

Lasse Sigbjørn Stambøl

Urban and Regional Labour Market Mobility in Norway

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Preface

This study contains the main results of a research project analysing the urban and regional labour market mobility in Norway. The project has been included in the research programme of the Norwegian Research Council: "Urban development - driving forces and planning challenges" and has partially been supported by grants from this programme. The project also forms part of a cooperation with the Norwegian Ministry of Labour and Government and has received some additional grants from this Ministry. Moreover, parts of the analysis are executed in cooperation with researchers in other Nordic countries making comparative international analyses dealing with regional labour market mobility.

The author is especially grateful to Bård Lian at Statistics Norway for valuable participation in the preliminary analysis for classification of Norwegian local labour markets into homogeneous categories of regions. The publication has as well benefited from comments by Audun Langørgen and Nils Martin Stølen at Statistics Norway. The English language has been partially improved by pointing outs by Grete Borge at Statistics Norway and Eli Wongraven at the Norwegian Ministry of Transport and Communications, while Marit Berger Gundersen has carried out the final editing work at Statistics Norway.

Oslo, January 2005

Abstract

Lasse Sigbjørn Stambøl

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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, e.g. due to a relatively high gross demand of labour and the problems of matching-time to fill in the vacancies. Moreover, increased total labour mobility is thus seen as one tool for reaching the goals of the labour market policy, employing as large a part of the labour force as possible into ordinary employment. Furthermore, high mobility is expected to satisfy the employers' 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 drawn from e.g. the human capital theory and theories of segmented labour markets and regional division of labour, but also from more modern theories which aim to explain structural change and new forms of transitions in the regional labour markets. According to human capital theory, the most highly educated persons are considered to benefit most from mobility. Inter-sector mobility is also expected to exist more frequently among younger people, who have not yet embedded branch-specific knowledge through a long professional career.

The main purpose of the study is to present some analyses of the mobility performance and competitiveness of cities and regions in terms of growth of employment and especially focusing on the number and quality of the persons who enter and leave the local labour markets. As a starting point cities and regions in Norway are classified into different categories according to a large set of production characteristics. It is perhaps not surprising that cities and regions with uneven production conditions perform differently according to employment growth and mobility, but when similar regions to some extent also perform differently, this

calls for 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.

The analysis shows that several regions with certain conformity with respect to production conditions differ significantly both according to total labour mobility performance as well as labour mobility structure. A much higher gross labour mobility and centrality in knowledge intensive business services (KIBS) than in the economy as a whole has been observed, and this tendency is positively correlated with the business cycle. The level of labour mobility is generally lower among Norwegian citizens compared with other main citizen groups. In addition to high net in-migration quantitatively, the in-migrants to the capital region possess a much higher education level than their out-migrant counterparts. All other types of regions show the opposite tendency. The net effect of all migration in Norway contributes, however, to a rise in the education level of employed persons. A stronger relationship between employment growth and gross labour mobility among the high educated compared with low and middle educated persons has been observed. Furthermore, a very strong but negative correlation between job growth and gross out-migration has been observed, a high and positive correlation between job-growth and gross in-migration has been observed and a strong and positive correlation between employment growth and gross labour mobility in sectors representing the "new economy" has been observed. Norwegian citizens also show a much stronger relationship between job growth and gross labour mobility than any other citizen groups. Non-mobile employed show a much lower income growth compared with mobile labour within or between the regional labour markets. While low and middle educated employed have a strong correlation between mobility and income level, the mobility among higher educated employed is more sensitive to annual income changes. There is, however, a stronger effect between labour mobility and employment growth than between mobility and regional income growth and regional differences in income.

Sammendrag

Lasse Sigbjørn Stambøl

Urban og regional arbeidsmarkedsmobilitet i Norge

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I Europa blir byer og regionenes konkurransevne viet stadig større oppmerksomhet innenfor regionalpolitikken. Effektiv matching av lokal etterspørsel og tilbud av arbeidskraft med forskjellige kvalifikasjoner blir sett som en viktig forutsetning for både økonomisk vekst og for sosial velferd. Således blir regionale utviklingsprogram utformet for å øke prestasjonene til funksjonelle lokale arbeidsmarkeder. I og med at planlegging og implementering av regionalpolitikken i større grad blir desentralisert til lokale regionale nivåer, blir sammenlignende analyser av regionale arbeidsmarkedsprosesser en stadig viktigere oppgave for regionale planleggere. Dette omfatter bl.a. analyse av strukturelle endringer i retning kunnskapssamfunnet og mobiliteten av human kapital. Både utdanningsnivået og avkastningen av utdanning varierer mellom forskjellige byer og regioner. Attraktive byregioner kan øke sin human kapital ytterligere gjennom geografisk mobilitet av høyt kvalifisert arbeidskraft. Dessuten blir det lagt vekt på ulike regionale produksjonsbetingelser gitt bl.a. gjennom lokalisering av utdanningssystemet, privat tjenesteyting, kommunikasjonssystemene og det institusjonelle rammeverk.

Formålet med prosjektet er å analysere byenes og regionenes funksjonsmåte og konkurransevne med hensyn til sysselsettings- og produksjonsvekst med særlig vekt på omfang og kvalitet på den arbeidskraften som rekrutteres/forsviner. Det tas utgangspunkt i byer og regioner som grupperes i forskjellige kategorier ut fra et sett av produksjonsbetingelser. At byer og regioner med ulike produksjonsbetingelser presterer forskjellig med hensyn til sysselsettings- og produksjonsvekst er kanskje ikke så overraskende, men i den grad like regioner også presterer forskjellig, gir det grunnlag for mer nyanserte forklaringer. Det er også foretatt spesielle analyser av deler av den såkalte nye økonomien, her representert gjennom kunnskapsbasert tjenesteyting, og mobilitet blant ulike nasjonalitetsgrupper. Til slutt er det foretatt analyser av mer kvalitative aspekter ved arbeidsmarkedsmobiliteten belyst gjennom aktørenes gjennomsnittlige utdanningsnivå og endring og nivå på aktørenes årlige personlige inntekt. Datagrunnlaget omfatter store koblinger av registerbaserte individdata i form av år-til-år panel bestående av hele befolkningen i yrkesaktiv alder, 16-74 år, for hvert av årene i perioden 1994-1999.

Analysen viser at flere regioner med relativt like produksjonsbetingelser viser klare forskjeller med hensyn til total og strukturell arbeidsmarkedsmobilitet. Det er observert mye sterkere bruttomobilitet og sentralitet innen kunnskapsbasert tjenesteyting sammenliknet med økonomien for øvrig, og at denne tendensen er positivt korrelert med konjunkturutviklingen. Nivået på arbeidsmarkedsmobiliteten er generelt lavere blant norske statsborgere sammenliknet med alle andre hovedgrupper etter statsborgerskap. I tillegg til høy netto innflytting kvantitativt sett, viser innflyttere til hovedstadsregionen et mye høyere utdanningsnivå enn utflytterne. I alle andre kategorier av regioner er forholdet det motsatte. Nettoeffektene av all innenlandsk flytting i Norge bidrar isolert sett til å øke utdanningsnivået i sysselsettingen. Det er observert en sterkere sammenheng mellom sysselsettingsvekst og brutto arbeidsmarkedsmobilitet blant høyt utdannede sammenliknet med lavt og middels utdannede personer. Videre er det observert en veldig sterk men negativ sammenheng mellom sysselsettingsvekst og brutto utflytting fra jobb, en høy og positiv sammenheng mellom sysselsettingsvekst og brutto innflytting til jobb og en sterk og positiv sammenheng mellom sysselsettingsvekst og brutto arbeidsmarkedsmobilitet i sektorer som representerer den såkalte "nye økonomien". Norske statsborgere viser en klart sterkere sammenheng mellom sysselsettingsvekst og brutto arbeidsmarkedsmobilitet enn noen annen hovedgruppe etter statsborgerskap. Sysselsatte som ikke er mobile på arbeidsmarkedet viser en klart lavere inntektsvekst enn sysselsatte som er mobile enten innenfor eller mellom de regionale arbeidsmarkedene. Mens sammenhengen er sterk mellom arbeidsmarkedsmobilitet og inntektsnivå hos lavt og middels utdannet arbeidskraft, er arbeidsmarkedsmobiliteten hos høyt utdannet arbeidskraft mer følsom overfor årlige endringer i inntekten. Det er til slutt observert sterkere sammenheng mellom brutto arbeidsmarkedsmobilitet og sysselsettingsendringer enn mellom brutto arbeidsmarkedsmobilitet og regional inntektsvekst og regionale forskjeller i inntektsnivå

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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 any region. Hence, more or less explicitly, regional development programmes are designed to improve the performance of functional local labour markets. This is e.g. based on analyses of structural change towards the knowledge society and the mobility of human capital. The levels of education as well as the returns 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 are also expected to be of immense importance for urban and regional growth.

The 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 aim to explain structural change and new forms of transitions in 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. We expect people 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 a surplus of jobs. According to human capital theory, it is the most highly educated persons who are considered to benefit most from mobility due to an expectation of higher returns to education among the highly educated. Inter-sector mobility is also expected to be more frequent among younger people, who do not yet have any sector-specific knowledge through a long professional career.

The main purpose of the project is thus to analyse the mobility 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 starting point cities and regions are first classified into different categories according to a set of production conditions and secondly into more familiar regional typologies. It is perhaps not very surprising that cities and regions with unequal production conditions perform differently according to employment growth and recruitment, but when similar regions to some extent also perform differently, this calls for more sophisticated explanations.

Statistics Norway has, in co-operation with researchers from other Nordic countries, analysed labour market mobility among persons with different qualification levels. In particular, we have established methods for analysing vacancy formations within and between regional labour markets based on the whole working age population. We have also established indexes that illuminate the gross (and thus also net) demand for labour in regional labour markets and sectors and differences between business cycles, as well as analyses of regional performance of recruitment to jobs within and between 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, 2003a,b and Stambøl et al. 1996, 1997, 1999, 2003).

By use of gross-flow data and specified mobility concepts the project aims to produce sets of regional, segments and sector-specific mobility performance indexes illustrating 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 found in different levels and structures of deactivation, thus including analyses illustrating part of the vacancy chain processes.

- 1) As an introductory analysis different categories of urban and regional labour markets are defined on the basis of similar and dissimilar production conditions (See table 3.1 and 3.2 in section 3) and through a somewhat more traditional and manual way of classification into regional typologies (See table 3.3 in section 3).
- 2) Gross mobility between different status groups and regions and abroad is calculated by use of a consistent regional annual vacancy account (See table 3.4 in section 3).
- 3) Different gross-streams by gender, age, education and sectors within and between the urban and regional labour markets are measured by different mobility concepts.
- 4) Specific and total performance indexes showing the urban and regional competitiveness by mobility are calculated (See table 3.7 in section 3).

- 5) Finally we also investigate if the growth of employment is positively correlated to the level of gross labour-mobility. In the same manner we also investigate the relationship between the *growth* of annual personal income/the *level* of annual personal income and the different types of gross mobility to and from jobs.

Another challenge is to explain any 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 16-74 years by year-to-year transitions through the time period 1994-1999.

More specifically we examine certain fields of the economy in addition to a more general overview representing mobility in all sectors in the urban and regional labour markets. Firstly, we carry out a more detailed analysis of parts of the so-called "new economy", here represented by knowledge intensive business services (KIBS). Secondly, we examine labour mobility among different national groups classified by Norwegian citizens, other Nordic citizens, other Western citizens and finally the remaining part of the labour force aggregated and recognized as non-Western citizens. Finally, we examine some qualitative aspects of labour market mobility streams, measured by use of average level of education, and changes and levels of annual income seen in light of different labour mobility.

The sections are distributed as follows: The second section includes a short overview of some theories and hypotheses that illustrate and define more general aspects of the regional labour mobility and some more specific aspects of labour mobility connected to the so-called "new economy". The third section describes the urban and regional classifications made operative for this analysis as well as a description of data and definitions of mobility concepts made operative for the methods being used. The fourth section includes all empirical results, starting with some general mobility analysis for the nation as a whole and the main urban labour markets followed by more specific analyses testing labour mobility performances within and across similar and dissimilar categories of local labour markets. Specific sections show results connected to labour market mobility in parts of the so-called "new economy", here represented by knowledge intensive business services (KIBS), and deviation in labour mobility across different national groups. Section four culminates with qualitative results which illustrate the "brain-gain"/"brain-drain" competition across typologies of regions and different sectors of the economy and concludes with a descriptive analysis of income change and education change within and between urban and regional labour markets. Section five summarizes the main findings of the analysis.

2. Theoretical foundation, hypotheses and policy

Long distance migration of labour has for a long time been considered a necessity. For several years labour market policies have encouraged the unemployed to look for jobs outside their local labour markets, e.g. by including the whole country as an arena of supply and providing economic support for necessary migration to job. Labour market policies have gently advocated the importance of intersectional mobility. The expectation is that higher mobility of the labour force should increase the general level of employment, e.g. due to relatively high gross demand of labour and the problems of matching-time to fill in the vacancies. Moreover, increased total labour mobility is thus seen as a tool for reaching the goals of the labour market policy, employing as large a part of the labour force as possible into ordinary employment. Furthermore, high mobility is expected to satisfy the employers' goal of filling vacancies with suitable labour as quickly as possible in a flexible labour market in continually structural change.

In theory, the bulk of 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 industries, to expansive regions with a surplus of jobs. The rate of migration is partly decided by demographic factors: younger persons and especially those with higher education dominate migration (see e.g. Stambøl et al, 1998). These are considered to benefit more from migrating, since their investments in formal education have to pay off. Furthermore, their investments in housing and real estate as well as in social networks in a given locality are generally lower than for older persons. Individuals who have not yet formed a family of their own have fewer ties and are more inclined 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 much more sensitive to environmental factors such as the spatial concentration of 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 an economic upswing stimulates long-distance migration, while a downturn has the opposite effect (e.g. Pissarides and Wadsworth, 1989, Milne, 1991). The causes for this are mainly found in the increased mobility of the labour force in prosperous periods, when "pull" factors are pronounced. In less favourable economic times people are likely to put more interest into the jobs that are available 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. Today's problem is the existence of both shortages and surpluses of labour within the same companies, sectors, 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 in 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. Today, the labour required by the urban labour market is different from the last decades. The regional division of labour has been more important, with an accentuated regional polarisation and specialisation 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 expected to be a certain 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 a decreasing substitutability between different kinds of labour and that the structure of the economy regulates the kinds of labour demanded in a given sector or region. This phenomenon is also valid with regard to the relationships 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 distinguish between labour mobility – i.e. 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 loss of old jobs and creation of new jobs. Flows of jobs are, however, closely related to flows of labour, e.g. that both closures of working places and the creation of new jobs necessarily generate flows of labour. Closures of complete firms or divisions within firms and companies give rise to involuntary flows of labour. Labour mobility is, however, much more comprehensive than the job mobility suggests. All kinds of mobility, however, depend 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 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 diffuse the physical concept of a work-place and require highly specialised 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 of any place-specific characteristics and that regional growth, to a large extent, is a matter of coincidence (Curran and Blackburn, 1994). Accordingly, different strategies are stressed in territorial industrial and innovation policy.

Knowledge intensive business services (KIBS), are often seen as an important characteristic of the new, more knowledge based economy, being concerned with the supply and management of new knowledge and intangible assets (so called 'knowledge-about-knowledge'). The new economy is used as a term to understand the current global social and economic changes, linked to the increased use of information and communication technologies and to the growth of new ways of organising industrial activity (post-fordist principles). These trends seem to appear early on in KIBS in city areas, as postulated by Storper and Scott (1990) more than a decade ago. Efficient sharing and transferring of knowledge is central, and KIBS plays an important role in these learning and transaction processes. It is thus of importance to analyse KIBS' role as a competitive base of larger cities in Norway, e.g. by studying the competitiveness of cities and regions in terms of growth of employment, and particularly focus on the mobility of the persons who enter and leave the KIBS sectors. Mobility is important for the knowledge transaction process of an economy, and KIBS employees are assumed to have an important role as knowledge diffusers in the economy due to the fact that the sector is characterised by modern education, intra and interregional as well as international networking, dynamism and flexibility. Labour mobility within this sector may also act as a prerequisite for what may be expected to form the future labour mobility structures of society, in line with the argument by Storper and Scott (1990).

Thus we examine in more detail the knowledge spillovers in the context of the KIBS sector in Norway, the mobility of workers between industries and geographical areas. By changing jobs employees take their accumulated skills and know-how with them to new employers. Mobility of workers is of particular importance in KIBS as 'the core competence of professional service firms is the expertise, experience and reputation of their staff, the asset base is knowledge and the competitive advantage is reputation' (Bryson et al. 2004: 87). Important knowledge in KIBS firms is embedded in individual employees and knowledge follows employees when they change jobs. Important questions are thus to which extent knowledge flows to and from the KIBS sector through the labour market, and which industries and geographical areas recruit former KIBS employees? Does for instance knowledge flow to other industries and from Oslo to other parts of Norway through the mobility of workers?

In more general terms, 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 which influence the interaction between the production systems and the labour market systems (Schmid, 1994). Another hypothesis is the emergence of the transitional labour market. It is based on the observations that the border between the labour market and other social systems, 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 repetitive. 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, definitions 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, in 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 domestic and international migrants and the migration processes as well as investigating how these transitions are operating within different and similar local labour markets. In such cases, 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 as well as international 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 year t to another year $t+1$) during the time period 1994-1999.

Urban and regional classifications

One important prerequisite for the analysis 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 not to cross any county borders, thus mak-

ing a few neighbouring regions part of the same functional labour market. Most obviously this is the case in the Oslo region, which consists 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 table 3.1.

Table 3.1. Production conditions for classification of "homogenous" categories of regions

<ul style="list-style-type: none"> - Total number of persons in age group 16-74 years - Total number of persons in 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 (high) 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 - Sector-mix (number of sectors based on NACE at 5-digit level) - Centrality - Population density (number of persons per square kilometre)
--

The next step was then to classify the local labour markets by categories of regions, which each should show a high degree of similarity based on the chosen production conditions (or production characteristics), whilst these production conditions should vary extensively across these categories of regions. As outlined above, it is probably not surprising that local labour markets with uneven production conditions perform differently 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 show stronger conformity in their mobility performance. A method of classification, which we have elaborated, for this analysis, is shown in table 3.2. We have chosen to classify the 86 Norwegian labour markets into 12 categories of regions based on 21 production conditions.

Table 3.2. A method elaborated for classification of "homogeneous" categories of regions**Number of regions: 86 - Number of groups: 12 - Production conditions: 21**

1. Collecting data for 21 production conditions as variables (see list of variables in figure 3.1 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, the mean value for the variable in the region 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 to 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 across regions will get the strongest weight in the classification.
- 7.¹ 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 basis of the average value of these two regions the second most similar region will be "searched" among the 84 remaining regions etc. until group 1 consists of altogether 4 regions.
 - The same procedure is then carried out for the next 11 groups (each including 4 regions)
 - Finally the remaining 38 regions (86 regions - (12*4 = 48 regions) = 38 regions) search their most similar group with regard to all 21 variables.

¹ The classification described in point 7 above is only one of several ways to make this classification. We have carried out different test combinations, e.g. first deciding two regions within each group and letting all remaining regions "search" their most similar group etc. up to the limit of first deciding seven regions within each group and let only two remaining 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 then give as low distances as possible within the groups and as high distance as possible between the groups. The method described in point 7 above gave the best score.

The result of the classification is shown in appendix A. This classification will obviously differ from more traditional classifications of regional types recognized by a few sets of main characteristics, e.g. large central regions, small manufacturing regions, public sector regions etc. due to the fact that our classification is done mathematically and simultaneously by use of a relatively large set of production conditions. However, the first group of regions classified by the model collected exclusively all four major urban regions in Norway into the same category. This is mainly due to the fact that these regions, consisting of the capital region of Oslo/Akershus, Bergen, Trondheim and Stavanger/Sandnes, are characterized by the most extreme values for many of the production conditions involved. Thus group number one represents the main urban labour markets of Norway. All other groups are simply recognized by their group number without any further attempt to mention the regional categories by names. The

main purpose of this classification is to analyse the mobility size and structure across as similar or dissimilar regions as possible.

In order not to only analyse somewhat arbitrary geographical categories of regions, we have included into the analysis a somewhat more manual and traditional classification. As some of the results from this Norwegian mobility analysis will be included into an international mobility analysis at the Nordic level, we have included a classification of 7 typologies of regions elaborated for all Nordic countries and used by Nordregio in Stockholm (See Edvardsson et al. (2004) and Persson ed. (2004)). This classification is also done according to some regional characteristics, but not mathematically decided as in the classification-model described above. The 7 main typologies of regions are shown in table 3.3. A more detailed description of the distribution of 86 economic regions on 7 typologies is shown in appendix B.

Table 3.3. Classification by 7 typologies of regions

- | |
|--|
| <ol style="list-style-type: none">1. The capital region2. Regional metropolises3. Regional centres with a university4. Other regional centres5. Medium-sized towns and regions6. Small labour areas7. Micro labour areas |
|--|

An annual vacancy accounting

Traditional labour market statistics operate 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. 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 illustrating the annual gross-flows between the statuses. Table 3.4 illustrates how this regional labour market indicator is measured in a so-called "annual vacancy account". With regard to 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.

Table 3.4. An "annual vacancy account" for gross-stream analyses in regional labour markets

(A). Entering stock: The number of employed in sector <i>s</i> in region <i>r</i> in year <i>t</i> including individual characteristics by age, gender and education	
(EX): Employment exits:	
- To other employment in year <i>t</i> +1	
- To unemployment in year <i>t</i> +1	(1) Out-migrated from the region from year <i>t</i> to <i>t</i> +1
- Out of the labour force in year <i>t</i> +1	
<i>Due to: (Further education)</i>	(2) Not migrated from the region from year <i>t</i> to <i>t</i> +1
<i>(Retirement - Age)</i>	
<i>(Other insurance)</i>	
<i>(Emigration)</i>	
<i>(Death)</i>	
<hr/>	
= Total employment leave from year <i>t</i> to year <i>t</i> +1	
(EN): Employment entries:	
- From other employment in year <i>t</i>	(1) In-migrated to the region from year <i>t</i> to <i>t</i> +1
- From unemployment in year <i>t</i>	
- From education in year <i>t</i>	(2) Settled in the region in year <i>t</i> and <i>t</i> +1
- From others outside the labour force in year <i>t</i>	
= Total employment recruitment (represents the filled in vacancies from year <i>t</i> to year <i>t</i> +1)	
(B). Outgoing stock: The number of employed in sector <i>s</i> in region <i>r</i> in year <i>t</i> +1 including individual characteristics by age, gender and education	

The number of *filled in vacancies (EN)* in each region, sector and segment appears as follows:

$$EN = B - A + EX$$

B = is the number of employed in year *t*+1

A = is the number of employed in year *t*

EX = is the number of employed in year *t* that left a job from year *t* to year *t*+1.

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 in 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 of employed is equal. If entering stock of employed (*A*) is higher than the outgoing stock of employed (*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 in this case thus represents 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 various 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 recruitment processes due to different development by sectors and segments in the local labour markets.

Of course, the vacancy account will not give a complete measure of all transitions in 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 a more aggregated industrial structure. The basic statistics open up 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 subclasses. Analyses operating at this disaggregated level may, however, be very vulnerable to annual statistical replacements and even misplacements between sectors, thus measuring fictive transitions in the labour markets. The project uses, however, a more aggregated industrial structure, including 28 sectors and one unspecified sector. The sector classification is found in table 3.5. In some part of the analysis, and for further Nordic comparisons, we do however aggregate the sectors further into 11 main sectors and one unspecified sector. This aggregation of sectors is found in table 3.6, where the figures in brackets refer to the number of the sectors in table 3.5.

Table 3.5. Basic sector classification used in the analysis

1. Primary/mining	17. Telecommunication
2. Manufacturing, raw material	18. Activities auxiliary to financial intermediation
3. Manufacturing, labour intensive	19. Finance (bank, insurance, real estate and renting of machinery)
4. Machine/Transport production	20. Renting of office machinery and equipment inclusive computers
5. ICT-Manufacturing	21. Information technology
6. Electro	22. Research and development
7. Printing and publishing	23. Other business activities
8. Energy	24. Activities of membership organisations and other service activities
9. Pharmaceutical production	25. Education: Basic education
10. Construction	26. Education: Higher education
11. Retail, recreation, culture and sport	27. Health and social work
12. Hotel and restaurant	28. Public administration
13. ICT-wholesale	29. Unspecified sectors
14. Other wholesale	
15. Transport	
16. Post and courier activities	

Table 3.6. Aggregated sector classification used in the analysis and for further Nordic comparisons

1. Primary/mining (1)	8. Finance (bank, insurance, real estate and renting of machinery) (19,20)
2. Manufacturing (2,3,4,6,7,8)	9. Education (25,26)
3. ICT-Manufacturing (5)	10. Health and social work (27)
4. Construction (10)	11. Public administration (24,28)
5. Distribution services (11,12,14,15,16)	12. Unspecified sectors (29)
6. ICT-wholesale (13)	
7. KIBS (Knowledge intensive business services) (17,18,21,22,23)	

(Numbers in brackets refer to the detailed classification in table 3.5 above)

Definitions of some central variables:

- *Internal migration*: Migrants are defined as individuals settled in different towns and regions within the nation in the first and second year of each two-year period. The analysis will partly focus on internal (or domestic) migration.
- *Immigrants/new recruits and emigrants/dead persons*: The analysis also comprises the marginal status group of immigrants/new recruits and emigrants/dead persons. These are individuals who are only found in the labour force in the first or second year in each two-year investigation period. The first group (present only in the first year) consists mainly of employees who have emigrated from the first to the second year of each period, but also comprises employees who died or left the working population the second year. 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 include 1) employed, 2) unemployed, 3) persons in 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 to and from jobs between regions, immigration/new recruitment to job and emigration/death from job.
- *Age*: The analyses comprise all persons in working age, here 16-74 years.
- *Education*: The skill dimension in the analysis is recognized by each person's highest formal education. All persons are classified by lower education (compulsory school), middle education (secondary education) and higher education (post-secondary education). In some parts of the analysis we have introduced a concept of average education, measured as the average of each person's number of years in education.

- *Income*: The income is measured as each person's personal annual income before taxes, which basically covers annual wages among employees and wages among self-employed persons. In all analyses concerning income, we only include persons classified as full time employed in the employment registers with an annual income above NOK 100 000.
- *Income change controlled for change in education*: In the final analyses we introduce a concept measuring the income change in relation to changes of education level. The average change of annual income by gender, age group, education group, sector and region is measured in relation to the total average change of number of years in education and further divided by the same relation at the national level. Or expressed as follows:

$$\text{Index of income change/education} = \frac{[(I_r t / I_r t-1) * 100] / [(E_r t / E_r t-1) * 100]}{[(I_n t / I_n t-1) * 100] / [(E_n t / E_n t-1) * 100]} * 100$$

where

- $I_r t$ = the sum of the level of annual income for all employed in a certain group in region r in year t divided by the number of employed in that group.
- $I_r t-1$ = the same relation in year $t-1$.
- $E_r t$ = the sum of the number of years in education for all employed in a certain group in region r in year t divided by the number of employed in that group.
- $E_r t-1$ = the same relation in year $t-1$.
- $I_n t$ = the sum of the level of annual income for all employed in a certain group in the nation n in year t divided by the number of employed in that group.
- $I_n t-1$ = the same relation in year $t-1$.
- $E_n t$ = the sum of the number of years in education for all employed in a certain group in the nation n in year t divided by the number of employed in that group.
- $E_n t-1$ = the same relation in year $t-1$.

The index is thus an expression of the return to education, by measuring the rise of income in relation to the rise of education. The index is standardized by measuring this relationship for different groups and regions to the same relationship for the nation as a whole.

- *Groups by citizenship*: In section 4.4 we briefly investigate the labour mobility by groups of citizens. We operate with altogether 4 main groups defined by each person's citizenship. The main groups include 1) Persons with Norwegian citizenship, 2) persons with other Nordic citizenships, 3) persons with citizenship from other western European countries or the USA/Canada (Western), whilst the fourth group consists of persons with citizenship from all other nations (non-Western).

Composition of a total local labour market mobility performance index

The analysis finally includes a total local labour market mobility performance rate, which measures the relative mobility performance of each region. The total mobility performance rate is composed of a set of different mobility rates (or transition rates) derived from both internal gross streams (or transitions) to and from jobs within the local labour markets as well as interregional and international labour market mobility to and from jobs. In the national context all local labour market mobility measures are described in relation to the national average measure correspondingly. The purpose of this total index is to illuminate how each region, and type of region, performs with respect to total gross labour mobility, while the underlying structure of this total mobility is found in each specific transition component (or transition segment).

Local labour market mobility 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, in education and others outside the labour force. Hence, the total local labour market mobility performance index (LLMMPI) is partly a description of the *rate of activation of twelve pools* of labour force *within* the local labour market (LLM) compared with the corresponding transition rate in the nation as a whole (table 3.7). With local activation rate we thus mean different types of transition rate to job within the local labour markets. In addition immigration 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 to job are thus measured for six main groups (A-F) broken down by three education levels. The activation rate of each group is measured separately, but obviously the rate of each element may be closely related. In a well functioning and strongly 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 are correlated. In many regions high in-migration to jobs may function as an obstacle to high activation from local unemployment to job or from local education to job, while in other regions the situation may be the opposite. The decomposition of all these activation rates by education levels gives the possibility to investigate how the segmentation processes operates in the regional labour markets.

On the other hand, the total local labour market mobility performance index is also taking into consideration the deactivation rate from job (transitions from job), measured by gross out-migration from job as well as by gross emigration/death from job (notice G and H in table 3.7). The deactivation within the local labour markets is, however, expressed by the activation rate A, showing how many employed persons are still employed in the same local labour market the following year. In most cases the activation rates measured by B-F are dependent on the size of the deactivation rate of employed out-migrants and emi-

grants (G and H) in addition to the activation rate A. In regions with stable or growing employment, the deactivation rate will establish vacancy chains in the local labour markets, demanding a replacement of former employees. In regions with decreasing employment this dependency may be less visible, due to an excess of losses of jobs compared with creations of new 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 will be far better off with respect to employment growth than a region with a similar activation rate, but due to a high deactivation rate.

Table 3.7. Composition of a total local labour market mobility performance index (LLMMPI). Rates of activation and deactivation in twenty-four pools of labour force.

	Status year t+1: Employed /or out-migrated,emigrated/dead		
Status year t:	Primary education	Secondary education	Post secondary education
A. Employed in region r	A1. Still in job in region r	A2. Still in job in region r	A3. Still in job in region r
B. Unemployed in region r	B1. Unemployed to job in region r	B2. Unemployed to job in region r	B3. Unemployed to job in region r
C. In education in region r	C1. From education to job in region r	C2. From education to job in region r	C3. From education to job in region r
D. Other statuses in region r	D1. From others to job in region r	D2. From others to job in region r	D3. From others to job in region r
E. Any status in other regions. In-migrants	E1. In-migrants to job in region r	E2. In-migrants to job in region r	E3. In-migrants to job in region r
F. Any status in other countries. Immigrants/New recruits	F1. Immigrants/New recruits to job in region r	F2. Immigrants/New recruits to job in region r	F3. Immigrants/New recruits to job in region r
G. Employed in region r	G1. Out-migrants from job in region r	G2. Out-migrants from job in region r	G3. Out-migrants from job in region r
H. Employed in region r	H1. Emigrated/dead from job in region r	H2. Emigrated/dead from job in region r	H3. Emigrated/dead from job in region r

and an alternatively expression to A1-A3:

	Status year t+1: Not in job but still living in region r		
Status year t:	Primary education	Secondary education	Post secondary education
I. Employed in region r	I1. From job in region r	I2. From job in region r	I3. From job in region r

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

Local activation rates:

A1-A3. Still in job: Employed persons in region r in year t still employed in the same region in year t+1/All employed in the same region in year t) - (the same relation for the nation as a whole).

B1-B3 Unemployed to job: Unemployed in region r in year t that became employed in the same region in year t+1/All unemployed in the same region in year t - (the same relationship for the nation as a whole).

C1-C3 Education to job: Persons in education in region r in year t that became employed in the same region in year t+1/All persons in education in the same region in year t - (the same relationship for the nation as a whole).

D1-D3 Others to job: Other persons in working age in region r in year t that became employed in the same region in year t+1/Persons outside the labour force and studies in the same region in year t - (the same relationship for the nation as a whole).

E1-E3 In-migrants to job: Internal in migrants that became employed in region r in year t+1/All employed in region r in year t - (the same relationship for the nation as a whole).

F1-F3 Immigrants/New recruits to job: Immigrants/new recruits that became employed in region r in year t+1/All employed in region r in year t - (the same relationship for the nation as a whole).

Local deactivation rates:

G1-G3 Out-migrants from job: Persons that were employed in region r in year t but had out-migrated from a job in region r in year t+1/All employed in region r in year t - (the same relationship for the nation as a whole)

H1-H3 Emigrants/dead from job: Persons that were employed in region r in year t but had emigrated (or died) from a job in region r in year t+1/All employed in region r in year t - (the same relationship for the nation as a whole).

I1-I3. From job local: Employed persons in region r in year t who were not employed but still living in the same region in year t+1/All employed in the same region in year t) - (the same relationship for the nation as a whole).

The deactivation rates I1-I3 represents an alternative (or more precisely the residual) to the activation rates A1-A3, where the first measures those who have left the job locally, while the second measures those who are still in job locally. Both measures are used in the analysis, where A1-A3 becomes recognized as the concept "still in job locally" while I1-I3 is recognized as "from job locally".

The total local labour market mobility performance index (LLMMPI):

In the total index for each region - i. e. the sum of the activation rate for eighteen groups minus the deactivation rate for six groups - each rate is given a weight based on the number of persons within each segment in relation to the total number of labour market mobile by adding up all 24 segments of mobile labour. The total mobility performance index of each local labour market is thus expressed as follows:

$$LLMMPI = [(A1 * x1/z) + (A2 * x2/z) + (A3 * x3/z) + (B1 * x4/z) + (B2 * x5/z) + (B3 * x6/z) + (C1 * x7/z) + (C2 * x8/z) + (C3 * x9/z) + (D1 * x10/z) + (D2 * x11/z) + (D3 * x12/z) + (E1 * x13/z) + (E2 * x14/z) + (E3 * x15/z) + (F1 * x16/z) +$$

$$(F2*x17/z) + (F3*x18/z) - (G1*x19/z) - (G2*x20/z) - (G3*x21/z) - (H1*x22/z) - (H2*x23/z) - (H3*x24/z) / 24;$$

where A1-H3 = rates within each mobility segment according to table 3.7, x1- x24 = the weights expressed as the number of persons within each segment of mobility and z = the sum of all persons within each segment of mobility.

This expression secures that positive rates (higher than the national average) for the segments A-F give positive contributions to the total mobility performance index, while the opposite is the case for negative values for each segment. On the other hand positive rates for the segments G and H give negative values to the total mobility performance index, while negative rates here give positive values.

Policy implications

The total mobility performance index thus gives an illustration how each regional labour market performs in the national context. Each transition rate should, however, give some incentives to different policy areas, what may be successful or not successful performance. The total index illustrates how the regional labour market functions as a whole, while each element shows which transition contributes mostly to a total high performance, or vice versa to a less successful performance. The ability to stay in work or 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 manner we may consider 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 new graduates, but also to what extent the local labour markets need to cover their demand by recruiting persons with a 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 a part of their inhabitants in ordinary jobs as possible. All these elements are however important to the regional policies. The elements representing the geographical labour market mobility should be of immense importance for all regions and many policy areas.

4. Empirical results

The performance of regional labour markets measured by net and gross labour mobility across different dimensions 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, focusing on the capital region of Oslo/Akershus, Bergen, Trondheim and Stavanger/Sandnes (section 4.1). Some main results do, however, take into consideration mobility structures broken down by different groups of regions and typologies of regions. In particular, we look at 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. We also analyse the relationship between total mobility performance and different production conditions observed in each region at the beginning of the investigation period (section 4.2). Sector analyses are especially connected to the so-called "new economy", focusing on both absolute and relative mobility of more modern knowledge intensive service activities (KIBS-sectors) (section 4.3). The gross mobility of Norwegian citizens versus different immigrant groups is also investigated (section 4.4). We have tested the hypothesis that the net growth of employment, as a dependent variable, is positively or negatively correlated to the level of different segments of gross mobility to and from jobs for all these types of labour mobility mentioned above. This main section culminates with qualitative results illustrating the brain-drain/brain-gain competition across typologies of regions and different sectors of the economy (section 4.5) and ends with some descriptive analysis of income and education change within and between urban and regional labour markets featuring an analysis of the correspondence between annual income change and different types of gross mobility, as well as the relationship between the level of income and gross mobility segments (section 4.6).

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 4.1a 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 of employment during the whole period, with strongest growth from 1996-1997 and 1997-1998 falling to a slight growth in the turn of the decade. The capital region of Oslo/Akershus shows the highest net growth of employment 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 urban main centre showing years of negative growth of employment, towards the end of the period.

Different status groups further break down the annual net entries to job. Figure 4.1b shows the result for the whole nation, whilst figure 4.1c concentrates the net mobility results on the four main urban regions of the country. The highest contribution to net employment growth derives from education to job in the local labour markets. Net recruitment from local unemployment to job also contributes positively with an exception for the last year. Internal migration contributes positively to net job growth although with decreasing importance towards 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, with strongest effect in 1998-1999.

The net mobility results of the four main urban regions reflect the general structure of net labour mobility in the nation as a whole, with some exception though. The net transition from education to job represents the main contribution to net job growth in all four regions. This entry is, however, remarkably strong in the economic growth years of 1996-1997, but also 1997-1998 shows a very high net flow from the education system. This reflects first and foremost the very strong economic growth in this period, but this was accompanied by an increasing number of students about to enter the labour market because of the large student numbers during the economic recession at the end of the 1980s and the first part of the 1990s. The capital region of Oslo/Akershus and the region of Stavanger/Sandnes differ from the other two main urban regions with respect to a much stronger net effect from internal migration to job. Internal migration do, however, also contribute positive in Bergen and Trondheim, but is of minor importance for the total net rise of employment. All urban main regions show a positive net effect from immigration to job, with a stronger importance in the capital region and in Stavanger/Sandnes. Net transitions from unemployment to job is mainly positive, except from the first year in Stavanger/Sandnes and the last year for all regions. Net contributions from others to job locally are almost generally negative, with the exception of Trondheim showing a net balance in 1996-1997. On the other hand, the negative net effect of others

to job locally is remarkable in Trondheim towards the end of the period being investigated.

