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# Urban and regional labour mobility performance in Norway

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## **Abstract**

Across Europe the competitiveness of urban and regional labour markets becomes an increasingly important task for regional and sector policies. Efficient matching of local demand and supply of labour at different qualification levels is considered to be an important prerequisite both for economic growth and social cohesion in every region. The expectation is that higher mobility of the labour force should increase the general level of employment. Moreover, increased total labour mobility is seen as a tool for reaching the goals of the labour market policy, employing as large as possible part of the labour force into ordinary employment. Furthermore high mobility is expected to satisfy the employer's claim of filling in the vacancies with suitable labour as quickly as possible in a flexible labour market in continually structural change.

Use of annual gross-flow labour market statistics may be very relevant in such analyses. Such data may allow multidimensional analysis of labour market mobility, i.e. in geographical terms as well as between sectors and according to the qualifications of the labour force. Theoretical considerations may be taken from e.g. the human capital theory and theories of segmented labour markets and regional division of labour, but also from more modern theories that apt to explain structural change and new forms of transitions in the regional labour markets. According to human capital theory, it is the most highly educated persons that are considered to benefit most from mobility. Inter-sector mobility is also expected to be more frequent among younger people, who have not yet embedded branch-specific knowledge through a long professional career.

The main purpose of the paper is to present some analyses of the performance and competitiveness of cities and regions in terms of growth of employment and especially focusing on the number and quality of the persons that enter and leave the local labour markets. As a point of departure cities and regions in Norway is classified into different categories according to a large set of production conditions. It is perhaps not surprising that cities and regions with uneven production conditions perform different according to employment growth and mobility, but when similar regions to some extent also perform different, this demand more sophisticated explanations. Labour market mobility is analysed by measuring regional labour market transitions by use of longitudinal gross-flow data during the 1990s specified by a concise regional vacancy-account.

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## 1. Background and challenges

Efficient matching of local demand and supply of labour at different qualification levels is considered to be an important prerequisite both for economic growth and social cohesion in every region. Hence, more or less explicitly, regional development programmes are designed to improve the performance of functional local labour markets. This includes e.g. analyses of structural change towards the knowledge society and the mobility of human capital. The levels of education as well as the return to education vary across different cities and regions. Attractive urban regions are expected to improve its human capital even more through geographical mobility of high-qualified labour. Infrastructure like location of higher education institutions, business services and transport systems as well as the institutional frameworks is also of importance.

Use of annual gross-flow labour market statistics is very relevant in these analyses. Such data may allow multidimensional analysis of labour market mobility, i.e. in geographical terms as well as between sectors and according to the qualifications of the labour force. Theoretical considerations may be taken from e.g. the human capital theory and theories of segmented labour markets and regional division of labour, but also from more modern theories that apt to explain structural change and new forms of transitions in the regional labour markets. The labour market mobility is partly considered to be associated with differences in supply and demand of labour both at the local and regional level, differences that create various forms of unemployment and vacancy formations. Persons are expected to move from low paid to better paid jobs, from unemployment to jobs, from decreasing and stagnated sectors to growing sectors and thus from stagnated and backwards cities and regions to more prosperous, expanding and dynamic cities and regions with surplus of working places. According to human capital theory, it is the most highly educated persons that are considered to benefit most from mobility. Inter-sector mobility is also expected to be more frequent among younger people, who have not yet embedded branch-specific knowledge through a long professional career.

The main purpose of the project is thus to analyse the performance and competitiveness of cities and regions in terms of growth of employment and especially focusing on the number and quality of the persons that enter and leave the local labour markets. As a point of departure cities and regions is classified into different categories according to a set of production conditions. It is perhaps not very surprising that cities and regions with unequal production conditions perform different according to employment growth and recruitment, but when similar regions to some extent also perform different, this demand more sophisticated explanations.

In Statistics Norway we have in co-operation with researchers from other Nordic countries analysed labour market mobility among persons with different qualification levels. More especially we have established methods for analysing vacancy formations within and between regional labour markets based on the whole population in working age. We have also established indexes that illuminate the gross demand for labour in regional labour markets and sectors and differing between business cycles, as well as analyses of regional performances of recruitment to jobs within and between the local labour markets (see e.g. Edvardsson et al., 2000, 2002, Heikkilä et al., 1999a,b, Heikkilä and Stambøl, 1999, Johansson et al., 1997, Persson ed. 2001, Stambøl, 1999, 2000, 2001, 2002 and Stambøl ed. 1996, 1997, 1999).

By use of gross-flow data and specified mobility concepts the project aims to produce sets of regional-, segments- and sector-specific performance indexes illuminating how each city and region perform with regard to recruitment of different kinds of labour in a) within the local labour market and b) through in-migration. An important aspect of different vacancy formation is to be found in different level and structure of deactivation, thus including analyses illuminating part of the vacancy chain processes.

1) - As an introductory analysis different categories of urban and regional labour markets is defined on the basis of similar and dissimilar production conditions (See figure 1 and 2 in section 3).

- 2) - Gross mobility between different status groups and regions is calculated by help of a consistent regional vacancy account (See figure 3 in section 3).
- 3) - Different gross-streams within and between the urban and regional labour markets are measured by different mobility concepts.
- 4) - We also investigate if the growth of employment is positively correlated to the level of gross labour-mobility and for certain sector groups also to net labour-mobility.
- 5) - Finally specific and total performance indexes showing the urban and regional competitiveness by mobility is calculated (See figure 4 in section 3).

One of the challenges is as well to explain eventually different performances in similar cities and regions, e.g. testing if the criteria that are chosen as production conditions (see paragraph 1 above) give significant differences. The analyses use individual register based gross-flow labour market data for total populations in working age by year-to-year transitions through the time period 1994-1999.

## **2. Theoretical foundation, hypotheses and policy**

Long distance migration of labour has for a long time been considered as a necessity. For several years labour market policies have encouraged the unemployed to search for jobs outside their local labour markets. Labour market policies have as well gently advocated the importance of intersectional mobility. The expectation is that higher mobility of the labour force should increase the general level of employment. Moreover, increased total labour mobility is seen as a tool for reaching the goals of the labour market policy, employing as large as possible part of the labour force into ordinary employment. Furthermore high mobility is expected to satisfy the employer's claim of filling in the vacancies with suitable labour as quickly as possible in a flexible labour market in continually structural change.

In theory, most long distance migration is considered to be associated with regional imbalances between supply and demand of labour (see e.g. Greenwood, 1985). Through rational decisions, labour is supposed to move from regions with a limited number of well-paid jobs, high unemployment and an overrepresentation of decreasing industrial branches, to expansive regions with a surplus of jobs. The rate of migration is partly decided by demographic factors: migration is dominated by younger persons and especially with higher education (see e.g. Stambøl et al, 1998). These are considered to benefit more from migrating, since their investments in formal education have to be paid off. Furthermore, their investments in housing and real estate as well as in social networks in a given locality are generally less than for older persons. Individuals, which have not yet formed a family of their own, have less personal restrictions to move to another region (for an overview of these processes, see e.g. Milne, 1991, Stark, 1991, Champion and Fielding, 1992).

In particular, highly educated people are as well much more sensitive to environmental factors such as the spatial concentration on high-skilled jobs and career possibilities. As such, in the "knowledge society" factors like amenities, the existence of a good environment and accessibility are also important location factors with respect to highly educated people (Kontuly, 1998, Harris and Becker, 2001).

It is generally accepted that economic upswings stimulate long-distance migration, while downswings have the opposite effect (e.g. Pissarides and Wadsworth, 1989, Milne, 1991). The causes for this can primarily be found in the increased mobility of the labour force during good times, when "pull" factors are especially pronounced. In worse times people are likely to place more interest in those jobs that exist and are less likely to move or change jobs without fixed plans.

The matching in regional labour markets is also of a different kind compared with the situation some years ago. The problem today is the existence of both shortages and surpluses of labour within the same companies, branches, and commuting regions. The reason for this is that the labour market has become more segmented regarding competence levels. A segmented labour market consists of a number of sub-markets, which are more or less separated from one another by various obstacles, resulting in a heterogeneous and unsubstitutable labour force. These sub-markets have their own supply and demand situations, their own wage structures and their own surpluses or shortages of labour. Mobility between segments is low, while it is high within individual segments. Segmentation of the labour force with regard to the supply side corresponds to its segmentation with regard to the demand side. The mismatch on the labour market seems to have been accentuated during the structural transformation in the past decades (for a mismatch overview, see e.g. Padoa Schioppa, 1990).

Different regions have differently composed labour markets. The labour required by the urban labour market today is also different from the last decades. The regional division of labour has been more important, with an accentuated regional polarisation as one result (Massey, 1995, Johansson, 1996). "Rural push" has declined as an activating force, and it seems that "urban pull" has come to dominate migration from old factory towns or rural areas to metropolitan areas and regional service centres. There is thus interdependence between the labour force and the structural transformation of the economy with the labour force being complementary to the new technology. This interdependence also seems to have been accentuated during the transfer from the industrial to the post-industrial society. This implies that the decreasing substitutability between different kinds of labour and that the structure of the economy regulates the kinds of labour demanded in a given branch or region. This phenomenon is also valid with regard to the relations between different regions (Massey, 1995, Johansson, 1996, Johansson and Persson, 1999).

Mobility is, however, not only associated with migratory movements. Instead most of the mobility in the labour market is a consequence of the fact that people change jobs without any geographical mobility. Here, we usually differ between labour mobility – that is the same as moving in or out or between jobs - and different kinds of job mobility. In this analysis the focus is primarily put on the labour mobility, thus making theories dealing with flows of labour somewhat more relevant compared with job mobility theories dealing with closures of old jobs and establishment of new jobs. Flows of jobs are, however, close related to flows of labour, e.g. that both closures and new established jobs necessarily generate flows of labour. Closures of complete firms or divisions within firms and companies are giving rise to involuntarily flows of labour. Labour mobility is, however, much more comprehensive than the job mobility suggests. All kinds of mobility are, however, dependent of the labour market situation and the transformation of this (see e.g. Burda and Wyplosz, 1994, Burgess, Lane and Stevens, 1996, Davis and Haltiwanger, 1998).

