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DOES THE EMPLOYMENT GROWTH RATE DEPEND ON THE LOCAL CONTEXT? AN ANALYSIS OF FRENCH INDUSTRIAL ESTABLISHMENTS OVER THE 2004-2010 PERIOD

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1. INTRODUCTION

Looking at entrepreneurship and firms' trajectories at a regional level is not so new. Two branches of economics already provide an argument in favour of such a perspective. The new economic geography has for twenty years provided a theory of the emergence of large agglomerations which relies upon an increasing return to scale and transportation costs (Baldwin, 1994). It also emphasises linkages between firms¹ and

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1 We will use interchangeably the terms firms or companies in the following text even if we are conscious that they do not mean exactly the same. For the empirical part, we will name as an establishment or plant a production unit that is geographically individual but legally dependent on an enterprise.

suppliers as well as between firms and customers. All these features result in giving a crucial advantage to the geographical concentration of economic activity. For industrial companies, this point was originally made by Marshall (1920, Chap. 10). He highlights the benefits of a larger local labour pool, non-traded goods and knowledge spillovers. These arguments have received a lot of attention in the empirical literature. In particular, the importance of technological spillovers has been investigated by Jaffe (1989), Audretsch and Feldman (2004), or Acs *et al.* (1994). Others look at market-based forces to explain why it can be profitable for firms to be located close to large input and output markets. In this vein, Schulz and Stahl (1996) argue that if consumers have search costs, then competitors have an incentive to seek proximity, even though this increases competition, as high diversity improves the quality of matching. Ottaviano and Puga (1998) and Glaeser (1998) provide comprehensive surveys on agglomeration and dispersion forces whereas Glaeser *et al.* (1992) or Duranton and Puga (2005) demonstrate that local considerations intervene insofar as growth and economic performances are concerned.

This local view has been overlooked for a long time by industrial economists, whereas most of the research undertaken in this field seeks to provide a realistic explanation of how firms function. Considering the fact that, in many recent papers, local conditions shape employment growth (Combes, 2004; Shearmur and Polese, 2007, Shearmur *et al.*, 2013 among many others), this paper seeks to contribute to the debate about the local determinants of firm growth, using a unique dataset of geo-referenced French plants in the manufacturing industry between 2004 and 2010. In placing emphasis on external variables in a model inspired by firm growth theories (Coad, 2009), it differs from most papers previously published on this topic, which focus mainly on individual features.

Looking at the literature, it quickly becomes obvious that the major challenge consists in finding the best proxies to describe the local business climate. Referring to economic geography, most papers use the concentration in the industry, an index used to measure business activities, and a demographic index alone, or together with regional specialisation, to mirror a region's capacity to host new companies and growing industries. These are often complemented by indicators measuring educational level and industrial characteristics to describe the local context properly (Braunerhjelm and Borgman, 2004; Schimke and Teicher, 2012). Following

Barbosa and Eiriz (2011), in this way we continue to increase the accuracy of the description at the local level.

This research makes several contributions to the literature on firm growth. Firstly, it focuses on plants and not on companies, an approach which makes it possible to analyse what happens at a local level with more precise accuracy. Secondly, based on panel data, our results control for possibly correlated time-invariant heterogeneity, which is still scarcely the case in research on the local determinant of employment growth. Finally, instead of considering location as a unique qualitative variable, we break down local characteristics to follow the mechanisms or channels that might be at work in the transmission of local conditions to the establishment of the growth rate. Thus, introducing indexes to illustrate area performances enables us to assess their effect on the rate of job creation at plant level between 2004 and 2010. Population skills, the share of industry in the total number of employees, the degree of autonomy, the rate of unemployment, and the concentration index are significant. Their role is confirmed, regardless of the model used, since the different estimations run demonstrate a clear stability of results.

The remainder of the paper is organised as follows. Section 2 presents the literature and the resulting hypotheses about the relationship between firm growth and local context, which are tested thanks to an empirical model. Section 3 presents the data and provides descriptive analysis. Section 4 exhibits the results of estimations run, first on the total sample and then on appropriate subsets to check the robustness of our analysis. Section 5 concludes and provides some recommendations.

2. LITERATURE, HYPOTHESIS AND MODEL SPECIFICATION

2.1. An overview of the relationship between local context and firm growth

An abundant literature, coming mainly from the World Bank (LaPorta *et al.*, 2008), emphasises that the business climate affects economic activity.

An improvement in the business climate leads to an increase in demand and generates new opportunities for companies to hire additional workers and to invest. It also improves business morale and, consequently, facilitates firm growth. On the other hand, a depressed business climate is not propitious to firm growth, not only because it discourages companies from investing but, also, from making full use of their production capacity.

A large number of publications relate broad indicators of institutional quality, policy and infrastructure to a number of macroeconomic outcome variables using cross-country data (Hall and Jones, 1999; Acemoglu *et al.*, 2001). The authors generally conclude that the business climate significantly affects economic performance. This macroeconomic view is, however, often suspected to suffer from various methodological drawbacks which limit its reliability (see Dethier *et al.*, 2011). These comments have opened a wide field of empirical research focusing on a more disaggregated level (firm or industry level) to achieve more robust results since, as mentioned by Neary (2001), micro-economic models have more to offer.

The literature has classified the determinants of firm growth into two major groups: internal antecedents and factors that are external to the firm (Audretsh and Dohse, 2007). In this paper, we mainly focus on the latter, comprising meso- and aggregated-factors describing the local context. Considering empirical research on the role played by agglomeration externalities on firm growth, there are a number of reasons to expect that location plays a role in shaping the growth of firms. From Krugman (1991), it is broadly acknowledged that agents are locally dependent.

Location shapes firm growth following a twofold causal chain². A direct link comes from market opportunities or localisation economies. They matter because firms tend to locate close to each other in areas where customers are numerous enough and/or where suppliers are nearby. This permits companies to minimise their transaction costs. In addition to these proximity effects, several types of external economies have been pointed out. The indirect influence consists then in agglomeration economies and comes from the organisation of the local production system and its density. In this sense, the location of a firm is thus an important determinant

2 Shearmur *et al.* (2007), Strange (2008), Fuchs (2009) and Gabriele *et al.* (2013) propose comprehensive and up-to-date surveys of this literature.

of its growth performance due to factors like the pooling of human capital, proximity to non-traded inputs and specialised goods, as well as easy access to markets (Audretsch, *et al.*, 2012).

However, the general notion of ‘location’ or ‘environment’ has often been poorly specified. Most studies that at least considered location as a potential growth determinant simply introduced a dummy variable for different regions as a proxy for locational influences. We propose to disentangle this issue by including the notion of local and urban externalities and to analyse the relationship between firm growth and different components of agglomeration externalities.

- **Agglomeration forces, geographical clustering and knowledge diffusion** have been widely examined and it is broadly admitted that not only do companies tend to locate close to each other but also that Marshallian externalities boost their growth. Although the empirical literature does not provide conclusive evidence about the direction and magnitude of the effect of industrial specialisation/diversity on firm growth (Figueiredo *et al.*, 2009), authors generally agree to consider that diversity or specialisation matter in the individual growth process. Following a recent paper by Martin *et al.* (2011) concerning the French situation, industrial specialisation measured at an ultra-fine level is shown to be responsible for an increase in productivity, thus in the competitiveness of plants. The authors conclude that the clustering of establishments operating in the same industry in a given area thus has a positive effect on their efficiency and, as a consequence, on their development. Garsaa *et al.* (2014) confirm these results, demonstrating that specialisation is positively correlated with the growth rate of Mediterranean companies over the 2004-2010 period.

- In an evolutionist view, **the level of competition** faced by a company determines its market share. According to Porter (1998), a concentration of industrial activity in a geographic region also affects firm performance. It introduces local competition that leads firms to innovate in order to remain competitive. These external economies of specialisation are especially valid for innovative firms provided that, if projects are location specific, and locations are known to differ in how profitable they can be, then firms with new ideas will initially implement these in the

more profitable locations. On the other hand, they only expand at a slower pace into less attractive locations. These economies of specialisation are strengthened by knowledge spillovers. As pointed out by Audretsch and Dohse (2007), “firms using knowledge inputs will exhibit a superior performance if they are located in an agglomeration” (p. 83). Variables capturing the local specialisation may thus be introduced as explanatory factors in a firm growth equation. Another type of local concentration which can also influence firm growth is that of the local market defined by the rate of workers employed in the five biggest establishments per employment area, according to Carré and Levratto (2014). According to the authors, the level of concentration at this territorial level increases the barriers to entry for new entrants and limits the opportunities for the growth of establishments located in the same employment area.

- The **local propensity to generate wealth** is also supposed to play a key role in determining individual firms’ behaviour and performance. Indeed, opportunities for profitable business activities clearly affect the ability of an entrepreneur to expand his or her firm. It is often measured by the unemployment rate, an indicator able to encompass demand and supply characteristics. In addition, a rising unemployment rate lowers the opportunity costs for self-employment (Creedy and Johnson 1983; Evans and Leighton 1990), providing an additional supply of talented workers to hire. The decrease in the entry rate consolidates the market position of incumbents and, as a result, strengthens the arbitrage in favour of wage earning compared to business creation. A negative correlation between the unemployment rate and the level of the median revenue at the employment area level, on the one hand, and a negative relationship between unemployment rate and the level of demand, on the other, have been previously demonstrated (Herpin, 1992) in the French case.

- **Governance structure and autonomy** in the decision process also shape the economic context in which a given company operates. According to Beaujolin-Bellet *et al.*, (2006), a higher proportion of business groups, as opposed to smaller, independent companies, tends to weaken the relationship between the firm growth path and the local economic climate. Indeed, boardroom decisions are not based on the local economic climate. Instead, they depend on the corporate strategy and the need to serve the group more than the goals and specific projects determined at the subsidiary or

plant level. This is especially the case with the investment, restructuring and closure of production plants, with a loss of local autonomy as a consequence. Following Duhautois *et al.* (2013) who show that business groups destroyed employment over the first decade of the century, we assume that the proportion of stand-alone establishments in a given area positively affects the firm growth rate.