Figure 4.1a Total net entries to job 1994-1999 in Norway and the main urban centres. Per cent of stock of employed

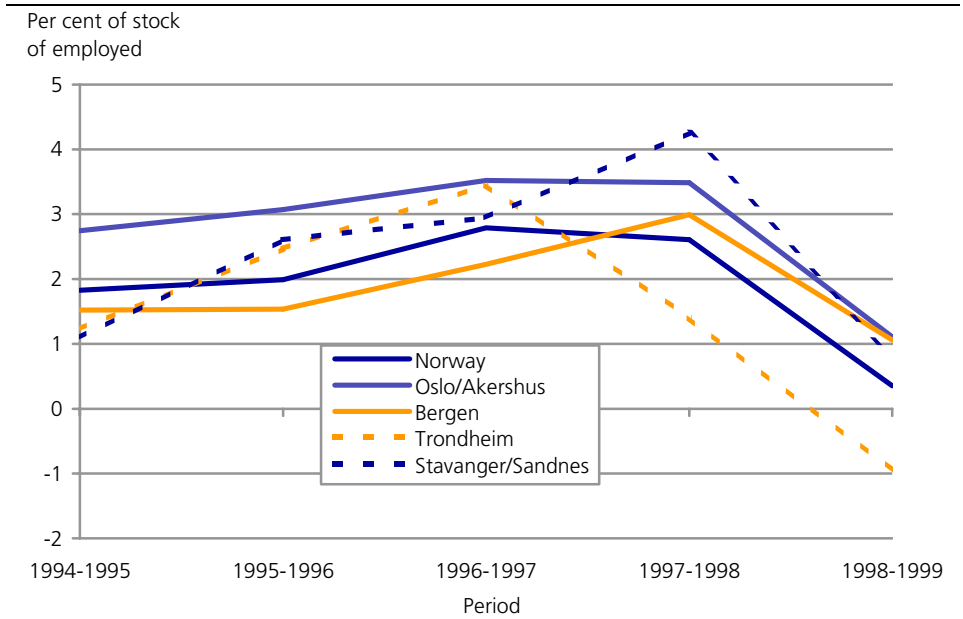


Figure 4.1b Net entries to job 1994-1999 broken down by status group. Norway. Per cent of stock of employed

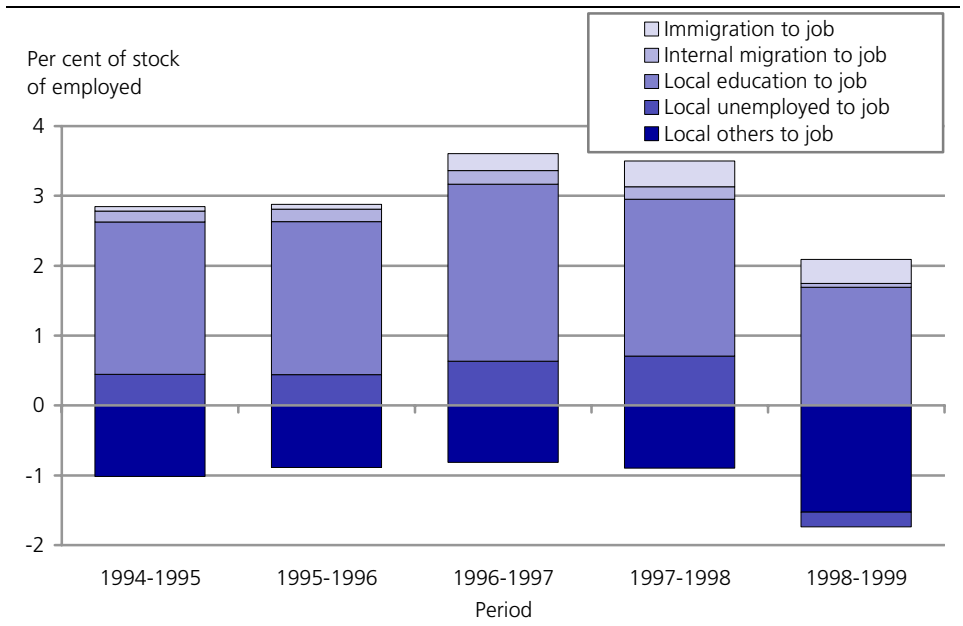


Figure 4.1c Net entries to job 1994-1999 broken down by status group. Main urban centres of Norway. Per cent of stock of employed

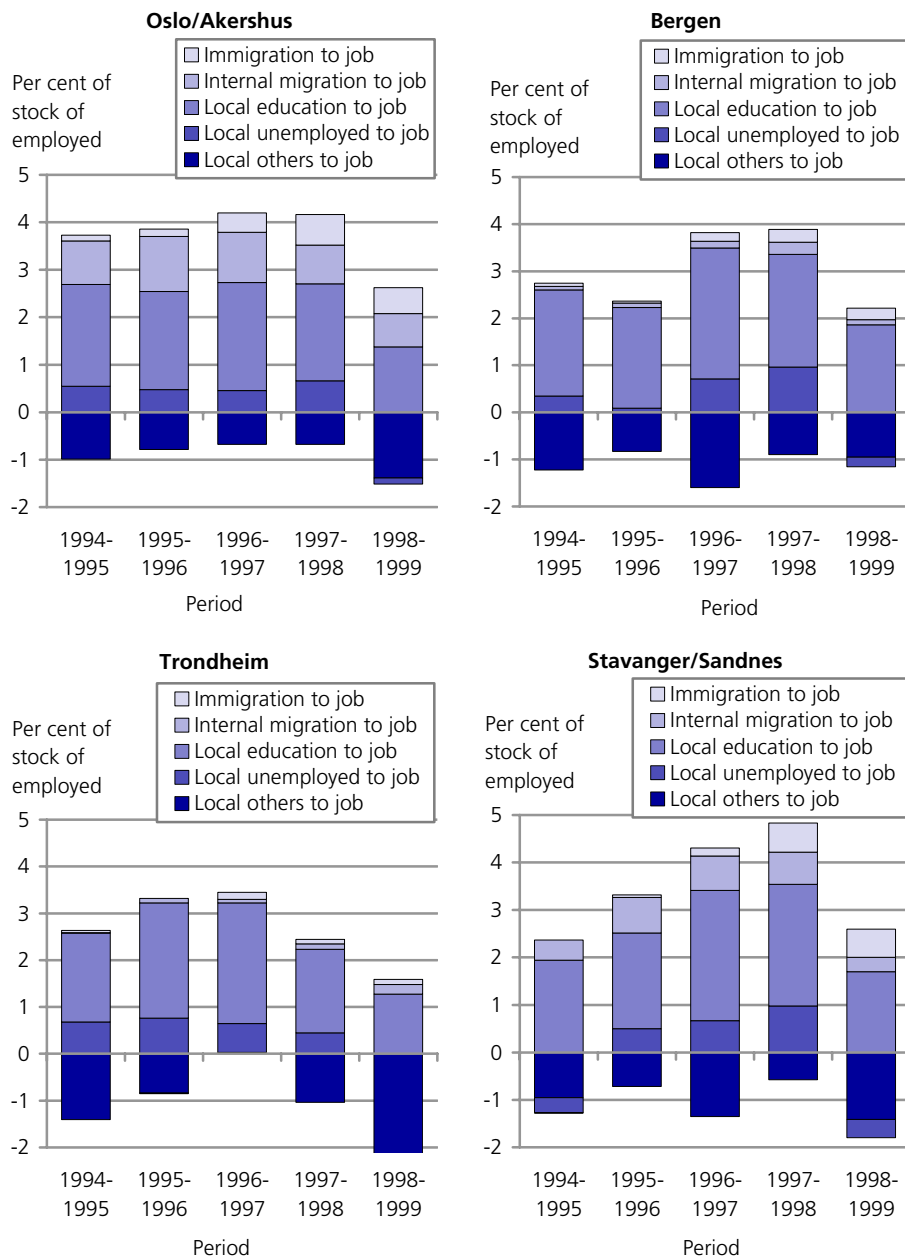


Figure 4.1d shows the level of gross mobility to jobs during the same period. The level of gross mobility to job definitely follows the business cycle, with the highest level during the economic boom period 1996-1998. The gross entries to job is, however, significantly higher in the capital region of Oslo/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 4.1e shows national results where different status groups break down the total gross entry. This analysis also includes local job-to-job mobility between 28 sectors (see table 3.5 for sector classification). The results indicate that job-to-job mobility (or inter-sector mobility) contributes with almost 50 per cent of the total gross mobility to job. As for total gross mobility, job-to-job mobility increases 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 compared to what the net effects of the education to job mobility suggested. When experiencing low unemployment rates in most of the regions, the entries from unemployment to job represent a small and decreasing part of the total gross mobility.

Figure 4.1d. Total gross entries to job 1994-1999 in Norway and the main urban centres. Per cent of stock of employed

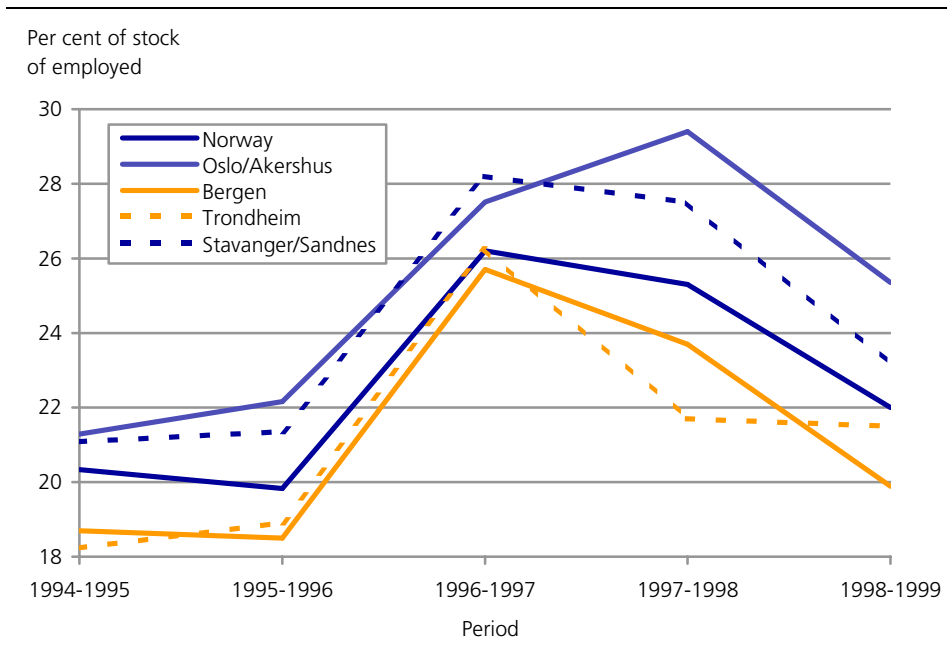


Figure 4.1e. Gross entries to job 1994-1999 broken down by different status groups. Norway. Per cent of stock of employed

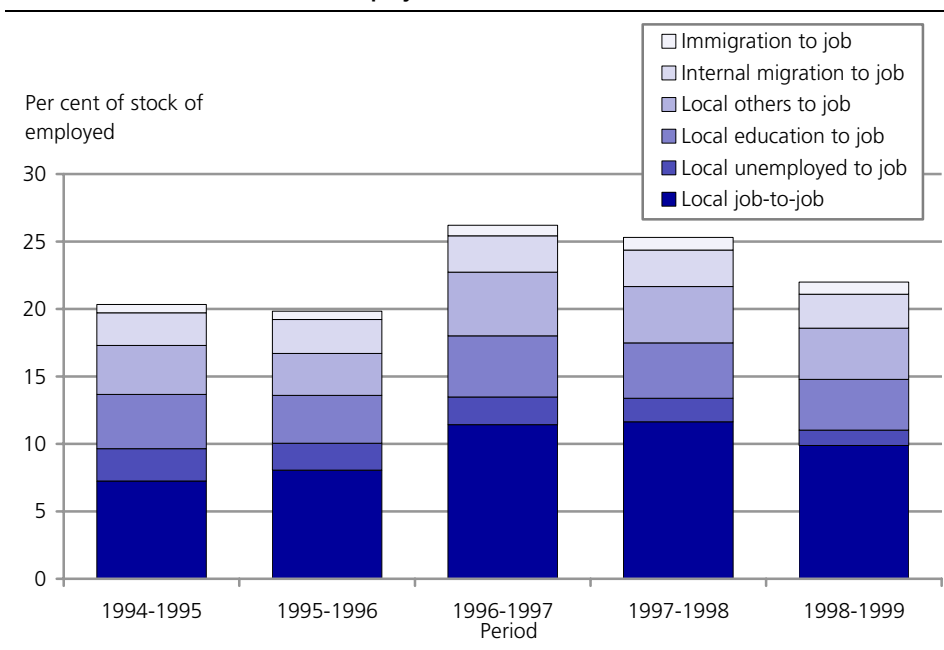
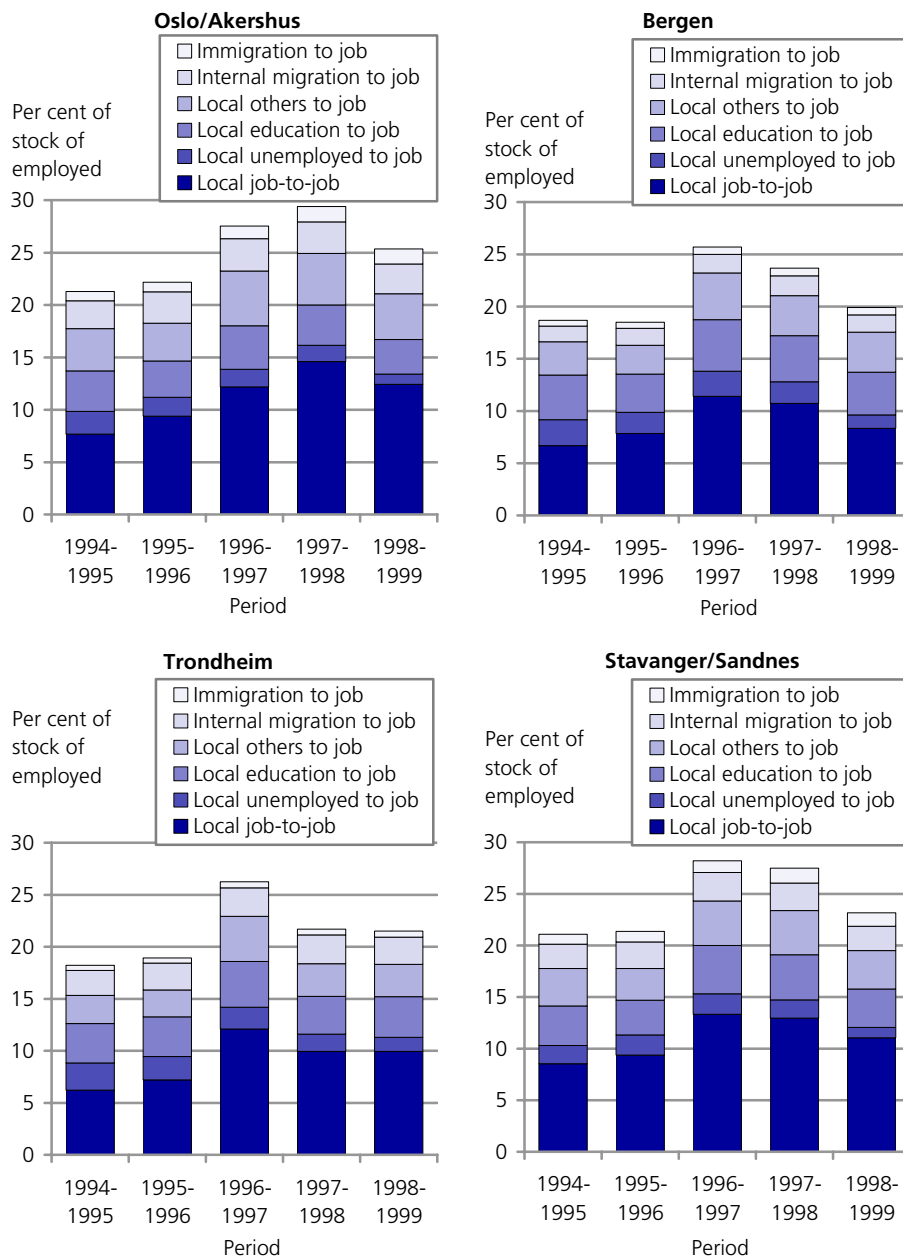


Figure 4.1f shows corresponding results for the four main urban regions. In addition to different gross mobility intensity, the local job-to-job mobility contributes somewhat more to the total gross mobility in Oslo/Akershus and Stavanger/Sandnes compared with the two other urban main regions. Especially high is the gross job-to-job mobility in the capital region in the strong growth years of 1997-1998. The same regional differences are found for gross immigration to job and internal migration to job, with somewhat higher flows in Oslo/Akershus and Stavanger/Sandnes. On the other hand a somewhat lower unemployment rate in the capital region and Stavanger/Sandnes resulted in a somewhat lower flow from unemployment to job during the period. Gross mobility from persons outside the labour force was somewhat higher in Oslo/Akershus than in the other regions, while the gross transitions from education to job seem to be more evenly distributed across the main urban labour markets.

Figure 4.1f. Gross entries to job 1994-1999 broken down by different status groups. The main urban centres of Norway. Per cent of stock of employed



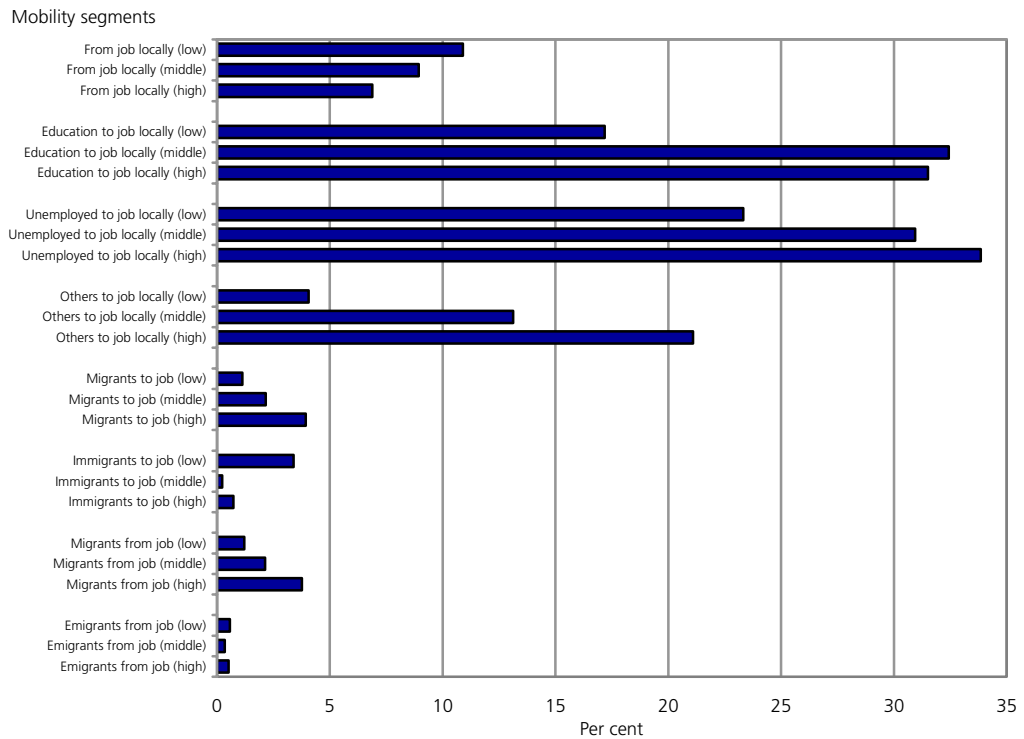
4.2. Total and specific local labour market mobility performance

In section 3 above and particularly in table 3.7 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 also 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 (tables 3.1 and 3.2). The result of the classification is found in appendix A below. Our main expectation is that regions representing a certain degree of conformity with respect to production conditions also should perform somewhat similar concerning transitions within and between local labour markets.

Figures 4.2a and 4.2b show the mobility rates and mobility structure in Norway for all 24 segments that define the total index of mobility performance. The example is derived from figures showing the mobility in the period 1998-1999. It is important to note that in both figures we have used local exit rate from job (from job locally) instead of measuring the percentage of the stock of employed still in job the next year (still in job locally). This is done due to the relative figure dimension. The differences between these two mobility concepts are described in more detail in section 3 and particularly in table 3.7.

Figure 4.2a shows that exit rates from job in the local labour markets are significantly higher for low educated persons compared with high educated. Middle and high educated persons show as well a much higher transition rate from education to job and unemployment to job compared with 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, unemployed to job and partly others to job is due to the facts that these rates are here measured in relation to the stock of persons in education, stock of unemployed and stock of others outside the labour force respectively, while all other segments are measured in relation to the total stock of employed by education (see table 3.7 in section 3).

Figure 4.2a. Mobility rates in 24 labour mobility segments 1998-1999. Norway. Per cent¹

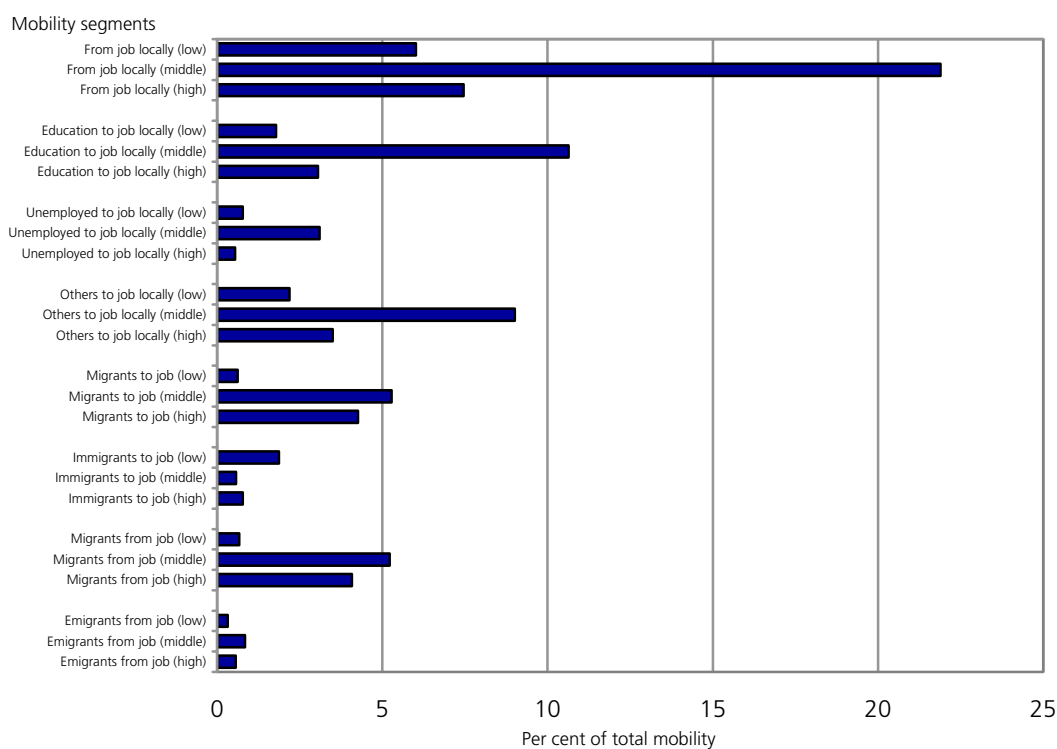


Education level in brackets (low, middle and high)

¹ From jobs local, migrants to and from job, immigrants to job and emigrants from job are measured in per cent of stock of employed by education. Education to job, unemployed to job and others to job are measured in per cent of persons in education, unemployed and other persons outside the labour force respectively

These differences appear in figure 4.2b, showing the total labour mobility broken down by all 24 mobility segments. Not surprisingly the middle educated persons show the highest deactivation in the local labour markets, due to the fact that this group represents the majority of all employed. This structure is also present in most of the other segments. As stated in section 3 above each segment of mobility is given a weight based on the number of persons within each group when calculating each region's total performance index.

Figure 4.2b. Total labour mobility broken down by 24 labour mobility segments 1998-1999. Norway. Per cent of total gross labour mobility

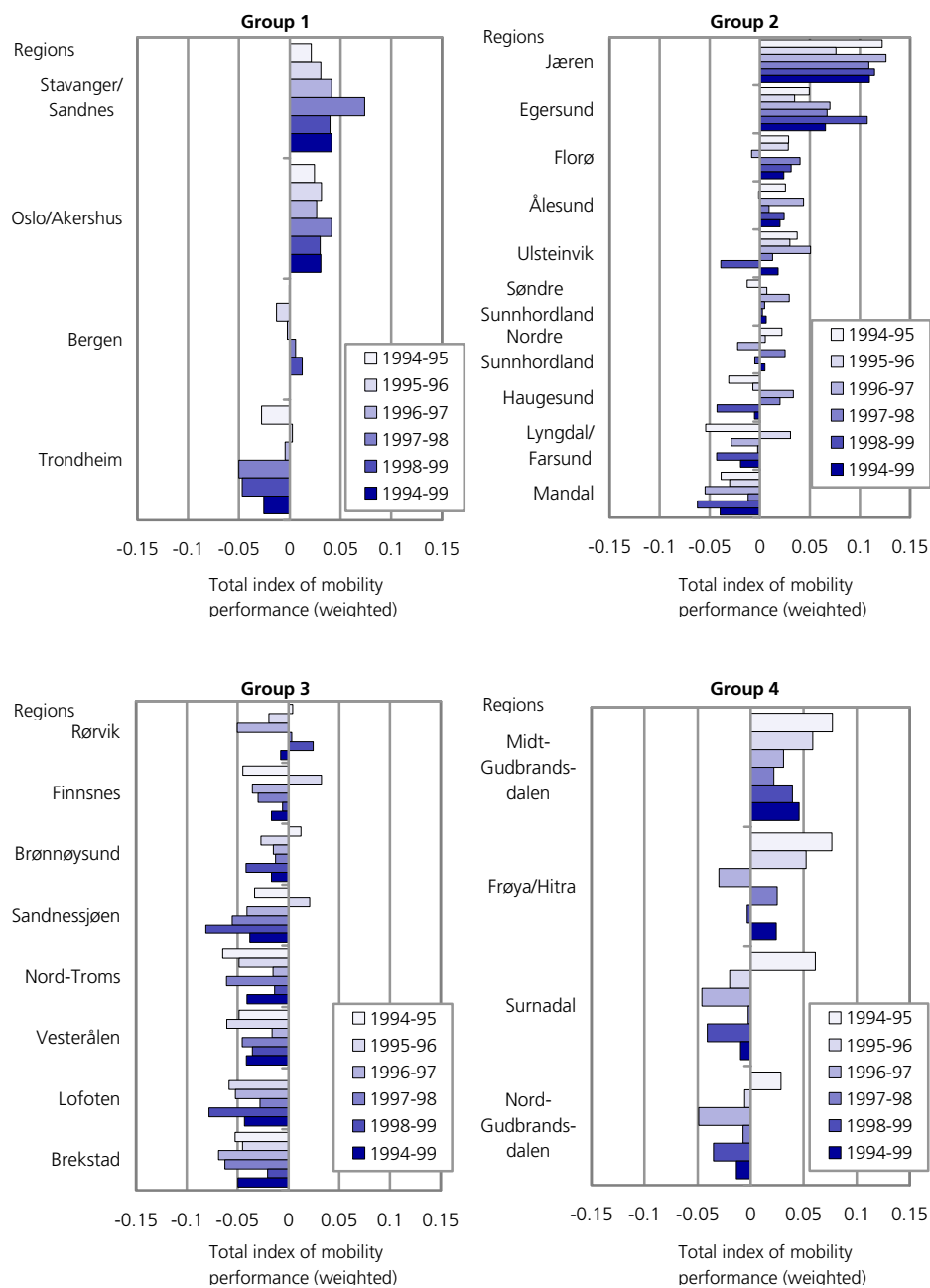


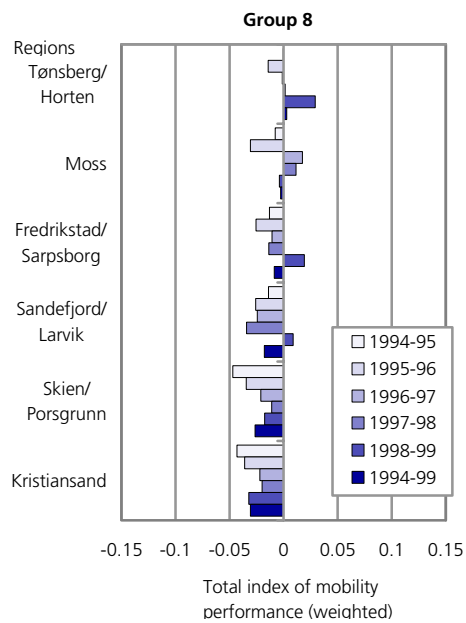
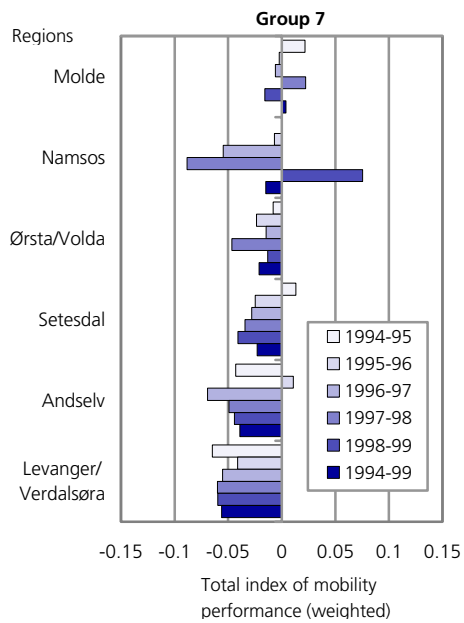
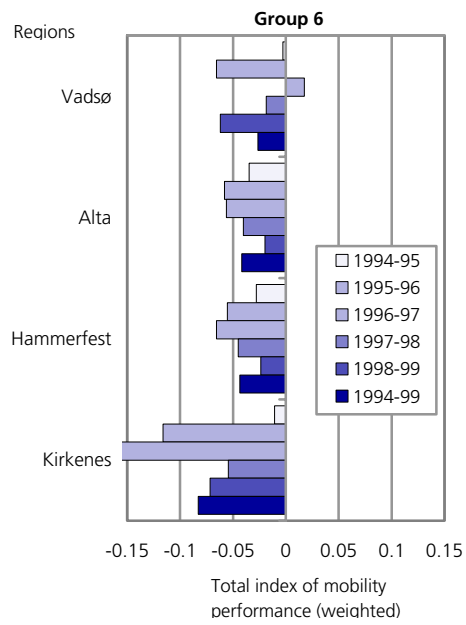
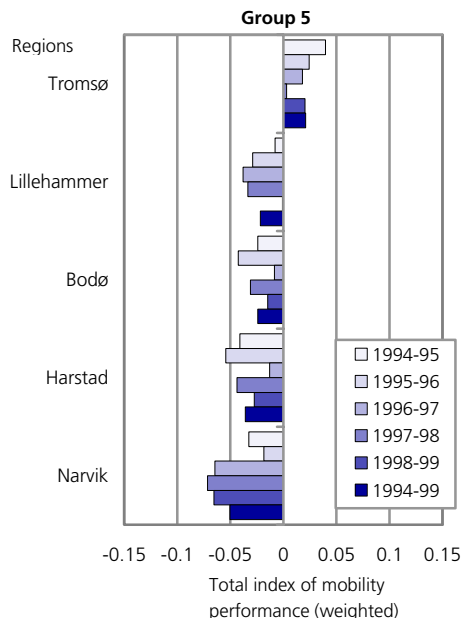
Education level in brackets (low, middle and high)

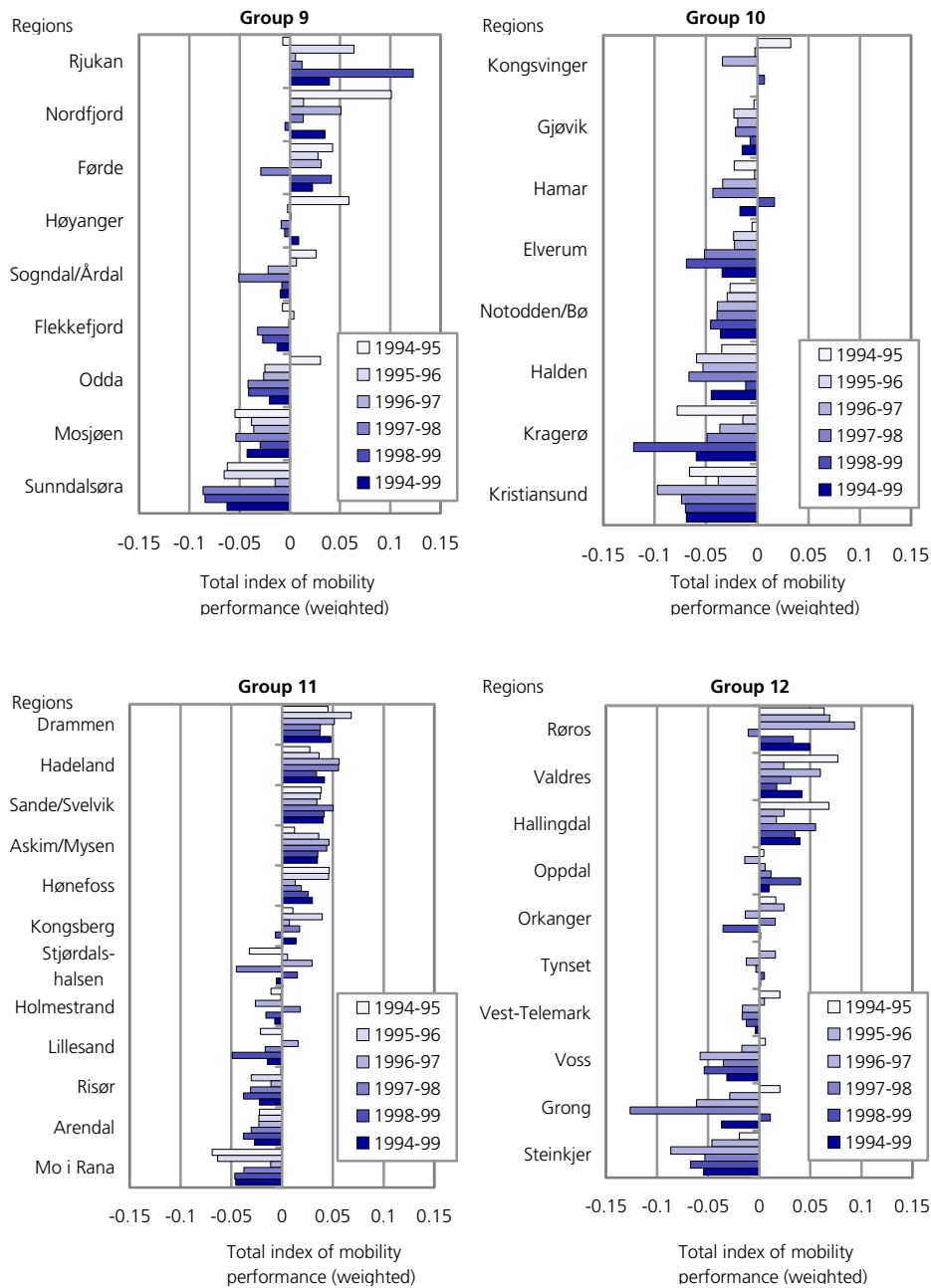
4.2.1. Total local labour market mobility performance in 12 groups of regions classified by a set of production conditions

How then does each region perform in relation to the national average described above? And how does each region perform within each of the 12 classified groups of regions? The results are shown in figure 4.2c below. The total index of mobility performance in the nation as a whole is here set at 0. The first group of regions in figure 4.2c 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/Akershus clearly performed better than the region of Bergen and especially compared with 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 total mobility performance, while regions within many of the other groups perform rather unevenly, partly well above and partly well below the national average. It is also interesting to note 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.

Figure 4.2c. Regions ranked by total index of mobility performance 1994-1999. Total index of mobility performance in Norway is set at 0







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 character-

istics that might be of importance than the 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 weakest mobility 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 with respect to labour mobility.

4.2.2. Total and specific local labour market mobility performance by 7 typologies of regions derived from a common Nordic classification.

As described in section 3, we have also included into the analysis a somewhat more manual and traditional classification of regions, which altogether includes a regional classification of 7 typologies of regions elaborated and used by Nordregio in Stockholm. The 7 main typologies of regions are shown in table 3.3 in section 3 above and a more detailed description of the distribution of economic regions by these 7 typologies of regions is shown in appendix B below.

Gross entries to and gross exits from job

Figures 4.2d and 4.2e show gross entries to job and gross exits from job at the local level, distributed by type of mobility and typology of regions. The mobility results are here derived from the strong growth period 1997-1998. The job-to-job mobility is significantly higher in the capital region than in any other type of regions. This is e.g. due to the fact that this is the biggest labour market in the country, has the highest sector-mix of production and a structure of production including a relatively large number of sectors showing high labour mobility, e.g. modern ICT sectors. The lowest job-to-job mobility was observed in regional centres with a university (Tromsø) and in medium-sized towns and regions. The rate of local unemployed to job is highest in regional metropolises and in the micro labour areas and smallest in the capital region. This structure is also clearly visible in the exits from job to unemployment, but with lowest figures for the capital region and in small labour areas. The gross streams from education to job are of immense importance and as expected, much more comprehensive than gross streams in the opposite directions. Somewhat surprisingly the capital region shows the lowest rates. In spite of that this region had the highest success of activating the newly educated, the turnover rates measured by the total stock of employment show the opposite effect. This is due to the fact that the size of the labour market in the capital region is larger compared to the number of persons in education than what is the situation in the other typologies of regions. Looking at the rates from others outside the labour force to job, the capital region shows the highest rates in both directions. Somewhat surprisingly the lowest rates were found in regional metropolises and the rates in the micro labour areas were higher than in many of the other types of regions. Gross mobility by in-migration to job is highest in regional centres with a university and in the capital region. The corresponding out-migration exit-rates are clearly lowest for the capital region and regional metropolises and highest in micro labour areas and regional centres with a university. The immigration entries and emigration exits are also highest in the capital region.

Figure 4.2d. Gross entries to job 1997-1998 broken down by mobility segment. 7 typologies of regions in Norway. Per cent of stock of employed in 1997

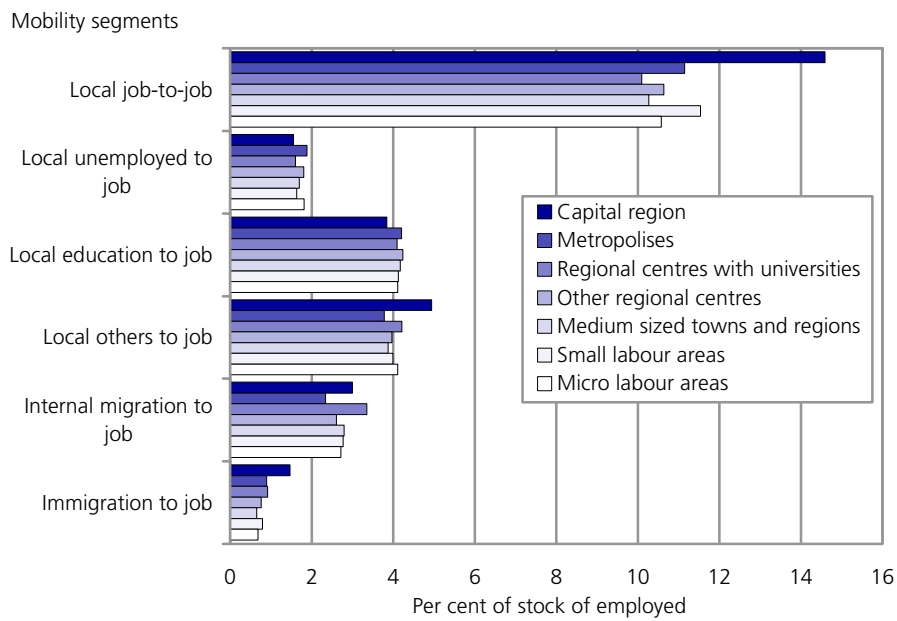
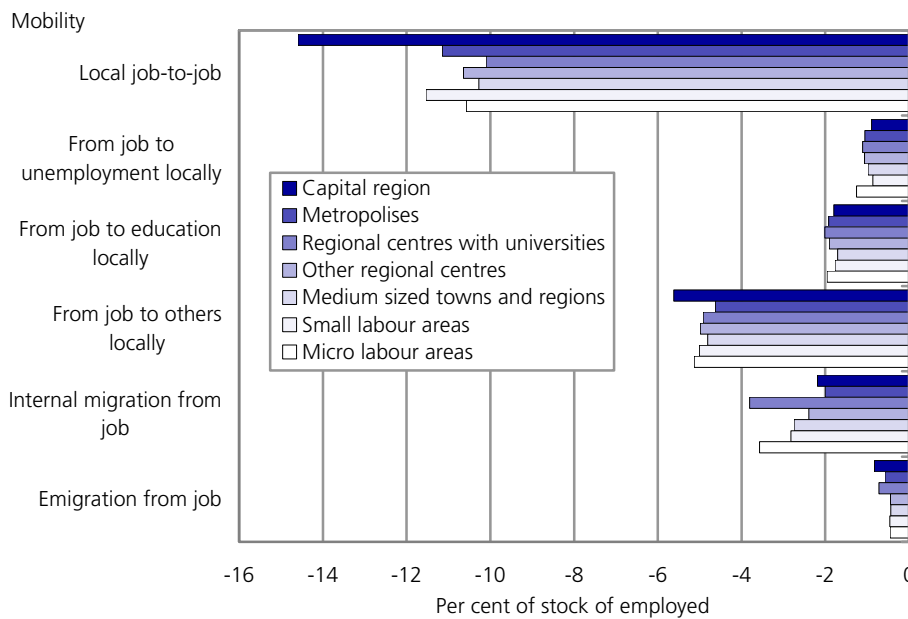


Figure 4.2e. Gross exits from job 1997-1998 broken down by mobility segment. 7 typologies of regions in Norway. Per cent of stock of employed in 1997



Net entries to job

Figure 4.2f shows the net effect of this gross mobility. When excluding the sector dimension the net effect of all job-to-job mobility within each region becomes zero due to the fact that all job-to-job exits and entries are balancing. The net effect of unemployed to job is strongest in regional metropolises and in small labour areas. The net effect of education to job mobility is, somewhat surprisingly, lowest in the capital region but highest in medium-sized towns and regions. The relatively low figures in the capital region are, as mentioned above, connected to a big labour market in relation to the number of persons in education. The exits from job to out of the labour force exceeded entries in the opposite directions in all types of regions. This is partly due to ageing, that the number of older employees that leave a job due to retirement or some pre-retirement agreements exceed the number of younger persons entering a job from outside the labour force. The strongest negative effects were found in other regional centres, small labour areas and in micro labour areas. The net effect of internal migration to job mobility is clearly most positive in the capital region and in regional metropolises and most negative in micro labour areas. The strong net migration effect for the capital region is, as noticed above, mostly connected to low out-migration from job, while the negative migration effect for the micro labour areas is definitely more connected to strong out-migration from job than to low in-migration to job. The effect of net immigration to job is positive for all types of regions, but strongest for the capital region.

