

## ***Chapter 4.***

### **Regional business employment dynamics**

*This chapter describes regional business dynamics and its related employment. It presents employment creation in new firms across OECD regions and explains the advantages and disadvantage of using establishment- – rather than enterprise- – level data to assess regional employment dynamics. It does so also by illustrating and quantifying the “headquarter bias” as well as discussing the overestimation of the impact of new firms when using establishment-level data. The chapter also examines the spatial distribution of employment dynamics across OECD regions and analyses discrepancies across different types of regions and sectors. This analysis is supplemented by an investigation of regional factors that are connected to regional employment growth in establishments. The chapter concludes by providing evidence on the contribution of small and medium-sized establishments to employment creation and the role of regional factors for employment growth in existing firms.*

## Introduction

Understanding the impact of business dynamics on employment across regions is crucial to design policies that effectively promote inclusive growth. The primary methodological concern of cross-country comparisons of regional data on business demography, the role of non-employer firms, is equally pressing for subnational employment creation indicators. In comparison to recording firm births and deaths, measuring the impact of business dynamics on employment at the subnational level requires considering further methodological challenges. When an enterprise located in a given region grows, the employment generated might be geographically located in another region if the enterprise has more than one establishment. While most new enterprises can be assumed to be single-establishment enterprises, some new enterprises can be comprised of various establishments.

As a consequence, common approaches of examining regional employment trends based on enterprise data can be subject to a bias if they fail to use information on local business units and focus instead the analysis on firms' headquarters. This chapter contributes to understanding the link between entrepreneurial dynamics and regional employment in several ways.

First, it presents recent trends in employment creation by new enterprises across OECD regions. This employment creation is also examined for different types of region. Furthermore, the description of regional employment growth is broken down by business sector.

Second, it shows the imprecision of enterprise data if the assumption that new firms are not exclusively present in one region does not hold. The bias that results from using business demography data at the enterprise instead of the establishment level is illustrated in the chapter. Since employment is of a local nature and enterprises can consist of multiples plants, assessing employment solely based on a firm's main location inevitably might not capture the full picture. This bias is not homogeneous across places; it tends to be stronger in capital regions, where the concentration of enterprises is very high and where relatively more firms set up their headquarters.

Third, trends in regional employment growth in businesses are presented. A particular focus is placed on the comparison between mostly metropolitan and non-metropolitan regions on the one hand. On the other hand, the classification of regions according to their productivity growth is used to assess potential differences in employment growth between economic frontier regions and those that converge or diverge in terms of economic growth. The chapter further assesses some drivers of the factors that might explain the differences in employment growth in the business sector across OECD regions.

Furthermore, the chapter shows the potentially vital role of new establishments and existing small to medium-sized establishments for regional employment growth. Changes in regional employment associated with newly created establishments are characterised by considerable regional heterogeneity; they can contribute up to 8% to regional employment. Similarly, small to medium-sized establishments, presented via the example of five OECD countries, differentially contribute to regional employment growth.

Finally, the chapter uses firm-level data to examine regional factors that are correlated to employment growth in existing firms. This complementary analysis based on microdata (Orbis) shows that regional characteristics such as gross domestic product (GDP) growth and the share of the labour force with a tertiary education are associated

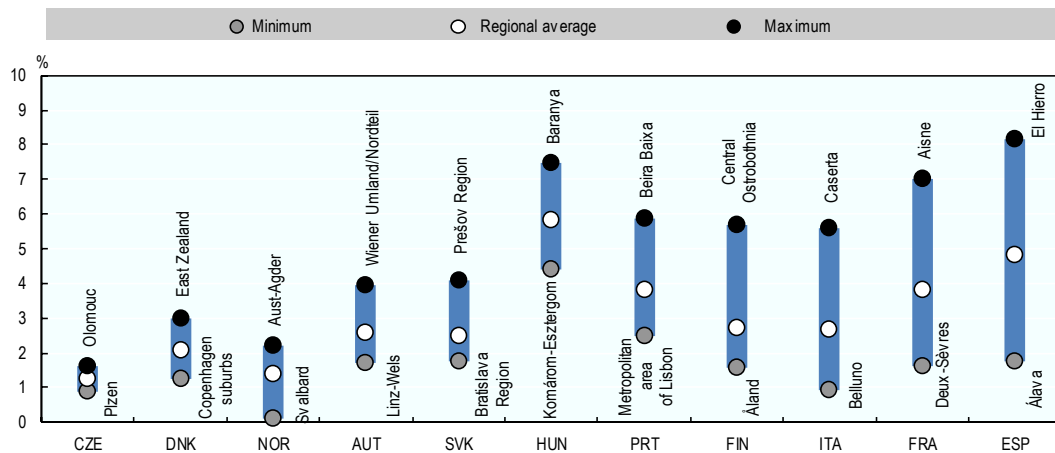
with larger employment growth in existing firms, even after controlling for individual firm information.

### Employment trends in new firms

The share of regional employment created by new employer firms is significant across the OECD, accounting for, on average, 3.3% of overall regional employment in active enterprises in 2014.<sup>1</sup> However, it displays large spatial heterogeneity. The share of newly created jobs by firm dynamics varies considerably both by country as well as across regions within the same country. Regions in Spain or Hungary gained on average 5% and 6% of employment through new firms, respectively, whereas not only the country average but the individual regional rates are below 2% for (almost) all regions in the Czech Republic and Norway (Figure 4.1). The OECD's *Regional Business Demography Database* also includes employment demography statistics on all types of firms, with a wider coverage of non-European OECD countries.

In some countries such as Finland, France, Italy or Spain, regional disparities in job creation in new firms is particularly large, with the top-performing region showing multiple times larger job creation than the respective bottom region. For example, the employment creation rate by new firms reached almost 6% in the Italian region Caserta while it fell below 1% in Belluno. Similarly, the range of employment creation in Spanish regions is defined by around 8.1% in El Hierro and 1.8% in Álava. In contrast, regions in the Czech Republic or Denmark are much more homogeneous in terms of the impact of new enterprises on regional employment. In Austria and Italy, the capital-city region or a neighbouring region experienced the largest rate of job creation; however, for most other countries this is not the case.

Figure 4.1. Employment creation rate by enterprise births, TL3, 2014 (or latest available year)



Notes: The figure presents the total number of employment created by firm births as a proportion of total employment in active firms in the region in the year 2014 (or last available year). Only employer firms are included (across all sectors).

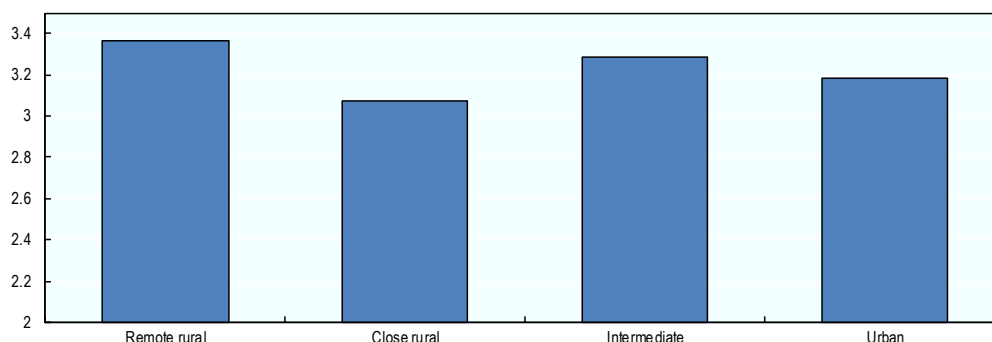
Sources: OECD (2017d), *Regional Business Demography* (database), <http://dx.doi.org/10.1787/region-data-en>.

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In fact, the heterogeneity of employment creation in employer firms along the urban-rural hierarchy is less pronounced than the heterogeneity of firm birth rates. Overall, all types of regions – remote rural, close rural, intermediate and urban – recorded

similar rates of employment creation between 2011 and 2014 of around 3.1-3.4% (Figure 4.2). The largest difference, between remote rural and close rural regions, is less than 0.3 percentage points. The differences are further reduced if the last five instead of the last three years are considered.

Figure 4.2. **Employment creation by type of region, 2011-14 (or last three available years)**



*Notes:* The figure displays the employment creation rates (employment created by firm births as a proportion of total employment in active firms in a region in the same year). Austria, the Czech Republic, Denmark, Estonia, Finland, France, Hungary, Italy, Latvia, Norway, Portugal, the Slovak Republic, Spain and Switzerland are included. Average across employer firms.

*Sources:* OECD (2017d), *Regional Business Demography* (database), <http://dx.doi.org/10.1787/region-data-en>.

*StatLink*  <http://dx.doi.org/10.1787/888933626155>

In terms of the sectoral composition of employment creation, there are, however, some striking differences between predominantly urban, intermediate and rural regions (Figure 4.3). For instance, the majority of employment in new enterprises in finance, professional services, transport as well as information and communication was created in predominantly urban regions. In information and communication, around 62% all newly created employment by firm births was located in urban regions, while only 11% were in rural regions. These findings mirror the sectoral composition of firm births documented in Chapter 3, as urban areas also accounted for comparably large shares of firm births in these sectors (see Figure 3.9). Noteworthy is that the share of employment in new firms is significantly greater in intermediate regions than the corresponding share of firm births in the same sector at the expense of rural regions, where the share of new employment is relatively lower compared to the share of firm births.

As long as new enterprises are only located in a single location, statistics on employment creation based on regional business demography are suitably represented by information on new enterprises. This chapter discusses and illustrates the problems that can arise if that assumption does not hold. In doing so, it also presents some of the potential consequences.

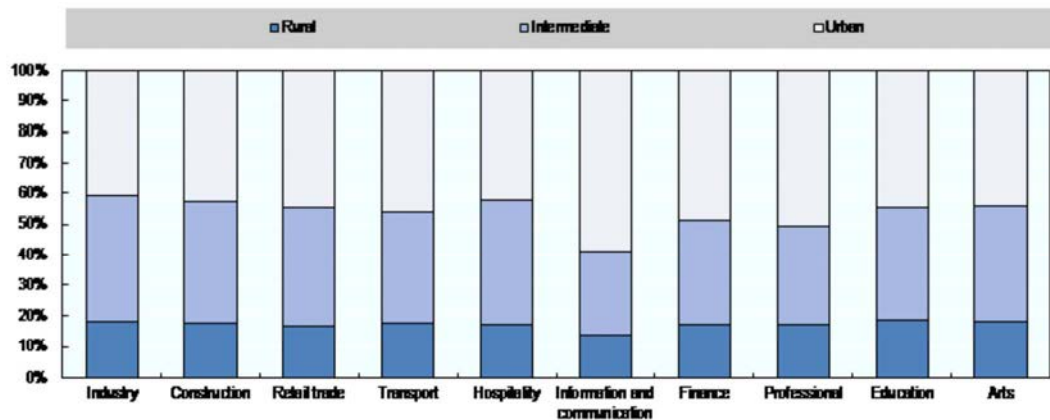
### ***Indirect employment effects through business dynamics***

The employment impact of new enterprises might go beyond what can be measured by the newly created employment in those firms. Such measures capture the direct effects of firm births. Additionally, firm births or dynamics in general also have indirect effects.

More firm entries (and exits) in a region lead to a more competitive business environment, which can be associated with higher or lower economic growth (Fritsch, 2011). Higher competition may contribute to higher innovation efforts or the improvement of the quality of production processes and goods in both incumbent and new firms. If this holds

true, a larger number of firm births in a region, combined with a widened production in that region, may support regional growth. However, firm entry may force incumbent firms to exit the market, which may result in lower employment and economic growth in a region (Fritsch, 2011).

Figure 4.3. **Employment creation by type of region and sector, 2014 (or latest available year)**



*Notes:* The figure displays the composition of employment creation rates by type of region and by sector of economic activity of the firm (share of created employment by firm deaths in a sector as a proportion of total employment created by firm births in a region). The figures by regional typology are computed as averages across countries: Austria, the Czech Republic, Denmark, Finland, France, Hungary, Italy, Norway, Portugal, the Slovak Republic and Spain. 2014 or last available year. Only employer firms are included.

*Source:* OECD (2017d), *Regional Business Demography* (database), <http://dx.doi.org/10.1787/region-data-en>.

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This ambiguity motivates the question whether there is a link between regional business dynamics and employment growth in existing firms. In particular, such indirect effects can be examined by analysing the firm-level impact of the EU's Cohesion Policy funds. One could expect that in a competitive and therefore innovative business environment, firms that (are able to) remain in the market and receive Cohesion Policy co-funding may be able to grow to a larger extent than supported firms that are located in a region which shows less business dynamics.

As part of the EU's Cohesion Policy, the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the Cohesion Fund (CF) co-fund projects that are selected by managing authorities in order to contribute to the target of a certain regional or national operational programme.<sup>2</sup> Recent research stresses the importance of understanding the micro-level effects of the co-funding on the beneficiaries' performance. Bachtrögl, Fratesi and Perucca (2017) find for a sample of eight countries that receiving co-funding affects the respective manufacturing firm's employment and value-added growth positively. Moreover, the authors find that the significance and size of the impact vary with the territorial conditions of the region in which the firms are located.

In order to test that hypothesis, the analysis below is focused on beneficiaries (firms) in the manufacturing sector that carry out projects as part of an operational programme, and therefore receive co-funding from the ERDF, the ESF or the CF. The period investigated is the multi-financial framework 2007-13 (as a cross-section) as for that period data on projects and beneficiaries are publicly available for the first time.<sup>3</sup> The estimation sample includes the Czech Republic, France, Italy, Portugal, the Slovak Republic and Spain. Using propensity score matching, similar firms within these countries are matched based

on observable firm and regional characteristics, which allows estimating average treatment effects on the (treated) firms' value added and employment growth. Given the methodological approach, only firms that were founded in 2007 or earlier (prior to the treatment) and have stayed in the market at least until 2014 are considered.