- It is also broadly agreed that the **labour market conditions** and the quality of the workforce act as resources a company needs to fuel its own growth path. As emphasised by Edith Penrose (1959) in so-called resource theory, a company requires talented and skilled workers to grow. A dense labour market and a high proportion of highly educated people able to perform superior functions facilitate the hiring of suitable workers (Acs *et al.*, 2007). On the one hand, most of the studies that take these aspects into account conclude that the availability of skilled workers exerts a positive effect on firm growth. In their empirical study of German regions, Audretsch and Dohse (2007) demonstrate that the quality of the workforce in the area where a firm is located positively affects its growth trajectory. This finding is confirmed in the French case, as shown by Garsaa *et al.* (2014), according to whom a higher proportion of white-collar and highly qualified workers leads to a higher individual growth rate for firms. Moreover, many papers concur about the positive relationship between density in employment and firm growth rate. For instance, in a study of English establishments over the period 1991-2000, Fingleton *et al.* (2004) find that companies located in areas characterised by a high concentration of labour force grow faster than others.

2.2. Hypotheses and empirical model

To determine the effects of local characteristics on the employment growth rate at the establishment level, we estimate an empirical model of firm growth. It begins with a standard definition of firm growth (Gibrat, 1931) such as equation 1:

$$Growth_{i,t} = \ln Size_{i,t} - \ln Size_{i,t-1} \quad (1),$$

where *Growth* denotes the changes in the number of employees in firm *i* at time *t*, and *Size* is the size of the firm. The basic form of the model used to

estimate the individual growth rate comes directly from the multivariate model of firm growth (see Coad 2009 for a survey). It includes several location-specific variables characterising the employment area³ in which any given establishment is located, and some individual variables introduced to control the effects of the variables of interest. It is written as follows:

$$Growth_{i,t} = \beta_0 + \sum_{k=1}^k \beta_k Loc_{it} + \sum_{j=1}^j \beta_j Firm_{it} + y_t + \vartheta_{it} \quad (2),$$

where i designates establishment, and t the period. Loc is a vector of local variables characteristic of the area and $Firm$ is a vector of a firm's characteristics such as size, age, and governance introduced in the model as control variables. $\vartheta_{it} = \mu_i + \varepsilon_{it}$ is a composed error term where μ_i and ε_{it} are respectively the individual fixed effect and the error term.

This model makes it possible to test a set of hypotheses attaching an explicit spatial dimension to environmental forces. They show how the local business climate disaggregated into various components such as human capital, the local labour market conditions, the structure of the productive sector, the competition, and the available human resources, may intervene in the firm growth path. The following six hypotheses are drawn from the literature:

- H1.** The proportion of industrial establishments in an area is positively correlated with establishment growth
- H2.** The local unemployment rate negatively affects establishment growth
- H3.** Establishment growth is a direct function of the share of stand-alone companies i.e. companies not included in a business group
- H4.** Employment concentration in a few establishments negatively influences establishment growth
- H5.** Establishment growth is positively related to employment density in the area
- H6.** A higher proportion of skilled workers positively influences establishment growth

3 INSEE defines the employment area ("zone d'emploi" in French) as a geographical area within which most employees reside and work, and in which establishments can find a large supply of labour for the jobs offered. Since 2010 there are 304 employment areas in mainland France.

2.3. Variables operationalisation

In accordance with the review of the literature and our set of hypotheses, the local business climate is split into different variables, showing how outside characteristics may influence individual performance.

As education and skills have been identified as sources of influence on firm growth, we introduce the share of white-collar workers in the labour force (*Skills*) as an explanatory variable in the model. The annual periodicity of the estimations run prevents us from using the education level of inhabitants per area, which is not provided yearly⁴. It is complemented by the share of employees working in stand-alone companies as a function of the total number of employees in a given area (*Indep*). As in Ciccone and Hall (1996), we approximate agglomeration effects using the ratio given by the total number of employees in a given area, divided by its area measured in square kilometres expressed as a logarithm (*LnDens*). We also consider the number of employees in industrial manufacturing compared to the total number of employees (*Manuf*), which may also be introduced as a proxy for agglomeration effects. Average size and competition in a given area may either encourage entrepreneurs to carry out their projects or deter them from doing so. We consider that the domination of the market by a few establishments can be a driving force in such a process. To capture this phenomenon, we compute the share of employees working in the five largest companies operating in any employment area in the total number of employees in the same area (*C5*). Finally, we add the unemployment rate (*Unempl*) as a proxy for the local economic context, firstly because there is no available data of the demand or incomes at the employment area level and, secondly, as the number of unemployed may influence the level of local demand through its impact on the available income of households.

The definitions and sources of the different explained variables are presented in Table 1.

4 INSEE provides the education level at the employment area level for the years 1999, 2006 and 2011, which is compatible neither with the period under review, nor with the panel structure of the model.

Table 1. Definitions and sources of the variables

Variable	Definition	Source
<i>Explained variable</i>		
$Growth_{it}$	Difference between the logarithm of the establishment number of employees at the end of the year t and $t-1$	CLAP
<i>Explanatory variables</i>		
<i>Establishment-specific variables</i>		
$lnEmpl_{it}$	Lagged value of the logarithm of the establishments' number of employees at the end of the year	CLAP
$lnAge_{it}$	The logarithm of the age of the establishment = date of creation of the establishment- t	CLAP and REE/Sirene
$MicroBG_{it}$	Dummy variable equal to 1 if the establishment belongs to a micro group, zero otherwise	LIFI
$MedBG_{it}$	Dummy variable equal to 1 if the establishment belongs to a medium group, zero otherwise	LIFI
$LargBG_{it}$	Dummy variable equal to 1 if the establishment belongs to a large group, zero otherwise	LIFI
<i>Location-specific variables</i>		
$Unempl_{it}$	12-month average unemployment rate by ZE	INSEE
$Indep_{it}$	Number of employees working in independent companies, companies affiliated in a micro group or uncontrolled subsidiary companies by ZE/ total number of employees by ZE	LIFI
$Manuf_{it}$	Share of workers employed in manufacturing industry in an employment area (ZE 2010) with respect to the total number of employees in this area	CLAP
$C5_{it}$	Share of workers of the biggest establishments in an employment area (ZE 2010) with respect to the total number of employees in this area	CLAP
$lnDens_{it}$	The logarithm of the number of employees working in establishments localised in an employment area (ZE 2010) divided by the surface of this area	CLAP
$Skills_{it}$	Number of skilled (or white-collar) employees ⁵ working in establishments localised in an employment area (ZE 2010) divided by the total number of employees in this area	CLAP

- 5 This socio-professional category contains scientific professors and professions which directly apply very thorough knowledge in the fields of the exact or human sciences and have activities of general interest such as research, teaching or health. It refers to managers and administrative officers, as well as workers who have important responsibilities in corporate management. It also includes engineers and technical staff mobilising skills requiring in-depth scientific knowledge. Finally, this class groups professionals whose activity is related to arts and media. For a detailed presentation of this category, see: http://www.insee.fr/fr/methodes/default.asp?page=nomenclatures/pcs2003/n1_3.htm

3. DATA AND DESCRIPTIVE ANALYSIS

3.1. Structure of the sample

To assess the effects of location on firm growth, we use a unique large dataset of establishments built by merging three sources provided by the French National Institute of Statistics and Economic Studies (INSEE)⁶: the Local Knowledge of the Productive System (CLAP or “Connaissance Locale de l’Appareil Productif”) and Financial Links between Enterprises Survey (LIFI or “Enquête sur les Liaisons Financières entre sociétés”) datasets provide the major sources (Table 1) over the 2004-2010 period. They are supplemented by the Register of Businesses and Establishments (REE/Sirene or Répertoire des Entreprises et des Etablissements) to compute the age of every establishment.

We eliminate from the initial database all establishments with missing data, establishments with no employees⁷, and those whose data do not cover at least three successive years⁸ over the 2004-2010 period. In the end, the final dataset is composed of an unbalanced panel of 149,929 establishments⁹. Table 2 presents the structure of the panel in 2004 and 2010. It appears that the number of employees increased in almost all subsectors of French manufacturing industry between 2004 and 2010 (+7%). This increase is particularly strong in the pharmaceutical industry, where employment grew by 30% over this period. In contrast, the manufacture of textiles, clothing and the leather industry exhibit a sharp decline in the number of employees. These positive figures contrast with the results usually found by papers dealing with the deindustrialisation of the French economy. Most of them observe that paid employment in the manufacturing sector has been in a downward trend since

6 We are grateful to the Statistical Confidentiality Committee (Comité du Secret Statistique), the French body supervising access to data, for providing the databases under strict confidentiality agreements.

7 The logarithmic form of the model requires this cleansing.

8 This constraint is essential to calculate the employment growth rate, keeping the structure of the panel.

9 105,400 observations in 2004, 114,798 in 2005, 129,745 in 2006, 129,631 in 2007, 128,886 in 2008, 117,477 in 2009, and 107,045 in 2010.

1980 (cf. Eudeline *et al.* 2012 and Demmou 2010). The increase we mention results from a panel effect and from a concentration effect according to the size of the surviving establishments, which tends to increase. This phenomenon is mentioned by Eudeline *et al.* (2012). This survivor bias explains the difference between cross-sectional and panel results but the unbalanced structure of the panel used helps to mitigate potential selection and survivor bias¹⁰.

The representativeness of the population used is shown by a comparative analysis between our sample and the French manufacturing industry in 2004 and 2010. At the start of the period under review, the proportion of every subsector in the panel is quite close to the total population. There are three exceptions which concern the manufacture of coke and refined petroleum products (C4), which are under-represented in the panel, and the manufacture of motor vehicles (C7), and to a lesser extent the manufacture of basic metals (C5), which are slightly over-represented¹¹. These gaps are marginal enough to consider that the structure of the panel is representative of the total population. The coverage rate is also quite good. The panel represents about 40% of the total number of establishments during the period under review and 72% and 88% of the total number of employees in 2004 and 2010 respectively. The details are given in Figures 3 and 4 in Appendix 1.

10 This problem has long been identified in the literature on firm growth. It is however considered to be a minor one compared to the advantages provided by the use of panel data (Lentz and Mortensten, 2005).

11 The sectorial distortion is greater at the end of the period because of the survivor bias. As shown by Figure 4 (Appendix 1), in 2010 the structure of employment over-represents some industries such as the manufacture of coke and refined petroleum products (C4), the manufacture of basic metals (C5), and the manufacture of computers (C6). This may result from a double phenomenon: the exit rate is smaller in these industries or the concentration process is stronger. As a consequence, the establishments operating in these industries tend to grow faster than the other ones. On the whole, their respective shares in the total number of jobs tend to be higher in the panel than in the annual data.

