

## **Do Capital Subsidies to SMEs Trigger Efficient Investment Projects? Some Evidence from Italy**

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*Using a sample of Italian manufacturing firms for the years 2002–2011, we investigate how government grants influence the creation of value added per assets of beneficiary firms. A set of multivariate tests shows that after grant reception, beneficiary firms underperform their non-beneficiary counterparts in terms of value added per assets and operating profitability while the overall profitability appears unaffected. Undertaking efficient investments thanks to grant reception appears a difficult task. The analysis raises questions on the real return to society on the investment of public money to facilitate the business activity through the use of government grants related to assets.*

**Field of Research:** Accounting, finance and government policy

**Keywords:** Government grants, investment projects, value added per assets, small and medium-sized enterprises

**JEL Codes:** M41, M48

### **1. Introduction**

International, national and local governments often intervene via financial contributions in order to support those firms with potentially profitable investments that experience difficulties in accessing financial sources. Similarly, government grants related to assets are provided to compensate for both the high risk profile of investing in disadvantaged geographical areas and business sectors (Bronzini and De Blasio 2006, p. 327). More widely, such subsidies aim at overcoming market failures that may jeopardise a socially desirable economic equilibrium (Felsenstein, Flesher & Sidi 1998; Cannari, D'Aurizio & De Blasio 2007, p. 329). However, analysing the effects of government grants is a complex topic and fraught with methodological difficulties (Evangelista 2007, p. 104). The extant literature presents conflicting findings that vary according to the specific variables and institutional contexts analyzed (Van Tongeren 1998; Bergström 2000; Roper and Hewitt-Dundas 2001; Tzelepis and Skuras 2004, 2006; Adorno, Bernini & Pellegrini 2007); similarly, the conceptual analysis of the impact of government grants on firms' operations is complicated by potentially diverging implications.

On one hand, it is argued that grant reception may positively influence the creation of value added thanks to either an increase of sales and/or a decrease in external costs as it allows

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Although the paper is a joint effort by the authors, in adherence to the academic Italian procedure we specify that sections 1, 3, 4 can be attributed to Alessandro Mura, while sections 2, 5, 6 can be attributed to Laura Mulas.

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the utilisation of economies of scale (Bergström 2000). Such positive effects represent the typical expectations that apparently inspire politicians to adopt generous government grant schemes. In effect, the real intention of politicians is deeply influenced by the search of votes and by the objective of protecting given groups of voters with a consequent weak focus on the efficient allocation of resources (Olson 1982). On the other hand, this virtuous impact may be mitigated or entirely offset by negative effects due to inefficient and opportunistic behaviours performed by beneficiary firms.

This paper empirically investigates how the receipt of government grants related to assets influences the ability of established small and medium-sized enterprises (SMEs) to generate value added per assets. We argue that the circumstances allowing government grants to generate a positive influence on the formation of value added per assets are difficult to materialise. For this to hold, these subsidies should trigger investment projects that are more efficient than those already in place. This would also imply that financial institutions fail to recognise firms with profitable investment projects in spite of their importance for their own profitability. And this appears counterintuitive especially during periods of financial crisis. In addition, when the risk of moral hazard is incorporated in the analysis (i.e. when managers do not put enough effort in to the investment projects), the chance of a negative influence on the creation of value added appears difficult to ignore (Pearce and von Finckenstein 2002, pp. 185, 189-190).

This study differs from prior related research in three main respects. First, regarding methodology, we monitor the impact of government grants related to assets over time through their accrual components as reported in the income statement. In effect, the accounting matching principle prescribes that the grant is gradually recognised as a component of earnings over the useful life of the asset and/or the related financial liability. Thus, observing the grant effects on firm's performance as the life of the underlying asset unfolds appears a more logical solution than simply focusing on the period of the grant's monetary manifestation, as it normally happens in the extant literature. We further contribute to the capital subsidy literature by investigating the impact on the creation of value added through the analysis of its two main drivers: sales per assets and external costs per assets. Second, this study focuses on Italy, an institutional setting where a large use of public resources to support the business sector combines with a low level of law enforcement, the presence of organized crime and substantial corruption in society (Del Monte and Papagni 2007; M. La Rocca, T. La Rocca & Cariola 2010). International indicators on these qualities highlight that Italy is an outlier among democratic and industrialized countries (World Economic Forum 2012, p. 27). In addition, small and medium-sized unlisted enterprises represent the vast majority (95% of the total) of the Italian entrepreneurial system, as in many other European country (Hall, Lotti & Mairesse 2009)<sup>1</sup>. As regards the subsidy system, national statistics show that during the time period of our analysis the Northern regions benefitted from less than 70 percent of the total amount of subsidized investments (Ministero dello Sviluppo Economico [Ministry of Economic Development] 2012, p. 36). This is in sharp contrast with the historical objective of helping the poor South in order to remove the endemic dualism North-South, which is peculiar to the Italian history (Leonardi 1995). Overall, these institutional features appear suitable for empirically observing how beneficiary SMEs actually react to the reception of governments grants. Third, in contrast to the long tradition of policy evaluation that normally focusses either on one particular programme or non a specific region at a time, this study analyzes government grants related to assets as a whole and is extended to the entire Italian country, regardless of the specific program or initiative that provides these subsidies. In effect, the Italian system of external subsidies to firms, though particularly differentiated by sector and region<sup>2</sup>, presents a frequent pattern:

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grants related to assets - either directly with cash grant and/or indirectly with low or non-interest bearing long-term liabilities - represent by large the most common and most significant type of incentive in terms of value<sup>3</sup>. Thus the choice of not limiting the focus of the study on disadvantaged areas and specific programmes might uncover the existence of common patterns with more general policy implications.

The analysis adopts a difference-in-differences approach to compare over the period 2002-2011 the value added per assets created by a group of manufacturing recipient firms with that of a group of non-beneficiary firms that are similar in many respects potentially influencing the creation of VA: geographical location, size, sector, legal form, age, financial leverage and profitability<sup>4</sup>. The study is based on a sample of 2.280 financial accounts and is drawn from the database AIDA (Bureau Van Dijk 2013). The application of a set of statistical tests unequivocally shows that the reception of governments grants is significantly negatively related to the value added per assets ratio of beneficiary SMEs and more widely to their operating profitability. Critically, firms appear to perversely depart from efficiency goals precisely when free or cheap public money is available.