The country samples of manufacturing firms are split into two groups of NUTS-2 and NUTS-3 regions each. First, the national average of business dynamics (the number of firm entries and exits divided by the number of active firms in the region) in 2008 (for the Czech Republic and Portugal 2013) is used as a threshold dividing the countries' regions. Second, the national average birth rate (the number of firm entries relative to the number of active firms) in 2008 (2010 for the Czech Republic and Portugal) splits the country samples in a below-average and above-average group.<sup>4</sup>

Treatment effects on treated firms within the groups of regions with high dynamics (and birth rates) are higher than those for firms in regions with relatively low business dynamics in the same country (Figure 4.4). This result proves to be robust when considering only employer firms and considering the business demography variables and the location of firms on the NUTS-3 instead of the NUTS-2 level.<sup>5</sup>

Not all differences in the average effects of Cohesion Funds receipt on treated firms across regional groups are statistically significant. In France and Spain, supported manufacturing firms grow significantly more in employment and value added if they are located in a dynamic business environment within their country. In Italy, that only leads to their ability to significantly increase their value added more than treated firms in other NUTS-2 regions. However, taking firm birth rates into account, treated Italian manufacturing firms can also achieve significantly higher employment growth rates in regions with a higher number of new firms.

For NUTS-3 regions, results point in the same direction for value-added growth. However, another picture arises for the Cohesion Policy effects on employment growth: only in Italian and Portuguese NUTS-3 regions with relatively high birth rates (for dynamics, there is no statistically significant difference in average effects in any country) firms seem to be able to make better use of Cohesion Funds with regard to creating more jobs than treated firms in other regions.

Overall, firms that receive Cohesion Policy co-funding grow to a larger extent if they are located in a competitive and innovative business environment than supported firms in less dynamic regions. Consequently, indirect effects appear to augment the overall employment impact of firm dynamics.

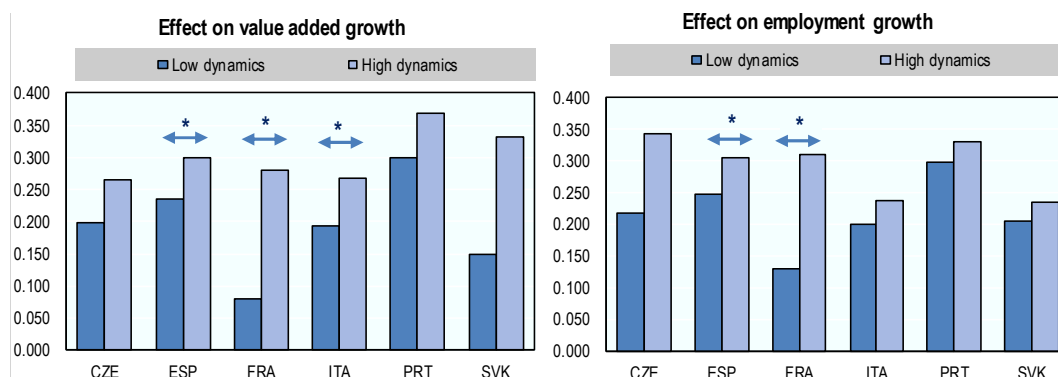
### **Measuring businesses at the regional level: Establishments vs. enterprises**

Enterprises can consist of a single or multiple local units, so-called establishments (see Box 4.1 for statistical definitions). In all countries, most enterprises have only one single establishment. However, there are numerous enterprises that exercise control over many establishments. These multi-plant firms comprise especially large and very large enterprises, which constitute around 0.5-1% of the total business population (OECD, 2017d). They can be marked by considerable degrees of geographic diversity and variety in the sectors in which the firm is active (as defined as NACE one-digit). In Portugal, for instance, only 2% of enterprises have been reported to have more than one local unit in 2016 (Statistics Portugal, 2016). However, those 2% of enterprises make up 27% of total employment in businesses.<sup>6</sup>

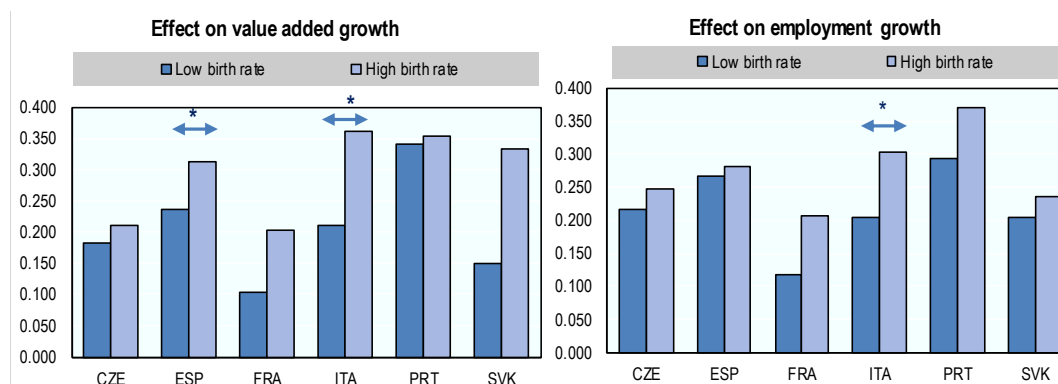
Figure 4.4. **Firm-level effects of Cohesion Policy across regions with low and high business dynamics**

Average treatment effects on the treated: Effects measured as log difference between post- and pre-treatment values of value added and employment

A. Business dynamics: Churn in firms



B. Business dynamics: Firm birth rates



*Notes:* \* A statistical significance (at the 10% or a lower level) of the mean differences. Apart from the effects estimated for Portugal, all average treatment effects (on the treated) are statistically significant (standard errors are bootstrapped with 500 replications).

*Sources:* Author's calculations based on data from Orbis business database (Bureau van Dijk); database of Cohesion Policy beneficiaries (Bachtrögler et al., 2017).

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### Box 4.1. Definitions

An enterprise is the smallest combination of legal units that is an organisational unit producing goods or services, which benefits from a certain degree of autonomy in decision making, especially for the allocation of its current resources. An enterprise carries out one or more activities at one or more locations.

An establishment is an enterprise, or part of an enterprise, that is situated in a single location and in which only a single (non-ancillary) productive activity is carried out or in which the principal productive activity accounts for most of the value added.

*Source:* OECD Glossary of Statistical Terms, <https://stats.oecd.org/glossary/detail.asp?ID=3207>.

As a result of their geographically spread-out locations, accounting for the exact location of multi-establishment enterprises' units of production is important when looking at regional employment dynamics connected to business demography. In the case of labour, the associated employment can be assigned to an enterprise's headquarter (enterprise approach) or to its actual physical location where the units of production are used. This distinction produces different measures (Ahmad, 2008).

While the former approach would document the employment generated by a firm's entire organisation, it would ignore its regional dimension. In an extreme case, employment growth in an establishment could not be attributed to the corresponding region at all if the headquarters were located in a different region than the establishment. The establishment approach, on the other hand, reports employment at its actual location, making it more suitable to studying subnational employment dynamics. This context highlights the importance of the regional level as a complement to national data in order to understand regional composition and subnational trends of employment.

The use of establishment data to monitor the employment of new businesses has also important caveats. More specifically, it might overstate the actual employment creation of new business as new local establishments can consist of either truly new businesses or new plants of existing firms. What is more, new firms face different challenges than existing ones that establish new local units. Chapter 5 addresses this issue using the case of France and demonstrates that single-establishment firms are responsible for most of the employment creation and destruction due to firms' exits and entries, which alleviates the aforementioned concern.

In principle, there should be consistency between structural data for establishments and enterprises. In particular, the number of establishments should at least equal or be greater than the number of enterprises in a given region and at the country level, while regional employment in establishments summed up for the total country should correspond to the country's total employment in enterprises. In practice, discrepancies might be observed when data sources for establishments and enterprises rely on different data collection requirements (e.g. application of thresholds for the inclusion of units, for instance based on minimum employment or turnover).

As far as possible, the enterprise and establishment datasets used for the evidence provided in this chapter have been harmonised in order to allow a meaningful comparison. Detailed information on this harmonisation is given in Annex 4.A3.

### ***Data sources and availability at the establishment level***

In 17 countries, the respective national statistics offices (NSOs) publish structural and demographic business indicators by establishment at the regional level. These countries make up the core of a new OECD *Database on Establishment Statistics* at the regional level that is part of the *Regional Business Demography Database*. In addition, data on 13 European OECD countries from Eurostat's structural business statistics are included to integrate, at the TL2 level, information of active establishments and their associated employment. Table 4.1 provides information on data sources, the original denomination of the unit and coverage of territorial levels.

For the majority of the 30 countries in the database, data on the number of establishments as well as the number of employees in each region are available. Statistics on business demography across regions are only available for a subset of countries. Many NSOs neither report births or deaths of establishments at the regional level nor do they document job creation or destruction across regions resulting from changes in establishments.



Table 4.1. **Data sources, units and level of regional breakdown**

Country	Source	Source type	Statistical unit	Spatial scale
Austria	Statistics Austria	Census on local units of employment	Local unit	TL2
Belgium	Eurostat	Structural business statistics	Local unit	TL2
Canada	Statistics Canada	Business Register	Statistical location	TL2
Czech Republic	Eurostat	Structural business statistics	Local unit	TL2
Denmark	Statistics Denmark	Business Register (AMR-UN)	Local unit	TL3
Estonia	Eurostat	Structural business statistics	Local unit	TL2
Finland	Statistics Finland	Administrative data	Local unit	TL3
France	INSEE	Business Register (Sirene)	Local unit	TL3
Germany	Federal Statistical Office	Business Register	Local unit	TL2
Greece	Eurostat	Structural business statistics	Local unit	TL2
Hungary	Eurostat	Structural business statistics	Local unit	TL2
Ireland	Eurostat	Structural business statistics	Local unit	TL2
Italy	ISTAT	Business Register of local units	Local unit	TL2
Japan	Statistics Japan	Economic Census	Local unit	TL3
Korea	Statistics Korea (via KOSIS)	Census on Establishments	Local unit	TL3
Latvia	Eurostat	Structural business statistics	Local unit	TL2
Luxembourg	Eurostat	Structural business statistics	Local unit	TL1
Mexico	INEGI	Economic Census	Local unit	TL2
Netherlands	Eurostat	Structural business statistics	Local unit	TL2
New Zealand	Statistics New Zealand	New Zealand Longitudinal Business Frame (LBF) until 2015 and Business Register from 2016	Local unit	TL3
Norway	Statistics Norway	Central Coordinating Register of Legal Entities (ER) and Central Register of Establishments and Enterprises (CRE)	Local unit	TL3
Poland	Eurostat	Structural business statistics	Local unit	TL2
Portugal	Statistics Portugal	Integrated business accounts system	Local unit	TL2
Slovak Republic	Eurostat	Structural business statistics	Local unit	TL2
Slovenia	Eurostat	Structural business statistics	Local unit	TL2
Spain	INE	Central Business Directory	Local unit	TL3
Sweden	Eurostat	Structural business statistics	Local unit	TL2
Switzerland	Swiss Federal Statistical Office	Business Register	Local unit	TL3
United Kingdom	ONS	Business Register	Local unit	TL2
United States	US Census Bureau	Longitudinal Business Database (LBD) based on Census Bureau's Business Register (BR)	Local unit	TL2
Number of countries covered		1 at TL1; 20 at TL2; 9 at TL3		

In total, four countries report detailed regional business demography statistics at the establishment level. These are Japan, Mexico, New Zealand and the United States. France reports data on business demography for establishments but not for the associated employment. For the remaining countries, changes in the headcount of establishments and changes in the number of employees in establishments can be deduced from the data from different years, but an accurate decomposition of those changes into births or deaths of establishments (or employment creation or losses, respectively) is not possible.

The OECD database on establishments presents data in ISIC Rev. 4 classification. Whenever possible, detailed sectoral information was included in the database. Due to the relatively low number of countries for which sectoral variables are available, sectoral statistics are only presented for regional employment changes.

For all countries in the database, regional business statistics cover either ISIC Rev. 4 sectors B to N (or A to U).<sup>7</sup> For some countries, only the aggregated statistics for those sectors (B-N or A-U) is available, while other countries report data that allow a detailed decomposition into individual sectors. The coverage of economic activities by country and sector is presented in Table 4.2.

Similarly, data by detailed size class of employment, measured by the number of employees or persons employed, are only available for a number of countries. Finland uses full-time equivalents while all other countries measure headcounts, which typically provide higher estimates of employment due to the inclusion of part-time work.

Table 4.2 summarises information on data availability, notably as concerns breakdowns by sector and size, and coverage of non-employer establishments (i.e. establishments with zero employees). The time span ranges from almost 40 years for the United States (1977-2014) to only a 2-year period for Finland (2013-14).

