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Regional branch-mix, firm size, job growth and job reallocation

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Regional branch composition, firm size, job growth and job reallocation

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Abstract: A growing body of evidence suggests that reallocation of jobs within and across firms and regions and from low to high-educated labour are essential in driving regional economic growth. Each year, many businesses expand and many others contract. New businesses constantly enter, while others gradually disappear.

This paper covers analyses of regional employment change investigating the relationship between regional branch composition, firm size, job growth and job reallocation in regional labour markets. The focus are put on different elements of job dynamics, by the creation of new jobs and destruction of old jobs and how these processes develop by job expansion versus job losses within existing firms, and by new firm establishments versus job losses due to firm closures. Our indicators are drawn from firm-level databases that cover all firms with at least one employee for all regions and sectors of the economy. The indicators cover also the number of employees within each firm including detailed information of their level of education.

Among questions to be answered is how branch composition and firm size affect job growth generally and for high-qualified labour especially, and to what extent new jobs are created by new established firms versus expansions of jobs within already existing mature firms.

Tentative results suggest positive relationship between the regional level of branch composition and job growth, between the level of branch composition and firm size and thus also between job growth and firm size. The relationship between regional branch composition and job growth due to new establishments tend, however, to be negative. Furthermore, there are positive relationship between job growth both within existing firms and in new established firms and job decline within firms and by firm closures, indicating that reallocation of jobs are important for job growth. New jobs by new firm establishments clearly exceed the number of jobs lost by firm closures, while job losses within mature firms exceed the number of new jobs created by expansion within mature firms. However, it is the creation of new jobs within mature firms that contribute most to the supply of new jobs. The results also indicate that reallocation from low to high-educated labour mostly take place in the job reallocation processes within mature firms, more than in job reallocation processes due to new firm establishments versus firm closures. Beyond these main trends there are, however, detected strong regional variations.

Keywords: Regional labour markets, job reallocation, labour mobility
JEL Classification: J 21

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1. Background

This paper includes some results from investigations prepared for a public commission appointed by the Norwegian government to promote cross-country growth in skill-intensive jobs (NOU 2011:3). The committee put forward requests and hypotheses considering effects of regional reallocation of jobs focusing the creation of new jobs versus destruction of old jobs both within existing mature firms as well as by the processes of new firm establishments versus firm closures. Furthermore, the commission put forward questions of how these job reallocation processes developed considering the educational change of labour as well as how the regional job growth processes might be considered in this respect. They were also questioning the importance of regional branch composition (number of branches) versus specialisation of branches and firm-size in the regional job growth processes. One central hypothesis was the expectation that new established small firms will be the drivers of the regional job growth generally, and for the establishments of new jobs for high-educated labour especially.

However, a growing body of evidence suggests that reallocation of jobs within and across firms and regions and from low to high-educated labour are essential in driving regional economic growth. Each year, many businesses expand and many others contract. New businesses constantly enter, while others gradually disappear.

This paper thus covers explorations and analyses of regional employment change investigating the relationship between regional branch composition, firm size, job growth and job reallocation in regional labour markets. The focus are put on different elements of job dynamics, on the creation of new jobs and destruction of old jobs and how these processes develop by job expansion versus job losses within mature firms, and by new firm establishments versus job losses due to firm closures. Our indicators are drawn from firm-level databases that cover all firms with at least one employee for manufacturing, private- and public services as well as primary sectors. The indicators cover also the number of employees within each firm including information of their level of education.

Among questions to be answered are then how branch composition and firm size affect job growth generally and for high-qualified labour especially, and to what extent new jobs are created by new established firms versus expansion of jobs within mature firms.

Theoretical aspects might e.g. be drawn from the large academic literature discussing if job creation mainly descend from start ups of firms or if the best surroundings for creation of new jobs will be the job expansion within already existing mature firms. There is a widespread popular perception that small businesses create most jobs in the U.S. While empirical studies (see, e.g., Birch (1987)) provided support for this perception, a variety of subsequent empirical studies have highlighted (see, in particular, Davis, Haltiwanger and Schuh (1996)) statistical and measurement pitfalls underlying much of the evidence in support of this perception (see e.g. Haltiwanger, Jarmin and Miranda (2009, 2010)). However, start ups by definition can only create jobs as they are not old enough to eliminate them yet. This might artificially inflates the job creation power of a start up. In e.g. Stambøl (2009) it is observed strong exit from, and thus low maintenance of, new self-employment businesses, and approximately half of the new created jobs were destructed during the next five years. Considering the importance of regional branch composition (or branch-mix) for regional job growth generally and for high-educated labour especially, we could move in direction of all those studies in the regional economics literature approaching the industrial specialisation of

regions and geographic concentration of industries. However, in this study we simply confine the investigations to the manifold of branches that exist in the different local labour markets.

More particularly, we first investigate the job reallocation processes between different firms at the national level. Then we calculate if the regional branch composition is of some importance for the job growth. Furthermore, we measure the relationship between regional branch composition and job reallocation for to test how the different job flows appears across regions with different number of branches. In this manner we also estimate the relationship between different types of regional job reallocations endogenously and between net job growth and regional reallocation of jobs exogenously. Finally, we have made some investigations of the relationship between regional firm size and the number of branches and the regional net job growth and firm size. All these investigations are made using a regional classification of 89 economic regions (see section 3).

In the second part of the paper we present some descriptive analyses of the local regional performances of job growth in relation to branch composition (number of branches) and firm size. Finally, we investigate how each local labour market region perform considering the job reallocation processes both generally and for high-educated labour. Here we use a regional division by altogether 162 local labour market regions, which are further aggregated by seven typologies of regions by centrality (see section 3 below).

2. Data, definitions and methods

The analyses are based on data from individual registers at Statistics Norway covering the entire population 16-74 years by different characteristics, and partly organised as annual regional panel data. However, in most of the analyses are used descriptive statistics, although based on unique sets of variables for presenting indicators that illuminate the regional labour market growth, job and labour marked mobility and regional job reallocation by education. Furthermore, we have used some simple regression techniques to illustrate the relationship between regional job growth and the number of branches in each local labour market region and regional firm-size as well as between different elements of the regional job reallocation processes.

The data are mostly derived from three different periods of time, where the years of 1997 and 1998 represent a period of strong economic growth, the years of 2002 and 2003 represents a period with a slight decrease in the national employment, while the last period of 2004 and 2005 represents a so called “neutral” business cycle, with an initial weak growth of employment at the national level. Mostly, the data are collected and calculated as a weighted annual average through these three periods, while some separate results are derived from the “neutral” business cycle period of 2004-2005, which then represents the most up-to-date period of the investigation periods.

Figure 1 is a schematic overview of how we have used the register data to measure the regional job and employment change in a most complete way. For the current investigation we measure the job and employment changes generally and for high-educated labour especially. In further investigations there will be possible to handle the data even more detailed. However, here we measure the regional change between the regional stock of employment in year t and year $t+1$. We have complete information of total exits and entries of persons at both firm and regional level, and with some few exceptions also at educational level. At the regional level we measure the net reduction of jobs in all mature firms that

reduce their number of employed and due to complete firm closures. Furthermore, we measure the net entries of jobs in firms that expand their number of employed and all new jobs in new established firms. In this way we obtain knowledge of the job reallocation processes due to net rise and net fall of jobs within mature firms and due to new firm establishments and firm closures.

Figure 1. Definition of job and employment change in firms from year t to year $t+1$ by region of work.