Table 2. Structure of the panel

Description (NAF, Rév.2, 2008)	2004				2010				2004-2010	
	Number of establishments		Number of employees		Number of establishments		Number of employees		Variation (number of employees)	%
	%	Number	%	Number	%	Number	%	Number		
Manufacture of food products, beverages, and tobacco products (from 10.1 to 12.00Z)	30,2	31 871	16,9	412 275	31,3	33 529	18,5	483 070	17,2%	
Manufacture of textiles, wearing apparel, and leather (from 13.1 to 15.20Z)	5,4	5 742	5,1	124 442	4,8	5 163	4	104 920	-15,7%	
Manufacture of wood; articles of straw and plaiting materials; paper and paper products; and Printing and reproduction of recorded media (from 16.01 to 18.20Z)	10,5	11 068	8	194 517	10	10 754	7,2	187 366	-3,7%	
Manufacture of coke and refined petroleum products; chemical products; pharmaceutical products; rubber and plastic products; and other non-metallic mineral products (from 19.1 to 23.99Z)	11	11 563	17,3	422 812	11,3	12 141	18,6	485 554	14,8%	
Manufacture of chemicals and chemical products (from 20.1 to 20.60Z)	2,0	2185	4,8	117 599	2,1	2284	5	129 294	9,9%	
Manufacture of basic pharmaceutical products and pharmaceutical preparations (from 21.1 to 21.20Z)	0,45	474	2,5	61 151	0,5	529	3,0	79 208	29,5%	
Manufacture of basic metals; and fabricated metal products (from 24.1 to 25.99B)	12,5	13 164	14,1	343 806	12,7	13 592	13,9	363 120	5,6%	
Manufacture of computer, electronic and optical products; electrical equipment; and machinery and equipment n.e.c. (from 26.1 to 28.99B)	8,9	9 400	15,4	376 718	8,9	9 484	15,8	413 104	9,7%	
Manufacture of motor vehicles, trailers and semi-trailers; and other transport equipment (from 29.1 to 30.99Z)	2	2 088	13,1	319 202	2	2 193	12,4	323 799	1,4%	
Manufacture of furniture; Other manufacturing; and Repair and installation of machinery and equipment (from 31.0 to 33.20D)	19,5	20 504	10,1	245 211	18,9	20 189	9,6	249 659	1,8%	
Total	100	105 400	100	2 438 983	100	107 045	100	2 610 592	7,0%	

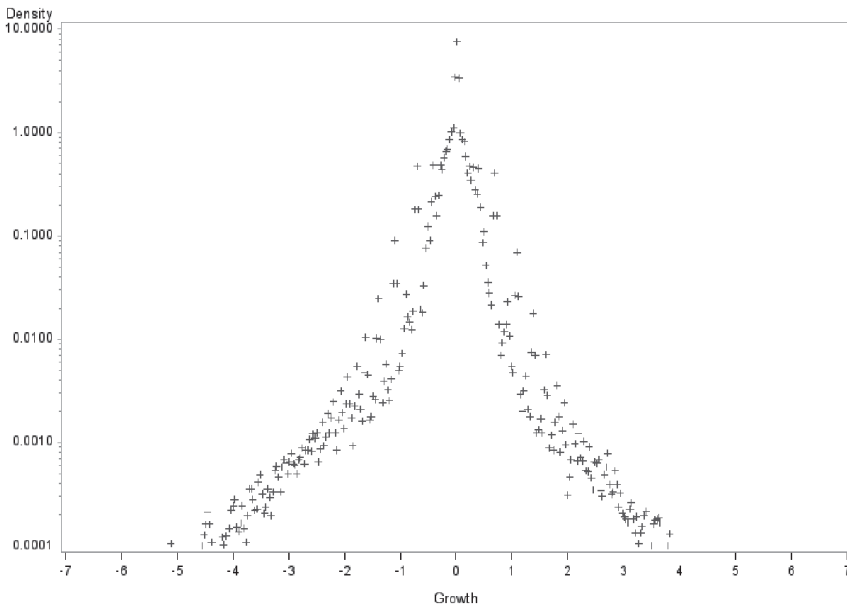
Note: the number of employees is as of the end of the year (12/31).

3.2. Growth rate distribution

Since the results reported in Stanley *et al.* (1996), who study growth rates density in the U.S. manufacturing industry, and in Bottazzi and Secchi (2003), who examine the growth rates distribution of business firms in the Italian manufacturing industry using data disaggregated by sector, the growth rates probability density is known for “possessing the same symmetric exponential character that, when plotted on a log scale, emerges as a sort of tent-like shape.” (Bottazzi and Secchi, 2006, 236)¹²

The kernel density estimation of the distribution of the establishments' growth rate respects this general conclusion. As shown in Figure 1, it looks like a Laplace distribution with fat tails. The tent-shaped form of the distribution means that most establishments do not create jobs, but a handful of them grow or decline. The job creation or destruction depends, thus, on the growth dynamics of these plants.

Figure 1. Establishment growth rate distribution during the period 2004-2010



Note: unbalanced panel of 679,271 observations over the 2004-2010 period.

¹² This stylised fact has been confirmed by several studies on firm growth (Fagiolo and Luzzi, 2006; Coad and Rao, 2008; Coad and Holzl, 2009; etc.)

This trend is respected when the total sample is broken down by type of employment area and activity. Figure 5 in Appendix 2 presents the plots for different subsamples, hereafter used to check for the robustness of the model.

4. RESULTS AND COMMENTS

This section presents the results of estimation of the growth model we have run using a fixed effects estimator (FE)¹³. Our estimations aim to show to what extent the employment growth rate computed at the establishment level depends on the local context, in which a plan operates controlling for size, age, the ownership or control rate and the economic situation. To circumvent the problem caused by the multicollinearity bias due to the correlation between some location-specific variables (see the correlation matrix Table 4, Appendix 2), we have estimated five different models by including them separately.

The null hypothesis of the Hausman test¹⁴ has been rejected for all models. Thus they have to be estimated using an FE estimator. Consequently, we only interpret the results corresponding to this estimator. Since the OLS estimator is biased, it is simply introduced as a reference in the tables of results, and we do not comment on it. The first part of the section presents the results obtained when the estimation is performed using the total sample. The second part proposes some additional robustness checks considering several subsamples that are defined in relation to both the global characteristics of the areas and the geographic scope of the market.

4.1. Total sample

Our results support the idea that location matters and that individual growth depends on the local context. By the way, these go in the same

13 The main attraction of the fixed effects model is that no assumptions about u_j are required.

14 The null hypothesis stands for no correlation between individual fixed effects and at least one explanatory variable included in the model. When this hypothesis is rejected, one may suspect an endogeneity bias which requires a fixed effects estimator.

direction as the literature (Shearmur *et al.*, 2007; Li *et al.*, 2015), testing the influence of local characteristics on establishments' performance. Beyond this general trend which asserts the linkages between individual performance (the dependent variable is computed from individual data) and the local context (the geographical explanatory variables are computed at the employment area level), our results make it possible to disaggregate the origin of this spatial effect.

Looking at the variable *Manuf*, which captures the agglomeration effects resulting from an industrial profile in the area, one observes that, as expected, the industrial specialisation positively affects the employment growth of the establishments. Companies detecting employment opportunities in the manufacturing industry are then encouraged to expand their own activity. Complementarity effects can cause such a phenomenon. Since the coefficient associated with the variable *Manuf* is significantly positive, one confirms the hypothesis according to which a high degree of proximity between production units promotes growth. This may correspond either to the MAR version of agglomeration externalities according to the geographic concentration that facilitates knowledge spillovers and boosts growth, or to the Porter version, which places some emphasis on competition as a factor that is able to increase job creation. It confirms the conclusions reached by Shearmur *et al.* (2007) according to whom the role of the industrial structure in the growth rate of employment in French urban areas was greater during the 2000s than it used to be in the 1990s. This does not seem specific to France as, using a similar method, the authors reach the same result with Canadian data (Shearmur and Polèse, 2007).

In the majority of estimated models, firm growth is negatively correlated with the local rate of unemployment (*Unempl*)¹⁵, used as a proxy

15 In Model 3, *Unempl* appears with a positive sign. It is not due to a problem of correlation (see correlation matrix, Table 4 in Appendix 2). Introducing unemployment and density jointly into the model may cause this change in the sign because this specification does not control for skills. However, unemployment mostly concerns unskilled workers. Unemployment is negative in Model 2, which does not control for skills either because it introduces the rate of concentration (*C5*). Like *Dens*, this variable is strongly correlated with skills (see correlation matrix, Table 4 in Appendix 2) because large plants also employed more skilled workers. The difference comes from the superior capacity of this variable to capture qualifications. Considering skills or concentration is, thus, almost the same.

for demand. The result obtained confirms the typical Keynesian relation between employment and demand for consumer goods. A lower local demand resulting from a decrease in the employment level following a downward adjustment of the level of production of industrial establishments located in the same area or a slowdown in household demand tends to deter growth¹⁶. This kind of contagion effect confirms our second hypothesis.

The rate of establishments belonging to stand-alone companies (*Indep*) in a given employment area appears to be negatively correlated with the employment growth rate. This result leads us to reject our third hypothesis, according to which a higher rate of establishments owned by stand-alone companies pushes up employment growth. The strategies of business groups may explain this negative relation. Indeed, they tend to adopt offensive strategies that may discourage establishments to grow for a double reason. Firstly, groups tend to acquire fast growing companies, as shown by Nefussi (2007) and Duhautois and Lagarde (2004). Once the target has been absorbed, this ensures synergies and a greater efficiency for the buyer. In many cases, the merger or acquisition generates a lower increase in the number of employees in the absorbing company than the one corresponding to the retention of all the employees formerly employed in the absorbed company (Picart, 2004). Secondly, top managers can be aware of the risk of acquisition which rapid growth could create. Therefore, they might prefer to slow down their growth process rather than lose their independence, following a loss of decision-making autonomy (Mottet, 2002). These strategies are particularly visible in France, where family-owned companies are increasingly taken over by large corporations.