Table 4.2. **Coverage of available data on establishments**

Country	Variable	Years	Size class breakdown	Economic sector breakdown	Sector coverage (ISIC Rev. 4)
Austria	Number of establishments	2011-14	No	No	05_99
	Number of persons employed	2011-14	No	No	05_99
Belgium	Number of establishments	2008-14	No	Yes	05_82, excl. 64-66
	Number of persons employed	2008-14	No	Yes	05_82, excl. 64-66
Canada	Number of establishments	2016	Yes	Yes	01_99
Denmark	Number of establishments	2008-14	Yes	Yes	01_93
	Number of persons employed	2008-14	No	Yes	01_93
Estonia	Number of establishments	2008-14	No	Yes	05_82, excl. 64-66
	Number of persons employed	2008-14	No	Yes	05_82, excl. 64-66
Finland	Number of establishments	2013-14	No	Yes	01_99
	Number of persons employed (employees converted to full-time equivalents)	2013-14	No	Yes	01_99
	Turnover	2013-14	No	Yes	01_99
France	Births	2008-14	Yes	Yes	05_96
	Number of establishments	2008-14	Yes	Yes	05_96
	Number of employees	2008-13	No	Yes	05_96
	Number of hours worked	2008-13	No	Yes	05_96
	Compensation of employees	2008-13	No	Yes	05_96
Germany	Number of establishments	2006-13	Yes	Yes	05_98
Greece	Number of establishments	2008-14	No	Yes	05_82, excl. 64-66
	Number of persons employed	2008-14	No	Yes	05_82, excl. 64-66
Hungary	Number of establishments	2008-14	No	Yes	05_82, excl. 64-66
	Number of persons employed	2008-14	No	Yes	05_82, excl. 64-66
Ireland	Number of establishments	2008-14	No	Yes	05_82, excl. 64-66
	Number of persons employed	2008-14	No	Yes	05_82, excl. 64-66
Italy	Number of establishments	2012-14	Yes	Yes	05_96
	Number of persons employed	2012-14	Yes	Yes	05_96
Japan	Number of establishments	2009, 2014	No	No	01_96
	Number of persons employed	2009, 2014	No	No	01_96
	Births	2009, 2014	No	No	01_96
	Deaths	2009, 2014	No	No	01_96
	Number of persons employed in births	2009, 2014	No	No	01_96
	Number of persons employed in deaths	2009, 2014	No	No	01_96

Table 4.2. Coverage of available data on establishments (*continued*)

Country	Variable	Years	Size class breakdown	Economic sector breakdown	Sector coverage (ISIC Rev. 4)
Korea	Number of establishments	2006-14	Yes	Yes	01_96
	Number of employees	2006-14	Yes	Yes	01_96
Latvia	Number of establishments	2008-14	No	Yes	05_82, excl. 64-66
	Number of persons employed	2008-14	No	Yes	05_82, excl. 64-66
Luxembourg	Number of establishments	2008-14	No	Yes	05_82, excl. 64-66
	Number of persons employed	2008-14	No	Yes	05_82, excl. 64-66
Mexico	Number of establishments	2004, 2008-09, 2013-14	Yes (only for 2014)	Yes	01_99
	Number of persons employed	2004, 2008-09, 2013-14	Yes (only for 2014)	Yes	01_99
	Births	2009, 2014	Yes	Yes	01_99
	Number of persons employed in births	2009, 2014	Yes	Yes	01_99
Netherlands	Number of establishments	2008-14	No	Yes	05_82, excl. 64-66
	Number of persons employed	2008-14	No	Yes	05_82, excl. 64-66
New Zealand	Number of establishments	2000-16	No	Yes	01_99
	Number of employees	2000-16	No	Yes	01_99
	Births	2001-16	No	Yes	01_99
	Deaths	2001-16	No	Yes	01_99
	Number of employees in births	2001-16	No	Yes	01_99
	Number of employees in deaths	2001-16	No	Yes	01_99
	Number of establishments	2009-17	Yes	Yes	01_99
Norway	Number of establishments	2008-14	No	Yes	05_82, excl. 64-66
	Number of persons employed	2008-14	No	Yes	05_82, excl. 64-66
Poland	Number of establishments	2010-14	No	Yes	01_99
	Number of persons employed	2010-14	No	Yes	01_99
Slovak Republic	Number of establishments	2008-14	No	Yes	05_82, excl. 64-66
	Number of persons employed	2008-14	No	Yes	05_82, excl. 64-66
Slovenia	Number of establishments	2008-14	No	Yes	05_82, excl. 64-66
	Number of persons employed	2008-14	No	Yes	05_82, excl. 64-66
Spain	Number of establishments	2009-15	Yes	Yes	05_96
Sweden	Number of establishments	2008-14	No	Yes	05_82, excl. 64-66
	Number of persons employed	2008-14	No	Yes	05_82, excl. 64-66
Switzerland	Number of establishments	2011-14	Yes	Yes	01_99
	Number of employees (as headcounts; also by gender)	2011-14	Yes	Yes	01_99
	Number of employees (as full-time equivalents)	2011-14	Yes	Yes	01_99
United Kingdom	Number of establishments	2016	Yes	Yes	01_99
United States	Number of establishments	1977-2014	Yes	No	05_99
	Number of employees	1977-2014	Yes	No	05_99
	Births	1977-2014	Yes	No	05_99
	Deaths	1977-2014	Yes	No	05_99
	Number of employees in births	1977-2014	Yes	No	05_99
	Number of employees in deaths	1977-2014	Yes	No	05_99
	Number of establishments surviving 1, 2, 3, 4 and 5 years	1994-2015	No	No	05_99
	Employees in establishments surviving 1, 2, 3, 4 and 5 years	1994-2015	No	No	05_99

### *The headquarter bias*

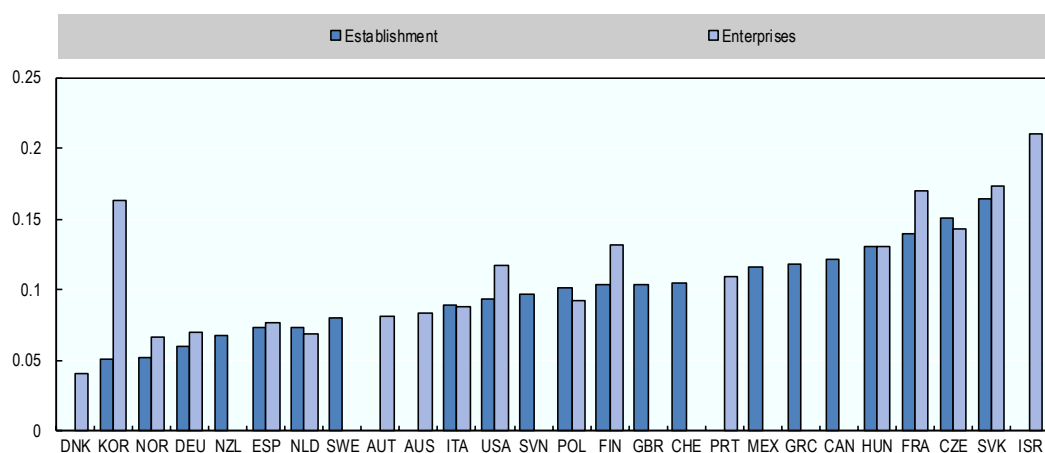
The salience of the distinction between statistics based on the enterprise or establishment approach depends on several factors. First, the overall degree of concentration of business activities within countries plays a role. Second, the relative importance of multi-establishment enterprises matters for the difference between the two sets of statistics, which especially affects statistics on regional employment. Finally, the geographic dispersion of establishments belonging to the same enterprise can drive a wedge between statistics based on the two different approaches.

The regional distribution of businesses varies considerably across countries. Firms might cluster for demographic reasons, such as population density. Furthermore, regional economic and political characteristics can both influence location decisions and affect business dynamics such as market entrance or exit. Factors such as local infrastructure, availability of adequately skilled labour, local research and development activities, or the size of the local economy, and therefore market, matter.

Figure 4.5 presents, for each OECD country in the database, Gini coefficients calculated for both the distribution of establishments and enterprises across regions.<sup>8</sup> To control for the fact that larger or more populous regions naturally tend to be the location of a greater number of local firms, the Gini coefficients are computed in terms of number of enterprises (establishments) per capita. The graph shows an uneven distribution of both establishments and enterprises across regions, with some countries showing large regional disparities.

Germany, the Netherlands, Norway and Spain appear to have the most equal territorial distribution of both establishments and enterprises. In comparison, the Czech Republic, France, Hungary and the Slovak Republic have a relatively less dispersed distribution of firms. Apart from a few exceptions, the regional concentration of establishments and enterprises seems to be fairly comparable. In Finland, France, Korea and the United States, however, enterprises are significantly more concentrated spatially than are establishments.

Figure 4.5. **Gini coefficients based on establishment and enterprise counts per capita**



*Notes:* The Gini coefficient ranges from 0 to 1. A coefficient equal to 0 can be interpreted as all TL2 regions having the same number of establishments (or enterprises) per capita, while a coefficient equal to 1 would reveal that all establishments (or enterprises) are located in only one TL2 region.

*Sources:* OECD (2017d), *Regional Business Demography* (database), <http://dx.doi.org/10.1787/region-data-en>.

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The distinction between enterprise-level and establishment-level statistics is more relevant for regional employment than for the mere headcount of firms. The reasons for this are twofold. First, as mentioned above, multi-establishment enterprises, while few, account for the bulk or at least large shares of employment (e.g. almost 60% in the United States; Sadeghi, Talan and Clayton, 2016). Second, within each country many enterprise headquarters tend to be located in a small group of regions, which is normally composed of the capital region and large cities in the country's most prosperous regions. These regions are characterised by greater access to services, better transport infrastructure and potentially closer links to political and administrative processes. Consequently, employment in a multi-establishment enterprise might be reported in its headquarters region, although this could differ from the region(s) where part of the economic activity is performed or some of the actual employment is located.

Such a phenomenon of headquarter bias can be detected through a comparison of a region's national employment share based on enterprise data with its national share based on establishment data. By taking the difference between the two shares, it becomes apparent whether employment statistics do indeed differ. If there are no discrepancies between enterprise and establishment data, i.e. there is no differential regional attribution of employment for establishment and enterprise approach, then the proposed measure of the headquarter bias should be zero. Following the same logic, regions with positive (negative) values of the bias measure are regions where the enterprise data relatively overstate (understate) actual employment.

$$HQ\_Bias_{ic} = \frac{Employment\ in\ Enterprises_{ic}}{Employment\ in\ Enterprises_c} - \frac{Employment\ in\ Establishments_{ic}}{Employment\ in\ Establishments_c}$$

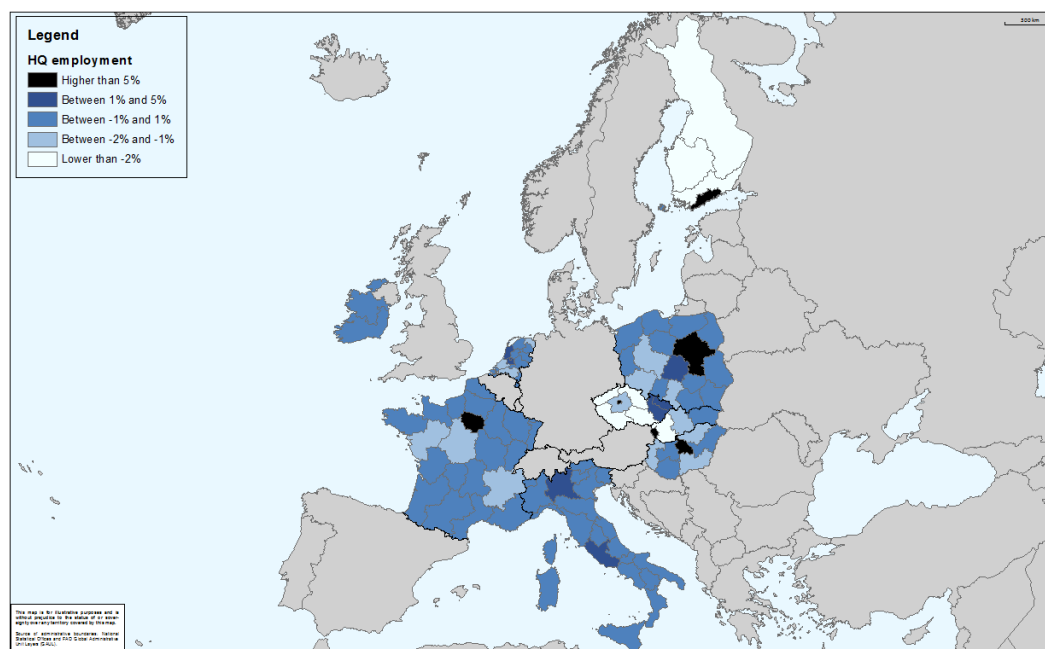
where  $HQ\_Bias_{ic}$  denotes the headquarter bias in region  $i$  in country  $c$ .

Figure 4.6 illustrates the headquarter bias graphically.<sup>9</sup> It confirms the existence of the headquarter bias across OECD regions. In many regions the bias is positive, indicating that enterprise-level statistics exaggerate the actual employment in those regions. Analogously, various regions display a significant negative measure, which implies that their regional employment would be downward biased if it were based on enterprise-instead of establishment-level data. The cases of Italy and especially France decisively capture the potentially enormous regional variation in the severity of the headquarter bias. In Italy, the capital region of Lazio and the country's economic centre, the region of Lombardy, have positive biases, whereas for the majority of Italy's remaining regions employment statistics would be downward biased if they were computed with enterprise data. In France, Île-de-France clearly stands out from the rest of the country in terms of the headquarter bias.

In terms of absolute values, the average regional headquarter bias corresponds to around 1 percentage point. Using enterprise-level data approximates the actual national employment share of any given region with a bias that amounts to 1.4 percentage points on average, i.e. a region were 5% of national employment is located would be estimated to have 6.4% or 3.6% of national employment. Depending on the number of regions and the level of concentration of economic activity, this bias can be much more severe in some countries and regions. On average, the maximum gap in each country is around 6.2%. The problem of the bias is likely to be even more accentuated if a lower regional tier is considered, because the challenge of correctly reporting employment in multi-establishment enterprises will be graver.

Figure 4.6. **Headquarter bias, selected EU countries**

Difference in regional weight in employment between establishments and enterprise data, 2014



Source: OECD (2017d), *Regional Business Demography* (database), <http://dx.doi.org/10.1787/region-data-en>.

StatLink  <http://dx.doi.org/10.1787/888933626231>

### ***Capital cities and the headquarter bias***

As mentioned above, the headquarter bias is best illustrated with the example of capital regions or the economically dominant regions in countries. Since many businesses have their headquarters based in those regions, the “headquarter bias” becomes particularly noticeable since at least some employment will be attributed to those regions even if the actual employment (in establishments) lies outside the capital region. Figure 4.7 demonstrates this fact by showing the difference in employment ratios in capital regions from the respective country average of that ratio.

In all (TL2) capital regions, the difference in the region’s national employment share between enterprise and establishment data is larger than the country average (which is centred at 0 by construction). In most cases, this difference is substantial. For instance, in the Czech Republic, Finland, France, Hungary, Poland and the Slovak Republic this capital headquarter bias surpasses more than 5%. In the Finnish and French capital regions, Helsinki-Uusimaa and Île-de-France, this figure rises to close to 12% and 11% respectively. Having business demography statistics (with related employment) at the establishment level would allow to correctly attribute employment to regions.