Figure 4.2f. Net entries to job 1997-1998 broken down by mobility segment. 7 typologies of regions in Norway. Per cent of stock of employed in 1997

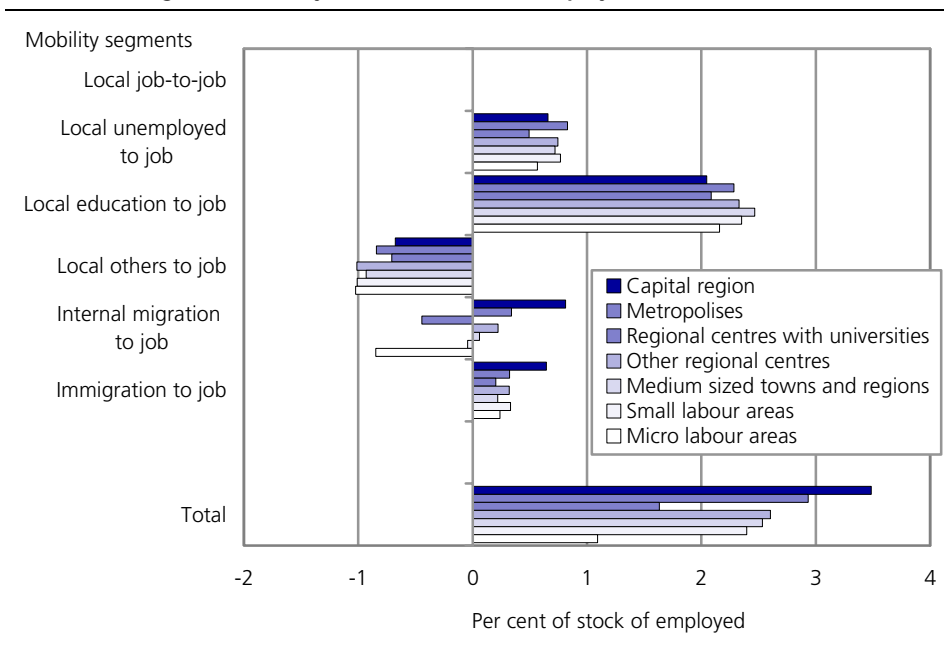
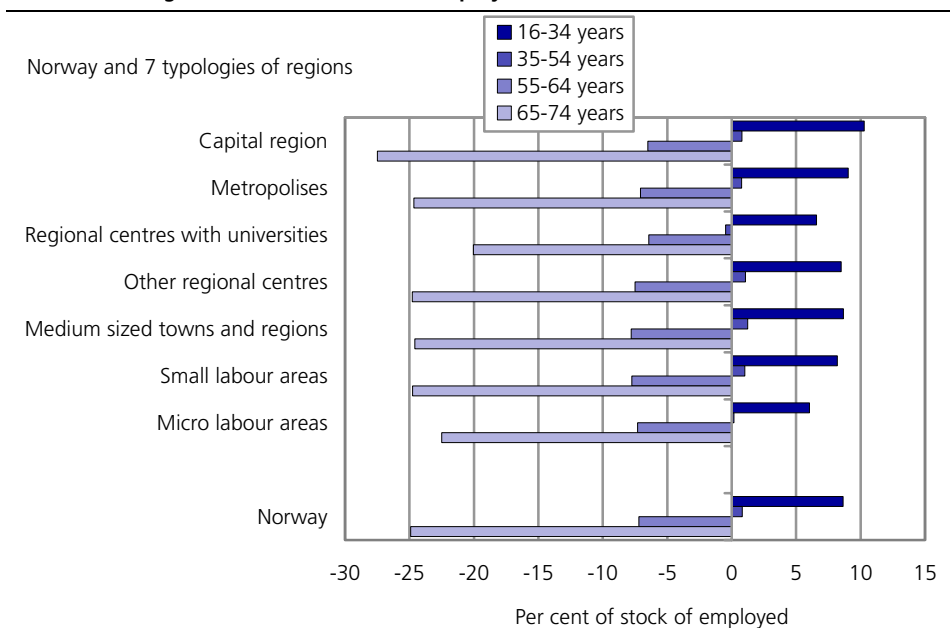


Figure 4.2g. Net flows of labour by age groups 1997-1998 in Norway and 7 typologies of regions. Per cent of stock of employed in 1997



Net job mobility by age groups

Figure 4.2g shows the corresponding net effect of labour mobility broken down by different age groups. The capital region shows the strongest positive net flows of labour in the youngest age group, whilst the micro labour areas show the lowest positive net growth of young labour. The net mobility effects for the age group 35-54 years are rather small but mostly positive, except from in regional centres with a university, where we find a slightly negative figure. The net figures for the two oldest age groups are generally negative, and most negative in medium-sized towns and regions for the age group 55-64 years, and in the capital region for the oldest age group.

Net labour mobility and net employment change by educational groups

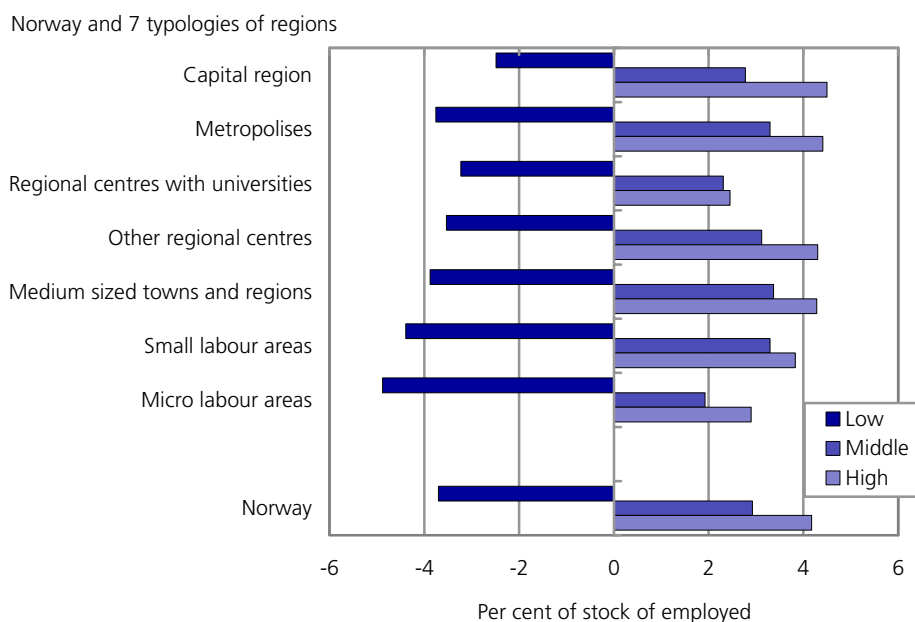
The positive effects of net change of employed with higher education is definitely strongest in the capital region followed by regional metropolises and other regional centres, whilst micro labour areas show negative net effects of labour change by high educated employed (See figure 4.2h). The net changes of low educated labour are generally negative with the strongest negative effects in small labour areas and in micro labour areas. On the other hand, the net change of middle educated labour are generally positive, and strongest in regional metropolises and medium-sized towns and regions.

Figure 4.2h takes into consideration both the net flows of labour by education and the change in education among all employed from 1997 to 1998 (education

mobility). The transition from lower towards middle and higher education thus becomes much more extensive than the labour mobility in itself suggests. All regional types experienced a negative net change of employed with low education and a net rise of employed with middle and higher education.

In figure 4.2i we have decomposed the total change of employment by education in figure 4.2h, investigating how much of the total change is derived from labour mobility to, from and between regions and sectors and how much is derived from the effect of changes in education level from the first to the second year.

Figure 4.2h. Net change of employment by education levels 1997-1998 in Norway and 7 typologies of regions. Based on the differences between the number of employed by education in 1997 and 1998. Per cent of stock of employed in 1997



In general, the capital region shows positive net effects from the labour mobility, even for people with low education. The strongest growth of employed by labour mobility is, however, found among middle educated persons. The education mobility from low, to middle and especially to higher education together with labour mobility showed the strongest growth of high educated employed in the capital region. It is, however, important to note that the capital region shows the lowest percentage growth of high educated employed by education mobility. The labour mobility is thus of immense importance for the employment renewal in the capital region. All other regions show negative effects of labour mobility for low educated employed. The strongest negative effects were found in regional centres with a university and in the micro labour areas. All regional types show, however, mostly positive effects of labour mobility among middle and high edu-

cated employed. Apart from the capital region, the strongest positive effects were found in the regional metropolises while both regional centres with a university and the micro labour areas showed negative mobility effects for persons with high education. The effects of education mobility are, as we could expect, strongly negative in all regions for people with low education. This effect is generally positive for middle educated employed, but of minor importance for employment growth due to high turnover from middle to higher education. The education mobility into higher education measured in per cent of stock of employed was most important in medium sized towns and regions and in the micro labour areas. At the national level both labour mobility and education mobility show positive effects for middle and high educated employed but negative for low educated employed. While the labour mobility was the most important factor for the employment growth of middle educated, the education mobility was more important than labour mobility for employment growth of high educated.

Figure 4.2i. Net change of employment by education levels 1997-1998 broken down by the effects of labour mobility and education mobility. Norway and 7 typologies of regions. Per cent of stock of employed in 1997

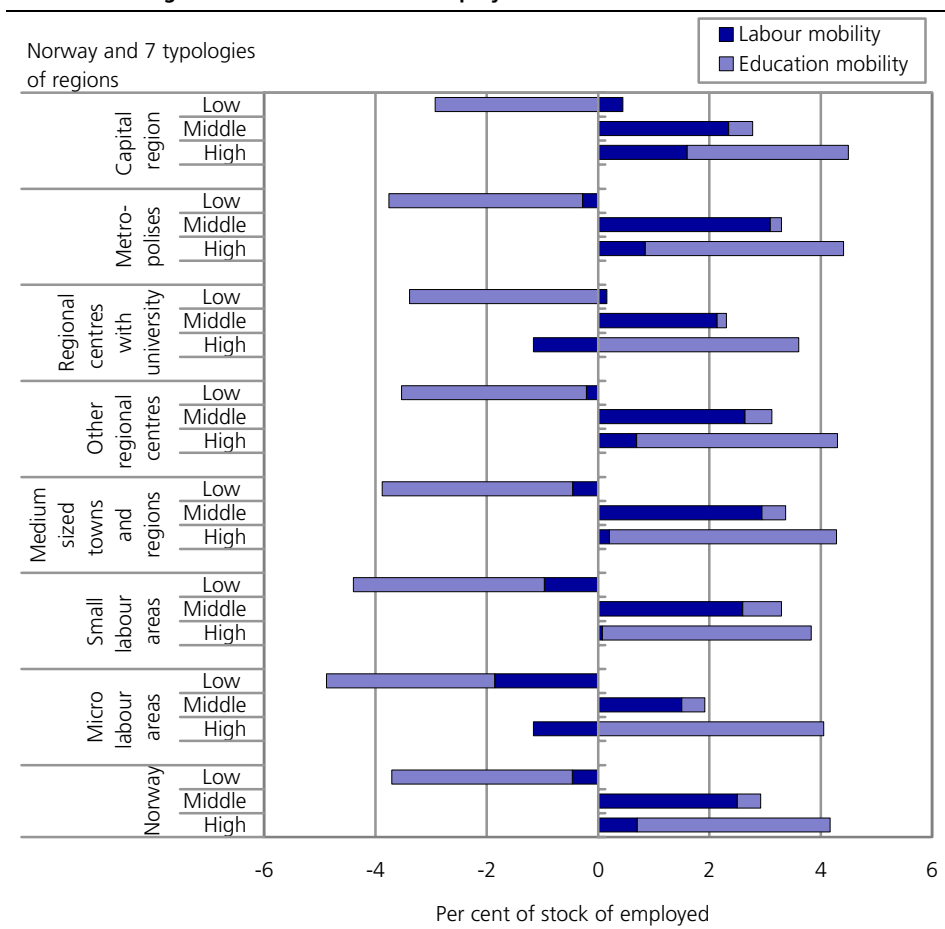
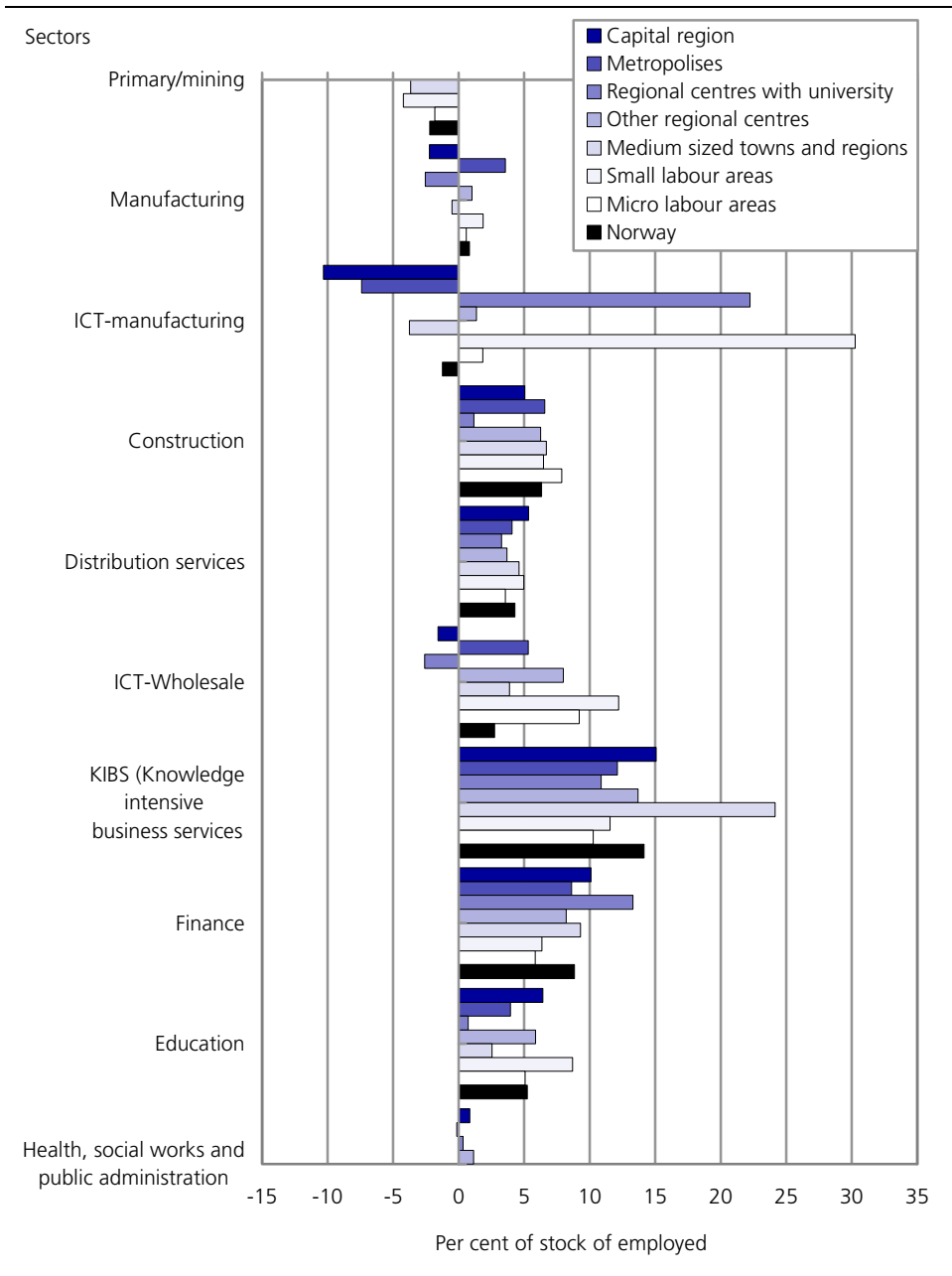


Figure 4.2j. Net flows of labour by economic sectors 1997-1998 in Norway and 7 typologies of regions. Per cent of stock of employed in 1997



Net job mobility by economic sectors and higher education

In figure 4.2j below we show the corresponding net effects of the mobility flows broken down by 10 sectors of the economy (see definition in table 3.6 in section 3.

Note that the sectors health and social work and public administration are aggregated to one sector due to statistical replacements between these sectors in the basic data sources). There were particularly strong net effects in sectors representing the so-called new economy, e.g. knowledge intensive business services (KIBS) and for some regions in ICT-manufacturing and ICT-wholesale. The KIBS-sectors showed the strongest net effects in the capital region and in medium sized towns and regions. ICT-manufacturing had a very strong net growth in regional centres with a university and in small labour areas. The finance sector also shows strong net effects in most types of regions, but strongest in the most central regions. On the other hand the non-market services of health and social work and public administration showed generally weak net effects from mobility in this period.

In figure 4.2k below we have shown the net change of employment by sectors for persons with higher education. As in figure 4.2i, we have decomposed how much of the total change that is derived from labour mobility to, from and between regions and sectors and how much is derived from the effect that many persons change their education level from middle to high education from the first to the second year in the period.

At the national level the results show that the strongest net effect of education mobility measured in per cent of stock of employed were found in distribution services, primary/mining sectors, finance and health, social work, and public administration. The most positive net effects of labour mobility were found in the finance sector and in the KIBS-sectors, while primary/mining, ICT-manufacturing, distribution services, health, social work, public administration and ICT-wholesale all showed negative net effects of labour mobility among high educated employed.

At the regional level there is an overall high net effect of education mobility in the primary/mining sectors and in distribution services. This must, however, be seen in relation to a previously low share of employed with higher education, resulting in that just a few new high educated cause a visible net growth of high-educated employment. The education mobility does, however, contribute positively or, in the worst case, to no net job growth in all sectors and regional categories. The percentage rise is also high in e.g. ICT-wholesale in regional centres with a university, medium-sized towns and regions and in small labour areas. The non-market services of health, social work and public administration as well as finance also increase the input of high educated labour by education mobility, with a tendency of a somewhat higher percentage increase of high educated labour in the more peripheral regions. The net effect of labour mobility shows a much stronger range of variations, from partly strong negative effects to partly high positive effects. Thus in many sectors and regional types the net effects of labour mobility and education mobility may work either in the same direction or in the opposite direction. Especially in the strong growth sectors of finance and KIBS the labour mobility contributes positively and thus in the same directions as education mobility. The results indicate a certain convergence in high-educated labour across regions in both the KIBS-sectors but especially in finance showing strong growth rates in

the smaller and more peripheral types of regions. In non-market services there is generally a tendency towards negative net effects of labour mobility of high-educated labour, and especially in small and micro labour areas.

Figure 4.2k. Net change of labour with higher education broken down by the effects of labour mobility and education mobility by economic sectors 1997-1998. In Norway and different typologies of regions. Per cent of stock of employed in 1997

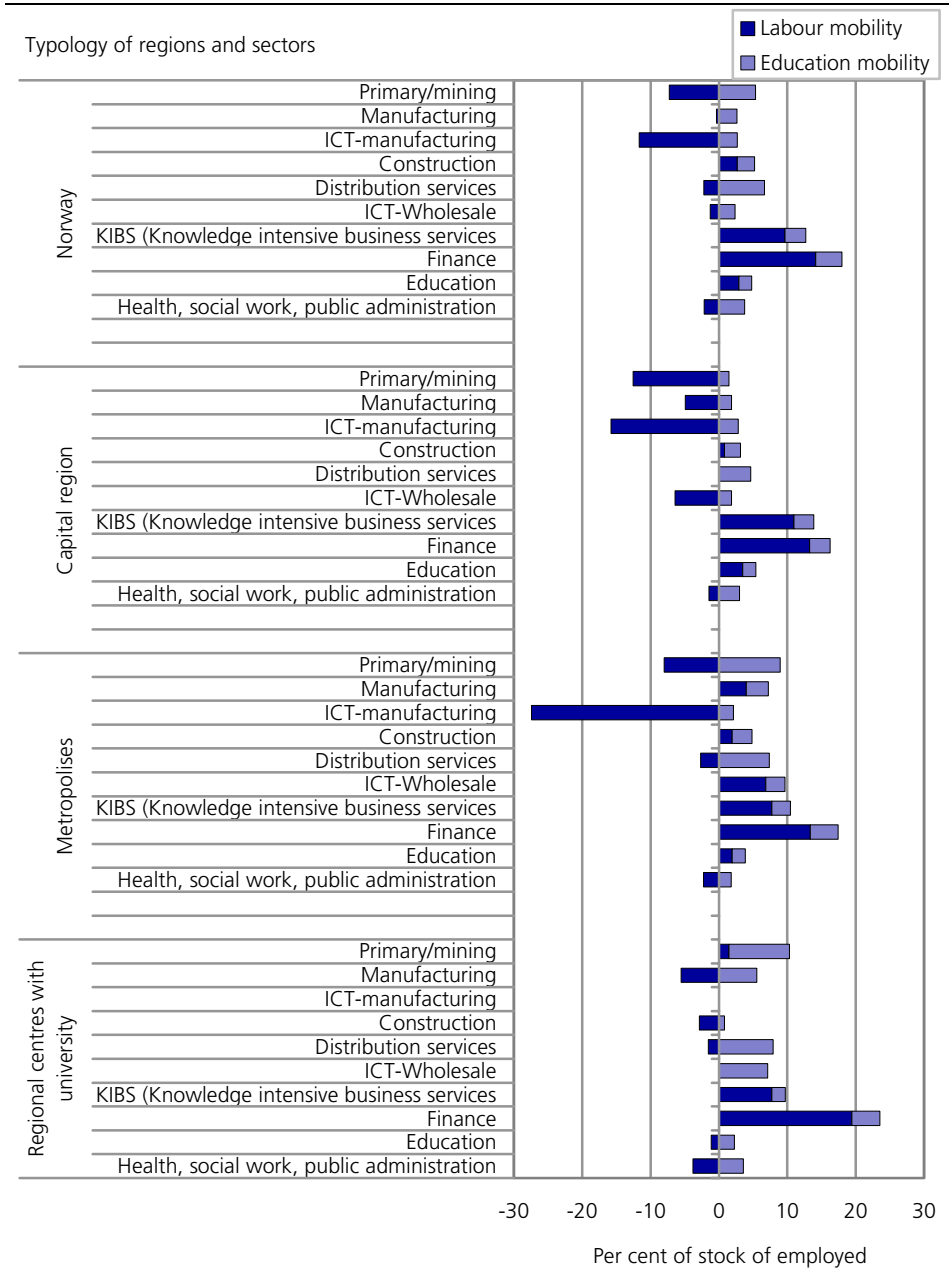
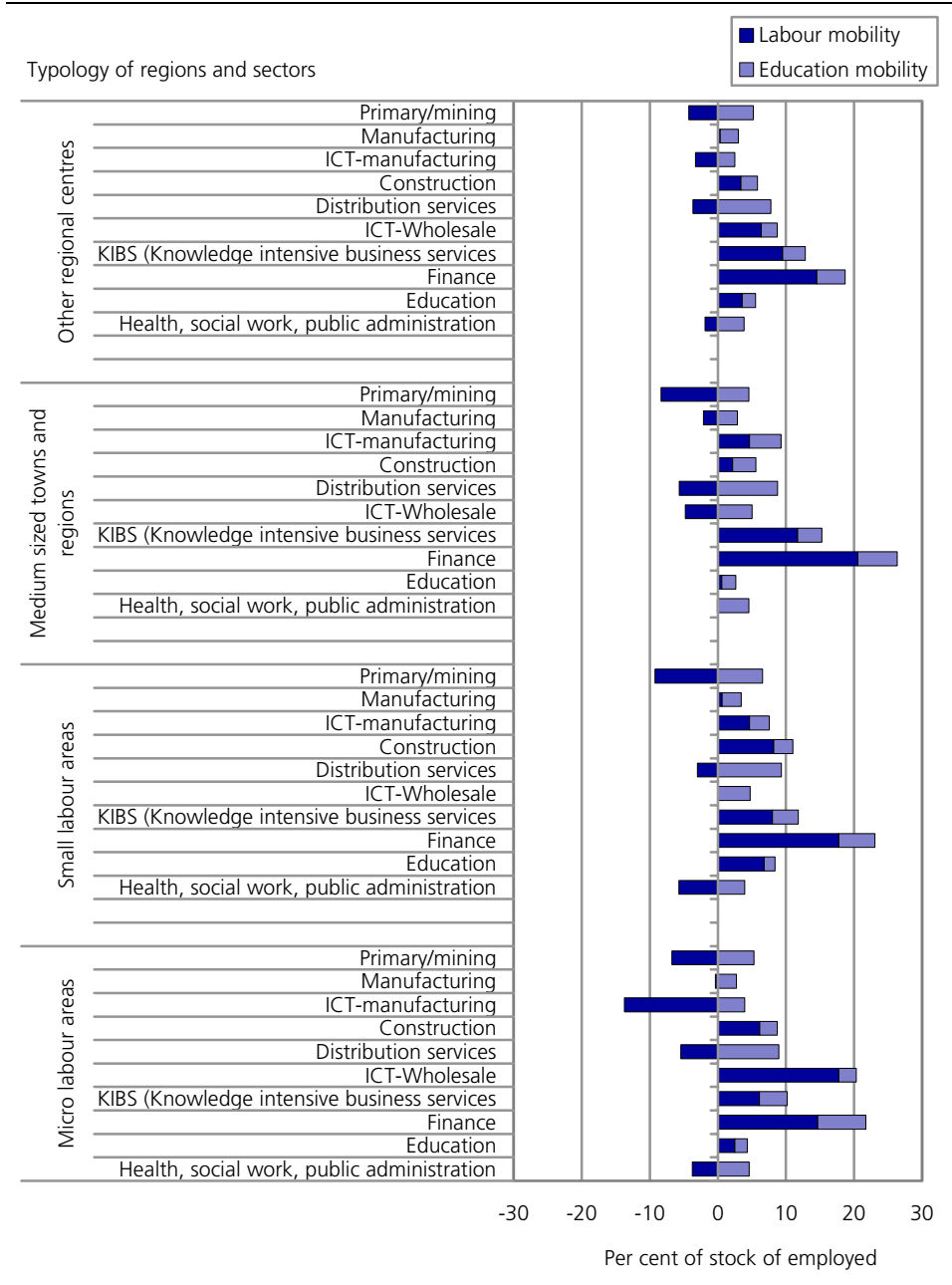


Figure 4.2k (cont.). Net change of labour with higher education broken down by the effects of labour mobility and education mobility by economic sectors 1997-1998. In Norway and different typologies of regions. Per cent of stock of employed



Transition rates by mobility groups and regional typologies:

Table 4.2a below shows mobility rates for 24 groups of transitions in the regional labour markets in Norway. All transition rates are defined as described in table 3.7 in section 3. There are strong variations across the regional typologies. The best total mobility performance is found in the capital region for all education levels, whilst the weakest total mobility performance was observed in the micro labour areas. It is worth noting that other regional centres, which include more than 1/4 of the total national employment, shows a total mobility performance below the national average for all education levels. The successful mobility performance in the capital region has a strong contribution from the education to job mobility, which means that this region has a very strong ability to employ new graduates. The opposite trend is found in the micro labour areas, where the transition rates from education to job is far below the national average for all education levels. Measured by number of persons, the cells showing the still in job rates are of immense importance for the total mobility score. Here the capital region shows, however, a weaker performance than the national average, with high exit from jobs in the local labour market for all educational groups. Regional metropolises, medium-sized towns and regions and small labour areas all show a lower than average transition from jobs in the local labour markets for all levels of education. The capital region also shows lower than average transitions with respect to unemployment to job mobility. Here regional metropolises, small labour areas and micro labour areas all show higher than average transition rates. One important reason for this regional difference is found by the fact that the capital region had a much lower unemployment rate, making it more than average difficult to employ the small remaining group of unemployed into ordinary jobs. On the other hand the capital region shows a high ability to employ other persons from outside the labour force both with respect to persons with low, middle and high education.

Concerning geographical mobility the capital region shows higher than average in-migration rates to job for low and middle educated persons, but lower than average in-migration rates for persons with higher education. The regional metropolises show lower than average in-migration rates to job for all education levels. On the other hand regional centres with universities, medium-sized towns and regions, small labour areas and micro labour areas all show higher than average in-migration rates to job, especially for persons with higher education. One important reason for this regional difference is found by the fact that more central regions have a much higher percentage of employed with higher education. This regional difference is even more pronounced in the internal out-migration rates, where employed in the most central regions show a much lower ability to out-migrate from jobs compared with other types of regions, and especially in relation to regional centres with a university and micro labour areas. Considering international migrations to and from jobs there are rather small differences across the regional typologies.

**Table 4.2a. Transition rates by 24 mobility groups in each typology of region in 1997-1998:
The Norwegian national average in each mobility group is set at 0¹**

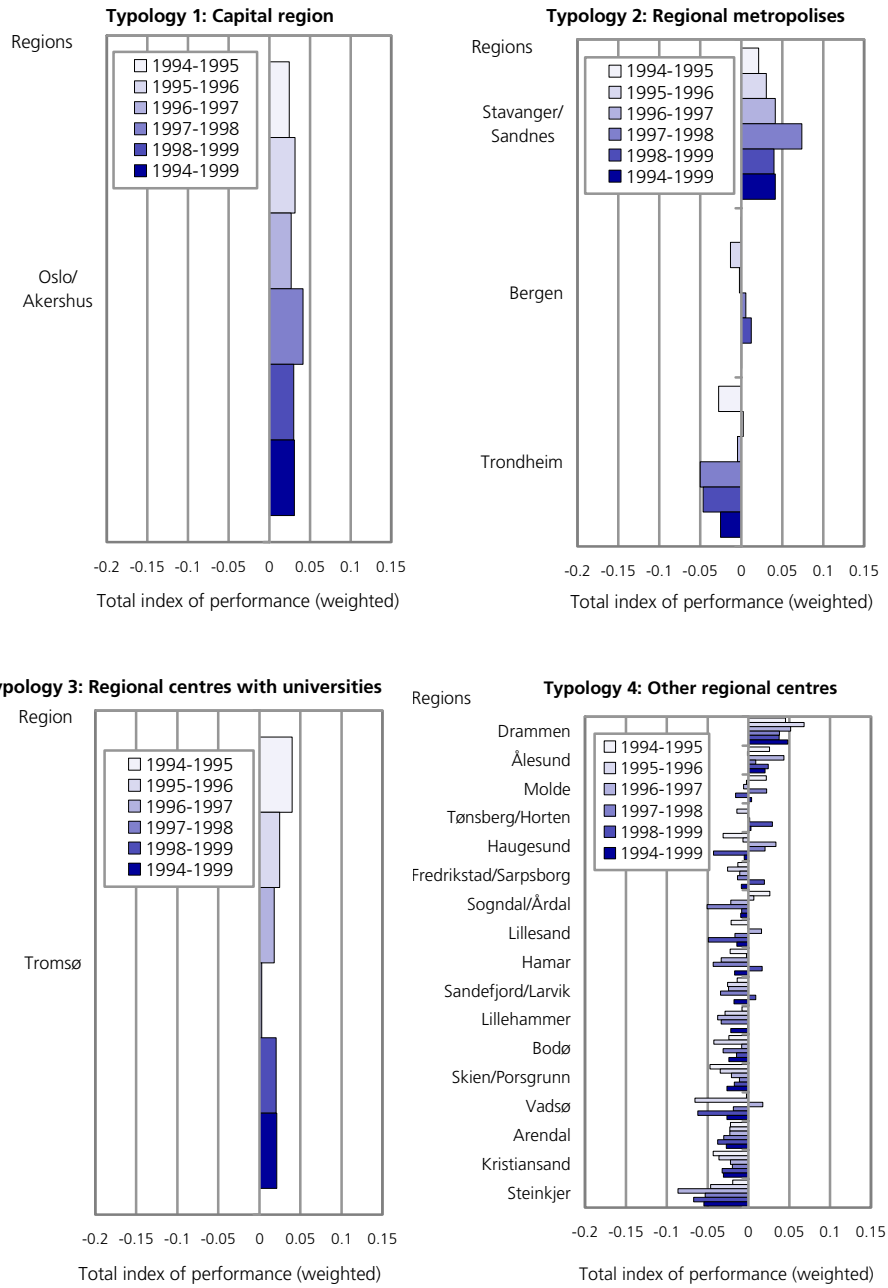
Mobility group and level of education:	Capital region	Metropolises	Regional centre with a university	Other regional centres	Medium sized towns and regions	Small labour areas	Micro labour areas
Still in job locally (Low)	-0.4	0.3	0.6	0.0	0.4	0.4	-0.4
Still in job locally (Middle)	-0.5	0.3	-0.3	0.0	0.7	0.5	-0.3
Still in job locally (High)	-0.5	0.3	-0.2	0.2	0.6	0.2	0.2
From education to job locally (Low)	8.0	-0.7	0.9	-1.1	-2.3	-1.6	-3.4
From education to job locally (Middle)	6.6	0.2	-0.6	-0.5	-0.5	-2.3	-3.7
From education to job locally (High)	4.0	-0.5	-2.8	-0.8	-0.6	-2.4	-3.2
From unemployed to job locally (Low)	-0.1	0.0	0.9	-0.8	-1.0	0.5	1.2
From unemployed to job locally (Middle)	-1.1	1.1	-0.6	-0.2	-0.2	0.7	0.1
From unemployed to job locally (High)	-0.3	0.7	-2.8	-0.7	-0.9	0.8	0.6
From others to job locally (Low)	1.6	0.0	1.5	-0.4	-0.6	-0.7	-0.2
From others to job locally (Middle)	1.2	-0.1	3.1	-1.2	-0.2	0.5	0.6
From others to job locally (High)	1.8	0.1	-0.2	-1.8	-2.3	-1.0	0.1
In-migration to job (Low)	0.1	-0.4	0.1	0.0	0.4	0.3	-0.1
In-migration to job (Middle)	0.3	-0.4	0.6	-0.1	0.1	0.1	0.1
In-migration to job (High)	-0.3	-0.4	1.1	0.0	0.4	0.3	0.8
Immigration to job (Low)	1.0	0.2	-1.0	0.0	-0.9	0.3	-0.6
Immigration to job (Middle)	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Immigration to job (High)	0.2	0.0	0.0	-0.1	-0.1	-0.1	-0.2
Out-migration from job (Low)	0.4	-0.4	0.0	-0.1	0.0	0.0	0.1
Out-migration from job (Middle)	-0.1	-0.7	0.8	-0.2	0.2	0.3	0.9
Out-migration from job (High)	-1.4	-0.5	2.6	0.2	1.0	1.1	3.0
Emigration from job (Low)	0.1	-0.1	0.0	-0.1	-0.1	0.0	0.1
Emigration from job (Middle)	0.1	0.0	0.0	0.0	0.0	0.0	-0.1
Emigration from job (High)	0.2	0.1	0.0	-0.1	-0.2	-0.2	-0.3
Average (Low)	1.2	0.0	1.1	-0.3	-0.5	-0.1	-0.5
Average (Middle)	0.8	0.2	0.1	-0.2	0.0	-0.1	-0.5
Average (High)	0.7	0.1	-0.2	-0.4	-0.5	-0.4	-0.5

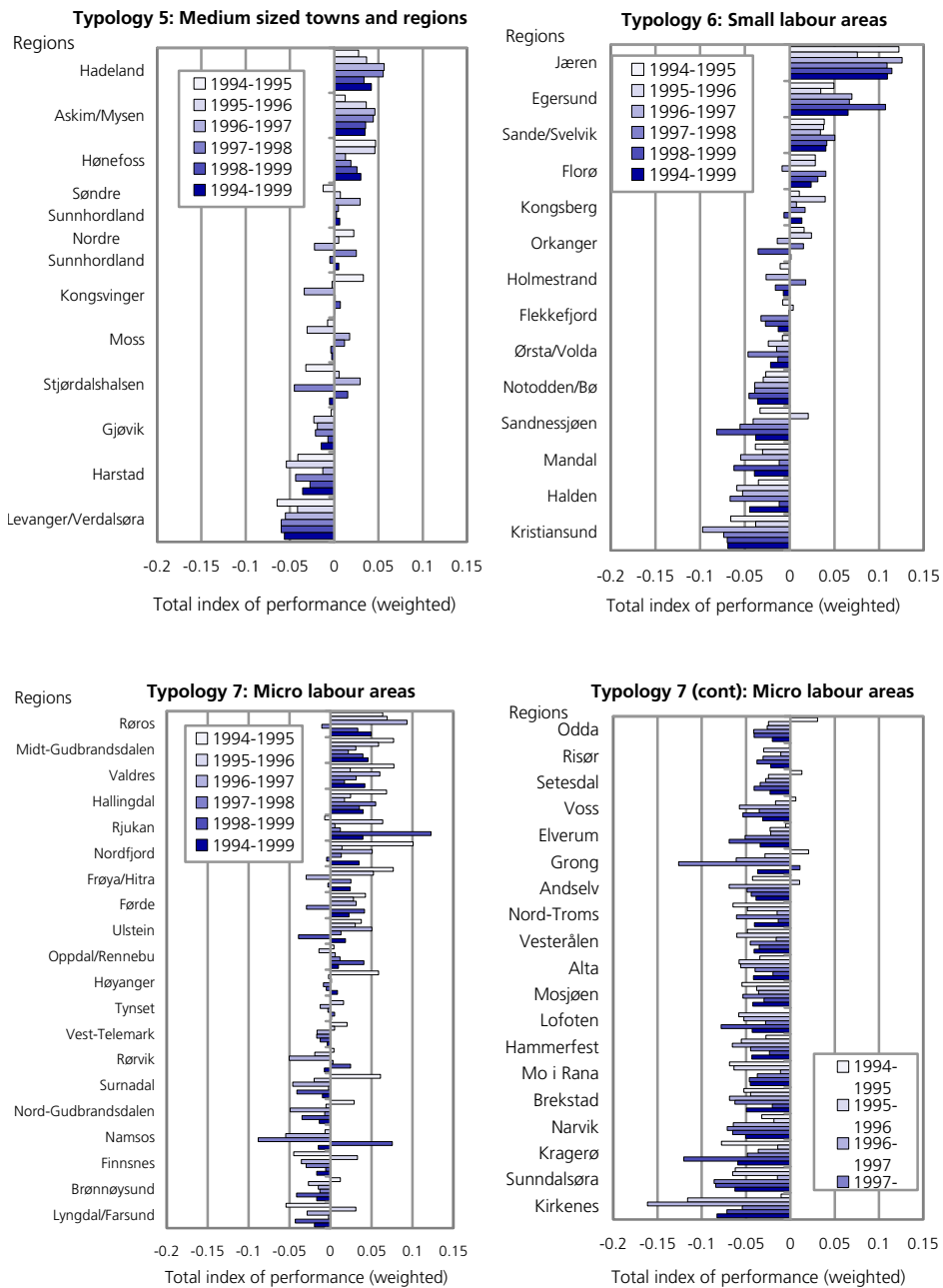
¹ The definition of mobility rates is found in table 3.7 above

Figure 4.21 below shows the total index of mobility performance (weighted by the number of persons in each group of mobility as described in section 3) in each region within the 7 main typologies of regions. It is important to note that we here show total mobility indexes for each year in the time period 1994-1999 as well as an average based on the mobility throughout the whole period. In the figures we have ranked the regions according to the average index of the whole period. When each typology of regions is classified by a certain set of common and equal characteristics, we should also expect that regions within each typology of regions show a certain conformity with respect to gross labour mobility. As the figures show, there are partly uneven total mobility structures across regions within the same typology. There is a tendency that regions showing good or bad total mobility performance within each typology of regions also do so each year or most of the years in the time period 1994-1999. Many of the regions showing less extreme mobility performances within each typology as an average during the time period, on the other hand have a tendency to vary their total mobility performance above or below the national average during the time period investigated. Or in other words, the stability of labour mobility seems to be weaker in these regions.

