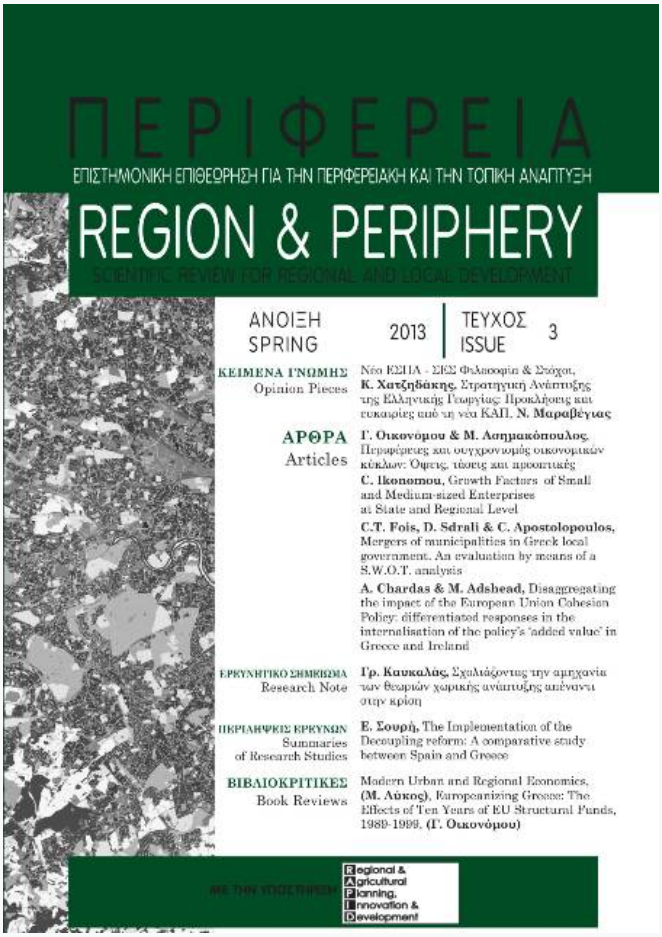
Περιφέρεια | Regional Integration: Politics, Economics, Governance

Τόμ. 3, Αρ. 3 (2013)

Περιφέρεια | Region & Periphery



Παράγοντες Ανάπτυξης των Μικρομεσαίων Επιχειρήσεων σε Εθνικό και Περιφερειακό Επίπεδο

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doi: 10.12681/rp.18899

Βιβλιογραφική αναφορά:

Ikonomou, C. (2013). Παράγοντες Ανάπτυξης των Μικρομεσαίων Επιχειρήσεων σε Εθνικό και Περιφερειακό Επίπεδο. *Περιφέρεια | Regional Integration: Politics, Economics, Governance*, *3*(3), 37–82. https://doi.org/10.12681/rp.18899

Περιφέρεια 2013 (3), 37-82
Region & Periphery 2013 (3), 37-82

Growth Factors of Small and Medium-sized Enterprises at State and Regional Level

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Abstract

The present research investigates the significance of various forms of capital and factors of production for SME growth in Greece, in the period before joining the Eurozone (1995-2002). A mathematical model associates SME growth with changes of features from various forms of domestic, local and regional capital and firm-level dummies, including firm size. The model is estimated using a representative sample. The findings on the limited significance of economic and manufacturing capital at state and regional level -especially in Attiki- are attributed to indirect causes, such as the 1999-2000 Athens Stock Exchange crash, SME increasing internationalization and the regional social, political and cultural capital. Additional findings indicate substantial failures in delivering growth-oriented local and regional policies focusing on SMEs and their problems. The significant association of SME growth with few forms of capital at state, regional and industrial level and with firm size is highlighted. The operation of a long-run economic capital-intensive accumulation process is investigated.

KEYWORDS: SME, Capital, Geography, Greece, Eurozone

Παράγοντες Ανάπτυξης των Μικρομεσαίων Επιχειρήσεων σε Εθνικό και Περιφερειακό Επίπεδο

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Περίληψη

Στην παρούσα έρευνα εξετάζεται η σημασία των ποικίλων μορφών κεφαλαίου για την ανάπτυξη των Ελληνικών μικρομεσαίων επιχειρήσεων (ΜΜΕ) την περίοδο προετοιμασίας ένταξης στην Ο.Ν.Ε. (1995-2002). Ένα μαθηματικό μοντέλο συσχετίζει την ανάπτυξη των ΜΜΕ με αλλαγές σε χαρακτηριστικά διάφορων μορφών εγχώριου, τοπικού ή περιφερειακού κεφαλαίου και με μεταβλητές σε επίπεδο επιχείρησης, συμπεριλαμβανομένου του μεγέθους των επιχειρήσεων. Το μοντέλο εκτιμάται με τη χρήση ενός αντιπροσωπευτικού δείγματος. Τα ευρήματα για την περιορισμένη σημαντικότητα του οικονομικού και βιομηχανικού κεφαλαίου σε

κρατικό και περιφερειακό επίπεδο -ειδικά στην Αττική- αποδίδονται σε έμμεσες αιτίες, όπως το κράχ του Χ.Α.Α., η αυξανόμενη διεθνοποίηση των ΜΜΕ και το περιφερειακό κοινωνικό, πολιτικό και πολιτιστικό κεφάλαιο. Πρόσθετες ενδείξεις αναδεικνύουν την αποτυχία διαμόρφωσης αναπτυξιακών τοπικών και περιφερειακών πολιτικών που να εστιάζουν στις ΜΜΕ και τα προβλήματά τους. Τονίζεται η σημαντική σχέση της ανάπτυξης των ΜΜΕ με ορισμένες μορφές κεφαλαίου και συντελεστές σε εθνικό, περιφερειακό και κλαδικό επίπεδο και με το μέγεθος των επιχειρήσεων. Ερευνάται η λειτουργία μιας μακροπρόθεσμης διαδικασίας έντονης συσσώρευσης οικονομικού κεφαλαίου.

ΛΕΞΕΙΣ-ΚΛΕΙΔΙΑ: Μικρομεσαίες, Κεφάλαιο, Γεωγραφία, Ελλάδα, Ευρωζώνη

1. Prolegomena

The Greek economy has been experiencing a time of great turmoil since the first significant crisis of the Eurozone. The blooming picture of its public debt, unemployment and of its current economic indicators raise substantial questions concerning the sustainability and capacity of its future growth efforts, which should be implemented from now on without additional financial support by its Eurozone partners. But Greece's current financial and economic instability poses an insecurity barrier first and foremost for all its Eurozone and European Union partners. Therefore, for the common EU interest Greek economists ought to shed further light on growth conditions concerning the Greek economy during its transition period that had led to its entry at the Eurozone, in 2002, which was recently described as a "mistake" in political circles in Germany, the Netherlands and in other common currency partners. Focusing on the factors that have managed or not to affect Greece's economic growth may have more to reveal than what was suggested to be, at first sight, at the root of its current economic and financial malaise. In case relevant research reveals something more systematic about Greece's growth efforts, its principal findings need to be reported for the common benefit of all Eurozone and EU partners. Since it is expected that in future, similar efforts to join the Eurozone will be undertaken by other EU partners, every single policy lesson has to be drawn concerning transitional periods that have led an EU Member State to join the common currency zone.

2. Introduction

As one of the earliest members joining the EU, Greece has advanced most of the policies promoting economic integration and accelerated efforts to join

the Monetary Union as a founding member, early in 2002. During Greece's preparatory phase to join the Eurozone, economic goal setting emphasized mostly macroeconomic adjustment, the need to reduce inflation, to improve principal fiscal indicators, especially those on debt and deficits, and to achieve stabilisation. Economic stability was promoted as a principal political motivation and target. The period from 1995 to 2002 was also associated with intensive policies and multiple political and administrative decisions to integrate the Greek periphery at the EU, to achieve economic and social cohesion and open-up its economy and its industries at the international competition. State-level barriers were progressively abolished and, as with other EU partners, Greece was forced to both reduce international competition barriers and improve domestic competition, as the EC quickened its pace towards a single market that would accommodate all its states, and intensively prepared to create an Economic and Monetary Union (EMU).

Greece suffered at that time from a double-peripherality problem, within the EU and across its territory, where spatial imbalances were taking place. It was envisaged as peripheral at the EU and, up to a great extent, as under-developed. Large amounts of funds were invested for its growth and development across its territory, less or more peripheral, by strengthening EU cohesion policy and its investments (Maravegias, 1995; Bachtler and Michie, 1995). The 1993 major Reform of Structural Funds and the related restructuring of EU Cohesion and Regional Policy have brought investments of unprecedented and -at the same time- pan-European scale, which comprised projects such as the new Athens Airport and the Athens METRO. Their construction was also accelerated because of the need to successfully organise the Athens 2004 Olympic Games. Specific regional programmes were combined with state-level operational programmes, such as the programme on manufacturing and few EC initiatives, such as a specific initiative on SMEs (Petrakos and Psycharis, 2004).

All these policies aimed to achieve a number of changes at the local and regional environment that concerned industrial capital and its infrastructure (e.g. concerning ICT and the location of new industrial spaces), entrepreneurship, human capital, the creation and fostering of changes in various degrees of education, changes with respect to legal environment and the laws implemented (e.g. a new development law was applied for enterprise growth and cohesion) and numerous other changes that related to SMEs and their growth. As with subsequent programming periods, the largest part of EU and Greek funds was devoted to hard infrastructure (Glynos et al., 2011). Their implementation required additionality and the co-financing of programmes with domestic funds, partnership creation, the appropriate legal context, the building of administrative, institutional and financial capacity and multi-level governance (Bachtler and Michie, 1995; Leonardi, 2005), which all have taken time to be realised and implemented.

Ex ante predictions (based on the HERMIN model) had early underlined the vulnerability of the Greek economy within the Single Market, which was attributed to the limited competitiveness of its domestic industries and the limited FDI inflows (ESRI, 1997, quoted in Bradley, 2005). Few studies emphasized the success of policies implemented. For example Leonardi (2005) suggested that EU policies assisted Greece to become less peripheral and two of its regions to cross the border between underdeveloped and developed states, as considered at that time. Despite these efforts, linking SMEs with domestic geographical, local or regional economic capital and the factors of production had not seemed to be a principal priority, as with regional policies implemented across EU Cohesion states at that time (see in Bradley, 2005; Bachtler and Michie, 1995; Leonardi, 2005 and many others). Besides, this is diagnosed in the principal EU-level ex post thematic evaluation on SME policies for the study period, which explicitly suggested that EU policies did not 'demonstrate strategic thinking with regard to the aims of SME measures or a close alignment between these measures and overall regional development objectives' and highlighted several aspects that had to be promoted across the EU, such as SME clustering, horizontal and vertical linking (ERNST & YOUNG, 1999, p. viii).

