same way (25,600 euros). Notice that in the calculation we do not take into account neither general equilibrium effects, nor externalities, and we consider only the direct costs of the policy (e.g., we did not take into account the costs to manage the auction).

Our estimates show that only about half of the 128 financed firms were generated by the policy, whereas the other half would have been born even without the public intervention. Therefore, the number of innovative start-ups created by the measure is 67 (0.52*128). Using this figure, we estimate that the local government spent about 210k euros per new firm created under the policy (14 million/67). Taking into account that on average each firm employs almost one employee (0.9), we estimate that the policy created about 60 new employees (0.9*67) and therefore the public outlay per new employee is about 234k euros. Even considering that the new firms are innovative enterprises, that employ highly qualified labor force, and that we have information only on the dependent workers but not on self-employment, in our view the expenditure per new employee seems rather consistent.

On the whole, the policy increased the local firms' value added. Multiplying the average value added of the financed enterprises (25,600) by the number of new firms created by the policy (67), we estimate that the value added directly created by the public intervention in one year is around 1.7 million euros. It takes about 8 years to reach the costs of the policy – 12 years if we consider that 30% of the firms did not survive over 5 years (see Table 8). Finally, we can estimate that thanks to the policy the increase in the total firms' assets is about 10 million euros (67*149,200; see Table A2 in the Appendix).

These estimates help the policymaker to be aware of the economic benefits of the policy but also of its costs. According to our estimates, the measure increased the number of innovative start-ups by a generous amount, i.e. by 52%, a percentage which is a little higher than that estimated by Accetturo (2022) for start-up policies implemented in two small provinces in North of Italy (Trento and Bolzano; between 30% and 40%). At the same time the costs of the policy appear sizeable. The rise of the value added directly induced by the policy takes at least 8 years to reach their direct costs. Again, this result is coherent with that found by Accetturo (2022), who finds sizable costs of the policy if compared to the local market returns (the time span necessary for the estimated value added generated by public intervention – 3 million euros in the first three years – to match the overall cost – 8 million euros – is surprisingly similar to ours). In this respect, one consideration is in order. Our cost-benefits analysis assumes no general equilibrium effects and no externalities. But for innovative activities it is hard to respect the latter assumption. If positive spillovers from the new innovative start-ups occur, the economic benefits would be higher than those estimated. The estimation of such spillovers is a promising but also complex task that deserves attention, but that we leave to future research.

6. Conclusions

Due to capital market imperfections, innovative ideas often struggle to secure sufficient private financing. In such circumstances, investment may be constrained, and innovation limited. To address the financial market frictions affecting innovative investments, many countries have implemented public funding initiatives to support the creation of innovative firms. In Italy, alongside the national policy known as the "*Start-up Act*", several regions have introduced local policies aimed at fostering innovative start-ups. In this paper we evaluate the effects of a program implemented in the second largest Italian region (Latium).

To assess the impact of the program, we compare similar treated and untreated applicants based on the assessment received by the projects. Our findings indicate that the policy increased the probability of creating a new innovative firm: more than half of the firms would not have been born without the policy. Furthermore, firms created through the program exhibit a survival rate comparable to other new companies established in the same period within the same geographic area. Overall, subsidized firms also display similar economic and financial conditions to their peers but experience slower growth in terms of sales, employment, and assets up to five years after the policy. The size gap, which widens over time, is primarily attributable to the lower proportion of high-growth firms among the treated, rather than to differences in the performance of the median firm. This suggests that policymakers may favor less risky, but also less ambitious, business projects compared to those typically supported by private capital markets. Lastly, we observe only a marginally higher innovative performance, as measured by patenting activity. However, recipient firms are more likely to access public funds in subsequent years, pointing to the potential presence of a learning or reputation effect.

Our back-of-the-envelope cost-benefits analysis indicates that the costs of the policy are not marginal compared to the direct economic benefits. The increased firms' value added due to the program takes at least 8 years to reach the direct costs of the policy. We have assumed no externalities, but of course if positive spillovers from innovative start-ups would occur, as it is likely for this set of enterprises, the economic benefits would be higher. We leave the study of such externalities for future research.