The remainder of the paper is structured as follows: after reviewing the extant literature on the topic in the next section, we develop in section 3 our hypotheses on the expected influence of capital subsidies on the creation of value added; Section 4 is devoted to the description of the research design and the methodological aspects; Section 5 presents findings and a general discussion to interpret them. Section 6 concludes identifying the main policy implications of our findings and suggestions for future research.

## 2. Related Literature

Previous empirical evidence seems to support the hypothesis of external subsidies improving firms' ability to survive. These contributions may encourage managers to undertake rent-seeking activities, thus determining organizational inefficiencies (Martin and Page 1983, p. 615). Bergström's (2000, p. 191) analysis of Swedish firms highlights that their productivity appears to increase in the year after the receipt of the grants, while later receipts seem to depress the economic growth and value added. Studies relating to Korean (Lee 1996, p. 391), Japanese (Beason and Weinstein 1996, p. 294) and Danish firms (Organisation for Economic Co-operation and Development 2001, p. 112) show the absence of correlation between productivity and contributions. In the United Kingdom, the influence of subsidies appear ambiguous and limited (Harris and Robinson 2004, p. 542), while in Greece, government grants related to assets show effects on the growth of firm's investments, though without improving other performance measures, such as the return on sales and the return on investments (Tzelepis and Skuras 2004, pp. 127-128). By contrast, findings relating to Northern Ireland (Harris and Trainor 2005, pp. 71-72) indicate that government grants significantly improve the level of production and that grants related to assets appear the most effective in increasing productivity. Studies on the performance of SMEs in Northern Ireland and Eire (Roper and Hewitt-Dundas 2001, p. 99) show that recipient firms grow faster, present a higher profitability, are more dynamic in terms of sales and market shares growth. In Greece too, grants related to assets show positive effects on long-term strategic orientation and appear to support both sales and market shares of recipient firms (Tzelepis and Skuras 2006, pp. 533-535). Differently, Dutch evidence shows that grants related to assets have not generated additional investments (Van Tongeren 1998, p. 73) as compared to those expected without subsidies.

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As regards Italy, various studies focus on the effects of the national Law 488/1992 which is one of the most popular source of public subsidies. They indicate the inability of these subsidies to stimulate additional incentives (Bronzini and De Blasio 2006, p. 346), as recipient firms realize projects that were already planned regardless of the funding. Further, it is argued that a phenomenon of substitution is in place: recipient firms undertake investment opportunities that would have been exploited by other firms in case of no public intervention. Instead, when the performance is assessed in terms of employment, fixed capital and turnover, the effects appear positive: the higher the contribution the higher the effect, though after a given point the marginal effect decreases (Adorno, Bernini & Pellegrini 2007, p. 67). Similar findings are supported by Bernini and Pellegrini (2011, p. 253), but in association with a less pronounced productivity as compared to the non-beneficiary firms. The negative influence on productivity in the long run seems to reduce the temporary positive effects of contributions. In particular, it is dubious whether the temporary effect documented in these studies is due to a real creation of value or it is simply the accounting effect of the grant on the selected performance measure. Finally, firm's economic value and financial structure appear unaffected by external subsidies (D'Amico and Biscotti 2008, p. 19).

### 3. Hypotheses Development

The extant literature offering conflicting findings and expectations on the role of capital subsidies to SMEs suggests that the prediction of unidirectional implications is not appropriate for our research question. In the following we develop the rationale for two concurrent hypotheses. The advantage of financing investment projects via government grants is that the firm does not have to pay back, either partially or entirely, the principal plus interest as in the case of debt financing activities, nor has it to remunerate the capital as in equity financing activities. In the context of project selection, these privileged conditions, *ceteris paribus*, lower the cost of capital and thus render acceptable projects that have a lower expected return. Though this facilitates the life of a project, it is the regeneration of capital that enables the firm to replace the project on completion, regardless of the original source of finance.

Indeed, firms are considered to be going concerns: they invest in new projects and perpetually roll them over into new projects (Penman 2010). Theory indicates that rational managers are expected to invest in assets that yield nonnegative net present value in order to maximize the value of the firm (Keane 1995). That is, they select investments that generate payoffs whose present value equal or exceed their cost. This happens as operating activities utilize the assets to produce goods or services for sale; and it is the future sales that realize the value anticipated in investing as long as sales cover all costs, including depreciations, over the useful life of the project (Onida 1974, pp. 396-397).

The value added to assets ratio - as measured by the difference between sales and external costs relative to total assets - resulting from funding a given project via government grants is expected to equalize that of an identical project which is financed via either debt or equity. In effect, all other things being equal, the different level of the cost of capital, which varies according to the specific source of finance adopted, will not impact neither sales nor external costs; it will only display its effects on the distribution of value added amongst the various stakeholders due to a different amount of interests, taxes and/or dividends.

Thus, when the use of government grants simply relates to the replacement of assets that would have been realized in any case, the chances of increasing the value added per assets

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appear limited. If the moral hazard problem is incorporated in the analysis, the risk of negative effects becomes apparent (Pearce and von Finckenstein 2002). In effect, the relief for the decrease in the cost of capital may lead to a less accurate capital budgeting process and may be perceived as a comfortable safeguard that opens the door to a less efficient utilization of the assets. On the other hand, established firms undertaking additional and profitable investments appear in the best position to successfully access financial markets thanks to their trading history, retained earnings, informative financial statements, collateralizable assets, etc. (Berger and Udell 2006). And this appears particularly true when SMEs operate in a dynamic and rich context. Under these circumstances, the possibility of government grants triggering additional investments will depend on firms selecting less efficient projects that have become acceptable thanks to the external subsidies. Thus, the value added to assets ratio will even decrease. "Firms, in effect, face a limited number of acceptable projects rather than a shortage of capital to finance them". (Keane 1995, p. 4).

These arguments lead us to postulate our first hypothesis:

**H<sub>1</sub>:** Government grants related to assets have a negative effect on the value added to assets ratio of established recipient SMEs as they trigger investment projects that are less efficient than those already in place.

