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CAN FOUNDATIONAL ECONOMY SAVE REGIONS IN CRISIS?

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CAN FOUNDATIONAL ECONOMY SAVE REGIONS IN CRISIS?

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Abstract: We perform an explorative analysis of employment patterns in the foundational economy producing mundane everyday necessities and providing welfare services across Swedish regional labour markets between 2007 and 2016. We focus specifically on hierarchical patterns in spatial distribution of foundational activities and their association – direct and through integration with other economic activities – with regional employment dynamics in times of crisis, recovery, and growth. Our findings suggest the foundational economy plays an important role as employment provider to a substantial number of Swedish workers, particularly in non-metropolitan regions. Besides, it appears to be associated with improved ability of regions to retain employment in the most acute phases of economic crisis, but only if it is well integrated into regional industrial profiles. However, its overall contribution to regional resilience in the long term appears to be rather limited.

Keywords: foundational economy; everyday economy; employment; regional resilience; crisis; recovery; Sweden

JEL codes: **E32** – Business Fluctuations. Cycles; **J21** – Labour Force and Employment, Size, and Structure; **L16** – Industrial Organization and Macroeconomics: Industrial Structure and Structural Change. Industrial Price Indices; **R11** – Regional Economic Activity: Growth, Development, Environmental Issues, and Changes; **R12** – Size and Spatial Distributions of Regional Economic Activity; **R23** – Regional Migration. Regional Labour Markets. Population. Neighbourhood Characteristics

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1. Introduction

Traditionally, research on drivers of economic development and focus of policymakers have tended to emphasise the importance of export- and technology-intensive industries (Moretti, 2012). Thus, the continuous focus on making regional economies more competitive (European Commission, 2018) often translates into support for a narrow set of high-tech industries that invest significantly in research and development (Bentham et al., 2013b, Fothergill et al., 2019, Hansen and Winther, 2014).

However, technology-intensive industries generally constitute a limited share of the economy (Hansen and Winther, 2011). To exemplify, in Sweden, high-tech manufacturing activities account for approximately 5 per cent of national employment, ranging between 0.4 and 10 per cent at the municipality level⁴. Thus, suitability and limitations of this (competitive) approach to economic development and policymaking are increasingly debated, in particular for regions far away from large metropolitan areas (Tomaney and Pike, 2020). Increasingly, attention of researchers is given to the role of the everyday (Reeves, 2018) or foundational (Froud et al., 2018) economic activities that deliver services essential for fulfilling basic human needs (Bentham et al., 2013a, Barbera et al., 2016, De Boeck et al., 2019), but remain outside of immediate attention of policymakers. While much of this literature is a normative critique of contemporary economic/industrial policies, there is an increasing stream of papers exploring foundational economy as an economic sector (De Boeck et al., 2019, Froud et al., 2020) and analysing its impact on regional economic performance (Calafati et al., 2020). We contribute to this literature by exploring hierarchical patterns in spatial distribution of foundational activities across Swedish regions and investigating their association – direct and through integration with other economic activities – with regional economic performance in times of crisis and recovery.

1.1. What's foundational in the economy?

Foundational thinking starts from a concept of multiple economies divided into four zones (see Figure 1) which are defined on the demand side by the necessity of consumption and on the supply side by the form of provision (Bentham et al., 2013a).

⁴ Own calculations based on Statistics Sweden data

[Figure 1 here](#)

The foundational economy (FE) zone is then the sphere of consumption of mundane everyday necessities and welfare services through various kinds of collective system provision⁵. The absence of or interruption in the provision of such necessities may cause immediate crisis for all households. In high-income countries, at least 30 per cent of employment in cities and regions is accounted for by this zone of the economy (Engelen et al., 2017). In Swedish municipalities, the share of FE in local employment reached up to 70 per cent in 2016.

Around the FE of daily necessities is an outer zone of the overlooked economy that produces individually provided cultural necessities (e.g., furniture, takeaway food, and tourism) where consumption is taken for granted but is occasional and can be postponed. It also includes lifestyle support goods and services which can be often low-tech goods or mundane support services. Similar to the foundational economy, this zone often remains below the policy radar. Its share in the municipality employment in Sweden in 2016 ranged widely between 7 and 47 per cent.

Following the definition of Froud et al. (2018), the foundational economy zone encompasses two parts. *Material foundational activities* connect households to daily essentials through the system of networks and branches. This part of the economy encompasses utilities (electricity, gas, water, etc.), transportation systems, food production and distribution, as well as private banking services and payment systems. *Providential foundational services* include a subset of (mainly) public sector activities providing universal welfare services to all citizens – education, healthcare, law enforcement, etc. This sector also includes some private supply chain activities, for example, dispensing chemists, which support healthcare, but not pharmaceutical companies.

As the FE delivers necessities for everyday life, these services are consumed by all citizens regardless of income (Moore and Collins, 2020, Hall and Schafran, 2017, Froud et al., 2018)⁶. Foundational services are distributed through branches and networks (Barbera et al., 2016, De

⁵ Collective provision argument here underlines the impossibility of self-provision (Calafati et al., 2019, Froud et al., 2020, Hall and Schafran, 2017). For example, while one can purchase a smartphone, one cannot install a private 4G network; so the latter needs to be collectively provided.

⁶ Individuals' access to such necessities may, however, be dependent on income (Calafati et al., 2020).

Boeck et al., 2019, Calafati et al., 2019), and the spatial distribution of foundational activities is expected to follow that of population. Foundational services are generally provided locally as they are either delivered through physical infrastructures or require direct interaction between provider and customer (Froud et al., 2018). While digitization may to some extent affect this by opening up for providing some providential services such as education from distance (Gulbrandsen and Sheehan, 2020), generally local provision of foundational services makes these activities rather immobile and sheltered from inter-regional and international competition (Bentham et al., 2013a, Moore and Collins, 2020).

Thus, while the FE is defined according to the characteristics of demand and opinions of citizens concerning the services that are actually foundational in character (Froud et al., 2018), the production of foundational services and its importance for economic development is arguably central to understand (see Hall and Schafran, 2017). Therefore, the first contribution of our paper is to analyse the distribution of employment in foundational activities across different types of regions and over time.

1.2. What's so important about the foundational economy?

Whereas an economic development approach focused on technology-intensive industries has little to offer in peripheral, left behind regions, the foundational economy constitutes an important part of the economy in all regions. Moreover, the role of foundational activities is believed to be more pronounced in less-developed regions (Moore and Collins, 2020). The FE thereby proposes a promising approach to embedded regional development, also in peripheral areas (Earle et al., 2018, Heslop et al., 2019a, Morgan, 2019). Crucially, this might be particularly important during times of crisis where *“the severest impacts are being felt in already disadvantaged regions”* (Tomaney et al., 2010, p. 773).

In relation to the latter point, the role of the foundational economy for economic development may differ significantly from that of traded industries due to non-cyclical demand for foundational services (Calafati et al., 2019). Further, given that foundational activities are labour-intensive (Engelen et al., 2017, De Boeck et al., 2019) and, indeed, employ a large chunk of labour, the FE may exercise a stabilising function on regional economies in periods when economy is contracting (Engelen et al., 2017). Indeed, there are theoretical expectations in the literature on regional resilience that regions with higher share of ‘sheltered’ economic activities and industries with non-cyclical demand can rely, at least in the beginning of a crisis, on a series of automatic stabilisers that soften the blow on employment (Ezcurra, 2011, Webber et al.,

2018, Ženka et al., 2019). More specifically, it was proposed that basic infrastructure, including water provision systems may facilitate regional resilience (Breen and Markey, 2019, Robinson et al., 2008). Specialisation in sectors closed to international and interregional competition imply that regional employment destruction in times of crisis may be reduced relative to other regions (Fratesi and Rodríguez-Pose, 2016). Our second contribution is, for that reason, to investigate how local presence of foundational activities relates to regional performance in times of crisis, recovery and growth.

While doing so, we move beyond analysing the influence of absolute levels of foundational and traded industries on regional development over time. The third contribution of our paper is to understand how specific compositions of foundational and traded industries in different regions influence regional development outcomes.

This approach not only allows for understanding how regional portfolios of foundational industries influence regional development, but also how integration between foundational and traded industries present in a region matters, rather than simply assuming that their influences can be isolated from each other. The foundational economy is often juxtaposed with traded industries (e.g., Engelen et al., 2017), however, there are multiple ways that foundational and traded regional industries influence each other. Foundational industries are extensively technology-using, highlighting the importance of products offered by traded industries (Coenen and Morgan, 2020). Further, delivery of high-quality foundational services are central for enhancing the competitiveness of traded industries: from ensuring sufficient supply of energy, water and other resources needed in the production of goods and services, to providing the providential services needed by the workforce (Berry, 2018). Also, similar to relations between high- and low-tech industries, collaborations between actors from foundational and traded industries may be of significant importance for some types of innovation processes (Hansen and Winther, 2011). Jointly, this suggests the importance of also considering integration between foundational and traded industries.

1.3. Paper outline

Empirically, we analyse the Swedish economy from 2007 to 2016. First, we present an extensive explorative analysis of employment patterns in foundational industries at various spatial scales over this period. Second, we use skill-relatedness approach (Kuusk and Martynovich, 2020, Neffke and Henning, 2013) to operationalise the degree and character of integration between foundational and other zones of the economy. We then investigate the

impact of such integration on regional performance in a regression framework. The specific research questions we pose are:

RQ1: How are foundational activities distributed across various types of regions?

RQ2: In what ways is the local presence of foundational activities and their integration with other economic zones related to employment growth in Swedish regions? Is this relationship different in times of economic crisis?

The remainder of the paper is organised as follows. Section 2 provides the discussion of the data and definitions employed. Section 3 provides an extensive overview of employment patterns in foundational (and overlooked) zones of the economy over the period between 2007 and 2016. Section 4 presents the summary of regression analysis of relationship between local presence of foundational activities and regional employment growth in different time periods. Section 5 provides discussion of results through the prism of the literature in the field. Finally, Section 6 concludes.

2. Data and definitions

2.1. Data

The data employed in this paper come from the Longitudinal Integration Database for Health Insurance and Labour Market Studies (LISA) that is an anonymised linked employer-employee database that aims at complementing traditional labour market statistics and providing a better description of the labour market and people's relationship to the world of work (SCB, 2016). It is a total-count individual register: all individuals aged 15 and above registered in Sweden on December 31 each year are included in the population for reference year. The data for the same individual can be linked for all years in which she is included in the population.

LISA integrates annual data from education, income, employment, health insurance, and population registers. The connection of an employee to an employer is denoted by the identity number of a firm and establishment where she has her main employment. The data also contains detailed information on various individual variables, such as age, education, annual earnings, municipality of residence and employment, industry of employment, etc. Thus, the data allows constructing a very accurate representation of regional industrial portfolios. The data employed in this paper covers the period 2007-2016.

Classification of economic activities (i.e., industries) is based on the 2007 Swedish Standard Industrial Classification (SNI2007) that is the Swedish implementation of the Statistical Classification of Economic Activities in the European Community (NACE 2.0).

Regions in the paper are defined as local labour markets (LLMs). These are integrated geographical units within which most interactions between workers seeking jobs and employers seeking labour occur. Thus, LLMs are appropriate for linking the supply and demand sides of the labour market and explaining regional labour market performance as a function of endogenous regional factors (including its structural composition). In practice, the boundaries of LLMs are defined by the statistics on commuting between municipalities in the way that maximises the self-containment of commuting flows (SCB, 2010). 290 Swedish municipalities are aggregated into 90 LLMs.

LLMs are further aggregated into four regional families: metropolitan areas, large regional centres, smaller regional centres, and peripheral regions. These are defined by the Swedish Agency for Economic and Regional Growth based on criteria such as the population size and density, regional business dynamics, share of individuals with higher education as well as access to higher education institutions (NUTEK, 2004). We chose this approach instead of a more common rural-urban division because research on Swedish economic development has shown that labour market dynamics varies considerably across hierarchy levels beyond the simple rural-urban dichotomy (Henning et al., 2016, Martynovich and Lundquist, 2016).

2.2. Operationalising the foundational economy

We depart from the idea of multiple economies that divides the economy into four zones – foundational economy, overlooked economy, household economy, and tradeable economy (Bentham et al., 2013a). The description of the former two is provided in the introductory section of the paper. The tradeable economy includes activities that are not classified as foundational or overlooked and comprises predominantly privately-owned export industries that satisfy aspirational private consumption. Household economy is not represented in the official statistics and, therefore, remains outside of our attention.

We employ the classification of economic activities developed by Froud et al. (2018) that allocates four-digit NACE2.0 industries into foundational (material and providential),

overlooked and tradeable zones of the economy⁷. Table 1 below summarises the distribution of industries across zones.

[Table 1 here](#)

Almost half of all four-digit industries belong to the tradeable zone of the economy. Overlooked and material foundational activities account for around 23 per cent of industry codes. Finally, providential foundational activities are by far the smallest group with just over 5 per cent of all industry codes.

3. Employment in the foundational economy in Sweden, 2007-2016

We start by exploring and discussing growth patterns of the foundational economy at the national level over 2007-2016. We pay particular attention to periods of crises respective recovery/growth compared to other parts of the economy. Further, we conduct an extensive regional decomposition of employment patterns in the foundational economy zone comparing three Swedish metropolitan areas with large regional centres, smaller regional centres and peripheral regions.

3.1. National employment in the foundational economy

National employment in different zones of the economy is summarised in Table 2.

[Table 2 here](#)

During the crisis of 2007-2009, employment decreased in all economy zones resulting in the overall loss of 131,302 jobs. The tradeable economy zone was hit the hardest, losing more than 4 per cent of employment, almost twice as much as the foundational and the overlooked zones of the economy. Gentler employment decline in the foundational economy (FE) zone indicates

⁷ Available at <https://foundationaleconomy.com/activity-classification/>. Also, see Appendix 5.

its lower sensitivity to crisis due to the non-cyclical demand for foundational services and pinpoints its potential to (at least partly) moderate the impact of crisis on the national economy.

After surpassing the bottom of the crisis in 2009, the Swedish economy moved into continuous period of employment growth with a total of 443,086 jobs created between 2009 and 2016. Somewhat surprisingly, the highest growth rate (15.2 per cent) was observed in the providential FE zone which resulted in an increase of its share in national employment from 33.0 per cent in 2009 to 34.3 per cent in 2016. Coupled with providential FE zone performance in crisis times, this underlines its role not only of an economic stabiliser but also domain of job creation. The material FE zone, however, while demonstrating comparatively good performance in crisis times, never managed to return to its pre-crisis employment numbers. The tradeable and overlooked economy zones demonstrated quite fast recovery and growth after 2009 (10.6 and 10.0 per cent employment growth respectively) and managed to keep their employment shares stable.

Overall, between 2007 and 2016, the share of FE zone in the national employment increased from 47.7 to 48.3 per cent (due to the good performance of providential FE activities). This underlines the crucial role that the FE played in provision of jobs in the Swedish economy.

Looking at the year-to-year variation in employment numbers allows to identify clear lags in the timing of crisis and recovery in different economy zones (Figure 2).