Greek SMEs were found to have lower increases in numbers, employment and turnover generation in comparison to SMEs located in other EU peripheral regions at that time, in Spain, Italy or Ireland (RASTEI, 2002, quoted in Palaskas and Tsampra, 2005). Their reduced competitiveness was attributed to their environment, especially the economic and institutional (Palaskas and Tsampra, 2005). In their study, Palaskas and Tsampra (2005) mostly focus on describing the Greek SME environment, especially the financial, banking and tax system, the conditions of entrepreneurship, human capital and those at the labour market and on emphasizing the problems and difficulties of the Greek SMEs. However, one needs to investigate more carefully and -if possibly- in depth, the way in which regional environment affected SME growth and the factors contributing to SME growth at the period, both at state and regional level. Additional studies are necessary to diagnose the validity of arguments held by Palaskas and Tsampra (2005) and any subjective claims. The use of quantitative rather than qualitative methods has the potential to better reveal economic realities, even after some critical time elapses from the study period, not to mention that it can be regularly reproduced. However, devising a new quantitative evaluation method would be needed to reconcile macro with micro-analytical approaches (as highlighted in Bradley, 2005; Bachtler and Michie, 1995). Answering the very broad question of the specific ways by which economic capital and other factors of production had affected SME growth, while assessing indirectly the policy effects on SME growth, is one of the principal subjects investigated under the present study.

For the non-acquainted with the developments of the Greek economy reader, one needs to add another point in our analysis. The last phase of the study period is associated with substantial losses for smaller in size investors, savers and firms, caused by the 1999-2000 crash of the Athens stock exchange (ASE). The ASE General Index had exceeded an annual increase of 100% at the end of 1999 (Spanos, 2003). The rise in share prices of listed companies from 1997 to 1998 reached an annual increase of ASE capitalisation by 194.7% (ibid). The total funds raised from public offerings (IPO's) increased from 59 million in 1997 to 1.1 billion Euro in 1998 and approximately 1.9 billion in 1999. In 1999, listed companies raised 472.9% more funds than the previous year (ibid, p.8). From January to October 2000, the ASE General Price Index for shares was reduced by 31.4% (Bank of Greece, 2000). This fall ranged across industries; in construction the percentage of fall in shares was 64.2%, while in manufacturing it was 33.8% (op.cit.). The stock market value of listed companies shrunk dramatically from approximately 197 billion Euro in December 1999 (representing 176% of Greek GDP) to approximately 146 billion in October 2000 (107% of GDP) (op. cit.). The causes for this crash[1] should not only be sought on domestic funds and the wealth effect produced but also on speculative movements of international funds, which were allowed by the increasing internationalisation and opening-up of the recently independent Greek stock market that had to deal with large-scale changes and money flows of unprecedented extent. The contagious, gregarious and massive behaviour of thousands of individuals that were difficult to handle, accumulated large amounts of domestic funds in ASE, which did not end up to healthy business investment opportunities.

This is an important aspect to consider in our analysis for the Greek economy at the time, for a country that recently faced the dramatic consequences of another consecutive -within a period of less than 10 years- crisis, this time of a global scale. If there is something more systematic to diagnose in the Greek case, this could relate to the exposition of states facing substantial stock market adjustments to a chain of negative reactions and shocks, as suggested in some studies (for example in Reinheart and Rogoff (2009; 2010)). The answer to the broad question of 'why nations fail' appears to relate to their environment (as underlined by Acemoglu and Robinson, 2012) but one should investigate with more concern how exactly a domestic economic and business environment is shaken by an initial shock and the specific factors affecting or not the growth of an economy and its businesses[2].

What is more, the Greek labour market suffers from limited flexibility. Flexibility was defined as the ability for 'rapid redeployment of labour between industries, occupations or regions, ensuring that any disturbance to the labour market

is short-lived', as well as an institutional setting determining high employment and low structural unemployment rates (by Pissarides in HM Treasury, 2003). It was distinguished in different forms, such as numerical, working-time, functional and wage flexibility (Bredgaard et al., 2005) and suggested to contribute to SME employment generation (Bredgaard et al., 2005; HM Treasury, 2003). Greece's limited flexibility was envisaged through policies implemented, but several of its causes, such as problems with labour market mobility and demographic change, have never been seriously considered[3].

Taking these points into account, the present work is a microeconomic study for the growth of Greek SMEs and the factors associated to it, during this transitory period that led Greece at joining the Monetary Union on time. It first develops a mathematical model that relates business and, in particular, small and medium-sized enterprise (SME) growth to: i) changes at the geographical environment of firms, at local and regional level, ii) firm-level dummies and iii) the particular dummy for the region where each firm is located. The model is then empirically tested with econometrics, using a representative for the Greek economy sample of 1023 SMEs, surviving from 1995 to 2002. Several microeconomic models associate firm-size changes variables (namely the logarithmic transformation of employment and turnover growth) with the dependent variables. They all take the form of seemingly unrelated regression equations (SURE).

The study is preceded by a theoretical reference on geographical features and their grouping in various forms or types of capital (or factors of production). This part excuses the choice of selected to be studied features and their grouping into factors that affected SME growth. Conclusions are reached on the Greek economy at the period, the growth of its surviving SMEs and the significance of changes of geographical and firm-level dummies that associated with SME growth. These are all regarded within the context of Greece's uneven regional development and centre-periphery pattern and the interaction among three different spatial scales, namely the local, regional and national. The study provides a more robust methodological basis for similar studies in the subject, in many different respects.

3. Geographical features, firm-level features and their grouping in various forms of capital and factors of production

Until today, several national or regional-level studies have been conducted on the factors affecting business growth in numbers or sizes (Hart and McGuiness, 2004; Moyes and Westhead, 1990; Reynolds et al., 1994; Westhead et al., 1995; Westhead and Moyes, 1992). These studies, usually focusing on SMEs in different states, geographical and historical environments[4], investi-

gate how specific state and geographical contexts affect firm growth, by using different proxies and various modelling specifications that combine factors at the firm environment with those at the firm level.

Selected factors are grouped in various methodological ways and groups (such as education or rurality), by making reference to theory or a proposed methodology, such as principal component analysis (see Westhead and Moyes, 1992). The variables tested are only but proxies, indicating the significance of a factor from financial, industrial or other type of business environment. Proxies are selected from a pool or 'concentration of characteristics' (Westhead and Moyes, 1992; p. 26). Reynolds et al. (1994) suggested that despite different geographical settings, similar factors affect business growth processes, indicating a rather uniform conceptualisation of the role of economic geography in affecting firm growth. Similar factors are likely to associate with firm growth in more central or peripheral environments (see in Vaessen and Keeble, 1995).

In comparison to these approaches, the present work takes a perspective that focuses on the features of the local and regional environment of firms (in a single word the "geographical" environment), which are grouped in various forms of capital. It also adds in the analysis of the firm environment, information at the firm level, by using dummies. All these forms of capital investigated are the factors of production detected in economic growth and development theory.

Geographical features constitute an essential aspect of geographical theory. They are distinguished in physical or human-centred (economic, social or other), dynamic or static, 'hard' or 'soft', material or immaterial, tangible or intangible (see in Cooke and Piccaluga, 2006; Asheim et al., 2006) and differ in type, degree or quality. For analytical purposes, we can group them in different types or forms of capital, such as the economic, industrial, entrepreneurial, human, social, cultural, the legal or any other form of capital. These forms of capital are in practice principal factors of production discussed in economic theory.

Examples of economic and financial capital features are the amount of savings, deposits, the declared income or the investment ratio, emphasized by neoclassical theory. Industrial capital features, such as market competition, structure and cost conditions are distinct for each industry. Industrial infrastructure features are features of hard or soft infrastructure found in each industry, such as the numbers of hotel beds in the tourist industry. Infrastructure has been discussed in various studies to be at the heart of growth efforts (see Aschauer, 1989).

Human capital features refer to labour, workers, their capacity to acquire skills, knowledge and know-how, and the various degrees of education attended. Human capital is extensively suggested to contribute to growth (McCann, 2013; Asheim et al., 2006; Becker, 1964), often through various models (see Romer,

1986; 1990; Lucas, 1988; Mankiw et al., 1992; Fagerberg, 1987). Higher levels of human capital have been associated to increases in employment, population and house prices (Glaeser et al., 1995).

Centrality or peripherality is another geographical feature that relates to business growth and development. Central regions are thought to achieve cumulatively better growth outcomes than peripheral regions (see in McCann, 2013). They are likely to provide higher increasing returns to scale, lower transaction costs, improved infrastructure in transportation, telecommunication or other domains, access to capital, technology, labour or other resources, often provided in larger scale and better quality. They may provide better learning environments, associated with innovation, technology, research and development (R&D) production and a more systematic provision of facilities supportive to firms (Storper, 1993; Morgan, 1997). They may be more research active and produce better knowledge outcomes. Access to finance, reduced entry barriers, higher competition and the economies made in central areas may result in price reductions, market expansion and export increases. Numerous regions and localities around the world have emerged as central growth places through emphasizing and improving human and social capital conditions, as discussed in the case of industrial districts and clusters (Malecki, 2012; Asheim et al., 2006). Growth thresholds may also appear, from rising congestion costs and agglomeration diseconomies. On the other hand side, peripheral and rural areas may suffer from accessibility, lack of mobility or other barriers, which raise the significance of human communication, trust and relations, the social aspects of living and indigenous social capital features. Extensively discussed in firm location theory, geographical proximity and distance of firms from central spaces is another feature affecting their growth (Boschma, 2010).

Social capital features refer to such features as trust, reciprocity amongst economic and social participants, norms and networks of civic engagement, which enable collective action, learning and information sharing, social cohesion, inclusion, empowerment and political action, all difficult to trace and grasp (Malecki, 2012; Putnam et al., 1993). Having important capital-like properties (Robinson et al., 1999), social capital is likely to be 'higher' in rural and peripheral areas (see Sørensen, 2012). Regional economies are affected by their social structure and embeddedness (Granovetter, 1985). However, the national effect upon social capital, various measurement problems and the absence of data may impede identifying its local and regional distribution and features in some states (Lyberaki and Paraskevopoulos, 2002). Social capital features affect differently economic growth and performance in different local and regional environments (Beugelsdijk and Schaik, 2005; Putnam et al., 1993). Their effects may be easier to diagnose at the firm and regional level (as discussed in Malecki, 2012). Culture and its features

on the other hand are necessary for societies (Kluckhohn, 1954; Towse, 1997). The cultural capital is described through numerous tangible and intangible features. These include the museums, antiquities, the arts market, the public provision of arts, the creative industries, the mass media markets and many other (Towse, 1997; 2007), all difficult to quantify and use in quantitative analyses.

Each region contains different urban settlements, characterised by urban and local features, such as rents, house prices or land costs (McCann, 2013; Richardson, 1969; O'Sullivan, 2009). House and land prices influence scale economies, infrastructure, its efficiency, accessibility and proximity, the labour-size markets and other aspects affecting businesses (O'Sullivan, 2009; Richardson, 1969). Urban congestion, agglomeration diseconomies and the intensity of urban problems may negatively affect firm growth (O'Sullivan, 2009; Richardson, 1969).

The legal capital affects firm growth, as underlined in law and corporate law studies (La Porta et al., 2002; 1998) and discourses from transaction cost theory. Different firm legal statuses reflect differential tax benefits, growth barriers and different legal environments. Differences in taxes or other income sources at the local level may associate with local firm growth. Legal and corruption constraints posed by legal environments, together with financial barriers, are likely to negatively associate with firm growth rates for smaller in size firms, especially in countries with underdeveloped legal systems and corruption problems (see in Beck et al., 2002).