Local concentration of productive activity measured at the employment area level (*C5*) does not have any significant effect on the manufacturing establishment growth rate. The propensity to create or destroy jobs on behalf of secondary entities in the French manufacturing industry is not influenced by the concentration of employment in the five biggest

¹⁶ We have tested the risk of reverse causation between unemployment and growth implementing a test of endogeneity. The results obtained show there is no correlation between the error term coming from the estimation of the models and the variable *Unempl*. The results for the samples used to run the robustness checks are similar.

plants, neither as customers nor as players in a subcontracting relationship. Contrary to the Porter idea, we may not consider that competition fosters economic growth and that companies benefit from a competitive environment. Our fourth hypothesis is therefore rejected.

This is not the case with the employment density (*Dens*), which positively affects establishment growth rate. Agglomeration externalities appear to be a favourable factor in the establishment growth process. This may come from the demand side as the needs and purchases are higher in areas advantaged from a demographic point of view. On the contrary, establishments located in remote areas do not benefit from these external effects and exhibit a lower growth rate. Our finding recalls the results obtained by Martin *et al.* (2011) who, in a paper estimating the effect of agglomeration on firm productivity, show that “agglomeration externalities in France take the form of localisation economies in the short-run” (*ibid.*, p. 192). Indeed, as in Blanc *et al.* (2008), the estimations run allow us to conclude that, when controlled for size and industry, the recruitment of firms in low-density areas experiences more difficulties in finding workers who meet the requirements of the jobs. Our results thus confirm the fifth hypothesis since a large labour supply enables establishments to grow faster.

The negative and highly significant coefficient of human capital (*Skills*) suggests that establishments experience lower growth rates in areas characterised by a high proportion of highly qualified employees. This conclusion is quite unusual and differs radically from the result obtained in former studies conducted at the regional level, according to which human capital exerts a positive effect on the firm growth path¹⁷. This unexpected sign is explained by the focus on the French manufacturing industry, which mainly hires blue-collar workers¹⁸. A higher share of white-collar

17 The literature reflects a strong consensus that a venture's connections to outsider competencies are beneficial for the growth of the firm. However, the field of application differs from our research. Audretsch and Dhose (2007) are only concerned with small and new technology-based companies in Germany. Garsaa *et al.* (2014) consider all the industries but in a limited area: the Mediterranean French Coast, whereas Lehtonen and Tykkyläinen (2014) find the same result but only in Finnish rural areas.

18 According to INSEE, in 2010 the manufacturing industry employed 53.33% of blue-collar workers, whereas white collar and “grey matter” positions only represented 14.64% of the total number of employees.

and “grey matter” positions for workers is not the most appropriate environment for plants whose production activity mainly requires blue-collar workers. This mismatch is exacerbated by a size effect. Indeed, a large majority of the companies in the dataset and, thus, in the French productive system, are small. As these firms are simultaneously the ones that have the highest growth rate and those that employ the lower rate of white-collar workers¹⁹, a higher rate of this category of workers in a given area is not necessarily an advantage. Our results are consistent with the features of our population which is mainly composed of small plants operating in the manufacturing industry. Small establishments grow faster and employ mostly unskilled workers, who are also hired by the manufacturing industry (Baldwin, 1998 and Duhautois *et al.*, 2014). This legitimates the results obtained.

The signs associated with the controlled variables (Size, Age and Governance) are consistent with the empirical literature on firm growth (See Coad, 2009 for a review of the literature and Hamelin, 2013 for the business groups).

4.2. Robustness checks

In order to check for the robustness of our estimation results we have also estimated our growth model, breaking down the total sample into different sub-categories. They have been defined according to two criteria: one is geographical; the other one is based upon the structure of the local production system. To run these robustness checks, we rely on a distinction made by INSEE (2010), which consists in differentiating “presential” from “productive” spheres²⁰. The partition of the domestic economic system into two subsets has been introduced to describe the spatial repartition of the productive system and to characterise the degree of openness of any area. Presential activities are located in a given area to produce goods and services dedicated to satisfying the needs of the inhabitants located in the

19 Still according to INSEE, in 2010 companies employing less than 10 people employed 9.5% of white-collar workers, whereas this share reached 22.35% in establishments employing more than 250 workers.

20 This distinction is commonly used to describe functional changes at the local level. See, among many others, Poupard and Tanguy (2012), Reynard and Vialette (2015), and Aubert *et al.* (2014).

same area. They correspond to services to the population, be it permanent or temporary, in a given area. The productive activities are determined as a complement to the presential ones, i.e. the ones that are excluded from the previous class. “Productive” activities located in a given area produce goods and services mainly by economic agents located in other areas, or by other establishments located in the same area. To determine whether a given employment area is presential or not, we have used an *ad hoc* dataset, provided by INSEE²¹.

- Presential vs. productive areas

In a first set of tests, we have distinguished establishments operating in areas oriented towards presential or face-to-face activities from those located in productive areas. This distinction between these two specific profiles of areas has been proposed by INSEE to provide a better description of the labour market at the local level (Léglise and Vilain, 2006). It provides an operative framework in which to build a typology of employment areas according to their productive features, as shown by Hecquet (2013, p. 59).

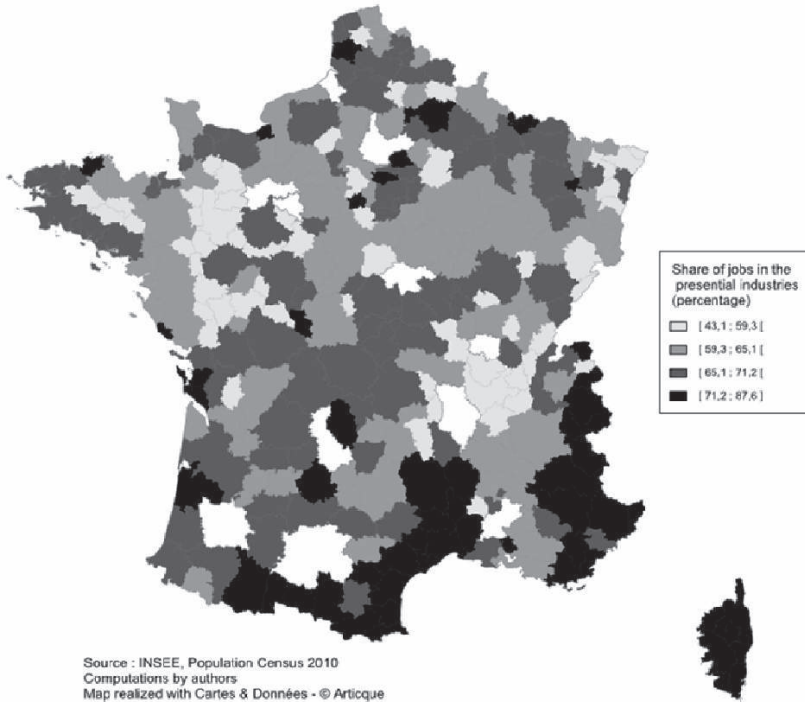
The areas where the ratio exceeds the median are called “presential”, whereas the ones where the ratio is below the median (0.64 at the national level) are considered as non-presential. Splitting the total population into two subsamples allows us to minimise the sample heterogeneity since, by virtue of the definition of the classes (INSEE, 2010), plants located in presential employment areas are more focused on local demand than those localised in non-presential places. We thus expect that the growth rates of the former depend more on the local business climate than the growth rate of the latter.

The results are presented in Tables 6 and 7, Appendix 3. They mainly give consistency to the idea that establishments located in presential areas are

21 The quantification of the presential and productive sectors at the employment area level from 1975 to 2010 are made available by data provided at the municipal level by INSEE at: http://www.insee.fr/fr/themes/detail.asp?reg_id=99&ref_id=sphere. To compute the share of employment in the presential sphere as a function of the total number of employees for every employment area, we started from data provided at the district level and aggregated them in accordance with the administrative scale.

more dependent on local conditions as far as employment is concerned. The comparison of the coefficients estimated for the different specifications of the model provides convergent results.

Figure 2. Share of jobs in the presential industries by employment area (2010)



Some variables have unambiguous effects, other things being equal. Looking at the sensitivity of the variable *Unempl*, it is clear that the correlation with establishment growth is stronger in presential than in productive areas. This result is confirmed regardless of the specification and this is consistent with the theory of the local roots of firm growth. The share of industrial plants in a given area (*Manuf*), introduced in Model 1, exerts a stronger influence on the growth rate of establishments located in a presential area (the estimated coefficient equals 0.824) than on the growth rate of the other ones (the estimated coefficient equals 0.335). The growth rate is also more strongly correlated with the variable representative of the density in employees (*LnDens*) for establishments located in presential areas than for those located in productive ones.

However, some effects are more ambiguous. They concern the share of plants belonging to stand-alone companies (*Indep*), which does not determine the establishments' growth rate in presential areas, whereas they negatively affect the growth rate in productive ones. Plants located in productive areas are oriented towards external markets. They rely more on corporate groups to increase their capacity to access distant customers. There is the same hierarchy when one focuses on the share of white-collar workers (*Skills*). This significantly deters establishment growth in productive areas but does not intervene in presential ones. The majority of small establishments serving a local market do not require highly skilled workers to produce goods, whereas large plants belonging to groups employ many more white-collar workers. We should point out that the variable representative of concentration (*C5*), already non-significant in the estimation run with the total sample, remains the same regardless of the kind of area observed.

- Establishments operating in presential industries vs. establishments operating in productive industries

At a second stage of the robustness check, we run separate estimations according to the industrial specialisation. The total sample has thus been broken down based on the type of industry in which they operate. The type of each industry is given by INSEE in an *ad hoc* table²². The typology respects the definition given above. We expect establishments operating in presential industries to be less affected by the local economic environment than those operating in productive industries. Indeed, the former produce goods that meet the needs of local populations, and their location does not depend on the quality of the local conditions but on the presence of populations. In contrast, the establishments operating in productive industries are more attentive to local conditions as they partially determine their competitiveness.