[Figure 2 here](#)

In the light of the discussion above, it is interesting to observe that the decline in employment is first observed in the FE zone, particularly in its providential services component. It took one extra year for the crisis to hit the overlooked and tradeable zones of the economy. The latter was hit the hardest, as discussed above.

Being the first to fall the providential FE zone is the also first to recover, reaching pre-crisis employment levels already in 2010. It took one additional year for the overlooked economy zone (recovery by 2011). These two sectors contributed the most to the national employment recovery by 2011. It took an additional year for the tradeable economy zone (recovery by 2012). The material FE employment never returned to the pre-crisis levels.

All in all, national employment trends underline the important role of the FE zone. It does indeed provide employment to almost half of workers by 2016 and demonstrates, in line with predictions in the literature (see, for example, Engelen et al., 2017, De Boeck et al., 2019), features of economy stabiliser in the times of crisis, thus making it a potential factor of regional resilience. What is less expected, providential FE activities contributed significantly to the recovery from crisis and subsequent growth. The employment trends in the material FE zone are more in line with expectations: relatively good performance in crisis, but sluggish recovery.

National trends may, however, disguise heterogeneity of regional trajectories with respect to employment in the FE zone. For example, it is hypothesised that its role is more pronounced in the places left behind (Moore and Collins, 2020). In the following section, we perform the regional decomposition of employment trends in the FE zone.

3.2. Regional employment in the foundational economy zone

We start by simply mapping the employment shares of the FE zone across 90 Swedish LLMs (Figure 3).

[Figure 3 here](#)

Between 2007 and 2016, the number of LLMs where the foundational zone of the economy employs more than half of local workers increased from 47 to 58. While such regions are spread throughout the whole country, by 2016 almost all LLMs to the north from Stockholm belonged to this group. The share of foundational economy employment increased in 70 out of 90 LLMs. Of the 20 LLMs, where the share of foundational economy decreased, only in four did foundational economy lose more than one percentage point (Tranås, Ludvika, Gällivare, Kiruna). A similar trend is observed at the municipality level, where between 2007 and 2016 the share of the FE employment increased in 214 out of 290 municipalities and reached over 50 per cent in 188 municipalities (see [Appendix 3](#)). This indicates that the national expansion of this economy zone was a wide-spread phenomenon rather than being driven by a small number of municipalities/LLMs.

To analyse how this expansion of the FE zone unfolded in space and over time we look at local labour market regions instead of municipalities to account for significant share of commuters (Eliasson et al., 2003). These are further grouped into regional families – metropolitan areas,

large regional centres, smaller regional centres, and peripheral regions – to address the question whether foundational economy is distributed hierarchically. These groups of regions (with respect to their population and employment in the FE zone) are presented below (Table 3).

[Table 3 here](#)

Table 3 confirms the claim in the literature that the spatial distribution of FE employment follows that of population distribution as we observe an almost perfect correlation between these two indicators in the beginning and the end of our time period.

Further, the Swedish population increased with more than 800 thousand during the investigated period. Although regions at all levels in the regional system gained population, the increase was strongly biased towards metropolitan regions, in particular Stockholm LLM (see [Appendix 4](#)). Around 75 per cent of the population increase happens in metropolitan areas, while in the remaining regions population growth rate gradually falls at lower levels of the regional hierarchy. This indicates the redistribution of national population from the lower levels to the top of the regional hierarchy. This development is not unique to this specific period but is a continuation, and actually strengthening, of patterns of divergence between metropolitan and more peripheral areas since the 1980s (Lundquist et al., 2017).

Similar hierarchical redistribution patterns can be found regarding the shares of employment in various zones of the economy (Table 4).

[Table 4 here](#)

During the crisis period, metropolitan areas increased their employment shares at the expense of regions at lower levels of the hierarchy. Stockholm LLM is standing out here as it gained its shares in all zones of the economy. For non-metropolitan regions, the development is characterised by decrease of shares in all economy zones (with exception of material foundational economy activities in peripheral regions). In that respect, regions at lower levels of the hierarchy are not only suffering from employment decline in absolute numbers (as all regions do), but they additionally lose their share in the national employment in various zones

of the economy. This points to the redistribution of national employment towards metropolitan areas in times of crisis.

The pattern continues in the recovery and growth period: Stockholm continues (at an accelerating rate) to concentrate employment in all economy zones with the trend reinforced by other metropolitan areas. FE employment is redistributed towards metropolitan areas following the concentration of employment in these regions.

Considering the share of foundational activities in regional employment in different types of regions provides additional details with respect to the hierarchy in their spatial distribution (Table 5).

[Table 5 here](#)

The share of FE in total regional employment increases at lower level of the regional hierarchy. The differences between the regions are reinforced over time as FE share decreases in two largest metropolitan areas – Stockholm and Gothenburg – while it increases in all other regions. By 2016, it ranges between 43.5 per cent in Stockholm and 52.5 per cent in the large regional centres.

All in all, the spatial (re)distribution of employment (in absolute numbers) in the FE zone closely follows population patterns in Sweden over the considered time period: regions with higher population have higher employment in foundational activities. This is in line with the necessity of foundational services to be locally provided (Froud et al., 2018). At the same time, the share of foundational activities in local employment tends to increase at lower level of regional hierarchy, particularly when comparing Swedish metropolitan areas to the rest of the economy. This underlines the claims made in the literature that the FE is likely to be of greater economic importance in more peripheral regions (Moore and Collins, 2020).

Focusing on the performance of regions during crisis, recovery and growth reveals a rather interesting sequence (Table 5 and Figure 4).

[Figure 4 here](#)

Overall, three metropolitan regions outperform the rest of the country both in terms of suffering less from employment decline during the crisis (2007-2009), but also demonstrating faster recovery after 2009. Recovery in smaller regional centres and peripheral regions could not compensate for employment loss during the crisis, resulting in a negative performance over the 2007-2016. As a result, we observe the increased divergence in employment growth across regions at different layers of the regional hierarchy, which fits nicely with redistribution of population discussed above.

When it comes to the foundational zone of the economy, it performed better during the crisis of 2007-2009 than regional economy on the whole in all regions except Stockholm and Malmö. There are, however, regional differences here: while in larger regions it was providential foundational activities that demonstrated smaller employment decline, in more peripheral areas it was material FE zone that was relatively unaffected. During recovery and growth after 2009, however, material foundational economy kept losing its share in all regions except Stockholm resulting in the overall decline over the considered time period. The providential FE zone, on the other hand, demonstrated faster-than-average recovery and growth in relative terms in all regions and ended up being one of the top economy zones in terms of overall performance over 2007-2016. This contributed to the increase of its share in total regional employment in all regions.

An interesting observation is that employment growth in providential foundational economy accelerated after 2014 in all regions. We have two tentative explanations (which are not mutually exclusive) to that fact. Firstly, in 2014 there was a change in the governing coalition from centre-right to centre-left as a result of parliament election. This might have led to the increased focus on welfare provision which is the major function of the providential foundational economy zone. Secondly, 2015 marked a dramatic increase in the number of immigrants to Sweden which required the proportional increase in demand for welfare services which, in its turn, resulted in the accelerated employment growth in the providential foundational economy zone.

Despite some similarities, there were also dramatic differences between regions at different levels of regional hierarchy. These are briefly summarised below.

In Stockholm, the overall employment falls slightly in the crisis (-0.1 per cent between 2007 and 2009; corresponding to losing 867 jobs) but it is far from the magnitude experienced in other regions. The FE zone is hit by the crisis earlier and stronger compared to the tradeable

and overlooked economy zones (see panel (a) in Figure 4). In that respect, neither material nor providential foundational activities act as a stabilising factor for Stockholm LLM; it is rather the other way around. In the recovery and growth period the leading role is played by the overlooked economy zone that somewhat surprisingly shows outstanding growth rates followed by the providential FE zone. Tradeable activities mirrored overall recovery and growth trend of Stockholm economy but never exceeded it (that likely has to do with the strong base effect as the tradeable economy is by far the largest employment zone in Stockholm LLM). Finally, material foundational activities demonstrated lagged recovery compared to other economy zones in Stockholm but continued to grow steadily thereafter, making Stockholm the only region in which employment in material foundational economy zone increased between 2007 and 2016.

In Gothenburg, the overall performance during the crisis was significantly worse but recovery and subsequent relative employment growth were at par with Stockholm LLM. The internal dynamics between the economy zones, however, played out quite differently. The providential FE zone demonstrated better performance during the crisis than any other sector in the economy and also led the recovery and growth after 2009. Tradeable economy zone took some time to recover from the deep decline in employment in 2009, but its fast growth after 2014 ensured that it performed better than the economy as a whole over the 2007-2016 time period. Material foundational activities were strongly affected during the crisis and did not recover until 2016.

Malmö was somewhat less hit by the crisis compared to Gothenburg but had a much weaker recovery. The internal dynamics between the economy zones resembled that of Gothenburg with a couple of minor exceptions. The providential FE zone performed quite well both in crisis and recovery, but particularly after 2012 when it leapt forward from other economy zones in terms of employment growth. Between 2012 and 2016, providential economy zone increased its share of employment by more than two percentage points (from 32.5 to 34.7 per cent). Material foundational activities represented the largest share of Malmö employment in 2007 compared to all other regions but suffered from strong decline during the crisis and never recovered to the pre-crisis level.

When comparing growth trajectories of large regional centres, smaller regional centres and peripheral regions, a shared feature is the dramatic fall in tradeable economy zone during the crisis (7.3-9.2 per cent) that far exceeded that in metropolitan regions (growth in Stockholm, and between 2.8 and 4.2 per cent decline in Gothenburg and Malmö). Demonstrating a

relatively fast recovery during a couple of years after 2009, employment hit the ceiling and stagnated/declined thereafter. This had a particularly negative impact in smaller regional centres and peripheral regions as they never returned to pre-crisis total employment levels. In large and smaller regional centres, employment decline in tradeable zone is partly off-set by a steady employment increase in providential foundational activities which are the only economy zone where employment returned to pre-crisis level. Same is true for peripheral regions; however, the recovery in providential foundational employment is smaller in magnitude and much delayed.

All in all, based on the discussion above we can claim that the performance of foundational economy zone during the crisis (for both material and providential FE) and during the recovery and subsequent growth (for providential FE) indicates that it might be a factor of regional resilience helping regions to mitigate employment decline when the crisis hits, and also boosting regional recovery after the crisis. To test this idea further, we perform the regression analysis that relates regional characteristics of foundational economy to the overall employment growth in regions during crisis and recovery.

4. Foundational economy and regional employment in times of crisis and growth

4.1. Measuring the regional presence of the foundational economy

To investigate the impact of FE on regional development we define two measures. The first one is simply the share of foundational activities (separately for material FE and providential FE) in regional employment. This allows us to analyse whether the scale of foundational activities in a region is related to the regional performance.

The second measure makes use of recent advances in research on skill relatedness and associated measures of regional related variety (Fitjar and Timmermans, 2017, Kuusk and Martynovich, 2020, Neffke and Henning, 2013). The starting point is the notion that excessive exchange of labour between two industries signals overlapping skill requirements between them and indicates that these industries are related (Neffke and Henning, 2013). In our case, let F_{ij} be an observed flow of labour between industries i and j ($i \neq j$) and \widehat{F}_{ij} – an expected flow of

labour between them derived from industry sizes, growth, and average wages during the same time period^{8,9}. Then the values of ratio of observed to predicted flows

$$SR_{ij} = \frac{F_{ij}}{\widehat{F}_{ij}},$$

that are significantly larger than 1 indicate that industries i and j are skill-related. We obtain a matrix of skill-relatedness indices for each of the $615 \times 614 = 377610$ combinations of 615 industries at the four-digit level of the NACE2.0/SNI2007 classification.

To aggregate constructed linkage metrics to the regional level it is possible to use the weighting procedure proposed by Fitjar and Timmermans (2017):

$$RV_r = \frac{(\sum_{i=1}^N \left(\frac{\sum_j s_{ijr}}{2} \right) \sqrt{q_{ir}}) / N_r}{(\sum_{i=1}^N \sqrt{q_{ir}}) / N_r} \quad (7)$$

where

$$s_{ijr} = \begin{cases} 1, & \text{if } SR_{ij} > 1 \text{ and both industries are present in region } r \\ 0, & \text{if one or both of the conditions are not satisfied} \end{cases},$$

q_{ir} – a share of industry i in regional employment; N_r – a number of industries present in region r . In broad terms, this indicator represents the (weighted) average number of related industries per each industry present in the region.

There are three possible situations, both industries i and j belong to the foundational zone of the economy, one of the industries is foundational and another is not foundation, or both industries fall outside of the foundational category. We can decompose $\sum_j s_{ijr}$ into three categories then:

$$\sum_j s_{ijr} = \sum_j s_{ijr}^{FEZ} + \sum_j s_{ijr}^{NFEZ} + \sum_j s_{ijr}^{AEZ}$$

where s_{ijr}^{FEZ} is relatedness measure for two industries belonging to the foundational economy one, s_{ijr}^{NFEZ} measures relatedness for two industries outside the foundational economy zone, and

⁸ F_{ij} and \widehat{F}_{ij} calculated at the national level.

⁹ For more detailed information on the procedure, consult the methodological supplement to Neffke and Henning (2013).

finally s_{ijr}^{AEZ} is relatedness for industries across economy zones. We can then decompose the regional measure in the following way:

$$RV_r = \frac{(\sum_{i=1}^N \left(\frac{\sum_j s_{ijr}^{FEZ} + \sum_j s_{ijr}^{NFEZ} + \sum_j s_{ijr}^{AEZ}}{2} \right) \sqrt{q_{ir}}) / N_r}{(\sum_{i=1}^N \sqrt{q_{ir}}) / N_r} =$$

$$= RV_r^{FEZ} + RV_r^{NFEZ} + RV_r^{AEZ}$$

where $RV_r^{FEZ} / RV_r^{NFEZ} / RSR_r^{AEZ}$ is the (weighted) average number of related industries per each industry in the foundational zone of economy, non-foundational zones of economy and across zones of economy respectively.

These indicators complement the share of foundational economy in regional employment: if a certain industry i employs a large number of workers (high q_{ir}) but is not related to any other activities present in the region ($\forall j: s_{ijr} = 0$) then its contribution to RV_r is zero. In that respect, these measures indicate how well (on average) various industries are integrated with each other in the regional industry space. In relation to foundational activities, RV_r^{FEZ} measures average relatedness of various industries within the regional foundational economy zone while RV_r^{AEZ} indicates the degree of relatedness across the zones of economy in a region. In the absence of data on input-output linkages this approach proves to be a good way of understanding how well different industries present in a region are connected to each other and the overall degree of integration within regional industry space.

4.2. Estimating relationship between foundational economy and employment growth

To investigate how the local characteristics of the foundational economy are associated with regional employment growth we estimate the OLS model of the following form:

$$Y_r = \alpha_0 + MatFE_r \alpha_1 + ProvFE_r \alpha_2 + RV_r \alpha_3 + Control_r \alpha_4 + \varepsilon_r \quad (18)$$

where Y_r represents employment growth in region r , $MatFE_r$ and $ProvFE_r$ are the measure of material and providential foundational activities in regional employment in region r , RV_r indicates related variety in a region r (total and separately for each of its components), and finally $Control_r$ is a matrix containing control variables values. ε_r is a standard error term. The model is estimated for the whole time period (2007-2016) as well as separately for the period

of crisis (2007-2009) and recovery and growth (2009-2016). All independent variables are measured at the beginning of each respective period.