Nonetheless, 'banks hesitate to lend funds to business in general and small enterprises in particular' (Blumberg and Letterie, 2007, p. 187). Marked information asymmetries, poor quality of financial data, less frequent transactions, less skilled administrative staff characterize the context of SMEs and exacerbate their difficulties to demonstrate the credibility of their business plan (Ang, 1991). In presence of capital market imperfections government grants related to assets will play the role of being a fundamental source of capital for funding new projects. Firms experiencing difficulties in accessing financial markets will thus have the chance to realize additional and profitable investments generating a positive effect on their value added to assets ratio. A better utilization of economies of scale will further amplify this positive effect (Bergström 2000). This situation will realistically apply when government grants are provided not only to start-up SMEs, which are beyond the scope of our analysis<sup>4</sup>, but also to established SMEs that experience capital rationing conditions, as those operating in a disadvantaged region or sector or during a period of financial crisis. We thus postulate our concurrent hypothesis:

**H<sub>2</sub>:** Government grants related to assets have a positive effect on the value added to assets ratio of established recipient SMEs as they trigger investment projects that are more efficient than those already in place.

## 4. Methodology

### 4.1 Performance Measure

In this study, the effectiveness of government grants is assessed according to the firms' ability to increase at a statistically significant level the creation of value added (VA) scaled by total assets (K):  $VA/K$ . VA is the difference between sales (item A.1 of the Italian income statement as prescribed by the civil law) and external costs<sup>5</sup>, while K represents total assets as in the balance sheet. More precisely, external costs are the cost of inputs from external sources that are unrelated to the pre-existing technical and organizational structure of the firm and to its financial activity and fiscal policy. They relate to materials, services, rents and other operating costs net of the difference between ending and beginning inventory. By

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contrast, depreciation, amortization and impairment of assets, labour, financial, extraordinary and fiscal costs are excluded<sup>6</sup>.

The choice of this performance measure has various advantages. First, it captures financial information that is central to assess how government grants impact managerial efficiency and firm's productivity (Ball 1968; Evraert and Riahi-Belkaoui 1998, p. 3; Nandi 2011, p. 59). Accordingly, we further break down the value added to assets ratio in its main drivers: the sale over total assets ratio and the external costs over total assets ratio. The former ratio focuses on the assets' ability to generate future benefits. As Ohlson puts it "if not sales then what?" (2011, p. 17). The latter indicates whether the new assets generate saving in external operating costs.

Second, VA is a measure that leaves out some of the accounting items that are more frequently subject to accounting manipulation (i.e. amortization, depreciation, impairment, special charges, etc.). In addition, excluding amortization and depreciation expenses eliminates any mechanical effect of the subsidized asset on our measure. Third, this ratio is useful as it keeps the process of generating corporate wealth – which represents the focus of our analysis - separated from its distribution to the various stakeholders. From this perspective value added is also equal to the sum of the remunerations to the various internal stakeholders (shareholders, employees, financial institutions, fiscal agencies, governments, etc. (Gruppo di Studio per il Bilancio Sociale 2001, pp. 22-24; Gray and Maunders 1979, p. 5; Morley 1979, p. 623). This different angle highlights the social impact of government grants as it shows whether recipient firms are able to generate enough wealth to remunerate the various stakeholders for the resources they provide to the firm, including the external subsidies (Montrone 2000).

### 4.2 Sample Selection and Nature of the Granting Process

To assess the impact of government grants on the creation of VA/K we use the counterfactual technique. This procedure estimates the effects by comparing the value added to assets ratio performed by recipient firms after treatment with that they would have generated in the absence of external subsidies (Heckman, Lalonde & Smith 1999, pp. 1938-1941). As the latter value is not directly observable, its estimate is based on a control group of non-recipient firms selected with a matching strategy that aims at replicating the characteristics of the recipient firms during the pre-treatment period.

The firms' selection has been drawn on the database AIDA (Bureau Van Dijk 2013) that contains detailed financial accounts on a large number of firms operating in Italy. First we have identified all manufacturing firms<sup>7</sup> operating as limited liability corporations and have excluded cooperative firms so as to focus the analysis on for profit organizations. Amongst the remaining firms we have further excluded those compulsorily or voluntarily complying with International Accounting Standards/International Financial Reporting Standards (IAS/IFRS). This is to ensure that all companies in our sample share the same accounting regime (i.e. the civil code integrated with Italian local accounting principles: by large the most widespread accounting regime in Italy), in order to control for bias in our performance measure due to different effects of alternative accounting standards. Within the remaining manufacturing SMEs we then identified the group of beneficiary firms: those that have continuously reported accrual components of government grants in the income statement for at least four years starting from the financial year 2006. Simultaneously, these firms had not benefitted from grants during the pre-treatment period 2002-2005.

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The condition of constantly reporting accrued grants for a time period ranging from a minimum of four to a maximum of six years is a compromise: while a shorter period may have unbalanced the analysis towards investment projects with a short useful life, a longer period may have amplified the difficulty of isolating the impact attributable to government grants (Bergström 2000, p. 188). As the year 2006 registered the most intense national activities relating to government grants, in terms of number of applications received and financed, investment activities, etc. (Ministero dello Sviluppo Economico 2012), we have selected it as the starting year of the treatment period.

After identifying the final sample of recipient firms according to the above criteria, we scrutinized their full financial accounts, as electronically collected from the Italian Business Register (Registro Imprese, Telemaco), so as to gain some insights into the granting process and the actual form of the subsidy. By combining the information gathered from the balance sheet, the income statement and the notes, we found evidence that, in spite of the variety of national and regional laws providing these subsidies, their granting process shared the same primary condition: beneficiary firms have to acquire long-term assets. This is prescribed by both national laws (488/1991, 598/1994, 388/2000 (art. 8) and 1329/65 (the so called “Sabatini” law)) - which represent the most common sources in our sample - and by a few regional laws. The subsidies mainly take either a direct form as cash grants, interest-free loans, or an indirect form as tax breaks, low-interest loans. Thus the accrual component in the income statement may represent the annual share of the cash-grant recognized according to the useful life of the asset, the share of the grant covering the interest expenses of the long-term liability related to asset or, more frequently, a mix of both. Within each national law the granting process is not uniform amongst the 20 administrative Italian regions as more generous schemes are prescribed in favor of the most disadvantaged regions. Nonetheless, as previously pointed out, a recent Italian survey shows that firms operating in the poor South of Italy enjoy only one-third of the overall national share (Ministero dello Sviluppo Economico 2012, p. 36). The final composition of our beneficiary group partly mirrors this picture as out of 114 beneficiary firms only 13 are located in the Southern regions.