Tables 8 and 9 in Appendix 5 present all the results of the estimations performed. The comparison of the estimated coefficients confirms the higher

22 In the manufacturing industries, the sectors corresponding to presential activities are: Bakery and bakery confectionery, cooked meat production and trade, baking of bakery products, confectionery. The complete table is freely downloadable on the website: http://www.insee.fr/fr/themes/detail.asp?reg_id=99&ref_id=sphere

sensitiveness of the growth rate to local conditions for the establishments operating in productive industries. Most of the local variables are non-significant when we run estimations on the subsample, composed of establishments operating in presential industries, whereas almost all the coefficient estimates are significant when estimated for the complementary subset. The only exception concerns the variable density (*lnDens*), which is also very significant for the presential sample (Table 9 Appendix 3). This is consistent with the fact that these activities were intended to satisfy the general needs of the population and are, thus, all the more dynamic, inasmuch as the market is extended. We observe just the opposite for the productive activities. In this case, the growth rate depends on all the variables except C5. The correlation with the rate of unemployment (*Unempl*) is negative²³. This means that these establishments are all the most prosperous when they are located in areas where the business climate is positively oriented because of the agglomeration effects. This relation corresponds to the positive signs associated with the coefficients of the variables *Manuf* and *lnDens*. The availability of skilled workers does not seem to promote establishments' growth. It has already been pointed out by Audretsch and Dhose, according to whom "Industries where knowledge is not an important factor of production depend less on knowledge inputs and provide less of a potential for knowledge spillovers and from learning from others" (Audretsch and Dhose, 2007: 84).

5. CONCLUSION AND POLICY IMPLICATIONS

In this paper we have sought to empirically assess the influence of the local context on individual establishment growth, an issue often debated but still barely studied. We handled it using a large dataset containing information about almost 150,000 plants localised in one of the 304 mainland France employment areas from 2004 to 2010. Using panel models based on establishments and local level data, we show that firm growth does not only depend on internal factors and characteristics but, instead, that local characteristics matter. This suggests that economic performance is shaped by the local business climate. This general result is reinforced by the robustness checks run on subsamples. One of these carried out a

²³ For Model 3, see Footnote 9.

breakdown of the whole population according to the kind of area where it is located, the other carried out a breakdown considering whether the activity is oriented toward a local or an external demand.

In particular, our results show that unemployment, here considered as a proxy for demand, has a strong negative effect on the establishments' growth process. Surprisingly, at first glance, a similar negative influence flows from the variable measuring the rate of the highest qualified workers in an area. This result is mainly due to the application field of our study, concerning the manufacturing industry, which is known to hire a minority of white-collar workers. The growth rate of the establishments operating in this sector relies less on the availability of this kind of human resources than other industries, such as high value services to business for instance. Agglomeration effects, however, have a positive influence on individual growth. Labour concentration, often considered as a proxy for barriers to entry or economic domination, does not deter establishment growth. This is probably because big entities can initiate subcontracting relations which can also facilitate the hiring of additional workers, but not systematically. This kind of dependence between leaders and followers is somehow confirmed by the negative influence played by the rate of stand-alone establishments on the individual growth rate.

From the practitioner's point of view, the findings of this study suggest that location choice is indeed strategic since plant growth depends significantly on the characteristics of the area where they are located. Even if mobility is quite rare and production plants barely move from one employment area to another, this finding implies that managers should be cautious when they decide either to open or to close a plant and that they would have to consider not only internal aspects but also geographical ones.

Another implication of our findings concerns policy makers. Since the possibility to grow differs according to the location, providing direct aids and subsidies to companies is not the only solution to support economic activity. Instead, measures aimed at nourishing and strengthening the local context should also be implemented in order i) to consolidate the growth process of existing companies, ii) to attract new ones and iii) to strengthen the link between the territory and the enterprise. This

framework corresponds to the policy of competitiveness clusters which has been implemented since 2005 in order to strengthen business-to-business relationships, as well as the local roots of production activities. This last point could also help to reduce the propensity to relocation, a concern shared by most local policy makers. Last but not least, these findings support local policies oriented towards the endowment of territories in local resources that are propitious to job creation.

In spite of the novelty and the robustness of our results, there is still room to test the relation between firms' dynamics and local factors introducing different variables, using other techniques and, also, analysing different spatial aggregations. Instead of working with a panel of establishments operating in industrial manufacturing, future research should also focus on services. It is indeed likely that these activities are less attached to the territory by material investments and tangible capital assets so that their location choice can be more reversible. In addition, a large part of service activities relies heavily on highly skilled workers. This could drastically change the nature of the relation between skills and educational attainments on the one hand, and the job creation process on the other.

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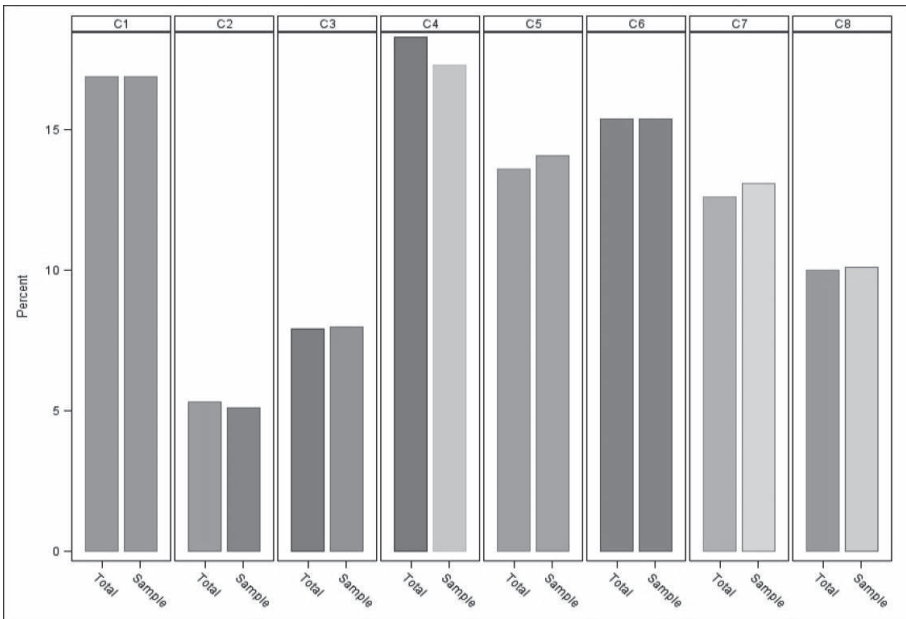
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APPENDICES

Appendix 1. Representativeness of the dataset (2004-2010)

Figure 3. Comparison of the structure (number of employees) of the panel to the structure of the total population (CLAP dataset) in 2004



Legend

C1: Manufacture of food products, beverages, and tobacco products (from 10.1 to 12.00Z)

C2: Manufacture of textiles, wearing apparel, and leather (from 13.1 to 15.20Z)

C3: Manufacture of wood; articles of straw and plaiting materials; paper and paper products; and Printing and reproduction of recorded media (from 16.01 to 18.20Z)

C4: Manufacture of coke and refined petroleum products; chemical products; pharmaceutical products; rubber and plastic products; and other non-metallic mineral products (from 19.1 to 23.99Z)

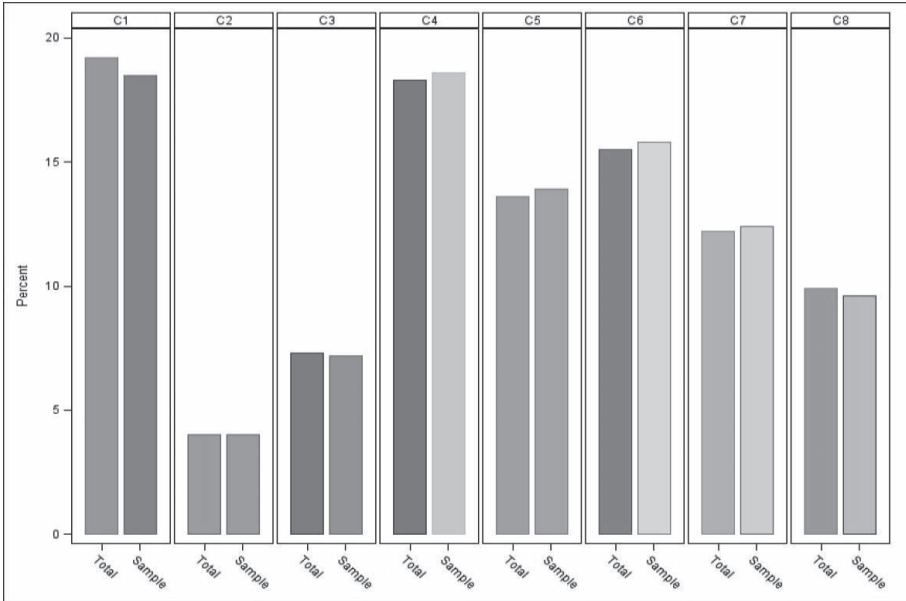
C5: Manufacture of basic metals; and fabricated metal products (from 24.1 to 25.99B)

C6: Manufacture of computer, electronic and optical products; electrical equipment; and machinery and equipment n.e.c. (from 26.1 to 28.99B)

C7: Manufacture of motor vehicles, trailers and semi-trailers; and other transport equipment (from 29.1 to 30.99Z)

C8: Manufacture of furniture; Other manufacturing; and Repair and installation of machinery and equipment (from 31.0 to 33.20D)

Figure 4. Comparison of the structure (number of employees) of the panel to the structure of the total population (CLAP dataset) in 2010



Legend

<p>C1: Manufacture of food products, beverages, and tobacco products (from 10.1 to 12.00Z)</p> <p>C2: Manufacture of textiles, wearing apparel, and leather (from 13.1 to 15.20Z)</p> <p>C3: Manufacture of wood; articles of straw and plaiting materials; paper and paper products; and Printing and reproduction of recorded media (from 16.01 to 18.20Z)</p> <p>C4: Manufacture of coke and refined petroleum products; chemical products; pharmaceutical products; rubber and plastic products; and other non-metallic mineral products (from 19.1 to 23.99Z)</p>	<p>C5: Manufacture of basic metals; and fabricated metal products (from 24.1 to 25.99B)</p> <p>C6: Manufacture of computer, electronic and optical products; electrical equipment; and machinery and equipment n.e.c. (from 26.1 to 28.99B)</p> <p>C7: Manufacture of motor vehicles, trailers and semi-trailers; and other transport equipment (from 29.1 to 30.99Z)</p> <p>C8: Manufacture of furniture; Other manufacturing; and Repair and installation of machinery and equipment (from 31.0 to 33.20D)</p>
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Appendix 2. Data description