At the demand side the more modern industries require local supply of a committed labour force, at the same time as new generations of ICT (Information and Communication Technology) and global "high-tech" industrial networks diffuses the physical concept of a work-place and require highly specialized labour with up-to-date training. As van der Laan (2001) points out, there are conflicting and complementary theories explaining the location in space of workplaces in the new economy, from traditional agglomeration and more recent and fashionable cluster theories, to theories of indifference. The latter meaning that new economic activities are increasingly independent on any place-specific characteristics and that regional growth is to a large extent a matter of coincidence (Curran and Blackburn, 1994). Accordingly, there are different strategies stressed in territorial industrial and innovation policy.

Other hypotheses put forward that functional labour markets can only be understood within the context of a systematic framework. Employment systems are defined as the set of policies and institutions influencing interaction between the production systems and the labour market systems (Schmid, 1994). Another hypothesis is the emerging of the transitional labour market. It is based on the observations that the border between the labour market and other social systems, like e.g. the

educational system, the private household economy etc. are becoming increasingly blurred, and thus increase transitions between formal employment and productive non-market activities. Each transition, such as those from school to job and vice versa, from parental or sick leave to job, from unemployment to job etc. can be temporary and repetitious. Transition itself is also enforced by policy intervention to encourage temporary leave for life-long learning periods and parental leave. This transition can be viewed as a supplementary dimension to that usually described as labour mobility, i.e. qualification or de-qualification careers, inter-sector mobility and inter-regional or international migration (for more discussions: see e.g. Schmid and Gazier, 2002).

### **3. Urban and regional classifications, data and methods**

An important aspect in this analysis of regional labour market mobility and migration is the classification of individuals according to their labour market status; e.g. employed, unemployed, under education and the remaining population outside the labour force. In this analysis one aim is to analyse the change of labour market status, sector and segment connected to the migrants and the migration processes as well as investigating how these transitions are operating within different and similar local labour markets. In such case, it is important to compare changes in labour market statuses among migrants and non-migrants, investigating the local labour market's inter- and intra-regional transition rates. Necessary gross-flow data for all individuals of working age are therefore established. The data cover whole populations, collected from individual register-based data sources at Statistics Norway.

In the analysis the comparison of the inter- and intra-regional labour market transition is based on changes in two-year periods (following each individual from a year  $t$  to another year  $t+1$ ) during the time period 1994-1999.

#### ***Urban and regional classifications***

One important prerequisite for the analyses is a proper classification of cities and regions into different and similar categories of local labour markets. This will further represent one of the independent variables in the analysis. Earlier investigations of geographical mobility have shown that the labour market and the level of education have a tendency to become increasingly important factors in explaining migration at a higher geographical level (see e.g. Stambøl, 1991, Stambøl et al. 1998). In this analysis, however, we use somewhat more disaggregated regional levels classified on the basis of what may be identified as functional regions. The analysis is based on 86 local labour markets in Norway, which mainly correspond to a classification of economic regions used by Statistics Norway (see Hustoft et al., 1999). The regions are basically classified by commuting figures, and should thus represent functional local labour markets. The regions are, however, classified so that they don't cross any county borders, thus making some few neighbour regions to be part of the same functional labour market. Most obviously this is the case in the Oslo region, which may consist of the capital region of Oslo and four economic regions in the surrounding county of Akershus. In this analysis these five regions are aggregated to one region: Oslo and Akershus.

The idea is to identify all economic regions by a common set of production conditions. The different production conditions included in the analysis are listed in figure 1.

The next step is to try to classify the local labour markets into some categories of groups, which each should show a high degree of similarity due to production conditions, while the production conditions may vary extensively across the categories of regions. As written above, it is probably not a sensation that local labour markets with uneven production conditions perform different with respect to e.g. economic growth, employment change, recruitment patterns and migration. On the other hand we should expect that more similar local labour markets should show stronger conformity in their way of performing. A method of classification, which we have elaborated for this analysis, is shown in figure 2. We do here classify 86 Norwegian labour markets into 12 categories of groups based on 21 production conditions.

Figure 1. Production conditions for classification of "homogenous" categories of regions

- Total number of persons in age group 16-74 years
- Total number of persons under higher education (School region)
- Share of population in 4 different age groups within the age interval 16-74 years
- Share of population in age group 16-74 years with 1. Compulsory (low) education, 2. Secondary (middle) education and 3. Post-secondary (higher) education
- Share of employed persons in 1. Primary sectors, 2. Secondary sectors, 3. Sectors representing the "New economy", 4. "Distribution" services, 5. Finance and 6. Non- market services
- Labour force participation rate for population in the age group 16-74 years
- Unemployment rate
- Average annual income for employed persons working full time
- Branch-mix (number of branches based on NACE at 5-digit level)
- Centrality (5 categories of centrality)
- Tightness of settlement (numbers of persons per square kilometre)

Figure 2. A method for classification of "homogeneous" categories of regions

**Number of regions: 86 - Number of groups: 12 - Production conditions: 21**

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1. Collecting data for 21 production conditions (see list of variables in figure 1 above):
2. Standardize the values of each variable in all regions into a common scale from 0 to 100 ranked in descending order (from highest to lowest) in the nation as a whole.
3. Specify the median value of each variable. Which here is the mean value of regions ranked as number 43 and 44
4. Calculate each region's distance from the median value of each variable as vectors
5. Rank all regions according the sum from highest to lowest distance from all median values of all variables
6. Calculate the standard deviation of each variable.  
This standard deviation defines the weight of each variable in the final classification if we decide that each variable should have the same weight. Otherwise the variables with the highest range of variation will get the strongest weight in the classification
- \*) 7. Classify 12 groups as follows:
  - The highest ranked region (most extreme) search the most similar region according to all 21 variables among the 85 other regions.
  - On the bases of the average value of these two regions the next most similar region will be searched among the 84 reminding regions et cetera until group 1 consists of 4 regions.
  - The same procedure is then carried out for the next 11 groups (each including 4 regions)
  - Finally the reminding 38 regions search the most similar group with regard to all 21 variables

\*) The classification described in point 7 above is only one of several ways to make this classification. We have carried out different test combinations, like for example first deciding two regions within each group, and let all reminding regions search their most similar group etc. up to the limit of first deciding seven regions within each group and let only two reminding regions search their most similar group. We have thus made a lot of different combinations where the groups are searching their most similar regions and where the regions are searching their most similar group. For a final decision we introduced a measure calculating the average distance between all variables across regions within each group, and the distance between these averages across all groups. The most preferable classification should give as low as possible distances within the groups and as high as possible distance between the groups. The method described in point 7 above gave the best score.

### ***A vacancy accounting***

Traditional labour market statistics operates with the number of employed, unemployed and individuals outside the labour force, where the annual differences express the net change of all gross-streams at the labour market. Consequently full knowledge of the gross-streams will also give full knowledge of the net change, while the opposite is obviously not the case. One basic aspect of this analysis is then to establish a regional labour market indicator illuminating the annually gross-flows between the statuses. Figure 3 illustrates how this regional labour market indicator is measured in a so-called "vacancy account". Concerning the "vacancy accounting", we basically deal with the filled in vacancies in the regional labour markets, which means that the average stock of not filled in vacancies is not taken into consideration.

The vacancy account represents a new and consistent way of measuring vacancies in the labour markets. Normally the vacancies are considered as the stock of not filled in vacancies at a certain point of time or the average stock of not filled in vacancies for a certain period of time, e.g. one year. The number of not filled in vacancies is based on registers, which may be vulnerable due to different resources used for the registrations of vacant jobs both over time and across regions. However, the number of not filled in vacancies generally reveals a clear underestimation of the real number of vacancies at the labour market. The total vacancy account is defined so that all transitions from jobs have to be replaced if the total entering stock and outgoing stock is equal. If entering stock (A) is higher than outgoing stock (B), not all employment exits will be replaced, and vice-versa, if (B) is higher than (A), the total employment recruitment will exceed the employment exits. The total employment recruitment is thus the result of the account, representing the filled in vacancies from year t to year t+1. Initial analyses made in the Nordic countries show that the leaving processes generate a very high share of the vacancies in the regional labour markets. A measure of structural change in the different local labour markets appears by breaking down the total figures by different sectors and segments. This is of course of great importance, because we expect that there will be clear differences in the leaving and recruiting processes due to different development by sectors and segments in the local labour markets.

Figure 3. A "vacancy-account" for gross-stream analyses in regional labour markets

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A. Entering stock: The number of employed in sector s in region r in year t including individual characteristics by age, gender and education	
Employment exits:	
- To other employment in year t+1	
- To unemployment in year t+1	(1) Out-migrated from the region from year t to t+1
- Out of the labour force in year t+1	
Due to: (Further education)	(2) Not migrated from the region from year t to t+1
(Retirement - Age)	
(Other insurance)	
(Emigration)	
(Death)	
<hr/>	
= Total employment leave from year t to year t+1	
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Employment recruitment:	
- From other employment in year t	(1) In-migrated to the region from year t to t+1
- From unemployment in year t	
- From education in year t	(2) Settled in the region in year t and t+1
- From others outside the labour force in year t	
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= Total employment recruitment (represents the filled in vacancies from year t to year t+1)	
<hr/>	
B. Outgoing stock: The number of employed in sector s in region r in year t+1 including individual characteristics by age, gender and education	
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This vacancy account will of course not give a complete measure of all transitions at the labour market. The number of vacancies is dependent on the definition of the number of sectors involved.