Choosing employment growth instead of regional GDP or productivity growth as a dependent variable is motivated by our interest not only in purely economic but broader social impact of the 2007-2009 crisis. Not disregarding the importance of value added or increased productivity, employment is better suited to reflect upon the welfare aspect of foundational economy. Given the potentially discouraging impact of 2007-2009 crisis on the labour market participation rate, employment growth is also preferred to changes in regional unemployment rates (Fratesi and Rodríguez-Pose, 2016).

For the whole time period, we also estimate the random effects panel model of the following form:

$$Y_{rt}^{t+2} = \beta_0 + MatFE_{rt}\beta_1 + ProvFE_{rt}\beta_2 + RV_{rt}\beta_3 + Control_{rt}\beta_4 + \theta_t + \varepsilon_r \quad (2)$$

where Y_{rt}^{t+2} – employment growth in region r between t and $t+2$ ¹⁰, and θ_t represents unobserved time-specific shocks that are uniform across all regions, such as national or global shocks.

A 3-year period panel model is preferred over a model capturing year-to-year variation in the data for two reasons: First, regional structural preconditions change rather slowly, implying a relatively low year-by-year variation within regions (Firgo and Mayerhofer, 2017). Second, year-to-year models only identify short-run associations between structural factors and regional growth, leaving out long-run effects. Yet, as changes in structural conditions often take time to translate into growth, it makes more sense to employ an interval model rather than a year-to-year model.

There is an agreement in the literature that similar economic structures do not necessarily produce similar economic effects in regions that fundamentally differ from each other (Ženka et al., 2019). As regional trajectories are more complex than industrial trajectories (Webber et al., 2018), it is important to differentiate the relationship between industry structures and regional outcomes in different kinds of regions. In our case, to account for the fact that the spatial distribution of foundational activities is related to the spatial patterns of population and

¹⁰ The model uses the ‘rolling’ estimation periods where each subsequent period is moved one year forward. For instance, the period $(t, t+k)$ is followed by the period $(t+1, t+k+1)$. This is done to minimise the impact of idiosyncratic fluctuations in the independent variables on the regressions results.

to investigate whether this has an impact on relationship between the local presence of the foundational economy and regional employment growth, we specify the following dummy variable:

$$Depop_r = \begin{cases} 1, & \text{if population}_r^{2016} < \text{population}_r^{2007} \\ 0, & \text{if population}_r^{2016} \geq \text{population}_r^{2007} \end{cases}$$

By interacting this dummy variable with the measures of regional characteristics of the foundational economy¹¹, we can estimate whether the association between the latter and regional employment growth differs between depopulation regions and regions with increasing population.

As control variables, we include some general structural characteristics of local labour markets. We account for the share of employment in manufacturing to control for the sensitivity of regional labour markets to macroeconomic conditions as ‘manufacturing and construction industries have been viewed as being more cyclically sensitive than private service industries’ (Martin, 2012, p. 13). To capture the regional innovativeness and competitiveness, we define the share of regional employment in high-tech manufacturing¹² and the share of employment in knowledge-intensive services¹³. Human capital effects on regional employment dynamics is captured by the share of regional population with higher education (within the group of workers aged 25+). Finally, urbanisation externalities are captured by population density of regions.

¹¹ The model specified in equation (1) takes the following form:

$$Y_r = \alpha_0 + MatFE_r(\alpha_1 + \alpha_5 * depop_r) + ProvFE_r(\alpha_2 + \alpha_6 * depop_r) + RV_r(\alpha_3 + \alpha_7 * depop_r) + Control_r\alpha_4 + \varepsilon_r$$

The model specified in equation (2) takes the following form:

$$Y_{rt}^{t+2} = \beta_0 + MatFE_{rt}(\beta_1 + \beta_5 * depop_r) + ProvFE_{rt}(\beta_2 + \beta_6 * depop_r) + RV_{rt}(\beta_3 + \beta_7 * depop_r) + Control_{rt}\beta_4 + \theta_t + \varepsilon_r$$

¹² High-tech manufacturing includes high-technology and medium-high-technology sectors as defined by OECD. This corresponds to the following two-digit sectors in NACE2.0. (20-21, 26-30).

¹³ Knowledge-intensive services are defined according to the OECD definition. This corresponds to the following two-digit sectors in NACE2.0. (50-51, 58-66, 69-75, 78, 80, 84-93).

4.3. Regression results

Table 6 presents the estimation results for the OLS and random effects model for the whole time period.

[Table 6 here](#)

The results of estimating OLS models indicate that the share of material foundational activities does not have any significant relationship with the regional employment growth while the share of providential foundational activities is negatively associated with it. Higher regional related variety tends to correlate with faster increase in employment, driven primarily by related variety within the non-foundational economy zone and across economy zones. Model diagnostics indicate that the former association is somewhat stronger. At the same time, related variety within the foundational economy (FE) zone is not correlated significantly with regional employment growth.

Random effects panel models, in general, confirm the findings summarised above. Two key differences are that (1) related variety within the FE zone is now weakly, but significantly associated with regional employment growth; and (2) model diagnostics prioritise the integration between foundational and non-foundational economy zones over related variety between non-foundational industries. The best model, however, is the one that accounts for the total related variety in the region.

All in all, it appears that having a large foundational sector in a region is not something to be desired as it tends to correlate with slower employment growth (particularly with respect to the providential foundational activities). This negative relationship is mitigated somewhat if foundational activities are well integrated with the regional non-foundational economy zone.

Looking at the models that account for heterogeneity of regional population growth patterns additionally qualifies the results above (Table 7).

[Table 7 here](#)

Most importantly, the negative association of providential activities share with regional employment growth is greatly mitigated in depopulating regions. That is, higher share of providential activities is more damaging in regions with increasing population. This result is observed both in OLS and random effects panel models. This is consistent with the fact that the providential foundational employment is growing across all groups of regions but contributes particularly strong to job creation only in smaller regional centres and peripheral regions which are suffering from depopulation.

When it comes to related variety measure and its sub-components, OLS models do not provide any additional evidence. Panel models, however, suggest that the impact of total related variety as well as integration within and between various zones of the economy is stronger in regions with growing population. This is in line with previous findings in the literature that related variety tends to have stronger relationship with employment growth in more successful regions (Firgo and Mayerhofer, 2017, Kuusk and Martynovich, 2020).

Looking at the relationship between characteristics of the local foundational economy and employment growth in times of crisis vs. recovery and growth reveals the differential role of foundational activities (Table 8).

[Table 8 here](#)

In times of crisis, regions with large share of providential foundational activities tend to be disadvantaged, similarly to the observations for the whole time period. Material foundational economy is not associated significantly with employment growth dynamics. What is interesting, however, higher related variety within the foundational economy zone has a positive association with regional employment growth during crisis. There is an additional positive association between employment dynamics and integration across the zones of the economy.

Thus, in times of crisis having a large foundational sector tends to accelerate employment decline in a region, which however can be offset if regional foundational economy zone is coherent within itself and integrated with the rest of the economy.

The dynamics is reversed in the times of recovery and growth. It is now the related variety within the tradeable zone of the economy that seems to support regional employment growth. That is much in line with most of literature on related variety. Also, the negative association

between the share of the foundational zone and employment growth disappears in times of growth. This may be related to the good performance of providential foundational activities as was discussed in Section 3.

Considering regional population growth patterns provides some additional details to the picture (Table 9).

[Table 9 here](#)

The model for the crisis period maintains the importance of integration within the foundational economy zone while still underlining the negative impact of large presence of providential foundational activities in the regions *per se* (Model 2). These associations are not differentiated between regions with growing population and depopulating regions. The integration across economy zones becomes insignificant.

The population growth patterns, however, seem to have an impact in the recovery and growth models. Here, the related variety within the non-foundational economy continues to have a positive association with employment growth, which is, though, stronger in regions with growing population. Once again, this is consistent with the literature.

What is more interesting, however, the models without regional heterogeneity masked the highly differential relationship between the share of providential foundational activities and employment growth in regions with growing population vs. depopulating regions. In the former, the association is negative. That is, in times of overall recovery and growth in the national economy, having a stronger local presence of providential employment tends to slow down employment growth despite the fact that such activities are expanding rather fast. This points to the fact that in successful regions faster job creation demands strong dynamics in non-foundational economy zones.

At the same time, the negative association between providential foundational employment share and regional employment growth turns positive in depopulating regions. This is consistent with the findings from the descriptive analysis that in regions at lower levels of regional hierarchy, which are suffering from depopulation, providential foundational economy zone was the only one to return to pre-crisis employment levels during the recovery period meaning that it was the only sector to create additional jobs.

Overall, the findings from regression analyses indicate that the foundational economy does not really generate new jobs: to stimulate employment growth, regions need a strong and large non-foundational sector. However, in crisis times the foundational sector may act as a stabilisation factor, particularly if it is diverse, but coherent. Importantly, but not surprisingly, the relationship between foundational economy zone and regional growth creation seems to be more positive in depopulating regions, particularly in the recovery and growth period.

5. Foundational economy: a factor of regional resilience?

In this paper, we set off to explore the employment in foundational zone of the economy in Sweden between 2007 and 2016. Following suggestions in the literature, we structured our discussion along two interrelated dimensions: geographical, in that we investigated hierarchies in spatial distribution of employment in foundational activities across various types of regions, and temporal, as we followed foundational economy employment during and in the aftermath of 2007-2009 crisis. Additionally, we analysed how regional characteristics of the foundational economy – its share, variety, and integration with other economy zones – was related to the overall performance of regional labour markets in crisis and recovery periods. Our findings allow us to discuss the role of foundational economy as stabiliser in turbulent times.

First, despite being largely disregarded in (regional) economic policies in favour of export- and technology-intensive sectors, foundational economy plays an important role as it employs almost a half of workers nationally and more than that in the majority of regional labour markets. In fact, its share in national employment increased over time as 170 thousand new jobs were created in the foundational zone of the economy between 2007 and 2016.

Second, foundational economy employment is unevenly distributed across regions. On the one hand, in line with the predictions in the literature (Barbera et al., 2016, Calafati et al., 2019), its spatial distribution pattern are almost perfectly correlated with patterns of population density, and spatial redistribution of population over time led to corresponding redistribution of employment in the foundational economy zone. On the other hand, there is a rather strict hierarchy when it comes to the role that foundational activities play in regions at different levels of the Swedish regional hierarchy. Their share in regional employment tends to increase from metropolitan areas to peripheral regions. In that respect, the foundational economy's role as

provider of jobs is more pronounced in less developed regions (Heslop et al., 2019b, Moore and Collins, 2020).

Third, in all regions but Stockholm and Malmö, the foundational economy zone suffered from less employment decline than the rest of the economy. This corresponds to the non-cyclical demand for foundational goods and services as the foundational economy supplies everyday necessities, consumption of which cannot be postponed. Besides, this is in line with the sheltered nature of foundational activities – that is, limited exposure to international and interregional competition (Bentham et al., 2013a, Moore and Collins, 2020). What is surprising, however, in most regions, employment in the foundational economy zone increased above regional average also after the trough of the crisis in 2009. This is primarily attributed to the providential component of the foundational economy zone, that is, provision of crucial welfare services to the population. The latter grew much faster in metropolitan areas, possibly reflecting the redistribution of population from peripheral to more dynamic regions.

Such employment dynamics in the foundational economy zone, coupled with predictions in the literature about sheltered' economic activities and industries with non-cyclical demand as regional stabilisers (Ezcurra, 2011, Webber et al., 2018, Ženka et al., 2019), may tempt us to conclude that regions with higher share of such activities in their employment portfolios will be less affected by the crisis; that is, foundational economy may be a positive factor of regional resilience. Is that so? Not really!

Our results are more in line with Fratesi and Rodríguez-Pose (2016) who demonstrated that European regions that had developed more sheltered economies over time tended to perform, on average, worse in terms of employment change during the Great Recession of 2007-2009 than more open economies. More specifically, Swedish regions that had higher share of foundational activities in regional employment before the crisis appeared to suffer more with respect to employment growth between 2007 and 2016, and particularly during the most severe crisis years (2007-2009). There are, however, several important qualifications to this result.

First, the relationship between foundational activities share and regional employment growth differs between regions with growing population and depopulating regions, particularly in the time of recovery and post-crisis growth. In depopulating regions, which are likely to be found at lower levels of regional hierarchy, the association turns positive after 2009. In such regions, foundational activities (specifically, providential foundational activities) were the only ones to return to pre-crisis level of employment. Thus, they were the only drivers of job creation.

Whether this is the outcome of regional/national welfare policies or the result of relocation of jobs and/or production facilities to other regions remains outside the scope of this paper and deserves additional research. Whatever the reason, post-crisis recovery and growth in depopulating regions tend to benefit regions with higher share of employment in the foundational economy zone. More generally, we agree with Ženka et al. (2019) that similar industrial structures (in our case, in terms of share of foundational employment) may produce different regional outcomes with respect to resilience to crises.

Second, while the size of the foundational economy zone tends to have a negative association with employment growth, the related variety between foundational industries as well as integration between foundational and non-foundational economy zones appear to contribute to slower employment decline in the trough of the crisis. We can relate this to the results of Christopherson et al. (2010) who showed that in the USA regions least affected by the economic crisis included those with high diversity in, among others, educational and health institutions (that are parts of the providential foundational economy). A positive role of integration between foundational and non-foundational economic zones in the crisis times (as well as over the whole period between 2007-2016) underlines the importance of considering the regional economies as a whole rather than treating tradeable/competitive and foundational sectors as independent entities¹⁴. Where ‘competitive’ emphasises the need for change, ‘foundational’ focuses on continuity and stability, and both are needed to make regions more resilient to economic shocks (Boschma, 2015).

The latter points allow us to contribute to the burgeoning literature relating regional resilience to regional industry structures (see, among others, Ezcurra, 2011, Fratesi and Rodríguez-Pose, 2016, Martin et al., 2016, Ženka et al., 2019). There is an agreement in this literature that industrial variety in a region spreads risks and can better accommodate economic shocks (Desrochers and Leppälä, 2011, Essletzbichler, 2007), particularly when local industries are skill-related, that is require similar skills, as this enhances regional labour matching (Neffke and Henning, 2013). Besides, related variety enhances the recombination potential of a region

¹⁴ Indeed, proponents of ‘competitive paradigm’ of regional development are readily reading off policy lessons from success stories of dynamic regions: if only less dynamic cities and regions develop clusters, build regional innovation systems, pursue ‘smart specialization’, etc. then their economies will be revitalised (Martin 2015). Supporters of ‘foundational view’ propose that we need to displace the idea of a ‘competitive region’ and focus instead on grounded cities and regions driven by their foundational economy (Engelen et al. 2017).

and provides local (related) resources on which new growth paths can build and develop, thus improving long-term regional resilience (Boschma, 2015).