Table 3. Descriptive statistics of the variables introduced in the model

	mean	Standard deviation	minimum	p10	p25	p50	p75	p90	maximum
Growth	-0.013	0.322	-6.866	-0.288	-0.074	0.000	0.044	0.288	6.165
lnEmpl	1.899	1.359	0.000	0.000	1.099	1.792	2.639	3.761	9.678
lnAge	2.071	0.911	0.000	0.693	1.386	2.197	2.773	3.135	4.625
lnDens	4.346	1.560	1.106	2.900	3.361	3.997	4.810	6.207	8.643
Manuf	0.152	0.070	0.026	0.069	0.102	0.139	0.190	0.242	0.466
Unempl	0.085	0.020	0.036	0.062	0.072	0.083	0.096	0.112	0.164
Indep	0.745	0.154	0.252	0.447	0.680	0.786	0.850	0.909	0.999
MicroBG	0.148	0.355	0.000	0.000	0.000	0.000	0.000	1.000	1.000
MedBG	0.060	0.237	0.000	0.000	0.000	0.000	0.000	0.000	1.000
LargBG	0.028	0.164	0.000	0.000	0.000	0.000	0.000	0.000	1.000
Skills	0.155	0.059	0.061	0.101	0.116	0.137	0.174	0.226	0.320
C5	0.081	0.041	0.013	0.030	0.058	0.076	0.102	0.131	0.381

Note: number of observations = 679,271

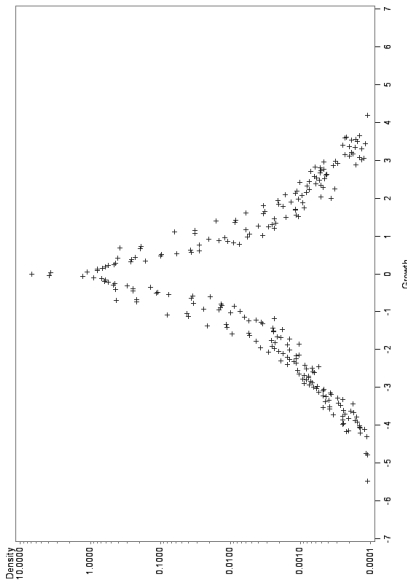
Table 4. Correlation matrix (whole sample)

	Growth	InEmpl	InAge	InDens	Manuf	Unempl	Indep	MicroBG	MedBG	LargBG	Skills	C5
Growth	1.000											
InEmpl	-0.117***	1.000										
InAge	-0.055***	0.146***	1.000									
InDens	-0.008***	-0.024***	-0.050***	1.000								
Manuf	-0.002*	0.122***	0.046***	-0.426***	1.000							
Unempl	-0.006***	-0.023***	0.004**	0.104***	-0.125***	1.000						
Indep	0.010***	-0.017***	0.025***	-0.789***	0.220***	0.082***	1.000					
MicroBG	-0.009***	0.332***	0.068***	-0.002	0.057***	-0.015***	-0.025***	1.000				
MedBG	-0.015***	0.320***	0.011**	-0.003**	0.027***	-0.005***	-0.013***	-0.105***	1.000			
LargBG	-0.011***	0.228***	-0.008**	0.003**	0.007***	-0.004***	-0.009***	-0.070***	-0.043***	1.000		
Skills	-0.001***	-0.034***	-0.064***	0.862***	-0.443***	-0.109***	-0.755***	-0.012***	-0.002***	0.006***	1.000	
C5	0.002***	0.036***	0.034***	-0.574***	0.469***	-0.007***	0.485***	0.001***	0.005***	0.004***	-0.567***	1.000

Note: * p < 0.05, ** p < 0.01, *** p < 0.001, Number of observations = 679,271.

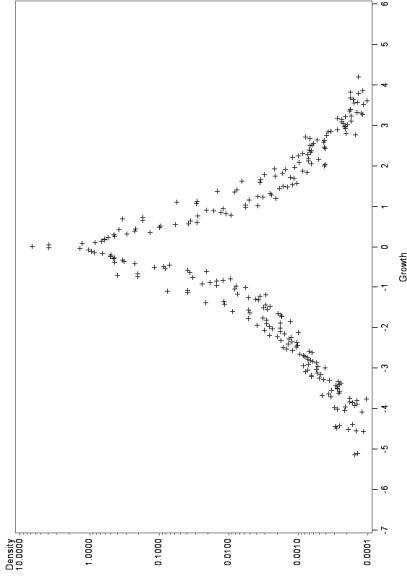
Figure 5. Establishment growth rate distribution during the period 20014-2010 by type of area

Figure 5.1. Establishments located in presential areas



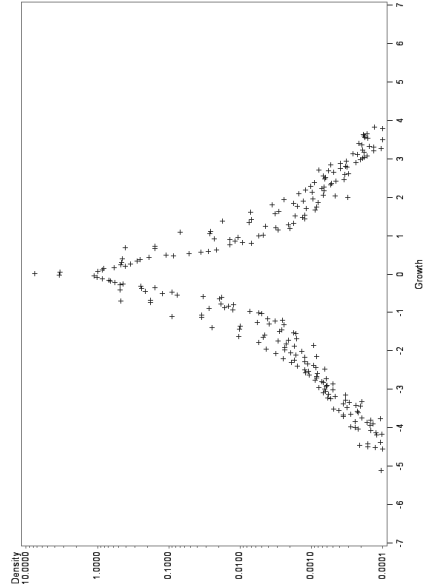
Number of observations = 338,076

Figure 5.2. Establishments located in productive areas



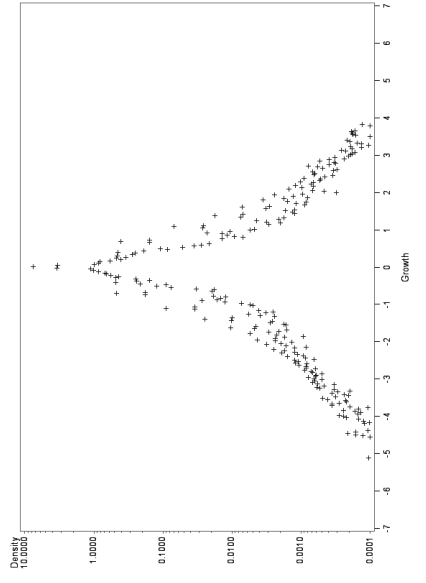
Number of observations = 341,195

Figure 5.3. Establishments operating in productive industries



Number of observations = 51,9867

Figure 5.4. Establishments operating in presential industries



Number of observations = 59,404

Appendix 3. Estimation results

Table 5. Results for the total sample

VARIABLES	Model 1		Model 2		Model 3		Model 4		Model 5	
	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects
lnEmpl	-0.0349*** (0.000386)	-0.712*** (0.00354)	-0.0348*** (0.000384)	-0.712*** (0.00354)	-0.0348*** (0.000384)	-0.712*** (0.00354)	-0.0347*** (0.000384)	-0.712*** (0.00354)	-0.0347*** (0.000384)	-0.712*** (0.00354)
lnAge	-0.0148*** (0.000525)	0.0302*** (0.00321)	-0.0147*** (0.000525)	0.0306*** (0.00321)	-0.0148*** (0.000524)	0.0299*** (0.00321)	-0.0148*** (0.000525)	0.0308*** (0.00321)	-0.0146*** (0.000525)	0.0306*** (0.00321)
MicroBG	0.0435*** (0.00121)	0.0238*** (0.00363)	0.0436*** (0.00121)	0.0236*** (0.00363)	0.0436*** (0.00121)	0.0236*** (0.00363)	0.0435*** (0.00121)	0.0236*** (0.00363)	0.0435*** (0.00121)	0.0236*** (0.00363)
MedBG	0.0521*** (0.00193)	0.0588*** (0.00806)	0.0520*** (0.00193)	0.0590*** (0.00806)	0.0520*** (0.00193)	0.0587*** (0.00806)	0.0521*** (0.00193)	0.0590*** (0.00806)	0.0518*** (0.00193)	0.0590*** (0.00806)
LargBG	0.0544*** (0.00260)	0.0732*** (0.00971)	0.0546*** (0.00260)	0.0734*** (0.00971)	0.0541*** (0.00260)	0.0733*** (0.00971)	0.0543*** (0.00260)	0.0734*** (0.00971)	0.0539*** (0.00260)	0.0734*** (0.00971)
Unempl	-0.103*** (0.0211)	-0.121 (0.122)	-0.105*** (0.0209)	-0.353*** (0.119)	-0.0838*** (0.0210)	0.273** (0.135)	-0.130*** (0.0210)	-0.385*** (0.119)	-0.103*** (0.0209)	-0.353*** (0.119)
Manuf	0.0416*** (0.00580)	0.547*** (0.0846)								
Indep	0.0153*** (0.00268)	-0.0207*** (0.00886)								
C5			0.0728*** (0.00951)	-0.0106 (0.0808)						

InDens	-0.00270*** (0.000258)	0.263*** (0.0303)				
Skills			-0.0743** (0.00681)	-0.239*** (0.0813)		
Year2006	0.0114*** (0.00142)	-0.00210* (0.00127)	0.0112*** (0.00142)	-0.00431*** (0.00122)	-0.00690*** (0.00125)	0.0111*** (0.00142)
Year2007	0.00561*** (0.00140)	-0.0109*** (0.00197)	0.00546*** (0.00140)	-0.0175*** (0.00175)	-0.0181*** (0.00175)	0.00551*** (0.00140)
Year2008	-0.0152*** (0.00140)	-0.0382*** (0.00264)	-0.0158*** (0.00139)	-0.0467*** (0.00236)	-0.0416*** (0.00240)	-0.0157*** (0.00139)
Year2009	-0.0302*** (0.00136)	-0.0707*** (0.00244)	-0.0312*** (0.00135)	-0.0779*** (0.00208)	-0.0816*** (0.00212)	-0.0312*** (0.00135)
Year2010	-0.00427*** (0.00136)	-0.0712*** (0.00295)	-0.00542*** (0.00136)	-0.0805*** (0.00246)	-0.0864*** (0.00253)	-0.00546*** (0.00136)
Constant	0.0711*** (0.00303)	1.239*** (0.0217)	0.0829*** (0.00255)	1.331*** (0.0150)	0.140 (0.138)	0.0883*** (0.00246)
Number of observations	679,271	679,271	679,271	679,271	679,271	679,271
Number of establishments	149,929	149,929	149,929	149,929	149,929	149,929
Fisher test statistic	899.5***	3905***	973.6***	4221***	4229***	1060***
Adjusted R ²	0.0200	0.0200	0.0200	0.0201	0.0200	0.0199
R ² within	0.337	0.337	0.337	0.337	0.337	0.337
R ² between	0.00673	0.00677	0.00677	0.00680	0.00683	0.00677
R ² overall	0.0140	0.0140	0.0140	0.0140	0.0140	0.0140