The job-to-job mobility (the cross sector exchange) will of course increase by using a more disaggregated industrial structure, and decrease by using an aggregated industrial structure. The basic statistics open the possibility to use a five-digit level of the SIC94 (Standard Industrial Classification) based on the EU standard NACE (Nomenclature générale des Activités économiques dans les Communautés Européennes). This includes almost 650 branches. Analyses operating at this disaggregated level may, however, be very vulnerable to annually statistical replacements and even misplacements between branches, thus measuring fictive transitions at the labour markets. The project use, however, a more aggregated industrial structure, including altogether 28 sectors.

### ***Definitions of some central variables:***

- *Internal migration*: Migrants are defined as individuals settled in different towns and regions in the first and second year of each two years period. The analysis will partly be focusing on internal migration.

- *Immigrants/new recruits and emigrants/dead persons*: The analysis also comprises the marginal status groups immigrants/new recruits and emigrants/dead persons. These are individuals only obtainable in the labour force the first or the second year in each investigation period. The first group (present only the first year) consists mainly of employed who have emigrated from the first to the second year of each period, but comprises as well employed who died or left the working age. The majority of the second group (present only the second year) consists of individuals who have immigrated and obtained a job in the second year of each period, but comprises as well a minor group of young individuals entering the working age in the second year of each period as employed.

- *Labour market statuses*: Definitions of labour market statuses includes 1) employed, 2) unemployed, 3) persons under education and 4) others outside the labour force. Different status in year t and year t+1 defines the labour market status change.

- *Regional labour market mobility*: The total regional labour market mobility is defined as changes of status to and from employment, mobility among employed between 28 economic sectors (cross sector exchange), migration between regions, immigration/new recruitment and emigration/death.

### ***A composition of a local labour market performance indexes***

The analysis finally includes a total local labour market performance rate, which measure the relative performance of each region. The total performance rate is composed of a set of different mobility rates derived both from internal gross streams at the local labour markets as well as through interregional and international labour market mobility. In the national context all local labour market mobility measures are compared with the national average measure correspondingly.

### ***Local Labour Market Performance Indexes***

Each individual in the local labour force (16 – 74 years) is classified according to his or her highest formal education: Primary, secondary and post secondary. Each individual in the local labour markets is also classified in terms of careers to employment status year t+1 from either of the following status year t: Employed, unemployed, under education and others outside the labour force. Hence, the Labour Market Performance Index is partly a description of the *rate of activation of twelve pools* of labour force in the Local Labour Market (LLM) compared with the corresponding activation rate in the nation as a whole (figure 4). In addition in-migration careers leading to employment as well as immigration leading to a job is related to the size of the regional employment. As the figure shows the activation rates are thus measured for six main groups (A-F) broken down by three educational levels. The activation rate of each group is measured separately, but obviously the rate of each element may be closely interdependent. In a well functioning and strong growing regional labour market there may be room for a high score in many of the separate indexes. In reality the situation may be different, where several of the included activation rates may be in competition with each other. In many regions high in-migration to jobs may function as an obstacle to high transition from local unemployment to job or from local education to job, while in other regions the situation may be opposite. The decomposition of all the activation rates by educational levels give the possibility to investigate how the segmentation processes operates in the regional labour markets.

On the other hand the Labour Market Performance Index is also taking into consideration the deactivation rate, measured by gross out-migration as well as by gross emigration/death from jobs (notice G and H in figure 4). In most occasions the activation rates measured by A-F are dependent on the size of the deactivation rate of employed out-migrants and emigrants. In regions with stable or growing employment, the deactivation rate will establish vacancy chains in the local labour markets, demanding a replacement of employed to jobs. In regions with decreasing employment this dependency may be less visible, due to an excess of closures compared with new established jobs. However, by taking into consideration the regional deactivation rate, the analyses of the activation rates will be controlled for uneven regional deactivation. A region with a high total activation rate in spite of a low deactivation rate may be far better off than a region with a similar activation rate but due to a high deactivation rate.

Figure 4. Composition of a Local Labour Market Performance Index (LLMPI). Rate of activation and deactivation of twenty-four pools of labour force.

Status year t	Status year t+1: Employed (or out-migrated,emigrated/dead)		
	Education: Primary	Secondary	Post secondary
A. Employed in the same LLM	<b>A1. Still in job (primary)</b>	<b>A2. Still in job (secondary)</b>	<b>A3. Still in job (Post secondary)</b>
B. Unemployed in the same LLM	<b>B1. Unemployed to job (primary)</b>	<b>B2. Unemployed to job (secondary)</b>	<b>B3. Unemployed to job (post secondary)</b>
C. Under education in the same LLM	<b>C1. From education to job (primary)</b>	<b>C2. From education to job (secondary)</b>	<b>C3. From education to job (post secondary)</b>
D. Others in the same LLM	<b>D1. To job (primary)</b>	<b>D2. To job (secondary)</b>	<b>D3. To job (post secondary)</b>
E. Any status in other LLM. In-migrants	<b>E1. In-migrants to job (primary)</b>	<b>E2. In-migrants to job (secondary)</b>	<b>E3. In-migrants to job (post secondary)</b>
F. Any status in other countries. Immigrants/New recruits	<b>F1. Immigrants/New recruits to job (primary)</b>	<b>F2. Immigrants/New recruits to job (secondary)</b>	<b>F3. Immigrants/New recruits to job (post secondary)</b>
G. Employed in the same LLM.	<b>G1. Out-migrants from job (primary)</b>	<b>G2. Out-migrants from job (secondary)</b>	<b>G3. Out-migrants from job (post secondary)</b>
H. Employed in the same LLM	<b>H1. Emigrated/dead (primary)</b>	<b>H2. Emigrated/dead (secondary)</b>	<b>H3. Emigrated/dead (post secondary)</b>

Each of the elements in the total local performance index is calculated as follows:

A1-A3. Still in job: Persons still employed at the same LLM year t+1/All employed at the same LLM year t) - (the same relation for the nation as a whole).

B1-B3 Unemployed to job = Became employed at the same LLM year t+1/All unemployed at the same LLM year t - (the same relation for the nation as a whole).

C1-C3 Education to job = Became employed at the same LLM year t+1/All persons under education in the same LLM year t - (the same relation for the nation as a whole).

D1-D3 Others to job = Became employed at the same LLM year t+1/Persons outside the labour force in the same LLM year t - (the same relation for the nation as a whole).

E1-E3 In-migrants to job = Became employed at the new LLM year t+1/All employed at the new LLM in year t - (the same relation for the nation as a whole).

F1-F3 Immigrants/New recruits to job = Became employed at the new LLM year t+1/All employed at the new LLM in year t - (the same relation for the national labour market as a whole).

**Local deactivation rates:**

G1-G3 Out-migrants from job = Were employed at the LLM year t but had out-migrated from the LLM in year t+1/All employed at the LLM in year t - (the same relation for the national labour market as a whole)

H1-H3 Emigrants/dead from job = Were employed at the LLM year t but had emigrated (or died) from the LLM in year t +1/All employed at the LLM in year t - (the same relation for the national labour market as a whole).

### ***The total local labour market performance index (LLMPI):***

In the aggregate index - i. e. the sum of the activation rate for eighteen careers to job minus the deactivation rate for six groups - each element is given a weight based on the number of persons within each group. The total performance of each local labour market is thus in a national context expressed as follows:

$$\text{LLMPI} = A1 + A2 + A3 + B1 + B2 + B3 + C1 + C2 + C3 + D1 + D2 + D3 + E1 + E2 + E3 + F1 + F2 + F3 - G1 - G2 - G3 - H1 - H2 - H3;$$

This equation secure that positive indexes (higher than the national average) for the elements A-F gives positive contributions to the total performance index while the opposite is the case for negative values for each element. On the other hand positive indexes for the elements G and H give negative values to the total performance index while negative indexes here give positive values correspondingly.

The total performance indexes should give an illustration how each regional labour market performs in the national context. The decomposition of the total indexes should, however, give some incentives to different political areas what may be successful or not successful performances. The total indexes illuminates how the regional labour market function as a whole, while each element gives a measure which transitions contributes mostly to a total well performance, or vice-versa to a not too well performance. The job-to-job elements (A1-A3) and not at least the unemployment-to-job elements (B1-B3) represent important areas for both regional and national labour market policies. In the same way we may say that the elements (C1-C3), from education to job, reflect the success of the educational policy, measuring to what extent the local labour markets are able to absorb the newly educated, but also to what extent the local labour markets need to cover their demand by recruiting persons with modern education. The elements (D1-D3) reflect in many ways the pressure in the local labour markets, measuring to what extent it is necessary to activate the so-called "reserve-army" of the labour market to increase the labour market participation rate, but also to what extent the local labour markets are able to employ as large part of their inhabitants into ordinary jobs as possible. All these elements are however important for the regional policies. For all regions and many political areas the elements representing the geographical labour market mobility should be of immense importance.

## **4. Some empirical results**

This paper shows some results from a proceeding project investigating urban and regional labour market mobility. More detailed results will be presented later in other reports. In this paper we have just chosen some examples from recent main results.

The performance of regional labour markets measured by gross labour mobility has been the main approach of this analysis. As mentioned in the introduction, the performance of regional labour markets is basically analysed as follows: Firstly performance is investigated more generally through the level of net and gross mobility to and from jobs broken down by different status groups. Some examples are derived from the mobility in the nation as a whole and in some main urban regions especially focusing the capital region of Oslo and Akershus. Secondly we have tested the hypothesis if the level of gross mobility is positively correlated to the growth of employment. Thirdly we reflect how the local labour markets perform through different activation to employment and deactivation from employment, both from gross streams within the local labour markets as well as gross streams between the local labour markets and international migration. Finally we have analysed the relationship between total mobility performance and different production conditions observed in each region at the beginning of the investigation period.