On the whole, our investigation indicates that public support effectively enhances the birth of new innovative enterprises and creates firms that are, on average, qualitatively similar to those financed by the capital market, as evidenced by their survival rate similar to the others. In this regard, we confirm some precedent findings for the Italian case (Manaresi et al 2021; Accetturo 2022). However, our results also suggest that public policies are to some extent costly if compared to economic benefits, and tend to reward less uncertain and potentially less ambitious ideas. This may have important implications for the policymakers, in that they can opportunely adjust the design of the policy to correct this bias if they want to finance riskier projects, for example, by intervening on the criteria used for selecting the proposals. But there might be also other reasons for the growth gap between financed and non-financed firms: since the costs borne by the firms that receive the public support are reduced by the public support, these enterprises could have fewer incentives to grow rapidly to repay the debt burden with respect to firms born without the public subsidies (Accetturo 2022). In any case, regardless of the underlying explanations, our analysis finds that the policy has been effective, and public measures for innovative start-ups could well complement private financing.

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Tables

Table 1. Examples of project evaluation

VERY POSITIVE	• On the economic front there are good growth prospects • Many of the members of the social company have excellent references. • The application is suitable, with good economic-financial feasibility.
POSITIVE	• The business plan is believed to be sufficiently achievable. • A sufficient judgment can be expressed on the economic validity of the investments.
NEGATIVE	• The hypotheses set out in the business plan are considered to be doubtful whether they will be achieved. • The high technical-scientific skills of the proponents are not integrated with the presence of management skills in the implementation of the business.

Source: Own elaborations on data provided from the Region Latium (LazioInnova).

Table 2. Rating of projects

Level	**Selected projects**	**Non-selected projects**
HIGH	52	0
MEDIUM	82	35
LOW	0	101

Notes: Own elaborations on data provided from the Region Latium (LazioInnova).

Table 3. Balancing project characteristics

	Full sample				Projects with similar rating (medium)			
	Selected Projects	Non-selected projects	Difference	P-value	Selected Projects	Non-selected projects	Difference	P-value
Number of shareholders (units)	4.3	3.7	0.7**	0.021	4.2	4.7	-0.5	0.339
Presence of major shareholder	0.35	0.45	-0.10	0.102	0.37	0.31	0.05	0.596
Share of young shareholders	45.4	45.8	-0.4	0.922	45.4	49.2	-3.9	0.610
Share of female shareholders	27.4	30.1	-2.8	0.440	29.0	19.5	9.6	0.113
Share of non-local shareholders	31.2	31.3	-0.1	0.977	30.3	30.7	-0.4	0.953
Share of academic shareholders	30.3	22.4	7.9*	0.029	28.4	32.4	-4.0	0.588
Entrepreneur/manager as shareholder	0.30	0.34	-0.04	0.485	0.34	0.34	0.00	0.989
University as shareholder	0.14	0.04	0.10***	0.006	0.09	0.14	-0.06	0.352
Other firm as shareholder	0.25	0.22	0.03	0.524	0.26	0.40	-0.14	0.122
Manufacturing project	0.08	0.13	-0.04	0.249	0.07	0.11	-0.04	0.471
ICT project	0.44	0.38	0.06	0.335	0.48	0.43	0.05	0.644
Professional/Tech/Scientific project	0.42	0.43	-0.02	0.792	0.40	0.37	0.03	0.756

Notes: Own calculations on data provided from the Region Latium (LazioInnova).

Table 4. Project-level Sample

Type	Rating of project	Number of projects	Number of startup firms
Selected projects	All	134	128
	High	*52*	*48*
	Medium	*82*	*80*
Non-selected projects	All	136	36
	Medium	*35*	*16*
	Low	*101*	*20*
Total	**All**	**270**	**164**

Notes: Own calculations on data provided from the Region Latium (LazioInnova).

Table 5. Entry analysis – Percentages of projects that became new firms

	(1)	(2)
	Full sample	Projects with similar rating (medium)
Selected projects	0.96	0.98
Non-selected projects	0.27	0.46
Mean difference	0.69***	0.52***
P-value	0.000	0.000

Notes: The Table shows the percentage of projects that became new firms within 5 years after the policy. *** p<0.01, ** p<0.05, * p<0.1.

