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FEMALE ENTREPRENEURSHIP AND GOVERNMENT POLICY: EVALUATING THE IMPACT OF SUBSIDIES ON FIRMS' SURVIVAL

by Elena Gennari* and Francesca Lotti**

Abstract

This paper assesses the effectiveness of Law 215/1992, an incentive scheme intended to boost female entrepreneurship in Italy. Under the law, which was only implemented in 1997 and remained in force for a decade, the allocation of subsidies among the regions was inversely proportional to their female labour market participation rates. Focussing on the subsidies for start-ups, we analyze survival patterns of subsidized versus non-subsidized firms. We find that subsidized firms show higher survival rates than non-subsidized firms for a period of up to five years after incorporation. After five years the survival patterns are very similar, leading us to conclude that the incentive scheme had no permanent effect on the subsidized firms but only produced a "honeymoon effect".

JEL Classification: C41, J16, M13.
Keywords: entrepreneurship, subsidies, evaluation, survival.

Contents

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** Bank of Italy, Economic Research and International Relations.

1 Introduction[1]

According to a recent survey carried out by the GEM Consortium in 59 economies, 104 million women started and managed new business ventures in 2010 only. Another 83 million women across those regions ran businesses they had launched at least three and a half years before (Kelley et al., 2010). The contribution women make to worldwide entrepreneurship and business ownership is non negligible. Nevertheless, women tend to participate less than men in entrepreneurship, as evident from Figure 1. However, the gap between women and men decreases with economic development level. Since, for various reasons, there are far fewer women engaging in entrepreneurial activity, starting and running businesses is a predominantly male occupation. This finding indicates that, with very few exceptions, nearly every society - no matter the level of entrepreneurship - is not fully benefiting from the enterprising activities of half their working age population.

In this landscape, Italy is not an exception: amongst the most industrialized countries it shows very low levels of the TEA index[2] for females. Focussing on sole proprietorships[3] and using data from Infocamere (the business register at the Chamber of commerce) we find that the share of female in Italy ranges from 0.21 to 0.28 per cent (see Figure 2). This limited presence of women entrepreneurs in Italy reflects a more general unsatisfactory female participation in the labor market, for which Italy fares very poorly if compared to other European countries. In this context, government subsidies for boosting female entrepreneurship can be viewed also as incentives for increasing female participation in the labor market. Since any kind of government intervention is designed to address a specific market failure, startup subsidies are aimed at relaxing credit constraints[4] that a newly established firm may face when going in business.

The most recent empirical literature provides several evaluation exercises of startup subsidies in Europe. Pfeiffer and Reize (2000) study the effect of the subsidies given to the unemployed workers in Germany. They conclude that the government support would have a negative effect on firm survival in the formerly East Germany and they

[1]We thank M. Lustri and S. Serafin of the Ministry for Economic Development for providing us with most of the data used in our analysis. We are grateful to M. Bianco and E. Santarelli for their insightful comments. M. Chiurato provided outstanding research assistance. The views expressed are those of the authors and do not necessarily reflect those of the Bank of Italy.

[2]The index is the percentage of 18 to 64 age group who are either a nascent entrepreneur or owner-manager of a new business.

[3]We focus on sole proprietorship firms because determining the gender of this group of firms it is straightforward and, most importantly, greenfield entry occurs mainly with this legal form.

[4]Credit constraints may be caused by several factors, like the lack of credit history, an insufficient managerial ability and, especially for female-run firms, a cultural resistance to see a woman running a firm. Although interesting, distinguishing the sources of the market failure goes beyond the scope of the present paper.

find no overall effect on employment. However, this latter result on employment, has been reconsidered by Almus (2001) on comparable data. He finds that, if one considers firms that have survived at least 6 years, there is a positive effect of start-up subsidies on employment growth. Battistin, Gavosto and Rettore (2001) study the effect of public support to startup by young entrepreneurs in Italy.[5] The authors compare the hazard rates of subsidized and non-subsidized firms. They find that the hazard rate of subsidized firms is increasing over time while the hazard rate of the non-subsidized firms is decreasing. Both hazard rates become similar after 4 years. Crépon and Duguet (2003) analyze the survival function of French startups and they find that the startup subsidies significantly increase the success of the entrepreneurs that were formerly unemployed, while no effect is evident for formerly employed workers. More recently, Désiage et al. (2010), based on French firms, find that subsidized[6] firms are more likely to survive after the first two years. Interestingly, the authors find no significant effect of the subsidy on the profitability and the productivity.

Our analysis fits into that stream of empirical literature since it is aimed at evaluating the effectiveness of the incentive scheme provided by L.215 to startups held by females. The methodology used in this study starts from the seminal paper of Rubin (1974), based on non-experimental data. We want to evaluate the effect of a treatment (i.e., the startup subsidy), that is applied to some individuals (female startups), on a specific outcome (the survival function). The aim of this methodology is to determine the "causal effect" of the subsidy on firms' survival. Using data on the survival patterns of "treated firms", and "control group", made by the whole set of firms which applied for the subsidies without receiving them, we find that the difference between the two survival curves is significant up to the sixth year of life. After that time, the effect of the subsidy is negligible. We label this behavior as a "honeymoon effect".