(1) Total stock of employed in firm F in region R in year T by level of education
Total exits: All persons in year $t+1$ that are not employed in the firm where they had their job in year t by level of education (Includes emigration and death)
a: Net reduction of jobs from year t to year $t+1$ in firms that reduced their employment
b: Net reduction of jobs from year t to year $t+1$ in firms that disappeared (100% reduction)
c: Other exits of employed that excess $a+b$ (retirement, job change, unemployment, education etc)
Total entries: All employed in year $t+1$ who are employed in a firm where they did not had a job in year t by level of education (Includes immigrants and persons 16 years old in year $t+1$)
d: Net entries of jobs from year t to year $t+1$ in firms that increased their employment
e: Net entries of jobs from year t to year $t+1$ in new established firms (100% entries)
f: Other entries of employed that excess $d+e$. (job change, from unemployment, education etc.)
(2) Total stock of employed in firm F in region R in year T+1 by level of education

The total exits and entries do, however, strongly excess the job mobility, due to the fact that the labour mobility is much more extensive than the job mobility. For this current investigation we have only taken into consideration the job change in mature firms that expand or contract in addition to new firm establishments and firm closures. In further investigations we may treat the job and labour mobility even more detailed, by follow each person in and out of each firm. Thus also take into consideration the so-called “status-quo” firms that do not change their number of employed from one year to another, but most probably replace some of their employed during the same period due to labour mobility.

The currant data makes it, however, possible to construct variables of regional branch composition, defined as how many industrial subclasses that are represented in each local labour market region, and the firm size telling how many employed there are in each firm. In the definition of firm size we obviously also take into consideration the firms that do not change the number of employed from one year to another. The use of data and methodology is also briefly described in each subsection below. However, first it is important to describe how we have made the regional classifications.

3. Regional classifications

The measures of the regional dimension basically follow a regional classification used by Statistics Norway, and consists of altogether 89 economic regions mainly defined on the base of commuting figures, although not crossing any administrative regions at the county level ((see e.g. Hustoft et al. (1999)). For special use of this classification see e.g. Stambøl (2005).

In addition we operate with a division of seven typologies of regions, aggregated from altogether 162 local labour market regions (See Juvkam (2002). This classification reflects a central-peripheral division of regions, where category (1) represents the most central “capital region”, category (2) represents “other metropolises regions” with central urban labour markets following in size next to the capital region, category (3) represents “the larger city regions”, while category (4) consists of “medium-sized city regions”. Categories (5-7) represent the more peripheral types of regions, where category (5) represents “the small-town

regions”, category (6) “the small-place regions” and finally category (7) consists of the most peripheral “rural areas”.

4. Main results

4.1. Reallocation of jobs and employment at the national level

In this section we show some main labour mobility results by decomposing all gross mobility of persons and jobs in the regional labour markets from 2004 to 2005. Table 1 indicates the gross reallocation of jobs and flows of labour beyond the net employment change at the national level in the years of 2004-2005. The figures are calculated for the employment generally and for high-educated labour.

It is, however, small deviation between the employment generally and high-educated labour, although some important differences there are. Column (1) and (2) indicate a higher job growth for high-educated labour than for the employment generally. The total exit is, however, stronger for the employment generally, mostly due to higher destruction of jobs within mature firms compared to high-educated labour. On the other hand high-educated labour show higher job destruction due to firm closures. High-educated labour show a higher creation of jobs both due to creation of jobs within mature firms and due to new firm establishments. When comparing the different cells of job reallocation, it is worth to notice that there are higher destruction of jobs than creation of jobs within mature firms for the employment generally, but a slightly stronger creation than destruction of jobs for high-educated labour. This indicates a clear reallocation of jobs from low to high educated labour within mature firms. When comparing the creation of new jobs in new established firms versus destruction of jobs by firm closures, the creation of jobs clearly exceed the job destruction. In spite of this most of the job creation takes place within mature firms. It is, however, important to take into consideration that mature firms represent a much higher share of the total employment compared to the numbers of employed involved in both new firm establishments and firm closures.

Table 1. Gross reallocation of employment 2004-2005. Total employment and high-educated labour. Norway. Percent of employed 2004.

	(1) Employ- ment 2004	Total exits:	a) Losses of jobs within firms	b) Closur- es of firms	c) Other exits	Total entries:	d) Job growth within firms	e) New estab- lished firms	f) Other en- tries	(2) Employ- ment 2005
Total employment:	100.0	25.7	9.2	2.8	13.7	26.9	7.7	5.5	13.7	101.2
High-educated labour:	100.0	23.4	7.2	3.6	12.6	26.3	7.9	6.2	12.2	102.9

4.2 Is the branch composition important for job growth?

We have made some simple regressions including net job growth as a dependent variable and the regional number of branches as an explanatory variable. The branch composition is measured both for the employment generally and for high-educated labour especially.

The results in table 2 indicate mostly positive relationship between job growth and branch composition, and with certain significance. The strongest relationship is to be found for the employment generally. This relationship is, however, also significant positive for high education jobs, and especially when the branch composition is measured in relation to job growth of high-educated labour. Measured specifically for employed with low and middle education, gives positive, albeit not significant, relationship between job growth and branch

composition. Furthermore, this relationship is significant positive for both men and women, but the male relationship is somewhat stronger than for female.

Table 2. The relationship between job growth and branch composition (the number of branches) in 2004-2005. Economic regions (OLS).

Net job growth:	Number of branches Total employment	Number of branches High-educated labour
Total employment	0.026 ** (2.09)	----
Employed with high education	0.024 * (1.91)	0.023 ** (2.01)
Employed with low and middle education	0.016 (1.17)	----
Employed male	0.030 * (1.93)	----
Employed female	0.022 * (1.88)	----

Level of significance: 99% ***, 95% **, 90% * (T-values in brackets)

4.3 The relationship between regional branch composition and job reallocation

In table 3 the relationship is measured by help of decomposed employment changes that reflects the reallocation of jobs in the regional labour markets. Net job growth, which is used for the analysis in table 2, is in table 3 broken down by gross flows in the regional labour market dependent on if the employment change is due to expansion versus job losses within existing firms, and by new establishments versus job destruction due to firm closures.

The results indicate that the strongest relationship between employment change and branch composition is to be found for closure of firms, that shows significant but negative relationship both for the employment generally and high-educated labour especially. This means that in those economic regions where the branch composition is highest we find the smallest number of closures of firm, while the rate of closures is increasing with falling branch composition.

Table 3. The relationship between branch composition and job change due to destruction of jobs within firms, destruction of jobs due to firm closures, creation of jobs within firms and creation of jobs due to new established firms 2004-2005. Economic regions (OLS).

The job change due to:	Number of branches Total employment	Number of branches High-educated labour
Destruction of jobs within firms generally	-0.008 (-0.73)	---
Destruction of jobs generally due to closures of firms	-0.018 *** (-3.31)	---
Expansion of jobs within firms generally	0.003 (0.37)	---
Creation of new jobs in new established firms generally	-0.003 (-0.29)	---
Destruction of jobs within firms for high-educated labour	-0.016 (-1.31)	-0.017 (-1.50)
Destruction of jobs for high-educated labour due to closures of firms	-0.024 *** (-3.51)	-0.022 *** (-3.52)
Expansion of jobs within firms for high-educated labour	0.006 (0.56)	0.003 (0.36)
Creation of jobs in new established firms for high-educated labour	-0.026 * (-1.87)	-0.023 * (-1.85)

Level of significance: 99% ***, 95% **, 90% * (T-values in brackets)

The relationship between destruction of jobs within firms and the branch composition gives also negative parameters, but none of them are significant negative, neither for the employment generally or for high-educated labour. The relationship between expansion of jobs within firms and the regional branch composition are generally positive, although none of the parameters are significant.

Somewhat surprisingly, the relationship between the number of branches and job growth in new established firms are generally negative, and for high-educated labour even with a certain significance. These results may, however, be in accordance with results obtained in Stambøl (2007, 2009), showing that the tendency to start new self-employment businesses is stronger in regions where the job growth and the opportunity to obtain wage jobs are weak. The same investigations detected, however, that there were in these local labour market regions where most self-employed persons had to close their self-employment businesses. It is thus reason to argue that the negative relationship between new created jobs in new established firms and the branch composition contribute to strengthen the negative relationship between destructions of jobs due to firm closures and the branch composition, and that this process is most expressed for high-educated labour.