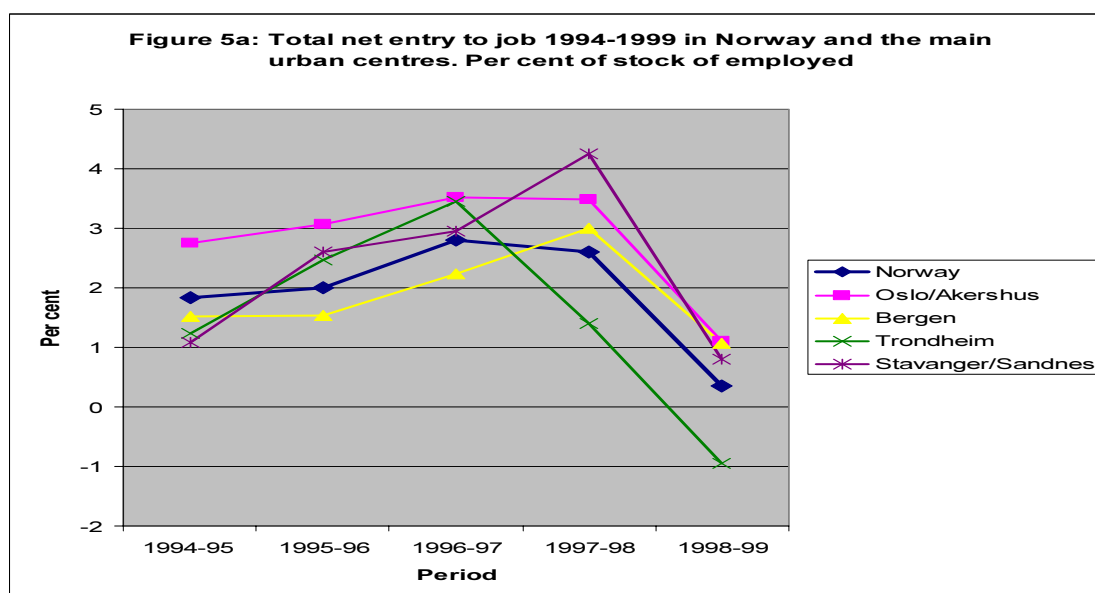
#### 4.1 The level of net and gross labour mobility in Norway during the 1990s.

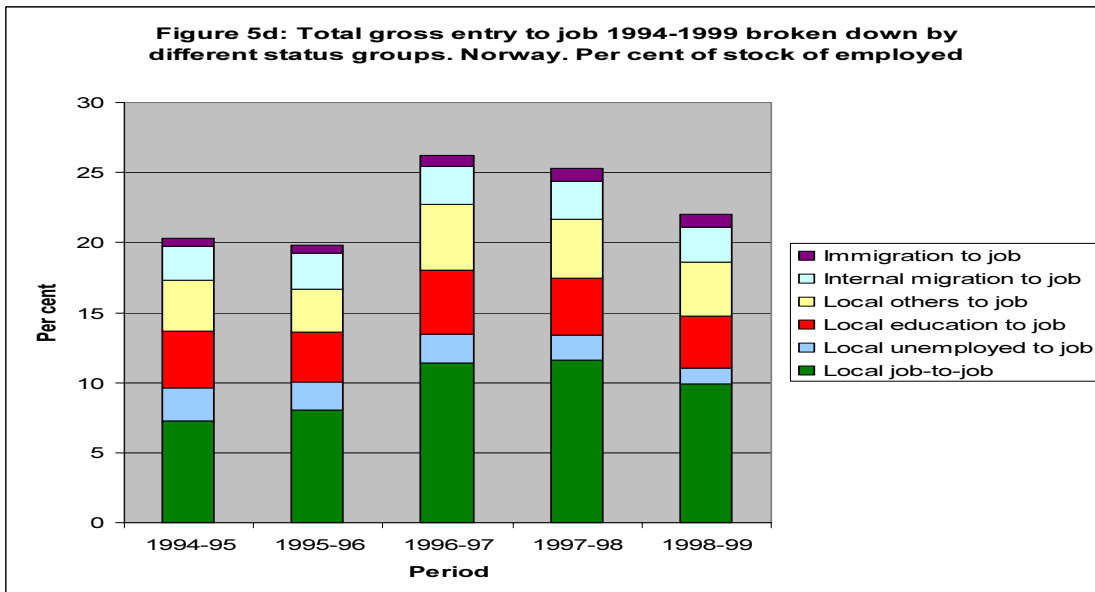
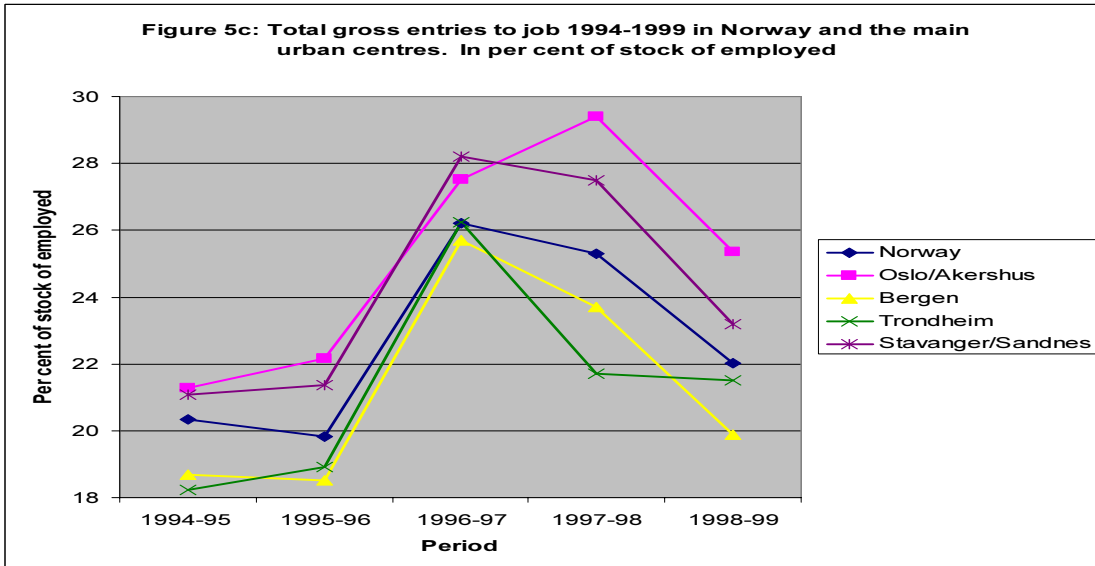
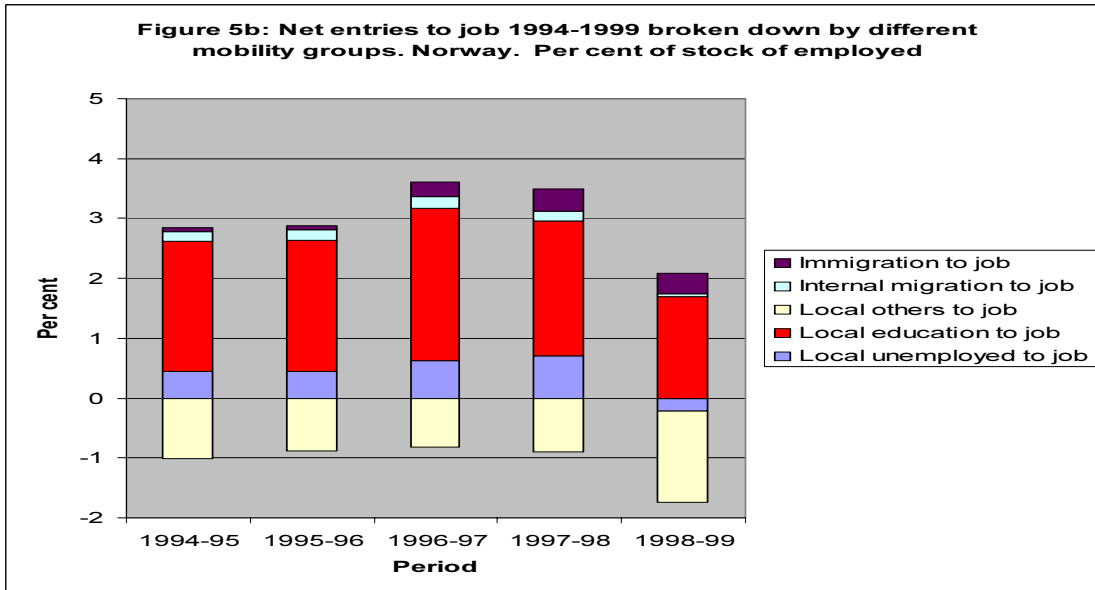
Hypotheses are raised with the expectation of increases in labour market mobility as economic recession recedes and we move to more affluent years with steady economic growth. Figure 5a shows the economic development in Norway and in the main urban centres 1994-1999 measured by net entries to job. At the national level there has been a positive growth during the whole period, with strongest growth from 1996-97 falling to a slightly growth in the turn of the decade. The capital region of Oslo and Akershus shows the highest net growth during most of the period, while the oil centre of Stavanger/Sandnes shows the highest growth from 1997 to 1998. The urban region of Trondheim is the only main centre showing years with negative growth, actually then in the end of the period.

The annual net entries to job are further broken down on different mobility groups. Figure 5b shows the result for the whole nation. The highest contribution to employment growth comes from education to job in the local labour markets. Net recruitment from local unemployment to job also contributes positively with exception of the last year. Internal migration contributes positively to job growth although with decreasing importance in the end of the period. Net immigration also contributes positively with an increasing importance during the period. Net contributions from other transitions in and out of the labour force are generally negative throughout the whole period.