As described earlier, two of the regional typologies consist of only one region; the capital region (Oslo/Akershus) and central regions with a university (Tromsø). Concerning regional metropolises there is a strong deviation of total mobility performance between Stavanger/Sandnes (highest) and Trondheim (lowest). In the typology of other regional centres there is a big difference in total mobility performance between Drammen (the highest ranked region) and Steinkjer (the lowest ranked region). The same deviation is found in the typology of medium-sized towns and regions, where Hadeland is the highest ranked region and Levanger/Verdalsøra is the lowest ranked region. The strongest deviation in total labour mobility performance is, however, found among small labour areas and micro labour areas. The best performing region among the small labour areas is Jæren. This region is, however, closely connected to the well performing Stavanger/Sandnes region, and therefore have a better framework for growth compared with for example the region of Kristiansund, which shows the weakest mobility performance among the small labour areas. Micro labour areas consist of a very large number of regions, which in itself increases the potential for deviation in mobility performance across the regions included. There are therefore, as might be expected, quite large differences in total mobility performance between the highest ranked region of Røros and the region of Kirkenes in the north of Norway close to the Russian border.

Figure 4.2i. Regions ranked by total index of mobility performance 1994-1999. Total index of mobility performance in Norway is set at 0 each year





In figure 4.2m below we show how the best and weakest performing region within each typology of regions perform with respect to each specific type of mobility. Thus we may indicate what are the major mobility segments for successful or less successful total mobility performance.

Regional typology 1 and 3 consists of only one region, so there is no internal comparison to be made. However, we have presented one figure showing the specific mobility structure in the capital region of Oslo/Akershus as well as in regional centres with a university represented by the region of Tromsø. Overall, the capital region performs better than the national average, and is particularly successful in recruiting new graduates into job, especially the low and middle educated persons. The ability to employ unemployed into ordinary job is less successful in the capital region, but the region is very successful in avoiding out-migration among their highly educated employed. On the other hand the region of Tromsø is rather successful in activating unemployed and others outside the labour force into job, but is definitely less successful in recruiting new graduates into the local labour market and to avoid out-migration among their employed, and especially then among high-educated labour.

In the regional metropolises (typology 2) there are, as we have seen, big differences between the best performing region of Stavanger/Sandnes and the weakest performing region of Trondheim. In general, Stavanger/Sandnes perform, like the capital region, better than the national figures suggest, with success in employing new graduates but also in employing the local unemployed and other persons outside the labour force. Immigration to job is also above the national figures. The less successful mobility performance in Trondheim is first and foremost found in a weak ability to employ new graduates, and especially low and middle educated persons.

In other regional centres (typology 4) the best mobility-performing region of Drammen shows a high success in employing new graduates as well as letting unemployed persons into ordinary jobs. The weakest performing region within this typology, Steinkjer, shows a very low ability to employ the newly educated as well as keeping their employed in the local labour market.

Hadeland is the highest ranking region among medium-sized towns and regions (typology 5). This region performs very well in employing middle and high-educated persons directly from school, from unemployment and from others outside the labour force. The region also shows a high ability to keep their employed in employment. One reason for a good mobility performance may be connected to closeness to the capital region. Due to the fact that all employment is measured by the region of residence and not by the region of work, part of the well mobility performance may be due to commuting. In the opposite end the region of Levanger/Verdalsøra shows the weakest total mobility performance within this regional typology. The performance is especially weak with respect to employing persons from the educational system and from unemployment for low and middle educated persons. This region should as well have some effects from commuting, located not so far north of Trondheim, but as we have seen the region of Trondheim also has a mobility performance below the national average.

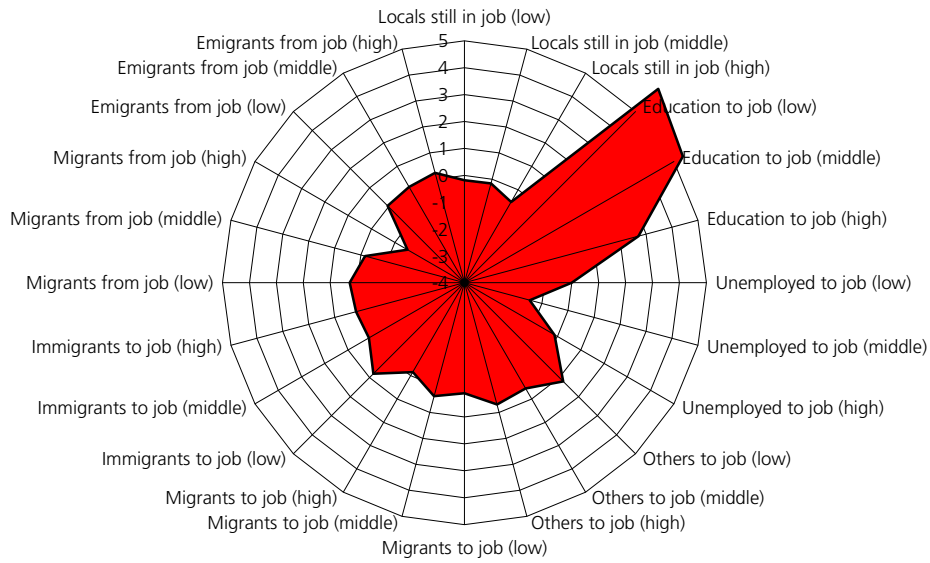
The best mobility-performing region in the whole country is Jæren, which is also the highest ranked region among the small labour areas (typology 6). As the figure shows, this region performs very well in most of the mobility segments. Very strong positive effects are found in the ability to employ low and middle educated persons from education, turning the unemployed into ordinary jobs and to employ others outside the labour force with higher education. The transition rate of low educated immigrants to job is also very high. As in Hadeland, the effect of commuting is expected to be very high. The region of Kristiansund, at the northern coastline of western Norway, shows the weakest mobility performance among the small labour areas. Again, the disability to employ persons directly from the educational system represents the strongest negative effect combined with a low turnover of middle educated from unemployment and higher than average out-migration from job.

The best performing region among the micro labour areas is Røros, a region located south-east of Trondheim, not far from the Swedish border. This region shows, like many other poorly performing regions, a low ability to employ persons directly from education and higher than average out-migration from job, especially among high and middle educated labour. On the other hand the region shows a very strong ability to transfer unemployed to job and to employ middle- and high-educated persons from outside the labour force. This region also shows high stability with low turnover from job in the local labour market. The region of Kirkenes represents the opposite end of the mobility-scale, ranked at the bottom of all Norwegian regions. The region's performance is especially poor for middle educated persons both with respect to high turnover from job in the local labour market and the ability to recruit newly educated and unemployed persons. The out-migration from job is also very high, and especially then for high-educated labour. On the other hand the region shows very high in-migration rates to job among high-educated persons, although lower than for out-migration respectively. High geographical turnover in both directions for high-educated persons may be connected to favourable tax systems for high-educated persons in the northernmost regions of Norway.

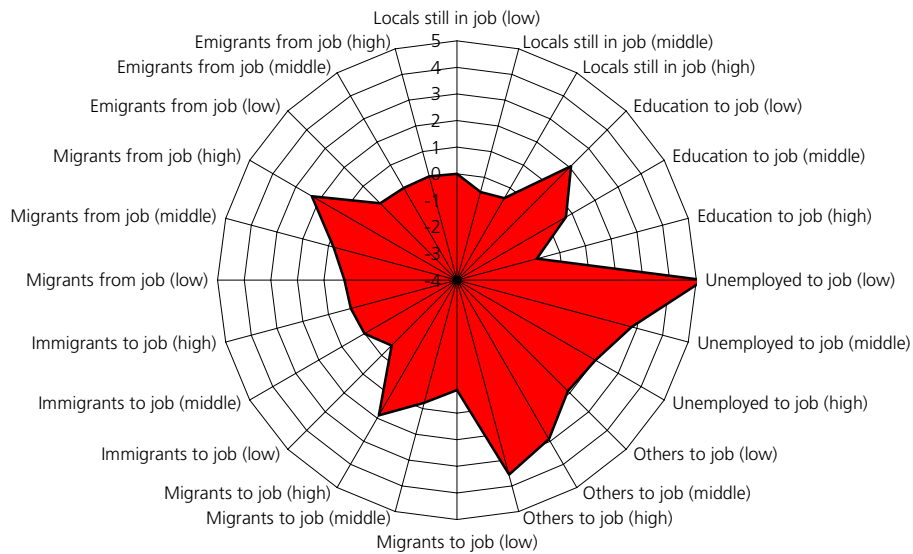
As a brief summary, the main trend separating the best performing regions from the weakest performing regions within each regional typology seems to be connected to the ability to employ persons from the educational system. This in turn reflects the optimism or pessimism of the persons involved to become settled or not within the local labour markets. Weak performances with respect to the ability to employ the young and new graduates, is, as we could expect, connected to higher than average out-migration from job. With respect to the total out-migration processes, there is reason to believe that the out-migration from job figures only show part of the reality, due to the fact that many young persons also out-migrate directly from the educational system without finding a job in the local labour markets before out-migrating. On the other hand, the results also indicate that out-migration from remote areas is not only due to lack of jobs, because much of the out-migration are moves from already existing jobs, although we have not examined from what type of job.

Figure 4.2m. The best and weakest performing region with respect to total mobility performance within each typology of regions 1994-1999. Specific indexes of mobility performance in Norway are set at 0 each year. The specific indexes are calculated by the average mobility during the time period 1994-1999¹

Regional typology 1: The capital region, Oslo and Akershus (only one region)

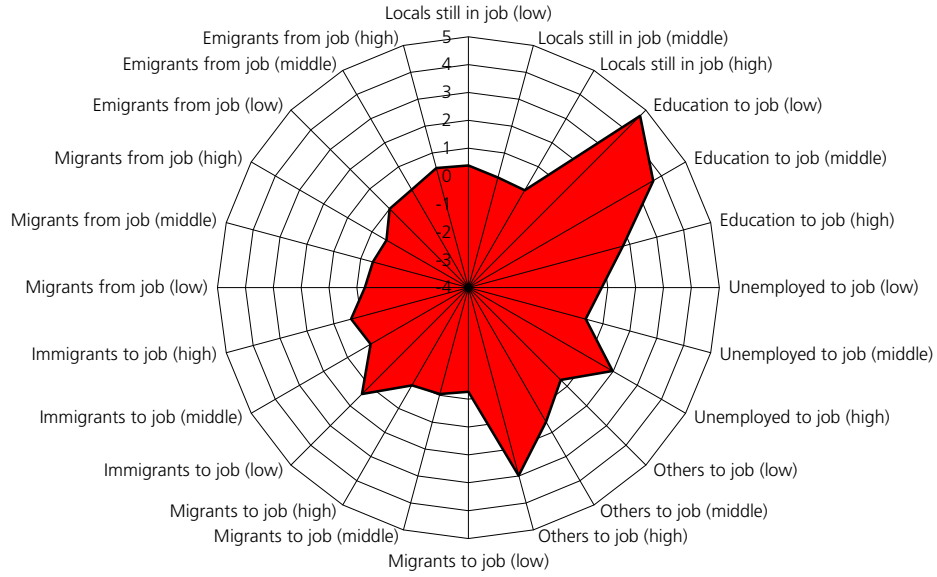


Regional typology 3: Regional centres with a university, Tromsø (only one region)

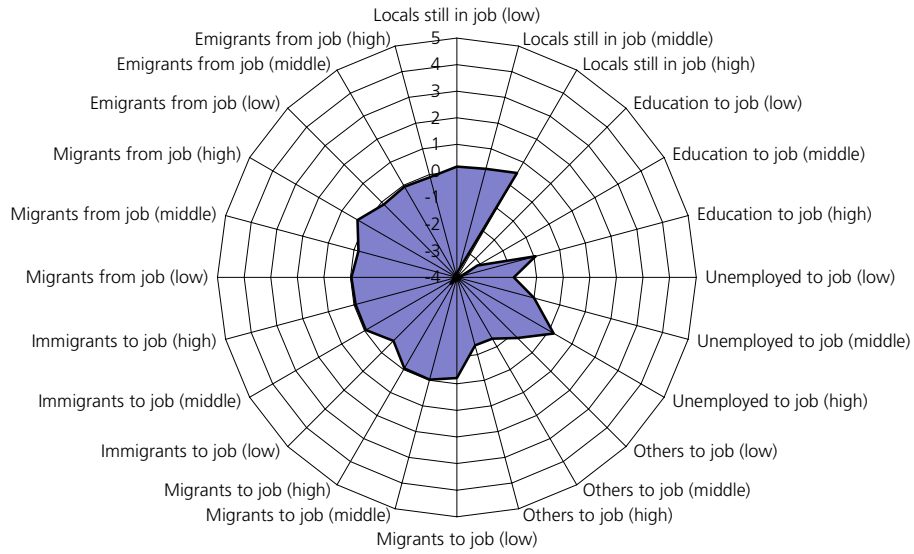


¹ All specific indexes follow definition given in table 3.7.

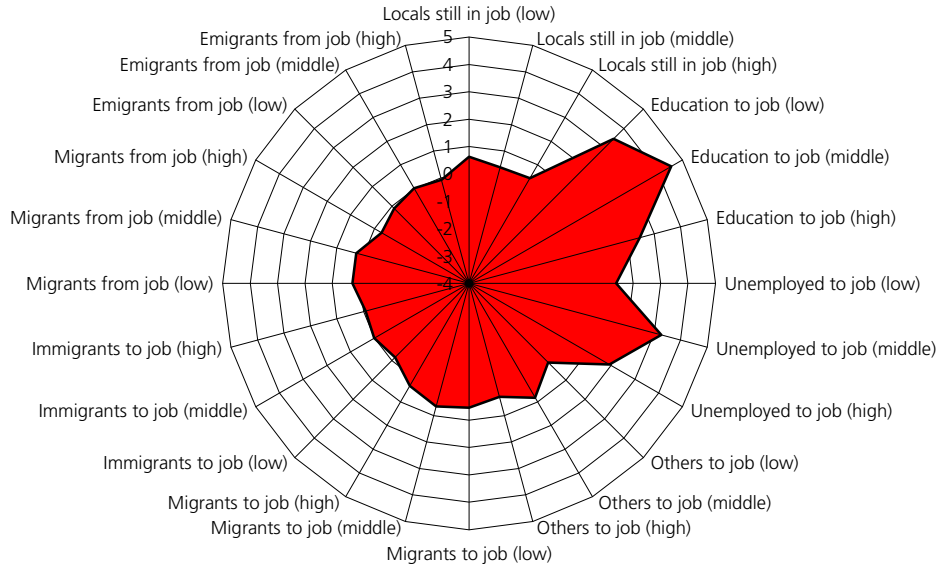
Regional typology 2: Regional metropolises. Stavanger/Sandnes (best mobility performance)



Regional typology 2: Regional metropolises. Trondheim (weakest mobility performance)



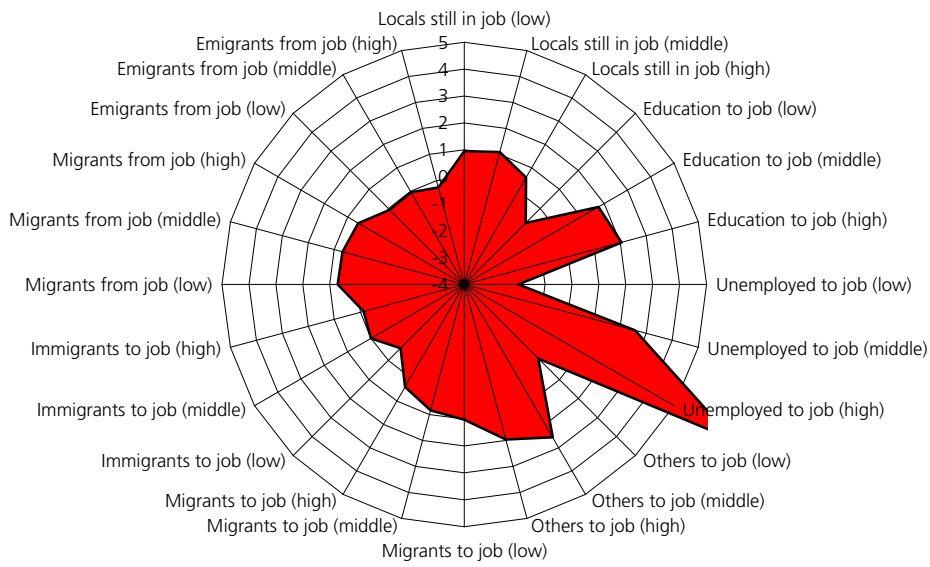
Regional typology 4: Other regional centres. Drammen (best mobility performance)



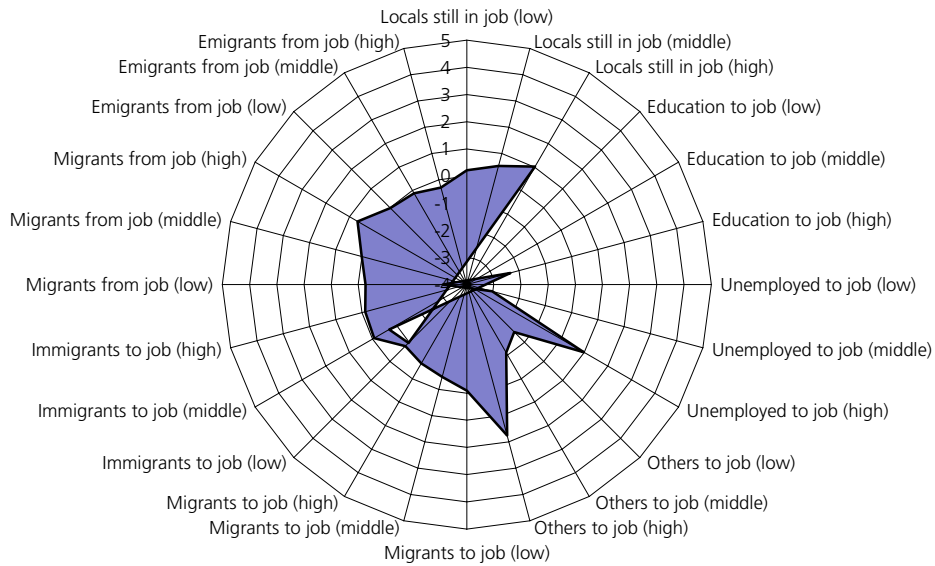
Regional typology 4: Other regional centres. Steinkjer (weakest mobility performance)



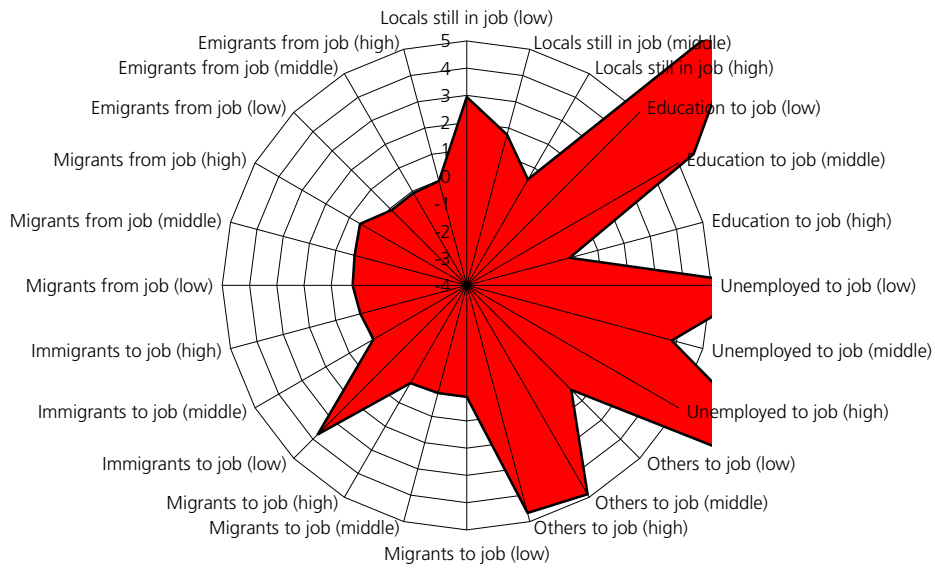
Regional typology 5: Medium-sized towns and regions. Hadeland (best mobility performance)



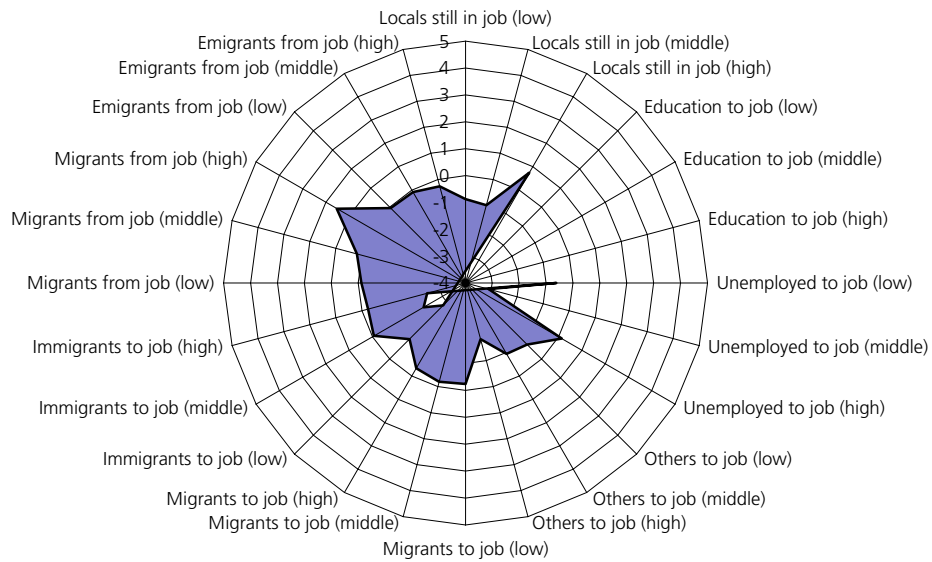
Regional typology 5: Medium-sized towns and regions. Levanger/Verdalsøra (weakest mobility performance)



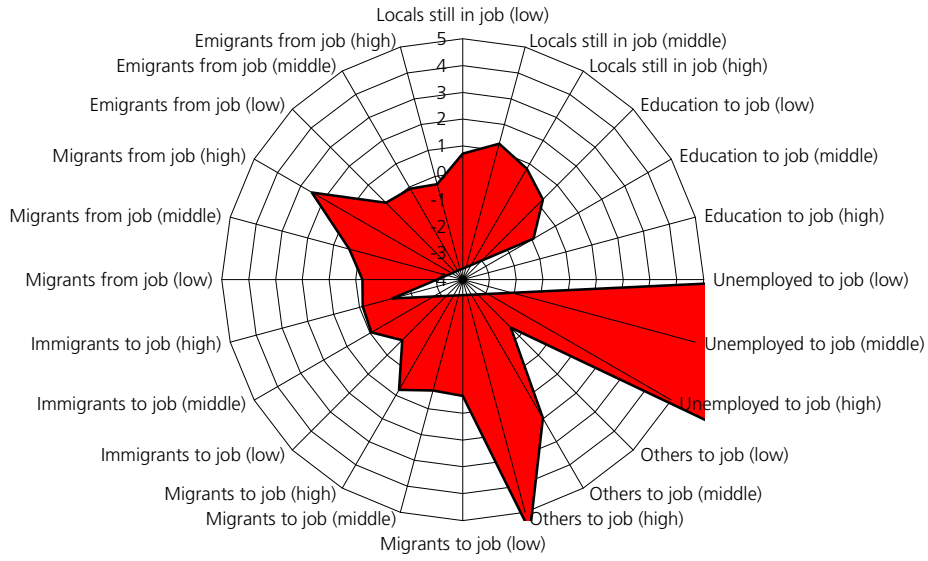
Regional typology 6: Small labour areas. Jæren (best mobility performance)



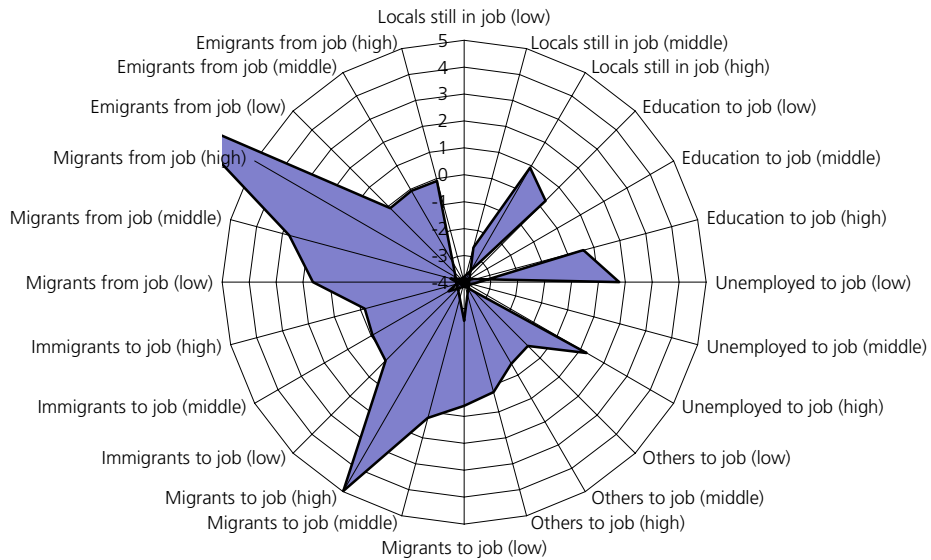
Regional typology 6: Small labour areas. Kristiansund (weakest mobility performance)



Regional typology 7: Micro labour areas. Røros (best mobility performance)



Regional typology 7: Micro labour areas. Kirkenes (weakest mobility performance)



4.2.3. The relationship between net employment growth and specific and total labour mobility performance in Norway

It is expected that increased labour mobility will be important for reaching the targets of employing as large a 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 the net change of employment and the level of gross mobility to job by using an ordinary least square regression model.

Table 4.2b shows the correlation results of the relationship between net employment growth and different types of gross mobility to and from job in altogether 86 Norwegian local labour markets in the strong upswing period of 1997-1998. There was observed a strong, positive and highly significant relationship between the ability to stay in job in the regions and employment growth for employed with low and high education. This relationship is positive but not significant for employed with middle education. The relationship between employment growth and mobility from the educational system is rather weak for low and middle educated persons, but positive and highly significant for persons with higher education. The relationship between net growth and recruitment from the unemployed shows some significance only for middle educated persons. The ability to increase the transitions from other persons outside the labour force in an upswing period is definitely stronger for low and high educated persons compared with middle educated persons. Recruitment to job from internal in-migration is highly significant for all educational groups, but strongest for high educated employed. Net job growth and immigration show a rather weak correlation with a certain exception of low educated persons. Out-migration from job seems to be very sensitive to job growth, and have a high but negative correlation for all educational groups, and especially for high educated employed, which here shows the highest estimated value of all mobility groups. The highly significant and negative estimates for out-migration and job-growth can be understood in light of the expectation that employed persons have better information of the situation in their own local labour market compared with all other local labour markets, thus regulating the out-migration processes closer to the regional business cycles than the corresponding in-migration processes. Job leaving through emigration shows a certain significance but negative correlation with the employment growth for employees with lower and higher education. When all the mobility measures are weighted together by the number of persons within each mobility group, the relationship between net employment growth and total mobility is strong, positive and significant for all educational groups with the strongest effects for high educated employed.

Table 4.2b. The relationship between net employment growth and gross labour mobility expressed as specific and total index of mobility performance. By type of mobility and education 1997-1998: Basis: 86 Norwegian regions

Type of mobility	Low education	Middle education	High education
Still in job locally	0.462*** (3.48)	0.159 (1.23)	0.706*** (4.30)
To job from education locally	-0.014 (-0.27)	0.027 (0.76)	0.133*** (4.53)
To job from unemployment locally	0.041 (1.17)	0.077** (2.41)	0.006 (0.61)
To job from others outside the labour force locally	0.656*** (3.79)	0.070 (1.24)	0.121*** (3.77)
To job from internal in-migration	1.388*** (4.29)	0.959*** (4.67)	0.846*** (6.81)
To job from immigration	0.316* (1.70)	4.073 (1.14)	0.548 (0.56)
From job to internal out-migration	-0.717** (-2.13)	-1.051*** (-5.06)	-0.843*** (-9.29)
From job to emigration	-2.142** (-2.52)	-0.745 (-0.60)	-1.332* (-1.90)
Weighted average	6.33*** (5.85)	1.139*** (6.34)	5.242*** (6.70)
Adjusted R ²	0.88	0.93	0.79

Level of significance: 99%***, 95%**, 90%*. (t-values in brackets). Number of observations=86)

In table 4.2c we have broken down this analysis further by comparing the 43 Norwegian regions with the strongest employment growth with the 43 regions with lowest employment growth. It is interesting to analyse any differences in the mobility structure between these two groups of regions.

The relationship between net employment growth and the ability to stay employed in the local labour market is positive for all educational groups in both high and low growth regions.

While the parameters are significant for middle educated employed in both categories of regions, they are only significant for low and high educated employed in the regions with the lowest employment growth. The relationship between employment growth and local recruitment from the educational system is only significant and positive for persons with high education in both categories of regions. For persons with low and middle education this relationship is positive only in the regions with the weakest employment growth, but without any significance.

Concerning the recruitment from unemployment the figures indicate a generally positive relationship, but the only significant relationship is found among middle educated persons in the regions with the weakest employment growth. The cor-

relation is also weak for recruitment from other persons outside the labour force, with an exception of high-educated labour in the regions with the weakest net rise of employment. On the other hand the results are more as could be expected for internal in-migration, showing a strong, positive and significant relationship between employment growth and in-migration to jobs for all educational groups in both categories of regions. The strongest correlation is, however, found among low- and high-educated persons in the regions with the strongest growth in employment. For immigration to job the parameters are positive and significant only for middle educated persons in regions with the strongest growth of jobs. The results indicate, however, a negative correlation for middle- and high-educated persons in the regions with the lowest employment growth, although not significant at a 90 per cent level. The relationship between net job growth and internal out-migration from job is generally negative for all groups of persons, but only significant for persons with high education in both categories of regions. For emigration from job the relationship is only negative and significant for middle- and high-educated persons in the strongest growth regions, while this relationship is significant but positively directed for middle educated persons in the regions with the weakest growth. The relationship between net employment growth and a weighted average of all types of mobility by education gives the strongest positive effects for persons with middle education in the regions with the weakest growth of employment and for low educated persons in both categories of regions. The parameters are overall significant and positive for persons with high education, but only at a 95 per cent level.

We have also made an analysis, showing the relationship between net change of employment and gross mobility to job by using a simple linear regression model. The analysis is made for different age groups and 28 economic sectors but still made on the basis of 86 Norwegian local labour markets. These analyses are made for each year of the period 1994-1999 and as an average for the whole period when it concerns the age groups, but simply as an average for the whole period when it concerns the 28 economic sectors. The gross mobility to job is an aggregation of all mobility to job from all status groups within the regions as well as from gross in-migration and immigration.

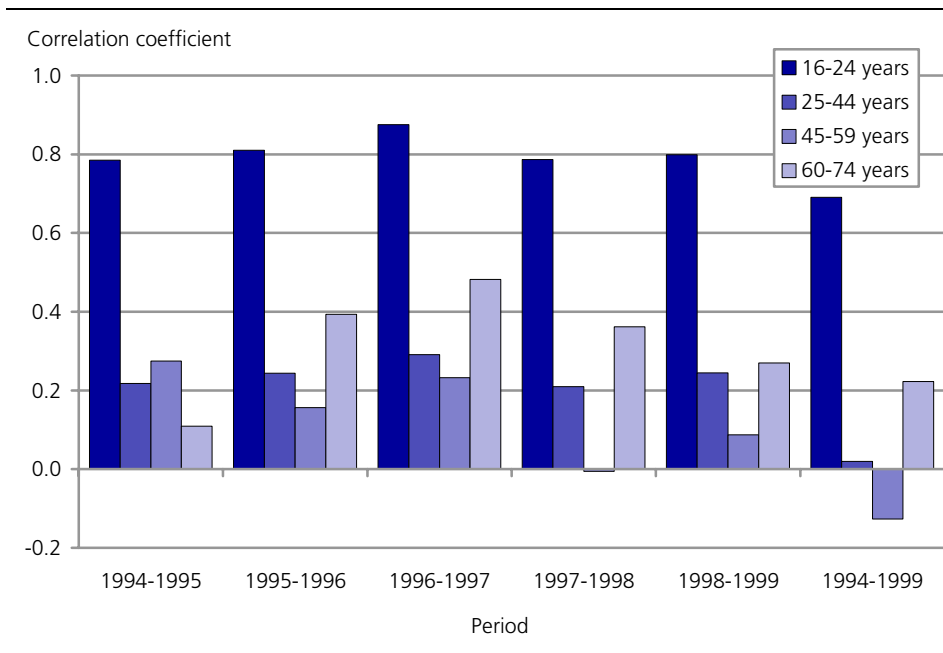
Table 4.2c. The relationship between net employment growth and gross labour mobility measured as specific mobility performances. By segments of mobility and education 1997-1998. Basis: 86 regions in Norway broken down by 43 regions with the lowest growth of employment and 43 regions with the highest growth of employment

Growth of employment:	Low	High	Low	High	Low	High
Type of mobility	Low education		Middle education		High education	
Still in job locally	0.398*** (1.90)	0.158 (1.08)	0.450** (2.71)	0.230* (1.95)	0.390* (1.90)	0.319 (1.41)
To job from education locally	-0.016 (-0.26)	-0.001 (-0.00)	0.056 (1.33)	-0.010 (-0.30)	0.095** (2.40)	0.084** (2.49)
To job from unemployment locally	0.005 (0.13)	0.029 (0.94)	0.058* (1.70)	0.029 (0.84)	0.008 (0.80)	0.015 (0.97)
To job from others outside the labour force locally	0.030 (0.15)	0.235 (1.36)	-0.035 (-0.48)	0.025 (0.47)	0.081* (1.76)	0.030 (0.75)
To job from internal in-migration	1.325** (2.32)	0.874*** (3.70)	0.527* (1.68)	0.435** (2.21)	0.531*** (2.82)	0.560*** (3.66)
To job from immigration	0.312 (1.57)	0.162 (1.03)	-2.047 (-0.49)	5.684* (1.65)	-1.842 (-1.30)	1.664 (1.64)
From job to internal out-migration	-0.239 (-0.60)	-0.489 (-1.15)	-0.344 (-1.34)	-0.349 (-1.41)	-0.475*** (-3.56)	-0.422** (-2.61)
From job to emigration	-0.662 (-0.78)	0.729 (0.70)	3.037** (2.09)	-4.201*** (-3.22)	1.324 (1.44)	-2.185*** (-2.83)
Weighted average	3.042*** (3.01)	3.335*** (3.04)	0.861*** (3.70)	0.360** (2.29)	2.339** (2.49)	1.822** (2.13)
Adjusted R ²	0.88	0.93	0.79	0.32	0.28	0.36

Level of significance: 99%***, 95%**, 90%*. (t-values in brackets). Number of observations=43 + 43

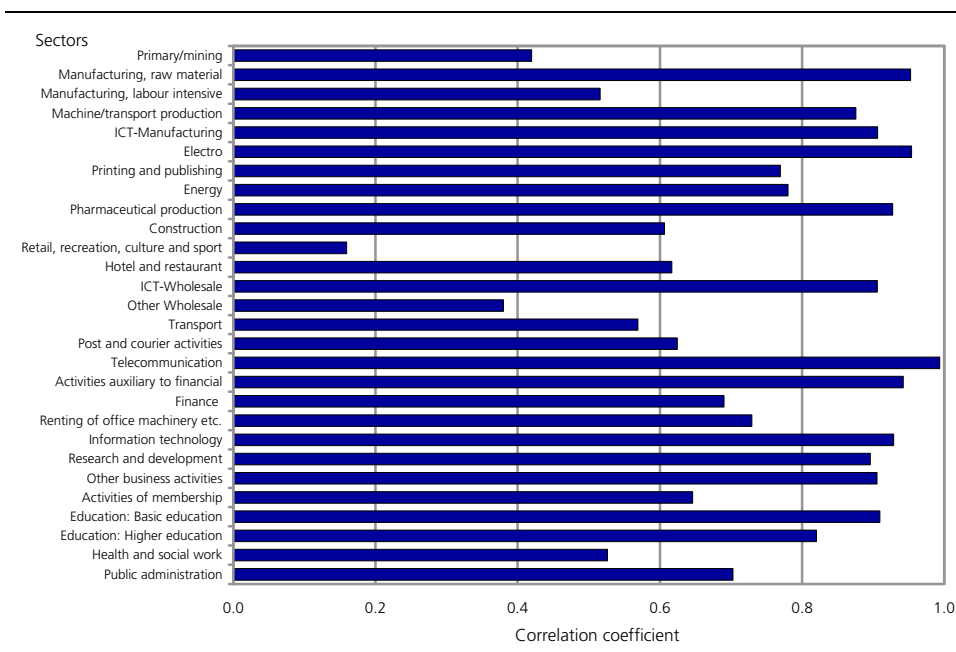
Figure 4.2n shows a rather strong correlation between gross mobility to job and net employment growth in the youngest age group. This group also shows the highest mobility to job. The high correlation may reflect the fact that much of the mobility in this age group includes the first entry to the labour market, and that this flow is higher in the regions experiencing the strongest net growth of employment. The highest correlation for the youngest age group was observed in the strong growth years of 1996-1997, but all correlations are rather high throughout the whole period. The lowest correlation between net job growth and gross mobility to job was observed among persons in the age group 45-59 years, with an especially weak correlation in the top growth years of 1997-1998. Perhaps somewhat surprisingly, the oldest age group, 60-74 years, shows a somewhat higher correlation between net job growth and gross mobility to job than persons in the age groups 25-44 years and 45-59 years of age. This may reflect the fact that in spite of very low gross mobility to job in the oldest age group, they are encouraged to do so when and where the local labour market is at its highest growth.

Figure 4.2n. The relationship between net employment change and gross mobility to job by age groups 1994-1999. Basis: 86 Norwegian local labour markets



The highest correlation between net job growth and gross mobility to job is, however, found when we break down the results by economic sectors (see figure 4.2o), although there are strong differences between some of the sectors. Firstly it is important to note the relatively high correlation in sectors representing the so-called "new economy". ICT-manufacturing shows a relatively high correlation among the manufacturing sectors. ICT-wholesale shows a very high correlation in relation to other wholesale and other distribution services, and the more knowledge intensive branches of telecommunication, financial intermediation, information technology, research and development and other business services all have high correlation values. On the other hand much of the bottleneck problems experienced in the public health services may be reflected by a relatively low correlation between the gross mobility and regional job growth in the sector health and social work. The weakest correlation is, however, found in the sector of retail, recreation, culture and sport. Part of the explanation is due to the fact that this sector is rather large and spread over a large geographical area and may be a net loser of employed to other sectors in the regions experiencing the strongest net growth generally.

Figure 4.2o. The relationship between net employment change and gross mobility to job by sectors. Average for the period 1994-1999. Basis: 86 Norwegian local labour markets



4.2.4. The relationship between total mobility performance and the level of production conditions

In the introduction section we also put forward challenges to explain any different performances in similar cities and regions, e.g. testing if the criteria that are chosen as production conditions give significant differences. We have analysed the relationship between the total mobility performance in all regions and each of the production conditions used in our mathematical classification of regions (see tables 3.1 and 3.2 in section 3 above). The analysis is done by use of an ordinary least square method, and the results are presented in table 4.2d.

Not surprisingly, positive estimates with high significance have been observed 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. The 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 4.2o. Somewhat surprisingly the percentage of people with high education showed mostly negative estimates, whilst the percentage of people with low education showed the opposite results. Somewhat surprising, is also the negative tendency in the estimates of average annual income, whilst the significant estimates for both centrality and tightness of settlement are positive.