In other words these findings indicate that persons generally and high-educated persons especially are strongly motivated to establish new firms in regions showing a small number of branches (which indicates in less central regions), but that the impact of this also contributes to strengthen the numbers of job destructions due to firm closures in regions showing a small number of branches.

4.4 Some further estimations of the decomposed job changes

In table 4 we show the regional relationship between each of the components that break down the total job changes. Or in other words, the gross flows of jobs in the regional labour markets due to destructions of jobs within mature firms and by firm closures and creation of new jobs within firms and by new firm establishments. The estimations produced several significant results both when estimated partially as well as estimating the explanatory variables simultaneously.

The main results indicate a positive relationship between both destruction of jobs within mature firms and due to firm closures at the one hand side and correspondingly regional rates of job expansions within firms and by new firm establishments on the other hand side. Turned around there are approximately as strong and positive relationship between regional creations of jobs within existing firms and by new firm establishments at the one hand side and the level of job exits within existing firms and due to firm closures on the other hand side.

There are, however, observed a more “either-or” relationship between job destructions within existing firms and job destruction due to firm closures, and between job growth within existing firms and job creation by new firm establishments. This is especially true when the estimations are made simultaneously, when the relationship between regional job growth within firms and job creation due to new established firms are both negative and significant.

These patterns are a bit surprisingly when simply interpreting job destructions as a negative phenomenon in local labour markets, and correspondingly job growth within existing firms as well as by new firm establishments to be something positive for regional labour markets. We should then expect the regional rates of job destructions both within existing firms as well as

by firm closures to turn in the same direction, and to be relatively higher in regional labour markets showing weak economic development and relatively lower in more prosperous regions. Correspondingly, we should expect that expansions of jobs within existing firms as well as job creation by new firm establishments should be relatively stronger in well developing regions and that both components should be low in regions not developing too well. The results in table 4 indicate, however, that this is far from being the situation.

Table 4. The relationship between job changes due to job destructions within existing firms and firm closures and job growth due to job creation within existing firms and by new firm establishments 2004-2005. Economic regions. Partial and simultaneous estimations (OLS).

	Destructions of jobs within mature firms	Destructions of jobs due to firm closures	Expansions of jobs within mature firms	Creation of jobs in new established firms
Partial estimation:				
Destructions of jobs within firms		0.29 (1.60)	0.47 *** (4.00)	0.30 *** (3.34)
Destructions of jobs due to firm closures	0.10 (1.60)		0.25 *** (3.55)	0.20 *** (4.06)
Expansions of jobs within firms	0.33 *** (4.00)	0.51 *** (3.55)		0.02 (0.31)
Creation of jobs in new established firms	0.38 *** (3.34)	0.78 *** (4.06)	0.05 (0.31)	
Simultaneous estimation:				
Destructions of jobs within existing firms		-0.23 (-1.23)	0.51 *** (4.30)	0.33 *** (3.71)
Destructions of jobs due to firm closures	-0.08 (-1.23)		0.27 *** (3.92)	0.22 *** (4.39)
Expansions of jobs within existing firms	0.35 *** (4.30)	0.56 *** (3.92)		-0.19 ** (-2.53)
Creation of jobs in new established firms	0.42 *** (3.71)	0.84 *** (4.39)	-0.36 ** (-2.53)	

Level of significance: 99% ***, 95% **, 90% * (T-values in brackets)

When putting these estimates into a reallocation process of regional jobs, the situation and interpretations become more complex. It is, however, possible to interpret destructions of jobs both within mature firms and by firm closures not simply as a negative aspect of regional labour markets, but as a component in a regional job reallocation process that might be necessary for a more prosperous regional economic development. As observed above there are strong and positive relationships between both job expansions within firms and job destructions within firms and due to firm closures, and between job creations by new firm establishments and destructions of jobs within firms and by firm closures. This reflects strong job reallocations in the regional labour markets, and several of the local labour markets that experience strong destructions of old jobs also show strong growth of new jobs both within mature firms as well as due to new firm establishments. The question is then if these regional job reallocation processes also contribute to net job growth in the regional labour markets?

In table 5 we have thus estimated each of the gross job components in each region with the total net changes of jobs in each of the regional labour markets. The regional net change of jobs is, like in table 2 above, treated as an independent variable, while the gross components are treated as explanatory variables. Like in tables 4 the estimations are made both partially and simultaneously with regard to the explanatory variables.

By partial estimations the results become only partially as expected. A strong and significant positive relationship between job expansions within firms and net job growth is as expected.

A negative relationship between destructions of jobs within firms and by firm closures and net job growth is also as expected, although the parameters are on the limit to be significant. On the other hand a negative relationship between job creation due to new firm establishments and net job growth is not as expected, but the parameters are not significant negative. As mentioned in the results of table 3 above, the tendency to start new self-employment businesses is somewhat stronger in regions where the development of wage jobs are weak. This might have an impact on the results in table 5, and especially due to the fact that new self-employment businesses constitute a considerable percentage of the total number of new firm establishments in less central regional labour markets (see Stambøl (2007,2009)).

When we estimate the effects of the explanatory variables simultaneously, the results are somewhat more in accordance with our expectations, with strong and significant negative relationship between destructions of jobs both within firms and by firm closures and net job growth at the one hand side, and a positive and significant relationship between job creations both within firms and by new firm establishments and net job growth at the other hand side. Also here the strongest relationship is to be found between net job growth and job creation within existing mature firms.

Table 5. The relationship between net job growth and job changes due to job destructions within existing firms and firm closures and job growth due to job creation within existing firms and by new firm establishments 2004-2005. Economic regions. Partial and simultaneous estimations (OLS).

Dependent variable:	Job destruction within firms	Job destruction due to firm closures	Job creation within firms	Job creation in new established firms
Net job growth (partial estimations)	-0.001 * (-1.65)	-0.003 * (-1.64)	0.003 *** (3.19)	-0.001 (-0.61)
Net job growth (simultaneous estimations)	-0.004 *** (-4.12)	-0.007 *** (-3.93)	0.008 *** (5.99)	0.002 ** (2.12)

Level of significance: 99% ***, 95% **, 90% * (T-values in brackets)

4.5 Regional branch composition and specialisation.

In the sections above we have made some analyses focusing the extent of regional branch composition and job reallocations. An alternative hypothesis is that some regions may develop well in spite of relatively small number of branches due to higher economic specialisation. Traditionally, regions showing a small branch composition is expected to be more vulnerable due to economic uncertainty connected to the performance of their key branches. However, in societies with a modern production high regional specialisation may not necessarily be interpreted as something negative and uncertain. One example is to be found in the “Silicon valley” in California, where we expect to find lower than average number of branches, but where a smaller number of branches is compensated by a strong accumulation of firms within the same branches or similar types of branches.

We have thus in addition to the level of branch composition introduced a variable that indicates the regional concentration towards firms and branches. The variable is constructed so that we first measure the total number of firms in each local labour market. Then we calculate how many firms do have: a) more than five employees, b) more than ten employees, and c) more than twenty employees (larger firms), and finally construct a variable showing the distribution of firm-size structure in each region. Regions showing high share of larger firms should indicate a somewhat stronger specialisation than regions with high share of small- and medium sized firms. Furthermore, we have measured the relationship between branch composition and firm-size for to indicate if regions may compensate a smaller than average branch composition with a higher than average concentration towards larger firms. A

positive relationship should indicate that where we find the highest number of branches we also find the highest share of larger firms, while negative relationship may indicate certain compensations, where a smaller branch composition becomes compensated by somewhat larger and more specialised firm units.

The results in table 6 indicate that regional branch composition and regional firm-size are strongly correlated, indicating that in regions showing the highest number of branches we also find the highest share of larger firms. All estimates are significant positive and the level of significance increases by firm size. The estimates and level of significance are somewhat higher for high-educated labour, indicating that the level of branch composition and firm size are somewhat more important for high-educated labour than for the employment generally.