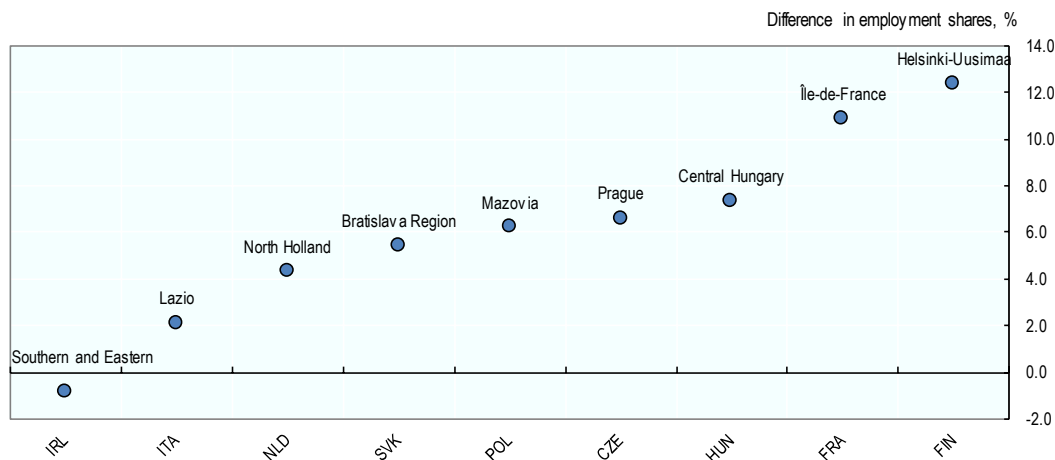
The only country where the employment bias is not more strongly pronounced in capital regions is Ireland, which can be explained by the fact that the country only consists of two TL2 regions. Excluding Ireland, the average headquarter bias in employment in capital regions is approximately 7%.

Overall, the striking example of capital regions provides evidence that employment statistics can differ substantially depending on whether they were collected based on the establishment or enterprise approach. The headquarter bias might be exacerbated for

capital regions or regions with extraordinary economic significance (e.g. Lombardy as Italy's economic centre), though the former are in all countries but Ireland the region with the largest bias. Furthermore, the findings document that the degree to which capital cities amplify the headquarter bias in employment statistics can vary substantially across OECD countries, highlighting its considerable heterogeneity.

Figure 4.7. **Headquarter bias of capital regions in employment**

2014 (or latest available year)



*Notes:* Difference in capital regions' national share of employment in enterprises to their national share of employment in establishments. Positive numbers indicate a relatively stronger bias in employment statistics based on enterprise data. The statistics are computed for TL2 regions. The figures are based on all business sectors, excluding education and arts (sectors B to N).

*Source:* OECD (2017a), *Regional Business Demography* (database), <http://dx.doi.org/10.1787/region-data-en>.

StatLink <http://dx.doi.org/10.1787/888933626250>

Choosing the appropriate statistical unit is essential for investigating regional inequalities and informing suitable regional development policies. The aggregation of establishment activities that produces the employment variable at the parent enterprise level masks information on the real geographical distribution of employment. On the other hand, establishments are not necessarily an appropriate unit when assessing the impact of start-ups on employment creation, for which enterprise-level statistics are more suitable (Box 4.2).

## Trends in regional employment in establishments

To examine dynamics in regional employment in businesses at the exact location of employment, three requirements need to be satisfied: 1) establishment employment data must be available at the subnational level; 2) data must be observed for multiple years; and, for the sake of comparability 3) the data must be encompassing the same business sectors. The scope of this chapter's analysis on establishments is constrained by the availability of data that satisfy those conditions.

For the 15 OECD countries for which suitable data are available, the most recent year coverage predominantly includes 2009-14. For that reason, the regional effects of the financial crisis can be described. The crisis had not only decisive repercussions, but also geographically very diverse adverse effects. The regional experience of employment changes has been far from uniform, with clear patterns observed between countries with



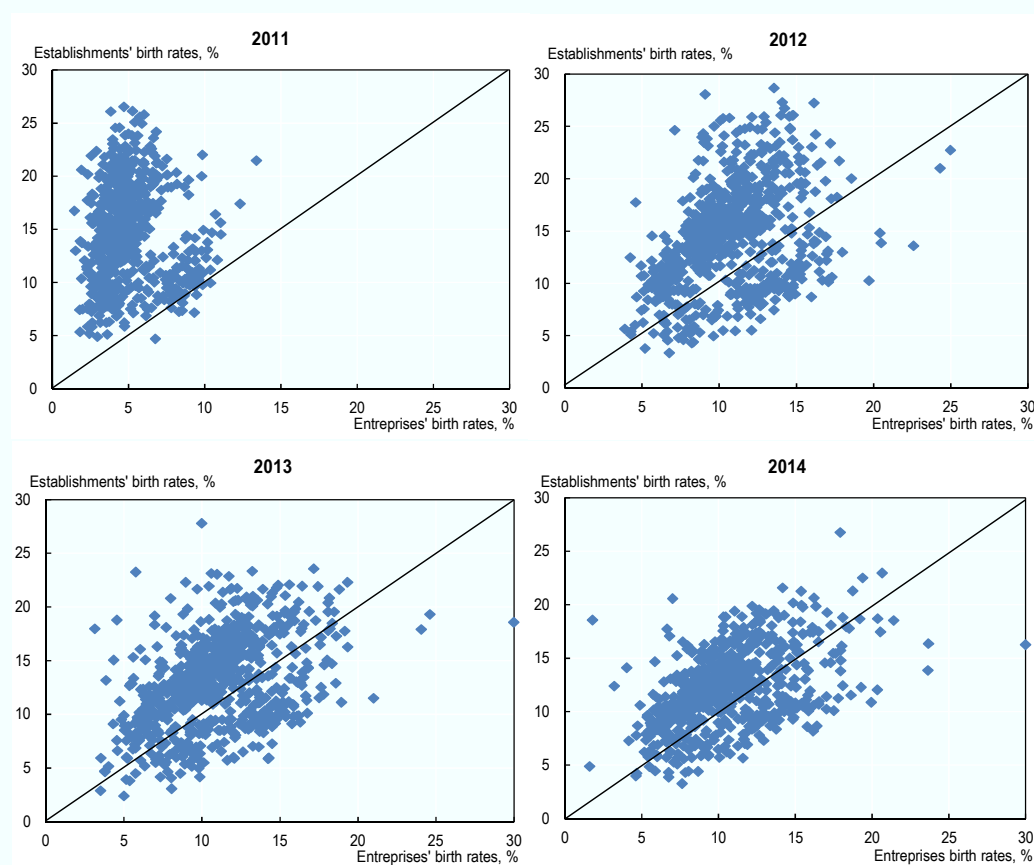
large heterogeneity in terms of employment growth, or in fact loss, across their regions (Figure 4.9).

#### Box 4.2. Differences in birth rates: Establishments and enterprises in France

The difference between enterprise and establishment creations becomes clearly visible in the case of France. Regional birth rates for establishments and employer enterprises in the same sectors differ strongly and deviate in many cases strikingly from the 45° line, which would be reached if enterprises and establishment birth rates were equivalent. This evidence demonstrates that enterprise and establishment creations may capture different economic decisions and concepts.

Additionally, the ratio between establishment and enterprise creations is not necessarily stable but may change over time or follow a cyclical pattern. For instance, in periods of uncertainty, countries may observe a reduction in births of enterprises, while establishment birth rates remain relatively high. In the case of France, enterprise creations in 2011 were fairly low compared to the creation of new establishments. The settlement of establishments might have been seen as a less risky option than the creation of new enterprises amid the economically critical time. Over time this pattern changed. While in 2012 establishment creations were still, relatively, more frequent than enterprise creations, in 2013 and 2014 a clear shift towards the creation of enterprises is notable.

Figure 4.8. Birth rates of establishments and enterprises in French TL3 regions, selected sectors

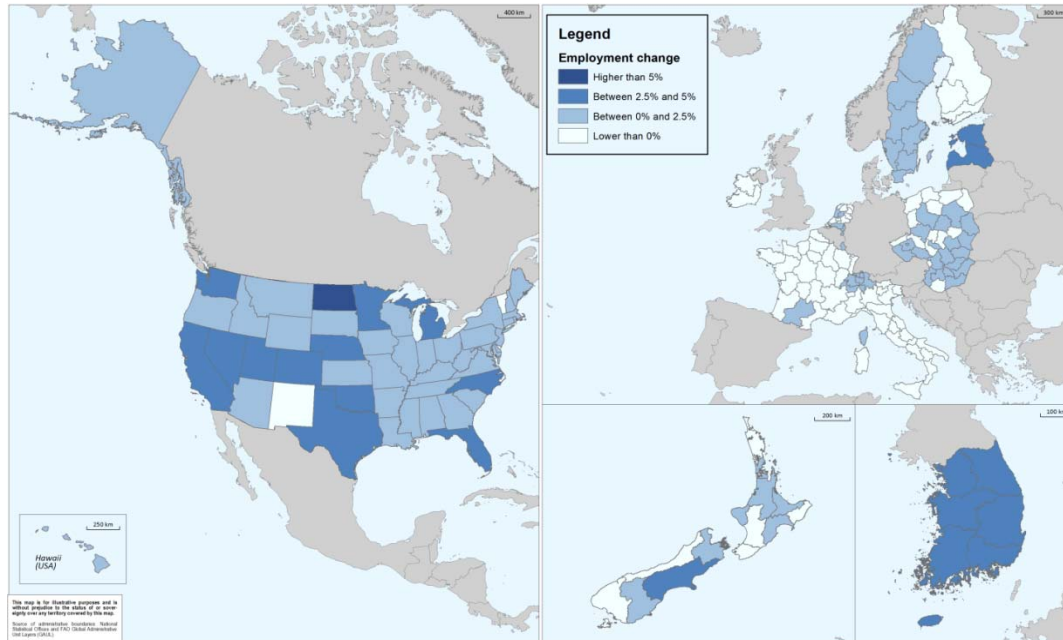


Note: TL3 French regions for eight individual sectors B-E, F, G, H, I, J, M-N and R-S.

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Figure 4.9. Annual employment growth across OECD regions, 2010-14



Notes: The annual average change (CAGR) in employment is computed for 2010-14. Based on data availability, the following exceptions were made: Luxembourg and Switzerland (2011-14); France (2008-13); Italy (2012-14); Finland (2013-14); Ireland (2009-11).

Source: OECD (2017a), *Regional Business Demography* (database), <http://dx.doi.org/10.1787/region-data-en>.

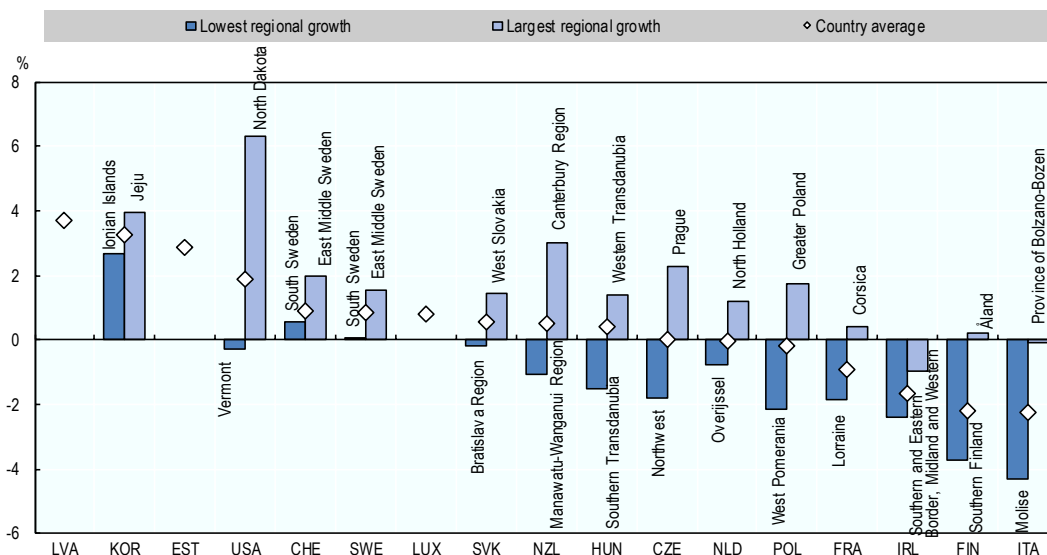
StatLink  <http://dx.doi.org/10.1787/888933626307>

In a few countries, namely Korea, Sweden, and Switzerland, all TL2 regions experienced employment growth. Korea, in particular, stands out with employment growth, measured in terms of annual average growth rates, surpassing 2.5% in the entire country but not exceeding 5% in any single region. In contrast, in the United States, most regions experienced positive but small employment growth rates, while in North Dakota employment grew on average around 6% per year.

Notwithstanding the cases of those countries, numerous OECD regions actually lost employment throughout the analysed period. For instance in France, Ireland, Italy and the Netherlands a majority or large proportion of regions had negative employment growth rates. National statistics can readily mask large differences across regions of the same country in the aftermath of the financial crisis.

Regional variation in annual business employment creation is considerable. Figure 4.10 takes a closer look at the respective regional country average as well as the best- and worst-performing regions in each country regarding employment creation. Apart from Korea and, to some extent, Switzerland, there are great regional differences in annual employment creation. In almost all countries, the regional leader in terms of business employment creation clearly outperformed the country average, and even more the worst-performing region.

The immediate aftermath of the financial crisis significantly affected regional employment in some OECD countries. Between roughly 2010 and 2014, regions in Finland, France, Ireland and Italy reported, on average, significant losses in employment. In many other countries, the average region only experienced muted employment growth of less than 1% per year.

Figure 4.10. **Employment creation across TL2 regions, annual average change, 2010-14**

Notes: The annual average change (CAGR) in employment is computed for 2010-14. Based on data availability, the following exceptions were made: Luxembourg and Switzerland (2011-14); France (2008-13); Italy (2012-14); Finland (2013-14); Ireland (2009-11).

Source: OECD (2017a), *Regional Business Demography* (database), <http://dx.doi.org/10.1787/region-data-en>.

StatLink  <http://dx.doi.org/10.1787/888933626326>

To some degree, the employment change mirrors the more general economic development in OECD countries following the financial crisis. European countries were not only hit hard by the crisis, but their economies predominantly needed longer to start a meaningful recovery. This can be observed by the right-hand tail of the figure, which exclusively consists of European countries.