2 The Law n. 215/1992

Law 215 in favor of female entrepreneurship was issued in February 1992 although its actual implementation started only five years later. Six waves took place from 1997 to 2006: in the first three, subsidies were directly managed by the Central government, while in the last three those regional authorities which could match State funds with their own funds were allowed to run the measure and include additional criteria for the selection process.[7]

Funds were allocated on the basis of the regional labour market conditions and were inversely proportional to the female employment rate. In Figure 3 we plot for

[5] In particular, they refer to the subsidy scheme provided by L44/1986.

[6] In this context, the subsidy is mainly a tax cut rather than a lump sum.

[7] This provision was intended to help Regions to frame aids within regional planning.

every region[8] the female participation rate and the ratio of initially financed firms on population. As pointed out also by the downward sloping regression line, the relationship is clearly negative.

The target of Law 215 was the small, female firm. Sole proprietorship firms should be owned by women while partnerships have at least 60% female partners and corporations have two thirds of shares and boards of directors in female hands. As to size, workers should not exceed 50 units and sales 7 million euros (5 millions for the balance sheet). Larger firms could not have a share greater than one quarter in the subsidized firms.

The financing was granted for four types of investment projects: 1) starting of a new activity (startup), 2) purchasing of existing businesses, 3) implementation of qualifying or innovative activities (concerning products or firm organization) and 4) purchasing of consulting services. Firms were divided into three sectors: Agriculture, Manufacturing and Services (including Commerce and Tourism).

Firms could finance plants, machinery, equipment, patents, software and, with some limits, masonry works, design specifications and feasibility studies. Goodwill and purchasing of land and buildings were excluded from the subsidy scheme.

For the first five waves, financing was in the form of a grant which amounted to a percentage of total investment expenditures. The percentage varied according to the region, the type of investment and the chosen regime. As a matter of fact, firms could ask for the application of *de minimis* rule and thus obtain a higher financing percentage under the grant limit of 100 thousand euros. In the last wave, half of the financing was transformed into a subsidized loan (at 0.5 %) with the contemporaneous introduction of a range limit for investments (60-400 thousand euros). Firm aids under Law 215 could not be cumulated with other forms of subsidized financing.

Priority criteria for firm ranking at the national level were set on the basis of investment and both total and female employment increases. Scores were raised in case of female only participation, environmental certifications and e-commerce. This last criteria was substituted in the sixth wave by the introduction of job flexibility aimed at balancing work and life. Criteria were required to be satisfied for a 5-year period during which firms were monitored and revoked if not compliant.[9]

3 The fourth and the fifth waves

We focus on the fourth and the fifth waves because the incentive scheme was very similar and data available. The fourth wave of Law 215, the first with the involvement of regional authorities, took place in 2001.[10] Total funds amounted to 233 million euros and were directly managed by 16 Regions of which 4 specified additional criteria

[8]Data on Piemonte and Valle d'Aosta are merged.

[9]In case of revocation the grant, if already delivered to the firm, had to be returned.

[10]Firms were allowed to apply for financing from the end of February to the end of May.

with respect to the national ones. The number of firms that applied for the subsidy and were admissible (we label them as "ranked"), was about 23 thousand: one quarter of them were subsidized. The majority of filed projects concentrated on the starting of a new activity (58%) and the remaining mainly on the implementation of qualifying or innovative activities (38%).[11]

The public announcement of selection for the fifth wave was issued in December 2002.[12] Resources were higher than in the previous wave (288 million euros): all but two regions added own funds and 8 of them included additional local criteria. Ranked firms turned out to be about 33 thousand. Initially subsidized projects were 6.5 thousand of which 64% concerned new businesses and 32% qualification or innovation.

In Table 1 we report for each region the number of total and start-up projects for both ranked and initially financed firms. The majority of projects concerned the starting of new businesses. Potential demand, which is proxied here by the ratio of non financed over total number of ranked firms (Figure 4) is inversely related to the female entrepreneurship rate in the region, given by the number of female entrepreneurs and population between 15-64 years. As a matter of fact, in those contexts characterized by a low female participation and high unemployment rates, the demand was particularly high, as this may have been perceived as a broader instrument to favor female employment rather than pure entrepreneurship.

A similar correlation can be observed when looking at the number of revoked projects, i.e. those that did not manage to satisfy over time the initial criteria or decided to drop out of the program. According to the data available for the fourth wave, the number of revoked firms was quite high, about 44% of those initially subsidized. This rate is likely to be correlated with the lack of local entrepreneurship tradition. We thus plot for every region (Figure 5) the share of revoked projects and the female entrepreneurship rate. Although the evidence is not particularly strong, the slope of the regression line appears slightly negative.

In the next Section we try to evaluate the effectiveness of L.215, by looking at whether startup subsidies were able to affect firms' survival patterns.

4 Was the Law effective?

4.1 Data and Methodology

We have no priors on the ex post performance of subsidized versus non-subsidized firms in terms of growth, productivity, or profitability, since this kind of subsidizing schemes were aimed at stimulating female participation into entrepreneurial activity, mostly by means of self-employment, reducing ex-ante startup constraints or barriers.