Features of entrepreneurial capital, such as numbers of start-ups, firm strategies, finance, innovation or other associate to firm growth (see Nijcamp, 2011; Sexton and Landstrom, 2000). Firm formation and demographic studies often use multivariate models -especially ordinary least squares (OLS) and logarithmic- to test the association of firms and their numbers (the principal proxy for entrepreneurship) with numerous proxies for geographical features. These are often selected ad-hoc, ranging across various features, such as different types of education, population, market sizes, the industry, firm size, access to capital, premises, rurality, urbanisation or peripherality (Reynolds et al., 1994; Moyes and Westhead, 1989). Cross-sectional models for different periods and national or geographical environments, associate new firm formation variation with changes in different geographical features[5] (see in Acs and Armington, 2006; Reynolds et al., 1994).

Firm size is a principal firm-level feature discussed to associate with economies of scale and to affect firm growth (Penrose, 1957). Firms of different sizes face different barriers and challenges. Studies on the SME sector emphasize the influence from the economic environment and internal to SMEs growth processes (Storey, 1994). SMEs are large employment contributors, capable of reducing unemployment. Their performance differs across regional labour environments

(Storey, 1994; Hitchens and O'Farrell, 1988; Vaessen and Keeble, 1995). Specific geographical features affect their growth, e.g. a special education or training (Pittaway and Cope, 2005; Cox and Taylor, 2006), finance, the financial institutions and a large variety of social and economic capital features (Becchetti and Trovato, 2002; Berry et al, 2004; Storey, 1994, Penrose, 1959). Finally, it is worth considering the degree of internationalisation of SMEs, i.e. their capacity to increasingly engage with international operations, generally discussed in various readings to affect their growth, positively or negatively (see Iben, 2006).

Having made clearer the above theoretical points for choosing to study the features affecting SME growth, the methodology of the present study will now be described.

4. The methodology followed in the present research

4.1. Sample's structure, selection and preparation

The present research had to create a representative sample of SMEs across the Greek territory and the various Greek industries, before developing models at the state, regional and industrial level.

Greece's geography is rather peculiar and difficult to ignore in economic research focusing on firms. It contains an archipelago of islands, approximately 300 of which are populated. Two-thirds of its physical territory is mountainous. Thus, physical geography poses severe obstacles to its firms, especially for the ones smaller in size, which have to overcome transportation costs. A country of approximately 11 million, whose major activities lie within the second and third sector, especially in tourism, trade and services, witnessed the creation and opening-up of new services during the 1990s, the expansion of existing ones, the development of construction and some of its manufacturing activity, especially the one related to its natural resources, such as food or cement.

SMEs are large employment contributors in Greece and a principal part of the Greek business population over the last decades (EC, 2000). The sample focused on them and was drawn first from the 1995 Greek V.A.T. database, across various industries and regions. Then, selected firms were traced in the 2002 V.A.T.[6].

The official EU definition of SMEs was used in sampling and only firms of initial employment size from 5 to 200 employees were selected. Greek firms have very small sizes and the distribution of business population in numbers is highly skewed towards smaller sizes. Such a distribution was acknowledged by integrating a lower employment band (5-9 employees) of micro firms. Thus, a third firm size (apart from small and medium) was added, as a control

dummy. Turnover thresholds were more than 0.15M Euro and less than 50M, in agreement with the EU definition[7].

Five key industries were selected: construction, manufacturing, tourism, trade and other services. These came from manufacturing and services, both sectors accounting together for approximately 90% of the Greek Gross Domestic Product in 1994.

The sample was spread across different regions, thereby avoiding the statistical bias that occurs when firms are collected from a single region, central or peripheral. By using a composite ranking index of regional economic and social features -as described in Ikonomou (2008)- similar to that found in Petrakos and Psycharis (2004), the Greek regions were ranked from more peripheral to more central. After ranking regions across a scale of centrality/peripherality, four out of thirteen Greek regions were selected. In descending order of centrality, the regions selected were Attiki, Kentriki Makedonia, Thessaly and Ipiros, which is a region of outmost peripherality[8]. The vast majority of firms from four out of the seven Greek mainland regions were included in the sample[9].

A stratified simple random sampling was made, by implementing quotas (proportional thresholds) for the pre-selected regions and industries, using available employment bands for stratification (provided by the Greek statistical authorities), thereby offering additional (indirect) stratification of the sample. The allocation of the sample in regions and calculations for its final size were made by taking into account regional variance (using Neyman's formula). For econometric purposes, a minimum of 50 firms were reached in each region and each combination of region and industry, by incrementing the sample when necessary[10].

Overall one hundred different combinations of employment bands, regions and industries were made, using simple random sampling in each of these combinations. 1,380 firms were selected for 1995 and their employment and turnover performance was traced in 2002. Cleaning the sample comprised meticulous and time-consuming tasks, such as removing inactive firms and double-checking the accuracy of recorded sizes.

A large sample of 1089 firms finally remained, very close to the originally calculated and distributed across employment bands, industries and regions. This was normally distributed, as a whole. Using non-parametric tests, it was found to be representative of the sample of 1,380 SMEs and of the overall population of Greek surviving SMEs at the study period.

Using Chow tests (that investigate the equality of coefficients between groups and whether data can be combined), a structural change between the two more central (REG1 and REG2) and two more peripheral regions (REG3 and

REG4) was tested. F-tests for both EMPLGR and TURNGR (**Table 1**, Appendix) accept the null hypothesis that coefficients between centre and periphery do not differ and are equal. Hence, the sample is found to behave as one.

4.2 The choice of variables

The V.A.T. sample provided information on size, industry, legal status and geography that was used to create some variables initially introduced as categorical and then broken down into dummies. Regional and local dummies were created for each region and department and introduced to test the centrality/peripherality of regions. These were linked to local and regional accounts, expressing various forms of capital features. The initial and final values of these features and their change were introduced (**Table 1**).

Industrial dummies were used to test separately the association of SME growth with each industry. Few industrial infrastructure proxies were added, using available surrogates on telephone lines and hotel beds. The market in telecommunications witnessed a great expansion since its opening in early 1990s and tourism is an expanding industry, absorbing significant funds. Few manufacturing capital features were added at the local level: sales, value added and investments for firms having more than 10 employees. In particular, the numbers of such small, medium and large manufacturing firms were also added and tested, as a more general feature for entrepreneurial capital.

Furthermore, initial employment size dummies were used to differentiate among micro, small and medium firms. Using the EU definition, firms from 5 to 9 employees were considered micro, from 10 to 49 small and from 50 to 200 medium.

Legal dummies tested the influence exercised by legal capital and ownership statuses. All main legal statuses in Greece at the time were tested: Unlimited, mixed and limited liability, sole traders and a proxy used for other legal statuses (that include partnerships).

Economic capital features were introduced through numerical variables for changes in savings, declared income, deposits, direct and indirect taxes and the number of taxpayers at the local (departmental) level. A proxy was used for changes in private house investments, significantly rising at the study period.

Human capital and labour features were tested, using numerous features: changes in activity rates (in 20-44 population age, divided by total population), the numbers of self-employed, salaried employed, the financial active and unemployed. Population density was used as a proxy for human capital and to test market effects, at local level. Various degrees of regional education were introduced, which reflect the levels of education at the region: University level,

higher technical, higher vocational, secondary, compulsory secondary and no education, tested through illiteracy levels.

Using postcodes, the distance from Athens -the capital of Greece and the region of Attiki- was created (DIST) as a geographical proximity feature. Changes in all geographical features were tested throughout the whole period studied or even, in the case of human capital proxies for a more extended period of 10 years, starting at the beginning of the decade of 1990s. All geographical variables were standardised, by dividing their yearly values by the respective local municipal population values, at the municipal level (for each firm). Hence multi-collinearity was bypassed, which remains one of the most principal problems in such geographical-level studies.

Changes in employment and turnover size were first employed as proxies for business and SME growth. These two variables were chosen because of their availability but also by reference to related literature (Delmar, 1997; Weinzimmer et al., 1998). Employment is a principal firm resource, a factor of production in economics and the focus of business support policies seeking to reduce unemployment. Business decisions on employment have a long-term perspective, as they strongly associate with fixed and variable costs. It is a firm growth variable discussed to display low volatility (Delmar, 1997). It is also less underestimated than other variables. Turnover is selected as one of the most widely used variables in firm growth studies (Weinzimmer et al., 1998) and is a commonly acknowledged performance measure, helping decision-making and financial appraisal. Turnover values were amended to constant prices in Euro. Logarithmic transformations of employment and turnover growth were preferred as dependent variables, to reduce or -if possible- eliminate heteroskedasticity in models (**Table 1**).

Table 1: *Variables/Features used in the study*

ACRONYMS	General Category	Definition/Description/Time period	Level, type, relation to firm
Dependent variables			
EMPLGR	Business Employment Growth	Employment change, 1994 - 2002	Firm, numerical
TURNGR	Business Turnover Growth	Turnover change, 1994 - 2002	Firm, numerical
LogEMPLGR	Logarithmic Employment Growth	Logarithmic employment change, size increasing firms only, 1994-2002	Firm, numerical
LogTURNGR	Logarithmic Turnover Growth	Logarithmic turnover change, size increasing firms only, 1994-2002	Firm, numerical
LogEMPLGRadj	Adjusted Logarithmic Employment Growth	Logarithmic employment change, all firms, 94-02	Firm, numerical
LogTURNGRadj	Adjusted Logarithmic Turnover Growth	Logarithmic turnover change, all firms, 94-02	Firm, numerical
Independent variables			
MICRO95	Size	Initial micro size, 1995	Firm, dummy, internal
SMALL95	Size	Initial small size, 1995	Firm, dummy, internal
MEDIUM95	Size	Initial medium size, 1995	Firm, dummy, internal
REG1_95	Peripherality/Centrality	Region Attiki, most central, 1995	Firm, dummy, external
REG2_95	Peripherality/Centrality	Region Kentriki Makedonia, middle central, 1995	Firm, dummy, external
REG3_95	Peripherality/Centrality	Region Thessalia, middle-peripheral, 1995	Firm, dummy, external
REG4_95	Peripherality/Centrality	Region Ipiros, most peripheral, 1995	Firm, dummy, external
IND1_95	Industrial capital	Construction, 1995	Firm, dummy, external & internal
IND2_95	Industrial capital	Manufacturing, 1995	Firm, dummy, external & internal

FEATURES	General Category	Definition/description	Level, type, relation to firm
IND3_95	Industrial capital	Other Services, 1995	Firm, dummy, external & internal
IND4_95	Industrial capital	Tourism, 1995	Firm, dummy, external & internal
IND5_95	Industrial capital	Trade, 1995	Firm, dummy, external & internal
TELLINES_9401	Industrial Infrastructure	Change in telephone lines, 1994 - 2001	Local, numerical, external
HOTELBED_9401	Industrial Infrastructure	Change in hotel beds, 1994 - 2001	Local, numerical, external
MANFSML_9401	Entrepreneurial capital	Change in numbers of manufacturing SMEs and large firms (>10 employees), 94-01	Local, numerical, external
MANFSMLINV_9401	Manufacturing capital	Change in investments by manufacturing SME and large firms, 1994-2001	Local, numerical, external
MANFSMLVA_9401	Manufacturing capital	Change in the value added of manufacturing SMEs and large firms, 1994-2001	Local, numerical, external
MANFSMLSAL_9401	Manufacturing capital	Change in the sales of manufacturing SMEs and large firms, 1994 - 2001	Local, numerical, external
DEPOSITS_9400	Economic capital	Change in deposits, 1994 - 2000	Local, numerical, external
SAVINGS_9400	Economic capital	Change in savings, 1994 - 2000	Local, numerical, external
INCDECL_9401	Economic capital	Change in declared income, 1994 - 2001	Local, numerical, external
INDTAX_9401	Economic capital	Change in indirect taxes, 1994 - 2001	Local, numerical, external
DIRTAX_9401	Economic capital	Change in direct taxes, 1994 - 2001	Local, numerical, external
TAXPAY_9401	Economic capital	Change in the numbers of tax payers, 1994-2001	Local, numerical, external
PRHSINV_9401	Economic capital	Change in private investments in houses, 94-01	Local, numerical, external
LGST1_95	Legal capital &environment	Unlimited liability firms, 1995	Firm, dummy, external & internal
LGST2_95	Legal capital &environment	Mixed liability firms, 1995	Firm, dummy, external & internal
LGST3_95	Legal capital &environment	Limited liability firms, 1995	Firm, dummy, external & internal
LGST4_95	Legal capital &environment	Sole traders, 1995	Firm, dummy, external & internal