The following step was to match each firm belonging to the recipient group with a non-recipient SME. To this end, we selected from Aida database all for profit manufacturing operating as liability corporations that had never received external subsidies during the entire period 2002-2011. This ensures that potentially latent effects of earlier subsidies are neutralised as both groups have not received any contributions over the sub-period 2002-2005 (Koski and Pajarinen 2013). Then, we grouped the non-beneficiary firms according to the specific Italian region in which they operate and matched them with those in the treatment group in order to offset the influence of geographical location on financial performance as well as to control for regional differentiations in the grant schemes. We arrived at the final composition of the control group by selecting those firms who registered the nearest amount of both value added and total assets during the pre-treatment period (2002-2005) in accordance with the nearest neighbor matching “with replacement” (Caliendo and Kopeinig 2008). Here, the aim is to reach homogeneity in terms of financial performance and size during the pre-treatment period. Further control variables to capture firms’ heterogeneity are taken into account in the following multivariate framework.

The final sample is thus composed of 2,280 firm-year observations relating to 114 beneficiary firms and 114 non-beneficiary firms. In sum the absence of external subsidies represents the fundamental peculiarity of the non-recipient firms (Blundell and Costa Dias 2000, p. 445) and that should reasonably allow the simulation of the performance that

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recipient firms would have shown without the aid of external subsidies (Martini and Sisti 2009; Marchesi, Tagle & Befani 2011). Eventual remaining differences in performance between the two groups will thus be attributable to the impact of government grants.

### 4.3 Difference-In-Difference Regression Model

To assess the effects of government grants on firms' financial performance, we adopt a difference-in-differences approach in a multivariate setting in order to isolate the effect of concurrent variables. In addition to the receipt of grants, which represents our key explanatory variable, we introduce a set of covariates that may potentially influence the level of value added per assets. More precisely, since the comparison between treatment and control group may depend on capital intensity we measure it with the ratio of long-term assets over total assets (as in Tzelepis and Skuras 2004). We use financial leverage as a proxy of riskiness in order to control for its influence on our performance measure (Safieddine and Titman 1999). We control for size as we expect that small firms exhibit a higher profitability than large firm as theoretically demonstrated by Dhawan (2001) and empirically observed in the Italian context (Mura, Emmanuel & Vallascas 2013). Maturation effects may also affect financial performance as firms move through the various stages of the business cycle (La Rocca, La Rocca & Cariola 2010). We thus introduce age as control variable in the difference-in-differences regression.

The model also includes vectors of industry, region and year dummies. In effect, though the firms in our sample are from the manufacturing sector, they belong to 14 different industries as identified by the two digit ATECO code classification. The purpose of these dummies is to difference away eventual fixed effects on value added due to the specificity of the business activity (Bergström 2000; Almus and Czarnitxki 2003). In the case of Italy, regional location may also play an important role in shaping financial performance. Though more than a century ago Italy reached its political unification, the historical disparities across regional development still characterize the present institutional context (Mura and Emmanuel 2010). A vector of dummies relating to the 20 Italian regions will thus net out administrative, cultural, economic and political fixed effects that can influence firms' performance. Controlling for regional differences is also useful to capture differences in grant schemes. Finally, the year fixed effects neutralize any trend affecting both beneficiary and non-beneficiary firms over time and this is particularly relevant as the last three years of the treatment period (2009-2011) fall within the financial crisis. Thus, the multivariate analysis is conducted by estimating the following difference-in-differences regression model:

$$VA/K_{i,t} = \alpha + \beta_1 GRANT_{i,t} + \beta_2 FIXED_{i,t} + \beta_3 LEVERAGE_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 AGE_{i,t} + \beta_6 REGION_i + \beta_7 INDUSTRY_i + \beta_8 YEAR + \varepsilon_{i,t}$$

Where:

$VA/K_{i,t}$  is the ratio of value added to assets of firm  $i$  at time  $t$ ,

$GRANT_{i,t}$  is a binary variable that takes the value one if a firm  $i$  reports a positive amount of grant in the income statement at time  $t$  and zero otherwise;

$FIXED_{i,t}$  is the ratio of fixed assets to total assets of firm  $i$  at time  $t$ ,

$LEVERAGE_{i,t}$  is the ratio of total debts to equity for firm  $i$  at time  $t$ ,

$SIZE_{i,t}$  is the log of total assets of firm  $i$  at time  $t$ ,

$AGE_{i,t}$  is a the log of the age of the firm age in number of years that controls for the influence of maturation effects;



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INDUSTRY<sub>*i*</sub> is a vector of dummies that controls for the influence of the business activity on performance;

REGION<sub>*i*</sub> is a vector of dummies that controls for the influence of the regional location on performance;

YEAR<sub>*i*</sub> is a vector of dummies that controls for the influence of the business cycle on on performance.

Our main interest is on the coefficient of “GRANT”, our key explanatory variable that takes on the value of one in the years affected by the intervention. The slope of  $\beta_1$  provides information on the effects of government grants on the creation of value added per assets, our response variable. Hence, a positive coefficient at a statistically significant level suggests that government interventions have virtuous effects on beneficiary firms, while a significantly negative coefficient indicates a pejorative effect on firms' financial performance. The model is initially estimated according to a pooled ordinary least-squares (OLS) regression and then it is replicated using a random effects regression as it allows to capture cross sectional heterogeneity within the firms of our sample. The preference of the random effects over the fixed effects estimation is driven by both the advantage of keeping in the model time invariant control variables and the result of the Hausman test statistic (1978) indicating that the fixed effect estimation is less appropriate for our panel dataset.

As the relation between government grants and value added per assets may also depend on the actual amount of the grant, we run an alternative model where we replace the binary variable “GRANT” with a continuous variable labeled “GRANT/VA<sub>2002-2005</sub>”. This variable equals the share of the grant reported in the income statement on an accrual basis by firm *i* at year *t* and is scaled by the average value added registered during the time period preceding the grant receipt (2002-2005). By doing so we are able to accurately observe the effects of the grant on firm's performance over time as the magnitude of the grant is spread according to the duration of the underlying asset and/or liability. Using VA<sub>2002-2005</sub> as the scaling factor allows to weigh subsidy in relation to the value added before the treatment. A different solution is adopted by Bergström (2000) and Tzelepis and Skuras, (2004) who consider the total amount of the subsidy and divide it by the number of employees.