[11] For a description, both at national and at regional level, of the results of the implementation of fourth and fifth wave of Law 215, see Ministero dello Sviluppo economico, 2009

[12] The initial deadline for the application was March 3^rd and then postponed to April 15^th

Accordingly, in order to evaluate the effectiveness of L.215's, we look at the whether the survival's patterns of the subsidized firms are significantly different from those of non-subsidized firms. To do so, we need first to gather information on the incorporation date and on the duration of the activity (i.e. "lifetime" of a firm). We first collected project-level data on the firms that applied for the subsides offered by the fourth and fifth waves (56 thousand in total).[13] Focussing on the projects concerning the start of a new activity (34 thousand), we matched this information with demographic characteristics taken from the Chamber of commerce (Infocamere), in order to trace the date in which the firm was founded (we were able to match 13 thousand firms only[14]). The distribution across waves is reported on Table 2.

In order to answer the question "what would have happened to the subsidized firms if they had not been financed" we need to set up a counterfactual framework. In the case of the startup subsidies, choosing a control group is not straightforward, since most of the non-financed projects are likely to fail to become active firms. Our strategy encompasses two steps: first, as a preliminary assessment, we use the whole set of non-subsidized firms as the control group, the reason being that we think that all the firms applying for these grants share some features, like financial constraints and a widespread lack of managerial ability. Of course, this approach has some limitations, since we are aware that we are comparing firms located in different sectors and in different regions. Second, as an extension, we plan to use a matching procedure (as in Dehejia and Wahba, 2002) choosing both among non-subsidized firms and among firms which did not apply for the L.215 grants.

Table 3 shows survival patterns of subsidized versus non-subsidized firms, at the end of 2011. At first glance, we may conclude that, although slightly higher for subsidized firms, survival ratios are not significant different between the two groups. Nevertheless, there might be differences in the survival patterns across different lifetimes, and this will be the core of the analysis developed in the next section.

4.2 Survival analysis

Econometric modeling to analyze duration (or survival) focus on the time spent in a given state before moving into another state: in our framework, the time elapsed since firms' incorporation. Suppose we start observing a set of N firms at time $T = 0$, the time of their foundation. We define the continuos random variable T as the duration of stay in the state "active"; suppose that we observe survival patterns at some given intervals $t_{(j)}$, with $j = 1, \cdots, r$.

Let n_j be the number of firms still active (i.e. at risk of failure) just before time t_j and d_j the number of exits (failures) at time $t_{(j)}$. Accordingly, the conditional probability that a firm exits in the time interval from $t_{(j)} - \Delta$ is estimated by the

[13]Data were kindly provided by the Ministry of Economic development.

[14]This huge loss of observations was expected since it is very likely that non-financed projects would not become active firms.

ratio $\frac{d_j}{n_j}$. The conditional probability that a firm survives beyond $t_{(j)} - \Delta$, given survival up to time $t_{(j)} - \Delta$, is estimated as $\frac{n_j - d_j}{n_j}$. If $\Delta \to 0$, the term $\frac{n_j - d_j}{n_j}$ becomes an estimate of the conditional probability of surviving beyond $t_{(j)}$ given the firm is still active up to $t_{(j)}$.
The discrete-time survivor function is:

$$S(t) = P\{T > t\}$$

which can be estimated non parametrically by its sample analogue

$$\hat{S(t)} = \prod_{j=0}^{k} \frac{n_j - d_j}{n_j}.$$

This estimator is commonly referred to as the Kaplan-Meier product limit estimator (Kaplan and Meier, 1958). The main advantages of this technique is that it does not require the use of covariates (very limited in our data set) and it is possible to obtain a visual representation of the estimated survival function.

In our framework, we estimated two survival functions, one for the "treated firms", i.e. those who received start-up subsidies and another for the "control group", made by the whole set of firms which applied for the subsidies without receiving them. Results are reported graphically on Figure 6, where the red line refers to subsidized firms, and the blue line refers to the non-subsidized ones. The difference between the two survival curves is significant up to the fifht year of life, as evident from Figure 7. These results are in line with those provided by Retecamere (2011): using a similar methodology, they find that the survival rates of the subsidized firms are higher, but they look at a 5-years time window only.

Although preliminary, this evidence suggest the existence of a "honeymoon effect" of these subsidies. Recall that the criteria to access the financial incentives were required to be satisfied for a 5-year time window: during this period, firms have a clear incentive to stay on the market even if operating at a suboptimal efficiency levels in order to maintain the subsidy. After that time, a pure market selection effect is at work on both groups of firms, making the survival patterns look very similar (Jovanovic, 1982).

At this point, a caveat is in order. Besides the choice of the control group, that we are aware is very relevant in this framework, our econometric analysis does not keep into account the revocations of authorization for the payment of the subsidy, due to the lack of up-to-date[15] project-level information. As a consequence, it is likely that some of the "treated" firms belong to the "non-treated" group instead: the result of this misplacement is an underestimate of the effect of the subsidy. For this reason,

[15]We plan to use data on revocations in the near future, when the coverage will be good enough to perform an econometric analysis.

although our analysis is very preliminary, we are confident that the the so called "honeymoon effect" will be even larger when no misclassification is in place.