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 6. Results for the presentational areas

VARIABLES	Model 1		Model 2		Model 3		Model 4		Model 5	
	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects
	Growth	Growth	Growth	Growth	Growth	Growth	Growth	Growth	Growth	Growth
InEmpl	-0.0372*** (0.000550)	-0.724*** (0.00491)	-0.0369*** (0.000547)	-0.724*** (0.00491)	-0.0369*** (0.000548)	-0.724*** (0.00491)	-0.0369*** (0.000547)	-0.724*** (0.00491)	-0.0369*** (0.000547)	-0.724*** (0.00491)
InAge	-0.0136*** (0.000757)	0.0262*** (0.00458)	-0.0135*** (0.000757)	0.0257*** (0.00458)	-0.0135*** (0.000757)	0.0257*** (0.00458)	-0.0135*** (0.000757)	0.0261*** (0.00458)	-0.0135*** (0.000757)	0.0262*** (0.00458)
MicroBG	0.0471*** (0.00178)	0.0240*** (0.00531)	0.0472*** (0.00178)	0.0239*** (0.00531)	0.0473*** (0.00178)	0.0238*** (0.00531)	0.0473*** (0.00178)	0.0239*** (0.00531)	0.0472*** (0.00178)	0.0239*** (0.00531)
MedBG	0.0528*** (0.00279)	0.0602*** (0.0118)	0.0528*** (0.00279)	0.0603*** (0.0118)	0.0528*** (0.00279)	0.0602*** (0.0118)	0.0529*** (0.00279)	0.0603*** (0.0118)	0.0528*** (0.00279)	0.0603*** (0.0118)
LargBG	0.0498*** (0.00362)	0.0626*** (0.0143)	0.0497*** (0.00362)	0.0628*** (0.0143)	0.0497*** (0.00362)	0.0631*** (0.0143)	0.0498*** (0.00362)	0.0629*** (0.0143)	0.0497*** (0.00362)	0.0628*** (0.0143)
Unempl	-0.0399 (0.0296)	-0.510** (0.205)	-0.0529* (0.0296)	-0.676*** (0.203)	-0.0477 (0.0301)	0.125 (0.225)	-0.0570* (0.0297)	-0.656*** (0.204)	-0.0531* (0.0296)	-0.676*** (0.203)
Manuf	0.0694*** (0.0145)	0.824*** (0.149)	0.00338 (0.0184)	0.0226 (0.106)						
Indep	-6.39e-05 (0.00457)	-0.00790 (0.0118)								
C5										
InDens			-0.000562 (0.000581)	0.297*** (0.0422)						

Skills							-0.0300 (0.0185)	0.106 (0.119)	
Year2006	0.0120*** (0.00205)	0.000943 (0.00186)	0.0117*** (0.00204)	-0.00213 (0.00177)	0.0117*** (0.00204)	-0.00537*** (0.00182)	0.0116*** (0.00204)	-0.00194 (0.00178)	0.0117*** (0.00204)
Year2007	0.00665*** (0.00200)	-0.0105*** (0.00295)	0.00603*** (0.00199)	-0.0176*** (0.00266)	0.00609*** (0.00199)	-0.0177*** (0.00265)	0.00585*** (0.00200)	-0.0169*** (0.00277)	0.00603*** (0.00199)
Year2008	-0.0135*** (0.00199)	-0.0379*** (0.00408)	-0.0143*** (0.00199)	-0.0475*** (0.00370)	-0.0142*** (0.00198)	-0.0414*** (0.00374)	-0.0144*** (0.00199)	-0.0468*** (0.00377)	-0.0143*** (0.00198)
Year2009	-0.0265*** (0.00195)	-0.0587*** (0.00359)	-0.0275*** (0.00194)	-0.0690*** (0.00301)	-0.0275*** (0.00194)	-0.0743*** (0.00308)	-0.0281*** (0.00198)	-0.0667*** (0.00398)	-0.0274*** (0.00194)
Year2010	-0.00466** (0.00197)	-0.0588*** (0.00435)	-0.00578*** (0.00195)	-0.0714*** (0.00361)	-0.00580*** (0.00195)	-0.0798*** (0.00376)	-0.00636*** (0.00199)	-0.0693*** (0.00431)	-0.00578*** (0.00195)
Constant	0.0743*** (0.00525)	1.218*** (0.0319)	0.0837*** (0.00389)	1.332*** (0.0235)	0.0857*** (0.00401)	0.0944 (0.176)	0.0888*** (0.00463)	1.317*** (0.0289)	0.0840*** (0.00354)
Number of observa- tions	338,076	338,076	338,076	338,076	338,076	338,076	338,076	338,076	338,076
Number of establis- hments	74,789	74,789	74,789	74,789	74,789	74,789	74,789	74,789	74,789
Fisher test statistic	468.0***	2051***	506.0***	2219	506.0***	2222***	506.0***	2219***	552.0***
Adjusted R ²	0.0207		0.0206		0.0206		0.0206		0.0206
R ² within		0.346		0.346		0.346		0.346	
R ² between		0.00711		0.00715		0.00615		0.00714	
R ² overall		0.0153		0.0153		0.0140		0.0153	

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 7. Results for the productive areas

VARIABLES	Model 1		Model 2		Model 3		Model 4		Model 5	
	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects
InEmpl	0.0330*** (0.000544)	-0.700*** (0.00509)	-0.0329*** (0.000541)	-0.700*** (0.00509)	-0.0330*** (0.000542)	-0.700*** (0.00509)	-0.0331*** (0.000542)	-0.700*** (0.00509)	-0.0326*** (0.000539)	-0.700*** (0.00509)
InAge	-0.0160*** (0.000727)	0.0341*** (0.00451)	-0.0158*** (0.000727)	0.0347*** (0.00450)	-0.0160*** (0.000727)	0.0339*** (0.00451)	-0.0160*** (0.000727)	0.0351*** (0.00451)	-0.0156*** (0.000727)	0.0347*** (0.00450)
MicroBG	0.0403*** (0.00165)	0.0234*** (0.00496)	0.0404*** (0.00165)	0.0233*** (0.00496)	0.0402*** (0.00165)	0.0233*** (0.00496)	0.0401*** (0.00165)	0.0234*** (0.00496)	0.0403*** (0.00165)	0.0234*** (0.00496)
MedBG	0.0507*** (0.00268)	0.0575*** (0.0110)	0.0505*** (0.00268)	0.0578*** (0.0110)	0.0505*** (0.00268)	0.0574*** (0.0110)	0.0507*** (0.00268)	0.0578*** (0.0110)	0.0504*** (0.00268)	0.0578*** (0.0110)
LargBG	0.0574*** (0.00373)	0.0823*** (0.0132)	0.0569*** (0.00373)	0.0825*** (0.0132)	0.0572*** (0.00373)	0.0823*** (0.0132)	0.0576*** (0.00373)	0.0824*** (0.0132)	0.0569*** (0.00373)	0.0826*** (0.0132)
Unempl	-0.178*** (0.0302)	0.0556 (0.153)	-0.156*** (0.0299)	-0.157 (0.148)	-0.110*** (0.0300)	0.296* (0.172)	-0.187*** (0.0300)	-0.199 (0.148)	-0.154*** (0.0299)	-0.153 (0.148)
Manuf	0.0245*** (0.00810)	0.355*** (0.106)	0.0980*** (0.0112)	-0.168 (0.127)						
Indep	0.0267*** (0.00400)	-0.0343** (0.0136)								
C5										
InDens					-0.00345*** (0.000301)	0.202*** (0.0442)				

Skills	-0.0881***	-0.462***									
	(0.00765)	(0.114)									
Year2006	0.0111***	-0.00510***	0.0106***	-0.00645***	0.0106***	-0.00816***	0.0106***	-0.00613***	0.0105***	-0.00636***	
	(0.00196)	(0.00176)	(0.00196)	(0.00168)	(0.00196)	(0.00173)	(0.00196)	(0.00168)	(0.00196)	(0.00168)	
Year2007	0.00457**	-0.0128***	0.00495**	-0.0183***	0.00539***	-0.0189***	0.00461**	-0.0194***	0.00497**	-0.0183***	
	(0.00196)	(0.00270)	(0.00196)	(0.00235)	(0.00196)	(0.00236)	(0.00196)	(0.00236)	(0.00196)	(0.00235)	
Year2008	-0.0173***	-0.0405***	-0.0171***	-0.0475***	-0.0165***	-0.0432***	-0.0175***	-0.0476***	-0.0171***	-0.0473***	
	(0.00197)	(0.00355)	(0.00196)	(0.00312)	(0.00196)	(0.00322)	(0.00196)	(0.00312)	(0.00196)	(0.00312)	
Year2009	-0.0340***	-0.0812***	-0.0347***	-0.0865***	-0.0351***	-0.0884***	-0.0363***	-0.0947***	-0.0348***	-0.0863***	
	(0.00189)	(0.00339)	(0.00189)	(0.00291)	(0.00189)	(0.00293)	(0.00190)	(0.00356)	(0.00189)	(0.00290)	
Year2010	-0.00399**	-0.0817***	-0.00499***	-0.0887***	-0.00545***	-0.0920***	-0.00643***	-0.0954***	-0.00516***	-0.0884***	
	(0.00190)	(0.00412)	(0.00190)	(0.00340)	(0.00190)	(0.00345)	(0.00190)	(0.00383)	(0.00190)	(0.00339)	
Constant	0.0725***	1.277***	0.0866***	1.350***	0.107***	0.346	0.112***	1.421***	0.0923***	1.337***	
	(0.00395)	(0.0308)	(0.00350)	(0.0201)	(0.00368)	(0.217)	(0.00385)	(0.0271)	(0.00343)	(0.0177)	
Number of observations	341,195	341,195	341,195	341,195	341,195	341,195	341,195	341,195	341,195	341,195	
Number of establishments	75,140	75,140	75,140	75,140	75,140	75,140	75,140	75,140	75,140	75,140	
Fisher test statistic	438.6***	1883***	474.2***	2031***	476.4***	2037***	476.4***	2030***	513.8***	2216***	
Adjusted R ²	0.0196	0.0195	0.0197	0.0197	0.0197	0.0197	0.0197	0.0193	0.0193	0.0193	
R ² within	0.329	0.329	0.329	0.329	0.329	0.329	0.329	0.329	0.329	0.329	
R ² between	0.00624	0.00624	0.00624	0.00624	0.00624	0.00624	0.00624	0.00634	0.00624	0.00626	
R ² overall	0.0128	0.0128	0.0128	0.0128	0.00978	0.0129	0.0129	0.0129	0.0128	0.0128	