In our case, overall related variety in a region appeared to correlate with faster employment growth over the whole time period between 2007 and 2016, which confirms the results in the literature. There are, however, critical differences between the acute phase of the crisis and the post-crisis recovery. In the former, it is related variety within the foundational economy zone as well as between foundational and non-foundational economy zones that tends to boost the ability of region to retain jobs. This relationship does not seem to differ between regions with growing population and depopulating regions. During the post-crisis recovery, however, variety in non-foundational/tradeable sectors tends to stimulate regional job creation more, particularly in regions with growing population. Thus, it is neither variety as a whole nor total related variety in region that matters for its resilience, but rather related variety *within certain groups of industries and at certain times*.

So where does this leave us with regards to foundational economy as a factor of regional resilience? On the one hand, being sheltered from international and interregional competition and facing non-cyclical demand, foundational economy zone manages to retain more jobs (in relative terms) than other economy zones. Besides, related variety within foundational economy tends to associate with less regional employment decline during the trough of the crisis. Thus, if we define resilience as the capacity of a region to respond better to short-term shocks, then we have evidence pointing to the foundational economy as contributing positively to regional resilience.

Contemporary definitions of resilience, however, tend to underline the capacity of regions to sustain long-term development, that is their ability to adapt and reconfigure their industrial, technological and institutional structures in an economic system that is restless and evolving (Boschma, 2015). While our analysis does not allow us to say much about the relationship between the foundational economy and the ability of regions to transform, the long-term focus of this definition renders the capacity of foundational economy to contribute to regional resilience as very limited. Indeed, once the economy passes the trough of the crisis, the foundational economy keeps its positive contribution only in the depopulating regions, while related variety in non-foundational sectors tends to promote job creation overall.

6. Concluding remarks

Overall, we find that the foundational economy plays an important role in providing employment to a substantial number of Swedish workers. Besides, it seems to be associated with better ability of regions to retain employment in the most acute phases of economic crises. Yet, its overall contribution to regional resilience in the long-terms appears to be rather limited.

When discussing the implications of our results in relation to the foundational economy literature and its suggestion that foundational sectors should take the centre stage in economic development policy, we want to underline two important qualifications to our study. First, while our analysis highlights that the foundational economy is positively associated with regional employment dynamics in some periods (especially during economic crises) and some regions (especially depopulating regions), our results do not suggest that the foundational economy is in general driving economic growth. However, it is important to remember that a central motivation for the work of proponents of the foundational economy is the skewed attention towards the tradeable economy zone in policymaking (Froud et al., 2018). Thus, one might hypothesise that the relative importance of the foundational economy zone for employment growth would be greater, relative to the tradeable economy zone, if policy support for these parts of the economy was balanced. While one could expect that the emphasis in policymaking on the tradeable economy zone would be less predominant in Scandinavian welfare states, previous research suggests that high-tech, traded industries are also prioritised in economic development policies in these countries (Hansen and Winther, 2014).

Second, the argument of foundationalists for placing foundational sectors in the centre of economic development policy is not only related to job creation effects. Additional arguments relate to improving working conditions for employees in the foundational economy zone and enhancing quality and accessibility of foundational services that matter to all (Froud et al., 2018). Thus, it would be beneficial for future research to complement the focus on employment growth with other dependent variables measuring working conditions as well as quality and affordability in foundational service provision. Still, we argue that job creation is indeed a fundamental element allowing citizens to live decent lives, and the current paper thereby provides a first detailed, longitudinal analysis of the role of the foundational economy across different types of regions.

Focusing on the relationship between the foundational economy and regional employment dynamics, we had only a limited opportunity to discuss the former as the driver of regional

structural change and economic growth. This, however, is an interesting avenue for further research that would allow for a broader understanding of economic impact of foundational activities. Such research direction would require a different approach, focusing on induced effects on growth rates in value added and productivity not only inside, but also (and, perhaps, more importantly) outside the foundational economy zone. There are many questions to be addressed. When and under which circumstances does regional presence of foundational activities is an enabler for building competitive advantage of cities and regions? Can it be a constraint? Can regions that are ‘left behind’ benefit not only from the stabilising function of the foundational economy zone, but also use it to escape their inferior growth paths. Alternatively, is the foundational economy zone’s role in this context rather to help regions to “shrink with dignity”? Answering these questions would help to better understand the hypothesised role of the foundational economy as a driver of regional resilience, beyond our approach. This would require combining systematic quantitative studies on the role of foundational economy across different types of regions with in-depth qualitative inquiries that would allow exploring various configurations of the mechanisms of interaction between foundational and tradeable economy zones.

In terms of policy, we claim that rather than saying that the foundational economy should be the starting point for economic development policy (as its proponents suggest (Froud et al., 2018)), we would suggest a more context-sensitive approach that would prioritise foundational sectors for job creation and stabilisation of regional labour markets in some places and in certain time periods. More generally, our analysis suggests that we need to move away from the foundational/traded dichotomy. Echoing the work within evolutionary economic geography, our analysis points to the importance for policy of considering interconnections between these parts of the economy, as well as coherency of regional foundational and tradeable industrial profiles. Prioritisations of policymakers should thereby also depend on the sets of foundational and tradeable industries that are already present in specific regions.

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Appendix 1. Figures

Figure 1. Zones of the economy



Figure 2. National employment growth index (2007=100)

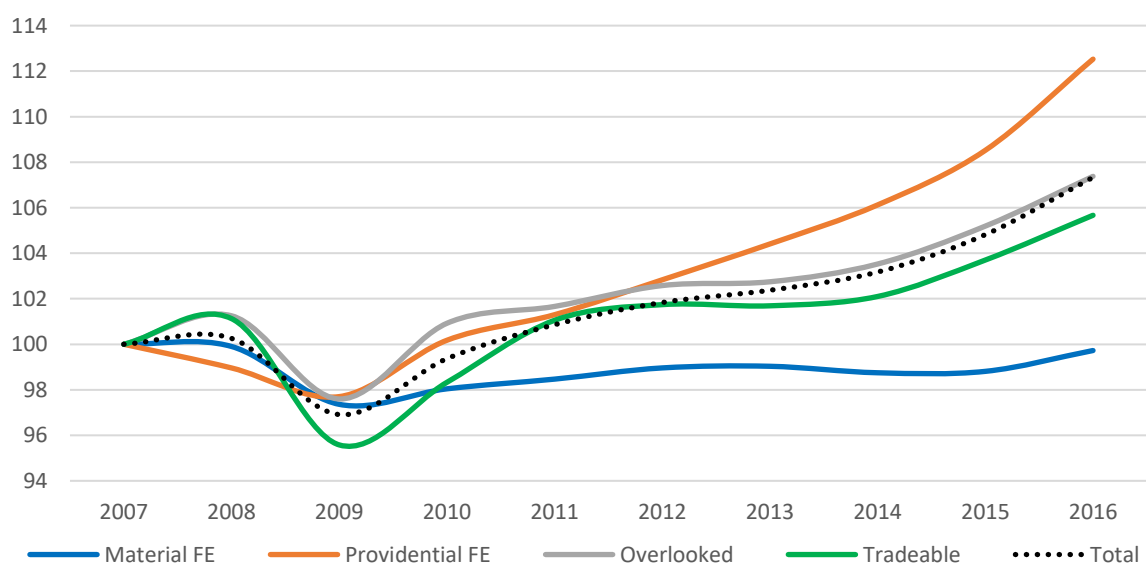


Figure 3. Foundational economy shares in Swedish LLMs

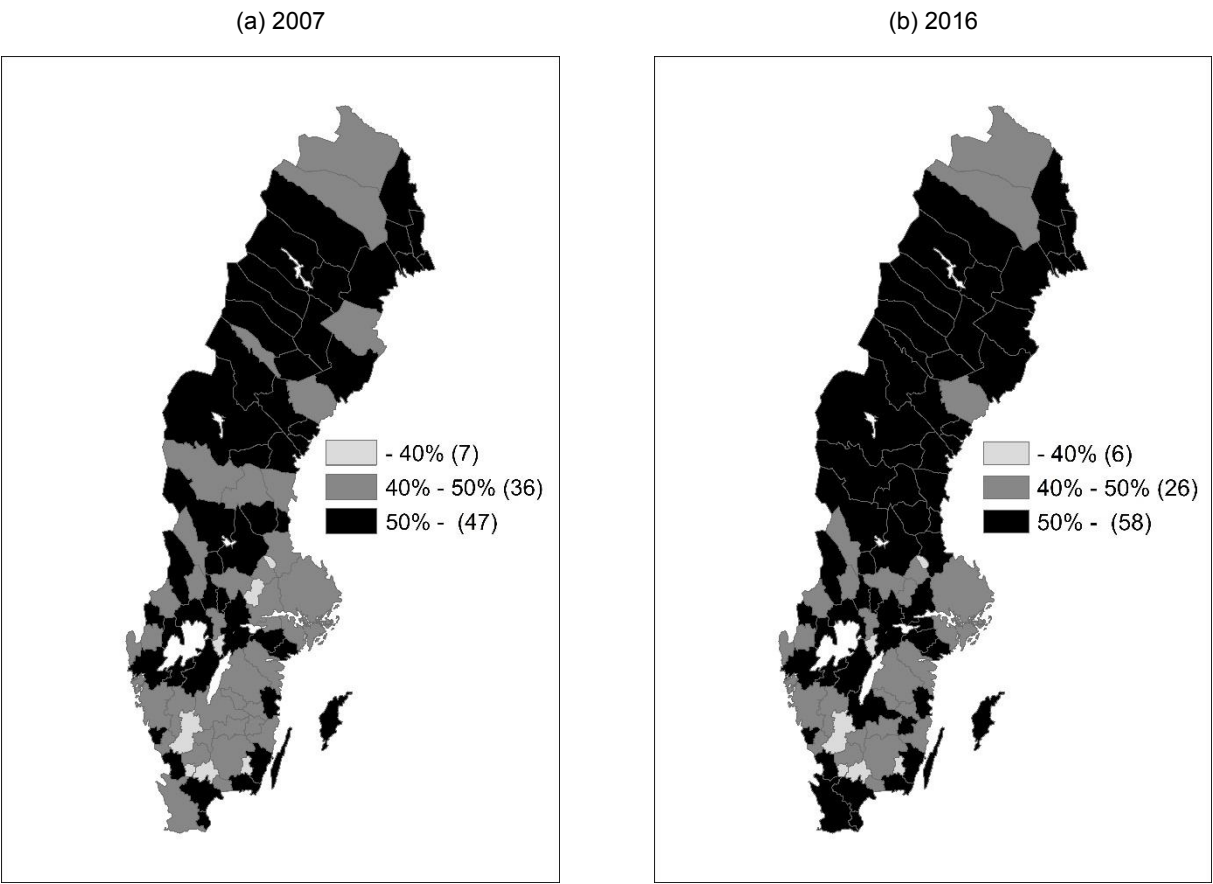
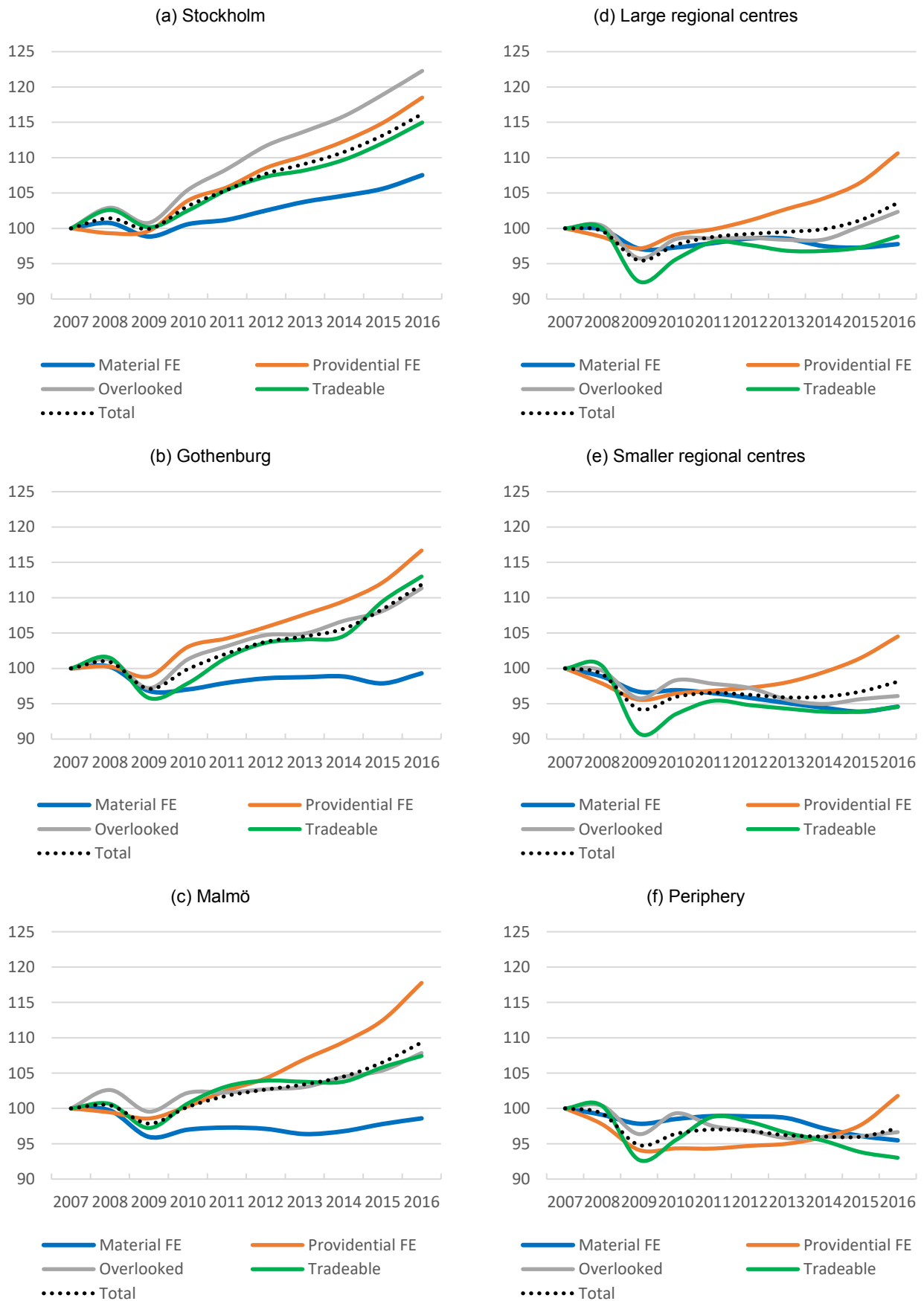


Figure 4. Regional employment growth index (2007=100)



Appendix 2. Tables

Table 1. Allocation of industries across zones of the economy

Zone	Number of industries	% of industry codes
Material FE	143	23.25%
Providential FE	33	5.37%
FE total	176	28.62%
Overlooked economy	139	22.60%
Tradeable economy	300	48.78%
Total	615	100%

Table 2. National employment in different zones of the economy, 2007-2016

	Employment growth			Share in total employment			
	2007 - 2009	2009 - 2016	2007 - 2016	2007	2009	2012	2016
Material FE	-2.6%	2.3%	-0.3%	15.0%	15.1%	14.6%	14.0%
Providential FE	-2.3%	15.2%	12.5%	32.7%	33.0%	33.0%	34.3%
FE total	-2.4%	11.2%	8.5%	47.7%	48.1%	47.6%	48.3%
Overlooked economy	-2.4%	10.0%	7.4%	18.4%	18.6%	18.6%	18.4%
Tradeable economy	-4.4%	10.6%	5.7%	33.9%	33.4%	33.8%	33.3%
Total economy	-3.1%	10.8%	7.3%	100%	100%	100%	100%
Absolute numbers	-131,302	443,086	311,784	4,251,677	4,120,375	4,329,699	4,563,461

Table 3. Population and foundational economy employment across regional groups

	No of LLMs	2007				2016			
		Population	FE emp	Average population	Average FE emp	Population	FE emp	Average population	Average FE emp
Stockholm	1	2,316,195	505,009	2,316,195	505,009	2,678,905	580,374	2,678,905	580,374
Gothenburg	1	951,605	202,673	951,605	202,673	1,053,426	225,070	1,053,426	225,070
Malmö	1	994,692	212,457	994,692	212,457	1,109,374	236,124	1,109,374	236,124
Large regional centres	20	3,170,107	729,762	158,505	36,488	3,378,814	779,956	168,941	38,998
Smaller regional centres	23	1,035,015	221,601	45,001	9,635	1,058,069	224,794	46,003	9,774
Periphery	44	715,313	151,859	16,257	3,451	716,565	151,443	16,286	3,442
Total	90	9,182,927	2,023,361	Corr=0.99¹⁵		9,995,153	2,197,761	Corr=0.99⁴	

¹⁵ Correlation is measured based on actual population and foundational economy employment in 90 LLMs.