5 Conclusions

This research, is aimed at evaluating the effectiveness of the incentive scheme provided by L.215 to startups held by females. We want to evaluate the effect of a treatment (i.e., the startup subsidy), that is applied to some individuals (female startups), on a specific outcome (the survival function) to determine the "causal effect" of the subsidy on firms' survival. Using data on the survival patterns of "treated firms", and "control group", made by the whole set of firms which applied for the subsidy without receiving it, we find that the difference between the two survival curves is significant up to the sixth year of life only. After that time, the effect of the subsidy is negligible (honeymoon effect).

From a procedural point of view, a 5-year window of monitoring phase may be viewed one one hand, as an appreciable element of modernity, on the other as a heavy administrative burden. Although the evaluation aspect is essential in our view, one should keep in mind that in some contexts, revocations rates were exceptionally high (more than 40% of the subsidized firms[16]): where entrepreneurial abilities are low, revocations tend to be higher. We thus attribute this effect more to a widespread lack of tradition and of managerial skills rather than to a selection inability.

[16]In those cases, although funds were recollected, it was impossible to use them to finance the excluded firms.

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Table 1: Fourth and fifth waves: ranked and subsidized firms.

Region	Ranked firms (startup)	Subsidized (startup)	Ranked (total)	Subsidized (total)
Piemonte-VA	807	379	1802	591
Lombardia	2063	929	3762	1219
TAA	31	31	63	63
Veneto	1039	392	2216	574
FVG	251	138	723	288
Liguria	871	342	1843	486
E-R	782	265	1726	424
Toscana	1167	441	2842	677
Umbria	624	206	1232	305
Marche	496	146	1034	230
Lazio	3190	1051	5201	1340
Abruzzo	601	182	821	219
Molise	446	109	864	171
Campania	9399	1724	13115	1995
Puglia	3124	828	4507	981
Basilicata	617	124	1121	182
Calabria	2754	400	4132	519
Sicilia	4837	1130	6968	1384
Sardegna	1253	427	2059	525

Database of the Ministry of Economic development. The number of non-subsidized firms are those which applied for the subsidies, but were not financed due to budget constraints.

Table 2: Fourth and fifth waves: subsidized vs non-subsidized firms.

Wave	N. of subsidized firms	N. of non-subsidized firms	Total
Fourth	2019	3139	5158
Fifth	2252	5747	7999
Total	4271	8886	13157

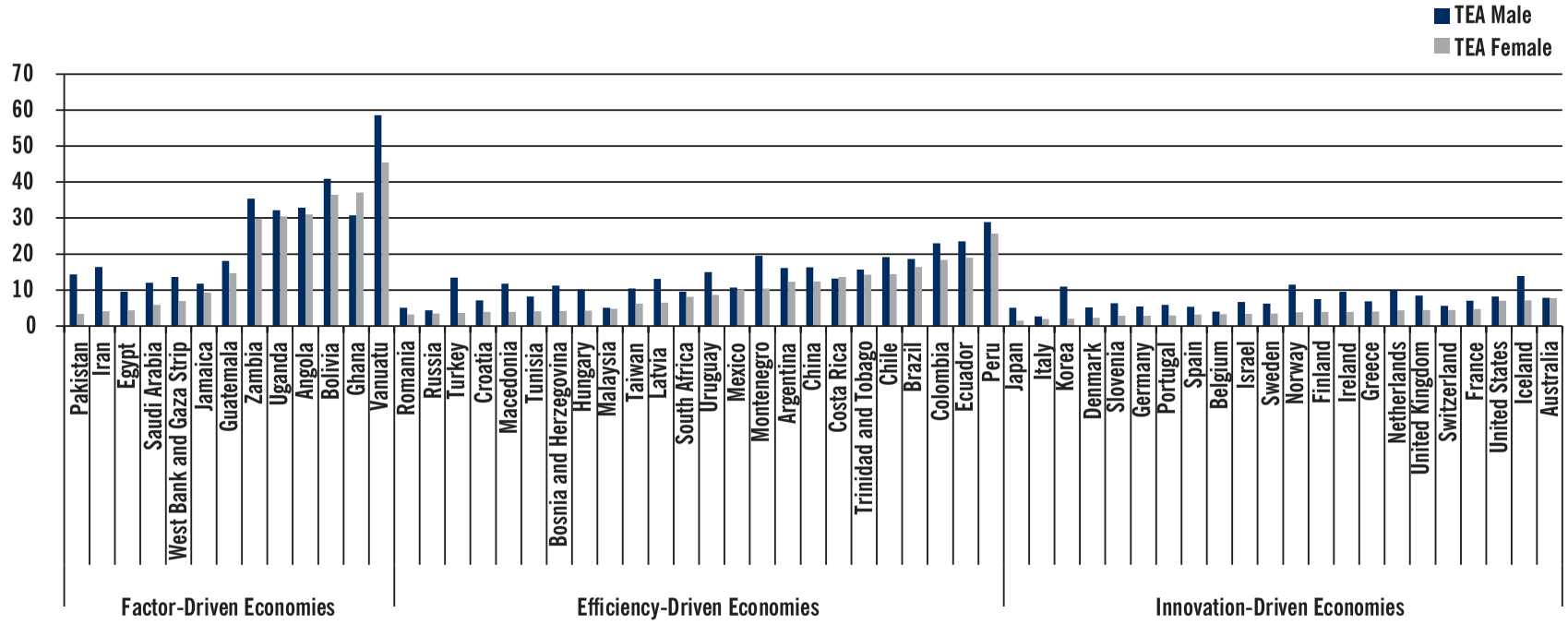
Authors' calculations. These figures represent those firms for which we could recover records in the Business register archives. The number of non-subsidized firms are those which applied for the subsidies, but were not financed due to budget constraints.