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FEATURES	General Category	Definition/description	Level, type, relation to firm
LGST5_95	Legal capital &environment	Other legal statuses, 1995 (including partnerships)	Firm, dummy, external & internal
FINACT	Human capital	Change in financial activity, 1991-2001	Regional, numerical, external
ACTIVE	Human capital	Change in activity rates, 1991-2001 Number of employees of 20-44 age group divided by total employment	Regional, numerical, external
SelfEMPL	Human capital	Change in self-employment per 100 inhabitants, 91-01	Regional, numerical, external
SalEMPL	Human capital	Change in salaried employment, 1991-2001	Regional, numerical, external
UNEMPL	Human capital	Change in unemployment, 1991-2001	Regional, numerical, external
POPDENS_9401	Human capital & market	Change in population density, 1994 - 2001	Local, numerical, external
HTE	Human capital	Change in higher technical education, 91- 01	Regional, numerical, external
HVcE	Human capital	Change in higher vocational education, 91- 01	Regional, numerical, external
UnE	Human capital	Change in university-level education, 91- 01	Regional, numerical, external
SE	Human capital	Change in secondary-level education, 91- 01	Regional, numerical, external
CmplSE	Human capital	Change in compulsory secondary education, 91-01	Regional, numerical, external
IL	Human capital	Change in illiteracy, 1991-2001	Regional, numerical, external
DIST	Geographical proximity	Distance from the centre of Athens, km	Firm, numerical, external

Note 1: Numerical variables were standardised first. Local and regional numerical variables were standardised by dividing by the municipal population at the municipality where each firm was located. Turnover values were deflated. For categorical variables tested, the models exclude one dummy.
Note 2: All local data are at the level of the department (prefecture), a sub-regional (NUTS III) local level that was recently abolished by the latest administrative reform. The numbers in variables show the year selected or the period of change.

4.3 The description of the model tested

In this section, the building of the model will be described. So far, various models have been built to associate geographical conditions and factors of production to regional growth, such as the neoclassical, interregional or demand growth models (Richardson, 1969; 1978). A principal 'family' of models is the regional econometric, especially the macro-econometric (Richardson, 1969; 1978). A multivariate econometric model uses multiple independent variables, testing the extent to which their variance accounts for the variance of the dependent(s). In the present research however, we are concerned with building a micro-econometric multivariate model that will associate firm growth -and more precisely its variance- with all sources of variance from the geographical environment of firms that are likely to affect it, measured both at the firm and geographical level.

We investigate regions as a segment of space but also as a collection of businesses and a site of their location (Duncan et al., 1961). One source of variance at the regional level associates with the degree of contiguity and homogeneity amongst regions and the differences existing amongst them (Duncan et al., 1961). A central region for example differs from a peripheral. Furthermore, the particular features of each region (or other area) and their changes could account for changes in firm sizes, for firms located inside them. The assumption made is that any territory is 'subdivided into elementary areal units subject to variation in several (quantitative and qualitative) aspects' (Duncan et al. 1969, p. 150) and such aspects can affect the growth of businesses. However it is not just a static picture of these aspects but their temporal change, as time elapses, which affects firm growth.

There is also a source of variation that relates to firms themselves. This is taken into account when the appropriate sampling choices are made that take into account regional variance and when growth and performance outliers are removed. But a part of it remains to be explained, by the use of features measured at the firm level.

Overall, our model needs to incorporate some component for the variation of geographical, regional or other features, some rough component for regions themselves and the part of region that remains unchanged and a more specific component referring to the more particular environment of each firm, such as the industrial or legal, by the use of qualitative variables (dummies). The distinction between regional or other geographical features and specific regional dummy variables is made because we are interested in studying regional variance by testing separately the effects of regional units and the features of the regional units.

To this end, we introduce both regional and firm-level dummies. More precisely, we consider the categorical dummies $(D_i)_i^{\omega}=1$, where D_1 is the regional dummy, and $D_2,...,D_{\omega}$ are firm-level dummies. Each of the above is broken down into n_i mutually exclusive dummies $D_{i1},...,D_{ini}(i=1,....,\omega)$.

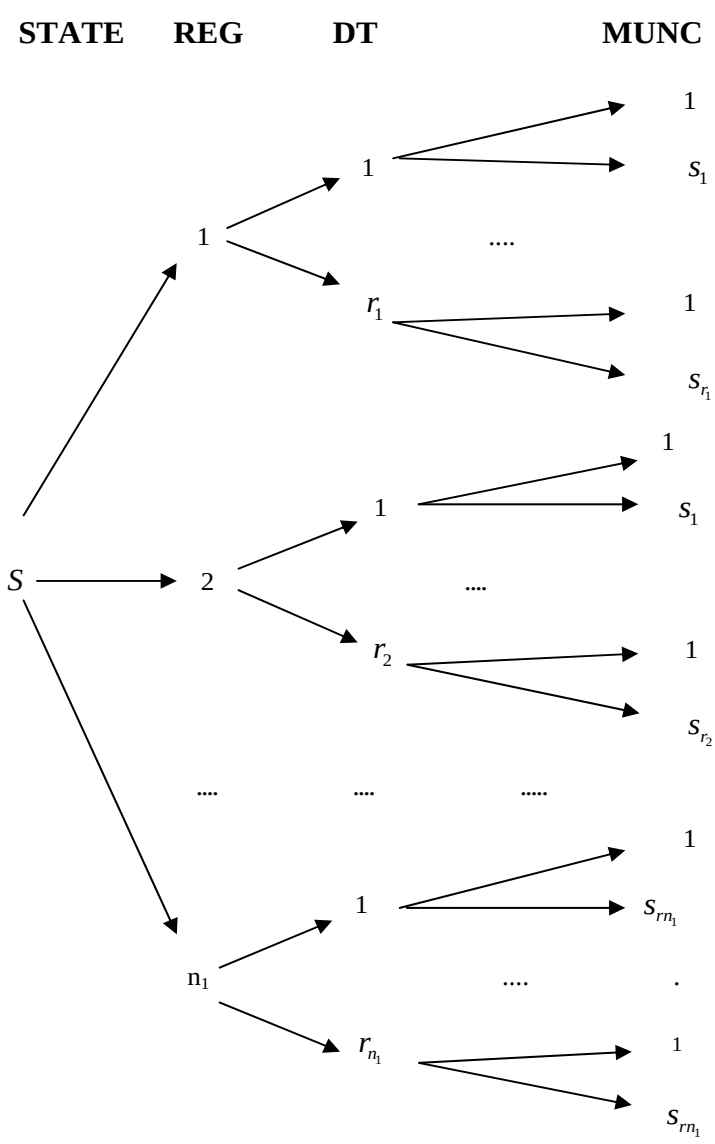
In particular, in our analysis we take the regional dummies REG1, REG2, REG3 and REG4, as seen in Table 1, i.e. $n_1=4$ and the firm-level categorical dummies D_2,D_3,D_4, broken down to IND1, IND2, IND3, IND4 and IND5 ($n_2=5$) for the industry where each firm belongs to, LGST1, LGST2, LGST3, LGST4 and LGST5 ($n_3=5$) for the legal status of each firm, and MICRO95, SMALL95 or MEDIUM95 ($n_4=3$) for the three different initial (in 1995) sizes of firms used in the study.

Such features are not time dependent (as opposed to geographical features). For geographical features at each different geographical level we suggest to better localise businesses first, by partitioning each region in departments and each department into municipalities, as follows:

Region i ($i=1,...,n_1$) is divided in $DT_{ir}(r=1,...,r_i)$ departments, each of which is -in turn- divided in municipalities $M_{irs}=(s=1,...,s_r)$, as illustrated in **Diagram 1**.

The way one country is subdivided into regions and the regions in sub-regional spaces is a matter of various controversies (see Richardson, 1969; 1978) and beyond the scope of the present study. Regional subdivisions are taken for granted for the case of Greece in particular. However it is highlighted that sampling focuses on regional ranking across a scale of peripherality/centrality and the regions finally selected are representative across this scale (ranging from more central to more peripheral). We also avoid considering relocation of businesses from one region to another, for simplicity purposes. Hence, the regional and sub-regional environment of a firm changes but this is not due to firm relocation.

Diagram 1: *Breaking the space into spatial components or units*



We consider F_{ij} to be the *j-th* regional geographical feature $(j=1,...,k)$ of region i $(i=1,...,n_1)$. In particular we include in the present study such regional features as education and human capital variables, which take different values in each region, and $k=11$.

We also suggest G_{irx} to be the *x-th* departmental geographical feature $(x=1,...,q)$ of department $DT_{ir}(r=1,...,r_i)$, which belongs in region $i(i=1,...,n_1)$. In particular, we include as departmental features the numbers of telephone lines and hotel beds, the levels of deposits, savings, income declared, indirect taxes, direct taxes, private investments in houses, population density, the number of taxpayers, the numbers of manufacturing small and large firms, the investment of manufacturing small and large firms, their value added and their sales. For all these variables *x=14.*

Furthermore, H_{irsy} is the *y-th* municipal and local-level feature $(y=1,...,p)$ of municipality $M_{irs}(s=1,...,s_r;r=1,...,r_i;i=1,...,n_1)$, which in the present study includes only DIST that is counted as the distance from the centre of Athens of the municipality where the firm is located, and $y=1$. Other geographical features can be added to complete the analysis[i].

Hence, adding all geographical features *F*, *G* and *H*, for a business operating in region *i*, we obtain:

$$\sum_{j=1}^{k} Fij \; + \sum_{r=1}^{ri}\sum_{x=1}^{q} Girx \; + \sum_{r=1}^{ri}\sum_{s=1}^{sr}\sum_{y=1}^{p} Hirsy$$

and considering the corresponding regional variable D_{1i}, we should have

$$\mathrm{D}_{1\mathrm{i}}\,(\sum_{i=1}^{\omega}\sum_{j=1}^{ni-1} dij\Delta ij\,)$$

Adding all firm-level dummies, including the dummy of the region, we obtain

$\sum_{i=1}^{\omega}\sum_{j=1}^{ni} Dij$. However to avoid multi-collinearity in econometrics that occurs when

all dummies of a categorical variable are selected, we need to exclude one of them, by referring to n-1 dummies:

$$\sum_{i=1}^{\omega}\sum_{j=1}^{ni-1} Dij \ ,$$

which becomes in the present case:

$\sum_{i=1}^{3} Di + \sum_{i=1}^{4} INDi + \sum_{i=1}^{4} LGSTi + \sum_{i=1}^{2} SIZEi$, where SIZE is used to refer to the three different sizes, namely MICRO95, SMALL95, MEDIUM95.