Figure 5c shows the level of gross mobility to jobs during the same period. The gross mobility to job definitely follows the business cycle with highest figures during the economic boom period 1996-1998. The gross entries to job is, however, significantly higher in the capital regions of Oslo and Akershus and in the region of Stavanger/Sandnes compared with the other urban centres of Bergen and Trondheim, both showing lower job mobility than the national average. These differences appear to be present both in the boom years as well as in years with somewhat lower employment growth.

Figure 5d shows national results where the total gross entry is broken down by different status groups. This analysis includes as well local job-to-job mobility between 28 sectors (see figure 6d for sector classification). The results indicate that job-to-job mobility (or inter-sector mobility) contributes with almost 50% of the total gross mobility to job. Like the total gross mobility, job-to-job mobility does increase significantly with the business cycle. Due to very strong economic growth, an important part of the gross entries also derives from persons outside the labour force. The mobility from local education to job is also important, albeit of minor importance than the net effects of the education to job mobility suggested. When experiencing low unemployment rates in most of the regions, the entries from unemployed to job represents a small and decreasing part of the total gross mobility.

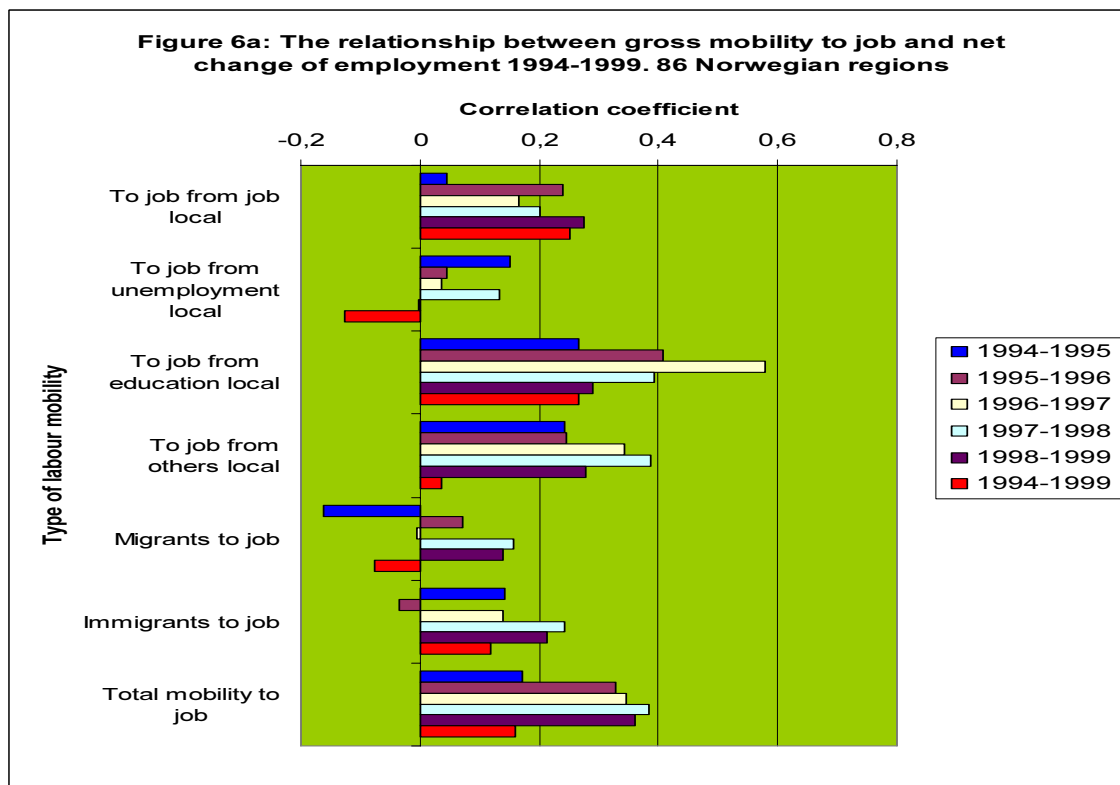


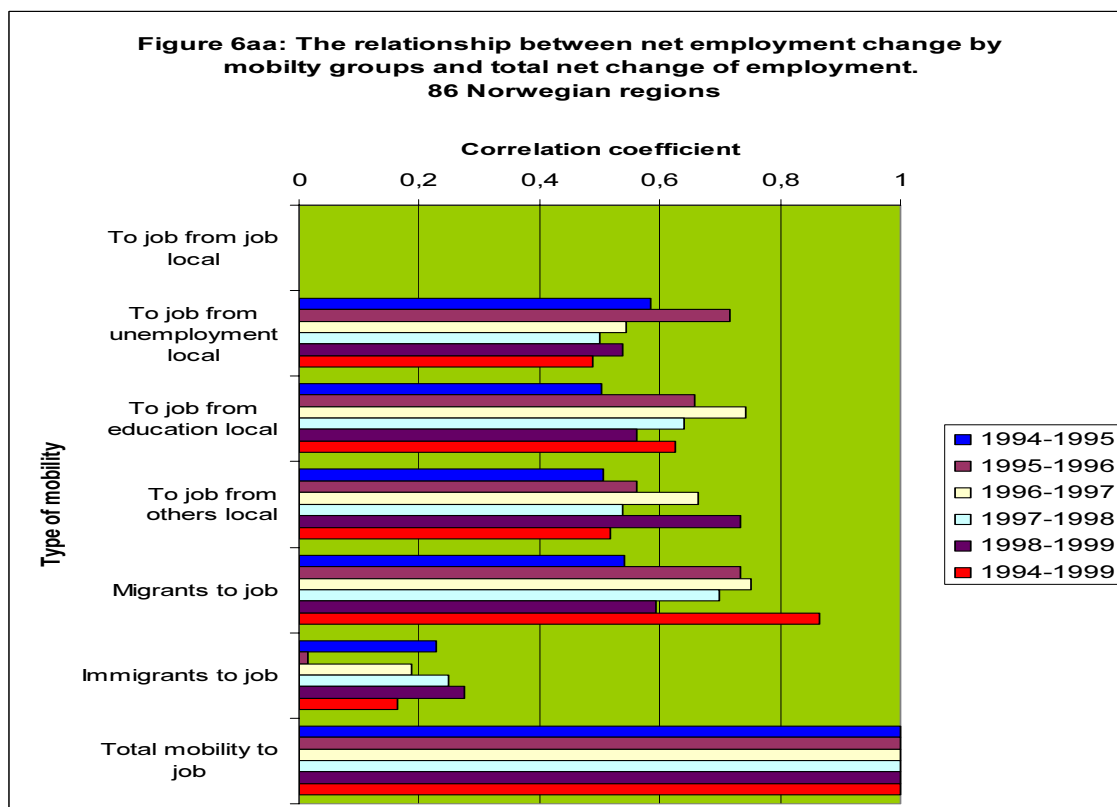


#### 4.2 The relationship between mobility to job and net change of employment.

It is expected that increased labour mobility may be of importance for reaching the targets of the labour market policy to employ as large part of the work force as possible into ordinary employment. Furthermore high labour mobility in regions is thus expected to increase the employment growth generally and especially in relation to regions experiencing low mobility rates. Put into the context of this analysis, we should expect that regions showing the highest labour mobility also experience the highest net growth of employment. Thus we have made an analysis, showing the relationship between gross mobility to job and net change of employment by using a simple linear regression model.

The results in figure 6a, showing the relationship between gross entries to job and total net change of employment, indicate rather low correlation. The best relationship is to be found in the transition from education to job. Somewhat surprising, there are very weak connections between the level of gross migration to job and employment growth. The same is the situation for local transitions from unemployment to job. To investigate this further, we have examined the relationship between net mobility to job and total net employment growth (see figure 6aa). Obviously the relationship between total net mobility to job and total net employment growth gives a complete correlation. The rather high correlation for net migration indicates, however, that the migration processes contributes positively to the regional employment growth. A weak correlation for in-migration to job indicates that good net results must derive from a high but negative correlation between regional job-growth and gross out-migration. This may be understandable due to the expectation that employed persons have better information of their own local labour market compared to all other local labour markets, thus regulating the out-migration processes closer to the regional business cycles than the corresponding in-migration processes.





In the figures 6b, 6c and 6d similar results are shown for gross mobility and net employment change when breaking down the figures by age groups, educational groups and 28 economic sectors. Figure 6b shows strong correlation between gross mobility to job and employment growth in the youngest age group. This group also clearly show the highest mobility to job. The high correlation may reflect the fact that much of the mobility in this age group includes the first enter to the labour market, and that this flow is higher in the regions experiencing the strongest net growth of employment. Perhaps somewhat surprisingly the group with lowest education shows the highest correlation (see figure 6c). This may partly reflect the fact that persons with higher education are more continually insiders at the labour market, and that the returning of lower educated labour into the local labour markets during upswing periods is higher in regions with the highest net rise of employment. We may as well put a question on how higher educated persons are moving within and between regions. Part of the regional mismatch problems is due to the fact that not all mobility among high-educated persons is going towards the regions with the highest net growth of employment. The highest correlation between gross mobility and net job growth is, however, to be found when we break down the results by economic sectors (see figure 6d), although there are strong differences between some of the sectors. Important to notice is the high correlation in sectors representing the so-called "new economy". ICT-manufacturing shows relatively high correlation. ICT-wholesale show very high correlation in relation to other wholesale, and the more knowledge intensive branches of telecommunication, information technology, research and development and other business services all show high correlation values. On the other hand much of the bottleneck problems experienced in the public health services may be reflected by relatively low correlation between the gross mobility and regional job growth in the sector health and social work.