Table 3: Survival patterns of subsidized vs non-subsidized firms. Percentages.

Subsidized	Survived[(a)]	Non survived
Yes	32.7	67.3
No	32.1	67.9

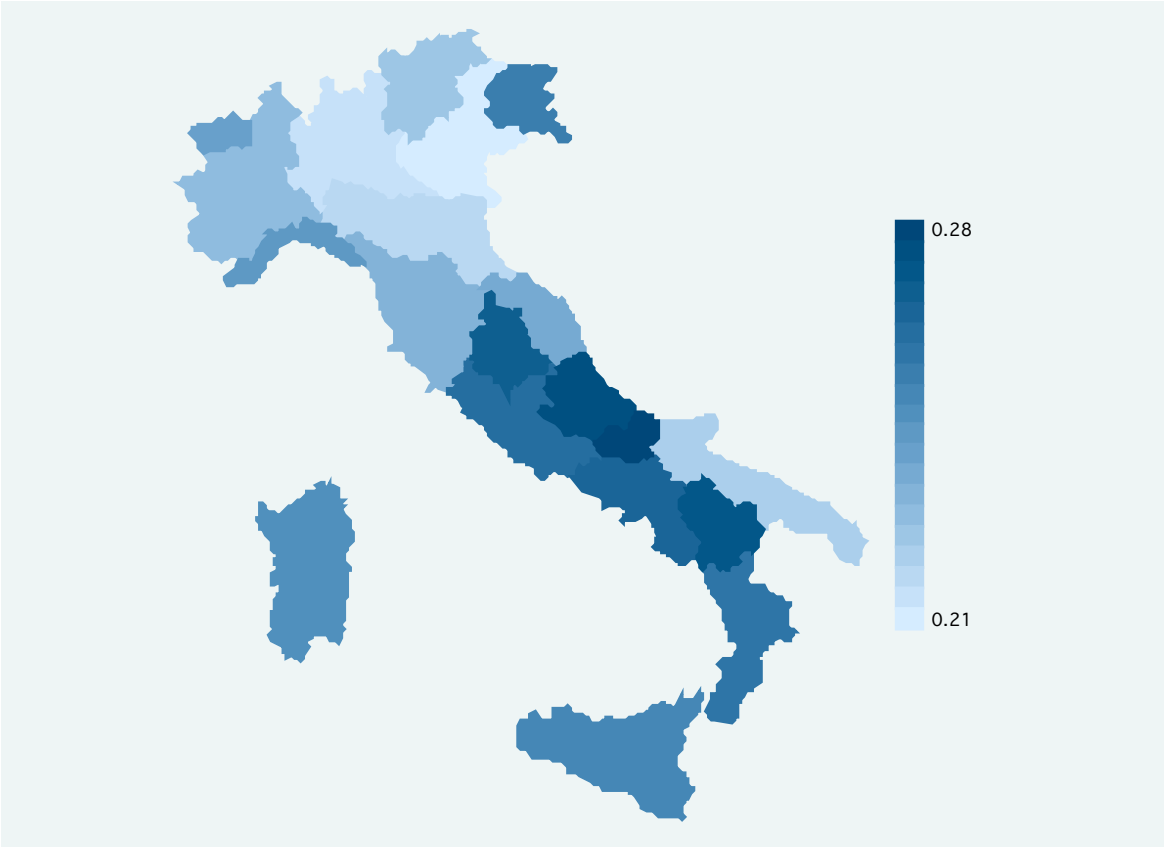
Authors' calculations. The number of non-subsidized firms are those which applied for the subsidies, but were not financed due to budget constraints. [(a)] Survived means that the firm is still active, according to the business register at the Chamber of commerce, at the end of 2011.

Figure 1: Total entrepreneurial activity, 2010. Percentages.