Table 6. Entry analysis – Dependent variable: Probability to become a firm (probit estimates) – Marginal effects of Dummy treatment in model (1)

	(1)	(2)
Dependent variable	Full sample	Projects with similar rating (medium)
Dummy Treatment	0.697*** (0.041)	0.541*** (0.063)
Obs.	270	117

Notes: Probit estimates; the dependent variable is a dummy equal to one if the project became a new firm within 5 years after the policy. All regressions in Panel B include number of project applicants, shares of female, young, non-local and academic/researcher applicants, dummy variables for the presence of a majority shareholder, an entrepreneur/manager, a university or a firm in the team of applicants, and sector (manufacturing, ICT, professional/tech/scientific services, other). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 7. Entry analysis - Average treatment effect on the treated

	(1)	(2)
	Full sample	Projects with similar rating (medium)
Panel A: Propensity score matching		
Dummy Treatment	0.741***	0.608***
	(0.065)	(0.071)
	[269]	[114]
Panel B: Inverse probability weighting		
Dummy Treatment	0.712***	0.571***
	(0.044)	(0.091)
	[270]	[117]
Panel C: Double Lasso estimator		
Dummy Treatment	0.706***	0.518***
	(0.042)	(0.087)
	[270]	[117]

Notes: The dependent variable is a dummy equal to one if the project became a new firm within 5 years after the policy. The baseline set of covariates include: number of project applicants, shares of female, young, non-local and academic/researcher applicants, dummy variables for the presence of a majority shareholder, an entrepreneur/manager, a university or a firm in the team of applicants, and sector (manufacturing, ICT, professional/tech/scientific services, other). Robust standard errors in parenthesis. Number of observations in brackets. *** p<0.01, ** p<0.05, * p<0.1. Panel A: The sample includes only observations in the common support. The standard errors are obtained following Abadie and Imbens (2016). Panel B: IPW obtained with a probit model. Panel C: Double adaptive Lasso. The set of covariates is integrated with quadratic, cubic and interaction terms.

Table 8. Distribution of the firm sample

	Treated firms	Non-selected projects	Other firms from the Register of innovative start-ups
Total	128	36	271
Number of startups by year of birth			
2012	34	2	49
2013	54	12	85
2014	40	9	137
2015 and after	0	13	0
Number of startups by region of localization			
Latium	128	29	271
Other regions	0	7	0
Number of startups by sector			
Manufacturing	9	4	22
ICT services	57	13	159
Professional/tech/scientific services	58	17	63
Other sectors	4	2	27

Notes: Own calculations on data from Infocamere, Cerved and Region Latium (LazioInnova).

Table 9. Balancing properties (startup year): Coefficients of Dummy treatment – Dependent variable in the first column (project characteristics)

	(1)	(2)	(3)	(4)
	Control firms = non selected projects		Control firms = other firms from the Register of innovative start-ups	
Dependent variable	Full sample	Only projects with similar rating (medium)	Full sample	Only treated and untreated firms from the Register
Number of shareholders (units)	0.311	-0.019	1.209***	1.682***
	(0.556)	(1.035)	(0.302)	(0.344)
	[164]	[96]	[395]	[349]
Dummy for presence of a majority shareholder	0.114	0.294*	-0.083	-0.152**
	(0.125)	(0.177)	(0.063)	(0.071)
	[164]	[96]	[395]	[349]
Share of young shareholders	2.384	-8.175	6.052	4.818
	(9.881)	(16.553)	(4.684)	(5.200)
	[164]	[96]	[395]	[349]
Share of female shareholders	4.565	6.688	3.076	-0.858
	(7.983)	(12.443)	(3.755)	(4.094)
	[164]	[96]	[395]	[349]
Share of non-local shareholders	-8.411	-9.761	-5.355	-2.072
	(10.118)	(14.211)	(4.080)	(4.679)
	[164]	[96]	[395]	[349]
Dummy for having a university as shareholder	0.013	-0.035	0.088***	0.109***
	(0.060)	(0.111)	(0.029)	(0.039)
	[164]	[96]	[395]	[349]
Dummy for having a firm as shareholder	-0.065	0.033	0.015	0.034
	(0.126)	(0.160)	(0.053)	(0.064)
	[164]	[96]	[395]	[349]

Notes: OLS estimates; each row reports the estimated coefficient of the dummy treatment for various indicators at the startup year. All regressions include sector (nace 2-digit), startup year and region dummies. Robust standard errors in parenthesis. Number of observations in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 10. Balancing properties (startup year): Coefficients of Dummy treatment – Dependent variable in the first column (balance-sheet variables)