Table 4. Employment shares of economy zones and hierarchical redistribution in times of crisis (2007-2009) and recovery/growth (2009-2016)

	Share of national employment 2009					Redistribution of national shares 2007-2009				
	Material	Providential	Overlooked	Tradeable	Total	Material	Providential	Overlooked	Tradeable	Total
Stockholm	26.3	25.0	25.8	32.6	27.9	0.38	0.49	0.82	1.49	0.84
Gothenburg	10.3	10.0	10.3	12.2	10.8	-0.06	0.12	-0.04	0.03	0.02
Malmö	11.4	10.1	9.9	10.1	10.3	-0.17	0.09	0.19	0.17	0.10
LRC ¹⁶	33.4	37.0	33.7	29.4	33.3	-0.10	-0.20	-0.64	-0.99	-0.51
SRC ¹⁷	10.7	10.8	12.4	10.0	10.8	-0.08	-0.24	-0.24	-0.53	-0.31
Periphery	7.8	7.1	8.0	5.6	6.9	0.03	-0.27	-0.10	-0.17	-0.15
	Share of national employment 2016					Redistribution of national shares 2009-2016				
	Material	Providential	Overlooked	Tradeable	Total	Material	Providential	Overlooked	Tradeable	Total
Stockholm	27.9	25.8	28.5	33.9	29.3	1.56	0.80	2.61	1.26	1.37
Gothenburg	10.3	10.2	10.7	13.1	11.3	-0.01	0.24	0.40	0.82	0.42
Malmö	11.4	10.5	9.7	10.1	10.3	0.00	0.37	-0.17	-0.01	0.08
LRC ⁵	32.8	36.6	32.7	28.4	32.6	-0.66	-0.43	-1.02	-0.97	-0.70
SRC ⁶	10.2	10.2	11.3	9.4	10.2	-0.51	-0.55	-1.11	-0.58	-0.66
Periphery	7.4	6.7	7.2	5.1	6.4	-0.39	-0.44	-0.72	-0.52	-0.52

¹⁶ Large regional centres

¹⁷ Smaller regional centres

Table 5. Regional employment in different zones of the economy, 2007-2016

	Employment growth			Share in total employment			
	2007 - 2009	2009 - 2016	2007 - 2016	2007	2009	2012	2016
Stockholm							
Material FE	-1.2%	8.8%	7.5%	14.4%	14.2%	13.7%	13.3%
Providential FE	-0.4%	18.9%	18.5%	29.6%	29.6%	29.9%	30.2%
FE total	-0.6%	15.6%	14.9%	44.0%	43.8%	43.5%	43.5%
Overlooked economy	0.8%	21.3%	22.3%	17.0%	17.1%	17.6%	17.9%
Tradeable economy	0.2%	14.8%	15.0%	39.0%	39.1%	38.9%	38.6%
Total economy	-0.1%	16.3%	16.2%	100%	100%	100	100
Absolute numbers	-867	186,725	185,858	1,147,626	1,146,759	1,236,402	1,333,484
Gothenburg							
Material FE	-3.2%	2.6%	-0.7%	14.3%	14.3%	13.6%	12.7%
Providential FE	-1.1%	18.0%	16.7%	29.9%	30.4%	30.5%	31.2%
FE total	-1.8%	13.1%	11.1%	44.2%	44.7%	44.1%	43.9%
Overlooked economy	-2.8%	14.5%	11.3%	17.5%	17.5%	17.6%	17.4%
Tradeable economy	-4.2%	17.9%	13.0%	38.3%	37.8%	38.3%	38.7%
Total economy	-2.9%	15.2%	11.8%	100%	100%	100%	100%
Absolute numbers	-13,241	67,584	54,343	458,599	445,358	475,810	512,942
Malmö							
Material FE	-4.0%	2.7%	-1.4%	17.0%	16.7%	16.1%	15.4%
Providential FE	-1.4%	19.5%	17.8%	32.2%	32.5%	32.7%	34.7%
FE total	-2.3%	13.8%	11.1%	49.3%	49.2%	48.8%	50.1%
Overlooked economy	-0.5%	8.3%	7.8%	17.5%	17.8%	17.5%	17.2%
Tradeable economy	-2.8%	10.5%	7.4%	33.3%	33.1%	33.7%	32.7%
Total economy	-2.1%	11.7%	9.3%	100%	100%	100%	100%
Absolute numbers	-9,248	49,472	40,224	431,290	422,042	442,788	471,514
Large regional centres							
Material FE	-2.9%	0.7%	-2.2%	14.8%	15.1%	14.7%	14.0%
Providential FE	-2.8%	13.9%	10.6%	36.1%	36.7%	36.8%	38.5%
FE total	-2.9%	10.0%	6.9%	50.9%	51.8%	51.5%	52.5%
Overlooked economy	-4.2%	6.9%	2.3%	18.6%	18.7%	18.5%	18.4%
Tradeable economy	-7.5%	6.9%	-1.2%	30.5%	29.5%	30.0%	29.1%
Total economy	-4.5%	8.5%	3.6%	100%	100%	100%	100%
Absolute numbers	-65,073	116,469	51,396	1,433,818	1,368,745	1,422,630	1,485,214
Smaller regional centres							
Material FE	-3.3%	-2.2%	-5.4%	14.6%	14.9%	14.5%	14.0%
Providential FE	-4.4%	9.4%	4.5%	32.4%	32.9%	32.8%	34.5%
FE total	-4.1%	5.8%	1.4%	47.0%	47.8%	47.3%	48.6%
Overlooked economy	-4.2%	0.3%	-3.9%	20.8%	21.2%	21.1%	20.4%
Tradeable economy	-9.2%	4.1%	-5.4%	32.2%	31.0%	31.7%	31.0%
Total economy	-5.8%	4.1%	-1.9%	100%	100%	100%	100%
Absolute numbers	-27,187	18,283	-8,904	471,721	444,534	454,070	462,817
Periphery							
Material FE	-2.2%	-2.4%	-4.5%	16.6%	17.1%	17.0%	16.3%
Providential FE	-5.9%	8.1%	1.8%	34.3%	34.1%	33.6%	35.9%
FE total	-4.7%	4.6%	-0.3%	50.9%	51.2%	50.5%	52.2%
Overlooked economy	-3.6%	0.3%	-3.4%	21.1%	21.4%	21.1%	20.9%
Tradeable economy	-7.3%	0.3%	-7.0%	28.0%	27.4%	28.4%	26.8%
Total economy	-5.2%	2.5%	-2.8%	100%	100%	100%	100%
Absolute numbers	-15,475	7,111	-8,364	298,347	282,872	288,778	289,983

Table 6. Foundational economy and employment growth, 2007-2016

Dependent variable - Employment growth	2007-2016 OLS				2007-2016 RE model			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total RV (log)	0.0162*** (0.0057)				0.0135** (0.0055)			
FE RV (log)		0.0123 (0.0134)				0.0195* (0.0110)		
Non-FE RV (log)			0.0101*** (0.0037)				0.0044* (0.0025)	
FE-non-FE RV (log)				0.0191** (0.0074)				0.0111** (0.0049)
Material FE share	-0.0048 (0.0251)	-0.0221 (0.0326)	0.0017 (0.0249)	-0.0160 (0.0253)	0.0069 (0.0271)	-0.0056 (0.0266)	0.0082 (0.0278)	0.0063 (0.0271)
Providential FE share	-0.0400* (0.0228)	-0.0587** (0.0255)	-0.0352 (0.0237)	-0.0489** (0.0214)	-0.0457*** (0.0162)	-0.0592*** (0.0171)	-0.0436*** (0.0160)	-0.0455*** (0.0166)
Human capital	0.0615*** (0.0167)	0.0973*** (0.0184)	0.0629*** (0.0170)	0.0730*** (0.0157)	0.0536*** (0.0154)	0.0727*** (0.0150)	0.0558*** (0.0166)	0.0574*** (0.0149)
Manufacturing share	-0.0320** (0.0131)	-0.0336** (0.0141)	-0.0342*** (0.0129)	-0.0255* (0.0141)	-0.0197 (0.0151)	-0.0177 (0.0174)	-0.0259* (0.0146)	-0.0190 (0.0153)
High-tech manufacturing	-0.0099 (0.0150)	-0.0153 (0.0158)	-0.0095 (0.0152)	-0.0143 (0.0150)	-0.0148 (0.0155)	-0.0158 (0.0145)	-0.0156 (0.0165)	-0.0144 (0.0155)
KIS share	-0.0316 (0.0315)	-0.0458 (0.0294)	-0.0309 (0.0314)	-0.0351 (0.0308)	0.0081 (0.0234)	0.0093 (0.0254)	0.0045 (0.0231)	0.0092 (0.0232)
Population density (log)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0003 (0.0007)	0.0008 (0.0006)	0.0005 (0.0007)	0.0004 (0.0007)
N	90	90	90	90	720	720	720	720
AIC	-708.1282	-700.1278	-708.5081	-705.4677	n/a	n/a	n/a	n/a
BIC	-685.6299	-677.6295	-686.0098	-682.9694	n/a	n/a	n/a	n/a
Within R ²	n/a	n/a	n/a	n/a	0.5393	0.5403	0.5391	0.5389
Between R ²	n/a	n/a	n/a	n/a	0.6622	0.6549	0.6533	0.6615
R ²	0.6889	0.6600	0.6902	0.6796	0.5615	0.5611	0.5598	0.5611

Table 7. Regional heterogeneity models, 2007-2016 (excerpt)

Dependent variable - Employment growth	2007-2016 OLS				2007-2016 RE panel			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total RV (log)	0.0145** (0.0068)				0.0147** (0.0066)			
Total RV (log)* Depop region	-0.0024 (0.0020)				-0.0048* (0.0025)			
FE RV (log)		0.0169 (0.0134)				0.0278* (0.0144)		
FE RV (log)*Depop region		-0.0083 (0.0068)				-0.0167** (0.0082)		
Non-FE RV (log)			0.0098** (0.0048)				0.0100** (0.0048)	
Non-FE RV (log)* Depop region			-0.0023 (0.0021)				-0.0047* (0.0026)	
FE-non-FE RV (log)				0.0203** (0.0092)				0.0258** (0.0102)
FE-non-FE RV (log)* Depop region				-0.0052 (0.0037)				-0.0093** (0.0047)
Material FE share	0.0192 (0.0204)	-0.0057 (0.0278)	0.0253 (0.0209)	0.0063 (0.0204)	0.0209 (0.0188)	-0.0177 (0.0252)	0.0288 (0.0206)	0.0069 (0.0185)
Material FE share* Depop region	-0.0674** (0.0324)	-0.0582 (0.0384)	-0.0689** (0.0310)	-0.0631* (0.0347)	-0.0629** (0.0305)	-0.0395 (0.0375)	-0.0695** (0.0288)	-0.0558* (0.0331)
Providential FE share	-0.0662*** (0.0212)	-0.0893*** (0.0320)	-0.0590*** (0.0212)	-0.0786*** (0.0222)	-0.0732*** (0.0160)	-0.1138*** (0.0291)	-0.0646*** (0.0146)	-0.0873*** (0.0193)
Providential FE share* Depop region	0.0451** (0.0193)	0.0558** (0.0267)	0.0409** (0.0183)	0.0527** (0.0213)	0.0642*** (0.0241)	0.0843*** (0.0320)	0.0573*** (0.0222)	0.0733*** (0.0267)
N	90	90	90	90	720	720	720	720
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AIC	-716.6187	-712.8021	-716.4274	-716.1557	n/a	n/a	n/a	n/a
BIC	-686.6210	-682.8044	-686.4297	-686.1580	n/a	n/a	n/a	n/a
Within R ²	n/a	n/a	n/a	n/a	0.5414	0.5392	0.5416	0.5414
Between R ²	n/a	n/a	n/a	n/a	0.7331	0.7415	0.7263	0.7417
R ²	0.7352	0.7237	0.7346	0.7338	0.5761	0.5759	0.5751	0.5777

Table 8. Foundational economy and employment growth in crisis and recovery

Dependent variable - Employment growth	2007-2009 OLS (crisis)				2009-2016 OLS (recovery and growth)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total RV (log)	0.0178 (0.0142)				0.0121 (0.0073)			
FE RV (log)		0.0411* (0.0216)				-0.0073 (0.0128)		
Non-FE RV (log)			0.0096 (0.0100)				0.0091* (0.0048)	
FE-non-FE RV (log)				0.0325* (0.0187)				0.0061 (0.0083)
Material FE share	0.0048 (0.0312)	-0.0441 (0.0332)	0.0102 (0.0365)	-0.0117 (0.0264)	-0.0099 (0.0313)	-0.0120 (0.0318)	-0.0025 (0.0315)	-0.0185 (0.0301)
Providential FE share	-0.0982** (0.0432)	-0.1584** (0.0612)	-0.0923** (0.0462)	-0.1120** (0.0431)	-0.0196 (0.0163)	-0.0130 (0.0195)	-0.0158 (0.0167)	-0.0221 (0.0155)
Human capital	0.0488 (0.0431)	0.0603* (0.0333)	0.0549 (0.0424)	0.0428 (0.0411)	0.0778*** (0.0172)	0.0923*** (0.0169)	0.0759*** (0.0176)	0.0875*** (0.0166)
Manufacturing share	-0.0958*** (0.0241)	-0.0993*** (0.0227)	-0.0994*** (0.0240)	-0.0827*** (0.0264)	-0.0169 (0.0165)	-0.0256 (0.0167)	-0.0169 (0.0161)	-0.0204 (0.0179)
High-tech manufacturing	0.0101 (0.0330)	0.0068 (0.0331)	0.0098 (0.0330)	0.0077 (0.0323)	-0.0172 (0.0223)	-0.0208 (0.0234)	-0.0170 (0.0219)	-0.0194 (0.0237)
KIS share	-0.0156 (0.0543)	-0.0168 (0.0540)	-0.0178 (0.0541)	-0.0126 (0.0535)	-0.0505* (0.0294)	-0.0614** (0.0288)	-0.0467 (0.0295)	-0.0584** (0.0291)
Population density (log)	0.0002 (0.0015)	0.0007 (0.0017)	0.0004 (0.0015)	-0.0001 (0.0015)	0.0003 (0.0007)	0.0010* (0.0006)	0.0001 (0.0007)	0.0008 (0.0006)
N	90	90	90	90	90	90	90	90
AIC	-540.4710	-542.1534	-539.7856	-543.0568	-677.0258	-674.4739	-678.3203	-674.4909
BIC	-517.9728	-519.6552	-517.2873	-520.5585	-654.5275	-651.9756	-655.8220	-651.9926
R ²	0.4355	0.4460	0.4312	0.4515	0.5702	0.5579	0.5764	0.5580