### ***Growth of employment in businesses – mostly metropolitan vs. non metropolitan regions***

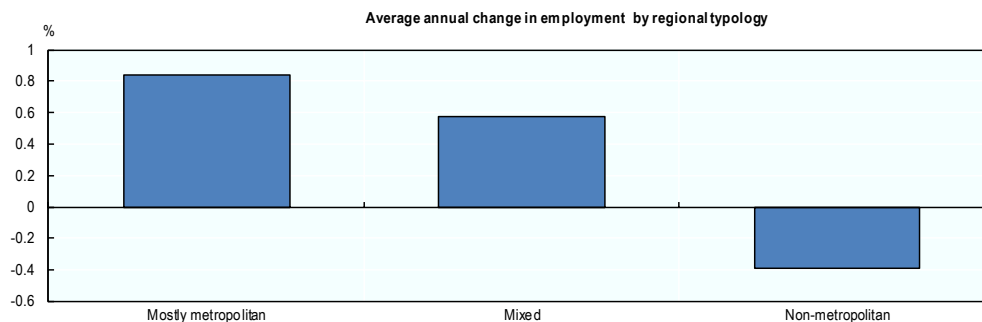
One dimension that has frequently been shown to be relevant in assessing regional economic trends is the typology of regions (OECD, 2016). Using the OECD typology of TL2 regions, the relevance of that categorisation for employment growth is assessable through a simple categorisation of regions based on the share of people living in functional urban areas (Table 3.3).

Mostly metropolitan regions experienced annual employment growth in excess of 0.8%, while non-metropolitan regions, on average, lost almost 0.4% of their employment base per year (Figure 4.11). In total, the annual difference in employment growth rates of approximately 1.2 percentage points over the course of four years demonstrates the vastly differential fates of employment in mostly metropolitan and non-metropolitan areas. Mixed regions recorded employment growth that was slightly lower than in mostly metropolitan regions, with an average growth rate of approximately 0.6%.

These different trends in employment growth were supported by simultaneous differences in the increase in the number of establishments. In mostly metropolitan regions, the count of establishments increased by around 1.5% per year, while the stock of establishments grew by 1.2% in mixed regions. In non-metropolitan regions on the

other hand, the number of establishments mildly fell over the same period (by 0.3%). This finding differs clearly from the recent trends of employment creation in new firms by type of region (Figure 4.2). Besides the fact that the figures assess TL2 and TL3 regions respectively, the contrast also points out that employment created by new establishments does not necessarily belong to a new enterprise, but can be caused by the expansion of an existing enterprise. Consequently, employment statistics on establishment demography data can overestimate the actual contribution of new firms on employment creation.

Figure 4.11. **Employment change – mostly metropolitan vs. non-metropolitan regions**

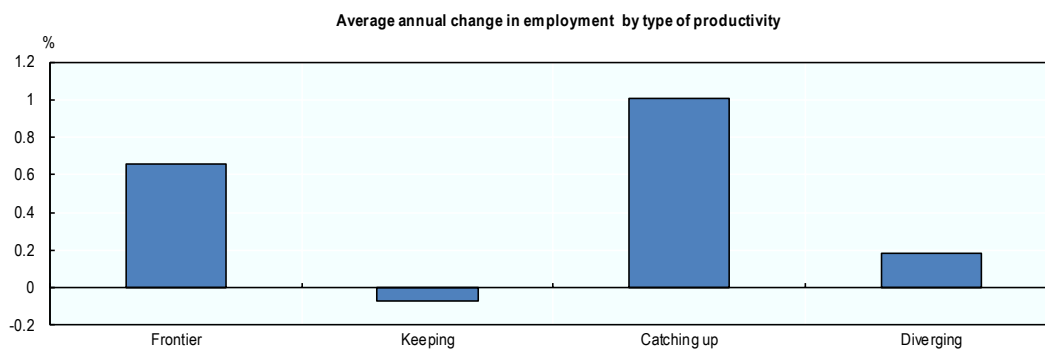


*Notes:* The annual average change (CAGR) in employment is computed for 2010-14. Based on data availability, the following exceptions were made: Luxembourg and Switzerland (2011-14); France (2008-13); Italy (2012-14); Finland (2013-14); Ireland (2009-11).

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Large regional disparities in employment growth rates are observed also when dividing regions according to their levels of regional productivity (measured by GDP per employee, classification reported in OECD [2016]). Overall, frontier regions, those among the highest 10% of regions regarding GDP per employee, and especially catching-up regions, clearly outpaced the remaining regions in terms of job creation. In the frontier regions, employment grew with an annual growth rate of more than 0.6% between 2010 and 2014 (Figure 4.12). Regions that are classified as catching-up, recording higher GDP per employee growth than the frontier regions, experienced the largest employment growth, with an average annual growth of 1.0% over the period of analysis.

Figure 4.12. **Employment change by regional productivity**



*Notes:* Countries included are the Czech Republic, Estonia, Finland, France, Hungary, Ireland, Italy, Korea, the Netherlands, New Zealand, Poland, the Slovak Republic, Sweden and the United States. The annual change (CAGR) is computed from multiple year changes, corresponding to 2010-14 for most countries.

*Source:* OECD (2017a), *Regional Business Demography* (database), <http://dx.doi.org/10.1787/region-data-en>.

StatLink <http://dx.doi.org/10.1787/888933626364>

In contrast to frontier and catching-up regions stand the experiences of diverging regions and those regions classified as keeping pace. Diverging regions barely recorded any employment creation at all, with a growth rate that was significantly below 0.2% annually. Regions classified as keeping pace even documented, on average, mild employment losses (0.5% annually).

Differences across regions in the growth of business employment can be connected to specific characteristics of the regions. Two sets of regional characteristics appear to be strongly correlated with regional employment growth: innovation and economic factors related to productivity and competitiveness. Using region-specific information, a simple OLS regression is run on a number of possible explanatory variables. To control for country-specific factors, country fixed effects are included (see Annex 4.A4).

Overall, regions with more innovative, more productive and high-tech oriented economies fared best with respect to employment creation across Europe. Innovation and research both within firms as well as in the regions generally appear to have mattered for employment creation. On the regional level, the number of scientific publications per capita and the number of high-tech inventors per capita were strongly correlated with employment growth. Similarly, the presence of innovative and collaborative small and medium enterprises (SMEs) and the proportion of knowledge workers among all employees were associated with higher employment creation.

The positive association between employment growth and human capital and innovation offers a potential explanation for the findings that urban regions record greater employment growth and employment creation through new firms (Figures 3.9 and 3.11). Large cities, and therefore urban regions, have a relative advantage in terms of the presence of university and research institutions or the average education of its workforce, which can induce more employment-increasing innovation (Acs, Bosma and Sternberg, 2011).

These results seem also to suggest that there are potential direct and indirect benefits to be reaped from efforts to encourage innovation, with knowledge spillovers to firms being one possible mechanism at work. Furthermore, employment growth was observed to be relatively higher in regions with higher levels of productivity and with a relatively stronger tradable sector, such as a higher relative export in high-tech manufacturing.

### **The role of new establishments for regional employment creation**

The importance of business demography (based on new establishments) for job creations has been documented by several studies. For instance, establishment births and deaths have been shown to account for almost 20% of job creation and destruction in the United States as observed by quarterly data for the years 1990-1995 (Spletzer, 2000).<sup>10</sup> Their importance rises considerably when job creation is measured at a lower frequency, because such an approach also captures some of the employment impact of establishment growth, which only materialises gradually and is therefore not immediately captured in the first quarter after a business is born.

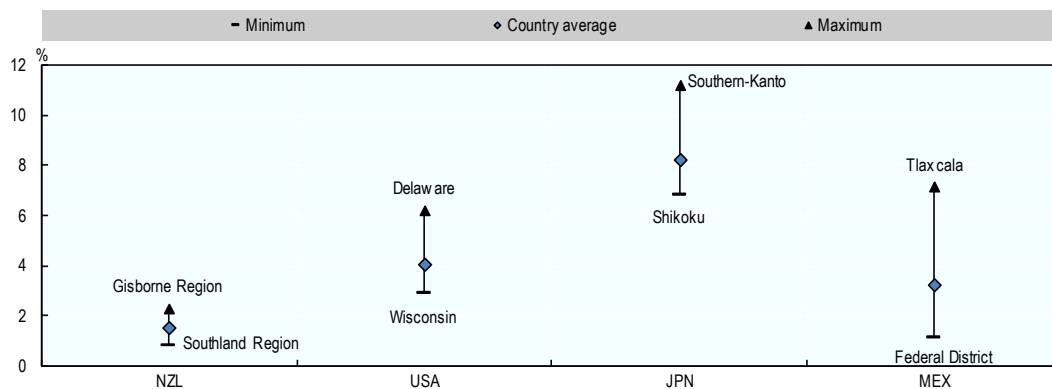
Subnational data on establishment birth and death rates, and the employment associated to these events, are only available for a small subset of OECD countries, namely Japan, Mexico, New Zealand and the United States. For Mexico there is only information on establishment births so that employment dynamics caused by establishment deaths as well as the overall impact of establishment demographic developments on employment creation can be only examined in three countries.

The impact of business demography at the regional level is examined along three measures: employment creation, employment destruction and net employment. The employment creation rate is measured as the share of a region's employment that was generated by new establishments over a defined period. Similarly, the employment destruction rate is defined as the number of jobs lost due to establishment deaths relative to the overall employment in the same region in the same year. Job net creation captures the net contribution of business demography, considering both firm deaths and births, to regional employment.

Newly founded establishments can account for large shares of created jobs in the four countries considered. For instance, new establishments in Japan created jobs equivalent to more than 8% of the regional employment total. At the same time, there is both considerable within-country as well as cross-country heterogeneity in the contribution of establishment births to employment creation.

In Mexico and the United States, the regions with the largest employment creation rates, Tlaxcala and Delaware, record job creation in excess of 5% of their respective entire employment (Figure 4.13). Employment creation in these two regions is twice as large as the respective national average. Similarly, the Japanese region with the largest share of newly created employment, Southern-Kanto, which includes among others Tokyo, registered an employment creation rate that is around 4.5 percentage points greater than in Shikoku, where job creation was the lowest. In contrast to the other three countries, employment creation by new establishments across regions in New Zealand was both modest and relatively homogenous.

Figure 4.13. **Employment creation rate by births, 2014 (or latest available year)**



*Note:* The statistics are based on all sectors (ISIC Rev. 4 categories A to U) as a breakdown to B to N would yield a loss of a further two countries.

*Source:* OECD (2017a), *Regional Business Demography* (database), <http://dx.doi.org/10.1787/region-data-en>.

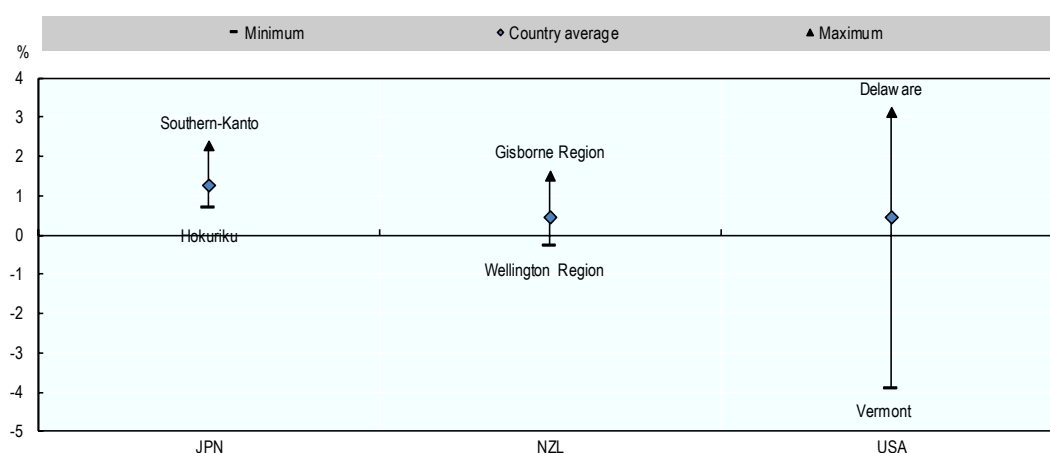
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Areas with large employment creation rates can be characterised by great employment dynamics more generally. Not only is the share of jobs created by newly founded establishments high in such regions, but the same holds true for the loss of employment by establishment deaths relative to overall employment. In Japan for instance, Southern-Kanto has both the largest employment creation and loss rates, while Shikoku records the lowest rates of employment created or lost by establishment dynamics.

Overall, regional employment loss and creation through establishment entries or exits seems to be correlated, though there may be exceptions. However, net employment rates could be examined to scrutinize this point further (Figure 4.14).

The cross-country differences in net employment creations are less pronounced than in either job creation or destruction, as evidenced by the more comparable country averages of regional net job creation rates. However, large regional disparities persist. While Vermont (United States) experienced employment destruction through the establishment births and deaths equivalent to 4% of its entire employment in 2014, net job creations amounted to more than 3% in Delaware (United States) and 2.2% in Southern-Kanto (Japan) in 2014.

Figure 4.14. **Net employment creation rates by new establishments, 2014 (or latest available year)**



*Note:* The statistics are based on all sectors (ISIC Rev. 4 categories A to U) as a breakdown to B to N would yield a loss of a further two countries.

*Source:* OECD (2017a), *Regional Business Demography* (database), <http://dx.doi.org/10.1787/region-data-en>.

StatLink  <http://dx.doi.org/10.1787/888933626402>

The findings point out two facts. First, the importance of new establishments on job creation is non-negligible. It can provide a vital source for employment growth in OECD regions. Second, the net effect of business demography is very diverse. As a result of establishment births and deaths, some regions experience a loss of employment, while in others jobs created by newly founded establishments clearly outnumbered jobs lost by the death of establishments.

The total effect of new firms on regional employment might constitute an even greater contribution to overall employment than that assessed in terms of jobs directly created with new firms. Indirect effects of new firms/start-ups on employment in existing, mature firms can arise through innovation spillovers and through a competition effect on existing firms. In the case of Germany, such indirect effects are estimated to be larger than the direct effect, accounting for 60% of new employment due to new firms between 1984 and 2002 (Fritsch and Noseleit, 2013).