Denoting Y the employment or turnover of business of some region i

$$Y = \sum_{i=1}^{n_1} b_i D_{1i} \ (\ c_1 \sum_{j=1}^{k} F_{ij} \ + \ c_2 \sum_{r=1}^{r} \sum_{x=1}^{q} G_{irx} \ + \ c_3 \sum_{r=1}^{r_i} \sum_{s=1}^{s_i} \sum_{y=1}^{p} H_{irsy} \ ) + \ \sum_{i=1}^{\omega} \sum_{j=1}^{n_i - 1} d_{ij} D_{ij}$$

where coefficients c_1, c_2, c_3 are used for geographical features at the regional, local (departmental) and municipal level respectively, b_i for each regional dummy D_i, and d_{ij} all firm-level dummies.

We remark that the expression $c_1 \sum_{j=1}^{k} Fij$ should be preferred from $\sum_{j=1}^{k} cjFij$ to illustrate rather similar effects of geographical features corresponding to the same region, even though it is possible to consider the second term that distinguishes between the effects of features $F_1, F_2, ..., F_{ij}$ (and similarly for the remaining terms for the geographical features in the model).

We are interested at estimating the following model that refers to changes of firm-sizes, ΔY, over the time period of two cross-sections at the left hand side of the equation. Note that *G's*, *H's* and *F's* change over the time period, and we symbolize such changes with ΔG, ΔH and ΔF respectively[ii].

The general form of the model becomes:

$$\Delta Y = \sum_{i=1}^{n_1} b_i D_{1i} \left(c_1 \sum_{j=1}^{k} \Delta Fij + c_2 \sum_{r=1}^{r} \sum_{x=1}^{q} \Delta Girx + c_3 \sum_{r=1}^{ri} \sum_{s=1}^{si} \sum_{y=1}^{p} \Delta Hirsy \right) + \sum_{i=1}^{\omega} \sum_{j=1}^{ni-1} d_{ij} \Delta_{ij} + u$$

Furthermore, we avoid the use of a constant, as this is a model using several dummies that will be tested with econometrics. We add a non-systematic disturbance error term, u, turning the model from deterministic to stochastic, due to other variables possibly interfering with change in size not included in the present form, the variable and rather not predetermined human action, possible sampling errors, omission of variables, measurement errors, specification errors or aggregation errors from summing-up the variables. We aim at investigating if the systematic part (without the disturbance error term) explains the largest part of the variance of ΔY.

This is a multivariate model, for which it is assumed that $u \sim N(0, \sigma^2)$, with u a random variable, $Eu = 0$, $Eu^2 = \sigma^2$ and $Eu_t u_s = 0$ for two different observations $t \neq s$ (i.e. error terms are homoskedastic). The error term, u, should be minimized. Two conditions should also be met: the number of observations is larger than the number of variables tested and there is no exact linear relation among independent variables. The model describes that each value of the dependent variable is a linear function of the values of all independent variables, including the error term u.

The models can now be estimated after expressing the dependent variables in the form of logarithms. Since logarithms are by definition positive, simple logarithmic models will focus on firm size increases only. Therefore, the lowest value of size change is added to all firm sizes, which is the common practice in quantitative business studies measuring business growth. Thus, adjusted logarithmic employment growth (LogEMPLGRadj) and logarithmic turnover growth (LogTURNGRadj) models are produced that comprise and refer to all firms in the sample.

The error terms could reflect the presence of some omitted common factor, leading to contemporaneous correlation between the error terms. Besides, we are not aware if firms emphasize their employment growth, their turnover growth or both. The various geographical features tested may associate more with one of the two dependent variables. For this reason, seemingly unrelated regression equations (SURE) are preferred.

Weights were applied using a square root transformation of the dependent variable. An estimate of correlations between the two regressions was also obtained (at the bottom of Table 4). The same SURE were calculated for each region (Tables 5 and 6) and industry (Table 7 and 8), where possible.

To draw some additional conclusions, SUR equations were produced for size in increases only in employment and turnover (LogEMPGR and LogTURNGR).

5. Analysis

The above model was tested for the sample of 1089 SMEs, after removing statistical outliers. Overall 66 employment and turnover growth outliers were removed, which is a reasonable proportion (as described in Ikonomou, 2008). The following Tables indicate the variations in the regional and industrial mean and per year mean employment and turnover growth for the remaining sample of 1023 firms.

Tables 2: *Mean and yearly mean for EMPLGR and TURNGR per region & total*

	EMPLGR	TURNGR	EMPLGR	TURNGR	RATIO
REGION	**MEAN**	**MEAN**	**YEARLY MEAN**	**YEARLY MEAN**	**TURNGR/ EMPLGR**
REG1 (Attiki)	3.13	3,160,000	0.39	395,000	1,012,821
REG2 (K. Makedonia)	5.36	2,690,000	0.67	336,250	501,866
REG3 (Thessaly)	2.89	1,710,000	0.36	213,750	593,750
REG4 (Ipiros)	3.68	1,290,000	0.46	161,250	350,544
Totals	3.73	2,639,000	0.47	329,875	707,507

Note: Employment in number of employees and turnover in Euros (deflated)

Tables 3: *Mean and yearly mean for EMPLGR and TURNGR per industry*

	EMPLGR	TURNGR	EMPLGR	TURNGR	Ratio
INDUSTRY	**MEAN**	**MEAN**	**YEARLY MEAN**	**YEARLY MEAN**	**TURNGR/ EMPLGR**
Construction	8.63	2,042,000	1.08	255,250	236,616
Manufacturing	-0.013	3,310,000	-0.00163	413,750	Very high
Services	4.06	2,600,000	0.51	325,000	640,394
Tourism	7.44	1,078,000	0.93	134,750	144,892
Trade	8.15	2,912,000	1.02	364,000	357,300

Note: Employment in number of employees and turnover in Euros (deflated)

Mean employment growth is higher in Kentriki Makedonia and Ipiros compared to Attiki. It is also higher in construction, trade and tourism compared to other services and manufacturing, where is finally reduced. The significant construction projects at that time, especially in Attiki, necessitated employment. Similarly, tourism generates employment, even though it does not generate higher mean turnover growth compared to other industries. Trade benefits both in employment and turnover terms from new conditions, such as the large-scale transportation and construction projects, which allow faster and wider circulation of goods and services, trade liberalisation across the domestic and EU space and the exploitation of various market niches.

Manufacturing does not generate jobs but its mean turnover growth is the highest amongst all industries. The high ratio of mean turnover growth to mean employment growth for both manufacturing and services reveals the difficulties in opening new job positions and the higher costs associated to them in these two industries, of a rather long-term character.

Regional mean turnover growth levels reflect imbalances in growth chances across the Greek territory, to the benefit of more central and advanced regions (**Table 2**). The levels for the most central region (Attiki) are almost tripled in comparison to the most peripheral, potentially associating with performance in construction and tourism.

It is clear that in Attiki, the emphasis is placed mostly on turnover than on employment growth. This is better reflected in the ratios of mean TURNGR to mean EMPLGR, which offer a rough index for the amount of turnover increase that equals the creation of one, single job position (per average/mean). This is surprisingly high in Attiki (over one million of Euro) but reduces to a rather logical amount of 350 thousands in Ipiros.

One can argue that in tourism and construction, a single job position accounts for turnover growth levels close to 145 and 236 thousands Euro respectively. Though expensive this may appear, it is not as high as in manufacturing, where more than 3.3 million Euro account for a job opening. This indicates the substantial problem of joblessness in the manufacturing and should reflect upon the mechanisation and technical improvements in manufacturing production, capital investments and its concentration in fewer firms. It could also indicate credit availability and fund raising problems for the creation of new job positions. It naturally affects the industrial mean per year, which is very high, at approximately 700 thousands Euro.

5.1 The results from models

Turning now at the models, as found in state-level SUR equations (**Table 4**), we observe total absence of association of changes in entrepreneurial and manufacturing capital features with LogEMPLGRadj or LogTURNGRadj, despite the presence of such associations in SURE-2 for LogEMPLGR and LogTURNGR. In particular the inverse association of changes in MANFSML with LogEMPLGR and LogTURNGR in SURE-2 equation is characterised by very high coefficients (**Table 4**). The inverse association is reflected in the high negative coefficients between changes in entrepreneurial capital (MANFSMLINV_9401) and SME size increases. There is no association of changes in entrepreneurial capital features with both LogEMPGRadj and LogTURNGRadj in regional SUR equations (**Tables 5** & **6**). Hence, we confirm at first the absence of association of changes in entrepreneurial capital with SME growth at state and regional level, as well as their negative association with SME employment and turnover increases.

In SURE-1 (**Table 4**), LogTURNGRadj does not associate with a range of changes that also include, apart from entrepreneurial and manufacturing, changes in economic and industrial infrastructure capital features. Similar associations are not traced in REG1 SURE (the exception of changes in unemployment confirms the rule) (in **Table 5**), but they are traced in the rest of regional SURE equations (for REG2, REG3 and REG4), even though with lower coefficients and standard errors, in all equations (**Table 5**).

There is a loose association of changes in human capital features with both LogEMPGRadj and LogTURNGRadj. The coefficients, standard errors and levels of significance for various degrees of education are very low but there is a single exception of strong association with activity rates (ACTIVE). The latter may reflect upon employment generation processes for the financially active age group of 20 to 44, at state level, in the association with LogEMPLGRadj. Hence,

it can be concluded that human capital changes are significant at state level, especially for LogEMPLGRadj. Limited evidence is provided on the association of LogEMPLGRadj with changes of economic capital features (given the very low coefficients and standard error for TAXPAY).

In REG1 SURE (for Attiki) no association is traced between LogEMPLGRadj and changes of economic, industrial, entrepreneurial and manufacturing capital features, while the association of MANFSMLINV with LogEMPLGRadj is described by very low coefficient and standard error (**Table 5**). There is also a negative association with distance from the centre of Athens (DIST). A similar negative association with DIST is traced both with LogEMPLGRadj and LogEMPLGR, in SURE-1 and SURE-2 equations respectively (in **Table 4**). These findings emphasize employment growth difficulties for SMEs in more central spaces and inside Attiki.

Overall, in the absence of any associations of changes in economic, manufacturing, entrepreneurial and industrial infrastructure capital in Attiki, and of the most central spaces, we can conclude that there is a weak association between changes in such forms of capital and SME growth at state-level. It should be taken into account that Attiki has the highest mean turnover to mean employment growth ratio from all regions, thus offering fewer jobs per average, compared to the mean turnover growth levels generated in it. Therefore, at least the absence or limited association of turnover growth with changes at firm environment is a remarkable finding.

Looking at industrial SURE for manufacturing and trade (the two industries with highest mean turnover growth in **Table 3**), changes in entrepreneurial, manufacturing and economic capital features significantly associate with LogTURNGRadj (in **Table 7**, where MANF stands for manufacturing). In SURE for manufacturing industry (which had the highest mean turnover growth), LogTURNGRadj strongly and negatively associates with changes in MANFSML. This could explain a similar negative strong association of both LogEMPLGR and LogTURNGR with changes in MANFSML in SURE-2 (**Table 4**). In either case it emphasizes the negative association of changes at entrepreneurial capital with SME growth at the manufacturing industry. LogTURNGRadj also associates with changes in economic capital in the same model but with changes in human capital (**Table 7**).