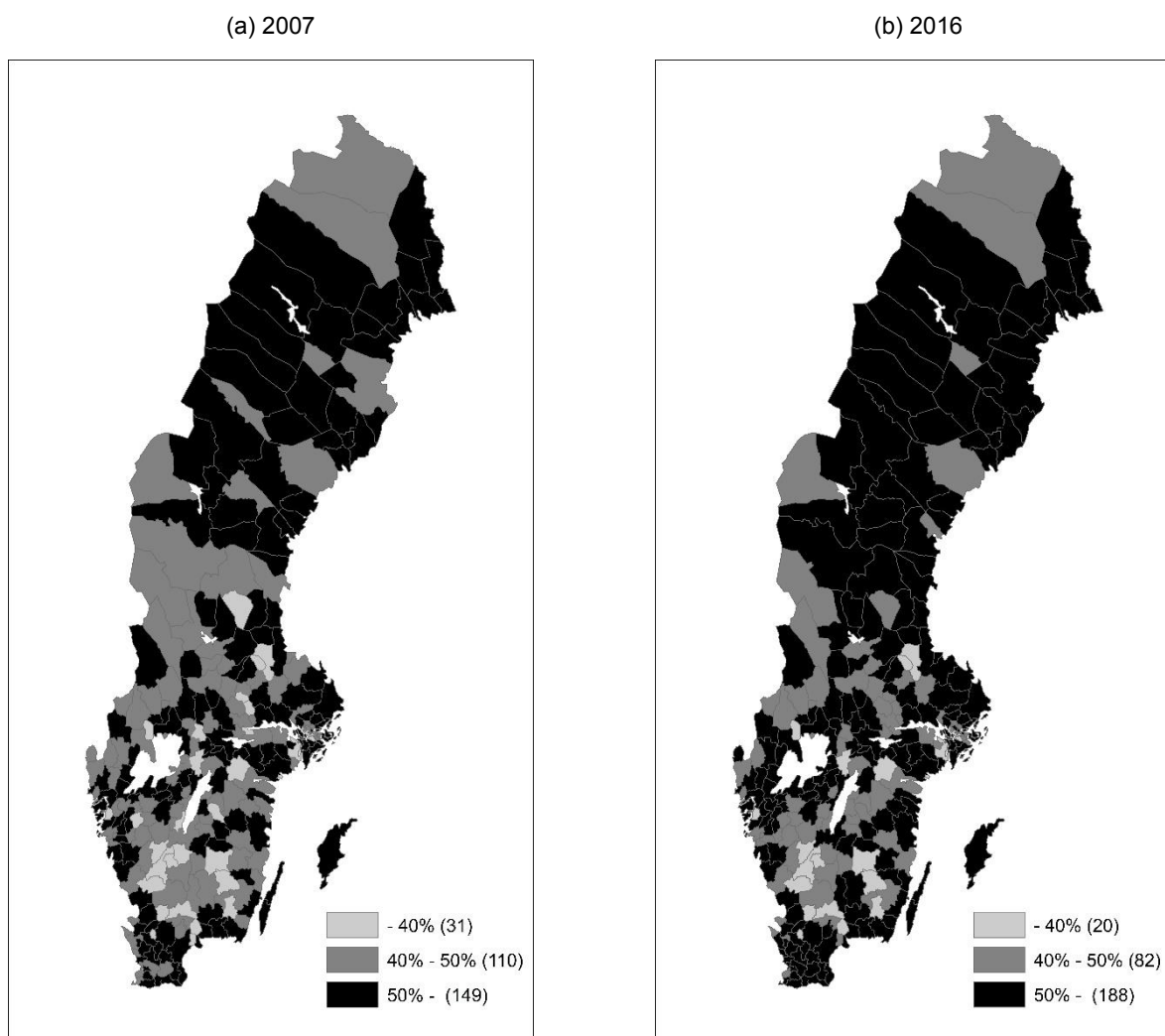
Table 9. Regional heterogeneity models in crisis and recovery

Dependent variable - Employment growth	2007-2009 OLS (crisis)				2009-2016 OLS (recovery and growth)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total RV (log)	0.0182 (0.0206)				0.0122 (0.0073)			
Total RV (log)* Depop region	0.0026 (0.0067)				-0.0050** (0.0023)			
FE RV (log)		0.0603* (0.0343)				0.0071 (0.0155)		
FE RV (log)*Depop region		-0.0019 (0.0207)				-0.0132 (0.0083)		
Non-FE RV (log)			0.0084 (0.0148)				0.0101* (0.0051)	
Non-FE RV (log)* Depop region			0.0024 (0.0068)				-0.0052** (0.0024)	
FE-non-FE RV (log)				0.0292 (0.0281)				0.0140 (0.0106)
FE-non-FE RV (log)* Depop region				0.0029 (0.0120)				-0.0090* (0.0046)
Material FE share	0.1214** (0.0594)	0.0414 (0.0544)	0.1219* (0.0617)	0.1043* (0.0542)	0.0069 (0.0271)	-0.0060 (0.0332)	0.0154 (0.0278)	-0.0034 (0.0275)
Material FE share* Depop region	-0.0814 (0.0728)	-0.0621 (0.0742)	-0.0748 (0.0709)	-0.0793 (0.0737)	-0.0629* (0.0364)	-0.0516 (0.0417)	-0.0685* (0.0347)	-0.0572 (0.0393)
Providential FE share	-0.0724 (0.0527)	-0.1664** (0.0813)	-0.0690 (0.0575)	-0.0873 (0.0526)	-0.0529*** (0.0165)	-0.0606** (0.0291)	-0.0458*** (0.0154)	-0.0597*** (0.0197)
Providential FE share* Depop region	0.0106 (0.0608)	0.0328 (0.0864)	0.0127 (0.0550)	0.0171 (0.0708)	0.0668*** (0.0225)	0.0741** (0.0319)	0.0615*** (0.0207)	0.0713*** (0.0261)
N	90	90	90	90	90	90	90	90
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AIC	-482.4036	-485.8403	-481.7649	-483.3733	-693.6609	-690.3931	-694.0517	-691.8179
BIC	-452.4059	-455.8426	-451.7672	-453.3755	-663.6632	-660.3954	-664.0540	-661.8202
R ²	0.4802	0.4997	0.4765	0.4858	0.6658	0.6534	0.6673	0.6589

Appendix 3. Employment in the foundational economy across Swedish municipalities

Figure A3 below maps the employment shares of foundational economy zone across 290 Swedish municipalities.

Figure A3. Foundational economy shares in Swedish municipalities



Between 2007 and 2016, the number of municipalities where the foundational zone of the economy employs more than half of local workers increased dramatically from 149 to 188. While such municipalities are spread throughout the whole country, it seems necessary to point that by 2016 almost all municipalities to the north from Stockholm belonged to this group. The share of foundational economy employment increased in 214 out of 290 municipalities. This indicates that the national expansion of this economy zone was a wide-spread phenomenon rather than being driven by a small number of municipalities.

Appendix 4. Population in regions at different levels of the regional system, 2007-2016

	No of LLMs	Population in 2016			Change in 2007-2016		
		Total population	Share of national	Average population	Absolute	Per cent	Share of national
Stockholm	1	2,678,905	25.9%	2,678,905	362710	15.7	0.6
Gothenburg	1	1,053,426	10.5%	1,053,426	101821	10.7	0.1
Malmö	1	1,109,374	11.0%	1,109,374	114682	11.5	0.2
Large regional centres	20	3,378,814	34.2%	168,941	208707	6.6	-0.3
Smaller regional centres	23	1,058,069	11.0%	46,003	23054	2.2	-0.3
Periphery	44	716,565	7.5%	16,286	1252	0.2	-0.3
Total	90	9,995,153	100%	9995153	812226	8.8	0.0

Appendix 5. NACE2.0/SNI2007 industry classification into the economy zones

NACE2.0/SNI2007 industry code and title	Industry classification
0111 Growing of cereals (except rice), leguminous crops and oil seeds	Material FE
0112 Growing of rice	Material FE
0113 Growing of vegetables and melons, roots and tubers	Material FE
0114 Growing of sugar cane	Material FE
0115 Growing of tobacco	Material FE
0116 Growing of fibre crops	Material FE
0119 Growing of other non-perennial crops	Material FE
0121 Growing of grapes	Material FE
0122 Growing of tropical and subtropical fruits	Material FE
0123 Growing of citrus fruits	Material FE
0124 Growing of pome fruits and stone fruits	Material FE
0125 Growing of other tree and bush fruits and nuts	Material FE
0126 Growing of oleaginous fruits	Material FE
0127 Growing of beverage crops	Material FE
0128 Growing of spices, aromatic, drug and pharmaceutical crops	Material FE
0129 Growing of other perennial crops	Material FE
0130 Plant propagation	Material FE
0141 Raising of dairy cattle	Material FE
0142 Raising of other cattle and buffaloes	Material FE
0143 Raising of horses and other equines	Material FE
0144 Raising of camels and camelids	Material FE
0145 Raising of sheep and goats	Material FE
0146 Raising of swine/pigs	Material FE
0147 Raising of poultry	Material FE
0149 Raising of other animals	Material FE
0150 Mixed farming	Material FE
0161 Support activities for crop production	Material FE
0162 Support activities for animal production	Material FE
0163 Post-harvest crop activities	Material FE
0164 Seed processing for propagation	Material FE
0170 Hunting, trapping and related service activities	Tradeable economy
0210 Silviculture and other forestry activities	Overlooked economy
0220 Logging	Overlooked economy
0230 Gathering of wild growing non-wood products	Overlooked economy
0240 Support services to forestry	Overlooked economy
0311 Marine fishing	Material FE
0312 Freshwater fishing	Material FE
0321 Marine aquaculture	Material FE
0322 Freshwater aquaculture	Material FE
0510 Mining of hard coal	Material FE
0520 Mining of lignite	Material FE
0610 Extraction of crude petroleum	Material FE
0620 Extraction of natural gas	Material FE
0710 Mining of iron ores	Tradeable economy
0721 Mining of uranium and thorium ores	Tradeable economy
0729 Mining of other non-ferrous metal ores	Tradeable economy
0811 Quarrying of ornamental and building stone, limestone, gypsum, chalk and slate	Overlooked economy
0812 Operation of gravel and sand pits; mining of clays and kaolin	Overlooked economy
0891 Mining of chemical and fertiliser minerals	Overlooked economy
0892 Extraction of peat	Overlooked economy
0893 Extraction of salt	Overlooked economy

0899 Other mining and quarrying n.e.c.	Overlooked economy
0910 Support activities for petroleum and natural gas extraction	Material FE
0990 Support activities for other mining and quarrying	Overlooked economy
1011 Processing and preserving of meat	Material FE
1012 Processing and preserving of poultry meat	Material FE
1013 Production of meat and poultry meat products	Material FE
1020 Processing and preserving of fish, crustaceans and molluscs	Material FE
1031 Processing and preserving of potatoes	Material FE
1032 Manufacture of fruit and vegetable juice	Material FE
1039 Other processing and preserving of fruit and vegetables	Material FE
1041 Manufacture of oils and fats	Material FE
1042 Manufacture of margarine and similar edible fats	Material FE
1051 Operation of dairies and cheese making	Material FE
1052 Manufacture of ice cream	Material FE
1061 Manufacture of grain mill products	Material FE
1062 Manufacture of starches and starch products	Material FE
1071 Manufacture of bread; manufacture of fresh pastry goods and cakes	Material FE
1072 Manufacture of rusks and biscuits; manufacture of preserved pastry goods and cakes	Material FE
1073 Manufacture of macaroni, noodles, couscous and similar farinaceous products	Material FE
1081 Manufacture of sugar	Material FE
1082 Manufacture of cocoa, chocolate and sugar confectionery	Material FE
1083 Processing of tea and coffee	Material FE
1084 Manufacture of condiments and seasonings	Material FE
1085 Manufacture of prepared meals and dishes	Material FE
1086 Manufacture of homogenised food preparations and dietetic food	Material FE
1089 Manufacture of other food products n.e.c.	Material FE
1091 Manufacture of prepared feeds for farm animals	Material FE
1092 Manufacture of prepared pet foods	Material FE
1101 Distilling, rectifying and blending of spirits	Material FE
1102 Manufacture of wine from grape	Material FE
1103 Manufacture of cider and other fruit wines	Material FE
1104 Manufacture of other non-distilled fermented beverages	Material FE
1105 Manufacture of beer	Material FE
1106 Manufacture of malt	Material FE
1107 Manufacture of soft drinks; production of mineral waters and other bottled waters	Material FE
1200 Manufacture of tobacco products	Tradeable economy
1310 Preparation and spinning of textile fibres	Overlooked economy
1320 Weaving of textiles	Overlooked economy
1330 Finishing of textiles	Overlooked economy
1391 Manufacture of knitted and crocheted fabrics	Overlooked economy
1392 Manufacture of made-up textile articles, except apparel	Overlooked economy
1393 Manufacture of carpets and rugs	Overlooked economy
1394 Manufacture of cordage, rope, twine and netting	Overlooked economy
1395 Manufacture of non-wovens and articles made from non-wovens, except apparel	Overlooked economy
1396 Manufacture of other technical and industrial textiles	Overlooked economy
1399 Manufacture of other textiles n.e.c.	Overlooked economy
1411 Manufacture of leather clothes	Overlooked economy
1412 Manufacture of workwear	Overlooked economy
1413 Manufacture of other outerwear	Overlooked economy
1414 Manufacture of underwear	Overlooked economy
1419 Manufacture of other wearing apparel and accessories	Overlooked economy
1420 Manufacture of articles of fur	Overlooked economy
1431 Manufacture of knitted and crocheted hosiery	Overlooked economy
1439 Manufacture of other knitted and crocheted apparel	Overlooked economy