Table 4.2d. Estimated relationship between total index of performance and the level of 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 in 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)	0.00219** (2.40)	0.00181** (2.29)	-0.00017 (-0.18)
Population 30-44 years	-0.00203 (-1.36)	-0.00317** (-2.13)	0.00116 (0.67)	-0.00062 (-0.42)	-0.00343* (-1.79)
Population 45-59 years	-0.00209 (-1.52)	-0.00072 (-0.53)	0.00029* (1.81)	-0.00017 (-0.13)	-0.00281 (-1.59)
Percentage with low education	0.00153*** (3.12)	0.00114** (2.34)	0.00053 (0.93)	0.00167*** (3.42)	0.00048 (0.76)
Percentage with high education	0.00006 (0.03)	-0.00082 (-1.18)	-0.00173** (-2.15)	-0.00109 (-1.58)	-0.00171* (-1.91)
Employed in secondary sectors	0.00001 (0.03)	0.00026 (0.75)	0.00097** (2.36)	0.00015 (0.43)	0.00034 (0.74)
Employed in sectors in "New economy"	0.00081** (2.18)	0.00129*** (3.49)	0.00119*** (2.78)	0.00092** (2.48)	0.00145*** (3.05)
Employed in distribution services	0.00024 (0.55)	0.00098** (2.22)	0.00083* (1.62)	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)	0.00101* (1.83)
Employed in non-market services	-0.00095* (-1.64)	-0.00028 (0.49)	-0.00048 (0.71)	-0.00092 (-1.60)	0.00044 (0.59)
Labour force participation rate	0.00532*** (4.30)	0.00338*** (2.75)	0.00457*** (3.20)	0.00255** (2.07)	0.00891*** (5.62)
Unemployment rate	-0.00105*** (-2.64)	-0.00121*** (-3.06)	-0.00095** (-2.07)	-0.00129*** (-3.25)	0.00047 (0.91)
Average annual income	-0.00219 (-1.63)	0.00107 (0.80)	-0.00308** (1.99)	0.00078 (0.58)	-0.00114 (-0.66)
Sector-mix	-0.00214 (-0.39)	-0.00048 (1.39)	0.00041 (1.01)	-0.00015 (-0.43)	-0.00049 (-1.10)
Centrality	0.00051** (1.99)	0.00052** (2.05)	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)	0.00084** (2.19)
Adjusted R ²	0.63	0.54	0.56	0.62	0.47

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

4.3. The net and gross labour mobility in knowledge intensive business services (KIBS-sectors)

The "new-economy" is an expression that became increasingly common in the 1990s and around the turn of the millennium. Consultancy, information and knowledge-based sectors were recognized to be very important factors in the economic development, and particularly in the central regions, where the universities and most qualified labour force are found. Much of the development in these sectors is based on processes of information and knowledge flows that have to be absorbed and prepared for application in the Norwegian society. In close connection to the universities and university colleges we find different types of research institutes as well as central administrations both within the market as well as non-market sectors. In addition we find, to an ever-increasing extent, a growing apparatus and network of different persons that represent the applied part of the modern information and knowledge based society due to the fact that ICT-products become a larger component in the work place as well as in the households. The expectation is that these processes mainly take place in the largest cities and regions. But there is reason to believe that several of these processes also take place through a process of diffusion. We expect that the largest and most central cities and regions represent the importation, preparation and development functions of the knowledge streams often in network with other operators in other central cities and regions both nationally and, to an ever-increasing extent, internationally. The new information and knowledge may diffuse to other parts of the economy thus resulting in these processes getting a regional dimension which point from the more central cities and regions towards other centres, medium-sized and smaller regions. Such theories of diffusion are closely connected to theories of agglomeration, which presume that new knowledge and innovations first and foremost will become prepared and developed where most of the persons within the knowledge economy is found, which means in the most central cities and regions.

Before measuring the development and labour mobility in the KIBS-sectors it is important to bear in mind a statistical phenomenon which has impact on the growth of employment within these sectors. During the last couple of decades there has been an increasing externalisation of knowledge based service functions. Due to increased specialisation a large number of service functions that previously were produced within larger companies both in secondary and tertiary sectors have been outsourced. This in turn has definitely increased the number of employed within separate knowledge intensive firms in the tertiary sectors. Due to these outsourcing processes an ever-increasing part of the job tasks within the KIBS-sectors have been directed towards other parts of the economy more than towards households. In other words the KIBS-sectors are expected to be more producer-oriented than consumer-oriented.

This job structure is also of immense importance with regard to the labour mobility of this sector. The producer-oriented structure indicates that employed persons in the KIBS-sectors have a well-developed network with a lot of other

sectors, companies and firms. On the other hand these other sectors have close contact with the KIBS-sectors due to the close co-operation necessary according to the type of services being demanded. Such complementary relationships between the KIBS-sectors and other sectors give rise to a set of hypotheses. Firstly, there is reason to believe that the development of the KIBS-sectors is strongly correlated to the growth of all other sectors served by the KIBS-sector. Secondly, there is reason to expect that the close network with other sectors will increase the potential job-to-job mobility between the KIBS-sectors and other sectors of the economy, and thus generate a flow of knowledge between these sectors. Due to the expectation of a relatively centralized localisation pattern of the KIBS-sectors there is reason to believe that the geographical mobility mainly will go in central directions towards the major city regions. On the other hand we expect that the diffusion hypotheses also will lead to gross streams of labour from the main city regions towards other centres, medium-sized and smaller towns and regions, but that the net effect of the gross labour migration is still expected to become centrally directed. As the name suggests, the knowledge intensive business services are also expected to recruit persons with high education above the average for all sectors of the economy. Due to the expectation that the KIBS-sectors are very innovation intensive there is also reason to expect that the demand for persons with modern and up-to-date education is higher than in most other sectors of the economy. Recruiting persons directly from the educational system may thus solve part of this demand. In geographical terms, there is also reason to expect that the migration streams between cities and regions with universities and university colleges will be of immense importance for the development of the KIBS-sectors. In the sections below we have made some analyses illustrating some of the hypotheses currently put forward in the section above.

Before presenting the results it is, however, necessary to answer the question what do we really mean by knowledge intensive business services? There have been several attempts to define this. The OECD has tried to harmonize the definition of information and knowledge based sectors. Corresponding definitions have also been established in the Nordic countries. A first approximation was made by the national statistics offices in the Nordic countries in cooperation with the Nordic Council of Ministers, and the results are presented in TemaNord 1998:587. More recently, a co-operation project between the national statistics offices in the Nordic countries was presented in Statistics Norway (2001). In this analysis we include 1) Telecommunication (NACE-code 642) and 2) Information technology (NACE-code 72) as part of the KIBS-sectors. In addition we have included 3) Activities auxiliary to financial intermediation (NACE-code 671-672) and all consultancy and advisory services within 4) Research and development (NACE-code 73) and 5) Other business services (NACE-code 74). In parts of the analysis we operate with these five sectors separately, but mostly we operate with the KIBS-sector as the sum of all the five sectors.

4.3.1. The localisation and net change of employment in the KIBS-sectors

As we could expect the knowledge intensive business services are strongly concentrated around the largest labour market regions. As shown in figure 4.3a the four main city regions include approximately 60 per cent of the total national employment in the KIBS-sectors. During the 1990s there has been a tendency towards increased concentration due to the fact that all remaining regions' share of the employment decreased from about 40 per cent in 1994 to approximately 38,5 per cent in 1999. The concentration is further illustrated by an increase in the share of employment in the city of Oslo from around 21 per cent up to about 24 per cent during this period. The surrounding county of Akershus shows a more moderate increase of the employment share, from slightly below to slightly above 18 per cent of the national employment. The other three main urban labour markets show, however, a slight decrease in their share of the nations' total KIBS-employment during this period. Bergen goes from slightly above to slightly below 8 per cent of the national employment, while the regions of Trondheim and Stavanger/Sandnes reduce their share by approximately 1 per cent point from 6.5 to 5.5 per cent of the national KIBS employment.

In figure 4.3b it is shown how this development has taken place measured by annual net changes in the employment of the KIBS-sectors. The figures indicate that the KIBS-sectors are of immense importance for the growth in the total economy, and may function as an "engine" for the economic development in the main urban labour markets. The increase of the employment in the KIBS-sectors has been much higher than the average increase of employment in the general economy both concerning the nation as a whole but also in the four main urban city regions (see figure 4.1a. in the section above for comparisons). The strongest growth of employment was found in the capital city of Oslo, followed by the region of Bergen, although with an employment growth mostly below the national average. The figures of Oslo and the surrounding county of Akershus represent so high share of the total employment that their employment results have a tremendous impact on the corresponding national average figures. The figure shows as well a slightly decrease in the region of Stavanger/Sandnes towards the end of the 1990s. This may be seen in relation to a somewhat lower activity in sectors connected to the oil production. It is, however, an almost general tendency that the highest growth of employment in the KIBS-sectors was found in 1998, which means one year later than the highest growth of employment in the general economy. This may reflect a "lag" in the ability of firms to buy information and telecommunication services in the markets. On the other hand the end of the 1990s represented a very special period with increased demand of KIBS-services due to preparations for the millennium transition. The weak development in the general economy in 1999 is, however, also reflected by a weak employment development in the KIBS-sectors.

Figure 4.3a. Percentage of Norway's total employment in the KIBS-sectors 1994-1999 distributed by the main urban regions and all other regions. Per cent

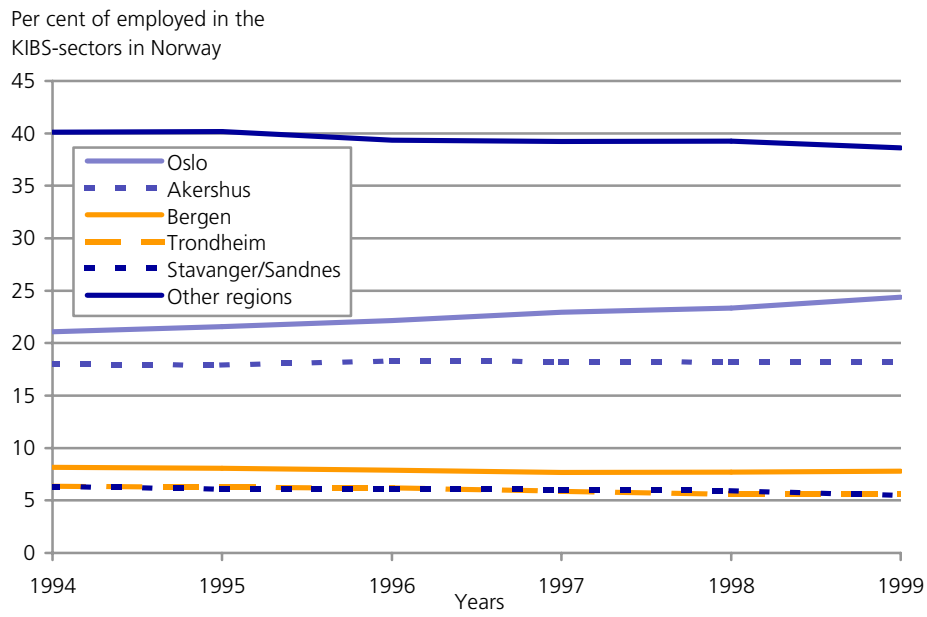


Figure 4.3b. Annual net change of employment in the KIBS-sectors 1994-1999 in Norway and the main urban regions. Per cent of stock of employed

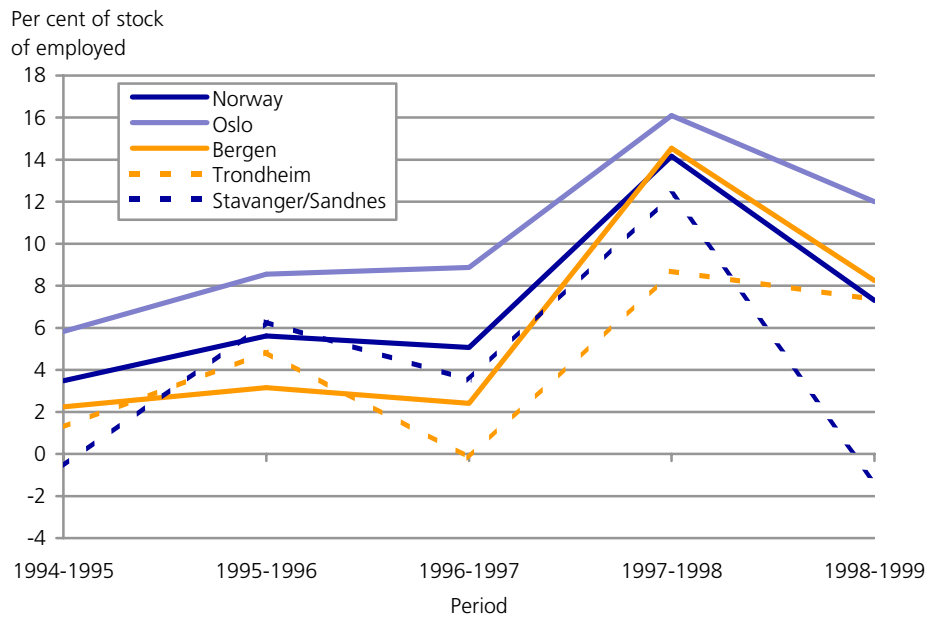
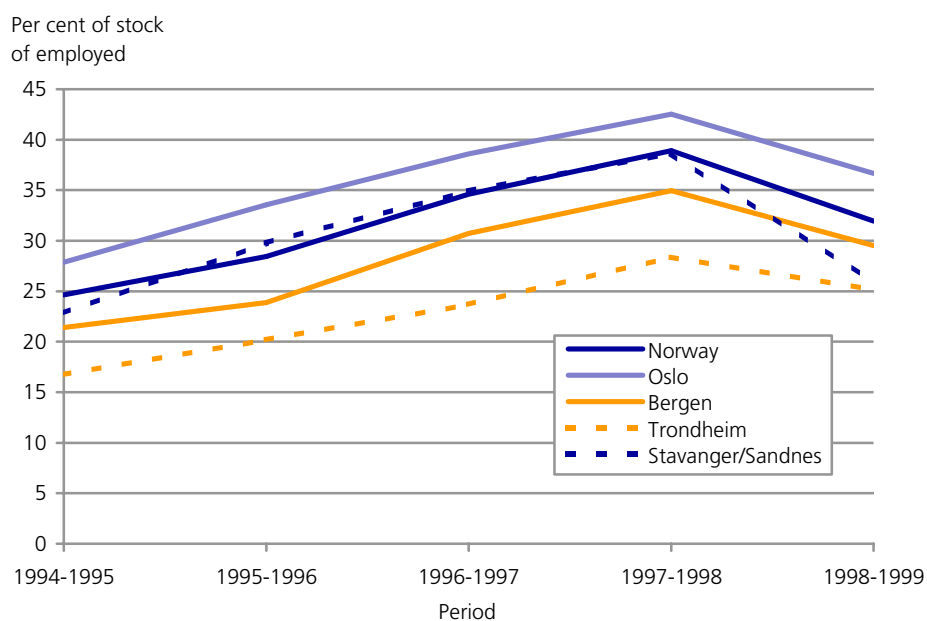


Figure 4.3c. Total gross entries to the KIBS-sectors 1994-1999 in Norway and the main urban centres. Per cent of stock of employed

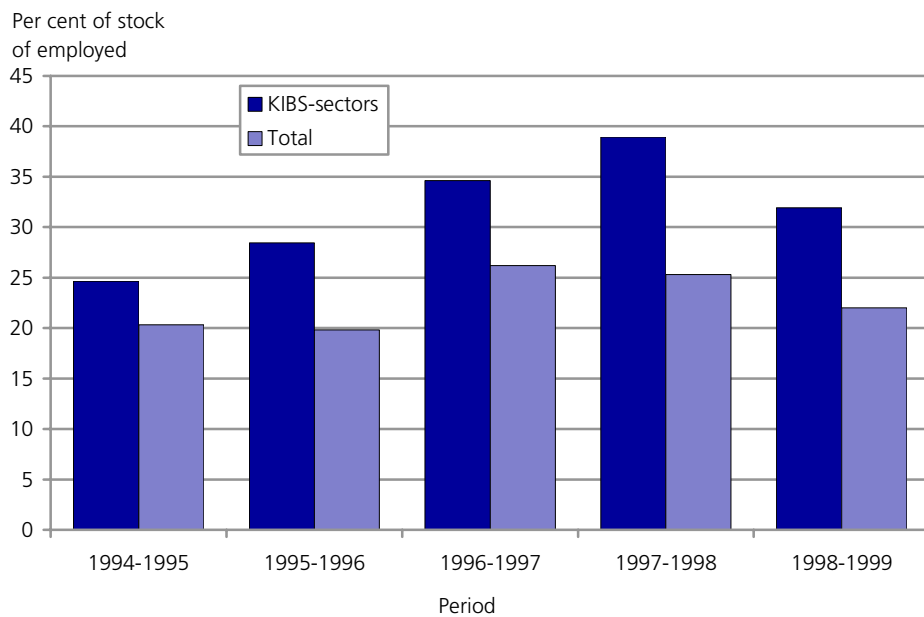


4.3.2. The structure of gross recruitment in the KIBS-sectors

This section gives a short description of how the pattern of gross recruitment in the KIBS-sectors takes place in the local labour markets. Figure 4.3c shows total gross recruitment to the sector measured by per cent of the total employment of the KIBS-sectors in the nation and in the four main urban regions correspondingly. The gross recruitment is very high but reflects the annual net change of employment in the KIBS-sectors. Generally, Oslo has the highest flows of recruitment throughout the whole period, with a peak in 1998, which also was the year with highest net growth. With an exception of the last year, the region of Stavanger/Sandnes shows higher gross recruitment compared to the other remaining regions. The region of Trondheim however, generally shows the lowest gross recruitment to the KIBS-sector among the main urban centres.

In the introduction we put forward a hypothesis that there are several reasons to expect a higher gross mobility in the KIBS-sectors than in the general economy. In figure 4.3d the gross entries to job in the KIBS-sectors are compared with the total gross mobility to job in all sectors of the economy. The figures represent the national average in the time period 1994-1999. There are very clear differences with an overall higher gross mobility in the KIBS-sectors compared with the total economy. The size of the differences seems to be positively correlated to the business cycle, with the highest gaps of mobility in the strongest growth years 1997 and 1998.

Figure 4.3d. Total gross entries to the KIBS-sectors and to all sectors 1994-1999. Norway. Per cent of stock of employed



Gross recruitment by labour market statuses

What does characterize the flows of recruitment to the KIBS-sectors? Among which status groups is it most natural to recruit from? As mentioned above knowledge based services represent a relatively modern sector of the economy, and the co-operation with other sectors through networks is expected to be high. These factors should favour recruitment directly from the educational system as well as from other sectors. The more marginal part of the labour market, here represented by the unemployed and other persons outside the labour force, should therefore be expected to represent a somewhat less important "pool" for recruitment. On the other hand, geographical mobility is expected to be of importance. Due to the fact that the localization of the KIBS-sectors is much more centralised than many other parts of the economy, the pattern of migration is expected to be more than average centralized. International recruitment may also be of importance. A large degree of international co-operation across countries encourages labour mobility both within the sectors and between countries. Occasionally it may also be necessary to cover the demand of certain expertises by import of labour.

In figure 4.3e we have broken down the total gross entries to the KIBS-sectors by status groups. The figures are here derived from the national average. The figure definitely shows the importance of recruitment through job-to-job mobility. In the first part of the time period job-to-job mobility represents slightly below 50 per cent of all gross mobility to the sector. This figure increases to well above

half of the total gross mobility towards the end of the 1990s. Transitions directly to job from the educational system are definitely of importance, but perhaps somewhat surprisingly the recruitment from in-migration to job is generally of even higher importance. The recruitment from persons outside the labour force is also of importance and in the end of the period almost as important as transitions from the educational system. The transition to job from unemployment and immigration is of minor importance. The transition from unemployment decreases during the time period, which is expected in a period with strong employment growth and shrinking unemployment. On the other hand the immigration to job figures show a slight increase and is thus positively correlated to the job-growth. The high importance of in-migration to job may partly be understood in relation to special rules of migration. The settlement rules in Norway functioned so that few students were included in the migration figures. The migration among students mostly appears when they have finished their studies and transfer to the labour market. There is therefore reason to believe that the migration figures include several transitions directly from the educational system to jobs in the KIBS-sectors.

Figure 4.3e. Gross entries to the KIBS-sectors 1994-1999 broken down by different status groups. Norway. Per cent of stock of employed

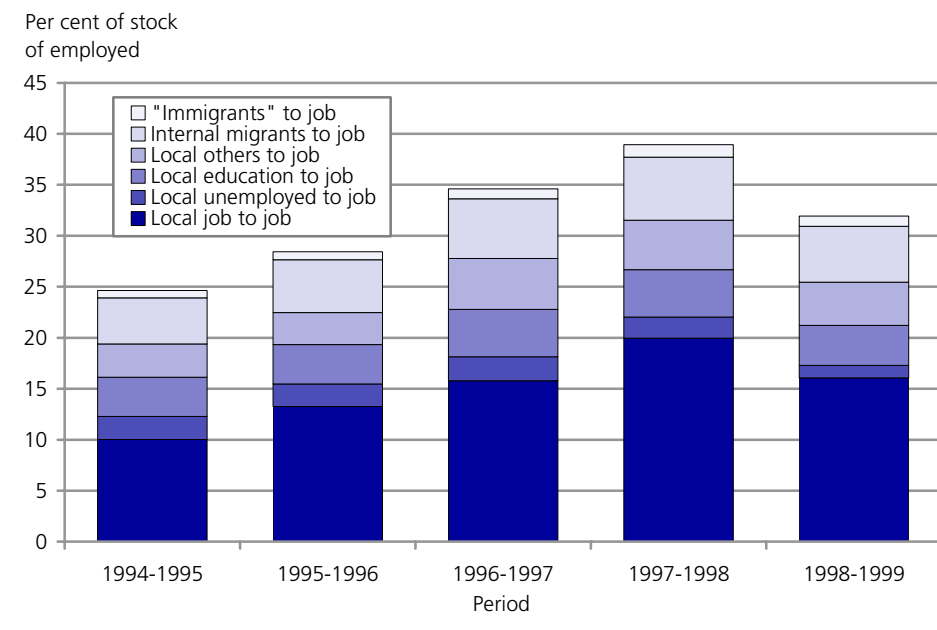


Figure 4.3f. Gross entries to the KIBS-sectors 1994-1999 broken down by different status groups. The main urban centres of Norway. Per cent of stock of employed

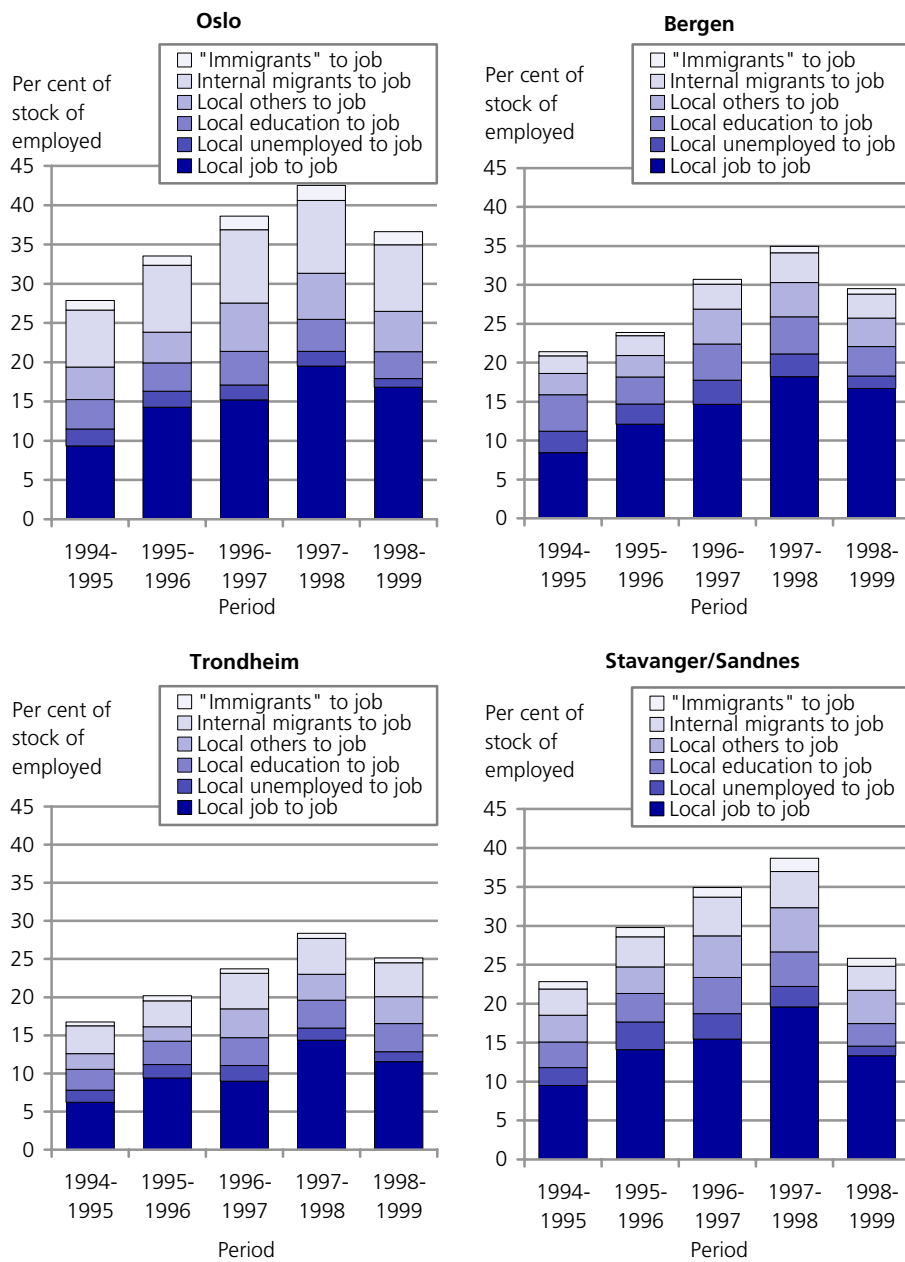


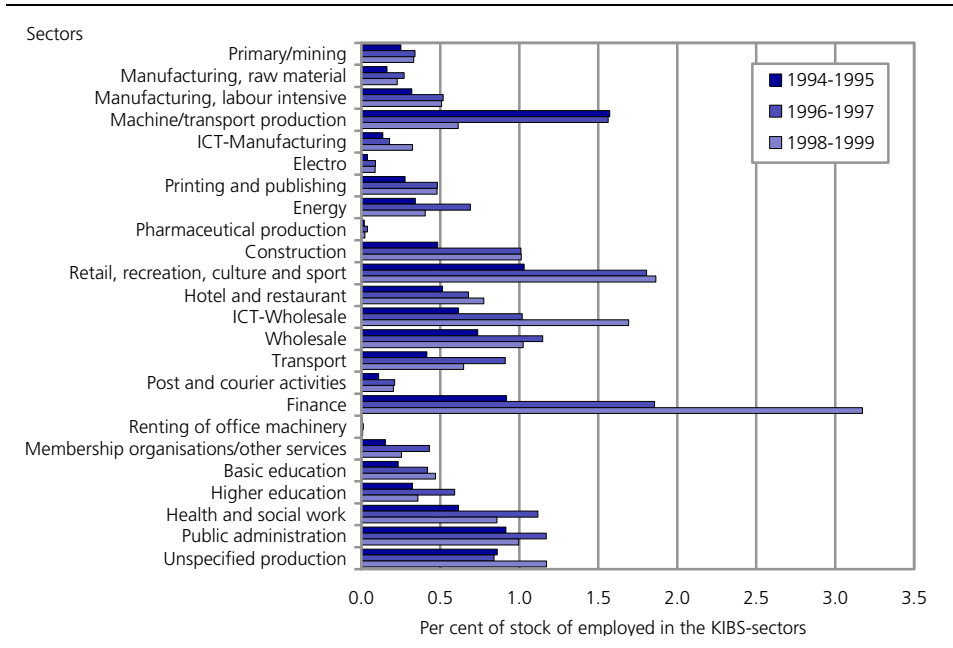
Figure 4.3f shows the same mobility results in the four main urban labour markets in Norway. As noted above, it is the city of Oslo and the region of Stavanger/Sandnes that show the highest gross mobility among the central regions, while the region of Trondheim shows the lowest gross mobility. Broken down by status groups the structure of gross mobility seems to be rather evenly distributed among the main urban labour markets. There are, however, some differences that may be of a certain importance. The transition from unemployment to the KIBS-sectors seems to be of less importance in Oslo compared with the other regions, and especially then in relation to Bergen and Stavanger/Sandnes. The recruitment directly from the educational system is lowest in Oslo and highest in Bergen when measured as a percentage of total gross mobility to job. Measured in per cent of stock of employed this transition seems to be more evenly distributed across the main regions. The most visible difference between the regions is found in in-migration to job. This transition is of importance in all regions, but definitely of highest importance in Oslo. This partly reflects the migration rules of students described above, and that it is reasons to believe that hidden transitions directly from the educational system to job is higher in the in-migration figures in Oslo than in any other regions. The recruitment of persons from outside the labour force and through immigration is clearly higher in Oslo and Stavanger/Sandnes than in the other two main regions. The highest gross entries to jobs in the KIBS-sectors do, however, derive from persons changing jobs within the local labour markets, and the job-to-job mobility represents approximately half of all gross mobility to the KIBS-sectors. Measured as a percentage of the stock of employed, the job-to-job mobility is highest in Oslo and Stavanger/Sandnes. Measured as a percentage of total gross mobility, the job-to-job shift is of most importance in Bergen, with more than 50 per cent of the total mobility in some of the strongest growth years. Most of the gross transitions to job in the KIBS-sectors seem to be positively correlated to the development in the employment with an exception of unemployed to job. Most visible is this positive correlation for the change in job-to-job mobility within the local labour markets.

Gross recruitment by sectors

In this section we have investigated in more detail which other sectors contribute the most to the job-to-job mobility in the KIBS-sectors. In figure 4.3g the total gross recruitment to the KIBS-sectors due to job shift is broken down by 23 other sectors and one unspecified sector. The figures cover the whole nation and show gross recruitment during the three transition periods 1994-1995, 1996-1997 and 1998-1999. When all the rates are measured in relation to the total stock of employment in the KIBS-sectors, the columns give an expression of the relative contribution from each sector. The highest gross contribution derives from Finance. The contribution from Retail, recreation, culture and sport is also considerable, but this sector includes a large number of employed, so the transition rates from this sector is, however, smaller than the share of the total gross flows to the KIBS-sectors suggests. Furthermore, the contribution is considerable from ICT-wholesale. This sector is in itself not very large, so the figure indicates a rather high transition rate to the KIBS-sectors. The contribution is definitely

lower from the manufacturing of ICT products, but this manufacturing sector is rather small in Norway, compared e.g. to the neighbouring countries of Finland and Sweden. On the other hand, the contribution from Machine and transport production is much higher. Some recruitment also took place from Construction and Non-market services, with Health and social work and Public administration being the most important.

Figure 4.3g. Gross entries to the KIBS-sectors in Norway 1994-1995, 1996-1997 and 1998-1999 broken down by different sectors. Per cent of stock of employed in the KIBS-sectors



4.3.3. The structure of net recruitment in the KIBS-sectors

Net recruitment by labour market statuses

The gross recruitment flows to the KIBS-sectors definitely have their opposite transitions out of the sectors. Simultaneously of entries from persons from other sectors, from education, from unemployment, from outside the labour force and from abroad, there are exits of persons from the KIBS-sectors to the different status groups. One way to show these flows is to present these exits flows in the same manner as the gross entry flows above. It is perhaps even more interesting to measure the net effects of all these gross mobility flows of labour. Is e.g. the job-flows to the KIBS-sectors from other sectors higher or lower than the flows of labour from the KIBS-sectors to other sectors? Are the KIBS-sectors winners or losers in the competitions of mobile labour, and accordingly for all other transitions to and from the KIBS-sectors?

Figure 4.3h. Net entries to the KIBS-sectors 1994-1999 broken down by different status groups. Norway. Per cent of stock of employed in the KIBS-sectors

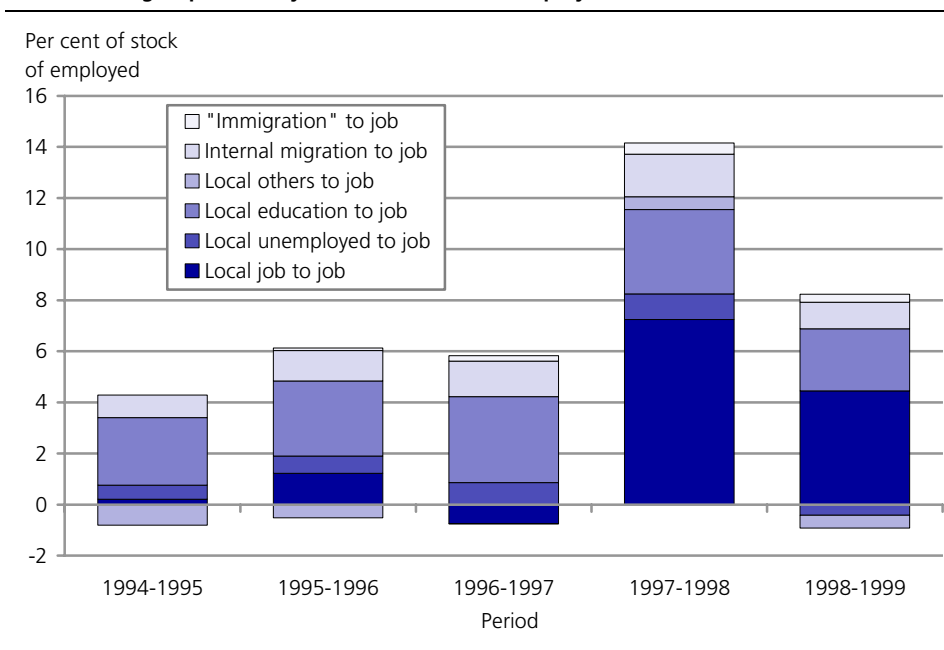


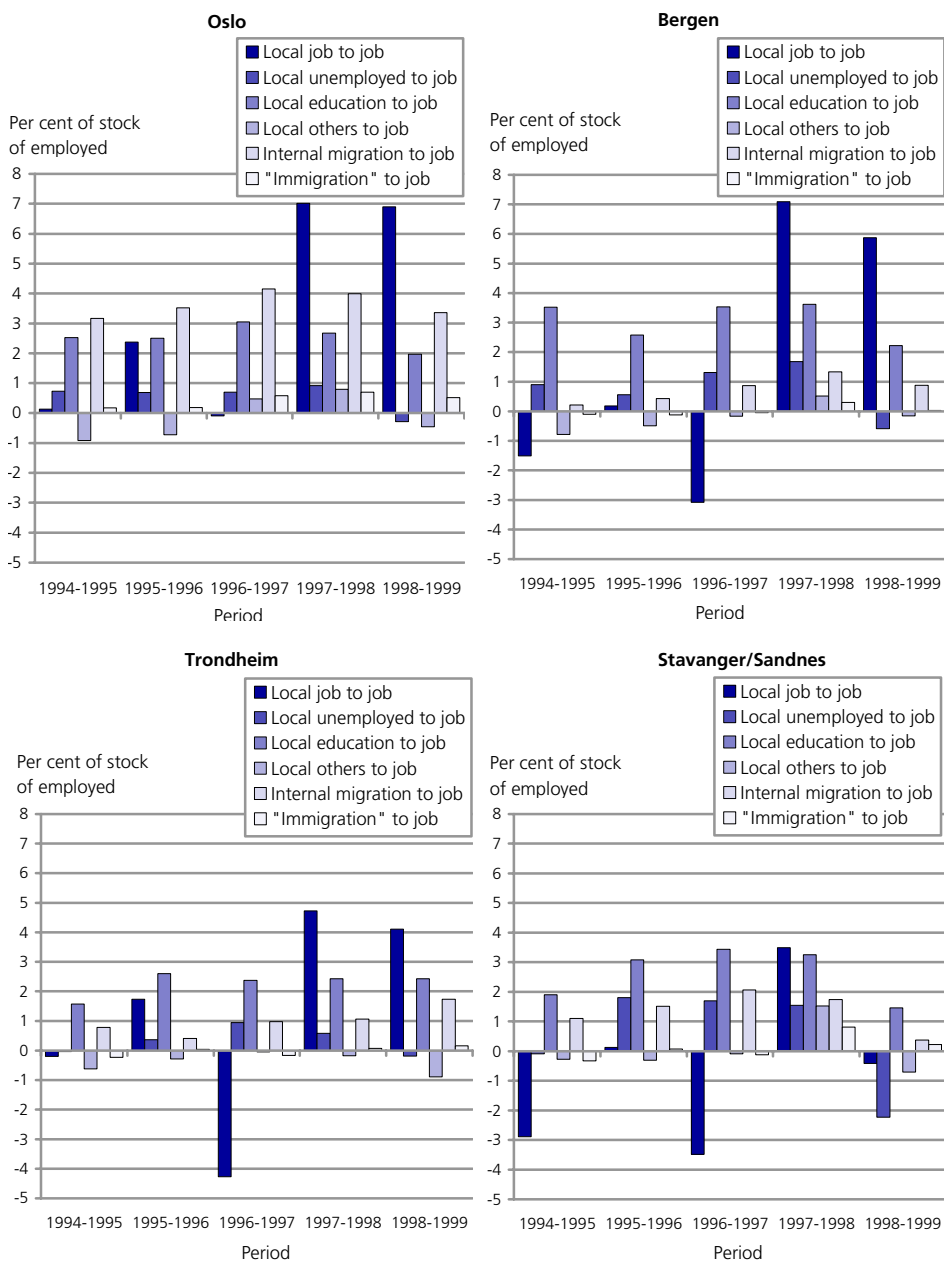
Figure 4.3h shows the net entries to the KIBS-sectors broken down by different status groups. The figures represent the average for the whole nation and all net flows are measured in relation to the total stock of employed in the KIBS-sectors. As seen in figure 4.3b above, the highest net growth in the KIBS-sectors took place from 1997 to 1998. When we turn from gross to net entries it is important to note that transitions from education to job definitely increases its importance. This is of course due to the fact that the recruitment from education is more one-way directed compared to all other types of transitions. Measured as a per cent of stock of employed the net effects of this transition were, as we could expect, highest in the strongest growth years of 1997 and 1998. The net recruitment through internal migration is also generally positive, which means that in-migration to the KIBS-sectors is all the time higher than the corresponding out-migration flows. The importance of migration is also highest in the strong growth year of 1998. Recollecting the strong importance of recruitment through gross job-to-job mobility, it is remarkable to note that the gross flows out of the KIBS-sectors to other sectors were almost as high during the three first years of the period, and from 1996 to 1997 even higher than the gross in flows. This changed remarkably towards the end of the 1990s, as the net recruitment from job-to-job mobility is the most important transition both in 1998 and 1999. One possible explanation is that the KIBS-sectors first become the winners in the job-to-job mobility when the general labour market is passing a certain threshold of tightness. The employment in Norway increased throughout the whole period

from 1993 to 1999, but it was only in the last years of the 1990s that the increased tightness gave severe bottleneck problems in the labour market. The results indicate, however, that the KIBS-sectors were able to increase their employment strongly at the expense of other sectors in the economy by positive net effects of the job-to-job mobility in the local labour markets in the end of the 1990s. The net effects of unemployment to job mobility to the KIBS-sectors were also positive, except from the year 1999. The net effects of immigration to and emigration from job are also mostly positive with a slight increase towards the end of the period. The net effects of mobility to and from others outside the labour force are mostly negative except from in the strong growth year of 1998.

The figure 4.3i shows the corresponding net results broken down by the four main urban regions in Norway. Concerning the job-to-job mobility the major tendency is stronger entries from than exits to other sectors of the economy. This is, however, not true for all and there are some differences across the regions. Overall, the job-to-job mobility in 1994-1995 and 1996-1997 are weak for the KIBS-sectors. In 1996-1997 the KIBS-sectors in Bergen, Trondheim and Stavanger/Sandnes had a net loss of labour to other sectors, whilst the KIBS-sectors in Oslo almost showed a net balance with other sectors. This is a bit surprising due to the fact that the KIBS-sectors had a strong growth from 1996 to 1997, Trondheim being the exception. When we turn to the strong growth year of 1998 the KIBS-sectors generally show a positive net job-to-job mobility with particularly strong effects in Oslo and Bergen. This tendency continued in 1999 with an exception of Stavanger/Sandnes, which showed a weak development in the KIBS-sectors in this period.