In manufacturing SUR equations for LogEMPLGR and LogTURNGR (**Table 8**), changes in features from the manufacturing, economic and human capital significantly associate with both, but especially with logarithmic employment increases (LogEMPLGR). The significance of REG2 and REG3 (in LogEMPLGR) is also emphasized.

Table 4	SURE-1		SURE-2	
	LogEMPLGRadj	LogTURNGRadj	LogEMPLGR	LogTURNGR
REG2_95	0.78***(0.26)		-2.57**(1.08)	
IND1_95	-0.1**(0.05)			
IND2_95	-0.13**(0.05)			
IND3_95	-0.09*(0.05)	0.14*(0.07)		0.68***(0.22)
IND4_95				-0.94****(0.21)
LGST1_95				0.51*(0.28)
LGST2_95			1.45***(0.44)	
MICRO95	0.21****(0.04)	-0.14**(0.06)		
SMALL95	0.21****(0.03)	-0.13***(0.04)		0.7****(0.14)
MEDIUM95				1.96****(0.17)
UnE		-0.01**(0.01)		
HTE				0.039*(0.02)
SE	-0.002*(0.001)	0.002*(0.001)		0.008**(0.004)
IL	0.01**(0.003)			0.03*(0.022)
CmplSE		-0.007*(0.004)		
ACTIVE	2.7***(0.92)			
PRHSINV_9401				0.05***(0.02)
MANFSMLINV_9401			-0.0001*(0.001)	0.001**(0.001)
MANFSML_9401			-14.91**(6.89)	-15.62** (7.11)
MANFSMLVA_9401			-0.05**(0.02)	-0.04*(0.02)
MANFSMLSAL_9401			0.01**(0.005)	
TELLINES_9400			-1.77***(0.82)	-1.53*(0.84)
HOTELBEDS_9401				-0.002***(0.001)
DEPOSITS_9400			0.04**(0.02)	
TAXPAY_9401	-0.001**(0.001)			
DIRTAX_9401				-0.14**(0.06)
INDTAX_9401				0.05**(0.02)
INCDECL_9401	-0.01*(0.004)		0.03*(0.015)	
POPDENS_9401			-6.49*(3.03)	-5.89*(3.13)
DIST	-0.002****(0.0004)		-0.004***(0.002)	
Iterations	1	1	2	2
RMSE	0.384	0.514	0.957	0.989
"R-sq"/P-values	0.147****	0.045	0.305****	0.491****
Obs	931	931	407	407
Parms	42	42	42	42
Chi 2 (1)	160.52	44.14	178.25	392.36
Breusch-Pagan	36.685 (Pr=0.0000)		100.03 (Pr = 0.000)	
Corr Matrix of residuals	1.000 0.1985 1.000		1.0000 0.4958 1.000	

TABLE 5	LogEMPLGRadj	LogTURNGRadj	LogEMPLGRadj	LogTURNGRadj	LogEMPLGRadj	LogTURNGRadj	LogEMPLGRadj	LogTURNGRadj
	REG1		REG2		REG3		REG4	
IND5_95	0.18**(0.08)							
LGST1_95					0.19***(0.06)	0.08*(0.04)		
LGST2_95					0.37****(0.10)			
LGST3_95					0.17***(0.07)		-0.1*(0.06)	-0.08*(0.05)
LGST4_95					0.02***(0.08)	0.11*(0.06)	-0.1*(0.06)	-0.08*(0.05)
MICRO95			0.17**(0.07)	-0.13***(0.04)	0.09* (0.07)	-0.09**(0.04)	-0.24**(0.12)	-0.27***(0.09)
SMALL95			0.17****(0.05)	-0.08***(0.03)	0.09**(0.04)	-0.07**(0.03)	-0.24**(0.12)	-0.23**(0.09)
MEDIUM95	-0.22***(0.08)							
UnE	0.02**(0.008)	-0.025**(0.013)			-0.02**(0.01)		-0.02***(0.006)	-0.01**(0.004)
HTE					0.03*(0.01)	0.032***(0.01)		
HVcE				0.01*(0.006)		-0.023****(0.005)		
SE		0.012**(0.006)		0.004*(0.002)		0.006***(0.002)		0.003*(0.002)
IL		-0.03**(0.014)		0.008**(0.003)		0.01*(0.005)		
CmplSE							-0.01***(0.002)	-0.004**(0.002)
ACTIVE							3.3*(1.89)	
FINACT						-0.002**(0.03)	-0.01****(0.002)	
SelfEMPL							0.011***(0.004)	0.005*(0.003)
SalEMPL							0.025****(0.005)	0.008**(0.004)
UNEMPL		0.09****(0.024)	-0.016**(0.01)					

TABLE 5	LogEMPLGRadj	LogTURNGRadj	LogEMPLGRadj	LogTURNGRadj	LogEMPLGRadj	LogTURNGRadj	LogEMPLGRadj	LogTURNGRadj
	REG1		REG2		REG3		REG4	
PRHSINV			0.003*(0.002)	0.002***(0.001)	-0.004**(0.002)		-0.001**(0.002)	
MANFSMLINV	-0.001***(0.001)							
MANFSMLVA			0.006***(0.001)	0.005****(0.001)		0.001**(0.001)	0.003***(0.001)	
MANFSMLSAL			-0.003****(0.001)	-0.002****(0.001)		-0.001**(0.001)	-0.003****(0.0001)	
HOTELBEDS			-0.001**(0.001)	-0.001****(0.001)			0.0001**(0.0001)	
TAXPAY			-0.001****(0.001)	-0.001****(0.001)			0.0001*(0.001)	
INDTAX					-0.01**(0.003)	-0.003*(0.002)		
INCDECL			0.003****(0.001)	0.001****(0.001)		-0.002****(0.001)	0.002****(0.001)	0.002***(0.001)
POPDENS					0.003****(0.001)			
DIST	-0.013**(0.006)							
Iterations	1	1	1	1	1	1	1	1
RMSE	0.475	0.715	0.304	0.185	0.153	0.11	0.096	0.076
"R-sq"/P-values	0.215****	0.072****	0.166****	0.234****	0.327****	0.475****	0.516****	0.518****
Obs	431	431	247	247	153	153	100	100
Parms	31	31	33	33	33	33	33	33
Chi 2 (1)	42680.24	7084.89	61409.52	62610.86	151490.12	106405.78	252636.52	142930.60
Breusch-Pagan	13.202, (Pr = 0.0003)		84.511, (Pr = 0.0000)		39.116, (Pr = 0.0000)		36.216, Pr = 0.0000	
Corr Matrix of residuals	1.0000 0.1750 1.0000		1.0000 0.5849 1.0000		1.0000 0.5056 1.0000		1.0000 0.6018 1.0000	

Note for Tables 4, 5 and **6:** *, **, *** indicate 90%, 95% and 99% significance levels respectively, **** extremely high significance (P < 0.001). Standard errors are in parentheses. In **Tables 4** and **5** regressions were weighted using the weight: 1/ (square root of LogEMPLGRajd). In Table 6 the weight 1/(sq root of LogEMPLGR) was used

TABLE 6	LogEMPLGR	LogTURNGR	LogEMPLGR	LogTURNGR	LogEMPLGR	LogTURNGR
	REG1		REG2		REG3	
IND1_95	-0.49**(0.24)					
IND3_95		1.31***(0.38)		0.956***(0.34)		
IND4_95		-0.76***(0.28)				
LGST1_95	0.77*(0.43)	1.1**(0.47)		1.42***(0.46)		
LGST2_95	1.65***(0.59)				2.53***(0.89)	
LGST4_95	1.06**(0.52)					
LGST5_95				1.09*(0.67)		
MICRO95			-0.62**(0.27)	-1.87****(0.29)		
SMALL95	0.6***(0.2)	0.7***(0.22)		-1.17****(0.25)		
MEDIUM95	1.45****(0.23)	2.2****(0.25)	0.56**(0.27)		1.05**(0.45)	0.98**(0.46)
UnE				-0.07**(0.03)		
HTE	-0.11**(0.05)					
HVcE	-0.07**(0.04)		0.09**(0.05)		-0.26**(0.11)	-0.2*(0.11)
IL				0.04*(0.02)		
CmplSE				-0.05***(0.02)		
ACTIVE					-86.5**(35.1)	-72.44**(36.34)
FINACT	-0.05**(0.25)	-0.06**(0.03)				0.04**(0.02)
SelfEMPL	0.07*(0.04)		-0.03**(0.01)	-0.04***(0.014)	-0.06*(0.04)	-0.08**(0.04)
SalEMPL	0.07**(0.03)	0.09***(0.03)				-0.18***(0.06)
PRHSINV			0.02**(0.007)			0.03*(0.02)
MANFSMLINV		0.01*(0.001)	-0.001**(0.001)	-0.001**(0.001)		
MANFSMLSAL			-0.01*(0.003)	-0.01*(0.001)		
HOTELBEDS			-0.001**(0.001)	-0.001**(0.001)		0.003*(0.003)
TAXPAY		-0.001*(0.001)	-0.001*(0.001)			
INCDECL			0.003**(0.001)		0.017*(0.01)	
DIST			-0.01**(0.005)			0.04*(0.02)
RMSE	0.887	0.972	0.934	0.877	0.678	0.703
"R-sq"/P-values	0.372****	0.515****	0.446****	0.659****	0.551****	0.659****
Obs	188	188	114	114	69	69
Parms	28	28	32	32	33	33
Chi 2 (1)	1631.71	247.45	828.48	247.94	777.20	145.62
Breusch-Pagan	40.120, (Pr = 0.0000)		42.207, (Pr = 0.0000)		2.831, (Pr = 0.0924)	
Corr Matrix of residuals	1.0000 0.4620 1.0000		1.0000 0.6085 1.0000		1.0000 0.2026 1.0000	

Note: Information for running SURE of LogEMPLGR and LogTURNGR for REG4 (Ipiros) was not sufficient. Similarly for the pair of LogNEMPLGR and LogNTURNGR for all regions apart from REG1 (Attiki).

In other services (the second highest mean turnover growth), LogTURNGRadj associates negatively with several changes in human capital, in most cases. In both industries (services and manufacturing), LogEMPLGRadj does not associate with changes in entrepreneurial, manufacturing and industrial infrastructure capital features (for other services the same finding is provided for LogTURNGRadj) but it associates with changes in economic and human capital features. What is also common between manufacturing and other services is the association of both LogEMPLGRadj and LogTURNGRadj with size and the strong association of LogEMPLGRadj with changes in activity. However, in other services, a negative association with DIST is found.

In trade, LogTURNGRadj significantly associates with changes in human capital, manufacturing, industrial infrastructure and economic capital features that account a great part of its variance (remarkably high levels of R-square). Most associations of changes in human capital with LogTURNGRadj are negative (as in other services), especially with higher education (UNE and HTE), whose changes do not seem to associate somehow to trade increases. Perhaps this indicates that higher education is not an important aspect for increasing sales in trade, at state level. There is a very strong association with unemployment. Furthermore, for most of the features of capital (entrepreneurial, manufacturing, industrial manufacturing, economic and human capital features), there is no association with LogEMPLGRadj at all, for an industry classified amongst the greatest job generators at the time (**Table 3**). This is not an odd finding and it rather reflects, once again, the little influence of the firm environment exercised upon SME growth in employment terms, especially for trade.