### 4.4 Preliminary Tests

All financial data in our database are deflated by the 2011 consumer price index. Table 1 reports descriptive statistics of the main variables adopted in the following analysis. Panel A regards the full sample while Panel B and C separately report the data for the group of beneficiary and non-beneficiary firms.

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**Table 1<sup>a</sup>: Descriptive statistics.**

	Obs.	Mean	Median	S.Dev	P1	P99
<b>Panel A: Full Sample</b>						
VA/K	2,263	0.33	0.30	0.19	0.36	0.95
SALES/K	2,222	6.23	0.99	-0.50	0.13	73.31
EC/K	2,222	-5.91	-0.69	40.21	-72.78	0.50
GRANT/VA <sub>2002-2005</sub>	2,274	0.01	0.00	0.04	0	0.20
FIXED	2,274	0.28	0.25	0.18	0.01	0.77
LEVERAGE	2,263	9.68	4.08	31.72	1.15	112.4
SIZE	2,263	8.64	8.53	1.21	6.39	11.83
AGE	2,235	3.26	3.26	0.45	2.47	4.48
<b>Panel B: Beneficiary firms</b>						
VA/K	1,131	0.33	0.30	0.18	0.03	0.85
SALES/K	1,117	4.66	0.97	19.72	0.01	62.99
EC/K	1,117	-4.33	-0.64	19.70	-62.72	0.49
GRANT/VA <sub>2002-2005</sub>	1,138	0.16	0.003	0.62	0	0.33
FIXED	1,131	0.31	0.28	0.17	0.03	0.75
LEVERAGE	1,131	8.00	4.12	22.46	1.16	65.71
SIZE	1,131	8.65	8.49	1.20	6.37	11.82
AGE	1,115	3.00	3.25	0.46	2.30	4.46
<b>Panel C: Non beneficiary firms</b>						
VA/K	1,132	0.34	0.30	0.19	0.04	0.99
SALES/K	1,105	7.83	1.06	53.43	0.02	78.07
EC/K	1,105	-77.49	-0.72	53.43	-77.93	0.53
GRANT/VA <sub>2002-2005</sub>	1,136	0	0	0	0	0
FIXED	1,124	0.24	0.21	0.18	0.07	0.81
LEVERAGE	1,132	11.36	4.03	38.77	1.14	184.3
SIZE	1,120	8.63	8.57	1.22	6.44	11.83
AGE	1,140	3.29	3.26	0.43	2.54	4.49

<sup>a</sup>Note: This Table reports basic descriptive statistics for the variables employed in the empirical analysis. Panel A refers to the full sample while Panels B and C focus, respectively, on beneficiary and non beneficiary firms. VA/K is the ratio between valued added and total assets, SALES/K is the ratio between sales and total assets, EC/K is the ratio between external costs and total assets, GRANT/VA<sub>2002-2005</sub> is the ratio between government grants and average value added in the pre-treatment period, FIXED is the ratio between fixed assets and total assets, LEVERAGE is the ratio between book value of total assets and equity, SIZE is the log of total assets, AGE is the log of the firm age in years. The sample has been selected from the database AIDA, managed by Bureau Van Dijk, for the period 2002-2011.

The validity of our difference-in-differences approach is strictly dependent on the reliability of the basic assumption that the pre-existing features of the firms in the treatment group are not the driving force behind the financial performance registered in the years in which the government intervention occurs. In this respect, Table 2 provides econometric evidence to verify whether the firms' financial performance and conditions prevailing in the years prior to the treatment (i.e. 2002-2005) are exogenous to the subsequent receipt of grants (Bergström 2000). We have run standard logistic regressions related to the pre-treatment period using a dummy variable labeled "BEN" as our dependent variable taking on the value of one if a firms receives a grant during the treatment period and zero otherwise (González and Plazò 2008).

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**Table 2<sup>a</sup>: Logistic regression: likelihood of being a beneficiary firm**

Dependent variable BEN = 1 if a firm is a grant beneficiary and = 0 otherwise		
Panel A (VA/K)		Panel B (ROE)
Panel A Panel B	2002-2005	2002-2005
VA/K ROE	0.643 (0.65)	-0.283 (-1.22)
FIXED	1.995** (1.96)	1.832* (1.77)
LEVERAGE	-0.150 (-0.98)	-1.701 (-1.12)
SIZE	-0.083 (-0.62)	0.071 (-0.51)
AGE	-0.238 (-1.04)	-0.213 (-0.93)
Constant	-0.365 (-0.23)	-0.238 (-0.15)
Industry Dummies	Yes	Yes
Region Dummies	Yes	Yes
Pseudo R-squared	0.096	0.099
Observations	916	916

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

<sup>a</sup>Note: This Table reports the estimation results of the logit models described in the methodology section. BEN is the dependent variable that takes on the value of 1 if a firm will benefit from government grants in the treatment period (2006-2011) and 0 otherwise. In Panel A the key explanatory variable is VA/K which is the ratio between value added and total assets, in Panel B the key explanatory variable is ROE which is the ratio between net earnings and total equity. FIXED is the ratio between fixed assets and total assets, LEVERAGE is the ratio between book value of total debts and equity, SIZE is the log of total assets, AGE is the log of the firm age in years. All control variables are lagged by one year. The sample has been selected from the database AIDA, managed by Bureau Van Dijk, for the period 2002-2011; *p*-values of the z statistic are reported in round brackets.

Panel A of Table 2 reports, the results of a logit model where value added over total assets is the key explanatory variable. Panel B shows the results of an alternative model where the return on equity is the main explanatory variable. This different performance measure reinforces the analysis as it expresses the overall profitability of a firm, including the effects of its financial activities and fiscal policies. In addition, both models include the same set of covariates as discussed above. The results of Table 2 corroborate the efforts of our matching strategy as the coefficients of both financial measures are not statistically significant at customary levels. Thus, the receipt of government grants is not related to the pre-existing profitability conditions of the firms. Amongst the control variables, FIXED is the only one entering the regressions with a positive coefficient that is statistically significant. This indicate that beneficiary firms display a higher percentage of long-term assets as they approach the treatment period and may suggest that firms start the operations of their investment projects earlier than the formal recognition of the grants. In effect, Local Italian accounting principles prescribe that grants shall not be recognized in the accounts until there is a reasonable certainty that they will be received (Organismo Italiano di Contabilità, 2005).

Table 3 provides information about the variables included in the logit models confirming the similarity of the two groups. Here, we test the hypothesis of the equality in mean values of

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these variables by using the two sample t-test. FIXED remains the only variable statistically different. Nonetheless, all our regression models will include FIXED as control variable.