What about the net effects of the other types of labour mobility? Overall, the KIBS-sectors show positive or almost balanced net effects in the mobility between unemployment and job up to the year 1998, and strongest effects for the region of Stavanger/Sandnes. In the final year of 1999 more employed turned from job to unemployment than in the opposite direction, and also with strongest effect for the region of Stavanger/Sandnes. The net effects of mobility to and from the educational system are, as we could expect, generally positive, and especially so in a period of strong economic upswing. The strongest net effects were found in the region of Bergen, whilst Trondheim shows weaker effects than the other main regions. The net effects of mobility between job and persons outside the labour force were generally small, with a tendency towards negative effects in the beginning and the end of the period, and positive effects in the strong growth year of 1998 except Trondheim. The centralized character of the internal migration processes is clearly documented by generally positive net effects for the KIBS-sectors in the four main urban regions. Strongest net effects were found in Oslo, where the net effects of migration to job showed the highest contribution to net job growth in the period 1994-1997. The net contribution from migration was also high in the capital towards the end of the 1990s, but the net effect of job-to-job mobility was even higher. The net effects of migration were also important for the net job growth in the other regions, and as an average for the whole period somewhat stronger in Stavanger/Sandnes than in Bergen and Trondheim.

Figure 4.3i. Net entries to the KIBS-sectors 1994-1999 broken down by different mobility groups. The main urban centres of Norway. Per cent of stock of employed

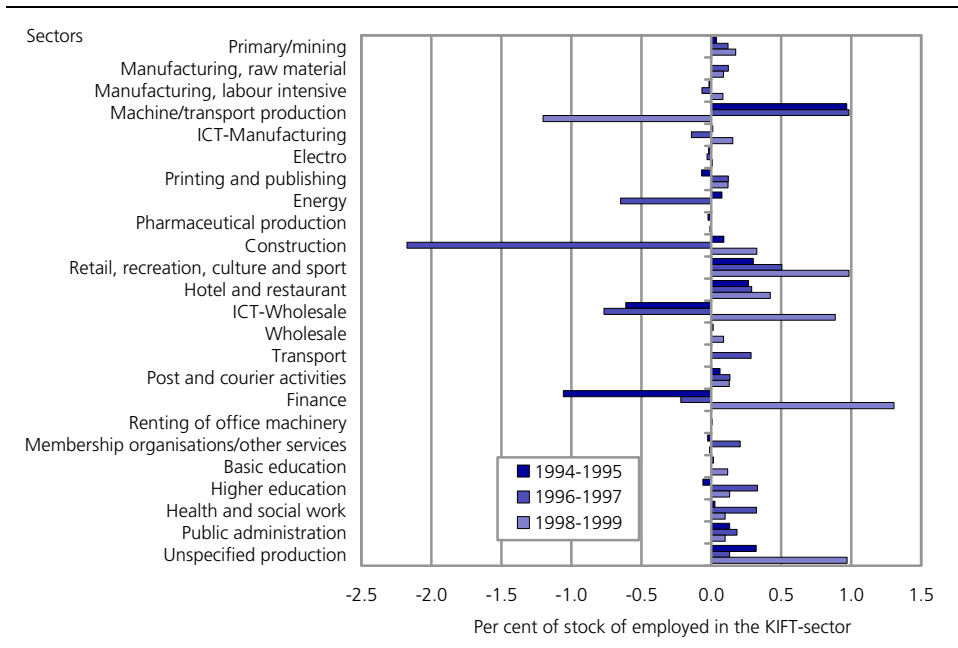


Net recruitment by sectors

In figure 4.3g above we saw which sectors contributed mostly to the gross recruitment to the KIBS-sectors. In figure 4.3j below we show the same figure for

the net job-to-job mobility to the KIBS-sectors. The figures are also here derived from an average for the whole nation, and show the net recruitment through three periods of time. The flows of labour between the sectors go in both directions, particularly with respect to the finance sector. As seen in figure 4.3g it was the finance sector that contributed the most to the gross job-to-job mobility to the KIBS-sectors. In figure 4.3j we see that in both 1994-1995 and 1996-1997 the gross flow of labour from the KIBS-sectors to the finance sector was even higher, resulting in a negative net effect for the KIBS-sectors. Towards the end of the 1990s the financial sector contributed, however, with the strongest net recruitment of labour to the KIBS-sectors. Furthermore we see that sectors like retail, recreation, culture and sport, hotel and restaurant, post and courier activities and the non-market services contributed positively to the net job-to-job mobility in the KIBS-sectors. On the other hand, sectors like machine and transport production, construction and ICT-wholesale in conformity with the finance sector all contributed strongly to the net job-to-job mobility in the KIBS-sectors, but in changing directions dependent on the time period. For more discussions of the flow of labour from the KIBS-sectors, see Aslesen et al. (2004).

Figure 4.3j. Net entries to the KIBS-sectors in Norway 1994-1995, 1996-1997 and 1998-1999 broken down by different sectors. Per cent of stock of employed in the KIBS-sector



4.3.4. Geographical distribution of labour migration in the KIBS-sectors

Recruitment by gross in-migration

As described in the section above the internal migration of labour is of immense importance both to gross and net recruitment to the KIBS-sectors. In this section

we focus on the geographical structure of this recruitment. What is the region of origin and what is the region of destination for those migrants entering and leaving the KIBS-sectors in the main urban regions? In accordance with traditional migration theories we must expect that distance will be of a certain importance, so that a major share of the recruitment through migration have their origin in the neighbouring regions. On the other hand the demand for knowledge based skills in the KIBS-sectors indicate that much of the recruitment through migration must come from regions that include a concentration of educational institutions, which is of great importance to the KIBS-sectors.

In figure 4.3k we have collected the total gross in-migration rates to the KIBS-sectors in the four main urban regions distributed by the counties of origin. Due to short distances between the capital city of Oslo and the surrounding county of Akershus we operate with Oslo/Akershus as one region. For the capital region the gross in-migration rate to the KIBS-sectors is surprisingly evenly distributed across the counties. However, it is possible to recognise a certain tendency towards a somewhat higher in-migration from the other counties in the south-eastern part of Norway, but the highest rates are found in relation to the counties of Hordaland and Sør-Trøndelag, which both have large concentration of universities and university colleges. In the other three main urban regions the gross in-migration to the KIBS-sectors is mainly recognised by the distance, due to the fact that the highest gross streams to the regions have its origin in the sum of all gross in-migration from the neighbouring counties including the county where the urban region is located. Measured by single counties the highest in-migration comes, however, from the capital region of Oslo/Akershus, where we also find the highest concentration of universities and university colleges. In the figure we have also included immigration to the KIBS-sectors, but as we already have noted these flows are especially high to the regions of Oslo/Akershus and Stavanger/Sandnes.

Recruitment by net in-migration

Gross in-migration to the KIBS-sectors also has its reverse flows through out-migration from the sector. Accordingly, figure 4.3l shows the net migration to the KIBS-sectors to indicate if the gross in-migration streams to the sector described above are higher or lower than the corresponding gross out-migration from the sector. The tendency towards centralisation is clearly visible due to the fact that the capital region of Oslo/Akershus generally shows a positive net in-migration to the KIBS-sectors from all other counties during the whole period 1994-1999. As for gross streams the highest net effects are also found in the counties of Hordaland and Sør-Trøndelag, but there are also strong net effects from other counties in south-east Norway as well as from the counties of Rogaland, Møre og Romsdal and Nordland. The net effects of migration to the KIBS-sectors in the other main urban regions show, as is the case with the gross migration, a clear neighbourhood structure, due to the fact that the gross in-migration from the surrounding counties is much higher than the corresponding gross out-migration. The KIBS-sectors in both Bergen and Trondheim clearly show negative net effects in the migration with Oslo/Akershus. In spite that the highest gross in-migration to the KIBS-sectors in

Bergen and Trondheim come from Oslo/Akershus, the gross streams in opposite directions are clearly higher. This indicates, however, that large streams of labour to the KIBS-sectors through migration to a large extent are recruited from the largest university and university college regions, and in both directions.

Figure 4.3k. Gross migration to the KIBS-sectors 1994-1999 in the main urban centres of Norway by county and abroad. Per cent of stock of employed

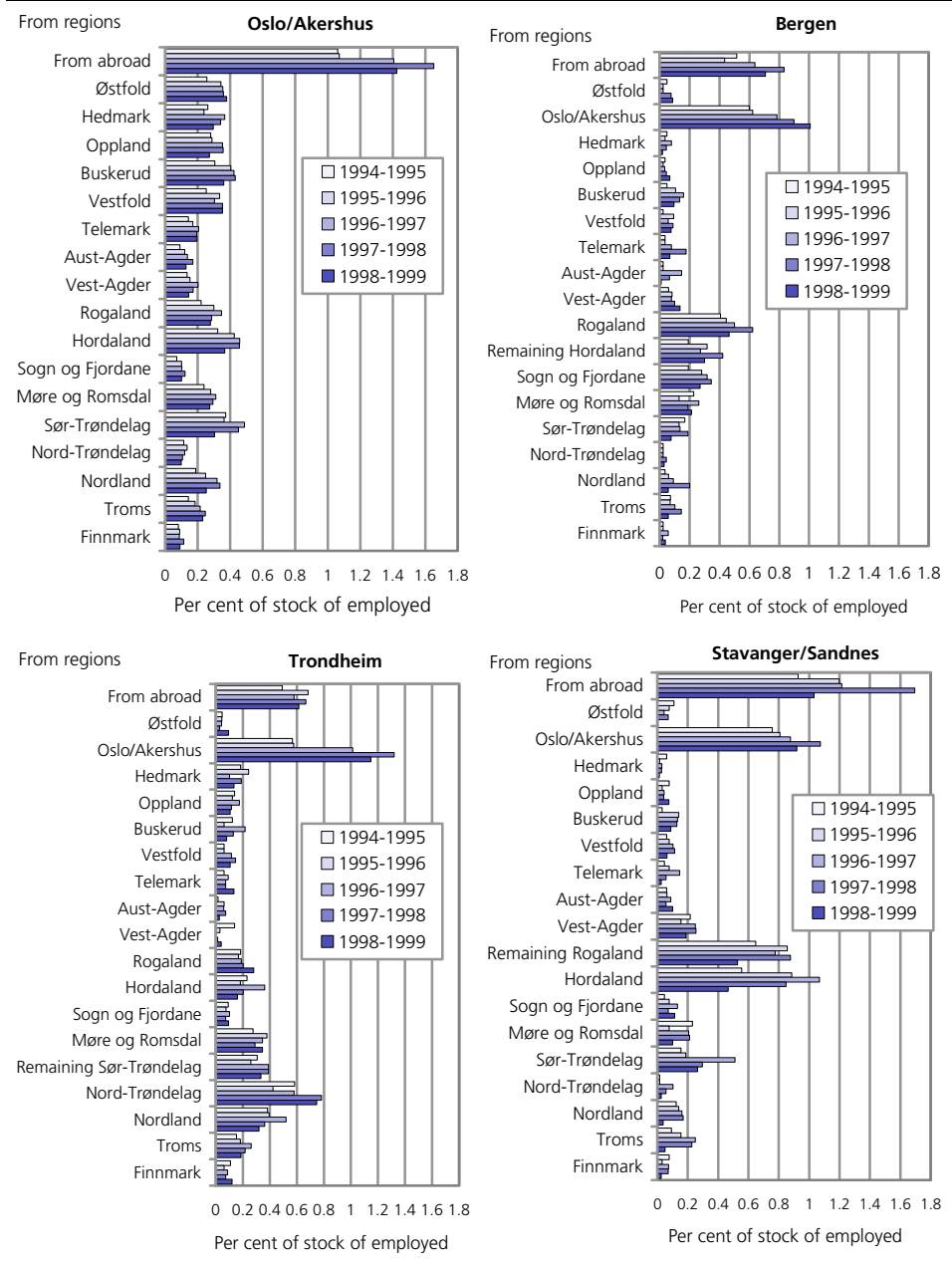
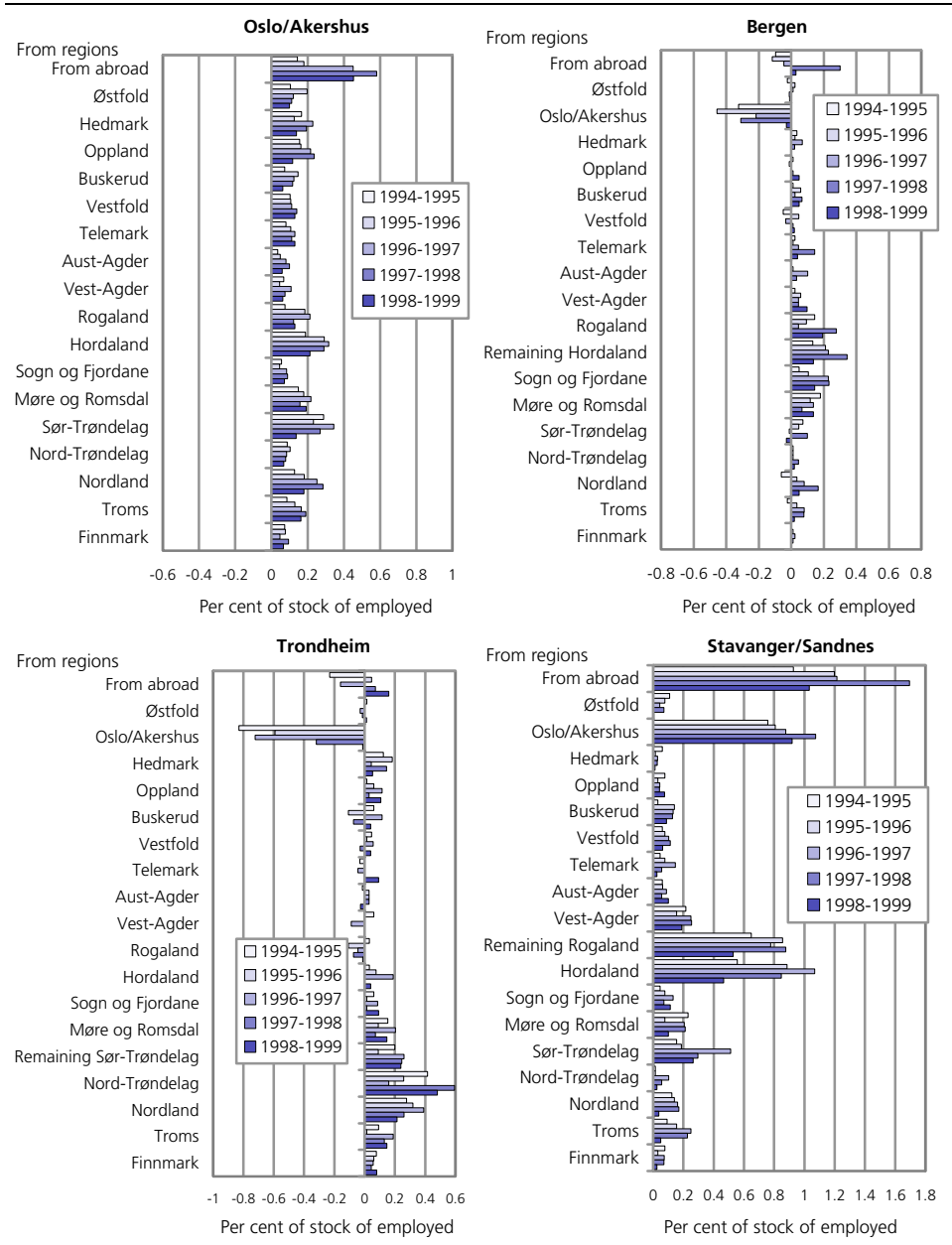


Figure 4.3I. Net migration to the KIBS-sectors 1994-1999 in the main urban centres of Norway by county and abroad. Per cent of stock of employed



4.3.5 The education level of labour in the KIBS-sectors

The characteristics of knowledge intensive services indicate that the education level of the employed should be higher than in many other parts of the economy. Figure 4.3m shows how large the differences in education level are between employed in the KIBS-sectors and the total economy and how the level of education has developed during the 1990s. The level of education is defined by the number of years each employed persons has been in education. The figures are derived from the whole nation, and show that employed persons in the KIBS-sectors on average have about 1.5 years more education than the average for all employed in Norway. As we could expect the education level has increased during the 1990s both in the KIBS-sectors as well as in employment generally. From 1994 to 1997 the education level in the KIBS-sectors grew somewhat more compared to all employed in Norway. Towards the end of the 1990s this tendency was slightly reversed, so for the whole period it was a weak convergence of the education level between the KIBS-sectors and the total economy. Part of the explanation may be found in the very strong increase of employment that took place in the KIBS-sectors in 1998, due to the fact that it may be more difficult to recruit labour with an optimal education level in a tight labour market.

Figure 4.3m. Average number of years in education among employed in the KIBS-sectors and totally 1994-1999. Norway

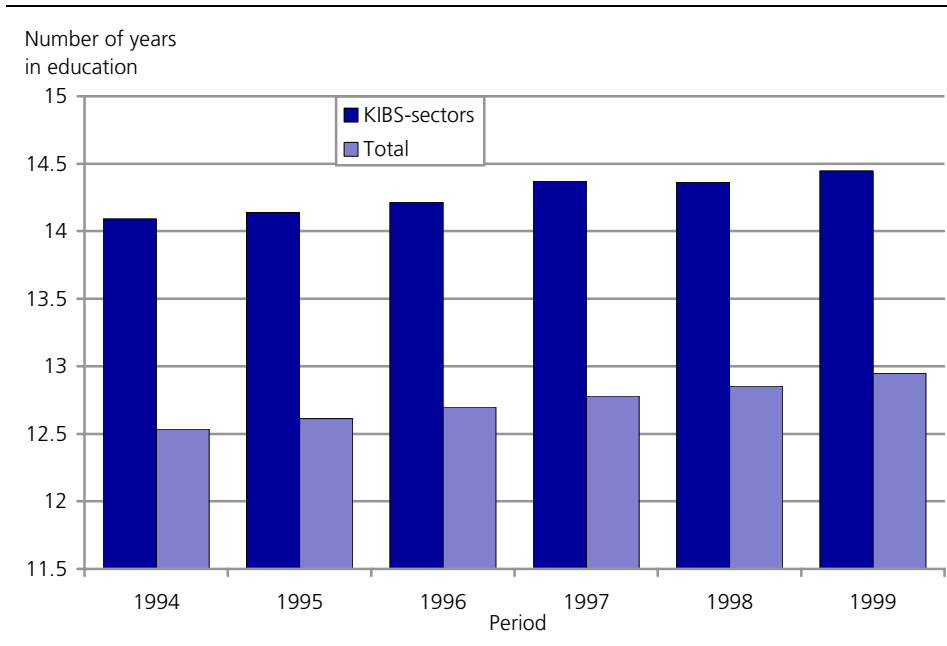
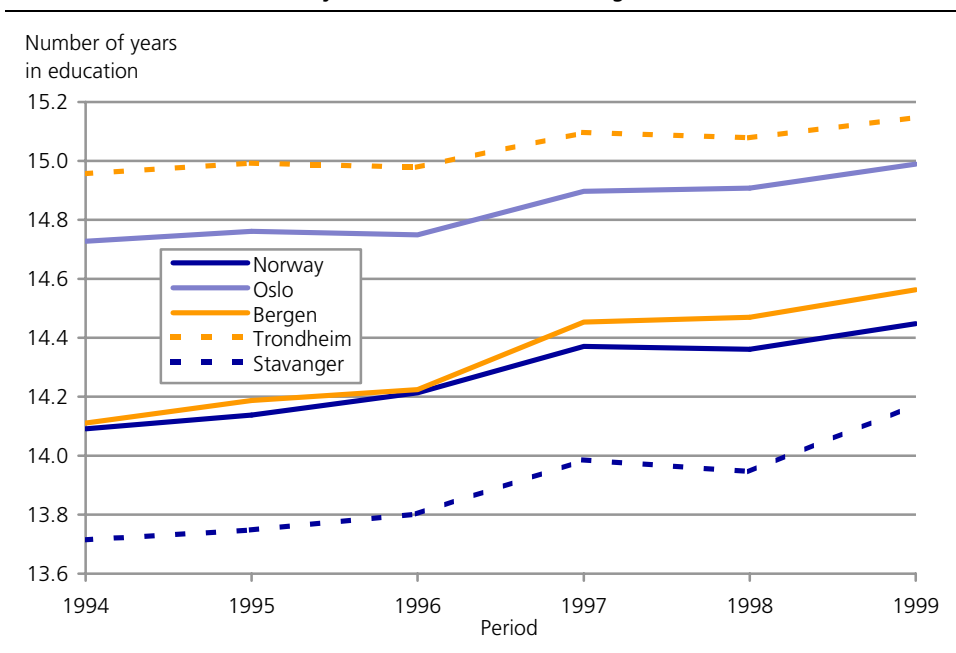


Figure 4.3n. Average number of years in education among employed in the KIBS-sectors 1994-1999. Norway and the four main urban regions



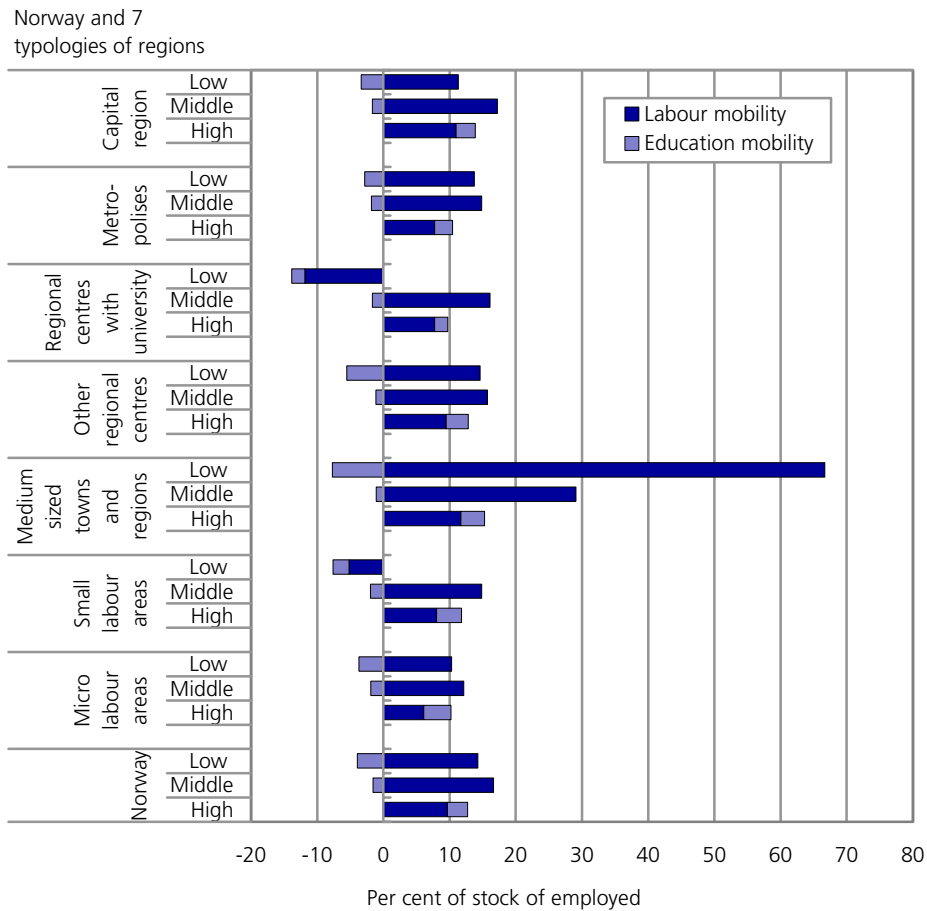
In figure 4.3n, results for the employed persons in the KIBS-sectors in the four main urban regions are presented. The figures show that employed persons in Trondheim generally have the highest level of education in this period. Employed persons in the KIBS-sectors in Oslo also have much higher education level than the national average suggests, while the region of Bergen initially shows an education level approximately in line with the national average. On the other hand, the region of Stavanger/Sandnes shows an education level well below the national average. There are, however, some differences in the change of education level across regions during this period. For the whole period, employed persons in Stavanger/Sandnes and Bergen had the highest increase in education levels, while employed persons in Trondheim had the weakest growth in education level.

Net recruitment by education

Figure 4.3o shows the employment change in the KIBS-sectors by education, which is further broken down by the effects of labour mobility and education mobility. The education mobility means that employed persons change their education level from lower towards higher education. The results are presented for the country as a whole and broken down by 7 typologies of regions. The effects of labour mobility dominate the total change of employment. The national figures show that the net rise in both low and middle educated employed were somewhat higher than for high-educated persons in spite of negative ef-

fects from education mobility in general. A particularly high growth rate was observed in medium-sized towns and regions. The only negative effect of labour mobility is found among low educated employed in regional centres with a university and in small labour areas. The effects of both labour mobility and education mobility are generally positive, with the strongest effect in the capital region and in medium-sized towns and regions. It is, however, important to bear in mind the educational structure of the KIBS-employment, where the employed at the national level are distributed with approximately 5, 44 and 49 per cent on low, middle and high education respectively. The highest share of high-educated labour is found in the most central regional typologies, e.g. 57 per cent in the capital region and almost 53 per cent in regional metropolises.

Figure 4.3o. Net change of employment in the KIBS-sectors by education levels 1997-1998 broken down by the effects of labour mobility and education mobility. Norway and 7 typologies of regions. Per cent of stock of employed



4.3.6. The age of employed in the KIBS-sectors

Knowledge intensive industries are recognized as rather new and modern sectors of the economy. Expressions such as dynamics, flexibility and innovations are often used as part of the characteristics of these sectors. If we also expect that the demand of labour includes a modern educational background, we further expect that the average age of the employed in the KIBS-sectors are somewhat lower than in most other sectors of the economy. Figure 4.3p below shows the difference in average age between employed persons in the KIBS-sectors and all employed persons. The figures are derived from the whole country. At the beginning of the period in the year 1994 there were small differences in average age between these two groups. Employed in the KIBS-sectors showed an average age slightly below 40 years while the total average was slightly above 40 years. During the period the development clearly moved in opposite directions. The average age of all employed increased somewhat from 1994-1996, and then it decreased somewhat during the strong growth years of 1997 and 1998, to finally reach the highest level in the stagnation year of 1999. The development in the KIBS-sectors went in the opposite direction, with a marked fall in average age, from 1994 to 1997 and a slight fall to the lowest level in 1999. A strong rejuvenation of the employed in the KIBS-sectors went parallel with a much higher than average growth in the economy generally. Some of the reasons for this rejuvenation may be the strong employment growth in the KIBS-sectors. A higher than average gross mobility may also represent an important factor. A complete stable stock of labour would inevitably lead to a rise in the average age with one year annually.

Figure 4.3p. Average age of employed in the KIBS-sectors and totally 1994-1999. Norway

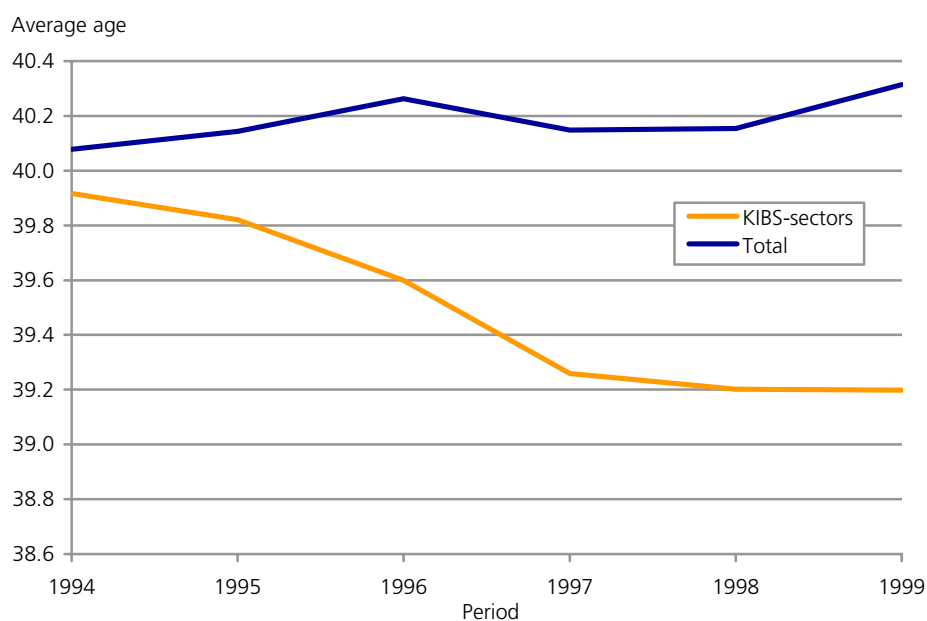
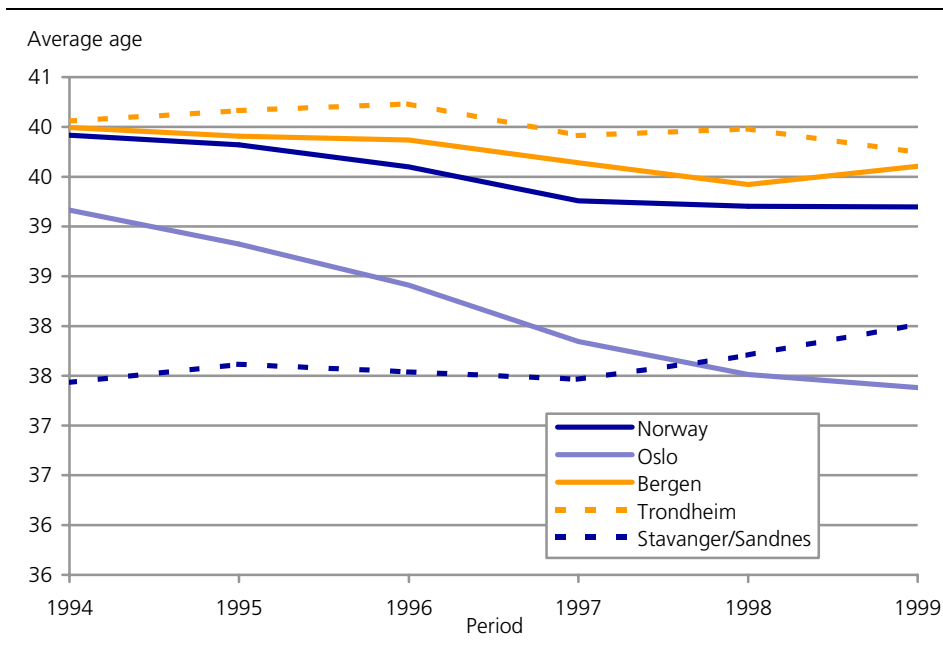


Figure 4.3q. Average age of employed in the KIBS-sectors 1994-1999. Norway and the four main urban regions



How did this development take place at the regional level? In figure 4.3q we show age developments in the KIBS-sectors in the four main urban regions. At the starting point there were strong regional differences in average age. Employed in the KIBS-sectors in Trondheim showed the highest average age in 1994, but also Bergen showed an average age above the national average. In Oslo and especially in Stavanger/Sandnes the average age was clearly below the national average.

The changes during the 1990s also included visible differences across the main urban regions. Oslo differs from the other regions with a strong fall in average age of employed in the KIBS-sectors. In Trondheim the development went in the opposite direction up to 1996 and then showed a slight fall in the average age towards the end of the 1990s, but not more than Trondheim still showed the highest average age of the urban main centres. Employed in the KIBS-sectors in Bergen showed a slight fall in the average age, but not as strong as the national average. On the other hand, Stavanger/Sandnes showed a clear tendency towards increased average age of the KIBS employed, although from a relatively low level. At the end of the period Oslo showed the lowest average age of employed in the KIBS-sectors. Compared to the employment development, it is the regions with the strongest employment growth that show the lowest average age. The strong rise of average age in Stavanger/Sandnes towards the end of the period went parallel with a decrease of employment in this sector.

4.3.7. Mobility performance in the KIBS-sectors in the main urban labour markets

In this section we investigate in more detail how each of the four main urban regions perform according to different mobility types and education. The calculation is done so that each of the transitions from and to job in the KIBS-sectors is measured in relation to the national average for each education level. The national average is set at zero for each transition, so it is possible to see if the regions perform better or worse than the mobility of the KIBS-sectors in the whole nation. The results are given in table 4.3a. Most of the rates are measured in relation to the total stock of employed by education apart from the rates to job from education, unemployment and others that are measured in relation to the number of persons in education, the number of unemployed and the number of persons outside the labour force. The average index at the bottom of the table 4.3a is an unweighted average of all transitions by education. All transitions are derived from the period 1997-1998, i.e. the years with the strongest growth of the KIBS-sectors. (More description of the calculation method is found in section 3 and in table 3.7).

In total, Oslo/Akershus shows the best performance of mobility in the KIBS-sectors both for middle and especially for high-educated labour. For low educated labour it is only the region of Stavanger/Sandnes that shows a total index above the national average. The region of Trondheim shows lower than average total indexes for all three education levels.

Transitions in each specific mobility group in the KIBS-sectors show that Oslo/Akershus and Stavanger/Sandnes have the highest turnover of labour within the local labour markets, while Bergen and Trondheim have more stable labour. This is also reflected in the local job-to-job mobility, where only middle- and high-educated employed in Oslo/Akershus have indexes above the national average. Especially Oslo/Akershus but also Stavanger/Sandnes show a high score on the transitions from the educational system to jobs in the KIBS-sectors. The same goes for unemployment to job, but when measuring the rates in relation to the number of unemployed the lower level of unemployment in these regions is expected to have some impact on the results. The recruitment among persons outside the labour force is also higher in the capital region, and particularly for high-educated persons. Concerning in-migration to job the indexes are above the national average for middle educated labour in Oslo/Akershus and in Trondheim, and for low- and high-educated labour in Stavanger/Sandnes. For all other groups the indexes are negative in relation to the national average. This is somewhat surprising according to high-educated persons in Oslo/Akershus, but this becomes more than balanced by very low out-migration of higher educated employed from the KIBS-sectors in the capital region. The very strong positive net effect of migration to the KIBS-sectors in Oslo/Akershus, as earlier shown, has first and foremost its explanation in relatively low out-migration from this sector. It is, however, important to note that relatively low indexes of in-migration of high-educated labour to the KIBS-sectors in the capital region, Bergen and Trondheim must be seen in relation to the em-

ployment structure, showing a much higher percentage of high-educated labour in these three main urban regions than in most other regions. Immigration to job shows positive indexes for Oslo/Akershus and Stavanger/Sandnes both for middle- and high-educated labour, but especially strong and positive is the index of immigration to the KIBS-sectors for low educated labour in Stavanger/Sandnes. The emigration from job is also most visible in the capital regions, which means that the international flows to and from the capital region is of importance in both directions.

Table 4.3a. Mobility performance of the KIBS-sectors 1997-1998 by status group and education. The main urban regions of Oslo/Akershus, Bergen, Trondheim and Stavanger/Sandnes. The corresponding levels of mobility in the whole nation = 0. Deviation from the nation in percentage point

Mobility group	Oslo/ Akershus	Bergen	Trondheim	Stavanger/ Sandnes
From job locally (L)	-1.0	-4.6	-8.4	-3.0
From job locally (M)	0.9	-3.7	-2.9	1.0
From job locally (H)	0.3	-0.9	-3.5	4.6
To job from job locally (L)	-2.4	-8.6	-12.3	-1.0
To job from job locally (M)	0.2	-3.0	-5.1	-2.0
To job from job locally (H)	0.6	-0.4	-4.7	-0.1
From education to job locally (L)	0.8	-0.1	-0.2	0.2
From education to job locally (M)	2.3	-0.4	-0.5	0.7
From education to job locally (H)	1.8	0.2	0.3	0.3
From unemployed to job locally (L)	1.0	0.1	-0.2	1.4
From unemployed to job locally (M)	1.6	0.6	-0.2	1.6
From unemployed to job locally (H)	1.2	0.5	-0.7	1.5
From others to job locally (L)	0.2	0.0	0.0	0.2
From others to job locally (M)	0.8	-0.1	-0.1	0.6
From others to job locally (H)	1.5	-0.4	0.2	0.4
In-migration to job (L)	-0.1	-0.4	-0.5	0.1
In-migration to job (M)	0.3	-1.3	0.5	-0.6
In-migration to job (H)	-0.3	-0.7	-0.7	0.8
Immigration to job (L)	-1.0	-2.2	-0.4	1.4
Immigration to job (M)	0.1	0.0	-0.2	0.0
Immigration to job (H)	0.2	-0.2	-0.2	0.2
Out-migration from job(L)	0.3	-1.4	-0.5	0.0
Out-migration from job (M)	-0.6	-1.2	-0.2	-0.6
Out-migration from job(H)	-1.8	-0.5	0.4	0.2
Emigration from job (L)	0.3	0.0	0.2	0.2
Emigration from job (M)	0.1	-0.1	-0.2	-0.1
Emigration from job (H)	0.3	-0.2	-0.1	-0.1
Average (L)	-0.1	-0.6	-0.6	0.6
Average (M)	0.5	0.1	-0.3	0.0
Average (H)	0.7	0.1	-0.3	-0.2

(L): Low education (compulsory school), (M): Middle education (secondary school) (H): Higher education

4.3.8. The relationship between employment growth and gross mobility performance in the KIBS-sectors

In this section we have also analysed the impact of different types of mobility on the regional employment net growth in the KIBS-sectors in Norway. As a basis we have used 86 regions in Norway, and the net change of employment by education in the KIBS-sectors are used as a dependent variable, whilst the specific labour mobility transitions are used as explanation variables. We concentrate on the transitions between 1997-1998, a period with very strong growth in the KIBS-sectors. The analysis is put forward by use of a regression analysis by ordinary least square methods, and the results are found in table 4.3b and 4.3c.

Table 4.3b. The relationship between net employment growth in the KIBS-sectors and gross labour mobility measured as specific mobility performance of the KIBS-sectors. By segments of mobility and education 1997-1998. Basis: 86 regions in Norway

Type of mobility	Low education	Middle education	High education
From job locally	-0.963*** (-5.79)	-0.983*** (-13.77)	-0.907*** (-7.98)
To job from job locally	1.036*** (22.84)	1.183*** (25.26)	1.141*** (10.91)
To job from education locally	0.724 (0.05)	1.702* (1.64)	0.690 (1.48)
To job from unemployment locally	11.579** (2.43)	-0.089 (-0.14)	0.251 (1.62)
To job from others outside the labour force locally	10.090 (0.22)	2.265 (1.04)	0.985 (1.64)
To job from internal in-migration	1.323** (2.14)	1.098*** (3.93)	0.875*** (4.78)
To job from immigration	0.839* (1.95)	5.368*** (3.75)	0.993 (0.78)
From job to internal out-migration	-1.153* (-1.79)	-0.668*** (-3.00)	-0.833*** (-6.66)
From job to emigration	-1.986 (0.86)	-2.30** (-2.58)	2.029 (1.49)
Weighted average	7.43*** (15.40)	4.21*** (20.57)	7.70*** (13.84)
Adjusted R ²	0.88	0.93	0.79

Level of significance: 99%***, 95%** , 90%*. (t-values in brackets). Number of observations=86)

The figures show that there is a strong but negative correlation between the net change of employment and the ability to leave a job in the KIBS-sectors in the regional labour markets. The effect is strong for persons with middle education, but somewhat more moderate for persons with low and high education although clearly significant for all educational groups. As noted, the job-to-job mobility is strong but positively correlated to the net change of employment, and also here the effects are strongest among persons with middle education. When we include all regions in Norway, the effects of transition from the educational system

are somewhat weaker correlated to the net job growth in the KIBS-sectors than expected. The correlation results are, however, positive for all educational groups, but only middle educated persons show estimates with certain significance. The relationship between transitions from unemployment to job at net employment growth is positive and significant only for persons with low education, while this relationship is weak for middle and high-educated persons. Considering gross transitions to job from other persons outside the labour force there are no significant estimates. The results do, however, indicate the strongest effects for persons with high education. On the other hand, the relationship between net employment growth and internal migration to job are significant for all educational groups, and strongest for persons with high education. For international migration to job the correlation to net job growth is generally positive, but clearly most positive for persons with middle education. The parameters for internal out-migration from the KIBS-sectors are all negative, and the effects for middle- and high-educated labour are particularly strong. For emigration from job the relationship is only significant for employed with middle education, but then as expected in a negative direction. A weighted average of all types of mobility by education in the KIBS-sectors shows only positive and significant correlations, but strongest for persons with middle education.

In table 4.3c we have broken down this analysis further by comparing the 43 Norwegian regions with strongest net employment growth in the KIBS-sectors with the 43 regions with the lowest net employment growth. The most interesting target here is to analyse any differences in the mobility structure between these two groups of regions.