	(1)	(2)	(3)	(4)
	Control firms = non selected projects		Control firms = other firms from the Register of innovative start-ups	
Dependent variable	Full sample	Only projects with similar rating (medium)	Full sample	Only treated and untreated firms from the Register
Employees (units)	-0.027	0.160	-0.099	-0.088
	(0.084)	(0.101)	(0.093)	(0.102)
	[122]	[78]	[331]	[295]
Assets (thousands of euro)	-23.842	-47.611	-0.361	-3.433
	(42.921)	(74.646)	(10.255)	(10.787)
	[122]	[78]	[331]	[295]
Leverage (debt-to-equity ratio)	1.091	2.222	-1.047	-1.828
	(2.257)	(3.524)	(2.598)	(2.477)
	[118]	[76]	[314]	[279]

Notes: OLS estimates; each row reports the estimated coefficient of the dummy treatment for various indicators at the startup year. All regressions include sector (nace 2-digit), startup year and region dummies. Robust standard errors in parenthesis. Number of observations in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 11. Survival analysis – Survival rate after 2 or 5 years

	(1)	(2)	(3)	(4)
	Control firms = non selected projects		Control firms = other firms from the Register of innovative start-ups	
	Full sample	Only projects with similar rating (medium)	Full sample	Only treated and untreated firms from the Register
Panel A: after 2 years				
Treated firms	0.90	0.89	0.90	0.94
Control firms	0.86	1.00	0.92	0.92
Mean difference	0.04	-0.11	-0.02	0.02
P-value	0.530	0.162	0.503	0.547
Panel B: after 5 years				
Treated firms	0.72	0.71	0.72	0.79
Control firms	0.78	0.81	0.73	0.73
Mean difference	-0.06	-0.10	-0.01	0.06
P-value	0.483	0.417	0.804	0.260
Obs.	164	96	399	353

Notes: The Table shows the percentage of firms surviving after 2 or 5 years. *** p<0.01, ** p<0.05, * p<0.1.

Table 12. Survival analysis – Dependent variable: Probability to survive (probit estimates) – Marginal effect of Dummy treatment in model (2)

	(1)	(2)	(3)	(4)
	Control firms = non selected projects		Control firms = other firms from the Register of innovative start-ups	
Dependent variable	Full sample	Only projects with similar rating (medium)	Full sample	Only treated and untreated firms from the Register
Panel A: after 2 years				
Dummy Treatment	-0.024	-	-0.028	0.024
	(0.062)	-	(0.044)	(0.047)
Panel B: after 5 years				
Dummy Treatment	-0.059	-0.044	0.007	0.092
	(0.098)	(0.168)	(0.055)	(0.059)
Obs.	164	96	395	349

Notes: Probit estimates; the dependent variable is a dummy equal to one if the firm survived after 2 or 5 years. All regressions include number of shareholders, shares of female, young and non-local shareholders, dummy variables for the presence of a majority shareholder, a university or a firm as a shareholder, sector (nace 2-digit), startup year and region. Robust standard errors in parentheses. Number of observations in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 13. Economic Performance – Coefficients of Dummy treatment in model (3) – Dependent variable in the first column

	(1)	(2)	(3)	(4)
	Control firms = non selected projects		Control firms = other firms from the Register of innovative start-ups	
Dependent variable	Full sample	Only projects with similar rating (medium)	Full sample	Only treated and untreated firms from the Register
Turnover (thousands of euros)	-436.767	-29.584	-130.383***	-112.538**
	(302.058)	(31.396)	(46.365)	(48.112)
	[134]	[84]	[359]	[319]
Employees (units)	-3.277	0.482	-0.739**	-0.559
	(2.574)	(0.579)	(0.372)	(0.455)
	[134]	[84]	[359]	[319]
Assets (thousands of euros)	-274.894	70.009	-115.302**	-77.190
	(231.751)	(88.061)	(47.758)	(58.391)
	[134]	[84]	[359]	[319]

Notes: OLS estimates; each row reports the estimated coefficient of the treatment variable for various outcomes. For each dependent variables, we consider the average over 5 years after the startup. All regressions include number of shareholders, shares of female, young and non-local shareholders, dummy variables for the presence of a majority shareholder, a university or a firm as a shareholder, sector (nace 2-digit), startup year and region. Robust standard errors in parenthesis. Number of observations in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 14. Economic performance (trimmed sample) – Coefficients of Dummy treatment in model (3) – Dependent variable in the first column