**Table 1<sup>a</sup>: Mean comparison of beneficiary and non-beneficiary firms during 2002-2005**

Variable	Type of firm	N. of observations	Mean
VA/K	Non-beneficiary	456	0.36
	Beneficiary	456	0.35
t-Stat			0.258 (0.796)
ROE	Non-beneficiary	456	0.015
	Beneficiary	456	-0.010
t-Stat			0.299 (0.765)
FIXED	Non-beneficiary	452	0.241
	Beneficiary	456	0.300
t-Stat			-4.719*** (0.000)
LEVERAGE	Non-beneficiary	456	11.20
	Beneficiary	456	9.65
t-Stat			0.870 (0.384)
SIZE	Non-beneficiary	456	8.49
	Beneficiary	456	8.51
t-Stat			-0.277 (0.782)
AGE	Non-beneficiary	448	22.34
	Beneficiary	448	20.74
t-Stat			1.568 (0.118)

<sup>a</sup>Note: This Table reports the results of the two sample t-test of equality in mean values between beneficiary and non-beneficiary firms during the pre-treatment period (2002-2005). VA/K is the ratio between value added and total assets, ROE is the ratio between net earnings and total equity, FIXED is the ratio between fixed assets and total assets, LEVERAGE is the ratio between book value of total debts and equity, SIZE is the log of total assets, AGE is the firm age in years. The sample has been selected from the database AIDA, managed by Bureau Van Dijk, for the period 2002-2011; p-values for the t-statistics are reported in round brackets.

## 5. Results

### 5.1 Multivariate Analysis

Table 4 reports the results of the difference-in-differences regression approach discussed in the methodology section to identify the differential in financial performance between beneficiary and non-beneficiary firms. That is the differential in value added per assets registered between the two groups during the treatment period, once purged from the pre-existing differences (Blundell and Costa Dias 2000, p. 442). Model 1 in Table 4 shows the results when the binary variable GRANT is employed as the key explanatory variable. It emerges a statistically significant negative relation between GRANT and VA/K. This finding holds regardless of the type of estimation adopted – pooled OLS and random effects – and after corrections for heteroscedasticity. The emerging empirical evidence strongly rejects our second hypothesis predicting that beneficiary firms virtuously improve their ability to create value added per assets after receiving government grants. Instead, the emerging relationship suggests that external subsidies trigger investment projects that are less efficient than those already in place in accordance with the arguments of our first hypothesis.

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**Table 4<sup>a</sup>: Difference-in-Differences regression: Government grants and Value added over total assets (VA/K)**

Dependent variable: Value added over total assets					
	Model 1		Model 2		
	Pooled OLS	Random Effects		Pooled OLS	Random Effects
<b>GRANT</b>	<b>-0.046***</b> <b>(-5.03)</b>	<b>-0.071***</b> <b>(-2.78)</b>	<b>GRANT/VA<sub>2002-2005</sub></b>	<b>-0.204***</b> <b>(-4.55)</b>	<b>-0.159***</b> <b>(-3.44)</b>
FIXED	-0.196*** (-10.66)	-0.089*** (-3.52)	FIXED	-0.189*** (-9.90)	-0.027*** (-4.25)
LEVERAGE	-0.247*** (-6.51)	-0.087*** (-3.53)	LEVERAGE	-0.262*** (-6.73)	-0.021*** (-4.44)
SIZE	-0.033*** (-9.04)	0.199*** (4.02)	SIZE	-0.036*** (-6.73)	-0.057*** (-4.62)
AGE	0.048* (1.98)	-0.120** (-2.31)	AGE	0.005 (0.92)	-0.048*** (-4.19)
Constant	0.796 (16.35)	1.221** (2.13)	Constant	0.771*** (13.66)	0.140*** (6.79)
Region Dummies	Yes	Yes	Region Dummies	Yes	Yes
Industry Dummies	Yes	Yes	Industry Dummies	Yes	Yes
Year Dummies	Yes	Yes	Year Dummies	Yes	Yes
R-squared	0.308		R-squared	0.317	
Adjusted R-squared	0.297		Adjusted R-squared	0.302	
Observations	2216	2216	Observations	2,216	2,216

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

<sup>a</sup>Note: This Table reports the estimation results for the model described in the methodology section. The regression analysis has been conducted via both pooled OLS and Random Effects estimates and is robust against heteroscedasticity. VA/K is the ratio between value added and total assets. In Model 1, the key explanatory variable is GRANT which is a binary variable taking the value of 1 if a firm  $i$  report a positive value of grants in the income statement of year  $t$  and zero otherwise. In Model 2 GRANT/VA<sub>2002-2005</sub> is the key explanatory variable taking the value of the grant amount as reported in the income statement by firm  $i$  at time  $t$  and scaled by the average value added during the pre-treatment period, FIXED is the ratio between fixed assets and total assets, LEVERAGE is the ratio between book value of total debts and equity, SIZE is the log of total assets, AGE is the log of the firm age in years. The sample has been selected from the database AIDA, managed by Bureau Van Dijk, for the period 2002-2011.

In line with the extant literature relating to the Italian context, our control variables provide evidence that firms display a lower value added per assets ratio as their size, financial leverage and percentage of long-term assets increase (Mura, Emmanuel & Vallascas 2013). The role of age is unclear as its coefficient estimator fluctuates according to the regression method adopted. The negative relation between grants and value added also holds after controlling for time fixed effects. In this respect, though we have not reported separate results for the coefficient estimators, it is in point to highlight that during the years 2009, 2010 and 2011 both beneficiary and non-beneficiary firms register a decrease in performance. This trend is perfectly in line with the timing of the financial crisis in Italy, however beneficiary firms carry on underperforming their non-beneficiary counterparts even under these circumstances. And this suggests how difficult it is to stimulate profitable investments under a period of financial crisis even with free or cheaper finance.

In addition, our control variables for regional location and industry sector coupled with the fact that our sample is dominated by firms located in the North of Italy, undeniably the wealthiest and most economically developed area of Italy, raise more critical doubts on whether external subsidies are actually targeting disadvantaged areas and sectors. Next, as the differential in performance may also depend on the actual amount of the grant, we have

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estimated an alternative model where the key explanatory variable is GRANT/VA<sub>2002-2005</sub> taking on the value of government grants reported in the income statement scaled by the average value added registered before the treatment period. Overall, the results of Model 2 in Table 4 confirm the general conclusion previously suggested that government grants are negatively related to the value added per assets ratio at a statistically significant level.