The relationship between net employment growth and local exits from job is clearly strongest but negatively directed for the regions with the lowest employment growth. Accordingly the relationship between employment growth and local job-to-job mobility is strong and positive for all educational groups in the regions with the strongest employment growth. While this relationship is clearly stronger for persons with low and middle education in the regions with the strongest employment growth, this relationship is perhaps somewhat surprisingly stronger for persons with high education in the regions with the lowest net rise of employment. The relationship between employment growth and local recruitment from the educational system is only significant and positive for persons with middle education in the regions with the weakest employment growth. For persons with low and high education this relationship is positive in the regions with the strongest employment growth, but without any significance. Concerning the recruitment to the KIBS-sectors from unemployment the figures indicate that the strongest positive relationship is found in the regions with the strongest employment growth, but none of the educational groups shows significant relationships here. The correlation is also weak for recruitment from other persons from outside the labour force, with an exception of middle educated labour in the regions with the strongest net rise of employment in the KIBS-sectors. On the other hand the results are more as could be expected for internal

migration, showing strong, positive and significant relationships between employment growth and in-migration to jobs in the regions with the strongest employment growth, and strong but negative relationships between employment growth and out-migration from job in the regions with the lowest rise of employment in the KIBS-sectors. For immigration to job and emigration from job the relationships to regional net job growth is rather weak, with an exception from immigration to job by middle educated persons in the regions with the strongest employment growth, where the relationship is strong, positive and significant. The relationship between net employment growth and a weighted average of all types of mobility by education gives somewhat stronger effects for persons with low and middle education in the regions with the strongest growth of employment, while this relationship is somewhat stronger in the regions with the lowest employment growth for persons with high education.

Table 4.3c. The relationship between net employment growth in the KIBS-sectors and gross labour mobility measured as specific mobility performance of the KIBS-sectors. By segments of mobility and education 1997-1998. Basis: 86 regions in Norway broken down by 43 regions with lowest growth of employment and 43 regions with highest growth of employment

Type of mobility	Growth of employment:		Low education		Middle education		High education	
	Low	High	Low	High	Low	High	Low	High
From job locally	-0.80*** (-4.06)	0.04 (0.13)	-0.93*** (-10.84)	1.05*** (-6.15)	-0.54*** (-4.20)	-0.94*** (-3.84)		
To job from job locally	0.36 (0.97)	0.98*** (21.99)	1.27*** (7.42)	1.15*** (18.02)	1.04*** (7.08)	0.73*** (4.17)		
To job from education locally	-22.26 (-1.09)	10.42 (0.57)	4.21** (2.51)	-0.83 (-0.62)	-0.55 (-0.85)	0.56 (0.89)		
To job from unemployment locally	-0.31 (-0.04)	3.99 (0.74)	-0.78 (-0.80)	0.06 (0.08)	0.08 (0.26)	0.20 (1.15)		
To job from others outside the labour force locally	-52.20 (-0.58)	12.78 (0.27)	-0.64 (-0.20)	5.70* (1.99)	0.96 (1.26)	0.44 (0.54)		
To job from internal in-migration	-0.57 (-0.54)	2.10*** (3.01)	0.18 (0.43)	1.74*** (4.49)	0.72** (2.48)	0.92*** (4.15)		
To job from immigration	0.76 (1.18)	-0.09 (-0.17)	5.31 (1.51)	6.15*** (3.63)	-2.00 (0.54)	0.00 (0.00)		
From job to internal out-migration	-1.12* (-1.88)	0.11 (0.10)	-0.71*** (-2.78)	-0.02 (-0.04)	-0.82*** (-6.54)	-0.50* (-1.92)		
From job to emigration	-1.53 (-0.41)	-2.66 (-1.09)	-1.44 (-1.50)	-3.05 (-1.46)	-3.01 (-0.93)	1.68 (0.97)		
Weighted average	15.60*** (4.50)	6.69*** (17.25)	3.55*** (9.53)	3.39*** (14.59)	5.01*** (7.65)	5.94*** (5.19)		
Adjusted R ²	0.27	0.93	0.81	0.90	0.67	0.53		

Level of significance: 99%***, 95%** , 90%*. (t-values in brackets). Number of observations=43 + 43

4.4. The level of net and gross labour mobility among different groups by citizenship

Investigations of differences and similarities in the labour mobility structure among different citizen groups represent another important approach of the analysis. Here we operate with altogether four main groups defined by each person's citizenship. The main groups include 1) Norwegian citizens, 2) other Nordic citizens, 3) citizens from western European countries and the USA/Canada (Western), whilst the fourth group consists of all remaining citizens (non-Western). (See section 3).

Figure 4.4a shows that the level of gross mobility to job is generally lower among Norwegian citizens compared with all other main citizen groups. The highest gross mobility is generally found among non-Western citizens reflecting a strong flexibility but also a more marginal and thus less stable position in the labour markets. All citizen-groups show, however, a gross mobility that is highly correlated to the business cycle with highest mobility in the strongest growth years 1997 and 1998. It is interesting to note that other Nordic citizens generally show higher gross mobility compared to other Western citizens. A part of this explanation reflects the neighbourhood effect of higher mobility between Norway and other Nordic countries compared with all other international migration.

Figure 4.4a. Gross mobility to job 1994-1999 broken down by Norwegian, other Nordic, Western and non-Western citizens. Norway. Per cent of stock of employed

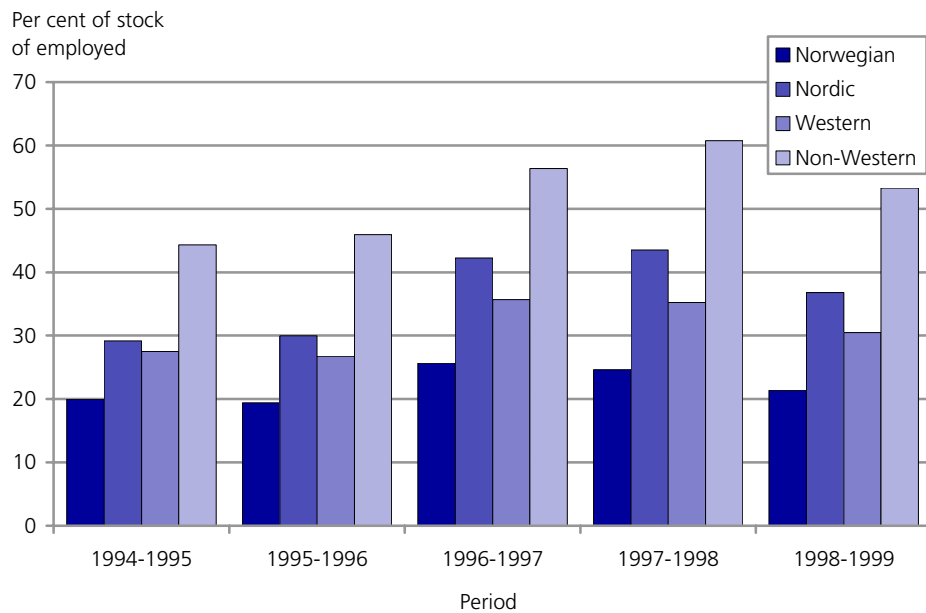
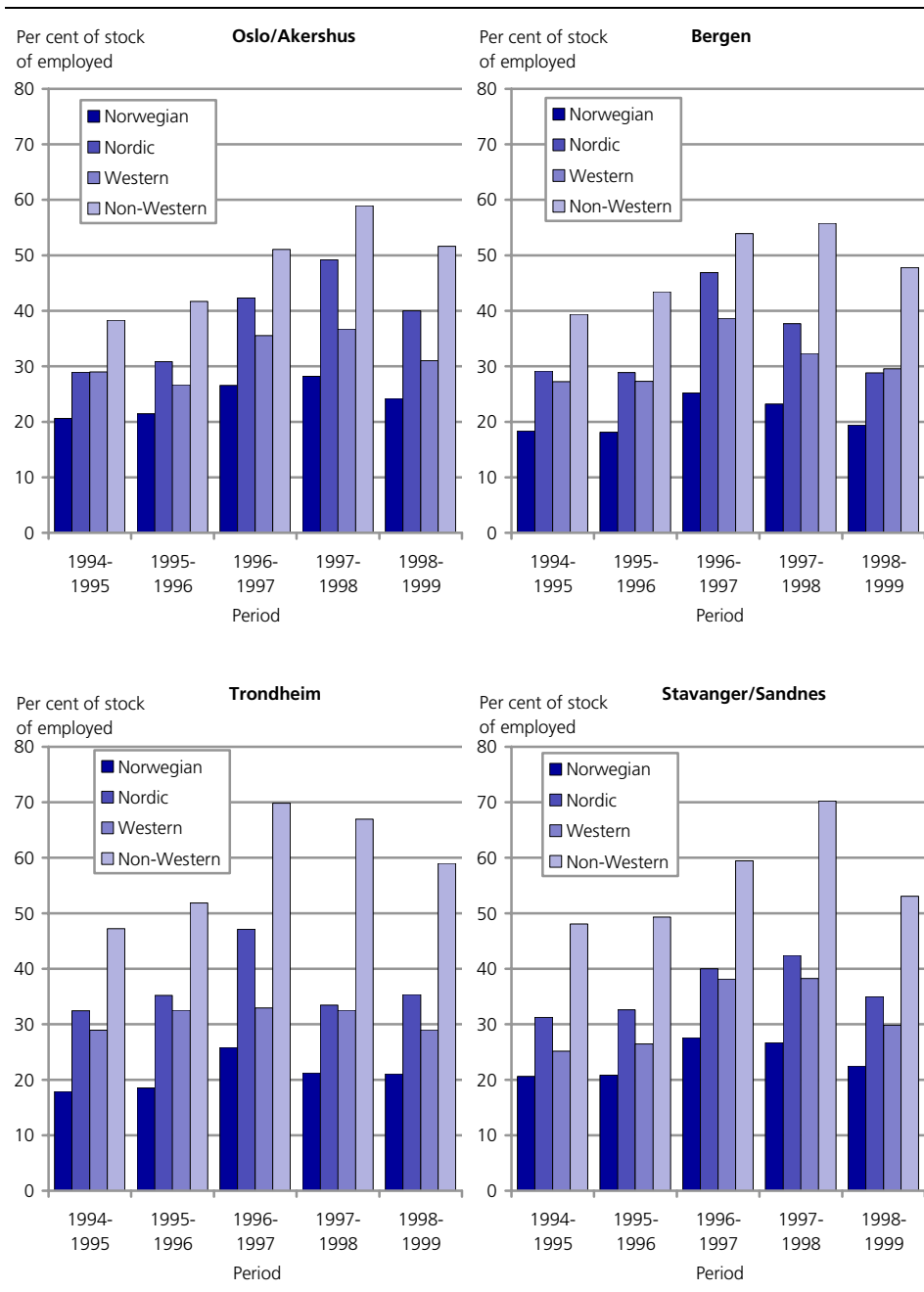
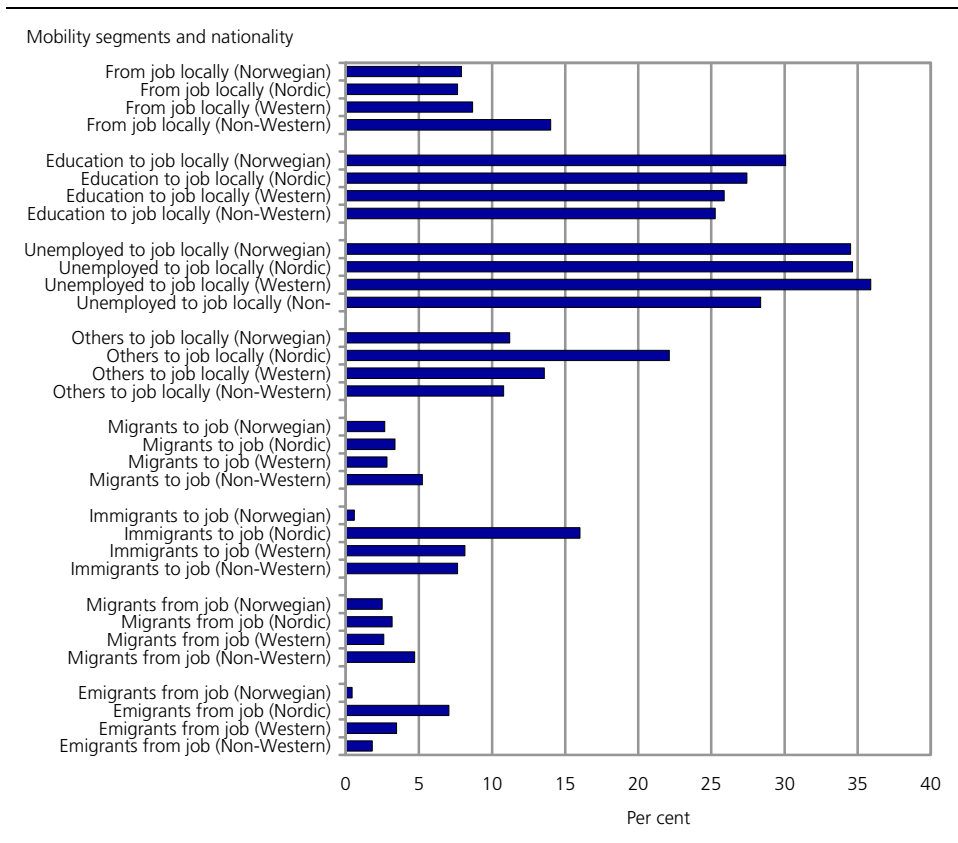


Figure 4.4b. Gross mobility to job 1994-1999 broken down by Norwegian, other Nordic, Western and non-Western citizens. The main urban regions. Per cent of stock of employed



Corresponding gross mobility results are presented for each of the four main urban regions (see figure 4.4b). The main tendency from the national figures, e.g. high gross mobility among non-Western citizens, a relatively lower gross mobility among Norwegian citizens than other citizens as well as higher mobility among other Nordic citizens are generally found in all main urban regions throughout the whole time period. The relatively higher total gross mobility in Oslo/Akershus and Stavanger/Sandnes (see figure 4.1d above) is partly due to a higher mobility to job among Norwegian citizens. Gross mobility among non-Western citizens is especially high in the regions of Trondheim and Stavanger/Sandnes in the top growth years of 1997 and 1998. The gross mobility among other Nordic citizens was also very high in the 1996-1998 period, with an increasing tendency in Oslo/Akershus and Stavanger/Sandnes but a falling tendency in Bergen and especially in Trondheim. All gross mobility to job shows a falling tendency from the top growth period of 1997-1998 to the period 1998-1999, with an exception of Norwegian and other Nordic citizens in Trondheim.

Figure 4.4c. Mobility rates in 8 mobility segments broken down by Norwegian, other Nordic, Western and non-Western citizens 1997-1998. Norway. Per cent



We have examined in more detail how each citizen group behave with respect to different mobility segments. The results are found in figure 4.4c, which shows the mobility rates in 8 different mobility segments for the whole nation in the economic growth period of 1997-1998. The rates are mostly measured in relation to the stock of employed except for the rates for education, unemployment and others outside the labour force which are measured in relation to the number of persons in education, the number of unemployed and the number of persons outside the labour force.

Strong behaviour deviations across the citizen groups have been observed. The probability of leaving a job within the local labour market is much higher among non-Western citizens compared with all other citizen groups. The lowest turnover from jobs within the local labour markets is found among other Nordic and Norwegian citizens. On the other hand, Norwegian citizens show a much higher ability to turn from the educational system into an ordinary job compared with all other groups. The lowest ability to find a job after education is observed among non-Western citizens. This group also shows the lowest transition from unemployment to job within the local labour markets. The highest turnover rate from unemployment to job is found among other Western citizens. Other Nordic persons show a much higher ability to find a job among persons outside the labour force than all other citizen groups. Also here the ability to find a job is lowest among non-Western citizens.

When we turn to geographical mobility the highest mobility rates of internal migration are definitely found among non-Western citizens. This goes for both migration to job and migration from job with a certain positive net effect. Norwegian citizens are more geographically stable than all other national groups. Looking at international migration, other Nordic citizens show much higher rates concerning immigration to job and emigration from job compared with all other groups. In particular, high immigration rates to job also secured high net immigration rates to job from other Nordic citizens in this period. This is in accordance with our findings above, expecting the neighbourhood effect to be of strong importance for the total gross labour mobility of other Nordic citizens. As we could expect, the immigration/emigration rates are lowest among Norwegian citizens while both Western and non-Western citizens show a relatively high gross and net immigration rates to job.

Table 4.4a shows corresponding results from a comparison of labour mobility among citizen groups broken down by different types of mobility in the four main urban regions in Norway. The results are standardized around the national average figures set at zero, showing the deviation from the national averages in per cent point for each segment of mobility.

Table 4.4a. Labour mobility by mobility segment and citizenship in the main urban regions 1997-1998. Deviation from the national average in per cent point

Mobility group:	Oslo/ Akershus	Bergen	Trondheim	Stavanger/ Sandnes
Still in job locally (Norwegian)	-0.3	0.1	0.7	0.5
Still in job locally (Nordic)	-0.3	0.7	1.4	0.7
Still in job locally (Western)	-0.9	0.4	1.7	1.6
Still in job locally (Non-Western)	-1.1	0.3	-0.5	0.0
From education to job locally (Norwegian)	6.4	0.2	-5.3	5.4
From education to job locally (Nordic)	4.6	-6.2	-17.4	8.1
From education to job locally (Western)	5.6	-4.3	1.7	6.4
From education to job locally (Non-Western)	3.3	-5.7	-6.5	1.7
From unemployed to job locally (Norwegian)	-0.1	1.8	-2.8	3.1
From unemployed to job locally (Nordic)	1.3	-7.4	-4.8	10.8
From unemployed to job locally (Western)	-2.0	-0.4	-0.8	6.6
From unemployed to job locally (Non-Western)	-0.8	-0.4	-5.7	4.8
From others to job locally (Norwegian)	2.9	0.2	-1.7	2.5
From others to job locally (Nordic)	3.3	-4.0	-3.4	5.4
From others to job locally (Western)	1.6	-0.3	-2.3	-3.7
From others to job locally (Non-Western)	0.2	-1.3	-2.3	2.4
In-migration to job (Norwegian)	0.3	-0.8	0.1	0.0
In-migration to job (Nordic)	-1.3	-0.5	0.2	-0.3
In-migration to job (Western)	-1.0	-0.6	-0.5	-0.8
In-migration to job (Non-Western)	-1.4	-2.2	-1.5	0.5
Immigration to job (Norwegian)	0.2	-0.1	-0.2	0.3
Immigration to job (Nordic)	4.0	-3.2	-5.0	-2.3
Immigration to job (Western)	-0.4	-0.8	0.0	6.0
Immigration to job (Non-Western)	-0.2	1.3	4.3	1.1
Out-migration from job (Norwegian)	-0.3	-0.9	0.1	-0.5
Out-migration from job (Nordic)	-1.3	0.3	0.6	-0.9
Out-migration from job (Western)	-1.2	-0.5	0.9	-0.8
Out-migration from job (Non-Western)	-3.4	-2.1	2.6	-2.3
Emigration from job (Norwegian)	0.2	-0.1	-0.1	0.1
Emigration from job (Nordic)	0.3	-1.1	2.2	-1.6
Emigration from job (Western)	-0.3	0.5	0.6	5.2
Emigration from job (Non-Western)	0.0	1.3	1.9	-0.3
Average (Norwegian)	1.2	0.3	-1.2	1.5
Average (Nordic)	1.6	-2.5	-4.0	3.1
Average (Western)	0.6	-0.7	-0.2	1.5
Average (Non-Western)	0.4	-0.9	-2.1	1.6
Adjusted average (Norwegian)	1.34	0.25	-1.05	1.07
Adjusted average (Nordic)	0.11	-0.03	-0.04	0.09
Adjusted average (Western)	0.01	-0.01	0.00	0.00
Adjusted average (Non-Western)	0.00	-0.03	-0.05	-0.01

In general, the ability to keep in employment within the local labour markets is higher in the regions of Bergen, Trondheim and Stavanger/Sandnes than the national average suggests. The only exception is found among non-Western citizens in Trondheim. Particularly good results are observed for Norwegian citizens in Trondheim, for other Nordic citizens in all three regions and for other Western citizens in Trondheim and Stavanger/Sandnes. On the other hand, the capital region of Oslo/Akershus shows negative figures for all national groups with the weakest mobility performance for Western and non-Western citizens.

The ability to employ persons directly from the education system is definitely better in the capital region of Oslo/Akershus and Stavanger/Sandnes than in the other two main regions. In the capital region this mobility performance is highest among Norwegian citizens and weakest among non-Western citizens, although all citizen groups perform better in Oslo/Akershus than the national average suggests. This is also the case in Stavanger/Sandnes with best mobility performance amongst other Nordic and other Western citizens but also here weakest among non-Western citizens. A particularly weak performance is observed among non-Norwegian citizens in Bergen and all except for other Western citizens in Trondheim.

The probability of transferring unemployed to job also varies across the main regions. The capital region of Oslo/Akershus performs better for other Nordic citizens than the national average suggests, while all other groups perform worse. The best ability to employ unemployed persons is found in the region of Stavanger/Sandnes. Bergen and Trondheim show negative figures for all national groups except for Norwegian citizens in Bergen.

With regard to the ability of employing persons from outside the labour force, the best performance is found in Oslo/Akershus and Stavanger/Sandnes. The capital region shows positive figures for all citizen groups, especially for Norwegians and other Nordic citizens, whilst Stavanger/Sandnes here shows best mobility performance among other Nordic citizens but negative for other Western citizens. As for unemployment to job, the transition from others to job is negative for all national groups in Bergen and Trondheim except for Norwegian citizens in Bergen.

The rates of geographical mobility show higher positive in-migration to job for Norwegian citizens in Oslo/Akershus and Trondheim than the national average suggests, whilst this figure is strongly negative for Bergen. All in-migration rates to job are mostly below the national average for non-Norwegian citizens except for other Nordic citizens in Trondheim and non-Western citizens in Stavanger/Sandnes. Particularly weak is the in-migration rates to job among non-Western citizens in Bergen, Trondheim and Oslo/Akershus. The corresponding out-migration rates from job are all below the national average for all national groups in the capital regions. This is almost generally true also for Bergen and Stavanger/Sandnes, whilst the region of Trondheim shows higher out-migration

rates from job for all citizen groups than the national average suggests. Looking at the net effects of internal migration to and from jobs, in and out-migration evenly contributes to positive net in-migration to job among Norwegian citizens in Oslo/Akershus. In spite of lower than average in-migration to job among other Western and non-Western citizens in the capital region a much lower than average out-migration from job secure a positive net effect of in-migration to job for these groups in Oslo/Akershus. In Bergen the lower than average in-migration to job was not compensated by lower out-migration from job resulting in negative net effects of migration to jobs for all citizen groups. The higher than average out-migration from job in Trondheim also gave negative net effects of migration to job except from Norwegian citizens. Stavanger/Sandnes shows positive net effects of migration to job among Norwegian citizens but negative net effects for other Nordic and non-Western citizens. It is, however, important to bear in mind that the in-migration rates to job are somewhat higher than the out-migration rates from job at the national level in this period, making the above average values of in-migration rates somewhat more important than the corresponding out-migration rates.

Turning to international migration, the capital region experienced higher than average immigration to job among Norwegian and other Nordic citizens, whilst the opposite was true for Western and non-Western citizens. The other three regions show a clearly lower than average immigration to job among other Nordic citizens but above average immigration for non-Western citizens. The positive effect of immigration to job is, however, especially high for other Western citizens in Stavanger/Sandnes. The corresponding emigration figures reveal a higher than average emigration from job among Norwegian and other Nordic citizens and a lower than average emigration from job among Western citizens in Oslo/Akershus. The other three regions show a higher than average emigration of Western citizens and especially then in Stavanger/Sandnes. For Nordic citizens the emigration from job is lower than average in Bergen and Stavanger/Sandnes but higher than average in Trondheim. Bergen and Trondheim also show higher than average emigration of non-Western citizens.

Looking at the total average figures at the bottom of table 4.4a the capital region of Oslo/Akershus and the region of Stavanger/Sandnes show positive indexes for all citizen groups. In Oslo/Akershus the best total mobility performances is found among other Nordic and Norwegian citizens, whilst in Stavanger/Sandnes other Nordic citizens show the best performance followed by an evenly distributed mobility performance among all other citizen groups. Bergen also shows above total average mobility performance for Norwegian citizens but below average total performance for all other citizen groups. In Trondheim the total average mobility performance is below the national average for all citizen groups.

Table 4.4b shows correlation results for the relationship between net employment growth and different types of gross mobility to and from job in altogether 86 Norwegian local labour markets in the strong upswing period of 1997-1998.

A positive correlation has been observed between the ability to stay in job in the local labour markets and employment growth for all groups except for West Europeans and North Americans. However, only Norwegian citizens show a certain significance in the ability to stay employed locally. Also for the transitions from education to job there are positive parameters for all groups except for West Europeans and North Americans. None of the estimates are, however, significant at a 90 per cent level, but there are indications that this type of mobility functions somewhat better for Norwegian citizens compared to the other national groups. Transition from unemployment to job in the local labour markets is only positive and significant for Norwegian citizens. For other Nordic and Non-Western citizens this relationship is even negative, although not significant. To job from others outside the labour force shows rather weak correlation with the employment growth with mostly negative parameters, but only with a certain significance for West-European and North American citizens. To job from internal in-migration generally shows positive correlations, but is clearly most significant for Norwegian citizens. To job from immigration is only positively correlated for Norwegians but most significant although negatively correlated for West-European and North Americans. Transition from job due to internal out-migration is generally negatively correlated with job growth, and most strongly so for non-Western citizens and Norwegians. Emigration from job is, as expected, mostly negatively correlated with employment growth except from among non-Western citizens, but none of the groups show significant correlations here. Looking at a weighted average for all types of mobility the correlation is only strong and positive for Norwegian citizens. This means that in total the labour mobility has the highest functionality among Norwegians with respect to transitions in directions job in the strongest growing regions. However, this result does not necessarily indicate a negative conclusion seen from a labour market policy view. In a period with a very tight labour market in quite many regions, there were lacks of supply of labour in many regions outside the main and strongest growing local labour markets of the nation, thus making it beneficial that not all foreigners follow the main stream of labour market mobility among Norwegian citizens. It is, however, important to note that negative correlation between employment growth and immigration to job among foreigners is followed by a more evenly behaviour among Norwegian and foreign citizens when it comes to internal in- and out-migration.

Table 4.4b. The relationship between net employment growth and gross labour mobility measured as specific mobility performance by groups of nationality 1997-1998. Basis: 86 regions in Norway

Type of mobility	Norwegian citizens	Other Nordic citizens	West European and North American citizens	Non-Western citizens
Still in job locally	0.250* (1.83)	0.035 (0.76)	-0.004 (-0.10)	0.041 (1.56)
To job from education locally	0.043 (0.97)	0.004 (0.30)	-0.007 (-0.79)	0.002 (0.14)
To job from unemployment locally	0.060** (2.09)	-0.002 (-0.23)	0.006 (0.94)	-0.014 (-1.55)
To job from others outside the labour force locally	-0.038 (-0.56)	0.001 (0.03)	-0.031* (-1.66)	-0.025 (-1.61)
To job from internal in-migration	1.044*** (5.27)	0.092* (1.66)	0.027 (0.66)	0.075** (2.51)
To job from immigration	1.498* (1.84)	-0.008 (-0.46)	-0.048*** (-3.67)	-0.025 (-0.63)
From job to internal out-migration	-0.960*** (-5.61)	-0.101** (-2.19)	-0.084** (-2.59)	-0.094*** (-6.12)
From job to emigration	-0.867 (-0.68)	-0.025 (-0.64)	-0.015 (-0.24)	0.052 (0.95)
Weighted average	0.866*** (6.70)	-0.001 (-0.00)	-0.006 (-1.42)	0.008 (1.49)
Adjusted R ²	0.88	0.93	0.79	0.31

Level of significance: 99%***, 95%***, 90%*. (t-values in brackets). Number of observations=86

In table 4.4c and 4.4d we have investigated this relationship a bit further by breaking down this analysis by the 43 Norwegian regions with the strongest net employment growth and the 43 regions with the lowest net employment growth.

The relationship between net employment growth and the ability to stay employed in the local labour markets is positive with a certain significance only for other Nordic citizens in regions with the weakest growth of employment. In the weakest growing regions the relationship between employment growth and local recruitment from the educational system is only significant and positive for Norwegians, and negative but not significant for all other groups of citizens. In the strongest growing regions this relationship is not significant for any of the groups, but the figures indicate most positive correlations for West-Europeans and North Americans. Concerning the recruitment from unemployment the figures indicate a positive but not significant relationship for Norwegians in both categories of regions. The only significant relationship is found among non-Western citizens in the regions with the strongest employment growth. The correlation is also weak for recruitment from other persons outside the labour force, with no significant parameters. The results are more as could be expected for Norwegians concerning internal in-migration, showing a strong, positive and significant relationship between em-

ployment growth and in-migration to jobs in the regions with the strongest growth. The Norwegians also show positive correlations in the weakest growing regions, although without significance. The only significant correlation for in-migration to job among non-Norwegians was found among non-Western citizens in the weakest growing regions, although this was negative. For immigration to job the parameters are significant only for West European and North Americans, but negatively directed both in the strongest growing regions but especially in the regions with weak employment growth. The relationship between net job growth and internal out-migration from job is generally negative for all groups of citizens in both categories of regions, but most significant for persons with Norwegian and non-Western citizenship. For emigration from job the relationship is only significant for non-Western citizens in the weakest growing regions, although positively directed. For Norwegian and other Nordic citizens the figures indicate negative correlations in the strongest growth regions, but negative correlations in the in the regions with the weakest growth.

Table 4.4c. The relationship between net employment growth and gross labour mobility measured as specific mobility performance by groups of nationality 1997-1998. Basis: 43 regions in Norway with highest growth of employment

Type of mobility	Norwegian citizens	Other Nordic citizens	West European and North American citizens	Non-Western citizens
Still in job locally	-0.003 (-0.02)	-0.031 (-0.88)	-0.007 (-0.26)	0.009 (0.36)
To job from education locally	-0.015 (-0.36)	-0.003 (-0.34)	0.012 (1.46)	0.007 (0.52)
To job from unemployment locally	0.011 (0.40)	-0.002 (-0.36)	-0.003 (-0.60)	0.021** (2.35)
To job from others outside the labour force locally	-0.008 (-0.14)	0.006 (0.44)	0.004 (0.21)	-0.034 (-1.35)
To job from internal in-migration	0.621*** (3.09)	0.069 (1.43)	-0.009 (-0.35)	0.017 (0.86)
To job from immigration	0.561 (0.89)	-0.007 (-0.44)	-0.030* (-1.74)	-0.003 (-0.13)
From job to internal out-migration	-0.593*** (-3.24)	-0.060* (-1.65)	-0.047 (-1.59)	-0.044*** (-2.98)
From job to emigration	-0.898 (-0.79)	-0.026 (-0.74)	0.071 (1.49)	0.055 (0.90)
Weighted average	0.239** (2.31)	0.001 (0.01)	-0.004 (-0.34)	0.045** (2.17)
Adjusted R ²	0.88	0.93	0.79	0.23

Level of significance: 99%***, 95%** , 90%*. (t-values in brackets). Number of observations=43

Table 4.4d. The relationship between net employment growth and gross labour mobility measured as specific mobility performance by groups of nationality 1997-1998. Basis: 43 regions in Norway with lowest growth of employment

Type of mobility	Norwegian citizens	Other Nordic citizens	West European and North American citizens	Non-Western citizens
Still in job locally	0.223 (1.13)	0.090* (1.89)	-0.033 (-0.83)	-0.037 (-1.28)
To job from education locally	0.111* (1.65)	-0.008 (-0.40)	-0.009 (-1.21)	-0.013 (-0.78)
To job from unemployment locally	0.055 (1.50)	-0.007 (-0.74)	0.001 (0.15)	-0.013 (-1.46)
To job from others outside the labour force locally	0.007 (0.07)	-0.010 (-0.67)	-0.011 (-0.64)	0.007 (0.54)
To job from internal in-migration	0.507 (1.56)	0.067 (1.17)	0.026 (0.54)	-0.087* (-2.02)
To job from immigration	-0.480 (-0.32)	-0.008 (-0.43)	-0.037*** (-3.41)	0.024 (0.51)
From job to internal out-migration	-0.600** (-2.17)	-0.015 (-0.30)	-0.026 (-0.79)	-0.052*** (-2.80)
From job to emigration	0.530 (0.30)	0.051 (1.42)	-0.017 (-0.25)	0.098* (1.90)
Weighted average	0.626*** (3.58)	0.025 (0.88)	-0.040*** (-4.31)	0.020 (1.32)
Adjusted R ²	0.88	0.93	0.79	0.20

Level of significance: 99%***, 95%***, 90%*. (t-values in brackets). Number of observations=43

The relationship between net employment growth and a weighted average of all types of mobility by citizenship gives strong and positive effects for persons with Norwegian citizenship in both categories of regions and among those with non-Western citizenship in the regions with the strongest growth of employment. On the other hand, a highly significant but negatively directed correlation was found among western Europeans and North Americans in the weakest growing regions.

4.5. "Brain-gain" or "brain-drain" in the regional labour market mobility

In all sections above we have analysed the quantitative aspects of regional labour mobility measuring the gross and net streams of intra- and interregional mobility by the number of persons. In this section we examine the qualitative impacts of labour mobility between regions and sectors. As has already been illustrated, well-functioning regions are expected to become net receivers of labour from other regions. In addition these regions are also expected to attract the most qualified labour and thus be the winners in the competition for the best human capital.

For an examination of the two concepts "brain-gain" (a relative gain of qualified persons) and "brain-drain" (a relative loss of qualified persons), we have introduced a concept of average education (for definition see section 3 above). As described in Stambøl (2002), there was a clear tendency towards an increase in the education level of the population in all regions during the 1990s, and especially for the number of people with higher education.

The "brain-gain"/"brain-drain" approach poses important questions in terms of regional competitiveness across the different sectors. In table 4.5a the average education level in different sectors and regions for the period 1994-1999 is shown. The average education level of all employed in Norway is recognized by an index set at 100. Indexes above and below 100 means education level above and below the national average respectively. The regional level follows the classification of 7 regional typologies, while the employed persons are distributed on 28 sectors (see definitions in section 3).

Besides the non-market services of basic and higher education and research and development the highest level of education in the nation as a whole was found in information technology, other business services, public administration and pharmaceutical production. The lowest level of education was observed in the primary sectors of agriculture, forestry and fishing, mining, labour intensive manufacturing and in post and courier activities. As the regional average of all sectors suggests, the highest education level in most sectors was found in the capital region and in regional metropolises, and vice versa the lowest level in medium sized towns and regions, small labour areas and micro labour areas. Sectors such as primary/mining and manufacturing all showed a significantly higher education level in the capital region than in other typologies of regions, mostly due to more administrative functions and localisation of head offices. The higher education level of the capital region was also pronounced in sectors such as retail, recreation, culture and sport, telecommunication, health and social work and public administration. At the other end of the scale, micro labour areas exhibited a lower education level than that of the national average across all sectors except from renting of office machinery. Most pronounced was the relatively low education level in sectors such as ICT- manufacturing, pharmaceutical production, telecommunication, financial intermediation and particularly in research and development.

What then are the net effects of the "brain-gain" and "brain-drain" processes across the sectors? Tables 4.5b-d illustrate the intra- and interregional competitiveness of qualified persons between sectors as an average for the period 1994-1999. The first table shows the net effects of "brain-gain"/"brain-drain" processes among cross sector mobile employed and persons changing their labour market status within the local labour markets. The second table illustrates the net results of qualifications from job migration between regional typologies totally, whilst the third table shows the net effects of education improvement across the sectors by the migration processes.

Within the local labour markets, the most pronounced "brain-gain" sectors were found in telecommunication, printing and publishing and higher educational institutions, whilst the sectors which predominantly experienced "de-qualification" through local cross sector mobility were pharmaceutical production, hotel and restaurant and retail, recreation, culture and sport (table 4.5b). Nevertheless, it was plain to see there were different regional effects of these processes at work. The strong "brain-gain" sector of telecommunication showed, however, a strong "brain-gain" within all regional typologies. The most pronounced "brain-gain" sector at the regional level was renting of office machinery in medium-sized towns and regions and regional metropolises. This may however be seen in light of the relatively low number of employed in this sector, making the potential educational change effect from gross mobility somewhat higher. Other strong "brain-gain" sectors at the regional level were ICT- manufacturing in micro labour areas, electro (electric and electronic manufacturing) in the capital region and medium sized towns and regions, printing and publishing in small and micro labour areas, energy in medium sized towns and regions, pharmaceutical production in medium sized towns and regions, small labour areas and micro labour areas, financial intermediation in other regional centres and research and development in medium sized towns and regions and micro labour areas. On the other hand the most typical "de-qualification" sectors from gross labour mobility within the local labour markets were pharmaceutical production in regional centres with a university and other regional centres, retail, recreation, culture and sport in the capital region, hotel and restaurant in the capital region, regional metropolises and small labour areas and renting of office machinery in small labour areas and micro labour areas.

It is, however, important to note a certain divergence of education improvement by labour mobility within the local labour markets totally, showing a "brain-gain" in all regions except from the capital region. This may be seen in light of a very tight labour market in the capital region forcing employers to search for labour among more marginal parts of the labour force, but partly also due to the fact of strong "brain-gain" effects through the migration processes, which are described in more detail below.

Table 4.5c shows the total annual net effect of "brain-gain" and "brain-drain" through the migration process between regions in 1994-1999. The total figures pronounce a strong "brain-gain" effect in the capital region through inter-regional migration with a certain increase in the last years of the investigation period. All other regional typologies mostly show a "brain-drain" through the migration processes with an exception of regional metropolises in the 1994-1995 and 1996-1997 periods and in regional centres with a university in the very beginning of the period. The strongest "brain-drain" through the migration processes is observed in medium-sized towns and regions, in small labour areas and in micro labour areas. The national figures indicate, however, that the net effects of all gross labour migration within the country contributed to an education improvement of the employment in all the years of the investigation period.

Table 4.7c show that the capital region generally had a "brain-gain" in all regional migration interactions except from regional centres with a university in parts of the period. Most pronounced was the "brain-gain" effect in the migration interactions with medium-sized towns and regions. The strongest "brain-drain" effect of migration interactions was, as we could expect, from all other regional typologies to the capital region, but the "brain-drain" effect is also strong in the migration from micro labour areas to most other regional typologies, from small labour areas to other regional centres and medium-sized towns and regions, from medium-sized towns and regions to regional metropolises and partially from regional centres with a university to other regional centres, medium-sized towns and regions and small labour areas.

As shown in table 4.5d, renting of office machinery, electro (electric and electronic manufacturing), machine and transport production, energy and pharmaceutical production experienced the highest "brain gain" through migration processes, whilst the most pronounced "brain-drain" sectors through migration were research and development, post and courier activity, hotel and restaurant, primary/mining and the non-market services of basic education.

At the regional level the most pronounced "brain-gain" effect from internal migration were found in renting of office machinery in the capital region. The number of migrants behind these changes were, however, not very high. The very strong "brain-gain" effect of migration to the capital region was found in ICT-manufacturing, labour intensive manufacturing and electro (electric and electronic manufacturing) partly due to main office location. Energy, different distribution services and finance also contributed remarkably to this "brain-gain" effect. Somewhat surprisingly sectors like research and development and non-market services like basic and higher education contributed to a weak "brain-drain" in the capital region during this period. Other strong "brain-gain" sectors from migration at the regional level were electro (electric and electronic manufacturing) in regional centres with a university, financial intermediation in medium-sized towns and regions, membership organisations in regional centres with a university and higher education in other regional centres and small labour areas. The most typical "de-qualification" sectors from migration were ICT-manufacturing in regional centres with a university and medium-sized towns and regions, pharmaceutical production in medium-sized towns and regions, telecommunication and higher education in regional centres with a university and research and development in regional metropolises.

Finally we have briefly investigated how the "brain-gain"/"brain-drain" process through migration corresponds to the net effects of migration to job. There are reasons to expect that the regions with the highest net in-migration to job also benefit from a "brain-gain" through the migration process and vice-versa that regions experiencing a strong net loss through the migration process also suffer from a "brain-drain" in this respect. Some regions may, however, compensate a negative net-migration with a "brain-gain" through the migration process, whilst

some regions may experience a "brain-drain" through migration in spite of positive net in-migration. Figure 4.5a illustrates the relationship between net migration to job and average net change in education for 86 regions in Norway in the period 1994-1999.