## Employment growth in small and medium-sized establishments

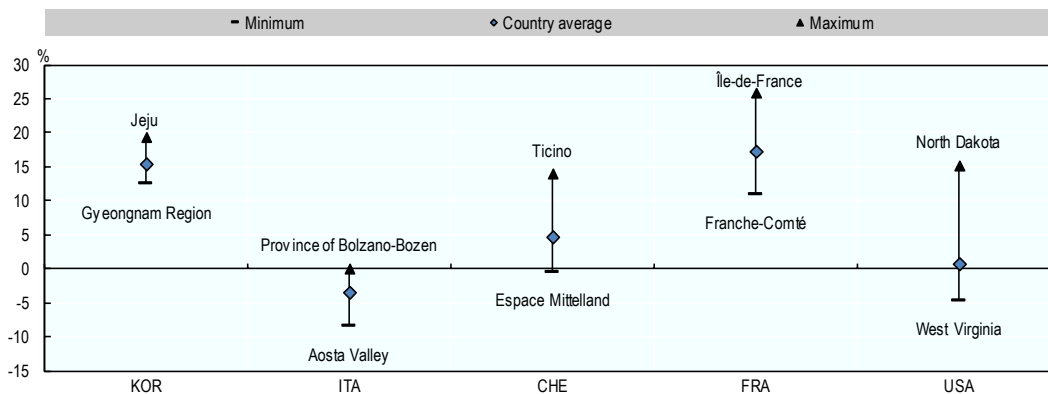
As discussed in Chapter 3, SMEs are often pivotal in creating jobs. Small and young firms contribute disproportionately to new employment (Neumark, Wall and Zhang, 2011). Therefore, SMEs are regularly the focus of attention in policy discussions about job creation.

The concept of small and medium-sized entities can also be applied to establishments, which might not always correspond to but certainly offer a good approximation of SMEs. In line with the most common definition of SMEs, small to medium-sized establishments in this report include establishments with less than 250 employees (OECD, 2010). They consist of micro (0-10 employees), small (10-49 employees) and medium-sized (50-249 employees) establishments. In general, SMEs make up the vast majority of all enterprises in the OECD (on average more than 99% in non-financial business sectors) and they are a major source of employment, as approximately 60% of all employment in the OECD is accounted for by SMEs (OECD, 2017b; 2017c).

Another appeal of SMEs is that they can be used as an approximation for the effect of business demography on employment. The vast majority, over 99% in 2014, of establishments and therefore also new establishments, fall into the small to medium-sized category of having less than 250 employees. For that reason, the change of the number of small to medium-sized establishments offers a reasonable measure for establishment dynamics in light of limited data availability on establishment demography.

In Figure 4.15, the regional variation in the change of the number of SMEs, as measured by establishments, between 2010 and 2014 is presented by country.<sup>11</sup> Korean and French regions saw, on average, a large increase in the number of SMEs. Average SME growth in American and Italian regions, on the other hand, was flat or even negative. In each of the countries presented in the figure, the leading region with regards to SME growth saw its number of SMEs grow markedly. In Île-de-France that growth was greater than 25%, while North Dakota, Ticino and Jeju all had SME growth rates between 15% and 20%. These figures include non-employer firms, which account for an important share of total business creation.

Figure 4.15. **Change in the number of small and medium-sized establishments, 2010-14**



*Note:* The statistics are based on all sectors (ISIC Rev. 4 categories A to U) as a breakdown to B to N would yield a loss of a further two countries.

*Source:* OECD (2017a), *Regional Business Demography* (database), <http://dx.doi.org/10.1787/region-data-en>.

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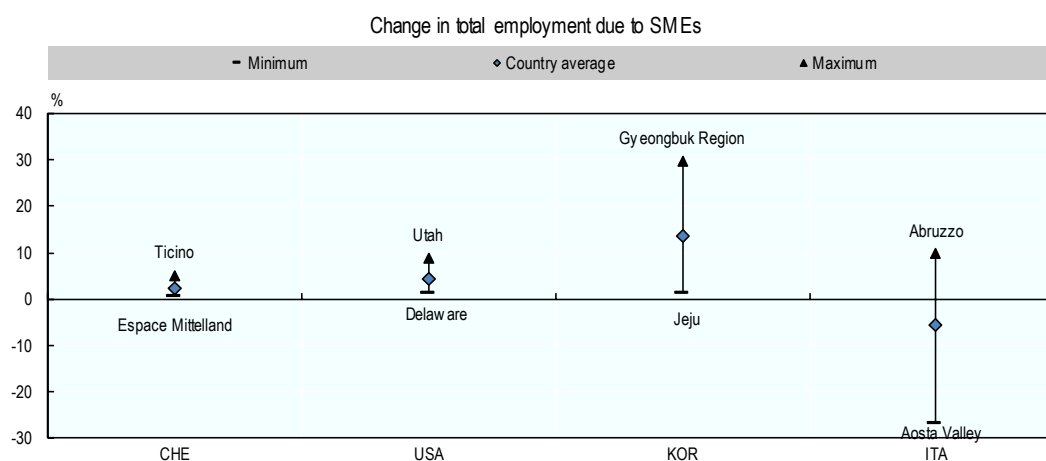
### ***Regional contribution of small to medium-sized establishments to change in employment***

Even though conditions that are conducive to entrepreneurship and SME creation are often associated with job creation, it is not absolutely clear how an increase in the number of SMEs affects employment, as the exact number of employees of each SME is unknown. To elicit the role of SMEs for regional employment, Figure 4.16 illustrates regional employment growth in small to medium-sized establishments relative to overall regional employment.

Across all countries and all types of regions employment changes can, to a very large extent, be attributed to SMEs. Across 17 OECD countries and Brazil, SMEs have been shown to account for 75% of gross job creation (Criscuolo, Gal and Menon, 2014).

In regions with very high employment growth, that growth was mostly driven by job creation through SMEs. Conversely, regions with low or even negative employment growth (e.g. Aosta Valley or Espace Mittelland) at the same time recorded sluggish or negative job creation in SMEs. This finding emphasises the crucial economic role SMEs might play for regions. They can be a powerful source of innovation and job creation and thus economic growth. Regions that lag behind economically or, more specifically, in terms of employment opportunities, can benefit from policies that augment the conditions for entrepreneurship and SMEs.

Figure 4.16. **Employment in SMEs and its regional growth relative to overall employment, 2010-14**



Note: The statistics are based on sectors B to N and capture the employment dynamics between 2010 and 2014.

Source: OECD (2017a), *Regional Business Demography* (database), <http://dx.doi.org/10.1787/region-data-en>.

StatLink  <http://dx.doi.org/10.1787/888933626269>

New establishments almost always, by default, fall into the SME category. At the same time the smaller and especially younger enterprises among SMEs are the ones that really drive SMEs' extraordinary importance for job creation (Lawless, 2014; Haltiwanger, Jarmin and Miranda, 2013).

### **Regional environment and employment growth in incumbent firms**

While regional employment growth as a result of business dynamics is considerable in many OECD regions, an even larger share of new jobs is created in existing firms.



Such employment growth is also highly heterogeneous, which begs the question: to what extent the location of a firm, i.e. regional factors, have an influence on its employment growth? While in theory it is acknowledged that location should be a relevant determinant of a firm's ability to create jobs, empirical research has mainly focused on firm-specific characteristics. To examine the role of the regional business environment, more than 2 million distinct firms from Bureau van Dijk's Orbis database in 19 European countries are matched to the region where they are located based on their postal codes.<sup>12</sup>

The sample covers the period 2008-14, with between 940 000 and 1.27 million observations for each year. Due to missing data the firms are unevenly distributed across countries with France, Italy, Poland, Sweden and Spain accounting for more than 80% of the firms in the sample. In the sample, the majority of firms are SMEs, firms with fewer than 250 employees, accounting for roughly 98% of observations in each year. Large firms in the sample, however, account for about 72% of total employment. These large firms have higher employment growth, on average, over the sample period. Among the SMEs, it is typically young firms that drive employment growth, in line with results in Chapter 5 and prior evidence (Criscuolo, Gal and Menon, 2014). The substantial heterogeneity between large firms and SMEs is therefore explicitly taken into account by allowing for different growth rates and a distinct effect of regional variables on SME employment growth.

In addition to firm-level characteristics such as size, age, productivity and sector of activity that have been found relevant for employment growth, the analysis controls for a set of regional characteristics, specifically whether the firm is located in a predominantly urban region at the TL3 level, real GDP per capita, real GDP growth, the unemployment rate at the TL2 and TL3 regional levels, and the educational attainment of the regional labour force at the TL2 level. The sample is also explicitly split between manufacturing firms and non-manufacturing firms, which, for the most part, produce services.

An important limitation of the Orbis database is that it is not a random sample, nor a registry of all businesses. While efforts have been made to create representative samples from the available database (Kalemli-Ozcan et al., 2015), the issue of firm births and deaths cannot easily be addressed. The results should therefore be taken as pertaining to incumbent firms. The estimations rely on multi-variate ordinary least squares regressions, accounting for a range of firm-level, regional and national characteristics, as well as country-industry and year fixed effects (Box 4.3).

#### Box 4.3. Empirical specification for firm-level regressions

Let  $emp_{c,r,j,i,t}$  denote firm-level employment in firm  $i$  operating in industry  $j$  in region  $r$  and country  $c$  in year  $t$ , the estimated model is:

$$\begin{aligned} \ln(emp_{c,r,j,i,t}) - \ln(emp_{c,r,j,i,t-1}) \\ = \alpha X_{c,r,j,i,t} + \beta Y_{c,t} + \delta Y_{c,r,t} \\ + \lambda SME_{c,r,j,i,t} + \theta SME_{c,r,j,i,t} Y_{c,r,t} + \gamma_t \\ + \gamma_{c,j} + u_{c,r,j,i,t} \end{aligned}$$

$X_{c,r,j,i,t}$  is a set of time-varying firm-specific variables including age (the difference between the year of observation and the year in which the firm was created) and the logarithm of the firm's multifactor productivity in year  $t-1$ .  $SME_{c,r,j,i,t}$  is a dummy variable equal to one if the firm is a small or medium enterprise, i.e. has strictly fewer than 250 employees, and zero otherwise.  $Y_{c,t}$  is a set of time-varying country-level variables, including the logarithm of real GDP per capita and the rate of real GDP growth.

### Box 4.3. Empirical specification for firm-level regressions (cont.)

$Y_{c,r,t}$  is a set of time-varying regional variables, including the logarithm of real GDP per capita, the rate of real GDP growth, the unemployment rate (all at the TL2 or TL3 levels), and the share of the labour force with a tertiary education (at the TL2 level). It also includes a dummy variable equal to one if the firm is located in a predominantly urban region at the TL3 level.  $SME_{c,r,j,i,t}$   $Y_{c,r,t}$  is a set of interaction terms between the SME dummy and the regional variables to account for the potential heterogeneity with which the regional environment affects firms of different size categories. Finally,  $\gamma_t$  are year fixed effects,  $\gamma_{c,j}$  are country-industry fixed effects and  $u_{c,r,j,i,t}$  is the error term.

Firm-level productivity (measured by multi-factor productivity) is one of the most important firm-level determinants for employment growth. Employment expands faster in more productive firms. A non-manufacturing firm with one standard deviation higher productivity has, on average, a 4 percentage points higher employment growth rate, equivalent to 13% of the standard deviation in employment growth (Columns 2, 4 and 5 in Table 4.3). In manufacturing, the effect is even larger, at around 5 percentage points (Columns 1, 3 and 5 in Table 4.3). Theoretically, the sign of the relationship between productivity and employment is ambiguous and the existence of a trade-off has been the subject of a long-standing debate (e.g. Gordon, 1995). Higher productivity (e.g. through technological progress) enables producing the same amount of output with fewer workers, thereby reducing labour demand. However, this might be offset by the fact that higher productivity reduces the cost of production, which leads to a higher demand for the products and for more workers until wages adjust upwards. Among incumbent firms this positive effect appears to dominate.

Older firms and SMEs are found to experience, on average, lower employment growth. This result likely hides substantial heterogeneity across SMEs as empirical results point to young SMEs as a significant source of employment and job growth (e.g. Criscuolo, Gal and Menon, 2014). The results for incumbent firms highlight that SMEs in the manufacturing sector actually do grow faster than large firms. The opposite is the case for non-manufacturing firms. There is substantial evidence that small firms face larger growth constraints and have more limited access to external finance, potentially explaining the lack of SME employment growth (e.g. Beck and Demircuc-Kunt, 2006) over the sample period 2008-14, which includes the aftermath of the 2007-08 global crisis and the euro area crisis that affected many of the countries that account for a significant percentage of the firms in the sample.

Employment grows more slowly in firms in richer countries, i.e. countries with higher GDP per capita. But, given a country's level of economic development, employment grows faster in firms located in the country's wealthier regions. As countries develop, the opportunities for catching up and rapid expansion diminish, leading to a slowdown in overall growth, including employment growth. The process of country-level growth can be accompanied by within-country convergence or divergence. Across the OECD, the trend was towards an increasing contribution of within-country inequality compared to the contribution of inequality across countries (OECD, 2016). In terms of employment, there seems to be a similar trend towards concentration, at least among incumbent firms, as those in wealthier TL2 regions attract more employment (Columns 1 and 2 in Table 4.3). For manufacturing firms, the positive impact is driven by large firms, but in the services

sector it is the growth of SMEs that is positively affected by the level of regional wealth (Columns 3 and 4).

Employment growth is not necessarily concentrated in the richest parts of a region. Employment in firms located in predominantly urban TL3 regions is growing more slowly than in other intermediate or predominantly rural regions. This effect is mainly due to large firms growing more slowly in the denser TL3 regions (Columns 1-6 in Table 4.3). Often rural regions in the proximity of cities are growing faster than the urban or even intermediate areas they are connected to (OECD, 2016). Since space is scarce, the cost of land is higher in larger cities. Locating in the vicinity can therefore yield a double-dividend of lower cost for land, but access to the labour and product markets in larger cities. This is in line with larger firms growing even slower than SMEs in predominantly urban areas (Columns 3 and 4 in Table 4.3). The result is also supported by considering regional per capita GDP at a smaller regional scale. At the TL3 level, the local per capita GDP has no statistically significant impact on employment growth, neither in manufacturing, nor in services nor for firms of different sizes (Columns 5 and 6 in Table 4.3).

