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Public funding and SME's; investigating factors determining R&D and environmental projects at firm level

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Abstract

In this paper we investigate the effects of state aids in the form of public funding towards Greek SME's throughout different instruments used for the period 2007-2013, to facilitate innovation and environmental protection, investing in R&D and environmental oriented projects. Based on an empirical research drawing data from 36 Greek SMEs in several sectors, our research contributes to the international debate on the effects of public funding and state aids in general, to the generation of innovations, improvement of competitiveness and the effectiveness of funding, according to the emerging needs of SMEs and individual characteristics.We argue that public funding, regarding Greek SMEs according to their different type, impacts positively, on achieving business objectives in almost all categories that business themselves pose and each individual program sets.These effects has found not to be related to the size of the surveyed enterprises, but have a strong correlation to the development stage of firms and their business planning and strategy.A well-designed public funding policy at national and European level, regarding R&D and environmental protection projects is needed, which will be able to identify different group of companies with similar needs and could strongly improve their effectiveness.

Keywords: state aids, public funding, SMEs, innovation, environmental protection

1. INTRODUCTION

In this paper we investigate the effects of state aids in the form of public funding towards Greek SME's throughout different instruments used for the period 2007-2013, to facilitate innovation and environmental protection, investing in R&D and environmental oriented projects. Public funding, in the form of state aids, creates synergies between R&D and environmental protection, two factors which constitute a fundamental basis for SME's to have access to finance and liquidity by national and European granting programs, especially under the context of the new programing period of 2014-2020 (European Commission, 2014).However, few empirical studies have been carried out into the effect offunding policies on SME development in Greece, and in particular,on those two types of activities. On the whole, this has been due to the complexity ofthe subject and the lack of sufficient information. Consequently, this paper has a twofoldobjective: firstly, to describe the factors determining the structure and aiming of different national and European funding programs aimed at SME's;secondly, to present an empirical study of exactly how Greek SMEs, are using public funding to innovate and invest in environmental protection, together with an analysis ofthe effectiveness of this type of funding regarding the purpose of granted aids.

2. LITERATURE REVIEW

2.1 State aids in general

State aids, in accordance with Article 107, p.1 of the Treaty on the Operation of the EU (2012), means any economic advantage to entities that perform economic activity which cumulatively: a) Are granted through state resources, directly or indirectly, in any form, b) Is a favorable treatment only for certain enterprises or industries and c) Affect the inter-linked trade and distorts or threatens to distort competition between EU member states.Examples mentioned as possible forms of state aids are, grants, tax and insurance exemptions and reliefs, guarantees, interest subsidies, state contributions or participation in business capital, debt cut, their conversion into capital share, privatizations with more favorable market conditions, a favorable debt settlement, a favorable estimate by government agencies etc.Promoting R&D and innovation, is an important objective of common interest. The objective through state aids for R&D, pursuant to Regulation (EC) No.364/2004, as amended by (EC) No. 70/2001, is to improve economic efficiency, in order to contribute to sustainable growth and employment. Thus, state aids for R&D will be compatible if they can lead to additional R&D and innovations and if the distortion of competition is not considered contrary to the public interest, which the Commission

equates for the purposes of this framework with economic efficiency. Note that, this framework applies also to state aids for R&D in the environmental sector, since there are many synergies that can be exploited between innovation for quality and performance, to optimize the use of energy, waste management and security (European Commission, 2006; 2008).

2.2 Public funding and SME's

The barriers that make financing for small- and medium-sized firms (SMEs) more difficult than for larger businesses have captured the attention of different stakeholders for a long time. The recent economic crisis and the harsh credit crunch triggered by a troubled banking sector have only reinvigorated the debate. From the EU to local governments, policymakers are increasingly targeting new ways to foster access to finance for SMEs, a sector that includes a large number of diverse businesses. This intrinsic diversity that characterizes SMEs and the multitude of actors involved make a comprehensive and exhaustive analysis of such policies extremely difficult (Infelise, 2014).

Literature has extensively discussed how economic activities carried out by SMEs present higher structural difficulties in securing their financing needs compared to large firms (Avery et al., 1998; Berger &Udell, 1995 and 1998; Gregory et al., 2005 and Vos et al., 2007). A root factor hampering SME finance is the idiosyncratic informational capacity that characterizes these businesses and specific sectors (Trigkas et al., 2012). SME financing is generally characterized by higher transaction costs due to several reasons: organizational features and business strategies generally do not allow them to communicate with the external business environment in the way that a firm accessing public financing would require. In addition, the great majority of these enterprises do not find the conventional tools employed by large companies to communicate with potential outside investors in a cost-effective way (Infelise, 2014).