TABLE 7	SURE- IND2		SURE- IND3		SURE- IND4		SURE- IND5	
	IND2 – MANF		IND3 - Other SERVICES		IND4 - TOURISM		IND5 - TRADE	
	LogEMPLGRadj	LogTURNGRadj	LogEMPLGRadj	LogTURNGRadj	LogEMPLGRadj	LogTURNGRadj	LogEMPLGRadj	LogTURNGRadj
REG1_95						0.52***(0.198)		
REG2_95						0.48***(0.186)		
REG3_95						0.54***(0.21)		
LGST1_95							-0.31**(0.12)	
MICRO95	0.21*** (0.08)	-0.14****(0.036)	0.189***(0.07)	-0.09**(0.05)				
SMALL95	0.17****(0.05)	-0.12****(0.024)	0.161***(0.06)	-0.08*(0.04)				
MEDIUM95					-0.15**(0.07)	0.08****(0.02)		
UnE			-0.029***(0.01)	-0.03****(0.008)				-0.3****(0.05)
HTE	0.023***(0.008)					0.006*(0.003)		-0.296****(0.079)
SE	-0.003*(0.001)		0.019**(0.008)	0.014**(0.006)				0.071**(0.03)
IL								-0.26**(0.09)
CmplSE			-0.05***(0.017)	-0.036***(0.013)				-0.54***(0.09)
SalEMPL			-0.019**(0.009)	-0.014**(0.007)				-0.169***(0.06)
ACTIVE	3.94***(1.34)		8.26**(0.006)					
UNEMPL								0.75****(0.079)
PRHSINV_9401		0.012****(0.001)						-0.04***(0.014)
MANFSMLINV_9401		0.001***(0.001)			0.001**(0.001)	0.001****(0.001)		0.001***(0.001)
MANFSML_9401		-4.54***(1.49)				0.001*(0.001)		
MANFSMLVA_9401		-0.013***(0.005)						-0.065****(0.018)
MANFSMLSAL_9401		0.002**(0.001)						0.048****(0.011)
TELLINES_9400		-0.498**(0.19)						
HOTELBEDS_9401		-0.001****(0.001)						0.003*(0.002)
DEPOSITS_9400		0.01***(0.003)						
TAXPAY_9401	-0.001***(0.001)		-0.001**(0.001)	-0.001**(0.001)		0.001****(0.001)		-0.001****(0.001)
DIRTAX_9401		-0.033****(0.008)		0.004****(0.001)	-0.02**(0.01)	-0.016****(0.003)		
INDTAX_9401		0.012***(0.004)				-0.003****(0.001)		
INCDECL_9401		-0.006**(0.003)	0.006****(0.002)				0.002**(0.001)	
POPDENS_9401		-1.93***(0.68)						
DIST			-0.007**(0.004)	-0.005*(0.003)		-0.001****(0.001)		
Iterations	1	1	1	1	1	1	1	1
RMSE	0.3883	0.1867	0.224	0.169	0.232	0.068	0.192	0.884
“R-sq”/P-values	0.223****	0.2214****	0.358****	0.316****	0.1764****	0.4708****	0.2131	0.6094
Obs	396	396	159	159	168	168	112	112
Parms	38	38	35	35	35	35	29	29
Chi 2 (1)	58610.56	98117.62	73106	48048	72315	302863	71711	1301

TABLE 8	SURE-IND2		SURE-IND3		SURE-IND4		SURE-IND5	
	IND2 – MANF		IND3 - Other SERVICES		IND4 - TOURISM		IND5 - TRADE	
	LogEMPLGR	LogTURNGR	LogEMPLGR	LogTURNGR	LogEMPLGR	LogTURNGR	LogEMPLGR	LogTURNGR
REG2_95	4.37**(1.78)				-1.879**(2.31)			
REG3_95	-12.07*(7.29)							
LGST1_95		1.16*(0.64)				1.01**(0.428)	-1.94***(0.572)	
LGST2_95	1.38*(0.76)					1.643**(0.669)		
SMALL95	0.76****(0.21)	0.79****(0.213)	0.672**(0.282)			1.245****(0.282)		
MEDIUM95	1.38****(0.24)	2.211*****(0.24)	1.901****(0.401)	0.989**(0.43)	1.11***(0.447)	2.585****(0.363)	1.202**(0.486)	
HTE						0.135**(0.055)		
SE						0.027**(0.011)		
HVcE					0.087**(0.042)	0.064**(0.034)		
CmplSE	-0.037*(0.014)							
SalEMPL								0.461**(0.262)
FINACT								-0.289***(0.164)
PRHSINV_9401	0.016**(0.007)	0.014**(0.007)						
MANFSMLINV_9401	0.001**(0.001)	0.001*(0.001)						
MANFSMLVA_9401	0.023**(0.013)					-0.034*(0.019)		
MANFSMLSAL_9401	-0.016*(0.008)	-0.014*(0.014)				0.017**(0.008)		
DEPOSITS_9400	-0.031*(0.017)							
TAXPAY_9401	-0.001*(0.001)				0.001**(0.001)			
DIRTAX_9401	0.095*(0.049)							
INDTAX_9401	0.049**(0.025)	0.042*(0.025)			-0.465**(0.018)	-0.029*(0.015)	-0.046***(0.019)	
INCDECL_9401	0.02*(0.012)					-0.032*(0.016)		
POPDENS_9401	-2.41**(1.066)							
Iterations	1	1	1	1	1	1	1	1
RMSE	0.8236	0.8312	0.8035	0.9217	0.9041	0.7349	0.6587	0.9159
"R-sq"/P-values	0.4091	0.6017	0.5257	0.4046	0.4276	0.6591	0.5401	0.3927
Obs	172	172	65	65	81	81	48	48
Parms	37	37	26	26	33	33	20	20
Chi 2 (1)	1496	338	544.83	104.48	591	194	977	65

Note for Tables 7 and **8:** Regressions are weighted using as weight 1/(square root of LogEMPLGRadj) in **Table 7** and 1/ (square root of LogEMPLGR) in **Table 8**. *, **, *** indicate 90%, 95% and 99% significance levels respectively, **** extremely high significance (P < 0.001). Standard errors are in parentheses. A SURE for construction could not be built and therefore was not considered.

In tourism, changes in human capital features are not significant in LogTURNGRadj and LogEMPLGRadj models (**Table 7)**. Similarly, this applies for changes in industrial manufacturing, entrepreneurial and manufacturing capital features, for an industry also classifying amongst those generating jobs. In general, after taking into account the limited (mostly negative) associations with changes in economic capital features, one can argue that tourism is less subject to local and regional environment changes, than to changes in business -medium- size. This conclusion is blurred for LogTURNGRadj, where all regional dummies are significant (one is dropped) and there is a negative association with DIST from Athens. The significance of all regional dummies shows that turnover growth is associated by the regional environment of firms, which is a logical finding because of the significance of tourism in the Greek economy across all regional environments, even though not so many changes of features from various forms of capital were significant for growth at the industry.

Turning to the industrial SURE equations for LogEMPLGR and LogTURNGR in other services, we do not observe any significant changes of features of capital tested for employment and turnover increases in sizes. Only size is significant. Given the very high R-square levels for the model (0.5 and 0.4 respectively) the significance of the economies of scale is highlighted, as opposed to other firm features and changes in geographical features at external to business environment. Besides, size, especially medium, is significant in almost all associations with employment and turnover increases across industries (**Table 8**). Size also significantly associates in SURE with LogEMPLGRadj and LogTURNGRadj, in all industries, apart from trade (**Table 6**).

Firm size was significant in all regions. Micro and small firm sizes significantly associated more with both LogEMPLGRadj and LogTURNGRadj in REG2, REG3 and REG4 models (i.e. away from Attiki) (see **Table 5**).

With respect to the rest of firm-level features expressed through dummies, one needs firstly to diagnose their occasional and non-systematic presence/ significance. In general, a firm-level significant dummy in one equation is not significant in another. In SURE-1 equation (**Table 4**), several industrial dummies are significant (IND1, IND2 and IND3), indicating the significance of these three industries at state level. The significance of IND2 is likely to relate to or explain the absence of significance with changes in features from manufacturing capital. Similarly, REG2 is significant in state-level SURE-1 equation, which is likely to relate to or explain the absence of numerous other associations with features from various forms of capital. This could also explain the association with REG2 in SURE-2 equation (for LogEMPLGR and LogTURNGR).

In regional SURE equations, only IND5 significantly associates with LogEMPGRadj for Attiki (REG1). This underlines the importance of trade in Attiki, and, as the same time, the limited importance of industrial environment at the regional level (given the above-mentioned results for changes in the regional environment).

Legal capital is generally not often found to be significant. At state level only LGST1 and LGST2 are significant in SURE-2 equation for LogEMPLGR and LogTURNGR respectively. In regional SURE equations for LogEMPLGRadj and LogTURNGRadj, legal statuses are not significant in REG1 and REG2 but are in REG3 and REG4. For REG3 (Thessaly) in particular, all legal statuses significantly associate with LogEMPLGRadj (a dummy is dropped), indicating a peculiar significance of the legal environment at the region.

6. Discussion and additional findings

The combined findings for Attiki and the limited associations at state-level SURE-1 equation, especially with changes in economic capital, are likely to be explained by three possible reasons. The first relates to the degree of internationalisation of SMEs in Attiki. As state-level barriers were progressively removed during the period studied, the Greek SMEs progressively became more acquainted with international competition and transactions. SMEs in Attiki are mostly classified amongst those transacting with the international environment and therefore, they are expected to be less affected by their domestic, local and regional environment.

A second possible reason is the 1999-2000 Athens Stock Exchange crash, which affected not only ASE firms but also firms and individuals that had turned at that time to the Greek stock exchange to collect funds. The funds invested in ASE could have been invested otherwise, for example in other firms located in Attiki. Nevertheless, they were diverted by a possible wealth effect, causing their accumulation in ASE firms of generally larger size. As a result, the ties with the economic capital in Attiki were reduced or even eliminated. All these firms in Attiki were deprived of substantial funds that were directed to ASE at that time, in a contagious way. As a result of the ASE crash, firms were forced to cut the flow of funds from stock exchange and, having cut or neglected their traditional ties with the economic capital in the region, were found in a vulnerable position, with a dramatically limited ability to draw the funds required, at a time when speculation and easy money-making were still considered a reliable option and preferred against healthy investment action (the two main alternatives of firms were either to turn to their sales or borrow more money). Apparently, it appears that such liquidity constraints had a greater impact on SMEs situated in more

central areas, a finding that could possibly associate to higher firm costs in central areas (rents, premises, electricity or other).

A third possible reason for the lack of association of SME growth with the economic capital could relate to some unspecified reason(s), possibly non-economic, such as growth influence exercised at the political, social or cultural capital of Attiki or in more peripheral Greek regions. All the above-mentioned explanations are likely to account for this lack of association. The last option could relate to features not grasped under the present analysis, given the difficulties discussed in literature (see for example in Lyberaki and Paraskevopoulos, 2002 for social capital in particular). Further research remains to be conducted on this matter, given that it is very rare to find any relevant piece of research on these three subjects relating them to SME growth or decline. However, one can underline that all these explanations are not in alignment with the general findings discussed in Palaskas and Tsampra (2005).