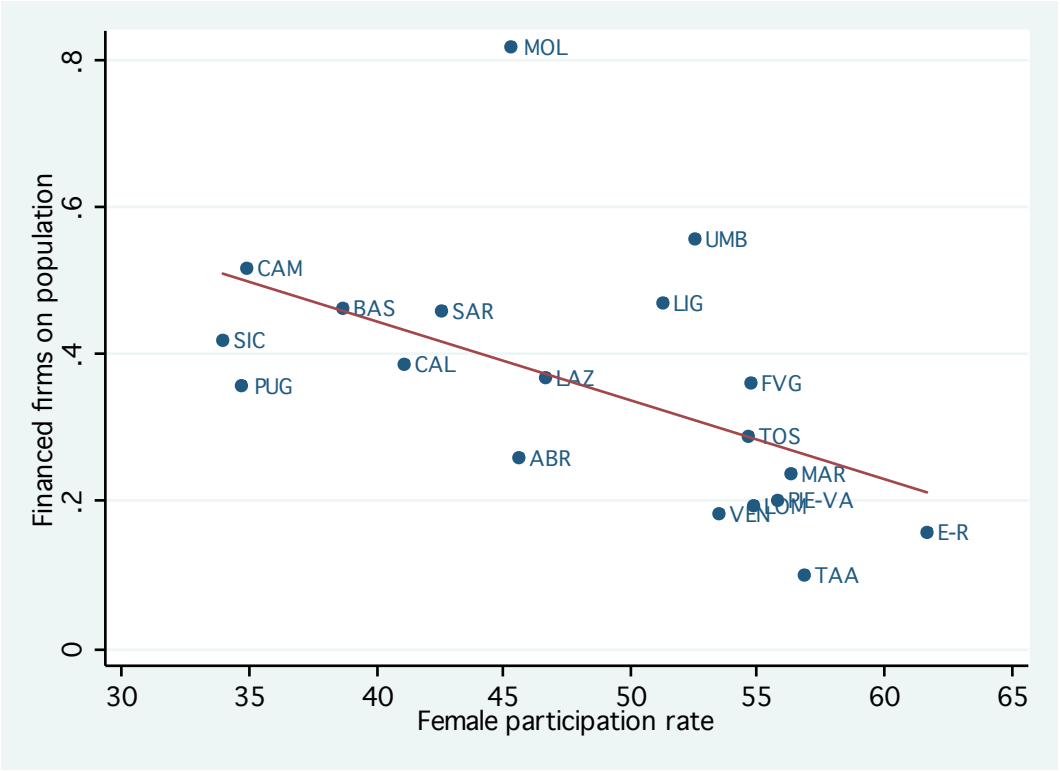
Source: GEM (2010). Proportion of the Adult Female and Male Population (ages 18-64) Participating in Total Early- Stage Entrepreneurial Activity (TEA) in 59 Economies, Ranked within Economic Group by Level of Female Participation, 2010.

Figure 2: Share of female firms. Sole proprietorships, 2010. Percentages.



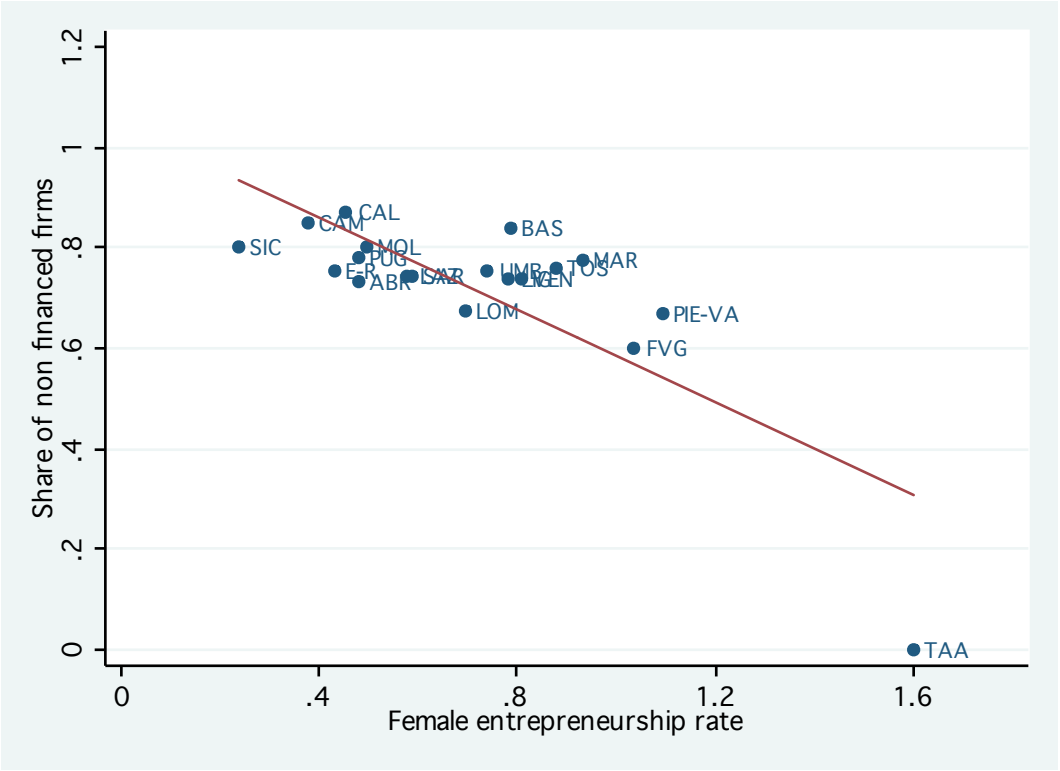
Source: authors' calculation on Infocamere data. Agriculture was excluded.