Real GDP growth is positively and statistically significantly correlated with employment growth in incumbent firms, both at the country and at the regional level (Columns 1 and 2 in Table 4.3). A growing economy will naturally create higher labour demand. However, it is interesting that the regional dimension still matters after controlling for the national dimension. This indicates that local economic conditions matter beyond national conditions, especially for SMEs. For non-manufacturing firms this result highlights the importance of local links in (non-tradable) services. As economic conditions improve, demand for hospitality services, local retail opportunities, etc. grows. For SMEs in the manufacturing sector, the importance of local economic growth for job creation is more striking (Columns 3 and 5 in Table 4.3). It might indicate that SMEs in manufacturing depend relatively more than large firms on local markets to sell their products.

Labour market conditions, such as the supply and the type of workers available, can affect employment growth in firms. A common complaint is the lack of available – qualified – labour. On average, firms in regions with higher levels of human capital can be expected to experience faster employment growth (e.g. Shapiro, 2006). In line with this, the share of the regional labour force with tertiary education is positively correlated with employment growth, but the magnitude of the relationship is small. A 1 percentage point increase in the share of the regional labour force with tertiary education is, on average, associated with a 0.04 percentage point increase in employment growth in manufacturing and a 0.01 percentage point increase in non-manufacturing firms. The relationship is only significant in manufacturing (Columns 1 and 2 in Table 4.3). Differences arise between SMEs and larger firms and across sectors. For large non-manufacturing firms, a larger pool of tertiary educated workers in the wider (TL2) region is positively associated with employment growth, with an estimate of 0.1 percentage points (Column 4 in Table 4.3). However, this effect is not evident when considering the labour force at the local (TL3) scale (Column 6 in Table 4.3). For manufacturing firms, the results indicate the opposite. Employment growth in manufacturing SMEs benefits from a more educated workforce in the wider (TL2) region, while a larger percentage of educated workers in the local area (TL3) is associated with positive growth in larger manufacturing firms. Combined, the results highlight the complex nature of local labour market links. Commuting flows, especially those among the more educated, can easily cross administrative boundaries. A second indicator of labour market conditions is the local unemployment rate. It captures the “slack” in the local labour market, i.e. the pool of available workers a firm can tap into. This “slack” does not seem to benefit SMEs, but

where the estimates are statistically significant, they indicate that employment in large firms grows faster when unemployment rises, indicating that during downturns SMEs, at least on average, find it harder to expand (Columns 3 and 6 in Table 4.3).

Results based on firm-level microdata highlight the importance of the local environment in shaping the employment growth of incumbent firms. Employment grows more slowly in firms in wealthier countries. But, given a country's level of economic development, employment grows faster in firms located in the country's wealthier regions. However, employment growth is not necessarily concentrated in the wealthier urban parts of a region, as locating in the vicinity of urban areas offers advantages in terms of costs and access to markets and inputs. In addition, regional growth matters beyond national growth, which indicates that firms depend on the dynamism of their local markets. Finally, the results highlight the complex nature of local labour market links, as there is substantial heterogeneity across firm size categories and sectors in the link between local skill availability and employment growth. Other factors not explored here deserve further examination, such as the general policy environment, the regulatory burden facing businesses, the ease of doing business, corruption levels, and specialisation in some segments, such as high-tech manufacturing and R&D activities. The low R-squared in the regressions highlights that there is a substantial proportion of variation in the data that remains unexplained.

Table 4.3. **Determinants of employment growth in incumbent firms**

	(1)	(2)	(3)	(4)	(5)	(6)
	Manuf.	Non-man.	Manuf.	Non-man.	Manuf.	Non-man.
Age	-0.137*** (0.01)	-0.189*** (0.01)	-0.137*** (0.01)	-0.189*** (0.01)	-0.166*** (0.01)	-0.212*** (0.01)
ln(MFP)	4.860*** (0.25)	3.993*** (0.23)	4.866*** (0.25)	3.991*** (0.23)	5.292*** (0.26)	4.364*** (0.26)
SME	1.663*** (0.24)	-1.596*** (0.26)	28.74* (14.98)	-36.35** (15.46)	2.599 (13.61)	-13.61 (13.88)
ln(GDP per capita) (country)	-16.64*** (6.23)	-6.690 (7.55)	-16.62*** (6.24)	-6.679 (7.53)	-10.07 (6.77)	-3.348 (7.95)
Real GDP growth (country)	0.613*** (0.07)	0.446*** (0.06)	0.616*** (0.07)	0.445*** (0.06)	0.591*** (0.08)	0.432*** (0.07)
Predominantly urban (TL3) region	-0.450*** (0.08)	-0.350*** (0.07)	-1.040*** (0.23)	-0.952*** (0.25)	-0.673** (0.32)	-1.129*** (0.35)
SME*Predominantly urban (TL3) region			0.609*** (0.23)	0.608** (0.24)	0.349 (0.32)	0.727** (0.35)
ln(GDP per capita)	5.544*** (1.95)	4.571*** (1.21)	10.93*** (3.58)	-2.851 (3.39)	-2.453 (2.80)	-2.788 (2.89)
SME*ln(GDP per capita)			-5.660* (3.23)	7.556** (3.31)	0.237 (2.93)	2.475 (3.02)
Real GDP growth	0.094*** (0.03)	0.092*** (0.02)	-0.154** (0.07)	0.099* (0.06)	-0.030 (0.06)	0.100** (0.05)
SME*Real GDP growth			0.257*** (0.07)	-0.004 (0.06)	0.105* (0.06)	-0.031 (0.05)
Unemployment rate	-0.001 (0.02)	0.010 (0.01)	0.062*** (0.02)	0.015 (0.02)	0.010 (0.04)	0.148*** (0.05)
SME*Unemployment rate			-0.065*** (0.02)	0.003 (0.02)	0.0136 (0.04)	-0.133*** (0.05)
Share of labour force with tertiary education	0.035** (0.02)	0.013 (0.02)	-0.044 (0.04)	0.093* (0.05)	0.086*** (0.02)	0.009 (0.03)

Table 4.3. **Determinants of employment growth in incumbent firms** (*cont.*)

	(1)	(2)	(3)	(4)	(5)	(6)
	Manuf.	Non-man.	Manuf.	Non-man.	Manuf.	Non-man.
SME*Share of labour force with tertiary education			0.079** (0.04)	-0.080* (0.04)	-0.055** (0.02)	0.040 (0.03)
Observations	1 467 583	6 380 165	1 467 583	6 380 165	1 241 428	5 395 796
R-squared	0.035	0.024	0.035	0.024	0.037	0.026
Regional level	TL2	TL2	TL2	TL2	TL3	TL3

*Notes:* OLS regressions with firm-level year-on-year employment growth as dependent variable. The sample is split between manufacturing (Manuf.) and non-manufacturing (Non-manuf.) firms, the latter being mostly services sector firms. The sample covers the period 2008-14. Regional covariates are measured at the TL2 level in Columns 1-4 and at the TL3 level in Columns 5-6. Countries included are Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Luxemburg, Latvia, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland and the United Kingdom, when using TL2-level controls. Portugal and Slovenia are excluded in TL3-level regressions as data are not available. All regressions include year and country-industry dummies. Robust standard errors in parentheses. Regression constants are not reported. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

*Source:* Calculations based on Orbis; OECD (2017e), *OECD Regional Statistics* (database), <http://dx.doi.org/10.1787/region-data-en>.

## Concluding remarks

This chapter has presented an analysis of business employment at regional level across OECD countries. It has documented the spatial variation across OECD regions in terms of employment creation by new firms. Based on the comparison of employment and establishment-level data, it has unveiled and discussed the primary challenges in measuring employment at the subnational level. Furthermore, it has demonstrated the relevance of regional business demography for employment creation and employment losses. Entrepreneurship is often embodied by regions' dynamics in terms of its SME environment, the contribution of which to employment growth is documented.

Comparing employment statistics derived from different approaches, this chapter reveals a bias between enterprise-level and establishment-level measures. This so-called headquarter bias, which results from regional misattribution of employment for multi-establishment enterprises, tends to overstate or understate regions' actual contribution to regional employment dynamics. This bias is especially pronounced in capital regions, where many enterprise headquarters are located.

While the development of a regional establishment database, its comparison with enterprise data and the analysis discussed in this chapter constitute important contributions, there are clear areas for future work to enhance the policy debate on the regional employment effects of entrepreneurship. Foremost, data availability limits the range of the geographic and conceptual scope of future analyses. Co-ordinated efforts with NSOs could alleviate this problem. Expanding coverage of employment demography statistics for TL3 regions could significantly enhance any subnational analysis of employment dynamics.

The analysis demonstrates that new enterprises, new establishments and existing small to medium-sized establishments more generally can be important sources of job creation across OECD regions. According to the most recent available data, regions do, however, vary quite substantially in their ability to create jobs through firm dynamics or in existing small or medium-sized establishments. Precisely for that reason, policies that stimulate entrepreneurship can help regions that lag behind to catch up and eventually converge not only in terms of employment, but also in economic welfare as a whole.

Overall, this chapter made first strides forward towards the objective of collecting and analysing an internationally comparable dataset of business demography and employment at the enterprise and establishment level across OECD countries. In order to improve this dataset further and thus to enhance any assessment of regional employment dynamics, the sample of countries that provide precise employment demographics information at a detailed geographical level (TL3 regions) needs to be extended to more countries. In this regard, a closer collaboration with NSOs might be conducive to filling the current empirical gap.

For future work, further light on the links between enterprises and establishments could be shed. Understanding such links would elicit how conditions in one location could have spillover effects, e.g. in the case of potential crisis scenarios. Economic difficulties or bankruptcy in one location or sector (enterprise) could have adverse consequences for different locations (establishments) of the same firm that are themselves in good condition. Such linkages and domino effects are of particular interest for the study of regional employment creations or losses, an area of notable importance to economic policy.

Until recently, such linkages were difficult to measure and examine. However, the availability of new and richer data has alleviated this problem. The most promising path in this direction exploits firm-level micro data, as the previous section on employment growth in existing firms did. Those data allow tracking the same firms over time and might also establish linkages between enterprises and establishment (through ownership structure information) across regions. Another important advantage of such micro-data is that it, with a sufficiently long temporal coverage, makes it possible to not only estimate the short-term, direct effects of new firms on employment, but also the longer term, indirect effects (Fritsch, 2013).

The following chapter pursues such an analysis of micro-data based on the OECD DynEmp Regional project (OECD, 2017a). It thus contributes to this report by providing evidence on regional employment dynamics by directly micro-aggregating firm-level data at the regional level. Such an exercise complements this chapter's focus on regional employment patterns. In particular, it includes an analysis of establishment-level characteristics as well as regional factors as potential determinants for regional employment growth.

## Notes

1. This section considers only employment in employer firms. In other words, it excludes self-employment firms from the analysis.
2. On the one hand, in most member states, there are operational programmes prepared targeted at each NUTS-2 (or NUTS-1) region's development. On the other hand, there are operational programmes in the context of a specific thematic priority, like environment or energy.
3. Bachtrögler et al. (2017) present a database with over 2 million of projects co-funded by Cohesion Policy instruments by the ERDF, the ESF and the CF in the multi-financial framework 2007-13. The projects are carried out by over 1 million individual beneficiaries (firms and institutions) which are matched with the Orbis

business database in order to get more information on business characteristics and the beneficiaries' location.

4. Note that for the country sample split into groups of regions, we use enterprise data and consider all firms in the baseline results. As a robustness check, the indicators are calculated considering only firms with employees. Furthermore, results are robust to including regional fixed effects in the calculation of propensity scores.
5. Exceptions are the results for the Czech Republic and Portugal when only considering firms with employees, where the effect (coefficient) on value-added growth generated by treated firms in regions with higher dynamics appears to be lower than in less-dynamic regions.
6. Another example is the United States, where the proportion of multi-plant firms among the entire business population has been estimated to be around one-third while multi-establishment firms constitute around 57% of all employment (Sadeghi, Talan, Clayton, 2016).
7. Sectors B to N include industry, construction, retail trade, transport, hospitality, information and communication, finance, and professional services. Sectors A to U cover the entire economy.
8. For reasons of comparability and greatest possible coverage, all figures in this chapter are based on the same set of business sectors unless stated otherwise. Aiming at the greatest possible coverage, the statistics include establishments (enterprises) from all business sectors, excluding education and arts, which corresponds to ISIC Rev. 4 categories B to N.
9. The sample of countries is restricted by the requirement of having subnational employment statistics for the same business sectors for both the enterprise and establishment approach.
10. Using longitudinal establishment data for Germany, Brixy (2014) also provides evidence of the positive contribution of start-ups to regional employment creation.
11. Analogously to the change in regional employment shown in Figures 4.9 and 4.10, the change was computed, where possible, from 2010 to 2014. Where data limitations restricted this choice, the next closest set of years was selected. See note of Figure 4.10 for more details.
12. See Gal (2013) for a description of the Orbis data. The 19 countries covered are Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Luxemburg, Latvia, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.