	(1)	(2)
	Control firms = non selected projects	Control firms = other firms from the Register of innovative start-ups
Dependent variable	Full sample	Full sample
Turnover (thousands of euros)	-46.322*	-1.929
	(26.332)	(9.490)
	[128]	[319]
Employees (units)	-0.149	-0.062
	(0.358)	(0.123)
	[127]	[325]
Assets (thousands of euros)	-28.872	-12.794
	(35.171)	(14.443)
	[128]	[321]

Notes: OLS estimates; each row reports the estimated coefficient of the treatment variable for various outcomes. For each dependent variables, we consider the average over 5 years after the startup. The observations are trimmed if they exceed p75+1.5*(p75-p25), where pX is the Xth percentile. All regressions include number of shareholders, shares of female, young and non-local shareholders, dummy variables for the presence of a majority shareholder, a university or a firm as a shareholder, sector (nace 2-digit), startup year and region. Robust standard errors in parenthesis. Number of observations in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 15. Economic and financial condition – Coefficients of Dummy treatment in model (3) – Dependent variable in the first column

	(1)	(2)	(3)	(4)
	Control firms = non selected projects		Control firms = other firms from the Register of innovative start-ups	
Dependent variable	Full sample	Only projects with similar rating (medium)	Full sample	Only treated and untreated firms from the Register
Leverage (debt-to-equity ratio)	0.158 (2.983) [134]	-1.624 (2.985) [84]	0.857 (1.783) [355]	-0.811 (1.096) [315]
Ratio of net financial costs to financial debt (percentage ratio)	0.035 (0.042) [100]	0.057 (0.049) [62]	-0.011 (0.030) [242]	-0.016 (0.028) [212]
EBITDA to sales ratio (percentage ratio)	-4.041 (3.232) [125]	-1.375 (0.898) [77]	-0.712 (1.105) [320]	-1.061 (1.488) [285]
ROA (percentage ratio)	-22.074* (12.866) [134]	-37.595* (21.425) [84]	15.565* (8.477) [358]	16.315* (8.914) [318]
ROE (percentage ratio)	6.251 (45.376) [134]	-39.836 (40.200) [84]	-7.288 (21.893) [355]	15.654 (25.476) [315]

Notes: OLS estimates; each row reports the estimated coefficient of the treatment variable for various outcomes. For each dependent variables, we consider the average over 5 years after the startup. All regressions include number of shareholders, shares of female, young and non-local shareholders, dummy variables for the presence of a majority shareholder, a university or a firm as a shareholder, sector (nace 2-digit), startup year and region. Robust standard errors in parenthesis. Number of observations in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 16. Patent analysis – Percentages of firms that applied for a patent

	(1)	(2)	(3)	(4)
	Control firms = non selected projects		Control firms = other firms from the Register of innovative start-ups	
	Full sample	Only projects with similar rating (medium)	Full sample	Only treated and untreated firms from the Register
Treated firms	0.13	0.11	0.13	0.15
Control firms	0.00	0.00	0.07	0.07
Mean difference	0.13**	0.11*	0.06*	0.08**
P-value	0.025	0.079	0.071	0.033
Obs.	164	96	399	353

Notes: The Table shows the percentage of firms that apply for a patent to the EPO in the five years after birth. *** p<0.01, ** p<0.05, * p<0.1.

Table 17. Patent analysis - Probit and negative binomial regressions

	(1)	(2)	(3)	(4)
	Control firms = other firms from the Register of innovative start-ups			
	Full sample	Only treated and untreated firms from the Register	Full sample	Only treated and untreated firms from the Register
Dependent Variable:	Dummy Patent	Dummy Patent	Number of patents	Number of patents
Dummy Treatment	0.053*	0.035	0.036	0.008
	(0.028)	(0.029)	(0.060)	(0.065)
Estimator	Probit	Probit	Negative binomial	Negative binomial
Obs.	395	349	395	349