1511 Tanning and dressing of leather; dressing and dyeing of fur	Overlooked economy
1512 Manufacture of luggage, handbags and the like, saddlery and harness	Overlooked economy
1520 Manufacture of footwear	Overlooked economy
1610 Sawmilling and planing of wood	Overlooked economy
1621 Manufacture of veneer sheets and wood-based panels	Overlooked economy
1622 Manufacture of assembled parquet floors	Overlooked economy
1623 Manufacture of other builders' carpentry and joinery	Overlooked economy
1624 Manufacture of wooden containers	Overlooked economy
1629 Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials	Overlooked economy
1711 Manufacture of pulp	Overlooked economy
1712 Manufacture of paper and paperboard	Overlooked economy
1721 Manufacture of corrugated paper and paperboard and of containers of paper and paperboard	Overlooked economy
1722 Manufacture of household and sanitary goods and of toilet requisites	Overlooked economy
1723 Manufacture of paper stationery	Overlooked economy
1724 Manufacture of wallpaper	Overlooked economy
1729 Manufacture of other articles of paper and paperboard	Overlooked economy
1811 Printing of newspapers	Overlooked economy
1812 Other printing	Overlooked economy
1813 Pre-press and pre-media services	Overlooked economy
1814 Binding and related services	Overlooked economy
1820 Reproduction of recorded media	Overlooked economy
1910 Manufacture of coke oven products	Tradeable economy
1920 Manufacture of refined petroleum products	Tradeable economy
2011 Manufacture of industrial gases	Tradeable economy
2012 Manufacture of dyes and pigments	Tradeable economy
2013 Manufacture of other inorganic basic chemicals	Tradeable economy
2014 Manufacture of other organic basic chemicals	Tradeable economy
2015 Manufacture of fertilisers and nitrogen compounds	Material FE
2016 Manufacture of plastics in primary forms	Tradeable economy
2017 Manufacture of synthetic rubber in primary forms	Tradeable economy
2020 Manufacture of pesticides and other agrochemical products	Tradeable economy
2030 Manufacture of paints, varnishes and similar coatings, printing ink and mastics	Tradeable economy
2041 Manufacture of soap and detergents, cleaning and polishing preparations	Overlooked economy
2042 Manufacture of perfumes and toilet preparations	Overlooked economy
2051 Manufacture of explosives	Tradeable economy
2052 Manufacture of glues	Tradeable economy
2053 Manufacture of essential oils	Tradeable economy
2059 Manufacture of other chemical products n.e.c.	Tradeable economy
2060 Manufacture of man-made fibres	Tradeable economy
2110 Manufacture of basic pharmaceutical products	Tradeable economy
2120 Manufacture of pharmaceutical preparations	Tradeable economy
2211 Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres	Tradeable economy
2219 Manufacture of other rubber products	Tradeable economy
2221 Manufacture of plastic plates, sheets, tubes and profiles	Tradeable economy
2222 Manufacture of plastic packing goods	Tradeable economy
2223 Manufacture of builders' ware of plastic	Tradeable economy
2229 Manufacture of other plastic products	Tradeable economy
2311 Manufacture of flat glass	Tradeable economy
2312 Shaping and processing of flat glass	Tradeable economy
2313 Manufacture of hollow glass	Tradeable economy
2314 Manufacture of glass fibres	Tradeable economy
2319 Manufacture and processing of other glass, including technical glassware	Tradeable economy
2320 Manufacture of refractory products	Tradeable economy
2331 Manufacture of ceramic tiles and flags	Overlooked economy

2332 Manufacture of bricks, tiles and construction products, in baked clay	Overlooked economy
2341 Manufacture of ceramic household and ornamental articles	Overlooked economy
2342 Manufacture of ceramic sanitary fixtures	Overlooked economy
2343 Manufacture of ceramic insulators and insulating fittings	Overlooked economy
2344 Manufacture of other technical ceramic products	Overlooked economy
2349 Manufacture of other ceramic products	Overlooked economy
2351 Manufacture of cement	Overlooked economy
2352 Manufacture of lime and plaster	Overlooked economy
2361 Manufacture of concrete products for construction purposes	Overlooked economy
2362 Manufacture of plaster products for construction purposes	Overlooked economy
2363 Manufacture of ready-mixed concrete	Overlooked economy
2364 Manufacture of mortars	Overlooked economy
2365 Manufacture of fibre cement	Overlooked economy
2369 Manufacture of other articles of concrete, plaster and cement	Overlooked economy
2370 Cutting, shaping and finishing of stone	Tradeable economy
2391 Production of abrasive products	Tradeable economy
2399 Manufacture of other non-metallic mineral products n.e.c.	Tradeable economy
2410 Manufacture of basic iron and steel and of ferro-alloys	Tradeable economy
2420 Manufacture of tubes, pipes, hollow profiles and related fittings, of steel	Tradeable economy
2431 Cold drawing of bars	Tradeable economy
2432 Cold rolling of narrow strip	Tradeable economy
2433 Cold forming or folding	Tradeable economy
2434 Cold drawing of wire	Tradeable economy
2441 Precious metals production	Tradeable economy
2442 Aluminium production	Tradeable economy
2443 Lead, zinc and tin production	Tradeable economy
2444 Copper production	Tradeable economy
2445 Other non-ferrous metal production	Tradeable economy
2446 Processing of nuclear fuel	Tradeable economy
2451 Casting of iron	Tradeable economy
2452 Casting of steel	Tradeable economy
2453 Casting of light metals	Tradeable economy
2454 Casting of other non-ferrous metals	Tradeable economy
2511 Manufacture of metal structures and parts of structures	Tradeable economy
2512 Manufacture of doors and windows of metal	Tradeable economy
2521 Manufacture of central heating radiators and boilers	Overlooked economy
2529 Manufacture of other tanks, reservoirs and containers of metal	Tradeable economy
2530 Manufacture of steam generators, except central heating hot water boilers	Tradeable economy
2540 Manufacture of weapons and ammunition	Tradeable economy
2550 Forging, pressing, stamping and roll-forming of metal; powder metallurgy	Tradeable economy
2561 Treatment and coating of metals	Tradeable economy
2562 Machining	Tradeable economy
2571 Manufacture of cutlery	Tradeable economy
2572 Manufacture of locks and hinges	Tradeable economy
2573 Manufacture of tools	Tradeable economy
2591 Manufacture of steel drums and similar containers	Tradeable economy
2592 Manufacture of light metal packaging	Tradeable economy
2593 Manufacture of wire products, chain and springs	Tradeable economy
2594 Manufacture of fasteners and screw machine products	Tradeable economy
2599 Manufacture of other fabricated metal products n.e.c.	Tradeable economy
2611 Manufacture of electronic components	Tradeable economy
2612 Manufacture of loaded electronic boards	Tradeable economy
2620 Manufacture of computers and peripheral equipment	Tradeable economy
2630 Manufacture of communication equipment	Tradeable economy

2640 Manufacture of consumer electronics	Tradeable economy
2651 Manufacture of instruments and appliances for measuring, testing and navigation	Tradeable economy
2652 Manufacture of watches and clocks	Tradeable economy
2660 Manufacture of irradiation, electromedical and electrotherapeutic equipment	Tradeable economy
2670 Manufacture of optical instruments and photographic equipment	Tradeable economy
2680 Manufacture of magnetic and optical media	Tradeable economy
2711 Manufacture of electric motors, generators and transformers	Tradeable economy
2712 Manufacture of electricity distribution and control apparatus	Material FE
2720 Manufacture of batteries and accumulators	Tradeable economy
2731 Manufacture of fibre optic cables	Tradeable economy
2732 Manufacture of other electronic and electric wires and cables	Tradeable economy
2733 Manufacture of wiring devices	Tradeable economy
2740 Manufacture of electric lighting equipment	Tradeable economy
2751 Manufacture of electric domestic appliances	Overlooked economy
2752 Manufacture of non-electric domestic appliances	Overlooked economy
2790 Manufacture of other electrical equipment	Tradeable economy
2811 Manufacture of engines and turbines, except aircraft, vehicle and cycle engines	Tradeable economy
2812 Manufacture of fluid power equipment	Tradeable economy
2813 Manufacture of other pumps and compressors	Tradeable economy
2814 Manufacture of other taps and valves	Tradeable economy
2815 Manufacture of bearings, gears, gearing and driving elements	Tradeable economy
2821 Manufacture of ovens, furnaces and furnace burners	Tradeable economy
2822 Manufacture of lifting and handling equipment	Tradeable economy
2823 Manufacture of office machinery and equipment (except computers and peripheral equipment)	Tradeable economy
2824 Manufacture of power-driven hand tools	Tradeable economy
2825 Manufacture of non-domestic cooling and ventilation equipment	Tradeable economy
2829 Manufacture of other general-purpose machinery n.e.c.	Tradeable economy
2830 Manufacture of agricultural and forestry machinery	Tradeable economy
2841 Manufacture of metal forming machinery	Tradeable economy
2849 Manufacture of other machine tools	Tradeable economy
2891 Manufacture of machinery for metallurgy	Tradeable economy
2892 Manufacture of machinery for mining, quarrying and construction	Tradeable economy
2893 Manufacture of machinery for food, beverage and tobacco processing	Tradeable economy
2894 Manufacture of machinery for textile, apparel and leather production	Tradeable economy
2895 Manufacture of machinery for paper and paperboard production	Tradeable economy
2896 Manufacture of plastics and rubber machinery	Tradeable economy
2899 Manufacture of other special-purpose machinery n.e.c.	Tradeable economy
2910 Manufacture of motor vehicles	Tradeable economy
2920 Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	Tradeable economy
2931 Manufacture of electrical and electronic equipment for motor vehicles	Tradeable economy
2932 Manufacture of other parts and accessories for motor vehicles	Tradeable economy
3011 Building of ships and floating structures	Tradeable economy
3012 Building of pleasure and sporting boats	Tradeable economy
3020 Manufacture of railway locomotives and rolling stock	Material FE
3030 Manufacture of air and spacecraft and related machinery	Tradeable economy
3040 Manufacture of military fighting vehicles	Tradeable economy
3091 Manufacture of motorcycles	Tradeable economy
3092 Manufacture of bicycles and invalid carriages	Tradeable economy
3099 Manufacture of other transport equipment n.e.c.	Tradeable economy
3101 Manufacture of office and shop furniture	Overlooked economy
3102 Manufacture of kitchen furniture	Overlooked economy
3103 Manufacture of mattresses	Overlooked economy
3109 Manufacture of other furniture	Overlooked economy

3211 Striking of coins	Tradeable economy
3212 Manufacture of jewellery and related articles	Tradeable economy
3213 Manufacture of imitation jewellery and related articles	Tradeable economy
3220 Manufacture of musical instruments	Tradeable economy
3230 Manufacture of sports goods	Tradeable economy
3240 Manufacture of games and toys	Tradeable economy
3250 Manufacture of medical and dental instruments and supplies	Tradeable economy
3291 Manufacture of brooms and brushes	Tradeable economy
3299 Other manufacturing n.e.c.	Tradeable economy
3311 Repair of fabricated metal products	Tradeable economy
3312 Repair of machinery	Tradeable economy
3313 Repair of electronic and optical equipment	Tradeable economy
3314 Repair of electrical equipment	Overlooked economy
3315 Repair and maintenance of ships and boats	Material FE
3316 Repair and maintenance of aircraft and spacecraft	Material FE
3317 Repair and maintenance of other transport equipment	Material FE
3319 Repair of other equipment	Tradeable economy
3320 Installation of industrial machinery and equipment	Tradeable economy
3511 Production of electricity	Material FE
3512 Transmission of electricity	Material FE
3513 Distribution of electricity	Material FE
3514 Trade of electricity	Material FE
3521 Manufacture of gas	Material FE
3522 Distribution of gaseous fuels through mains	Material FE
3523 Trade of gas through mains	Material FE
3530 Steam and air conditioning supply	Material FE
3600 Water collection, treatment and supply	Material FE
3700 Sewerage	Material FE
3811 Collection of non-hazardous waste	Material FE
3812 Collection of hazardous waste	Material FE
3821 Treatment and disposal of non-hazardous waste	Material FE
3822 Treatment and disposal of hazardous waste	Material FE
3831 Dismantling of wrecks	Tradeable economy
3832 Recovery of sorted materials	Tradeable economy
3900 Remediation activities and other waste management services	Tradeable economy
4110 Development of building projects	Tradeable economy
4120 Construction of residential and non-residential buildings	Overlooked economy
4211 Construction of roads and motorways	Material FE
4212 Construction of railways and underground railways	Material FE
4213 Construction of bridges and tunnels	Material FE
4221 Construction of utility projects for fluids	Material FE
4222 Construction of utility projects for electricity and telecommunications	Material FE
4291 Construction of water projects	Material FE
4299 Construction of other civil engineering projects n.e.c.	Material FE
4311 Demolition	Tradeable economy
4312 Site preparation	Tradeable economy
4313 Test drilling and boring	Tradeable economy
4321 Electrical installation	Overlooked economy
4322 Plumbing, heat and air-conditioning installation	Overlooked economy
4329 Other construction installation	Overlooked economy
4331 Plastering	Overlooked economy
4332 Joinery installation	Overlooked economy
4333 Floor and wall covering	Overlooked economy
4334 Painting and glazing	Overlooked economy

4339 Other building completion and finishing	Overlooked economy
4391 Roofing activities	Overlooked economy
4399 Other specialised construction activities n.e.c.	Overlooked economy
4511 Sale of cars and light motor vehicles	Material FE
4519 Sale of other motor vehicles	Material FE
4520 Maintenance and repair of motor vehicles	Material FE
4531 Wholesale trade of motor vehicle parts and accessories	Material FE
4532 Retail trade of motor vehicle parts and accessories	Material FE
4540 Sale, maintenance and repair of motorcycles and related parts and accessories	Material FE
4611 Agents involved in the sale of agricultural raw materials, live animals, textile raw materials and semi-finished goods	Tradeable economy
4612 Agents involved in the sale of fuels, ores, metals and industrial chemicals	Tradeable economy
4613 Agents involved in the sale of timber and building materials	Tradeable economy
4614 Agents involved in the sale of machinery, industrial equipment, ships and aircraft	Tradeable economy
4615 Agents involved in the sale of furniture, household goods, hardware and ironmongery	Tradeable economy
4616 Agents involved in the sale of textiles, clothing, fur, footwear and leather goods	Tradeable economy
4617 Agents involved in the sale of food, beverages and tobacco	Tradeable economy
4618 Agents specialised in the sale of other particular products	Tradeable economy
4619 Agents involved in the sale of a variety of goods	Tradeable economy
4621 Wholesale of grain, unmanufactured tobacco, seeds and animal feeds	Material FE
4622 Wholesale of flowers and plants	Overlooked economy
4623 Wholesale of live animals	Material FE
4624 Wholesale of hides, skins and leather	Material FE
4631 Wholesale of fruit and vegetables	Material FE
4632 Wholesale of meat and meat products	Material FE
4633 Wholesale of dairy products, eggs and edible oils and fats	Material FE
4634 Wholesale of beverages	Material FE
4635 Wholesale of tobacco products	Tradeable economy
4636 Wholesale of sugar and chocolate and sugar confectionery	Tradeable economy
4637 Wholesale of coffee, tea, cocoa and spices	Tradeable economy
4638 Wholesale of other food, including fish, crustaceans and molluscs	Tradeable economy
4639 Non-specialised wholesale of food, beverages and tobacco	Tradeable economy
4641 Wholesale of textiles	Overlooked economy
4642 Wholesale of clothing and footwear	Overlooked economy
4643 Wholesale of electrical household appliances	Overlooked economy
4644 Wholesale of china and glassware and cleaning materials	Overlooked economy
4645 Wholesale of perfume and cosmetics	Tradeable economy
4646 Wholesale of pharmaceutical goods	Tradeable economy
4647 Wholesale of furniture, carpets and lighting equipment	Overlooked economy
4648 Wholesale of watches and jewellery	Tradeable economy
4649 Wholesale of other household goods	Tradeable economy
4651 Wholesale of computers, computer peripheral equipment and software	Tradeable economy
4652 Wholesale of electronic and telecommunications equipment and parts	Tradeable economy
4661 Wholesale of agricultural machinery, equipment and supplies	Tradeable economy
4662 Wholesale of machine tools	Tradeable economy
4663 Wholesale of mining, construction and civil engineering machinery	Tradeable economy
4664 Wholesale of machinery for the textile industry and of sewing and knitting machines	Tradeable economy
4665 Wholesale of office furniture	Overlooked economy
4666 Wholesale of other office machinery and equipment	Tradeable economy
4669 Wholesale of other machinery and equipment	Tradeable economy
4671 Wholesale of solid, liquid and gaseous fuels and related products	Tradeable economy
4672 Wholesale of metals and metal ores	Tradeable economy
4673 Wholesale of wood, construction materials and sanitary equipment	Overlooked economy
4674 Wholesale of hardware, plumbing and heating equipment and supplies	Overlooked economy
4675 Wholesale of chemical products	Tradeable economy