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 8. Results for the establishments operating in productive industries

VARIABLES	Model 1		Model 2		Model 3		Model 4		Model 5	
	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects
	Growth	Growth	Growth	Growth	Growth	Growth	Growth	Growth	Growth	Growth
InEmpl	-0.0305*** (0.000423)	-0.676*** (0.00432)	-0.0304*** (0.000420)	-0.676*** (0.00432)	-0.0305*** (0.000421)	-0.677*** (0.00432)	-0.0305*** (0.000421)	-0.676*** (0.00432)	-0.0301*** (0.000419)	-0.676*** (0.00432)
InAge	-0.0168*** (0.000617)	0.0303*** (0.00383)	-0.0166*** (0.000618)	0.0306*** (0.00382)	-0.0168*** (0.000617)	0.0298*** (0.00383)	-0.0168*** (0.000617)	0.0309*** (0.00383)	-0.0164*** (0.000618)	0.0307*** (0.00383)
MicroBG	0.0344*** (0.00126)	0.0235*** (0.00366)	0.0344*** (0.00126)	0.0234*** (0.00366)	0.0345*** (0.00126)	0.0234*** (0.00366)	0.0344*** (0.00126)	0.0234*** (0.00366)	0.0342*** (0.00126)	0.0234*** (0.00366)
MedBG	0.0394*** (0.00197)	0.0578*** (0.00805)	0.0391*** (0.00197)	0.0581*** (0.00805)	0.0393*** (0.00197)	0.0578*** (0.00804)	0.0394*** (0.00197)	0.0581*** (0.00805)	0.0389*** (0.00197)	0.0581*** (0.00805)
LargBG	0.0412*** (0.00263)	0.0702*** (0.00962)	0.0407*** (0.00263)	0.0704*** (0.00962)	0.0411*** (0.00263)	0.0704*** (0.00962)	0.0413*** (0.00263)	0.0704*** (0.00962)	0.0405*** (0.00263)	0.0704*** (0.00962)
Unempl	-0.126*** (0.0243)	-0.0341 (0.136)	-0.113*** (0.0240)	-0.0309* (0.132)	-0.0788*** (0.0241)	0.343** (0.151)	-0.154*** (0.0242)	-0.350*** (0.132)	-0.110*** (0.0240)	-0.309** (0.132)
Manuf	0.0408*** (0.00656)	0.617*** (0.0954)	0.120*** (0.0109)	-0.0456 (0.0926)						
Indep	0.0307*** (0.00306)	-0.0238** (0.00983)								
C5										
InDens					-0.00449*** (0.000295)	0.271*** (0.0343)				

Skills	-0.118***	-0.322***						
Year2006	0.0191*** (0.00163)	0.00228 (0.00149)	0.0187*** (0.00163)	-0.000261 (0.00142)	0.0187*** (0.00163)	-0.00288** (0.00146)	0.0186*** (0.00163)	-0.322*** (0.0923)
Year2007	0.0115*** (0.00160)	-0.00578** (0.00226)	0.0118*** (0.00159)	-0.0134*** (0.00199)	0.0122*** (0.00159)	-0.0140*** (0.00199)	0.0111*** (0.00160)	0.0187*** (0.00163)
Year2008	-0.00954*** (0.00159)	-0.0321*** (0.00300)	-0.00995*** (0.00159)	-0.0419*** (0.00266)	-0.00933*** (0.00159)	-0.0365*** (0.00272)	-0.0106*** (0.00159)	0.0187*** (0.00163)
Year2009	-0.0344*** (0.00155)	-0.0748*** (0.00277)	-0.0358*** (0.00155)	-0.0830*** (0.00237)	-0.0359*** (0.00155)	-0.0867*** (0.00241)	-0.0380*** (0.00156)	0.0187*** (0.00163)
Year2010	0.000809 (0.00155)	-0.0708*** (0.00334)	-0.000698 (0.00155)	-0.0814*** (0.00279)	-0.010106 (0.00155)	-0.0875*** (0.00287)	-0.00273 (0.00156)	0.0187*** (0.00163)
Constant	0.0593*** (0.00345)	1.282*** (0.0250)	0.0774*** (0.00294)	1.390*** (0.0176)	0.104*** (0.00310)	0.149 (0.157)	0.110*** (0.00327)	1.387*** (0.0159)
Number of observations	519,867	519,867	519,867	519,867	519,867	519,867	519,867	519,867
Number of establishments	112,330	112,330	112,330	112,330	112,330	112,330	112,330	112,330
Fisher test statistic	676.8***	2569***	731.3***	2776***	736.9***	2782***	736.4***	2775***
Adjusted R ²	0.0198	0.314	0.0197	0.314	0.0199	0.314	0.0199	0.314
R ² within		0.00788		0.00792		0.00485		0.00800
R ² overall		0.0129		0.0128		0.00931		0.0129

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 9. Results for the establishments operating in presential industries

VARIABLES	Model 1		Model 2		Model 3		Model 4		Model 5	
	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects	OLS	Fixed effects
	Growth	Growth	Growth	Growth	Growth	Growth	Growth	Growth	Growth	Growth
InEmpl	-0.0750*** (0.00101)	-0.833*** (0.00437)	-0.0742*** (0.00100)	-0.833*** (0.00437)	-0.0754*** (0.00102)	-0.833*** (0.00437)	-0.0749*** (0.00101)	-0.833*** (0.00437)	-0.0737*** (0.00100)	-0.833*** (0.00437)
InAge	-0.0138*** (0.00101)	0.0140*** (0.00600)	-0.0140*** (0.00101)	0.0141*** (0.00600)	-0.0136*** (0.00101)	0.0135*** (0.00600)	-0.0138*** (0.00101)	0.0140*** (0.00600)	-0.0144*** (0.00101)	0.0140*** (0.00600)
MicroBG	0.0609*** (0.00684)	0.0498*** (0.0176)	0.0604*** (0.00684)	0.0499*** (0.0176)	0.0599*** (0.00683)	0.0495*** (0.0176)	0.0604*** (0.00684)	0.0499*** (0.0176)	0.0617*** (0.00684)	0.0499*** (0.0176)
MedBG	0.0816*** (0.0191)	-0.0568 (0.0624)	0.0787*** (0.0191)	-0.0570 (0.0624)	0.0818*** (0.0191)	-0.0564 (0.0630)	0.0786*** (0.0191)	-0.0569 (0.0625)	0.0799*** (0.0191)	-0.0570 (0.0624)
LargBG	0.00425 (0.0790)	0.111 (0.0735)	0.0109 (0.0790)	0.111 (0.0736)	4.58e-05 (0.0785)	0.109 (0.0740)	0.00338 (0.0787)	0.111 (0.0738)	0.0186 (0.0791)	0.111 (0.0736)
Unempl	-0.0458 (0.0422)	-0.381 (0.270)	-0.0902*** (0.0418)	-0.421 (0.267)	-0.145*** (0.0421)	0.0683 (0.294)	-0.0441 (0.0421)	-0.401 (0.268)	-0.0910*** (0.0418)	-0.421 (0.267)
Manuf	-0.00892 (0.0125)	0.102 (0.180)								
Indep	-0.0548*** (0.00562)	-0.0107 (0.0201)								
C5			-0.135*** (0.0195)	0.0739 (0.164)						
InDens			0.00624*** (0.000546)	0.213*** (0.0637)						

Skills	0.146***	0.128					
	(0.0146)	(0.169)					
Year2006	-0.0127***	-0.0122***	-0.0125***	-0.0123***	-0.0147***	-0.0120***	-0.0120***
	(0.00282)	(0.00244)	(0.00231)	(0.00282)	(0.00239)	(0.00282)	(0.00282)
Year2007	-0.0131***	-0.0233***	-0.0246***	-0.0148***	-0.0252***	-0.0133***	-0.0140***
	(0.00287)	(0.00398)	(0.00287)	(0.00287)	(0.00357)	(0.00287)	(0.00287)
Year2008	-0.0329***	-0.0519***	-0.0534***	-0.0339***	-0.0496***	-0.0321***	-0.0329***
	(0.00288)	(0.00555)	(0.00288)	(0.00288)	(0.00510)	(0.00288)	(0.00288)
Year2009	-0.0155***	-0.0508***	-0.0519***	-0.0138***	-0.0549***	-0.0111***	-0.0138***
	(0.00277)	(0.00505)	(0.00276)	(0.00276)	(0.00438)	(0.00278)	(0.00276)
Year2010	-0.0175***	-0.0592***	-0.0607***	-0.0156***	-0.0654***	-0.0133***	-0.0156***
	(0.00283)	(0.00620)	(0.00282)	(0.00282)	(0.00536)	(0.00283)	(0.00282)
Constant	0.176***	1.062***	1.067***	0.115***	0.131	0.109***	0.136***
	(0.00658)	(0.0439)	(0.00527)	(0.00527)	(0.281)	(0.00559)	(0.00499)
Number of observations	159,404	159,404	159,404	159,404	159,404	159,404	159,404
Number of establishments	37,599	37,599	37,599	37,599	37,599	37,599	37,599
Fisher test statistic	437.0***	2924***	470.0***	474.5***	3166***	473.2***	510.5***
Adjusted R ²	0.0343	0.0340	0.0340	0.0346	0.0343	0.0337	0.0337
R ² within		0.421	0.421	0.421	0.421	0.421	0.421
R ² between		0.000507	0.000505	0.000768	0.000519	0.000519	0.000509
R ² overall		0.0311	0.0310	0.0289	0.0312	0.0311	0.0311

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.