Notes: In Columns 1-2, the dependent variable is a dummy equal to one if the firm that apply for a patent to the EPO in the five years after birth. In Columns 3-4, the dependent variable is the total number of patents. All regressions include number of shareholders, shares of female, young and non-local shareholders, dummy variables for the presence of a majority shareholder, a university or a firm as a shareholder, sector (nace 2-digit) and startup year. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 18. Public subsidies analysis - Percentage of firms that received other public subsidies

	(1)	(2)	(3)	(4)
	Control firms = non selected projects		Control firms = other firms from the Register of innovative start-ups	
	Full sample	Only projects with similar rating (medium)	Full sample	Only treated and untreated firms from the Register
Panel A: All Govs				
Treated firms	0.34	0.30	0.34	0.44
Control firms	0.31	0.38	0.28	0.28
Mean difference	0.04	-0.08	0.06	0.15***
P-value	0.670	0.560	0.228	0.008
Panel B: Central Govs				
Treated firms	0.13	0.14	0.13	0.16
Control firms	0.11	0.13	0.18	0.18
Mean difference	0.02	0.01	-0.05	-0.02
P-value	0.823	0.895	0.186	0.698
Panel C: Local Govs				
Treated firms	0.27	0.23	0.27	0.37
Control firms	0.11	0.13	0.14	0.14
Mean difference	0.16**	0.10	0.13***	0.23***
P-value	0.043	0.374	0.002	0.000
Obs.	164	96	399	353

Notes: The Table shows the percentage of firms that received other public subsidies in the five years after birth. *** p<0.01, ** p<0.05, * p<0.1.

Table 19. Public subsidies analysis (probit estimates)

	(1)	(2)	(3)	(4)
	Control firms = non selected projects		Control firms = other firms from the Register of innovative start-ups	
	Full sample	Only projects with similar rating (medium)	Full sample	Only treated and untreated firms from the Register
Panel A: All Govs				
Dummy Treatment	0.073	-0.172	0.105**	0.173***
	(0.098)	(0.119)	(0.050)	(0.057)
Panel B: Central Govs				
Dummy Treatment	0.035	0.050	-0.025	-0.003
	(0.059)	(0.080)	(0.039)	(0.046)
Panel C: Local Govs				
Dummy Treatment	0.279**	0.070	0.137***	0.195***
	(0.123)	(0.134)	(0.041)	(0.045)
Obs.	164	96	395	249

Notes: Probit estimates; the dependent variable is a dummy equal to one if the firm has received in the five years after birth. All regressions include number of shareholders, shares of female, young and non-local shareholders, dummy variables for the presence of a majority shareholder, a university or a firm as a shareholder, sector (nace 2-digit) and startup year. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix

Table A1. Descriptive statistics - startup year

		Treated firms	Non selected projects	Other firms from the Register of innovative start-ups
Employees (units)	Mean	0.1	0.1	0.2
	S.d.	0.3	0.3	0.9
	Max	2	1	10
	Min	0	0	0
	N	110	12	221
Assets (thousands of euros)	Mean	51.9	55.4	55.4
	S.d.	66.0	99.9	117.4
	Max	473	366	1061
	Min	0	4	0
	N	110	12	221
Leverage (debt-to-equity ratio)	Mean	3.9	3.2	4.4
	S.d.	11.8	3.4	22.1
	Max	70	11	269
	Min	-33	0.1	-21
	N	107	11	207

Notes: Own calculations on data from Infocamere, Inps, Cerved and Region Latium (LazioInnova).

Table A2. Descriptive statistics - average over 5 years after startup

		Treated firms	Non selected projects	Other firms from the Register of innovative start-ups
Turnover	Mean	71.8	553.2	175.5
(thousands of euros)	S.d.	115.0	1720.7	428.7
	Max	855	6761	4066
	Min	0	6	0
	N	119	15	244
Employees	Mean	0.9	4.7	1.5
(units)	S.d.	1.6	14.8	3.6
	Max	12	58	41
	Min	0	0	0
	N	119	15	244
Assets	Mean	149.2	464.4	253.6
(thousands of euros)	S.d.	243.4	1309.2	417.5
	Max	2074	5177	2902
	Min	3	15	0
	N	119	15	244

Notes: Own calculations on data from Infocamere, Inps, Cerved and Region Latium (LazioInnova).