Table 6. The relationship between firm-size and number of branches in regional labour markets in 2004-2005. Economic regions (OLS).

Firm-size:	Number of branches Total employment	Number of branches High-educated labour
Firm-size measured as the share of firms with more than 5 employees	2.25 *** (5.42)	3.44 *** (4.91)
Firm-size measured as the share of firms with more than 10 employees	4.12 *** (7.27)	6.10 *** (7.72)
Firm-size measured as the share of firms with more than 20 employees	7.69 *** (9.08)	9.29 *** (8.40)

Level of significance: 99% ***, 95% **, 90% * (T-values in brackets)

Finally, table 7 shows the relationship between firm-size and net job growth. We have used the same criteria for the level of firm-size as above, by the share of firms by minimum 5, 10 and 20 employees respectively. The results indicate a positive relationship between firm-size level and net job growth, although the relationship is not significant positive when including smaller firms in the minimum criteria. The results indicate an increasing positive relationship between firm-size and job growth by increased share of larger firms. This is true both considering high-educated labour, although most pronounced for the employment generally.

Table 7. The relationship between net job growth and firm-size in regional labour markets in 2004-2005. Based on economic regions (OLS).

Firm-size Based on total employment	Firm-size Based on high-educated labour
0.001 (min. 5 employees) (1.25)	0.001 (min. 5 employees) (1.41)
0.001 * (min. 10 employees) (1.74)	0.002 * (min. 10 employees) (1.65)
0.004 ** (min. 20 employees) (2.57)	0.003 * (min. 20 employees) (1.71)

5. Results at detailed regional levels

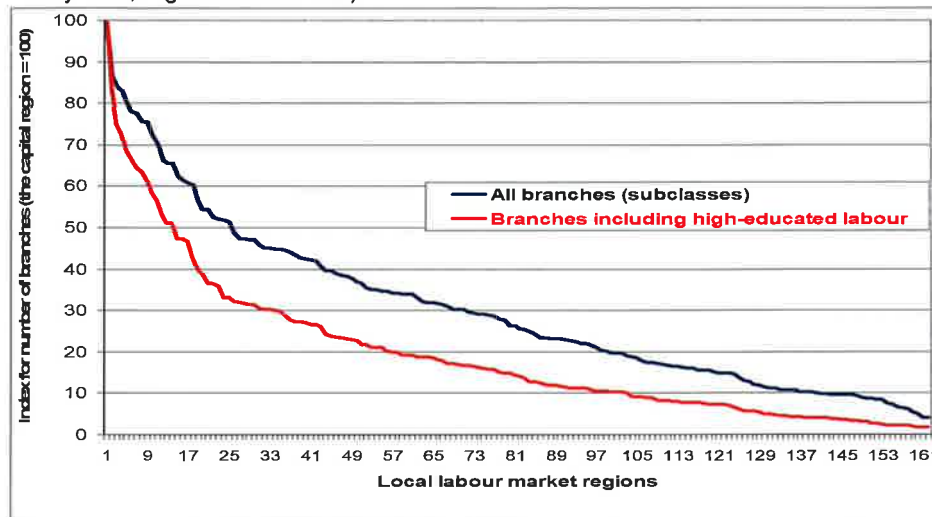
5.1 Branch composition and firm size at detailed regional levels

In this section we have analysed how many branches are represented in each of the 162 local labour market regions. The number of branches represented in the capital region is set at an index = 100 percent. The number of branches in each of the other regions is measured as a percentage of the number of branches in the capital region for the total number of branches and the number of branches that include high-educated labour respectively.

Figure 2 shows that the region with the lowest number of branches totally, has a branch composition of just 4 per cent of the total branch composition in the capital region. When we only consider branches with high-educated labour, the regional differences in the number of

branches increases, and the region showing the lowest number of branches has a branch composition just above 2 percent of that observed in the capital region. This indicates that the localisation of firms including high-educated labour might be even more centralised than among firms generally.

Figure 2. The number of branches (subclasses) represented in each labour market region. The number of branches (subclasses) in the capital region is set at an index = 100 percent. Measured for all branches and for branches that include high-educated labour. (The number of branches (subclasses) in the capital region: Totally=606, High educated=566)



For to illustrate that this is the real situation, we have in table 8 aggregated the results as an average for each typology of region defined by seven levels of centrality. We notice a very clear central-peripheral pattern, where the number of branches decreases gradually from the most central located capital region towards the most peripheral located typologies of regions represented by the rural areas. The number of branches thus clearly increases by centrality both for all firms totally, but mostly among firms that include high-educated labour.

Table 8. The number of branches (subclasses) by typology of regions by centrality measured as average branch composition in each typology of regions. The number of branches (subclasses) in the capital region is set at 100 percent. Total number of branches and branches including high-educated employed.

Aggregated groups of typology of regions by centrality	All branches (subclasses)	Branches (subclasses) including high-educated labour
The capital region	100.0	100.0
Other regional metropolises	84.5	77.0
Large city-regions	74.6	62.2
Medium-sized city-regions	58.0	43.2
Small-town regions	41.6	26.1
Small-place regions	25.9	14.5
Rural areas	12.4	5.7

Figure 3 illustrates the regional differences in firm size measured by the average number of employed in all firms and in firms with high-educated labour in each local labour market region. The average number of employed per firm in the capital region is also here set at an index of 100 percent. As distinct from the branch composition, it is not the capital region that shows the highest average number of employed per firm due to the fact that some regional labour markets experience up to ten percent higher averages than observed in the capital

region. Moreover, it is worth to notice that firms including high-educated labour show lower average number of employed compared to firms without high-educated labour.

The region showing the smallest average number of employed per firm has only $\frac{1}{4}$ of the corresponding average of the capital region. When just considering those firms that includes high-educated labour the rank of variation does not vary much from the total average.

We have in table 9, like in table 8 above, aggregated the results as an average for each typology of regions defined by seven levels of centrality. We notice also here a clear central-peripheral pattern, when the average number of employed per firm gradually fall from the most central located capital region and regional metropolises to the most peripheral located typology of regions represented by the rural areas. Thus the average number of employed per firm clearly increases by centrality both for all firms totally and among firms including high-educated labour.

Figure 3. The average number of employed by firm and labour market region. The average number of employed per firm in the capital region is set at an index = 100 percent. Total for all firms and for firms that include high-educated labour. (The average number of employed per firm in the capital region: Total =9.3. Including high-educated=7.1)

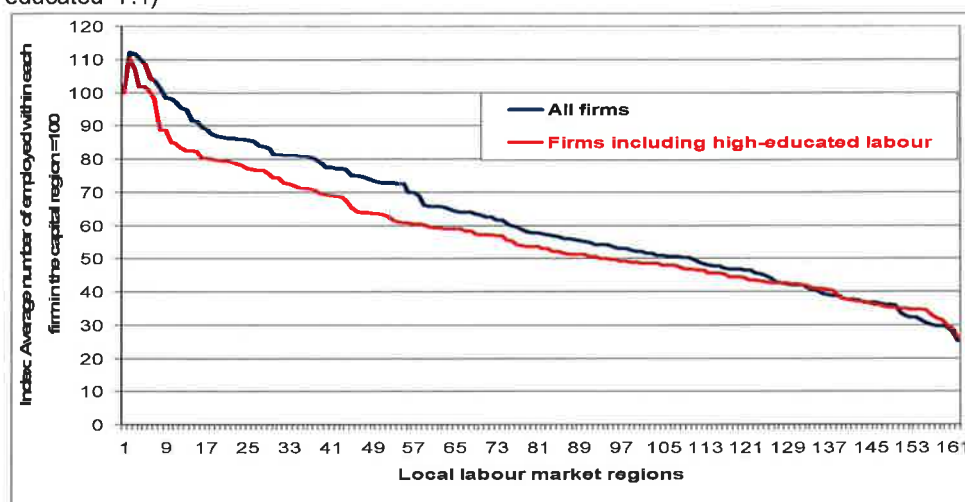


Table 9. Average number of employed within firms by typology of regions by centrality. Index: Average number of employed within firms in the capital region is set at 100 percent (Average number of employed within firms in brackets). Average number of employed within firms generally and firms that include high-educated labour.