Figure 6b: The relationship between gross job mobility to job and net employment change by age groups 1994-1999. 86 Norwegian regions

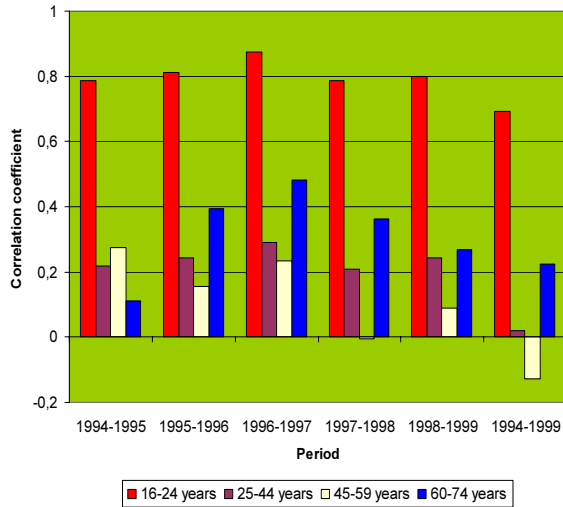


Figure 6c: The relationship between gross mobility to job and net employment change by education 1994-1999. 86 Norwegian regions.

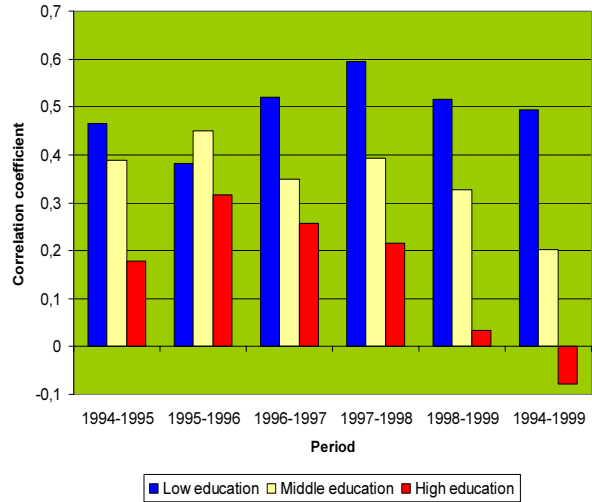
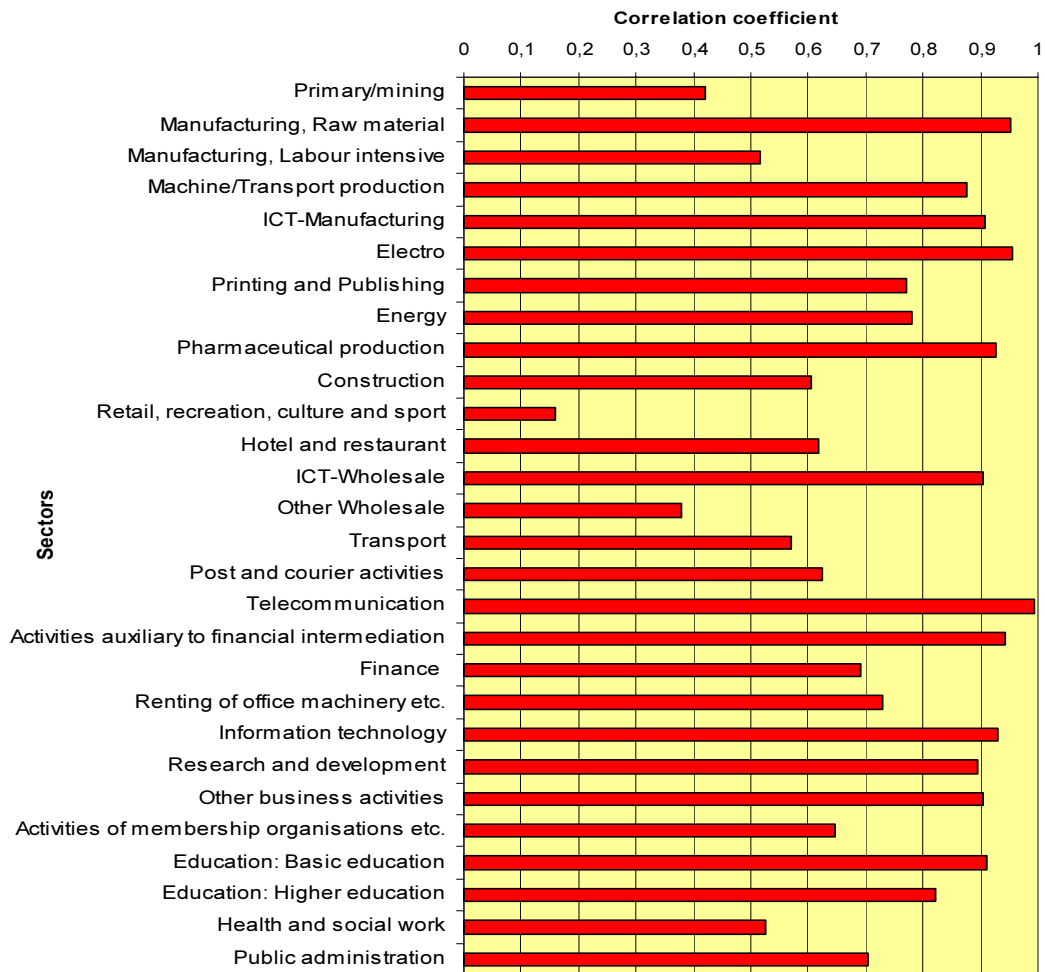


Figure 6d: The relationship between gross mobility to job and net employment change by sectors. Average 1994-1999. 86 Norwegian regions





### **4.3 Total local labour market mobility performance.**

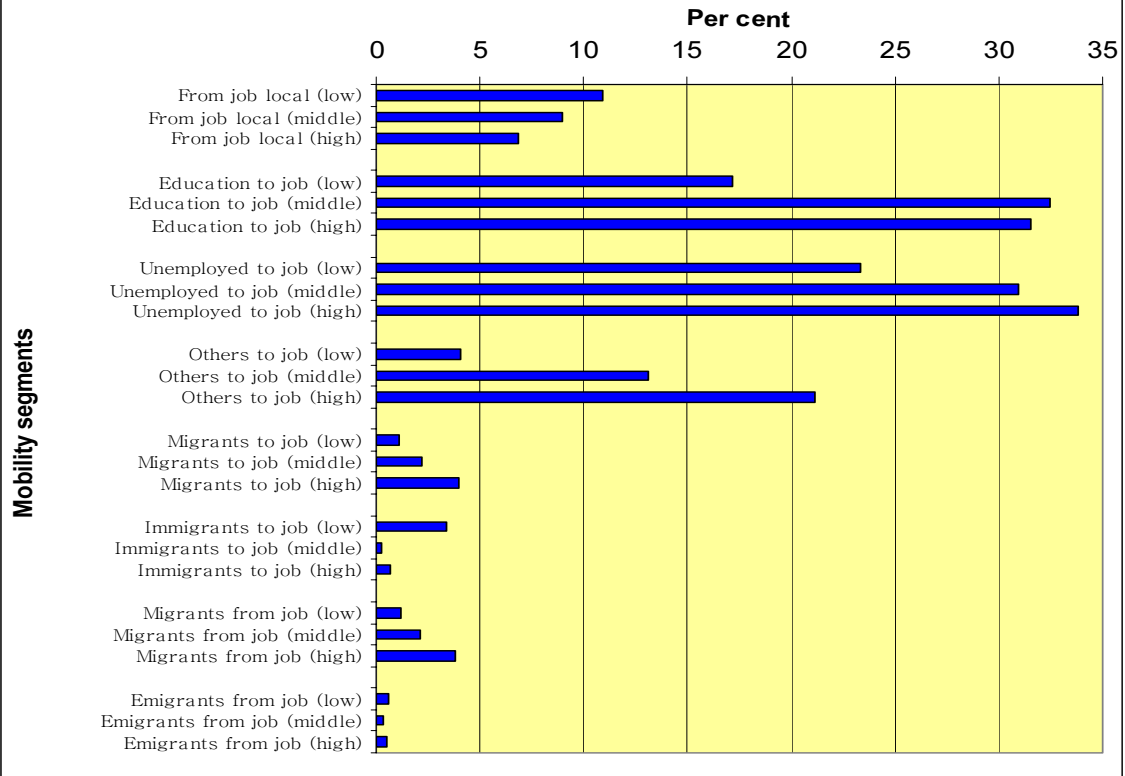
In section 3 above and particularly in figure 4 we have described how we have measured a total index of mobility performance in each region composed of a set of eighteen activation rates and six deactivation rates. In the same section we have described how we have classified all 86 Norwegian regions into 12 groups that should be as homogeneous as possible according to a set of production conditions. Our main expectation is that regions representing a certain degree of conformity also should perform similar concerning transitions within and between the local labour markets.

Figures 7a and 7b show the mobility rates and mobility structure in Norway for all 24 segments that define the total index of performance. The example is collected from figures showing the mobility in the period 1998-1999. It is important to notice that in both figures the job-to-job rate (or still in job rate) is measured opposite to the description in figure 4, by measuring the local exit rate from job instead of measuring the percentage of the stock of employed still in job. This is made due to the figure dimension. Figure 7a shows that exits from job in the local labour markets are significantly higher for low educated persons compared to high educated. Middle and higher educated show as well a much higher transition from education to job and unemployment to job compared to low educated. The same structure is even more visible in the transitions from others outside the labour force and in the internal migration. The immigration/newcomer figures reflect, however, an opposite structure. The very high rates of education to job and unemployed to job is due to the facts that these rates are measured in relation to the stock of persons under education and stock of unemployed respectively, while all other segments are measured in relation to the stock of employed. These differences appears in figure 7b, showing the total labour mobility broken down by all 24 mobility segments. Not surprisingly the middle educated shows the highest deactivation in the local labour markets, due to the fact that this group represents a majority of all employed. This structure is also present in most of the other segments. As written in section 3 above each element is given a weight based on the number of persons within each group when calculating each regions total performance index.