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## ***Annex 4.A1.***

### **Establishment data sources**

<b>Austria</b>	<p>Statistics Austria</p> <p>Data: <a href="http://www.statistik.at/web_en/statistics/Economy/enterprises/local_units_of_employment_from_census_2011/index.html">www.statistik.at/web_en/statistics/Economy/enterprises/local_units_of_employment_from_census_2011/index.html</a>.</p> <p>Metadata: <a href="http://www.statistik.at/web_en/statistics/Economy/enterprises/local_units_of_employment_from_census_2011/index.html">www.statistik.at/web_en/statistics/Economy/enterprises/local_units_of_employment_from_census_2011/index.html</a>.</p>
<b>Canada</b>	<p>Statistics Canada</p> <p>Data: <a href="http://www5.statcan.gc.ca/cansim/a26?lang=eng&amp;retrLang=eng&amp;id=5520006&amp;&amp;pattern=&amp;stByVal=1&amp;p1=1&amp;p2=31&amp;tabMode=dataTable&amp;csid=">www5.statcan.gc.ca/cansim/a26?lang=eng&amp;retrLang=eng&amp;id=5520006&amp;&amp;pattern=&amp;stByVal=1&amp;p1=1&amp;p2=31&amp;tabMode=dataTable&amp;csid=</a> and <a href="http://www5.statcan.gc.ca/cansim/a26?lang=eng&amp;retrLang=eng&amp;id=5530006&amp;&amp;pattern=&amp;stByVal=1&amp;p1=1&amp;p2=31&amp;tabMode=dataTable&amp;csid=">http://www5.statcan.gc.ca/cansim/a26?lang=eng&amp;retrLang=eng&amp;id=5530006&amp;&amp;pattern=&amp;stByVal=1&amp;p1=1&amp;p2=31&amp;tabMode=dataTable&amp;csid=</a></p> <p>Metadata: <a href="http://www.statcan.gc.ca/daily-quotidien/170814/dq170814b-eng.htm">http://www.statcan.gc.ca/daily-quotidien/170814/dq170814b-eng.htm</a>.</p>
<b>Denmark</b>	<p>Statistics Denmark</p> <p>Data: <a href="http://www.statbank.dk/10096">www.statbank.dk/10096</a>.</p> <p>Metadata: <a href="http://www.dst.dk/en/Statistik/dokumentation/documentationofstatistics/employment-in-businesses">www.dst.dk/en/Statistik/dokumentation/documentationofstatistics/employment-in-businesses</a>.</p>
<b>Finland</b>	<p>Statistics Finland</p> <p>Data: <a href="http://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin_yri_alyr/?tablelist=true">http://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin_yri_alyr/?tablelist=true</a>.</p> <p>Metadata: <a href="http://www.stat.fi/til/alyr/index_en.html">www.stat.fi/til/alyr/index_en.html</a>.</p>
<b>France</b>	<p>INSEE</p> <p>Data: <a href="https://www.insee.fr/fr/statistiques/2021271#consulter">https://www.insee.fr/fr/statistiques/2021271#consulter</a>.</p> <p>Metadata: <a href="https://www.insee.fr/fr/statistiques/2021271#documentation">https://www.insee.fr/fr/statistiques/2021271#documentation</a>.</p>
<b>Germany</b>	<p>Federal Statistical Office</p> <p>Data and metadata: <a href="https://www-genesis.destatis.de/genesis/online/data;jsessionid=497C45668A6875451263FFCF281281CF.tomcat_GO_2_1?operation=abruftabelleAbrufen&amp;selectionname=52111-0004&amp;levelindex=1&amp;levelid=1493308751235&amp;index=97">https://www-genesis.destatis.de/genesis/online/data;jsessionid=497C45668A6875451263FFCF281281CF.tomcat_GO_2_1?operation=abruftabelleAbrufen&amp;selectionname=52111-0004&amp;levelindex=1&amp;levelid=1493308751235&amp;index=97</a>.</p>
<b>Italy</b>	<p>ISTAT</p> <p>Data: <a href="http://dati-censimentoindustriaeservizi.istat.it/Index.aspx?lang=en">http://dati-censimentoindustriaeservizi.istat.it/Index.aspx?lang=en</a>.</p> <p>Metadata: <a href="http://dati-censimentoindustriaeservizi.istat.it/Index.aspx?lang=en">http://dati-censimentoindustriaeservizi.istat.it/Index.aspx?lang=en</a>.</p>
<b>Japan</b>	<p>Statistics Japan</p> <p>Data: <a href="http://www.stat.go.jp/english/data/e-census/">www.stat.go.jp/english/data/e-census/</a>.</p> <p>Metadata:</p> <p>2009 Census: <a href="http://www.stat.go.jp/english/data/e-census/2009/pdf/gaiyou_e.pdf">www.stat.go.jp/english/data/e-census/2009/pdf/gaiyou_e.pdf</a>.</p> <p>2014 Census: <a href="http://www.stat.go.jp/english/data/e-census/2014/pdf/gaiyou_e.pdf">www.stat.go.jp/english/data/e-census/2014/pdf/gaiyou_e.pdf</a>.</p>
<b>Korea</b>	<p>Statistics Korea via Korean Statistical Information Service</p> <p>Data: <a href="http://kosis.kr/eng/statisticsList/statisticsList_01List.jsp?vwcd=MT_ETITLE&amp;parentId=K#SubCont">http://kosis.kr/eng/statisticsList/statisticsList_01List.jsp?vwcd=MT_ETITLE&amp;parentId=K#SubCont</a>.</p> <p>Metadata: <a href="http://kostat.go.kr/portal/eng/surveyOutline/3/3/index.static">http://kostat.go.kr/portal/eng/surveyOutline/3/3/index.static</a>.</p>

<b>Mexico</b>	INEGI Data: <a href="http://www3.inegi.org.mx/sistemas/tabuladosbasicos/tabdirecto.aspx?s=est&amp;c=33628">www3.inegi.org.mx/sistemas/tabuladosbasicos/tabdirecto.aspx?s=est&amp;c=33628</a> . Metadata: <a href="http://www.inegi.org.mx/inegi/contenidos/investigacion/experimentales/default.aspx">www.inegi.org.mx/inegi/contenidos/investigacion/experimentales/default.aspx</a> .
<b>New Zealand</b>	Statistics New Zealand Data and metadata: <a href="http://nzdotstat.stats.govt.nz/wbos/Index.aspx?DataSetCode=TABLECODE7601#">http://nzdotstat.stats.govt.nz/wbos/Index.aspx?DataSetCode=TABLECODE7601#</a> .
<b>Norway</b>	Statistics Norway Data: <a href="https://www.ssb.no/en/virksomheter-foretak-og-regnskap/statistikker/bedrifter">https://www.ssb.no/en/virksomheter-foretak-og-regnskap/statistikker/bedrifter</a> . Metadata: <a href="https://www.ssb.no/en/virksomheter-foretak-og-regnskap/statistikker/bedrifter/aa/2017-01-20?fane=om#content">https://www.ssb.no/en/virksomheter-foretak-og-regnskap/statistikker/bedrifter/aa/2017-01-20?fane=om#content</a> .
<b>Portugal</b>	Statistics Portugal Data: <a href="https://www.ine.pt/xportal/xmain?xpid=INE&amp;xpgid=ine_indicadores&amp;indOcorrCod=0008597&amp;contexto=bd&amp;selTab=tab2">https://www.ine.pt/xportal/xmain?xpid=INE&amp;xpgid=ine_indicadores&amp;indOcorrCod=0008597&amp;contexto=bd&amp;selTab=tab2</a> . Metadata: <a href="https://www.ine.pt/xportal/xmain?xpid=INE&amp;xpgid=ine_cont_inst&amp;INST=6251013">https://www.ine.pt/xportal/xmain?xpid=INE&amp;xpgid=ine_cont_inst&amp;INST=6251013</a> .
<b>Spain</b>	INE Spain Data and metadata: <a href="http://www.ine.es/dynt3/inebase/en/index.htm?padre=51&amp;dh=1">www.ine.es/dynt3/inebase/en/index.htm?padre=51&amp;dh=1</a> .
<b>Switzerland</b>	Swiss Federal Statistical Office Data and metadata: <a href="https://www.pxweb.bfs.admin.ch/Selection.aspx?px_language=de&amp;px_db=px-x-0602010000_101&amp;px_tableid=px-x-0602010000_101\px-x-0602010000_101.px&amp;px_type=PX">https://www.pxweb.bfs.admin.ch/Selection.aspx?px_language=de&amp;px_db=px-x-0602010000_101&amp;px_tableid=px-x-0602010000_101\px-x-0602010000_101.px&amp;px_type=PX</a> .
<b>United Kingdom</b>	Office for National Statistics (ONS) Data and metadata: <a href="https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/ukbusinessactivitysizeandlocation">https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/ukbusinessactivitysizeandlocation</a> .
<b>United States</b>	US Census Bureau, Business Dynamics Stats, Business Employment Dynamics Data and metadata: <a href="https://www.census.gov/ces/dataproducts/bds/data.html">https://www.census.gov/ces/dataproducts/bds/data.html</a> .
<b>All other countries</b>	Belgium, the Czech Republic, Estonia, Greece, Hungary, Ireland, the Netherlands, Luxembourg, Latvia, Poland, the Slovak Republic, Slovenia, Sweden Eurostat Data and metadata: <a href="http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_r_nuts06_r2&amp;lang=en">http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_r_nuts06_r2&amp;lang=en</a> .

### *Annex 4.A2.*

#### Notes on regional data coverage

In general, employment growth rates throughout this chapter are calculated for sectors B to N. Additionally, the time period over which those growth rates are computed is the same for all regions in each country.

However, there are a few exceptions to those rules. These exceptions are due to data availability and are listed below.

Sector coverage:

- Central Moravia (sectors F to N)
- Moravia-Silesia (sectors F to N)
- Mazovia (sectors F to N)
- West Pomerania (sectors F to N)
- Lodzkie (sectors F to N)
- Lubuzs (sectors F to N)
- Drenthe (sectors F to N, excluding J).

Temporal coverage:

- Upper Norrland (2013-14 instead of 2010-14)
- Stockholm (2011-14 instead of 2010-14).

### **Annex 4.A3.**

## **Harmonisation of datasets**

The establishment data have been collected for 36 countries, in 17 directly from the national statistical offices' (NSOs) websites and 19 were added from the Eurostat site (table sbs\_r\_nuts06\_r2). Over these, five countries have indicators related to demographic birth/death events (France, Japan, Mexico, New Zealand and the United States), and in this sample, only France, Mexico and the United States have data disaggregated by sector and size classes. Establishment data have been harmonised *ex post* to be compared with enterprise data with the same levels of sectorial breakdown and size classes, but the comparability of the demographic events *per se* relies on the definitions applied in the country which follows the international recommendations.

### **Comparability of the demographic indicators**

For **France**, the notion of creation of an establishment is consistent with the harmonised European definition of a company birth, and corresponds to the implementation of new means of production. For **Mexican** data, it was determined to consider as death and subsequently to register as a birth those establishments that were affected by two of the following three situations: change in economic activity; change of owner or company name; change of physical location. The establishments that presented only one of the three changes mentioned above were considered within the level of survival. In **New Zealand**, births and deaths follow the international definitions and do not include entries/exit due to reactivations, mergers, break-ups, split-offs or other restructuring of a group of businesses linked by ownership or control. Births also exclude entries into a population resulting from changes to characteristics of existing businesses, which is largely based on, and fully consistent with, the Eurostat definition of enterprise births. To be considered a birth (death) in the business demography population, the geographic units existed at neither time  $t-1$  ( $t$ ) year nor time  $t-2$  years ( $t+1$  year). For the **United States**, birth year is defined as the year an establishment first reports positive employment in the *Longitudinal Business Database*, and excludes events from breakouts or consolidations in multi-unit firms. In the case of **Japan**, the data are less harmonised with international recommendations, and therefore should be taken with caution: the start-up date refers to: 1) the time the establishment concerned started its business at the present location, in other words, an establishment that has been transferred to another place may be included in some cases in births and deaths data; 2) those establishments present as of the date of the 2014 survey that were not identified in the 2012 Economic Census for Business Activity, and as such, births and deaths do not refer directly to annual data, and deviate from the international definition, mainly for what concerns the establishments which have been created and disappeared within the observed period. As a proxy, the Japanese values for birth and deaths have been divided by two.

### **Harmonisation of the sectorial and size classes breakdown**

The data collected from NSOs were detailed at a 4-digit level of the ISIC Rev. 4 for Switzerland; at mainly a 2-digit level for Finland, Norway and Spain; and mainly at groups of 2-digits for the other countries. Special efforts have been made to organise the establishment data with the same breakdown as for enterprises' business demography

(presented in Table 4.A3.1) and produce the sector to B-N excluding K (financial and insurance activities) aggregate to have a major coverage of the economy that can be compared across countries and across datasets.

Table 4.A3.1. **Sectoral classes**

B-E	Industry (except construction)
F	Construction
G	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	Transportation and storage
I	Accommodation and food service activities
J	Information and communication
L	Real estate activities
M-N	Professional, scientific and technical activities; administrative and support service activities

The employment size ranges can differ in some countries to the standard ranges 1-9, 10-19, 20-49, 50-249, 250+. To improve the usability of the dataset, size classes have been aligned in the five national size classes (as in Table 4.A3.2). The reference used for the employment ranges is generally based on the number of employees, and therefore excludes working proprietors, active business partners, unpaid family workers and home-workers, irrespective of whether or not they are on the payroll. The exceptions are Italy and the United Kingdom for which the reference is the number of employed persons.

Table 4.A3.2. **Employment size classes**

NSC	SC label	Exceptions
1	1-9	..
2	10-19	..
3	20-49	..
4	50-249	Canada (50-199); Denmark, Spain (50-99); France (50-199); Korea (50-299)
5	250+	Canada (200+); Denmark, Spain (100+); France (200+); Korea (300+)
6	Total	..
23	10-49	Switzerland

### **Annex 4.A4.**

#### **Regional characteristics associated with employment growth**

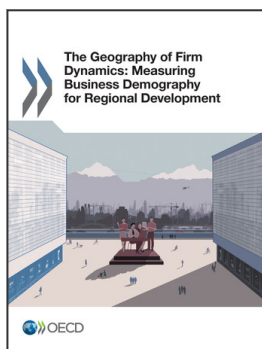
For reasons of data availability, the analysis below is limited to European countries. For those countries, potential determinants of employment growth are more consistently available at the subnational level. The focus on European regions reduces the sample further, limiting the scope of the analysis to around 110 regions. Therefore, the findings should be seen as illustrating some correlational patterns rather than any causal relationship.

*Note:* The regressions are based on simple OLS estimation. In all cases country fixed effects were included.

Table 4.A4.1. **Determinants of regional employment growth, 2010-14**

Factor considered	Labour productivity (GDP per employee)	Innovative SMEs collaboration	Knowledge workers (% of employment)	Scientific publications	High-tech inventors	Exports medium-high/ high (tech manuf.)
OLS coefficient (standard error)	0.0090941*** (0.0024695)	0.0109987* (0.005944)	0.0060408*** (0.0022907)	0.002943*** (0.0013896)	0.0050133** (0.0020006)	0.0038203* (0.0019465)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations (regions)	112	109	112	112	106	109

*Notes:* The table shows the estimated coefficient of correlation between the indicated factors and regional employment growth. OLS regression for the period 2010-14. Country fixed effects are included. \*\*\*p<0.01, \*\*p<0.05, \*p<0.1.



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