Aggregated groups of typology of regions by centrality	All firms	Firms including high-educated employed
The capital region	100.0 (9.3)	100.0 (7.1)
Other regional metropolises	108.6 (10.1)	103.3 (7.4)
Large city-regions	91.6 (8.5)	83.8 (6.0)
Medium-sized city-regions	86.3 (8.0)	77.3 (5.5)
Small-town regions	73.6 (6.8)	69.1 (4.9)
Small-place regions	59.1 (5.5)	54.2 (3.9)
Rural areas	45.8 (4.3)	45.0 (3.2)

5.2 The relationship between branch composition and job growth

In this section we include some investigations showing the relationship between the branch composition measured as the number of branches (subclasses) in each local labour market region and the net change of jobs as an average of some selected years of the period 1997-2005. The results are shown in Figure 4 where all local labour market regions are classified

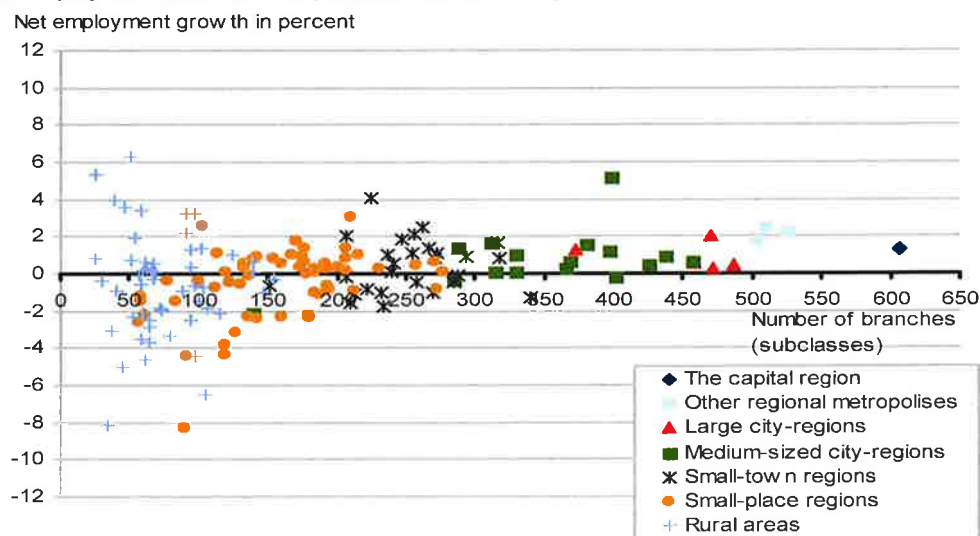
by a colour and sign according to which typology of regions by centrality each of the local labour markets belongs to.

As already observed in table 8, the number of branches significantly increases by centrality. The capital region clearly differs from other typologies of regions with the highest number of branches followed by other regional metropolises and large and medium-sized city-regions, while small-town and small-place regions and finally rural areas show the smallest number of branches within their local labour markets.

Figure 4 shows that local labour market regions with highest numbers of branches almost generally also show a positive job growth in this period. When moving further down the scale of centrality the job growth increasingly vary across the local labour markets, where the majority of the rural areas show both low branch composition and weak job development. It is, however, important to notice that several of the rural areas and small-place regions show high job growth in spite of low number of branches, indicating a strong variation of labour market performance across the most peripheral local labour market regions.

Simple regression calculations within each typology of regions by centrality indicate that an increase in the number of branches has strongest positive impact on the job growth among small-place regions and partly among the medium-sized city-regions. The rural areas and large city-regions differ, however, from all other typologies of regions showing a negative relationship between the branch composition and employment growth.

Figure 4. Net job growth and branch composition in local labour market regions and typology of regions by centrality. Annual average of job growth generally in the period of 1997-1998, 2002-2003 and 2004-2005. Percent of employed. The branch composition is measured by number of branches (sub-classes).

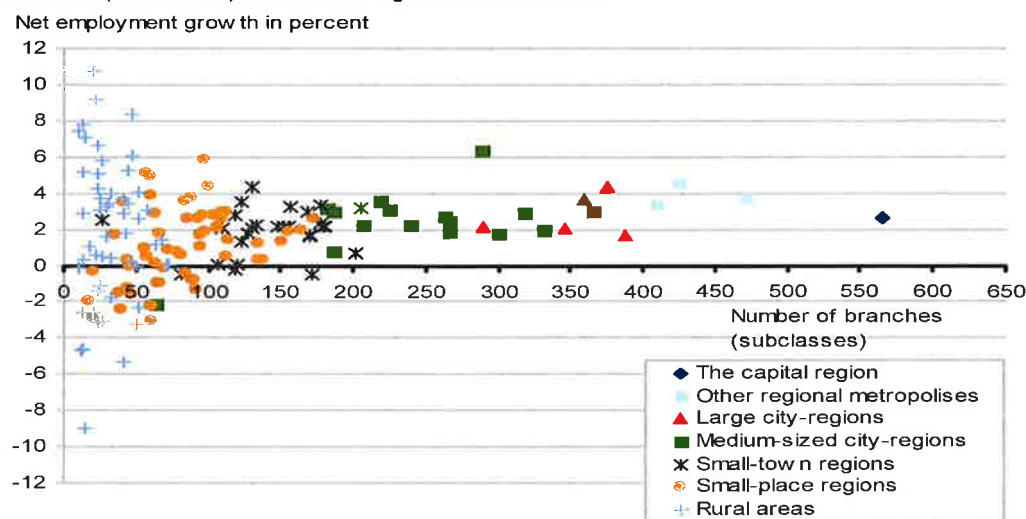


In Figure 5 we have included the corresponding relationship between branch composition and job growth for high-educated labour. Much of the same patterns observed in Figure 4 are also to be found for high-educated labour. The branch composition is, as already observed, less nuanced for high-educated labour compared to the employment generally.

It is still the more central typologies of regions that show the highest number of branches and almost generally a positive job growth, while the variation across the local labour markets increases by their level of peripheral location and by their level of branch composition.

Like for the job growth generally, it is also for high-educated labour the small-place regions that show the strongest positive relationship between the branch composition and job-growth, but also medium-sized and small city-regions show increasing employment with a more nuanced branch structure for high-educated labour. The rural areas differ also here from all other typologies of regions showing a negative relationship between the branch composition and job growth.

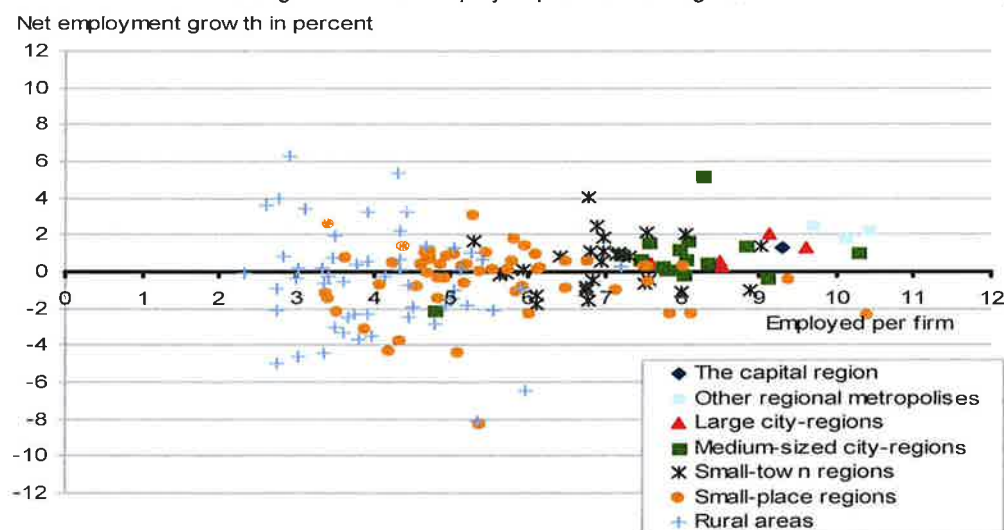
Figure 5. Net job growth and branch composition in local labour market regions and typology of regions by centrality. Annual average of job growth of high-educated labour in the periods of 1997-1998, 2002-2003 and 2004-2005. Percent of employed with high education. The branch composition is measured as the number of branches (subclasses) that include high-educated labour.