Figure 3: Financed firms and female participation rate



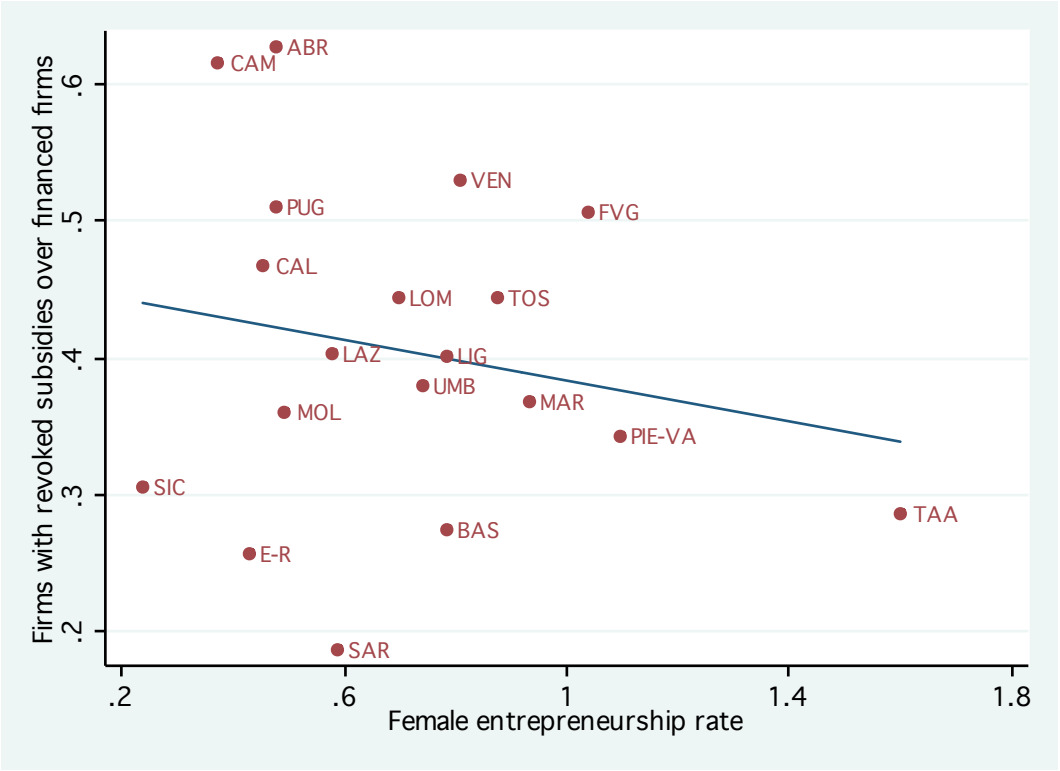
Source: Ministry of Economic development and National Statistical Office.

Figure 4: Non financed firms and entrepreneurship rate



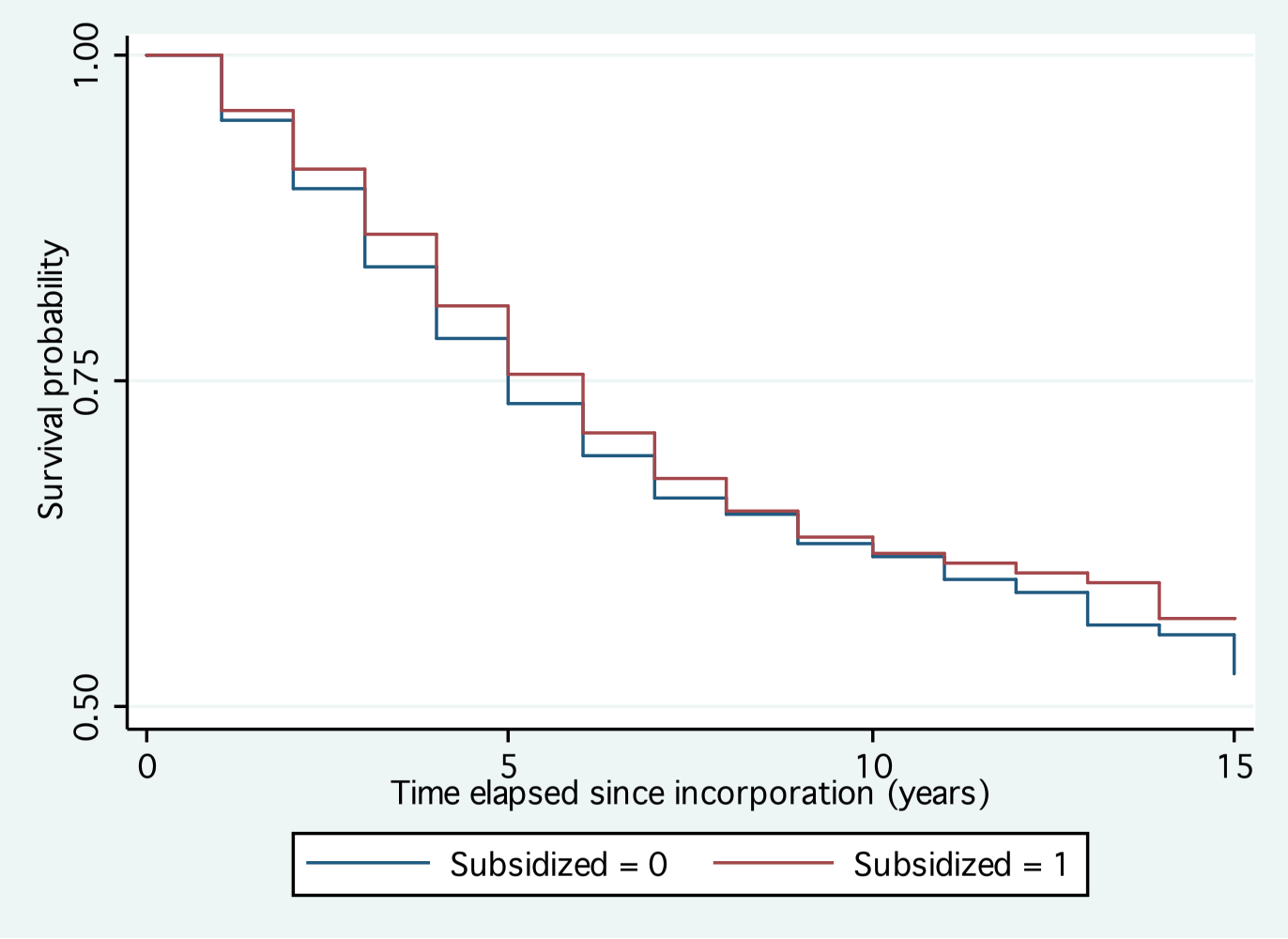
Source: Ministry of Economic development and National Statistical Office.