Finally, to increase our understanding of the relationship between grants and performance, we extend the analysis to the drivers of VA/K. Table 5 reports the regression results when we employ as dependent variables two complementary indicators representing the two sources of value added to assets: sales over total assets and external costs over total assets. The results show that the worsening performance shown by beneficiary firms in terms of value added per assets is partly due to a decrease in the assets' ability to generate sales and partly due to an increase in external costs. The former trend confirms that after the receipt of government grants firms use assets less efficiently to generate sales while the latter indicates that the new assets generate higher costs for acquiring external operating factors of production. These trends support the arguments in favor of hypothesis 1 predicting that firms choose less efficient investment projects as the hurdle rate of return declines due to the grant.

**Table 5<sup>a</sup>: Government grants and drivers of value added per assets**

Dependent variable:	Sales over total assets (Sales/K)		External costs over total assets (EC/K)	
	Pooled OLS	Random Effects	Pooled OLS	Random Effects
<b>GRANT</b>	<b>-9.028**</b> (-1.95)	<b>-8.211*</b> (-1.81)	<b>8.781**</b> (1.94)	<b>7.977*</b> (1.76)
FIXED	1.115 (0.96)	-0.993 (0.81)	-1.139 (-0.97)	-1.010 (-0.82)
LEVERAGE	-0.191 (-0.14)	-0.340 (-0.22)	0.166 (0.12)	0.314 (0.21)
SIZE	-7.447** (-2.46)	-8.010** (-0.023)	7.41*** (2.45)	7.967** (2.27)
AGE	4.164 (1.04)	4.208 (0.99)	-4.161 (-1.04)	-4.206 (-0.99)
Constant	48.49*** (1.93)	53.98* (1.83)	-53.23*** (-2.78)	-53.19* (-1.81)
Region Dummies	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
R-squared	0.054		0.052	
Adjusted R-squared	0.032		0.032	
Observations	2,176	2,176	2,176	2,176

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

<sup>a</sup> Note: This Table reports the estimation results for the model described in the methodology section. The regression analysis has been conducted via both pooled OLS regression and Random Effects regression and is robust against heteroscedasticity. Sales/K is the ratio between sales and total assets, EC/K is the ratio between external costs and total assets, GRANT is the ratio between government grants and value added of the pre-treatment period, GRANT<sup>2</sup> is the square of GRANT, FIXED is the ratio between fixed assets and total assets, LEVERAGE is the ratio between book value of total debts and equity, SIZE is the log of total debts, AGE is the log of the firm age in years. The sample has been selected from the database AIDA, managed by Bureau Van Dijk, for the period 2002-2011.

To sum up, the battery of statistical tests discussed in this section strongly supports our first hypothesis in its prediction of a negative relation between the creation of value added per assets and government grants. This finding only marginally accords with the extant literature, (Beason and Weinstein 1996; Lee 1996; Tzelepis and Skuras 2004; Bernini and Pellegrini 2011). A decrease of the sales over assets ratio and an increase of the external

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costs over total assets ratio appear jointly responsible for this trend. Thus, the temporary productivity growth documented in other studies is not supported by our analysis (Bergström 2000; Adorno, Bernini & Pellegrini 2007). The overall negative relationship between external subsidies and the performance of beneficiary firms is robust to changes in estimation methods and after controlling for size, age, leverage, legal form as well as for time, industry and regional fixed effects. Therefore the emerging evidence does not appear a consequence of omitted variables reflecting firm-specific characteristics. Our set of control variables also shows that VA/K is higher for firms that are less geared, older, with a lower percentage of long-term assets.

### 5.2 Additional Analysis

In this section we discuss additional tests that we have conducted to corroborate the theoretical arguments and empirical evidence reported in the previous sections. A first concern of our analysis is that in policy response studies it is generally suggested that lagged variables should be used as many policies can be expected to have an impact only after some time has passed (Wooldridge 2010). Though we believe in our choice of monitoring the profitability of the subsidized investments over time in accordance with the grant recognition as under the accrual basis accounting, we have created a set of lagged variables of one to three time periods for  $GRANT/VA_{2002-2005}$ . These lags still enter the regression with a significant negative coefficient confirming our main results. For the sake of brevity, we have not reported the results, which are available upon request by the authors.

In addition, as the ratio between value added and total assets is rarely adopted in the extant literature investigating the effects of external subsidies we verified the robustness of our results using the more traditional return on investments (ROI) as the key performance measure to compare the degree of operating profitability of beneficiary and non-beneficiary firms. The evidence offered by these multivariate tests further support our first hypothesis: the operating profitability of beneficiary firms appears inversely correlated to grant reception at the 1% level of statistical significance (see Panel A of Table 6). Indeed, these findings invalidate the arguments we have elaborated to develop our second hypothesis predicting positive effects on the operating performance of beneficiary firms.

By combining the evidence that supports the view of beneficiary firms selecting less efficient investments with the arguments that lowering the cost of capital represents the practical advantage of capital subsidies it is of interest to ascertain how the receipt of grants affect the overall profitability of the firms after including the effects of financing activities and fiscal activities. Panel B of Table 6 reports the regression results when the return on equity (ROE) is used as dependent variable in our main regression model. These tests show that the overall profitability of beneficiary firms is not significantly different from that of their non-beneficiary counterparts after the grant is collected. This suggests that beneficiary firms manage to offset the lower operating profitability of their new investments with the positive effects of free and/or cheap finance thus leaving unaffected the return on equity. To put it differently, they appear to exploit a favorable financial leverage by balancing the negative effects of a lower return on investments and the positive effects of a lower borrowing cost in order to keep unchanged the overall profitability.

We have also made an effort to include a proxy for corporate governance in our model: the ratio between the amount of capital owned by executive directors and the total share capital. The aim is to verify how the absence of separation between ownership and management influences the negative relationship between value added per assets and grants. However,

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as we have not managed to collect enough observations of this variable due to missing information, we have decided not to report the results showing that during the treatment period the performance of beneficiary firms declines as the percentage of capital owned by executive directors increases.