5.3 The relationship between firm size and job growth

In this section we have in the same manner as in the previous section analysed the relationship between the firm size, measured as average number of employed per firm, and the net job growth both generally (Figure 6) and for high-educated labour (Figure 7). As observed above the firm size is positively correlated to the level of centrality, but the job growth generally seems to have weaker positive relationship with firm size than branch composition.

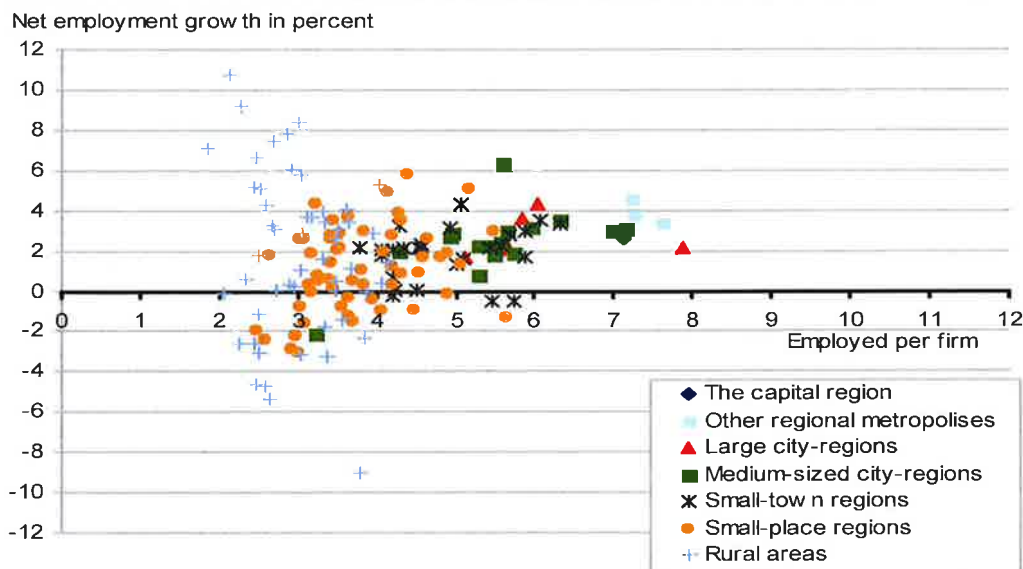
Figure 6. Net job growth and firm size in local labour market regions. By typology of regions by centrality. Annual average of total net employment growth 1997-1998, 2002-2003 and 2004-2005. Percent of employed. The firm size is measured as average number of employed per firm and region.



It is positive relationship between job growth and firm size in the regions that belongs to more central located typologies of regions, and as we see several of the regions in rural areas and small-place regions with the smallest firm size show weak job growth. However, also here several of the local labour markets in rural areas experience a relatively strong job growth in spite of smaller than average firm size. This is most remarkable for high-educated labour.

Simple regression calculations within each typology of regions by centrality indicate that an increase of firm size has strongest positive impact on the employment growth among medium-sized city regions for the employment generally, and among small-place regions and medium-sized city regions considering the high-educated labour. The rural areas and other regional metropolises differ from all other typologies of regions showing a negative relationship between the firm size and job growth both considering the employment generally and for high-educated labour.

Figure 7. Net job growth and firm size in local labour market regions. By typology of regions by centrality. Annual average of net job growth by high-educated labour 1997-1998, 2002-2003 and 2004-2005. Percent of high-educated labour. The firm size is measured as average number of employed per firm and region.



5.4 The relationship between job creation and job destruction

In this section we have investigated the gross flows of jobs in the local labour markets by a distribution of altogether 162 local labour market regions. Furthermore, these local labour market regions are classified by which typology of regions by centrality each of them belongs to. When operating at so detailed regional level we have to take into consideration the differences in population size across these regions when making interpretations of the results. The gross flows appearing within each of the typologies of regions should, however, reflect a somewhat stronger homogeneity considering the size of the regions. Like in the previous sections we also here measure the gross flows as an average of the periods 1997-1998, representing a period of strong economic growth, 2002-2003, representing a period of weak economic growth, and 2004-2005, representing a more “neutral” business cycle period.

5.5 Job creation and job destruction generally

We first look at new created jobs and old jobs that disappear in the local labour markets. The entries of new jobs include here both new jobs created by new established firms as well as expansions of jobs within existing businesses. In the same manner we also includes the job exits due to reductions of jobs within existing firms as well as job destruction due to closures

of entire firms. Figure 8 shows the total job entries and exits for all local labour market regions distributed by their corresponding typology of regions by centrality. The 45 degree diagonal tells us if the total numbers of new jobs and the losses of old jobs are in balance or not. Regions placed along the diagonal have a balance between new jobs and job destruction. Regions above the diagonal experience an excess of new jobs relatively to the job losses, while regions below the diagonal experience higher job destruction than the number of new job created. Furthermore, the distance from origo in the figure reflects the extensiveness of job reallocation, where the regions placed closer to origo show relatively low gross job reallocation, while the regions placed further from origo show strong reallocations of jobs whether they experience an excess of new jobs or an excess of job deficits. In the interpretation of the results it is, however, important to take into consideration the strong dispersion of regional size across local labour markets.

Figure 8. Job entries and exits in local labour market regions and typologies of regions by centrality. Annual average of job reallocation totally in the periods of 1997-1998, 2002-2003 and 2004-2005. Percent of total employment.