The effects of direct subsidies can be better measured than those of fiscal indirect support (Bérubé and Mohnen, 2009). Regarding the effect of subsidies, one of the long standing questions is whether firms substitute subsidy for their own R&D investment. Although recent studies tend to reject full crowding-out effects, the results are ambiguous, although complementary appears to be the rule in European studies (Piekkola, 2007). Wallsten (2000) finds that the public R&D subsidies have a strong crowding-out effect on private investment and no effect on employment. Busom (1999) and Hussinger (2003), find evidence that public funding has real effects on private innovations. Later studies with this conclusion are these of Czarnitzki and Fier, (2002), Almus and Czarnitzki, (2003), Duguet (2004), while Reinkowskietal (2010) and Herrera and Sánchez-González (2013), reject full crowding-out effects concluding that subsidies increase innovation output, but the effect depends on firm size. Sorensen et al. (2003) find that subsidies increase private R&D expenditures. Ebersberger (2004) utilizes differences-in-differences techniques to analyse the innovation and labor demand effects of public R&D funding in Finland. The results suggest that subsidies have a positive impact on innovation output and in the long run on employment (Lehto, 2000). Czarnitzkiand Licht (2006) find that firms which receive direct R&D subsidies spend more on innovation and R&D, and that direct subsidies influence firms' patenting activities in a positive way. Czarnitzki and Lopes-Bento (2011) find that direct grants increase the number of innovations, and Hottenrott and Lopes-Bento (2014) show that targeted R&D subsidies increases ales generated from novelties. As for the impact on firms' behavior, Buisseret et al. (1995) specify that subsidies can have an effect on the breadth of innovation activities and can lead to changes in both the technological and business strategies of the firm. Very few studies such as Clarysse et al., (2009) and Hsuetal., (2009) provide empirical analysis of this issue.

3. METHODOLOGY APPLIED

Our research follows a bottom – up approach, based on the collection of primary data from SME's themselves. For this purpose a specially structured questionnaire was developed (Norussis, 2007), in electronic form using the google forms application. The questionnaire was sent via email to enterprises of the Greek processing industries, trade, primary sector, energy production, constructions, transports, storage and financial services. A total of 36 completed questionnaires were collected, number able enough to draw conclusions considering the nature of the research and the high level of technical knowledge that is required. Data groups included awareness of Greek SMEs on several public funding programs and tools, use of relative funding, contribution of these aids to the achievement of business goals, assessment of the operation of several forms of state aids and finally the profile of the surveyed enterprises. Our analysis was made using descriptive statistics and correlation analysis and all the relative tests were made (Norussis, 2007; Siomkos and Vasillikopoulou, 2005).

4. RESULTS

Our results show that the majority of the surveyed firms' (50%) have stated that during 2007 – 2013, had access to state aids in several forms regarding R&D and environmental protection projects, however a very significant percentage (44%) had no access to these grants. The use of such grants had led to different types of innovations. More specifically a 17% of the firms has managed to develop product innovations, a 22% process innovations and a 6% in marketing innovations. There is also a percentage of 11% of the surveyed firms which states that they were not able to develop any kind of innovation using public funding during the above mentioned period, which is considered to be quite significant. This result verifies previous research as mentioned to the literature review section, regarding the ambiguous effects of public funding to private innovations and crowding out effects. Furthermore, a very significant percentage (47%), has stated that environmental protection projects was not part of their R&D projects, with only a 28% of the surveyed enterprises to give positive answers.