Table A2. Descriptive statistics - average over 5 years after startup (continue)

		Treated firms	Non selected projects	Other firms from the Register of innovative start-ups
Leverage	Mean	3.6	3.2	4.3
(debt-to-equity ratio)	S.d.	12.3	7.2	9.8
	Max	120.0	26.5	53.1
	Min	-26.8	-4.1	-29.2
	N	119	15	240
Ratio of net financial costs to financial debt	Mean	0.1	0.0	0.1
(percentage ratio)	S.d.	0.1	0.1	0.3
	Max	1	0	3
	Min	0	0	-1
	N	89	11	155
EBITDA to sales ratio	Mean	-1.7	-0.3	-1.1
(percentage ratio)	S.d.	8.0	0.7	4.4
	Max	3	0	3
	Min	-75	-2	-49
	N	110	15	214
ROA	Mean	-11.8	-2.5	-23.5
(percentage ratio)	S.d.	43.9	17.4	70.6
	Max	53	28	83
	Min	-275	-33	-634
	N	119	15	243
ROE	Mean	5.1	23.7	-9.1
(percentage ratio)	S.d.	150.5	47.2	157.1
	Max	979	102	761
	Min	-700	-56	-1122
	N	119	15	240

Notes: Own calculations on data from Infocamere, Inps, Cerved and Region Latium (LazioInnova).

Table A3. Economic performance (year-by-year estimates) - Dependent variable in the first column

	(1)	(2)	(3)	(4)	(5)
	Full sample	Full sample	Full sample	Full sample	Full sample
Years after birth:	Year 1	Year 2	Year 3	Year 4	Year 5
	Panel A: Control firms = non selected projects				
Turnover (thousands of euro)	-109.702**	-330.625	-423.851	-600.533	-707.408
	(41.812)	(220.911)	(309.204)	(451.162)	(596.805)
	[131]	[124]	[118]	[106]	[95]
Employees (units)	-0.549	-1.827	-3.084	-4.298	-6.072
	(0.335)	(1.343)	(2.405)	(3.724)	(6.031)
	[131]	[124]	[118]	[106]	[95]
Assets (thousands of euro)	-32.313	-169.845	-297.860	-373.484	-424.863
	(49.336)	(143.275)	(278.766)	(332.319)	(452.220)
	[131]	[124]	[118]	[106]	[95]
	Panel B: Control firms = other firms from the Register of innovative start-ups				
Turnover (thousands of euro)	-65.878*	-67.888***	-151.205***	-205.637**	-332.952***
	(37.302)	(25.499)	(57.945)	(83.193)	(113.441)
	[350]	[328]	[298]	[272]	[238]
Employees (units)	-0.257	-0.580**	-0.788**	-1.027	-1.648*
	(0.186)	(0.251)	(0.397)	(0.638)	(0.918)
	[350]	[328]	[298]	[272]	[238]
Assets (thousands of euro)	-22.301	-77.917***	-104.331	-167.559**	-305.230***
	(26.303)	(27.841)	(71.381)	(78.539)	(100.342)
	[350]	[328]	[298]	[272]	[238]

Notes: OLS estimates; each row reports the estimated coefficient of the treatment variable for various outcomes. All regressions include number of shareholders, shares of female, young and non-local shareholders, dummy variables for the presence of a majority shareholder, a university or a firm as a shareholder, sector (nace 2-digit), startup year and region. Robust standard errors in parenthesis. Number of observations in brackets. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A4. Economic performance (median regression) - Dependent variable in the first column

	(1)	(2)
	Control firms = non selected projects	Control firms = other firms from the Register of innovative start-ups
	Full sample	Full sample
Turnover (thousands of euros)	-39.549	-3.542
	(41.480)	(9.728)
	[134]	[359]
Employees (units)	-0.452	-0.050
	(0.365)	(0.131)
	[134]	[359]
Assets (thousands of euros)	-19.073	-10.781
	(23.354)	(15.455)
	[134]	[359]

Notes: Median regression estimates; each row reports the estimated coefficient of the treatment variable for various outcomes. For each dependent variables, we consider the average over 5 years after the startup. All regressions include number of shareholders, shares of female, young and non-local shareholders, dummy variables for the presence of a majority shareholder, a university or a firm as a shareholder, sector (nace 2-digit), startup year and region. Robust standard errors in parenthesis. Number of observations in brackets. *** p<0.01, ** p<0.05, * p<0.1.