Figure 5: Revocation rate and entrepreneurship rate



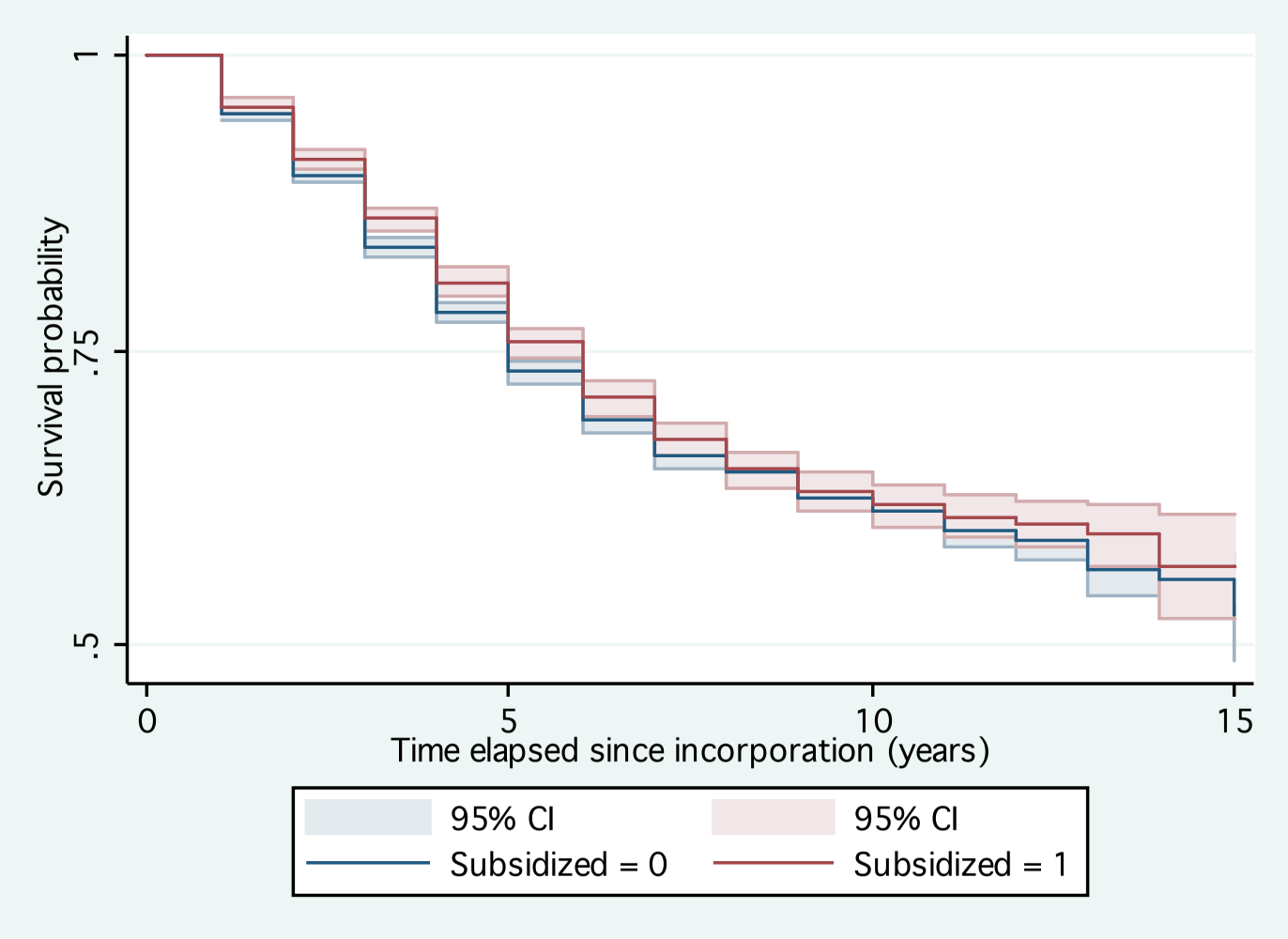
Source: Ministry of Economic development and National Statistical Office.

Figure 6: Kaplan-Meier survival estimate.



The red line refers to subsidized firms, while the blue line refers to the non-subsidized ones. The control group is made by the whole set of firms which applied for the subsidies without receiving them.

Figure 7: Kaplan-Meier survival estimate with confidence intervals.



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