One could further raise a question on the extent to which the contemporary crisis of the Greek economy relates to the Athens Stock Exchange crash, the internationalisation of SMEs in Attiki and the social, cultural and political environment in Attiki or peripheral Greece or other rigidities, such as institutional and administrative concerning the implementation of new, previously unknown policies. At least the former explanation should be seen in the light of increasing internationalisation of domestic stock market and the strong destructive forces exercised by speculative movements of European and other international funds that are transferred at states joining the EU monetary union during their transitory periods (and whose action is often smoothed by political forces aimed at supporting relevant political strategies for the common currency interests or - at least - unable or vulnerable enough to resist to them). One should be aware that, in the event of a possible combination of domestic and international causes impeding business and SME growth in economies preparing to join the Eurozone, the imposition of even stronger structural adjustments and changes that may lead to economic asphyxia might be required, irrespective of whether some of these causes weight more over other, in terms of their growth implications.

It is worth considering few additional points highlighted by the present research. Firstly, size was found to constitute one the principal significant factors in most models. This finding should help to acknowledge further the emphasis that ought to be placed upon policies supportive to SMEs and their sizes.

Many of the features at the economic, entrepreneurial, manufacturing, industrial infrastructure and legal capital were not found significant in industrial SURE equations for trade, tourism and services. This finding underlined the limited significance of changes achieved in firm environmental conditions and

capital, for an economy considered to be service-oriented. This is very clear in SURE for LogEMPLGR and LogTURNGR in other services, where changes of all features of capital tested were not found significant. This is also found for entrepreneurial, manufacturing, human capital and several economic capital features for both LogEMPLGRadj and LogTURNGRadj in tourism and for LogEMPLGRadj in trade. Hence, by comparing **Table 7** and **Table 8** for the three main industries of the service sector (tourism, trade and other services), similar patterns of patterns of non-significant firm environment features can be identified. These findings highlight *the need to establish better links of regional and local economic development policies that relate to services with SME growth at the state, local and regional level.*

Given that in SURE for LogEMPLGRadj in manufacturing there is a limited number of associations with all forms of capital tested (entrepreneurial, manufacturing, industrial infrastructure and partially for economic capital), it is doubtful whether changes at the environment surrounding manufacturing have finally affected SME growth in employment terms. It should have been better that such changes focused on manufacturing SMEs.

Taken together, these findings highlight the potential presence of some weaknesses of policies scheduled to achieve changes at the surrounding environment of firms and the relevant failures to deliver firm growth outcomes, as well as problems with the particular services that were provided in support for SMEs, for the specific industries tested. In general, the evidence provided in the present study forms the picture of a *loose association between SME growth and regional and local economic changes at firm-environment level.*

In **Tables 5** and **6**, one can read more carefully across the signs of each association, if the purpose is to discuss each association in further detail. For example, with respect to human capital and in particular to educational features, in **Table 6** university level education was not associated at all with SME employment increases (EMPLGR) in Attiki (REG1), while higher technical education and higher vocational education were negatively associated. These findings indicate that changes in education at the central region in Attiki do not associate positively with SME growth, emphasizing possibly problems related to education and educational levels at the region. In Kentriki Makedonia, changes in illiteracy levels positively associate with logarithmic turnover increases (LogTURNGR) and changes in university-level education negatively. The two associations create doubts and offer some potential hints on the use of education in SMEs and their capacity to absorb higher and university-level education that is provided. Such a negative association of university education or the absence of association changes of higher education is further witnessed at the state-level, in

SURE equation with LogTURNGRadj (**Table 4**). Within this context, the negative association of changes in higher educational levels with LogTURNGRadj should not be seen as an odd finding and similarly for the absence of any association of educational variables with trade increases.

Another important finding that is worth considering is the remarkably strong but negative association between activity rates (ACTIVE) and SME increases in the middle peripheral region of Thessaly (REG3). This should indicate substantial labour market rigidities and difficulties for the specific age working group of 20-44, in Thessaly and other middle peripheral regions. Besides, such an association with a strong coefficient is found in SURE-1 model. This finding is further supported by the absence of any significant industrial dummy or changes in manufacturing features. This is likely to be at the root of interregional movements of this age working group towards more central areas and places providing more and better employment opportunities. Whichever is the case, this finding highlights the need to better specify policies in tackling such labour market rigidities and creating job positions in SMEs, in middle peripheral regions. In Thessaly, mostly larger -medium- sizes significantly associate with SME employment and turnover increases, as opposed to more central regions (REG1 and REG2).

In section 5, we have also underlined the high turnover to employment ratios, especially in manufacturing, which is likely to reflect upon the mechanisation and capital accumulation processes, the concentration in fewer firms, credit availability problems and the limited job positions in manufacturing industry. Given the above-mentioned point on labour market rigidities, this evidence further highlights the necessity of labour flexibility and of fast redeployment of labour across industries and regions.

Attiki, the region with the lower mean yearly employment and a remarkably higher turnover to employment ratio compared to other, seems unable to generate high employment rates comparable to its turnover rates. This finding, apart from other reasons, should relate to problems within Attiki's labour market, such as mobility or demographic problems, and the need for industrial, intra-regional and inter-regional redeployment and flexibility in Attiki's labour, of various forms.

Legal status and the legal capital were significant in peripheral and especially middle peripheral regions. This finding could relate to the dissimilar growth conditions across legal statuses. But one was expecting to trace a more even distribution of the significance of legal status dummies across different regions. Given the above-mentioned findings for Thessaly and the significance for all legal statuses in this region, it is likely that such a finding should indicate something unique about Thessaly's legal environment. This could relate to legal capital barriers associated with each legal capital or even, most importantly, to

corruption problems, both impeding SME growth. Besides in Thessaly, the size significantly associating with firm size increases is medium rather than small, indicating the significance of larger in size 'players'. Further research on the matter could shed more light, given that Thessaly should be seen in the present study as a representative Greek middle peripheral region. This finding raises doubts on the legal barriers and impediments present in the legal environment across peripheral, especially middle peripheral environments, at that time (extending not only in their urban spaces but also in their villages and more peripheral areas), where market sizes are smaller and competition less completed and, as discussed in theory, monopolistic behaviour may take place. In the most peripheral environment, such as in Ipiros, it is clear that changes in economic, manufacturing, entrepreneurial and human capital features significantly associated with LogEMPLGRadj.

Looking at the significant sizes of firms in **Table 6**, medium size associates with SME employment and turnover increases in most of the regions -and regional levels- tested. In **Table 5** though, higher - medium - sizes were found to significantly associate with SME growth only in more central regions (REG1) for LogEMPGLRadj, while in the rest of regions only small and micro sizes were significant for LogEMPLGRadj. In other words, higher sizes (medium) are associated with employment and turnover increases (LogEMPLGR and LogTURNGR) in almost all regions tested, while such size levels (medium) are significant only in Attiki for the sample of all firms (**Table 6**). Small and micro sizes significantly associate with LogEMPLGRadj and LogTURNGRadj in the rest of regions. This finding is likely to indicate policy failures concerning medium-sized firms in most regions - apart from Attiki - in comparison to firms smaller in size (micro and small firms) but mostly if compared against Kentriki Makedonia, where a larger number of medium firms is contained. This sounds as a plausible suggestion, since changes pursued at the economic and industrial environment were not specifically oriented towards larger in size (medium) firms at the time, while medium firms require more specific, well-established and organised, customer-oriented advice and service provision to achieve growth outcomes and cope with international competition and their orientation towards non-domestic markets. The latter are still absent in Greece, at the local and regional level.

The significance of size (a principal proxy for economies of scale) especially in industrial models, could hide not only its importance for SME growth but also relate to the creation of a level of heteroskedasticity or the operation of extended borrowing processes and credit availability problems.

One can suggest that, despite expectations, stability was not finally achieved at the study period. It seems that SME growth in Attiki has finally influenced

the results at state level, being affected by unpredicted historical factors, such as the ASE behavior and other non-economic, unidentified factors of production that have weighted more over principal economic factors tested, and related policy scheduling. Even in the REG-4 model (for the most peripheral region) that exhibited very high R-square levels -for an SME growth model-, several changes in forms of capital were not found significant and associations were not characterised by high-level coefficients. If we compare across most peripheral (REG4) and most central regions (REG1), many more changes of factors of production are significant than the former case. One can argue that either the peripheral environment produced a more stable SME growth outcome or the central environment had not associated as much as needed with SME growth, rather causing the opposite effects and de-stabilisation. An emerging question is if the larger geographical scale possibly affects more and in the long-run SME growth patterns. Greece's peripherality at the broader geographical -EU and global- scale, should be acting as a potential source of instability that possibly depending on the interaction across geographical scales and the weighting of one scale over another. This is a more general theoretical matter, which requires a thoughtful consideration and should not be based upon one indication.

Perhaps a seemingly related question is what exactly 'fails' in a nation-state, how exactly and under which circumstances of time, space and their interaction.

The present text has focused on the associations of SME growth with changes in various factors of production at the geographical level. It has neither focused on the general success of SME support policies nor assessed the long-term impact of geographically focused policies (e.g. the local effects from building the Athens METRO). Reaching some more general conclusions on the effects of SME support policies, as implemented at that time, requires bringing together the various pieces of the research (Ikonomou, 2008; 2012; 2013).

7. Acknowledgment

I would like to thank Robert J. Bennett, Emeritus Professor, and Emeritus Fellow at St Catharine's College at the University of Cambridge, for his inspiring contribution and for introducing me into this area of studies.

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9. Appendix

Table 1: Chow tests for the pair of central and peripheral regions

Variable	F-values	Degrees of freedom
EMPLGR	0,285	(46, 937)
TURNGR	0,765	(46, 937)
Range of critical F-values values for a=0.05, same degrees of freedom	1,59-1,43	

10. Endnotes

1. Greek academic and policy circles remain divided on the 1999-2000 Athens Stock Exchange crash. A significant part of them suggest that it was simply a severe adjustment. Research on the subject remains limited.
2. Greece had never produced a guide as adequate as the five-tests document, which investigated the implications of joining the Eurozone on U.K.'s convergence, flexibility, investments, financial services, growth, stability

and employment (HM Treasury, 2003a) or its follow-up on labour market flexibility (HM Treasury, 2003b).

3. e.g. the main construction projects promoting labour mobility were completed by the end of the period, while at the time Greece's migration problems had not yet been realised.
4. e.g. on "Thatcher period" in the UK, in the study by Westhead and Moyes, 1992.
5. with R-square levels as high as 0.9.
6. The Greek V.A.T. database offers the largest, most accurate approximation of the total business population in the Greek economy and is a reliable business information source.
7. In larger sizes data are more accurate.
8. Ipiros at the Nort-West classified in official EU documents as one of the most EU peripheral at that time.
9. In islands, peculiar growth barriers -such as transportation costs- may bring monopolistic behaviour and the service-orientation of local economies impedes the study of secondary sector. Confidentiality is also a problem.
10. This is a standard procedure, since 50 firms is a sufficient number to run regional and industrial models.
11. In case the model would expand to include business-level features, another component representing these business-level features would have to be added.
12. If we seek to include geographical features considered not to change, X's rather than ΔX's should be included.