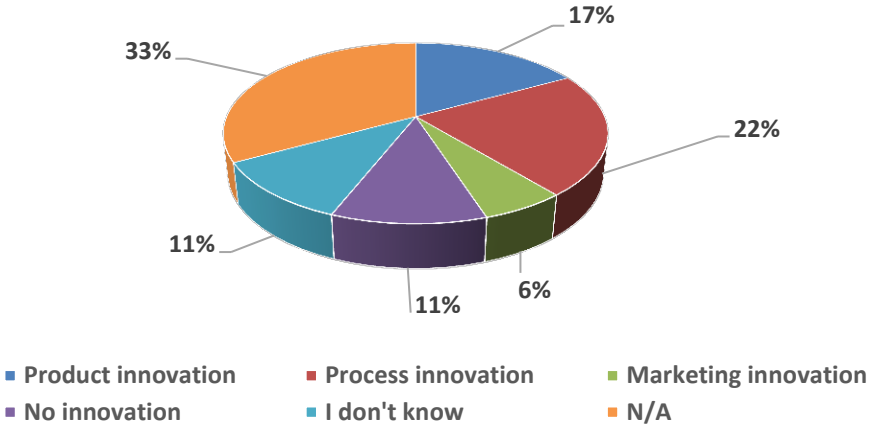

Figure 1: Use of public funding of Greek SMEs in developing innovations

Elaborating further our analysis regarding the inputs used in the form of funding, it is observed that the majority of enterprises in the sectors' surveyed (77.4%), directed their funding towards experimental development projects, with applied research projects to follow (59.3%). Showing a significantly lower percentage (11.1%), follow enterprises that moved towards investments related to basic research. Especially for projects related to environmental protection, of the total expenditures amount, a 19.04% was invested by enterprises towards this direction. This percentage is particularly important, although there could be a significant improvement in the absorption of funds, demonstrating a substantial turn to environmental protection, both as a means of improving efficiency and reducing the cost of doing business, and as an additional qualification for claiming extra funding. In relation to the allocation by source of funding, about the 40% of enterprises received funding via NSRF and the Greek investment law and only a 6% from European sources directly. According to the answers given regarding the type of concrete results that businesses have achieved with the use of these types of public funding, the majority stated that this led to the improved products and processes (44%), establishment of quality control systems and certifications (ISO, ECO labeling, CE etc.) in a percentage of 33%, collaboration with Universities and Research centers in Greece and abroad (31%), with finding new markets in Greece and internationally and with participation in actions for acquiring knowhow and training of personnel to follow with a rate of 22% of businesses respectively. A little lower in the ranking stand the employment growth, under the context of jobs creation and the protection of intellectual property rights (patents, etc.), with rates of 14% and 11% respectively.

Of great importance are the results in the next category of questions relating to the evaluation of individual funding programs in relation to the type of the aids, their contribution to the achievement of businesses' objectives (1=very much, 5=not at all). Based on the results, surveyed enterprises consider that the aid, contributed almost positive to the majority of their business objectives. Particularly, much of this positive effect was translated into their capability to adapt to market changes and overcoming the economic crisis (1.44), have access to the necessary liquidity (1.72), the improvement of quality of products and services (1.81), the acquisition of knowhow and sophisticated technology at a lower cost and improvement of investments in human capital through education and lifelong training (1.83 respectively), to create a friendly and flexible internal business environment and expand the scale of production through investments in machinery and other equipment (1.92 respectively), upgrading the internal organization of the enterprise (1.94) and maintain and increase the market share of the enterprise (1.97). In this evaluation also, targets that have some relation to environmental protection are lower in the ranking, but in general we can argue that they were assessed for their achievement with a relatively satisfactory rating. It is characteristic that, quite positively were evaluated the

achievement of saving energy and improving energy efficiency by penetration of renewable energy sources in the energy balance mix of the firms, the rational management of resources and integration of environmental commitments and requirements regarding health and safety of employees and customers and the design and production of new products with ecological orientation (score 2.33, respectively). Finally, we can consider as very important the achievement of reduction of production costs of products and provided services, which contributes essentially to increase competitiveness.

Correlation analysis has shown that there is a statistically significant importance of:

- The development stage of the SME's and their funding by state aids, the investments of public funding in R&D and environmental protection projects and seeking of public funding as a part of their entrepreneurial strategy (Pearson correlation coefficient 0.335, 0.363 and 0.371 respectively, at a sig. level=.005, 2-tailed), while the size of firms played no crucial role.
- The number of employees with the lack of time and information about public funding (Pearson correlation coefficient 0.371 and 0.439 respectively, at a sig. level=.005, 2-tailed)
- The annual turnover and the lack of information regarding public funding (Pearson correlation coefficient 0.423, at a sig. level=.005, 2-tailed)

Finally, regarding the type of aid and its relation to the achievement of business goals, correlation analysis has revealed that there are numerous positive effects as shown to the next Table 1.Indicatively we mention the positive effects of subsidies to the reduction of production's cost and the establishment of a friendly inter business environment, the positive effects of tax and insurance exemptions to the majority of the individual business goals such as, improvement of quality, enhancement of extroversion, confrontation of economic crisis, enhancement of investments, acquisition of knowhow at a lower cost, development of environmental friendly products, achievement of green public contracts etc. Finally, state aids in the form of several financial tools have positive effects on improvement of firms' liquidity, confrontation of economic crisis, better business organization, expand of market share, and achievement of several environmental goals.