4676 Wholesale of other intermediate products	Tradeable economy
4677 Wholesale of waste and scrap	Tradeable economy
4690 Non-specialised wholesale trade	Tradeable economy
4711 Retail sale in non-specialised stores with food, beverages or tobacco predominating	Material FE
4719 Other retail sale in non-specialised stores	Tradeable economy
4721 Retail sale of fruit and vegetables in specialised stores	Material FE
4722 Retail sale of meat and meat products in specialised stores	Material FE
4723 Retail sale of fish, crustaceans and molluscs in specialised stores	Material FE
4724 Retail sale of bread, cakes, flour confectionery and sugar confectionery in specialised stores	Material FE
4725 Retail sale of beverages in specialised stores	Material FE
4726 Retail sale of tobacco products in specialised stores	Tradeable economy
4729 Other retail sale of food in specialised stores	Material FE
4730 Retail sale of automotive fuel in specialised stores	Material FE
4741 Retail sale of computers, peripheral units and software in specialised stores	Tradeable economy
4742 Retail sale of telecommunications equipment in specialised stores	Material FE
4743 Retail sale of audio and video equipment in specialised stores	Tradeable economy
4751 Retail sale of textiles in specialised stores	Overlooked economy
4752 Retail sale of hardware, paints and glass in specialised stores	Overlooked economy
4753 Retail sale of carpets, rugs, wall and floor coverings in specialised stores	Overlooked economy
4754 Retail sale of electrical household appliances in specialised stores	Overlooked economy
4759 Retail sale of furniture, lighting equipment and other household articles in specialised stores	Overlooked economy
4761 Retail sale of books in specialised stores	Tradeable economy
4762 Retail sale of newspapers and stationery in specialised stores	Tradeable economy
4763 Retail sale of music and video recordings in specialised stores	Tradeable economy
4764 Retail sale of sporting equipment in specialised stores	Tradeable economy
4765 Retail sale of games and toys in specialised stores	Tradeable economy
4771 Retail sale of clothing in specialised stores	Overlooked economy
4772 Retail sale of footwear and leather goods in specialised stores	Overlooked economy
4773 Dispensing chemist in specialised stores	Providential FE
4774 Retail sale of medical and orthopaedic goods in specialised stores	Overlooked economy
4775 Retail sale of cosmetic and toilet articles in specialised stores	Tradeable economy
4776 Retail sale of flowers, plants, seeds, fertilisers, pet animals and pet food in specialised stores	Overlooked economy
4777 Retail sale of watches and jewellery in specialised stores	Tradeable economy
4778 Other retail sale of new goods in specialised stores	Tradeable economy
4779 Retail sale of second-hand goods in stores	Tradeable economy
4781 Retail sale via stalls and markets of food, beverages and tobacco products	Tradeable economy
4782 Retail sale via stalls and markets of textiles, clothing and footwear	Tradeable economy
4789 Retail sale via stalls and markets of other goods	Tradeable economy
4791 Retail sale via mail order houses or via Internet	Tradeable economy
4799 Other retail sale not in stores, stalls or markets	Overlooked economy
4910 Passenger rail transport, interurban	Material FE
4920 Freight rail transport	Material FE
4931 Urban and suburban passenger land transport	Material FE
4932 Taxi operation	Material FE
4939 Other passenger land transport n.e.c.	Material FE
4941 Freight transport by road	Material FE
4942 Removal services	Material FE
4950 Transport via pipeline	Material FE
5010 Sea and coastal passenger water transport	Overlooked economy
5020 Sea and coastal freight water transport	Material FE
5030 Inland passenger water transport	Material FE
5040 Inland freight water transport	Material FE
5110 Passenger air transport	Overlooked economy
5121 Freight air transport	Material FE

5122 Space transport	Tradeable economy
5210 Warehousing and storage	Tradeable economy
5221 Service activities incidental to land transportation	Material FE
5222 Service activities incidental to water transportation	Material FE
5223 Service activities incidental to air transportation	Material FE
5224 Cargo handling	Material FE
5229 Other transportation support activities	Material FE
5310 Postal activities under universal service obligation	Material FE
5320 Other postal and courier activities	Tradeable economy
5510 Hotels and similar accommodation	Overlooked economy
5520 Holiday and other short-stay accommodation	Overlooked economy
5530 Camping grounds, recreational vehicle parks and trailer parks	Overlooked economy
5590 Other accommodation	Overlooked economy
5610 Restaurants and mobile food service activities	Overlooked economy
5621 Event catering activities	Overlooked economy
5629 Other food service activities	Overlooked economy
5630 Beverage serving activities	Overlooked economy
5811 Book publishing	Tradeable economy
5812 Publishing of directories and mailing lists	Tradeable economy
5813 Publishing of newspapers	Tradeable economy
5814 Publishing of journals and periodicals	Tradeable economy
5819 Other publishing activities	Tradeable economy
5821 Publishing of computer games	Tradeable economy
5829 Other software publishing	Tradeable economy
5911 Motion picture, video and television programme production activities	Tradeable economy
5912 Motion picture, video and television programme post-production activities	Tradeable economy
5913 Motion picture, video and television programme distribution activities	Tradeable economy
5914 Motion picture projection activities	Tradeable economy
5920 Sound recording and music publishing activities	Tradeable economy
6010 Radio broadcasting	Tradeable economy
6020 Television programming and broadcasting activities	Tradeable economy
6110 Wired telecommunications activities	Material FE
6120 Wireless telecommunications activities	Material FE
6130 Satellite telecommunications activities	Material FE
6190 Other telecommunications activities	Material FE
6201 Computer programming activities	Tradeable economy
6202 Computer consultancy activities	Tradeable economy
6203 Computer facilities management activities	Tradeable economy
6209 Other information technology and computer service activities	Tradeable economy
6311 Data processing, hosting and related activities	Tradeable economy
6312 Web portals	Tradeable economy
6391 News agency activities	Tradeable economy
6399 Other information service activities n.e.c.	Tradeable economy
6411 Central banking	Tradeable economy
6419 Other monetary intermediation	Material FE
6420 Activities of holding companies	Tradeable economy
6430 Trusts, funds and similar financial entities	Tradeable economy
6491 Financial leasing	Tradeable economy
6492 Other credit granting	Tradeable economy
6499 Other financial service activities, except insurance and pension funding n.e.c.	Tradeable economy
6511 Life insurance	Tradeable economy
6512 Non-life insurance	Tradeable economy
6520 Reinsurance	Tradeable economy
6530 Pension funding	Tradeable economy

6611 Administration of financial markets	Tradeable economy
6612 Security and commodity contracts brokerage	Tradeable economy
6619 Other activities auxiliary to financial services, except insurance and pension funding	Tradeable economy
6621 Risk and damage evaluation	Tradeable economy
6622 Activities of insurance agents and brokers	Tradeable economy
6629 Other activities auxiliary to insurance and pension funding	Tradeable economy
6630 Fund management activities	Tradeable economy
6810 Buying and selling of own real estate	Tradeable economy
6820 Renting and operating of own or leased real estate	Tradeable economy
6831 Real estate agencies	Overlooked economy
6832 Management of real estate on a fee or contract basis	Tradeable economy
6910 Legal activities	Tradeable economy
6920 Accounting, bookkeeping and auditing activities; tax consultancy	Tradeable economy
7010 Activities of head offices	Tradeable economy
7021 Public relations and communication activities	Tradeable economy
7022 Business and other management consultancy activities	Tradeable economy
7111 Architectural activities	Tradeable economy
7112 Engineering activities and related technical consultancy	Tradeable economy
7120 Technical testing and analysis	Tradeable economy
7211 Research and experimental development on biotechnology	Tradeable economy
7219 Other research and experimental development on natural sciences and engineering	Tradeable economy
7220 Research and experimental development on social sciences and humanities	Tradeable economy
7311 Advertising agencies	Tradeable economy
7312 Media representation	Tradeable economy
7320 Market research and public opinion polling	Tradeable economy
7410 Specialised design activities	Tradeable economy
7420 Photographic activities	Tradeable economy
7430 Translation and interpretation activities	Tradeable economy
7490 Other professional, scientific and technical activities n.e.c.	Tradeable economy
7500 Veterinary activities	Overlooked economy
7711 Renting and leasing of cars and light motor vehicles	Tradeable economy
7712 Renting and leasing of trucks	Tradeable economy
7721 Renting and leasing of recreational and sports goods	Tradeable economy
7722 Renting of video tapes and disks	Tradeable economy
7729 Renting and leasing of other personal and household goods	Tradeable economy
7731 Renting and leasing of agricultural machinery and equipment	Tradeable economy
7732 Renting and leasing of construction and civil engineering machinery and equipment	Tradeable economy
7733 Renting and leasing of office machinery and equipment (including computers)	Tradeable economy
7734 Renting and leasing of water transport equipment	Tradeable economy
7735 Renting and leasing of air transport equipment	Tradeable economy
7739 Renting and leasing of other machinery, equipment and tangible goods n.e.c.	Tradeable economy
7740 Leasing of intellectual property and similar products, except copyrighted works	Tradeable economy
7810 Activities of employment placement agencies	Tradeable economy
7820 Temporary employment agency activities	Tradeable economy
7830 Other human resources provision	Tradeable economy
7911 Travel agency activities	Overlooked economy
7912 Tour operator activities	Overlooked economy
7990 Other reservation service and related activities	Overlooked economy
8010 Private security activities	Tradeable economy
8020 Security systems service activities	Tradeable economy
8030 Investigation activities	Tradeable economy
8110 Combined facilities support activities	Tradeable economy
8121 General cleaning of buildings	Tradeable economy
8122 Other building and industrial cleaning activities	Tradeable economy

8129 Other cleaning activities	Tradeable economy
8130 Landscape service activities	Tradeable economy
8211 Combined office administrative service activities	Tradeable economy
8219 Photocopying, document preparation and other specialised office support activities	Tradeable economy
8220 Activities of call centres	Tradeable economy
8230 Organisation of conventions and trade shows	Tradeable economy
8291 Activities of collection agencies and credit bureaus	Tradeable economy
8292 Packaging activities	Tradeable economy
8299 Other business support service activities n.e.c.	Tradeable economy
8411 General public administration activities	Providential FE
8412 Regulation of the activities of providing health care, education, cultural services and other social services, excluding social security	Providential FE
8413 Regulation of and contribution to more efficient operation of businesses	Providential FE
8421 Foreign affairs	Providential FE
8422 Defence activities	Providential FE
8423 Justice and judicial activities	Providential FE
8424 Public order and safety activities	Providential FE
8425 Fire service activities	Providential FE
8430 Compulsory social security activities	Providential FE
8510 Pre-primary education	Providential FE
8520 Primary education	Providential FE
8531 General secondary education	Providential FE
8532 Technical and vocational secondary education	Providential FE
8541 Post-secondary non-tertiary education	Providential FE
8542 Tertiary education	Providential FE
8551 Sports and recreation education	Providential FE
8552 Cultural education	Providential FE
8553 Driving school activities	Providential FE
8559 Other education n.e.c.	Providential FE
8560 Educational support activities	Providential FE
8610 Hospital activities	Providential FE
8621 General medical practice activities	Providential FE
8622 Specialist medical practice activities	Providential FE
8623 Dental practice activities	Providential FE
8690 Other human health activities	Providential FE
8710 Residential nursing care activities	Providential FE
8720 Residential care activities for mental retardation, mental health and substance abuse	Providential FE
8730 Residential care activities for the elderly and disabled	Providential FE
8790 Other residential care activities	Providential FE
8810 Social work activities without accommodation for the elderly and disabled	Providential FE
8891 Child day-care activities	Providential FE
8899 Other social work activities without accommodation n.e.c.	Providential FE
9001 Performing arts	Tradeable economy
9002 Support activities to performing arts	Tradeable economy
9003 Artistic creation	Tradeable economy
9004 Operation of arts facilities	Tradeable economy
9101 Library and archives activities	Overlooked economy
9102 Museums activities	Overlooked economy
9103 Operation of historical sites and buildings and similar visitor attractions	Overlooked economy
9104 Botanical and zoological gardens and nature reserves activities	Overlooked economy
9200 Gambling and betting activities	Tradeable economy
9311 Operation of sports facilities	Overlooked economy
9312 Activities of sport clubs	Overlooked economy
9313 Fitness facilities	Overlooked economy
9319 Other sports activities	Overlooked economy

9321 Activities of amusement parks and theme parks	Overlooked economy
9329 Other amusement and recreation activities	Overlooked economy
9411 Activities of business and employers membership organisations	Tradeable economy
9412 Activities of professional membership organisations	Tradeable economy
9420 Activities of trade unions	Tradeable economy
9491 Activities of religious organisations	Tradeable economy
9492 Activities of political organisations	Tradeable economy
9499 Activities of other membership organisations n.e.c.	Tradeable economy
9511 Repair of computers and peripheral equipment	Tradeable economy
9512 Repair of communication equipment	Tradeable economy
9521 Repair of consumer electronics	Overlooked economy
9522 Repair of household appliances and home and garden equipment	Overlooked economy
9523 Repair of footwear and leather goods	Overlooked economy
9524 Repair of furniture and home furnishings	Overlooked economy
9525 Repair of watches, clocks and jewellery	Overlooked economy
9529 Repair of other personal and household goods	Overlooked economy
9601 Washing and (dry-)cleaning of textile and fur products	Overlooked economy
9602 Hairdressing and other beauty treatment	Overlooked economy
9603 Funeral and related activities	Overlooked economy
9604 Activities of physical well-being institutes	Tradeable economy
9609 Other personal service activities n.e.c.	Tradeable economy
9700 Activities of households as employers of domestic personnel	Tradeable economy
9810 Undifferentiated goods-producing activities of private households for own use	Tradeable economy
9820 Undifferentiated service-producing activities of private households for own use	Tradeable economy
9900 Activities of extraterritorial organisations and bodies	Tradeable economy