**Table 6<sup>a</sup>: Government grants and alternative profitability ratios**

Dependent variable	PANEL A		PANEL B	
	ROI		ROE	
Regression model	Pooled OLS	Random Effects	Pooled OLS	Random Effects
<b>GRANT</b>	<b>-0.022***</b> <b>(-4.84)</b>	<b>-0.013***</b> <b>(-3.08)</b>	<b>-0.019</b> <b>(-0.35)</b>	<b>-0.021</b> <b>(-0.47)</b>
FIXED	-0.113*** (-10.58)	-0.130*** (-8.67)	-0.307*** (-2.67)	-0.351*** (-3.39)
LEVERAGE	-0.0223*** (-12.85)	-0.024** (-7.71)	-0.269*** (-12.75)	-0.310*** (-3.37)
SIZE	0.006*** (2.63)	0.110* (1.65)	-0.037** (1.98)	0.043** (2.30)
AGE	0.009** (2.39)	-0.021*** (-3.17)	-0.028 (-0.76)	0.048 (-1.17)
Constant	0.887*** (3.79)	0.156** (2.25)	-0.070*** (-0.27)	0.003 (0.01)
Region Dummies	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
R-squared	0.184		0.096	
Adjusted R-squared	0.170		0.080	
Observations	2213	2213	1.326	1.326

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

<sup>a</sup> Note: This Table reports the estimation results for the general model described in the methodology section. The regression analysis has been initially conducted via pooled OLS regression and then via random effects regression and is robust against heteroscedasticity. In Panel A, the dependent variable is ROI which is the ratio between operating earnings and total assets, in Panel B the dependent variable is ROE which is the ratio between net earnings and total equity. GRANT is a binary variable that takes the value of 1 if a firm *i* report a positive value of grants in the income statement of year *t* and zero otherwise, FIXED is the ratio between fixed assets and total assets, LEVERAGE is the ratio between book value of total debts and equity, SIZE is the log of total assets, AGE is the log of the firm age in years. The sample has been selected from the database AIDA, managed by Bureau Van Dijk, for the period 2002-2011

Thus, our data cannot say to what extent this practice is simply driven by the choice of less efficient investments or more worryingly by opportunistic or illegal behaviors that artificially alter the remuneration of the various stakeholders of the firms. But it still remains the fact that assisting the business sector requires a huge sacrifice of public wealth that is associated to a decrease in the operating profitability performed by Italian beneficiary SMEs.

## 6. Concluding Remarks

The findings of this study raise questions on the effectiveness of capital subsidies in attracting profitable investments as they show a significantly negative relationship between the value added per assets of beneficiary firms and the receipt of government grants related to assets. This relationship holds after controlling for several variables, alternative operating profit indicators and is robust to change in estimation methods. A decrease in sales and an increase in external operating costs following the receipt of grants appear jointly responsible for this outcome. Firms seem to proceed with less efficient investment projects that have become attractive thanks to the grants enabling their expected return to exceed the cost of financing them. The policy implications of such trend are critical as it emerges that firms



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show less attention towards sound investments especially when society makes huge sacrifices to help them.

Encouraging recent trends show that a non trivial amount of national and local Italian budgets devoted to external subsidies has been increasingly trimmed over the span period of our analysis (European Commission, State Aid Scoreboard 2012; Ministero dello Sviluppo Economico 2012). Nevertheless, the same survey underlines that much of the cuts relate to grants in favor of the South of Italy, while the richest area of Italy keeps benefitting from substantially the same share as before. We therefore wonder whether capital subsidies in Italy are actually targeting disadvantaged areas.

This different perspective may suggest an alternative interpretation of our findings. After all, for financial institutions to be successful it is essential to select firms that are able to reimburse and remunerate the borrowed capital. Providing free or cheap money to firms undertaking efficient projects requires substantially the same skills. For these policy initiatives to guarantee a return to society, beneficiary firms should be able to replace the subsidized investments on completion. From this view our findings simply suggest that national and local governments underperform financial institutions in the search for SMEs undertaking sound investments. Thus, the strong rejection of our second hypothesis predicting positive effects on the operating performance of beneficiary firms might be due to the lack of its main assumption: the presence of market failures in the supported area. More widely, in light of the current pressures on government fiscal balances, the criticality of our findings appears a solid base for policy makers to debate whether further downsizing the role of external subsidies in favour of a general reduction in corporate taxation or new infrastructure investments. Without the challenging task of selecting them, efficient firms will naturally enjoy the benefits.

With the aim of uncovering common trends and effects relating to different type of asset grants this analysis relates to the entire Italian territory regardless of the specific grant program and the specific region. This represents the novelty of this study but also its main limitation as there is the risk of disguising eventual different effects amongst different programs. In addition, due to the need of ensuring a rigorous matching procedure the final sample of this study is relatively small and is limited to the manufacturing sector. Increasing the sample and extending the analysis to other sectors may be the objective of future studies in order to verify the replicability of these findings.

We have not been able to accurately monitor the role that earnings management may play in shaping financial performance either before or after the receipt of grants. Disentangling the impact of earnings management from real financial performance may represent the focus of future research and a potential explanation of so many different results in the extant literature that analyses the impact of government grants on firms' performance. Still, our findings question the real return to society on the investment of public money to directly facilitate the business activity with capital subsidies.

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## Endnotes

1. Indeed, anecdotal evidence indicates that "half of America's jobs are in small and medium-sized firms (SMEs). In Europe such firms play a bigger role. In France SMEs employ 60% of workers, in Spain the figure is 67% - and in Italy, 80% (The Economist 2013, p. 13).
2. Out of 1.307 external subsidies programs registered over the period 2003-2008, 91 were national and 1.216 regional (Ministero dello Sviluppo Economico 2009, p. 55).
3. Government grants related to income are substantially irrelevant representing only 2% of the total number of registered incentives and less than 1% in terms of value (Ministero dello Sviluppo Economico, 2009, pp. 56-57).
4. More specifically, as clarified in the methodology section, both groups do not receive any subsidies during the period 2002-2005, while during the period 2006-2011 only one group receives government grants, while the control group still operates without them.
5. Start-up firms are excluded from our analysis since our sample is made up exclusively of established firms, as clarified in the methodology section.
6. That is the cost of goods sold, services, rent, as identified by the sum of items B.7, B.8, B.11, B.14 net of items A.2, A.3 and A.4 of the income statement according to art. 2425 of the Civil Code.
7. The manufacturing sector includes firms with an ATECO code that ranges from 06.100 to 33.200.

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