Table 1: Correlations between different forms of state aids and achievement of business goals

	Improvement of quality	Extroversion	Lower costs	Establishment of a flexible and friendly inter business environment	Expansion of productionscale	Adjustment to market changes and confrontation of economic crisis	Liquidity	Betterbusinessorganizing	Investments in human resources	Acquisition of knowhow and sophisticated technology at lower cost
Directsubsidy	,124	,223	,348*	,444**	,166	,187	,219	,241	,188	,166
Grants for leasing and other financial services	,195	,048	,290	,057	,258	,512**	,446**	,266	,433**	,202
Tax and Insurance exemptions	,359*	,420*	,262	,124	,324	,562**	,203	,325	,475**	,567**
Special credit interests and interests granting	,202	,135	,204	,251	,235	,516**	,549**	,444**	,350*	,393*
Preferential treatment of public agencies	,293	,304	,298	,265	,175	,357*	,213	,276	,315	,283
Stateguarantees in crediting	,139	,080	,251	,185	,151	,334*	,115	,389*	,316	,340*
State funding regarding business capital	,209	,125	,195	,329*	,215	,208	,360*	,322	,330*	,291

	Biggermarketshare	Energy saving and use of RES in the energy mix of the firm	Sustainable resource management and commitments regarding safety	Desing and production of environmental friendly products	Lean and clean production method	Achievemnt of pubplic contracts with environmental orientation	Creation of a strong business image and enchancement of CSR
Directsubsidy	,083	,301	,247	,216	,143	,402*	,194
Grants for leasing and other financial services	,291	,188	,194	,301	,177	,528**	,502**
Tax and Insurance exemptions	,307	,323	,239	,477**	,434**	,625**	,390*
Special credit interests and interests granting	,330*	,208	,220	,402*	,385*	,416*	,384*
Preferential treatment of public agencies	,342*	,132	,108	,285	,158	,705**	,534**
Stateguarantees in crediting	,283	,142	,089	,233	,171	,644**	,597**
State funding	,123	,211	,155	,328	,357*	,492**	,484**

regarding
business capital

**. *Correlation is significant at the 0.01 level (2-tailed).*

*. *Correlation is significant at the 0.05 level (2-tailed).*

CONCLUSIONS

In conclusion, we could argue that public funding, regarding Greek SMEsaccording to their different type, impacts positively, on achieving business objectives in almost all categories that business themselves pose and each individual program sets, as they are designed, such as: ensuring liquidity and tackling the economic crisis, developing innovations in products and services, strengthening competitiveness, networking and stimulating extroversion and finally enhancing environmental protection. These positive effects has found not to be statistically related to the size of the surveyed enterprises, but have a strong correlation to the development stage of firms and their business planning and strategy.This fact is considered as of exceptional significance, since it concerns the substance of the design of public funding and the results that finally achieved by the surveyed enterprises who received relative funding.

A relatively small proportion of enterprises fostered by European sources, were able to achieve a significant amount of funding. This result raises questions about access of SMEs to European funding programs, which are usually managing larger budgets. Hence, we can argue that Greek enterprises need smaller and more flexible European funding, according to their emerging needs, constituting a way to confront with competition from bigger European companies.Beyond the mere quantification of the amounts available for spending, and given the significant budget constraints that EU governments are facing, there is also an increasing need to have a better targeted use of these limited resources. A qualitative assessment should be also considered on this issue. As today, the fragmentation of several initiatives across an enormous group of vaguely defined SMEs suggests that better coordination among policy actions is required. A well-designed public funding policy at national and European level, regarding R&D and environmental protection projects is needed, which will be able to identify different group of companies with similar needs and with a dimension that reflects thesingle market, could strongly improve their effectiveness.

Finally, the competent authorities that should be entrusted with this important role and the availabilityof credit information should be subject to further assessment. Not surprisingly, several institutionsclaim a role in coordinating initiatives to enhance SME access to finance. Greater contributions fromnational member states should be forthcoming, especially in those sectors that suffer stronginformation asymmetries or incomparability of credit information. Overall, the question of whethernational governments and the EU institutions should devise separate national or supranational policyactions for SMEs is a crucial issue that certainly deserves further attention.

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