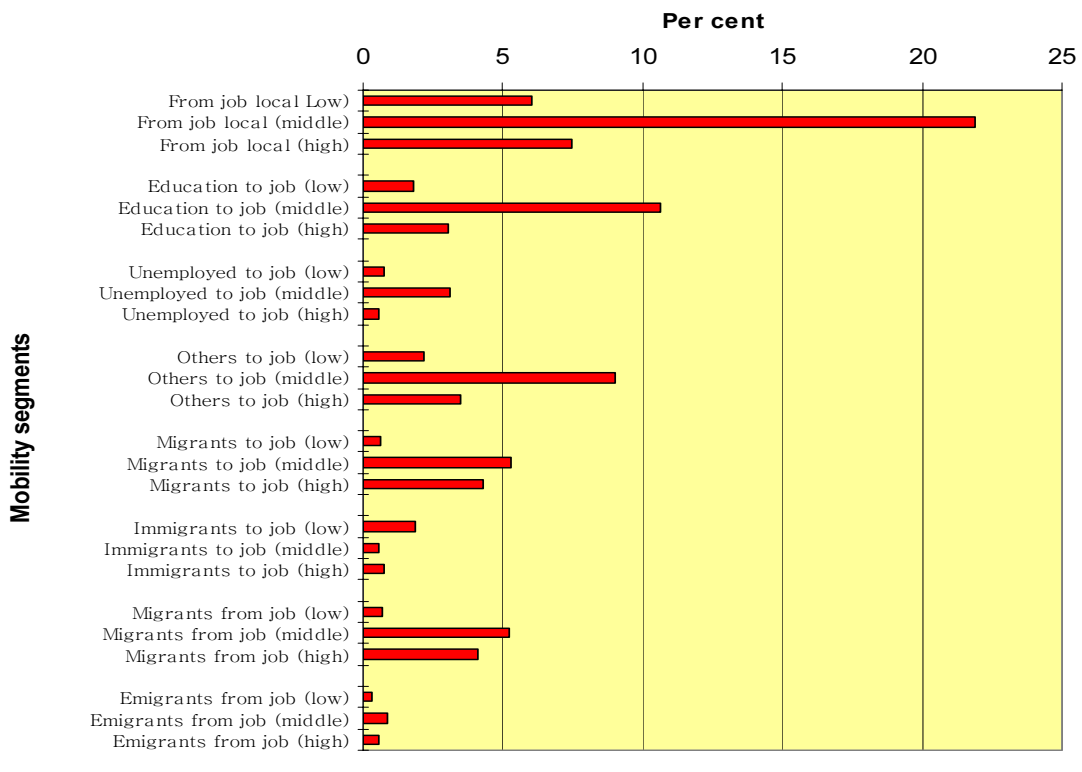
How then do each region perform in relation to the national average? and how does each region perform within each of the 12 classified groups of regions. The results are shown in 12 figures in the Appendix below. The total index of performance in the nation as a whole is here set at 0. Figure 1 in the appendix shows the results of the four main urban centres of Norway, which actually were classified into the same group. We notice that the region of Stavanger/Sandnes, the oil and natural gas centre of Norway, and the capital region of Oslo clearly performed better than the region of Bergen and especially compared to the region of Trondheim. The homogeneity in total mobility performance does actually vary between the groups. Some groups, especially group number 3, 6, 7 and 8 all show a certain degree of conformity in performance, while regions within many of the other groups perform rather different, partly well above and partly well below the national average. It is also interesting to notice that some regions perform rather different during the time period of investigation, although the majority of regions seem to have certain stability in their total mobility performance.

The conclusion is thus that regions within some of the groups do perform in accordance with our expectations, although there are several groups where the regions perform opposite to our expectations. Obviously there are other regional characteristics that might be of importance than our 21 production conditions used in our classifications. However, it could be of interest to investigate further differences in policy between regions showing the best and worst performance within each group. Is it possible to recognise special policies being practised in the best performing regions? In such case these policies could be of great importance for regions not performing to well.

**Figure 7a. Mobility rates in 24 labour mobility segments 1998-1999. Norway. Per cent.**



**Figure 7b. Total labour mobility broken down by 24 mobility segments 1998-1999. Norway. Per cent**



#### 4.4 The relationship between total mobility performance and the production conditions.

In the introduction section we also put forward challenges to explain eventually different performances in similar cities and regions, e.g. testing if the criteria that are chosen as production conditions give significant differences. So far we have only analysed the relationship between the total mobility performance in all regions and the production conditions used in our classifications. The analysis is made by help of an ordinary least square method, and the results are presented in table 1.

Table 1. Estimated relationship between total index of performance and different production conditions used for categorization of regions. (Estimated by OLS-method)

Production conditions:	1994-1995	1995-1996	1996- 1997	1997-1998	1998-1999
Number of inhabitants	0.0063 (0.51)	0.00098 (0.79)	0.00005 (0.04)	0.00149 (1.21)	0.00048 (0.30)
Persons under higher education	-0.00073 (-0.67)	-0.00043 (-0.40)	0.00029 (0.23)	-0.00123 (-1.14)	-0.00111 (-0.80)
Population 16-29 years	-0.00086 (-1.09)	0.00003 (0.12)	<b>0.00219**</b> <b>(2.40)</b>	<b>0.00181**</b> <b>(2.29)</b>	-0.00017 (-0.18)
Population 30-44 years	-0.00203 (-1.36)	<b>-0.00317**</b> <b>(-2.13)</b>	0.00116 (0.67)	-0.00062 (-0.42)	<b>-0.00343*</b> <b>(-1.79)</b>
Population 45-59 years	-0.00209 (-1.52)	-0.00072 (-0.53)	<b>0.00029*</b> <b>(1.81)</b>	-0.00017 (-0.13)	-0.00281 (-1.59)
Percentage lower education	<b>0.00153***</b> <b>(3.12)</b>	<b>0.00114**</b> <b>(2.34)</b>	0.00053 (0.93)	<b>0.00167***</b> <b>(3.42)</b>	0.00048 (0.76)
Percentage higher education	0.00006 (0.03)	-0.00082 (-1.18)	<b>-0.00173**</b> <b>(-2.15)</b>	-0.00109 (-1.58)	<b>-0.00171*</b> <b>(-1.91)</b>
Employed in secondary sectors	0.00001 (0.03)	0.00026 (0.75)	<b>0.00097**</b> <b>(2.36)</b>	0.00015 (0.43)	0.00034 (0.74)
Employed in sectors in "New economy"	<b>0.00081**</b> <b>(2.18)</b>	<b>0.00129***</b> <b>(3.49)</b>	<b>0.00119***</b> <b>(2.78)</b>	<b>0.00092**</b> <b>(2.48)</b>	<b>0.00145***</b> <b>(3.05)</b>
Employed in distribution services	0.00024 (0.55)	<b>0.00098**</b> <b>(2.22)</b>	<b>0.00083*</b> <b>(1.62)</b>	0.00059 (1.34)	0.00078 (1.38)
Employed in finance	-0.00062 (-1.44)	-0.00053 (-1.23)	0.00022 (0.45)	-0.00012 (0.29)	<b>0.00101*</b> <b>(1.83)</b>
Employed in non-market services	<b>-0.00095*</b> <b>(-1.64)</b>	-0.00028 (0.49)	-0.00048 (0.71)	-0.00092 (-1.60)	0.00044 (0.59)
Labour force participation rate	<b>0.00532***</b> <b>(4.30)</b>	<b>0.00338***</b> <b>(2.75)</b>	<b>0.00457***</b> <b>(3.20)</b>	<b>0.00255**</b> <b>(2.07)</b>	<b>0.00891***</b> <b>(5.62)</b>
Unemployment rate	<b>-0.00105***</b> <b>(-2.64)</b>	<b>-0.00121***</b> <b>(-3.06)</b>	<b>-0.00095**</b> <b>(-2.07)</b>	<b>-0.00129***</b> <b>(-3.25)</b>	0.00047 (0.91)
Average annual income	-0.00219 (-1.63)	0.00107 (0.80)	<b>-0.00308**</b> <b>(1.99)</b>	0.00078 (0.58)	-0.00114 (-0.66)
Branch-mix	-0.00214 (-0.39)	-0.00048 (1.39)	0.00041 (1.01)	-0.00015 (-0.43)	-0.00049 (-1.10)
Centrality	<b>0.00051**</b> <b>(1.99)</b>	<b>0.00052**</b> <b>(2.05)</b>	0.00019 (0.67)	0.00037 (1.48)	0.00003 (0.09)
Tightness of settlement	0.00048 (1.60)	-0.00025 (-0.84)	0.00014 (0.01)	0.00029 (0.99)	<b>0.00084**</b> <b>(2.19)</b>
<b>Adjusted R<sup>2</sup></b>	<b>0.63</b>	<b>0.54</b>	<b>0.56</b>	<b>0.62</b>	<b>0.47</b>

Significance: 99% \*\*\*, 95% \*\*, 90% \*. (T-values in brackets). Number of observations = 86 regions.

Not surprisingly there are observed positive estimates with high significance for the relationship between total mobility performance and the level of labour force participation rate and negative and highly significant estimates for the level of unemployment. Percentage of employed in sectors representing the "new economy" gives high and significant estimates during the whole period. This is

in accordance with high correlation between the level of mobility to job and economic growth shown in figure 6d. Somewhat surprisingly the percentage with higher education gave mostly negative estimates with certain significance while the percentage with lower education gave the opposite results. Both results are, however, in accordance with the results presented in figure 6c. Somewhat surprisingly is also the negative tendency in the estimates of average annual income, while the significant estimates for both centrality and tightness of settlement is positive.

As mentioned this project will continue, and more analyses will be made. Furthermore we are going to analyse similar relationship for those regions performing well and for those regions with not too well mobility performance. It will also be interesting to analyse the relationship between each of the mobility segments and the production conditions. Some preliminary analyses have shown that there are big differences in mobility structure between the regions reflecting a relative high importance for the education-to-job mobility in the most central regions.