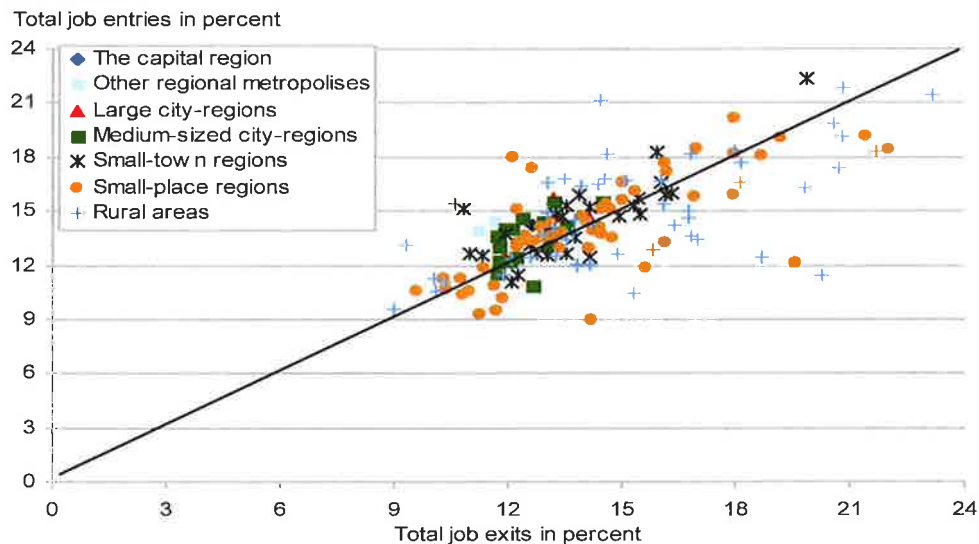
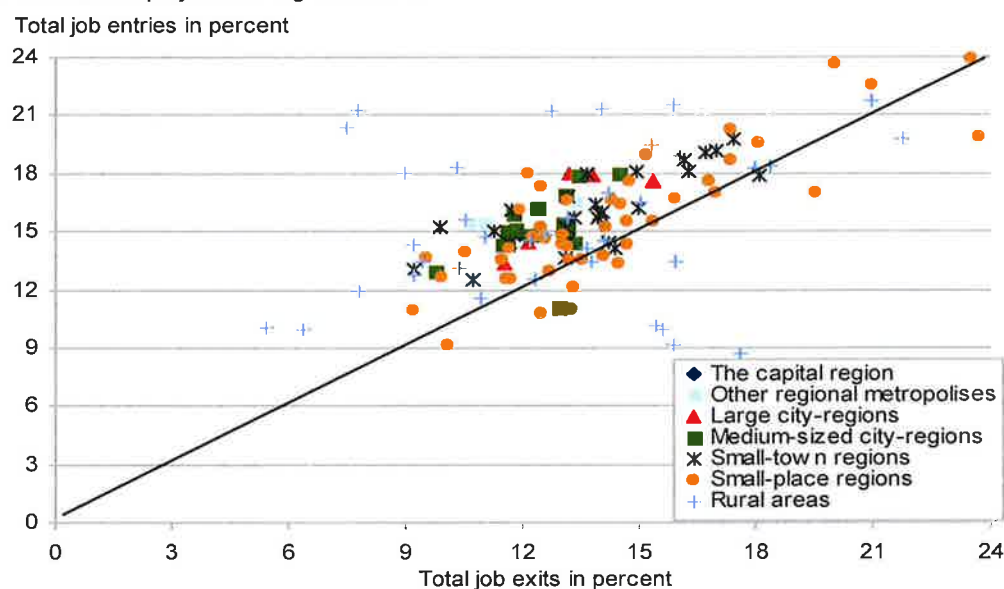


Figure 8 shows that the regions in the three most central located typologies of regions and the majority of the medium-sized city-regions are placed above the diagonal, indicating that these regions experienced an excess of new jobs and thus a net job growth during these periods. These regions are also placed in the middle of the figure, indicating an average level of job reallocation due to average level of both new job entries and job exits. Among the three least central typologies of regions it is a more balanced distribution of regions above and below the diagonal. The most remarkable is, however, the very strong dispersion in job reallocation across these regions, which shows that many of them have experienced a strong net growth in job creation while many have experienced strong net job losses. This indicates that several of the least central located regions adapt themselves very well to new conditions at the labour market, while many do not.

Considering high-qualified jobs the wish is to adapt more knowledge out of the job reallocation processes thus focusing the labour markets of high-educated labour. Thus Figure 9 shows similar job reallocation processes as presented in Figure 8, but concentrated to high-educated labour. The pattern is, however, somewhat different from what was observed for the employment generally. First, a clear majority of the regions are placed above the diagonal, indicating a stronger excess of new jobs relatively to job losses. The regional labour markets

placed below the diagonal are, however, all to be found among the least central located typologies of regions. Second, there is a stronger dispersion in net job growth both considering more central located regions as well as among less central located regions than observed in the job reallocation processes for the regional labour market generally. The regional “picture” is thus, so to speak, less homogeneous. Finally, it is worth to notice that the reallocation towards high-qualified jobs seemed to function well in a majority of regions in these periods. Once more, it is important to keep in mind that there is strong dispersion in regional size and most probably even stronger among high-qualified jobs than among jobs generally.

Figure 9. Job entries and exits in local labour market regions and typology of regions by centrality. Annual average of job reallocation among high-educated labour in the periods of 1997-1998, 2002-2003 and 2004-2005. Percent of employed with high education.



5.6. Job creation by new established firms and job destruction by firm closures

In this section we are focusing the job reallocation processes due to creation of new jobs by new established firms versus destruction of jobs due to closures of entire firms. We put forward the following requests: First, do the creation of new jobs in new established firms and destruction of jobs due to firm closures function as an “engine” for modern regional job reallocation processes, and thus function as an indicator for the job dynamics in the regional labour markets? And second, to what extent is the importance of new establishments and closures of firms on the job reallocation process dependent on different typologies of regions?

For Norway generally, the number of employed affected by job losses within mature firms has been approximately three times higher than the number of employed losing their jobs due to firm closures. On the other hand, there is an excess of persons obtaining a new job due to job expansions within firms than due to job expansions of new firm establishments (see table 1). Nevertheless, the processes of new firm establishments and old firm closures are expected to be of importance for the national job reallocation processes. Furthermore, at the national level we also found that the job supply due to new established firms clearly exceeds the job losses due to completely firm closures. Figure 10 illuminates that this is also the situation in a majority of local labour market regions. The strongest exception is, however, to be found in small-place regions and in rural areas.

Somewhat surprisingly, the job dynamics in the regional labour markets generally (Figure 10) do not deviate much from the similar structures of the job processes due to new firm establishment and firm closures among high-educated labour (Figure 11). The deviation across regions is somewhat stronger, but no significant differences are detected between these groups, neither for the central regions nor the less central regions. This indicates that the processes of job creation by new established firms versus job losses due to firm closures to a less extent contributes to the job reallocation processes towards more knowledge based working places. Otherwise, the net growth of high-educated jobs, shown in Figure 11, should clearly have exceeded the net growth of new established jobs generally, shown in Figure 10.

Figure 10. New jobs in new established firms and destruction of jobs due to firm closures in local labour market regions and typology of regions by centrality. Annual average for the employment generally in 1997-1998, 2002-2003 and 2004-2005. Per cent of total employment.

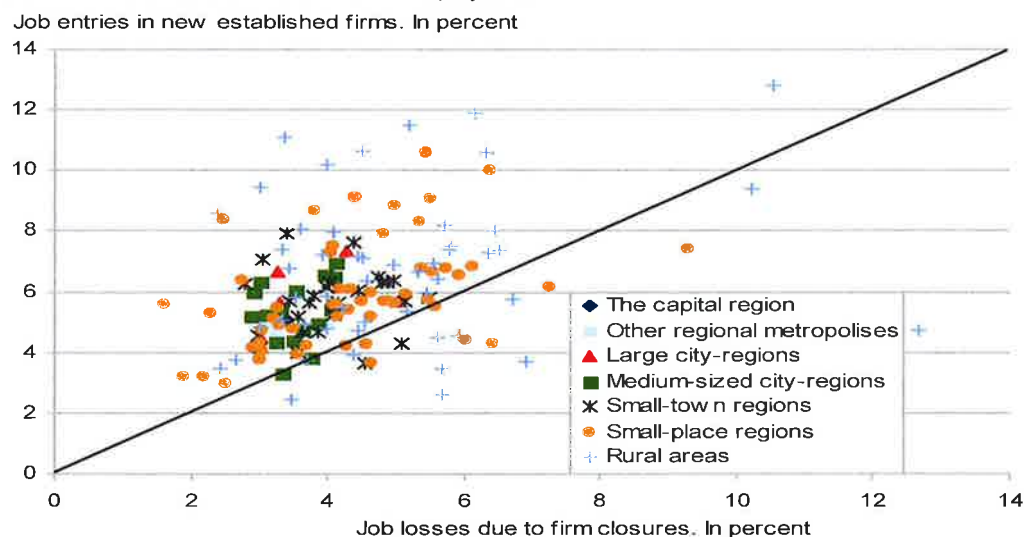
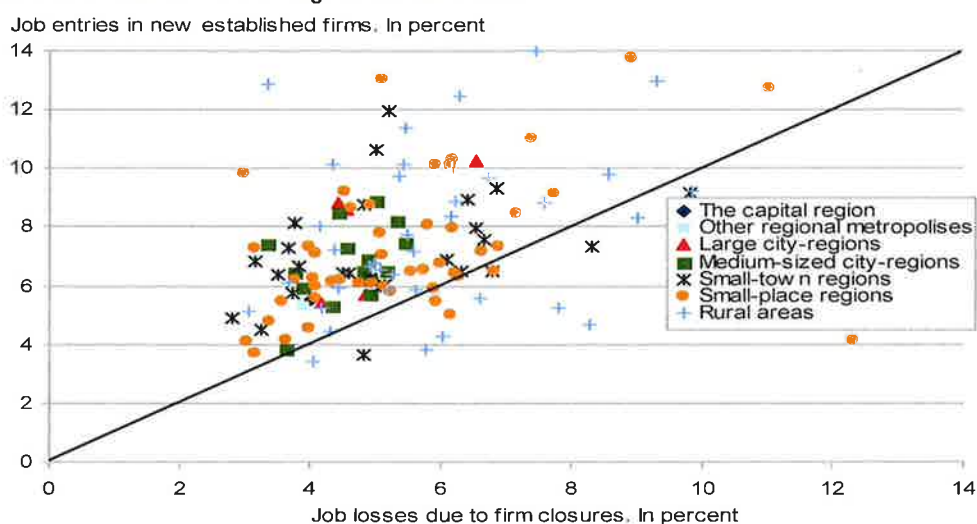


Figure 11. New jobs in new established firms and destruction of jobs due to firm closures in local labour market regions by typology of regions by centrality. Annual average for high-educated labour in 1997-1998, 2002-2003 and 2004-2005. Per cent of high-educated labour.



5.7 Job creation and job destruction within existing firms

While a majority of local labour market regions experienced job growth due to the processes of new jobs in new established firms versus job losses by firm closures, a majority of the local labour markets experienced job losses due to firm internal changes in the number of jobs (see

Figure 12). At the national level the results also indicate that the amount of job losses within mature firms clearly exceed the number of new jobs created within firms. Amongst the few local labour markets regions that experienced a net firm internal job growth we find several less central regions, mostly to be found among small-place regions and rural areas.

Figure 12. Job growth and job destruction within firms in local labour market regions by typology of regions by centrality. Annual average of *the employment generally* in 1997-1998, 2002-2003 and 2004-2005. Percent of total employment.

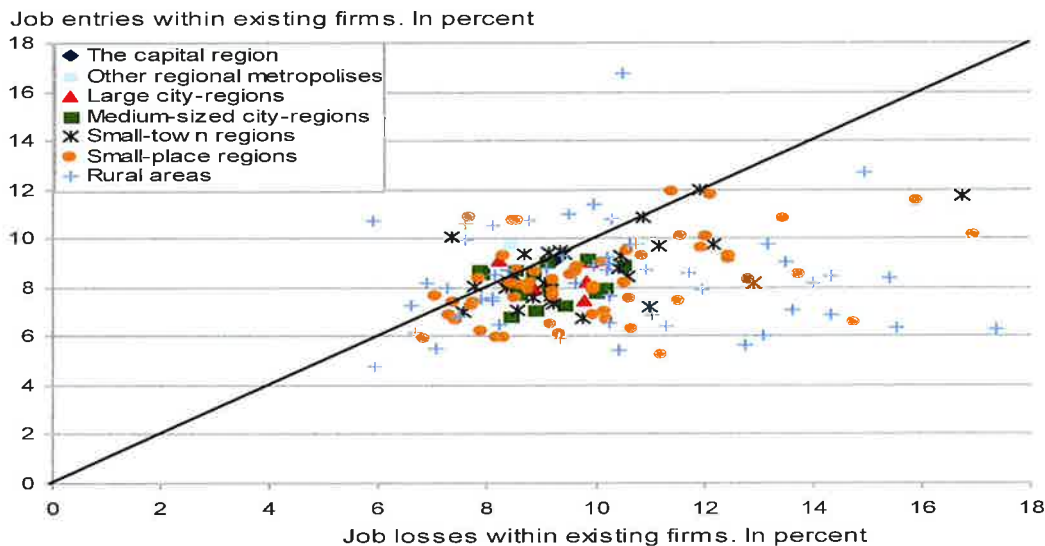
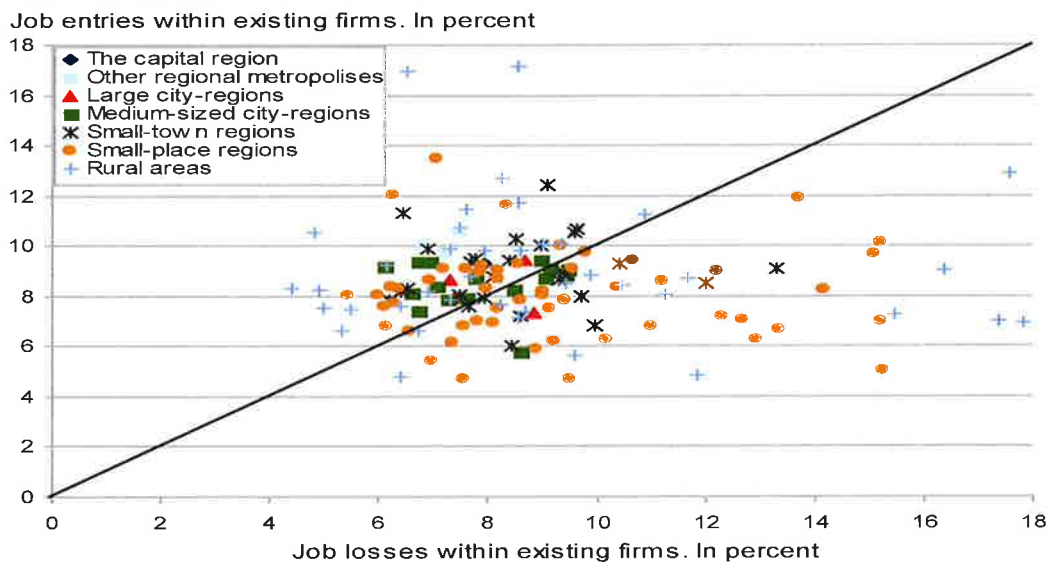


Figure 13. Job growth and job losses within firms in local labour market regions and typologies of regions by centrality. Annual average of *high-educated labour* in 1997-1998, 2002-2003 and 2004-2005. Percent of high-educated labour.



When considering only jobs of high-educated labour, these processes develop rather differently from the general job development. A majority of local labour market regions show a positive balance between firm internal job growth and firm internal job losses of high-educated labour (see Figure 13). However, the results also here reveal strong regional variations, especially amongst the less central located local labour market regions. When comparing the general results in Figure 12 with the results of high-educated labour in Figure 13, we note that a clear majority of the large and medium-sized local labour market regions show higher firm internal job growth than firm internal job losses for high-educated labour.

This shows that the job reallocation processes that occur within existing firms indicate that several job functions that earlier become executed by persons with low and medium level of education has a tendency to disappear, while these functions partly become replaced by jobs requiring high-educated labour.

6. Summary and reflections of the regional job reallocation dynamics.

We do not find strong deviation between central and the average of less central regions due to the dynamics in labour markets generally and for high-educated labour especially. But the dispersal in the ability to reallocate jobs and labour are definitely much stronger across the less central regions than across the central regions.

The results suggest positive relationship between the regional level of branch composition and job growth, between the level of branch composition and firm size and thus also between job growth and firm size. The relationship between regional branch composition and job growth due to new establishments tend, however, to be negative. Furthermore, there are positive relationship between job growth both within existing firms and in new established firms and job decline within firms and by firm closures, indicating that reallocation of jobs are important for job growth. New jobs by new firm establishments clearly exceed the number of jobs lost by firm closures, while job losses within mature firms exceed the number of new jobs created by expansion within mature firms. However, it is the creation of new jobs within mature firms that contributes most to the supply of new jobs. The results also indicate that reallocation from low to high-educated labour mostly take place in the job reallocation processes within mature firms, more than in job reallocation due to new establishments of firms versus firm closures. Beyond these main trends there are, however, detected strong regional variations.

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