## **5. Main findings**

The performance of regional labour markets measured by gross labour mobility has been the main approach of this analysis.

- Both total gross labour mobility and inter-sector mobility reflects the business cycle with highest mobility in years with strong employment growth.
- Inter-sector mobility contributes with almost 50% of the total gross job-entries. Due to strong economic growth during the investigation period gross flows of labour from outside the labour force also show a significant contribution, approximately at the same level as the education-to-job flows. Recruitment from internal migration is also important, while the unemployment-to-job flows has a somewhat minor importance due to strong economic growth and low unemployment rates.
- Higher labour mobility is expected to increase the employment. Relative low correlation between the level of gross labour mobility to job and net job growth in 86 Norwegian regions indicate that this may be only partly true. The correlation does, however, increase when breaking down the gross mobility and net job change by age groups, educational groups and especially by economic sectors. Strong correlation is observed among younger persons, among low educated persons and especially in economic sectors representing the so-called "new economy".
- The exit rate from job in local labour markets is significantly higher among low educated employed compared to middle and high educated employed. Mobility rates from education to job, from unemployment to job, from others to job and in-migration to job are clearly highest among higher and middle educated persons and lowest among lower educated. Due to the educational structure of the population the gross labour mobility flows are generally highest for middle educated when measured by the number of persons.
- Taking this structure into consideration, we expected that regions with a certain conformity with regard to a large set of production conditions also should show a certain conformity in gross labour mobility. The results indicate that this is just partly true, and that several regions within homogeneous groups of regions differ significantly according to total labour mobility performance, partly well above and partly well below the national average. It is also worth to notice that some regions perform rather different during the time period of investigation, although the majority of regions seem to have certain stability in their total mobility performance.
- Testing the relationship between total mobility performance and the production conditions used for classification of regions, gave positive and certain significant estimates for the level of labour force participation rates, for percentage of employed in sectors representing the "new economy", centrality and tightness of settlement but somewhat more surprisingly for percentage of population with lower education. As expected, the estimates was negative and highly significant for the level of unemployment, but more surprisingly also for the percentage of population with higher education and to a certain degree for average annual income.

As mentioned, the results presented in this paper are an excerpt from a proceeding project on labour market mobility, and several other results will be available later.

## References

- Burda, M. and C.Wyplosz (1994): Gross worker and job flows in Europe. *European Economic Review*, 38: 1287-1315.
- Burgess, S, J.I.Lane and D.W.Stevens (1994): Job Flows and Worker Flows; Issues and Evidence from a Panel of US Firms. In R. Schettkat (ed.), *The Flow Analysis of Labour Markets*, London and New York, Routledge, 96-114.
- Champion, T. and T. Fielding (eds.), (1992): "Migration Processes & Patterns". Volume 1. *Research Progress & Prospects*. Belhaven Press.
- Curran, J. and R. Blackburn (1994): Small firms and local economic networks. The death of the local economy? London, Paul Chapman Publishing
- Davis, S.J. and J.C.Haltiwanger (1998): Measuring Gross Worker and Job Flows. In Haltiwanger, J.C, M.E.Mansner and R.Topol (eds.) *Labor Statistics Measurements Issues*. Chicago: University of Chicago Press, 77-119.
- Edvardsson, I.R, E.Heikkilä, M.Johansson, L.O.Persson and L.S.Stambøl (2000): *Competitive capitals - Performance of Local Labour Markets - An International Comparison based on Gross-stream Data*. Working Paper 2000: 7, Nordregio, Stockholm.
- Edvardsson, I.R, E.Heikkilä, M.Johansson, L.O.Persson and L.S.Stambøl (2002): "The performance of metropolitan labour markets. A comparison based on gross-stream data" In *Jahrbuch für Regional Wissenschaft*, Heidelberg.
- Greenwood, M.J. (1985): "Human Migration: Theory, Models and Empirical Studies". *Journal of Regional Science*, 25.
- Harris, C. and D. Becker (2001): Amenity or Extraction-Based Rural Economics? The Role of Tourism and other Resource-Based Industries in Inland Northwest Towns. Paper at the WRSA-meeting in Palm Springs, 2001
- Heikkilä, E., M. Johansson, L.O. Persson and L.S. Stambøl (1999a): Interregional labour market mobility through regional vacancy chains - a comparative international approach. Paper presented at "the 39th. Congress of the European Regional Science Association", in Dublin, Ireland, 23-27 of August 1999.
- Heikkilä, E., M. Johansson, L.O. Persson and L.S. Stambøl (1999b): Regional labour mobility in Finland, Norway and Sweden. In *North*, The Journal of Nordregio, no. 6, 1999, Scandinavian University Press.
- Heikkilä, E. and L.S. Stambøl (1999): Regional labour force migration: A Finnish-Norwegian Experience. In A. Alanen, H. Eskelinen, J. Mønnesland, I. Susiluoto and H. Tervo (eds.): *Structures and Prospects in Nordic Regional Economics*". Nordregio Report 1999:5, Stockholm
- Hustoft A.G., H. Hartvedt, E. Nymoen, M. Stålnacke and H. Utne (1999): *Standard for økonomiske regioner*, Reports no. 6, 1999, Statistics Norway.

- Johansson, M. (1996): "Flexibility, Rigidity, and Innovation Diffusion – the Case of Northern Sweden". In Johansson, M. and L.O. Persson (eds.): *Extending the Reach. Essays on Differing Mobility Patterns in Sweden*. Fritzes.
- Johansson, M., L.O. Persson, E. Rissanen and L.S. Stambøl (1997): Interregional labour market mobility patterns in rapidly changing Nordic welfare states - a comparative analysis. Paper presented at the 37th European Congress of the Regional Science Association in Rome, Italy, 25-29 August 1997.
- Johansson, M. and L.O. Persson (1999): "Mobile Unemployment in a Post-industrial Society: The Case of Sweden". In Crampton, G.R. (ed.): *European Research in Regional Science*, Vol 9. Pion Limited.
- Kontuly, T. (1998): "Contrasting to Counter-urbanisation Experience in European Nations". In Boyle, P. and K. Halfacree (eds.) *Migration into Rural Areas, Theories and Issues*, John Wiley and Sons. Chichester.
- Massey, D. (1995): *Spatial Division of Labour. Social Structures and the Geography of Production*. Mac Millan.
- Milne, W. (1991): "The Human Capital Model and its Econometric Estimation". In Stilwell J. and P. Congdon (eds.) *Migration Models, Macro and Micro Approaches*. Belhaven Press. London and New York.
- Padoa Schioppa, R. (ed.), (1990): *Mismatch and Labour Mobility*. Cambridge University Press.
- Pissarides, C.A. and J. Wadsworth (1989): "Unemployment and the Inter-Regional Mobility of Labour", *Economic Journal*, 99.
- Persson, L.O. (ed.) (2001): Local labour market performance in Nordic countries. Report 2001/9, Nordregio, Stockholm.
- Schmid, G., 1994:: Labour Market Institutions in Europe. *A Socioeconomic Evaluation of Performance*, Armonk, NY: M.E. Sharpe Schmid, Günther, 1998:
- Schmid, G. and B. Gazier, (eds.) 2002: The Dynamics of Full Employment - *Social Integration Through Transitional Labour Markets*, Edward Elgar Publishing, UK and USA.
- Stambøl, L.S. (1991): "Migration Projection in Norway: A Regional Demographic-Economic Model". In Stilwell, J. and P. Congdon (eds.) *Migration Models, Macro and Micro Approaches*. Belhaven Press. London and New York.
- Stambøl, L. S. (1999): Interregional labour force mobility in Norway, *Economic Survey*, no. 2, 1999, Statistics Norway.
- Stambøl, L. S. (2000): Regional arbeidsmarkedsmobilitet i Norge - Bruttostrømsanalyser og etterspørselsbetraktninger i de regionale arbeidsmarkedene, *Økonomiske analyser*, no. 4, 2000, Statistics Norway.
- Stambøl, L. S. (2001): Local labour market performance through different activation rates, input and economic returns to human capital. Paper presented at the 41th European Congress of the Regional Science Association in Zagreb, Croatia, 29 August - 1 September 2001.

Stambøl, L. S. (2002): Qualification, mobility and performance in a sample of Norwegian regional labour markets. Reports 2002/6, Statistics Norway.

Stambøl, L. S. (ed.), E. Heikkilä, M. Johansson, H. Jussila, L.O. Persson and the Danish Ministry of Finance (1996): *Flytting og arbeidsmarked i nordiske land - Et forprosjekt*. TemaNord 1996:576. Nordic Council of Ministers. Copenhagen.

Stambøl, L. S. (ed.), M. Johansson, L.O. Persson and E. Rissanen (1997): *Flytting og sysselsetting i nordiske land - Bruttostrømsanalyser og tilbudsidetilpasninger i de regionale arbeidsmarkedene*. TemaNord 1997:599. Nordic Council of Ministers. Copenhagen.

Stambøl, L.S., N.M. Stølen and T. Åvitsland (1998): "Regional Analyses of Labour Markets and Demography - A Model Based Norwegian Example". *Papers in Regional Science*, The Journal of the RSAI , vol 77, 1, 37-62, Regional Science Association International, Illinois, USA.

Stambøl, L. S. (ed.), E. Heikkilä, M. Johansson, O. Nygren and L.O. Persson (1999): Regional arbeidsmarkedsmobilitet i nordiske land - Bruttostrømsanalyser og etterspørselsbetraktninger i de regionale arbeidsmarkedene. TemaNord 1999:551. Nordic Council of Ministers. Copenhagen.

Stark, O. (1991): *The Migration of Labor*. Basil Blackwell.

van der Laan, L. (2001): *Knowledge economies and transitional labour markets; new regional growth engines*, Rotterdam School of Economics, Rotterdam University.

# APPENDIX