There are only 12 of these regions that experienced a positive net-migration and a positive "brain-gain" effect revealing higher average education level of in-migrants to job compared with out-migrants from job. Not surprisingly it is the capital region that shows the strongest net in-migration to job as well as the highest "brain-gain" through the migration processes. Two other regions, Tønsberg/Horten and Kongsberg, perform better than the national average on both variables. The first region is classified amongst other regional centres and the second one amongst small labour areas. Another two regions within this category of regions, Trondheim and Lillesand, perform very well on "brain-gain" through the migration processes but the effect of net migration to job is rather weak, albeit positive. Altogether the capital region, 2 regional metropolises (Trondheim and Stavanger/Sandnes), 6 other regional centres, 1 medium sized town and region and 2 small labour areas are found among these regions.

Another 12 regions show positive net in-migration to job but suffer from negative education improvement through migration due to the fact that out-migrants from job had a higher average education level than their corresponding in-migrants to job. The strongest positive net-migration to job in this category was observed in the region of Moss, which is classified as a medium sized town and region, while the weakest net change in education was observed in the region of Mandal, which is classified amongst small labour areas. The regions showing negative net change in education but positive net-migration to job are distributed between 1 regional metropolis (Bergen), 4 other regional centres, 3 medium-sized towns and regions and 4 small labour areas.

Furthermore, 27 regions show negative net-migration to job, but partly compensate for this by a "brain-gain" through the migration processes. The strongest educational compensation effect was observed in the region of Vadsø, which also showed the highest negative net migration from job within this category of regions. Vadsø is classified amongst other regional centres. Altogether this category of regions compensating their negative net-migration to job by "brain-gain" through the migration processes is distributed between 1 regional centre with a university, 4 other regional centres, 4 medium-sized towns and regions, 2 small labour areas and 16 micro labour areas. The relatively high numbers of micro labour areas here indicate, however, an educational compensation of negative net-migration in certain parts of the more remote areas.

The remaining 35 regions experienced both negative net-migration to job as well as a "brain-drain" through the migration processes. This category of regions is further distributed between 3 other regional centres, 3 medium sized-towns and regions, 6 small labour areas and 23 micro labour areas.

Table 4.5a. Average education level of employed persons 1994-1999 by sectors and typology of regions. Index: The average education level of all employed in Norway is set at 100¹

Typology of region:	Ca- pital region	Re- gional metro- polises	Re- gional centres with a univer- sity	Other re- gional cen- tres	Me- dium- sized towns and regions	Small labour areas	Micro labour areas	Norway
Sectors:								
1. Primary/mining	95	90	82	89	89	88	87	88
2. Manufacturing/raw material	105	93	92	94	92	93	94	95
3. Manufacturing/labour intensive	93	91	90	91	89	90	90	91
4. Machine and transport production	98	98	93	95	95	96	95	96
5. ICT-Manufacturing	108	104	106	103	98	103	98	104
6. Electro	102	99	95	96	94	97	96	98
7. Printing and publishing	101	98	99	98	96	98	98	99
8. Energy	108	108	100	100	99	99	98	103
9. Pharmaceutical production	114	114	104	101	101	98	95	107
10. Construction	97	96	94	94	92	93	92	94
11. Retail, recreation, culture and sport	98	95	94	93	92	92	92	94
12. Hotel and restaurant	95	95	95	93	93	93	93	94
13. ICT-Wholesale	102	100	97	100	99	101	99	101
14. Other Wholesale	98	95	93	94	93	94	94	95
15. Transport	96	95	93	93	91	92	92	94
16. Post and courier activity	93	93	92	91	91	90	90	92
17. Telecommunication	108	103	103	102	99	100	99	104
18. Activities auxiliary to financial intermediation	112	108	99	104	105	102	100	109
19. Finance	103	99	100	97	96	97	97	99
20. Renting of office machinery and equipment	103	99	102	102	99	100	105	102
21. Information technology	114	115	114	110	109	111	112	113
22. Research and development	127	125	126	124	115	114	110	124
23. Other business activities	115	111	112	109	107	107	108	111
24. Membership organisations and others	106	101	99	100	99	99	99	102
25. Basic education	121	120	121	119	118	119	118	119
26. Higher education	130	128	130	129	127	134	127	129
27. Health and social work	107	104	104	102	100	100	99	102
28. Public administration	111	107	105	106	105	104	104	107
All sectors	105	102	101	99	97	97	97	¹ 100

Table 4.5b. Average education level of entries to job versus exits from job within the local labour markets 1994-1999 by sector and typology of region. Index: The average education level of exits from job is set at 100

Typology of region:	Ca- pital region	Re- gional me- tropo- lises	Re- gional centres with a unive- sity	Other re- gional cen- tres	Me- dium- sized towns and regions	Small labour areas	Micro labour areas	Norway
Sectors:								
1. Primary/mining	99.8	99.2	100.6	100.7	101.2	100.1	100.9	100.5
2. Manufacturing/raw material	101.4	101.1	106.5	102.1	102.2	101.6	101.8	101.5
3. Manufacturing/labour intensive	100.2	101.4	100.8	101.1	101.6	101.2	101.5	101.2
4. Machine and transport production	102.7	101.0	99.5	101.2	101.5	101.4	100.6	101.1
5. ICT-Manufacturing	101.8	100.8	101.9	100.8	102.2	98.1	103.4	100.9
6. Electro	103.1	99.4	100.7	101.9	103.2	98.3	102.8	101.5
7. Printing and publishing	101.3	102.6	99.4	102.3	101.1	104.4	103.9	102.0
8. Energy	101.1	100.9	100.1	100.8	103.4	102.6	102.6	101.5
9. Pharmaceutical production	97.0	101.1	80.7	97.9	104.1	103.5	103.8	97.4
10. Construction	98.1	99.8	100.1	100.1	100.3	100.2	101.1	99.9
11. Retail, recreation, culture and sport	97.5	98.6	99.5	98.9	99.5	99.3	100.0	98.7
12. Hotel and restaurant	97.3	97.6	98.0	98.0	98.2	97.9	99.0	97.9
13. ICT-Wholesale	99.1	100.3	99.7	99.5	100.5	99.0	101.5	99.5
14. Other Wholesale	99.9	100.6	100.8	100.0	100.1	99.4	100.5	100.0
15. Transport	99.1	100.3	100.8	100.4	101.4	100.8	101.2	100.3
16. Post and courier activity	100.7	101.1	100.6	100.3	101.2	101.7	102.6	101.1
17. Telecommunication	103.0	105.2	103.9	105.3	105.6	104.7	105.4	105.4
18. Activities auxiliary to financial intermediation	101.2	102.7	98.8	103.6	99.1	98.0	100.2	101.4
19. Finance	101.5	101.4	101.8	101.3	101.5	100.8	101.7	101.4
20. Renting of office machinery and equipment	98.5	106.0	-	98.4	111.2	94.4	94.5	99.6
21. Information technology	100.3	101.8	101.0	100.5	99.8	99.9	99.7	100.6
22. Research and development	99.8	99.6	102.7	98.7	103.1	99.0	105.0	99.9
23. Other business activities	99.2	99.6	98.2	100.1	101.0	99.4	100.1	99.6
24. Membership organisations and others	99.8	99.8	99.4	99.7	99.5	99.4	101.1	99.7
25. Basic education	98.1	99.9	99.0	100.4	99.3	100.6	100.6	99.8
26. Higher education	101.2	102.0	100.3	102.8	102.1	101.9	102.7	101.7
27. Health and social work	98.8	99.4	98.9	99.7	100.3	100.0	100.9	99.6
28. Public administration	99.6	99.1	98.8	98.8	100.6	100.1	100.6	99.7
All sectors	99.7	100.3	100.3	100.4	100.8	100.6	101.3	100.4

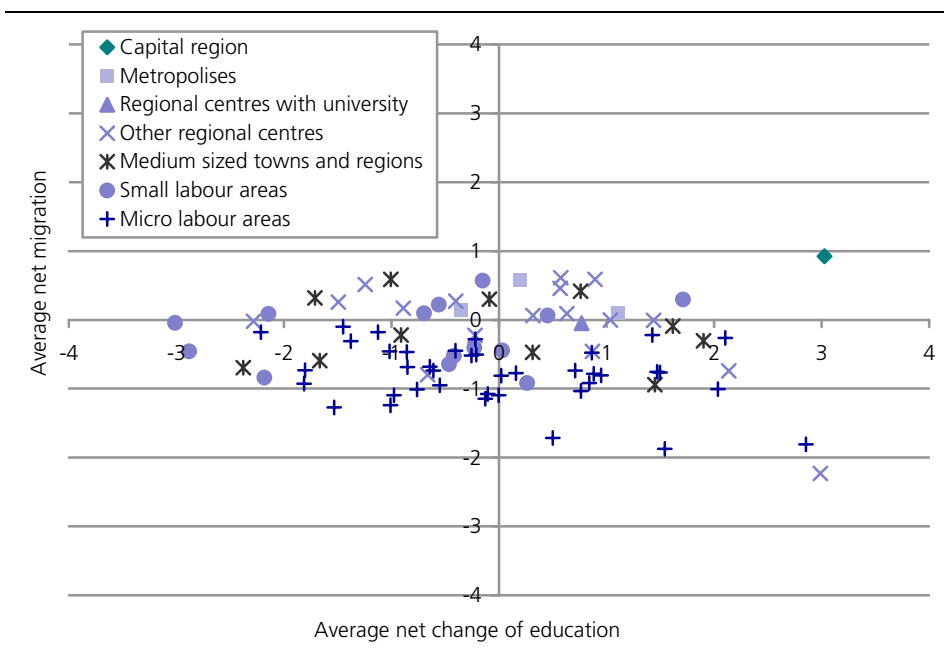
Table 4.5c. Average education level of in-migrants to job and out-migrants from job 1994-1999 by typology of region. Index: The education level of out-migrants from job is set at 100

Region of origin:	Periods	Capital region	Regional metropolises	Regional centres with a university	Other regional centres	Medium-sized towns and regions	Small labour areas	Micro labour areas	Total
Region of destination:									
Capital region	1994-95	-	100.6	96.5	102.2	103.9	102.3	103.1	102.6
	1995-96	-	101.6	95.6	102.4	105.3	101.4	103.0	102.9
	1996-97	-	102.2	101.4	102.6	106.4	103.6	102.6	103.7
	1997-98	-	100.5	101.5	102.1	104.8	103.6	103.4	103.0
	1998-99	-	101.0	99.8	102.3	105.1	103.4	103.2	103.1
Regional metropolises	1994-95	100.0	101.1	96.8	100.9	100.5	101.7	103.7	100.3
	1995-96	98.8	100.5	102.3	100.0	100.7	102.0	103.2	99.9
	1996-97	98.6	100.0	98.1	101.0	102.2	102.9	103.7	100.2
	1997-98	99.5	99.9	98.6	99.4	101.5	100.0	101.7	99.3
	1998-99	99.5	100.1	99.2	101.3	100.6	100.2	102.3	99.9
Regional centres with a university	1994-95	101.0	100.6	-	102.0	99.0	95.5	102.4	100.2
	1995-96	102.8	97.9	-	102.7	95.2	104.8	101.5	99.9
	1996-97	98.3	103.0	-	97.9	101.8	106.4	102.2	99.2
	1997-98	98.0	100.2	-	97.4	98.6	98.1	98.4	97.6
	1998-99	98.4	98.7	-	98.6	97.3	98.4	101.8	98.9
Other regional centres	1994-95	97.9	100.2	99.4	99.8	101.3	101.9	101.9	99.5
	1995-96	98.2	100.7	96.7	100.3	101.8	104.0	100.9	99.8
	1996-97	98.0	100.0	102.8	100.3	99.1	100.0	102.0	99.4
	1997-98	98.6	99.8	101.2	100.0	99.8	100.9	101.4	99.6
	1998-99	98.2	99.4	102.5	100.4	101.8	100.2	102.5	99.7
Medium-sized towns and regions	1994-95	97.5	99.9	101.4	99.3	99.8	99.1	101.8	99.3
	1995-96	95.7	98.6	101.2	98.4	99.8	102.3	101.7	98.2
	1996-97	94.9	99.2	98.3	101.2	100.2	98.0	102.6	98.5
	1997-98	96.1	98.8	100.9	100.5	100.0	101.8	101.2	98.7
	1998-99	95.7	100.0	103.1	99.1	100.3	106.9	103.6	98.8
Small labour areas	1994-95	98.6	100.1	108.6	98.9	101.6	100.1	102.2	99.7
	1995-96	98.4	98.8	97.3	97.8	97.9	100.1	102.6	98.6
	1996-97	97.2	97.5	93.2	100.2	103.0	100.6	101.7	99.1
	1997-98	97.3	100.2	98.9	99.1	96.5	100.7	99.5	98.7
	1998-99	97.0	100.0	105.1	100.3	95.3	99.7	101.7	99.3
Micro labour areas	1994-95	98.0	97.9	99.6	99.4	98.0	97.5	99.9	98.5
	1995-96	98.4	98.0	98.1	99.2	98.7	98.0	100.6	98.7
	1996-97	98.5	97.6	97.9	98.7	97.7	98.8	100.0	98.4
	1997-98	97.2	99.0	101.3	99.1	99.6	100.9	100.5	99.1
	1998-99	98.3	99.3	100.5	98.7	97.8	98.8	100.4	98.8
Norway	1994-95	-	-	-	-	-	-	-	100.3
	1995-96	-	-	-	-	-	-	-	100.3
	1996-97	-	-	-	-	-	-	-	100.4
	1997-98	-	-	-	-	-	-	-	100.2
	1998-99	-	-	-	-	-	-	-	100.4

Table 4.5d. Average education level of in-migrants to job versus out-migrants from job 1994-1999 by sector and typology of region. Index: The average education level of out-migrants from job is set at 100

Typology of region:	Ca- pital region	Re- gional me- tropo- lises	Re- gional centres with a univer- sity	Other re- gional centres	Me- dium- sized towns and regions	Small labour areas	Micro labour areas	Nor- way
Sectors:								
1. Primary/mining	100.7	100.4	99.0	97.5	98.2	98.3	98.6	98.8
2. Manufacturing/raw material	102.1	99.4	92.2	101.6	102.7	100.9	100.8	101.4
3. Manufacturing/labour intensive	105.9	100.9	99.8	100.1	100.0	99.3	99.8	100.7
4. Machine and transport production	104.3	102.0	100.4	101.4	99.8	101.0	98.0	101.1
5. ICT-Manufacturing	106.2	101.8	92.9	101.1	93.7	100.8	94.1	101.7
6. Electro	105.9	99.1	106.2	101.7	96.7	101.9	95.3	101.5
7. Printing and publishing	103.9	102.3	102.3	99.2	100.0	97.5	98.4	100.9
8. Energy	104.9	100.1	100.1	99.8	101.7	100.7	99.0	101.1
9. Pharmaceutical production	103.5	100.1	98.6	98.2	91.1	100.9	104.1	101.1
10. Construction	103.0	100.7	97.7	100.1	98.5	98.9	98.2	100.1
11. Retail, recreation, culture and sport	103.3	99.7	100.9	97.9	95.9	98.1	98.3	99.5
12. Hotel and restaurant	102.2	98.5	100.6	97.5	96.5	97.5	97.8	98.7
13. ICT-Wholesale	103.7	99.1	98.0	100.0	96.8	97.5	97.0	100.7
14. Other Wholesale	104.0	100.2	100.7	98.7	97.8	98.9	97.7	100.3
15. Transport	104.2	100.5	100.4	99.0	97.4	97.4	98.3	100.2
16. Post and courier activity	104.3	97.9	100.9	95.5	95.9	95.0	96.0	98.4
17. Telecommunication	101.7	101.1	93.0	98.7	97.9	100.6	98.8	100.9
18. Activities auxiliary to financial intermediation	101.8	100.2	-	96.7	105.4	96.9	96.8	100.8
19. Finance	104.2	99.4	101.7	98.8	98.1	98.4	96.6	100.6
20. Renting of office machinery and equipment	112.0	98.0	-	96.8	95.8	-	-	105.2
21. Information technology	100.4	98.0	100.3	98.9	98.1	100.4	94.8	99.3
22. Research and development	98.9	94.9	94.9	99.0	99.0	99.0	99.1	97.6
23. Other business activities	100.4	98.7	97.2	98.6	98.8	98.1	99.1	99.3
24. Membership organisations and others	101.0	101.5	104.1	100.6	100.6	99.3	100.8	100.8
25. Basic education	99.3	98.5	97.0	99.5	99.3	98.3	98.1	98.8
26. Higher education	99.4	98.9	95.0	104.9	99.6	105.9	101.3	100.4
27. Health and social work	101.9	99.3	97.5	99.2	98.6	98.0	97.9	99.4
28. Public administration	102.1	99.2	101.8	100.3	99.7	98.8	98.4	100.1
All sectors	103.1	99.9	99.1	99.6	98.7	99.1	98.7	100.3

Figure 4.5a. Average net effects of migration to job and average net "brain-gain" through the migration process 1994-1999 by 86 Norwegian regions. Index: The level of out-migration from job and the average education level of out-migrants are set at 0



4.6. Income change by education and regional labour market mobility

We have put forward the hypotheses that employed persons who add to their highest formal education another year of formal education will have an income growth above the average increase of income. On the other hand, the most qualified employed expects to achieve as much return to their human capital investment as possible, pushing their careers in direction of those regions and sectors that actually give the best return. This section is thus stressing two main aspects of these topics. First, analysing the relative rise of income among employed persons changing their education level, and second, analysing the return to human capital by use of changes in personal income in different person groups by sectors and regional typologies.

In the same manner qualification flows were investigated in the previous section, this section illustrates the course of economic returns in the different mobility groups and sectors. Tables 4.8a-g describe income change by different mobility groups where the average annual income change is measured by an index in relation to the average annual income change of all employed persons in Norway. The analysis comprises only those employed persons working full time with at least NOK 100 000 in annual personal income. In tables 4.8h-k all changes in annual income are controlled for change in education. For definitions

of income, income change and change of income controlled for changes in education, see section 3. All results are derived from the change of income and change in education in the upswing years of 1997-1998.

In figure 4.6a the income change among employed persons is broken down by labour market mobile and non-labour market mobile, and furthermore by those adding another year of education to their highest formal education and those employed that do not change their level of education. The national figures indicate a clear tendency that non-mobile employed had weaker income growth compared with employed persons that were mobile within or between the regional labour markets. This supports the conclusion in Stambøl (2002) based on an analysis of some other time periods. This reveals the expectation that when employed persons choose to change their jobs, they mostly do so when achieving a higher income. Furthermore, the results reveal a remarkable higher income growth among those employed increasing their level of education from 1997 to 1998 independent of whether they are labour market mobile or not. The highest income growth is thus found among employees who are mobile and increase their education level.

This pattern is also true at the regional level. Not surprisingly the highest income growth is found in the capital region. Somewhat more surprisingly, small labour areas also experienced income growth above the national average, partly due to a relatively high index score among non-mobile employed that changed their education level. Employees both education mobile and labour market mobile generally have the highest income growth in all regional typologies. The highest increase is found in regional centres with a university.

In table 4.6b similar results are presented for job-to-job mobile employed within the local labour markets. The national results reveal the fact that education mobile men had a somewhat higher income growth compared with education mobile women, whilst the income growth among non-education mobile show small or no gender differences. Broken down by age groups the annual income growth is clearly disproportional with age. The strong annual income growth among the youngest employed is partly due to very high labour mobility between sectors. Furthermore, the results reveal an income growth proportional with education level, showing the highest income growth among the high-educated labour market mobile employed. Turning to nationality groups, in some regions very few foreign labour market mobile employed changed their education level. However, the results at the national level indicate a much higher income growth among other Western citizens. For non-education mobile, the strongest income growth was found among labour mobile non-Western citizens, although the income increased from a lower income level than for other groups.

At the regional level, education mobile employed generally show higher income growth than the non-education mobile. The highest increase gap between the education mobile and the non-education mobile is found in regional centres with

a university. The dominance of male versus female income growth was most pronounced in the capital region, and for education mobile also in regional metropolises and other regional centres and for non-education mobile in regional centres with a university. In medium-sized towns and regions and small labour areas the female income growth indicates a somewhat higher returns to education. In all regional typologies the income growth is generally disproportional with age for both education mobile as well as non-education mobile employed. The income growth is predominantly stronger for high educated employed in all regional typologies except from small labour areas showing a somewhat higher income growth of low educated labour improving their education level and in regional metropolises and micro labour areas where middle educated non-education mobile increased their income the most. However, it is worth noticing that most results reveal income growth above the total national average indicating a stronger income growth among the labour market mobile employed.

In figure 4.6c corresponding results are shown for job-to-job mobile in-migrants. At the national level the income growth of in-migrants are almost generally higher than for local cross sector mobile employed. The female return to education is slightly higher than for men. Also in-migrants show an income growth that is disproportional with age and proportional with education level. Other Nordic citizens show a higher return to education than other nationality groups, while non-Western citizens show the highest income growth also among in-migrants.

At the regional level the returns to education for in-migrants is high in regional centres with a university, regional metropolises and the capital region, whilst medium-sized towns and regions showed the lowest return. For non-education mobile in-migrants the income growth was most pronounced in the capital region. Furthermore, the female returns to education is significantly higher than for men in the capital region, but higher for male in-migrants for non-education mobile employed.

In the same manner figure 4.6d includes the relative income growth of job-to-job mobile out-migrants. The result at the national level is the same as in figure 4.8c, due to the fact that all job-to-job mobile out-migrants are also job-to-job mobile in-migrants. There is a clear tendency that out-migrants from less central regions show the best returns to education. Out-migrants from micro labour areas show both higher returns to education as well as higher income growth for non-education mobile than out-migrants from other regional typologies correspondingly. It is, however, worth noting that even out-migrants from the capital region show a higher income growth than the average for all employed persons in the nation, but a lower income growth than most other out-migrants from other regions. Male education mobile out-migrants from the capital region show a rather high increase of income, whilst return to education and income growth is low for female out-migrants from this region.

In table 4.6e and 4.6f all the results are broken down by 28 sectors. Table 4.6e includes all job-to-job mobile within the local labour markets seen from the sector of origin, whilst the results in table 4.6f measures the relative income growth in relation to the sector of destination. At the national level the highest income growth for education mobile occurred among employed persons leaving information technology, higher education institutions, financial intermediation, other business activities, telecommunication and ICT-manufacturing. For the majority of non-education mobile employed the highest income growth is found among those leaving pharmaceutical production, higher education, other business activities, information technology and telecommunication. The most pronounced destination sectors with respect to income growth are for education mobile employed research and development, ICT-manufacturing and information technology, and for non-education mobile employed information technology, pharmaceutical production, energy, machine and transport and telecommunication. In the capital region, entries to information technology and energy showed high income growth.

Table 4.6a. Average income change of employed broken down by labour mobile/non-labour mobile and education mobile/non-education mobile in 1997-1998 by typology of region. Index: The average income change of all employed in Norway is set at 100

Typology of regions:	Labour market mobile			Non-labour market mobile			All employed		
	Edu- mo- bile	Non- edu- cation mobile	All labour market mobile	Edu- cation mo- bile	Non- edu- cation mo- bile	All non- labour market mobile	Edu- cation mo- bile	Non- edu- cation mobile	All em- ployed
Capital region	115.6	104.9	105.0	108.7	100.0	100.1	110.1	100.7	100.7
Regional metropolises	116.6	103.1	103.3	105.0	99.3	99.4	106.4	99.7	99.8
Regional centres with a university	120.8	103.4	103.7	106.1	98.6	98.7	107.9	99.1	99.2
Other regional centres	110.0	102.4	102.6	103.8	99.4	99.4	104.5	99.7	99.7
Medium-sized towns and regions	109.5	102.2	102.3	103.6	99.3	99.4	104.2	99.6	99.7
Small labour areas	110.5	102.4	102.5	105.2	99.7	99.8	105.9	100.0	100.1
Micro labour areas	108.7	102.4	102.6	103.1	99.1	99.2	103.8	99.4	99.5
Norway	112.4	103.3	103.5	104.8	99.5	99.6	105.8	99.9	100.0

Table 4.6b Average income change of employed job-to-job mobile within local labour markets broken down by education mobile/non-education mobile 1997-1998 by gender, age, education, nationality and regional typology. Index: The average income change of all employed in Norway is set at 100

Typology of region:	Capital region	Regional metro-polises	Regional centres with a university	Other regional centres	Medium-sized towns and regions	Small labour areas	Micro labour areas	Norway
1. Gender: (Education mobile)								
Men	119	115	117	110	110	110	107	112
Women	108	110	117	106	112	112	106	108
1b. Gender: (Non-education mobile)								
Men	105	102	104	103	102	102	103	103
Women	103	103	100	102	102	103	101	103
2. Age group: (Education mobile)								
16-24 years	128	122	126	129	124	122	135	127
25-44 years	112	112	117	106	108	108	104	109
45-59 years	103	103	105	100	103	100	102	102
60-74 years	-	-	-	76	-	95	-	86
2b. Age group: (Non-education mobile)								
16-24 years	114	115	111	113	112	114	113	113
25-44 years	105	104	103	103	103	103	103	104
45-59 years	100	98	101	99	100	97	99	99
60-74 years	96	90	96	96	88	96	93	94
3. Education group: (Education mobile)								
Low education	105	101	117	103	101	115	102	104
Middle education	115	112	116	110	112	109	107	111
High education	114	124	120	111	116	109	110	115
3b. Education group: (Non-education mobile)								
Low education	101	101	103	100	100	101	100	101
Middle education	103	103	103	102	102	102	103	103
High education	105	102	103	104	103	102	101	104
4. Nationality group: (Education mobile)								
Norwegian citizens	113	113	117	109	110	110	107	111
Other Nordic citizens	118	148	-	113	-	96	105	116
Other Western citizens	169	148	-	112	109	-	-	134
Non-Western citizens	110	-	-	-	-	-	-	110
4b. Nationality group: (Non-education mobile)								
Norwegian citizens	104	102	103	102	102	102	102	103
Other Nordic citizens	102	101	93	102	99	97	103	101
Other Western citizens	103	100	108	103	98	96	106	102
Non-Western citizens	104	108	106	115	113	118	117	108
All labour market mobile (Education mobile)	113	114	117	109	110	110	107	111
All labour market mobile (Non-education mobile)	104	102	103	103	102	102	102	103

Table 4.6c. Average income change of employed job-to-job mobile in-migrants broken down by education mobile/non-education mobile 1997-1998 by gender, age, education, nationality and regional typology. Index: The average income change of all employed in Norway is set at 100

Typology of region:	Capital region	Regional metropolises	Regional centres with a university	Other regional centres	Medium-sized towns and regions	Small labour areas	Micro labour areas	Norway
1. Gender: (Education mobile)								
Men	119	126	135	114	105	108	114	116
Women	134	119	124	112	114	121	111	119
1b. Gender: (Non-education mobile)								
Men	111	108	105	103	102	104	104	105
Women	109	105	105	101	101	101	101	104
2. Age group: (Education mobile)								
16-24 years	130	132	130	123	110	119	125	125
25-44 years	121	123	144	111	105	106	107	114
45-59 years	96	108	80	100	126	-	92	103
60-74 years	-	-	-	-	-	-	-	-
2b. Age group: (Non-education mobile)								
16-24 years	125	120	115	114	111	113	112	117
25-44 years	109	107	105	102	102	104	103	105
45-59 years	99	97	98	96	97	99	98	97
60-74 years	87	84	90	85	83	82	86	85
3. Education group: (Education mobile)								
Low education	109	105	-	100	100	103	101	103
Middle education	118	119	116	115	109	114	108	115
High education	126	133	160	113	108	106	120	121
3b. Education group: (Non-education mobile)								
Low education	102	99	93	98	97	99	100	99
Middle education	108	104	103	101	101	102	101	103
High education	112	109	107	103	103	106	105	107
4. Nationality group: (Education mobile)								
Norwegian citizens	122	124	130	114	108	111	115	117
Other Nordic citizens	102	122	-	205	-	-	109	132
Other Western citizens	-	-	-	89	-	135	-	104
Non-Western citizens	-	-	-	-	-	-	60	75
4b. Nationality group: (Non-education mobile)								
Norwegian citizens	110	107	105	102	102	103	103	105
Other Nordic citizens	118	115	91	103	106	119	100	108
Other Western citizens	114	109	140	104	99	94	84	107
Non-Western citizens	114	107	-	114	115	106	145	114
All job-to-job in-migrants (Education mobile)	122	124	130	114	108	111	113	117
All job-to-job in-migrants (Non-education mobile)	110	107	105	102	102	103	103	105

Table 4.6d. Average income change of employed job-to-job mobile out-migrants broken down by education mobile/non-education mobile 1997-1998 by gender, age, education, nationality and regional typology. Index: The average income change of all employed in Norway is set at 100

Typology of region:	Capital region	Regional metropolises	Regional centres with a university	Other regional centres	Medium-sized towns and regions	Small labour areas	Micro labour areas	Norway
1. Gender: (Education mobile)								
Men	116	116	107	126	106	109	118	116
Women	101	119	122	123	123	132	124	119
1b. Gender: (Non-education mobile)								
Men	102	106	105	106	106	106	107	105
Women	99	105	98	105	107	104	105	104
2. Age group: (Education mobile)								
16-24 years	123	117	125	128	126	129	125	125
25-44 years	107	117	111	126	104	107	117	114
45-59 years	109	114	90	104	90	108	105	103
60-74 years	-	-	-	-	-	-	-	-
2b. Age group: (Non-education mobile)								
16-24 years	111	118	100	119	120	117	118	117
25-44 years	101	106	104	106	106	105	106	105
45-59 years	96	98	97	98	99	96	98	97
60-74 years	88	87	78	82	66	97	87	85
3. Education group: (Education mobile)								
Low education	101	98	119	103	109	114	90	103
Middle education	112	111	94	123	103	111	119	115
High education	114	122	113	131	115	120	123	121
3b. Education group: (Non-education mobile)								
Low education	98	99	100	98	100	98	101	99
Middle education	99	103	100	104	105	103	106	103
High education	103	108	104	109	109	109	108	107
4. Nationality group: (Education mobile)								
Norwegian citizens	113	117	109	125	111	114	120	117
Other Nordic citizens	-	-	-	205	116	-	113	132
Other Western citizens	104	-	-	-	-	-	-	104
Non-Western citizens	-	-	-	-	60	94	97	75
4b. Nationality group: (Non-education mobile)								
Norwegian citizens	101	106	102	106	106	105	107	105
Other Nordic citizens	106	102	120	112	108	104	116	108
Other Western citizens	100	105	-	105	107	118	114	107
Non-Western citizens	109	113	117	128	113	99	107	114
All job-to-job out-migrants (Education mobile)	113	117	109	125	109	114	119	117
All job-to-job out-migrants (Non-education mobile)	101	106	103	106	106	105	107	105

Table 4.6e. Average income change of employed job-to-job mobile within local labour markets broken down by education mobile/non-education mobile 1997-1998 by sector of origin and regional typology. Index: The average income change of all employed in Norway is set at 100

Typology of region:	Capital region	Regional metropolises	Regional centres with a university	Other regional centres	Medium-sized towns and regions	Small labour areas	Micro labour areas	Norway
Sectors:								
Education mobile:								
1. Primary/mining	132	110	-	108	112	-	103	109
2. Manufacturing/raw material	157	116	-	115	113	87	103	111
3. Manufacturing/labour intensive	121	112	-	107	106	120	101	109
4. Machine and transport	71	114	-	111	102	108	119	110
5. ICT-Manufacturing	131	83	-	-	166	95	-	123
6. Electro	101	120	-	117	110	94	-	111
7. Printing and publishing	108	133	-	97	-	169	109	113
8. Energy	103	100	132	110	131	144	115	110
9. Pharmaceutical production	108	-	-	-	-	-	-	108
10. Construction	111	110	118	104	112	105	101	107
11. Retail etc.	126	106	101	101	118	143	105	112
12. Hotel and restaurant	112	107	-	118	-	146	120	114
13. ICT-Wholesale	125	100	104	113	144	96	107	116
14. Other Wholesale	102	118	-	105	124	103	100	106
15. Transport	113	109	117	112	116	121	104	111
16. Post and courier activity	108	110	-	69	89	-	159	108
17. Telecommunication	129	-	-	114	115	140	-	124
18. Financial intermediation	125	-	-	-	-	-	-	125
19. Finance	106	97	104	98	101	95	135	103
20. Renting of office machinery	-	-	-	-	-	-	-	-
21. Information technology	106	153	-	133	-	119	-	129
22. Research and development	119	117	-	127	-	101	-	118
23. Other business activities	143	131	115	126	116	99	111	125
24. Membership organisations	106	85	-	105	99	-	106	103
25. Basic education	108	119	155	116	102	110	110	113
26. Higher education	122	134	123	120	118	-	111	126
27. Health and social work	101	124	106	101	104	112	104	104
28. Public administration	115	107	132	109	111	99	108	110
Non-education mobile:								
1. Primary/mining	99	107	102	102	102	102	103	102
2. Manufacturing/raw material	102	104	88	102	105	102	101	102
3. Manufacturing/labour intensive	104	103	103	103	102	102	104	103
4. Machine and transport	103	100	100	103	100	105	105	102
5. ICT-Manufacturing	102	99	-	102	85	99	103	100
6. Electro	99	95	69	107	103	104	90	100
7. Printing and publishing	105	99	112	104	104	112	101	104
8. Energy	100	102	98	102	103	101	104	102
9. Pharmaceutical production	115	96	-	122	102	113	107	115
10. Construction	103	104	101	102	101	103	102	103
11. Retail etc.	105	104	103	101	105	104	101	103
12. Hotel and restaurant	104	101	105	103	104	101	104	103
13. ICT-Wholesale	103	102	104	102	104	98	104	103
14. Other Wholesale	103	102	104	101	102	101	104	102
15. Transport	105	105	108	104	103	97	103	104

Table 4.6e (continue).

Typology of region:	Capital region	Regional metro-polises	Regional centres with a university	Other regional centres	Medium-sized towns and regions	Small labour areas	Micro labour areas	Norway
Sectors:								
16. Post and courier activity	102	101	107	107	105	110	108	103
17. Telecommunication	109	101	100	105	99	108	99	106
18. Financial intermediation	101	68	98	98	92	87	111	96
19. Finance	107	104	105	103	103	99	105	105
20. Renting of office machinery	105	-	-	105	107	-	-	105
21. Information technology	109	109	104	101	111	102	100	106
22. Research and development	108	105	90	104	103	104	100	105
23. Other business activities	110	105	106	106	108	108	104	107
24. Membership organisations	103	102	100	102	103	102	101	103
25. Basic education	104	103	108	102	101	103	100	102
26. Higher education	110	108	106	100	105	101	104	107
27. Health and social work	100	102	101	102	102	102	101	101
28. Public administration	105	104	100	101	102	101	100	103

Table 4.6f. Average income change of employed job-to-job mobile within local labour markets broken down by education mobile/non-education mobile 1997-1998 by sector of destination and regional typology. Index: The average income change of all employed in Norway is set at 100

Typology of region:	Capital region	Regional metro-polises	Regional centres with a university	Other regional centres	Medium-sized towns and regions	Small labour areas	Micro labour areas	Norway
Sectors:								
Education mobile:								
1. Primary/mining	100	100	-	99	109	120	101	102
2. Manufacturing/raw material	115	109	-	104	107	108	105	107
3. Manufacturing/labour intensive	137	109	-	119	111	93	112	112
4. Machine and transport	121	138	-	112	110	118	97	116
5. ICT-Manufacturing	119	107	-	306	-	119	103	128
6. Electro	99	119	-	113	-	85	108	109
7. Printing and publishing	123	141	-	103	-	-	-	124
8. Energy	147	129	-	126	107	105	95	123
9. Pharmaceutical production	105	-	-	-	-	-	-	105
10. Construction	119	107	117	111	118	117	108	112
11. Retail etc.	110	108	-	109	122	99	113	109
12. Hotel and restaurant	113	108	159	117	112	165	124	118
13. ICT-Wholesale	126	110	-	124	159	100	105	120
14. Other Wholesale	136	112	106	105	103	100	99	111
15. Transport	118	79	95	99	96	112	96	98
16. Post and courier activity	110	133	-	113	119	-	-	115
17. Telecommunication	118	-	132	113	-	-	-	119
18. Financial intermediation	93	-	-	-	-	172	-	107
19. Finance	115	122	104	120	194	105	124	119
20. Renting of office machinery	-	-	-	-	-	-	-	-
21. Information technology	136	116	143	137	122	116	122	127
22. Research and development	119	137	-	-	175	-	-	130
23. Other business activities	109	116	-	106	107	124	121	110

Table 4.6f (continue)

Typology of region:	Capital region	Regional metro-polises	Regional centres with a university	Other regional centres	Medium-sized towns and regions	Small labour areas	Micro labour areas	Norway
Sectors:								
24. Membership organisations	112	124	106	119	101	99	147	117
25. Basic education	109	116	97	102	103	112	104	105
26. Higher education	102	107	117	116	104	169	107	108
27. Health and social work	109	110	142	103	108	106	107	108
28. Public administration	104	108	119	102	105	105	113	105
Non-education mobile:								
1. Primary/mining	101	104	107	103	102	92	100	101
2. Manufacturing/raw material	115	102	101	102	103	104	106	105
3. Manufacturing/labour intensive	105	101	106	102	99	103	104	103
4. Machine and transport	106	108	110	104	104	105	105	106
5. ICT-Manufacturing	108	91	-	106	102	103	101	102
6. Electro	100	103	114	107	100	104	104	103
7. Printing and publishing	107	100	108	102	108	102	107	103
8. Energy	110	107	99	106	106	109	106	107
9. Pharmaceutical production	111	102	-	108	115	103	104	108
10. Construction	104	102	103	102	101	101	103	102
11. Retail etc.	104	93	101	101	100	100	101	100
12. Hotel and restaurant	102	105	102	101	105	104	102	103
13. ICT-Wholesale	105	104	105	103	103	106	104	104
14. Other Wholesale	105	103	101	102	102	102	101	103
15. Transport	107	104	105	103	102	103	104	104
16. Post and courier activity	100	102	99	102	106	102	99	101
17. Telecommunication	106	105	104	108	109	103	108	106
18. Financial intermediation	106	96	128	99	100	100	108	104
19. Finance	103	99	101	104	106	93	102	102
20. Renting of office machinery	112	110	-	85	-	-	-	104
21. Information technology	111	106	113	108	112	110	103	109
22. Research and development	103	105	96	101	108	102	102	103
23. Other business activities	106	102	101	101	101	102	102	103
24. Membership organisations	104	102	103	107	102	106	104	104
25. Basic education	101	100	99	100	102	100	100	100
26. Higher education	103	102	101	100	103	101	98	101
27. Health and social work	101	101	103	100	99	100	99	100
28. Public administration	99	101	104	100	101	100	99	100

4.6.1. Average income change controlled for change in education

The results above reveal a clear correlation between income change and the level of education, and that employed persons adding another year of education to their formal education increases their income mostly. In this section the average income change controlled for change in education of all employed persons in Norway is recognized by an index set at 100. The controlled income changes in each group are measured in relation to this national average index (for definitions, see section 3). The analysis is made as a weighted average of income growth and education change during the period 1994-1999.

Table 4.6g. Average income change controlled for change in education of employed job-to-job mobile within local labour markets 1994-1999 by gender, age, education, nationality and regional typology. Index: The average income change controlled for change in education of all employed in Norway is set at 100

Typology of region:	Capital region	Regional metro-polises	Regional centres with a university	Other regional centres	Medium-sized towns and regions	Small labour areas	Micro labour areas	Norway
1. Gender:								
Men	104	102	103	102	102	101	102	103
Women	104	103	102	102	102	102	102	103
2. Age group:								
16-24 years	112	111	108	111	110	110	110	111
25-44 years	105	103	103	103	103	102	102	104
45-59 years	100	99	101	98	99	98	100	99
60-74 years	95	96	100	94	94	97	96	95
3. Education group:								
Low education	102	100	102	100	100	100	99	100
Middle education	103	102	102	102	102	102	102	102
High education	105	104	103	103	103	101	103	104
4. Nationality group:								
Norwegian citizens	104	102	102	102	102	101	102	103
Other Nordic citizens	102	101	102	101	99	101	104	102
Other Western citizens	103	103	110	102	97	100	101	102
Non-Western citizens	109	108	114	111	116	108	112	110
All local job-to-job mobile	104	102	103	102	102	101	102	103

Table 4.6h. Average income change controlled for change in education of employed job-to-job mobile in-migrants 1994-1999 by gender, age, education, nationality and regional typology. Index: The average income change controlled for change in education of all employed in Norway is set at 100

Typology of region:	Capital region	Regional metro-polises	Regional centres with a university	Other regional centres	Medium-sized towns and regions	Small labour areas	Micro labour areas	Norway
1. Gender:								
Men	109	105	105	103	102	103	103	105
Women	108	104	104	101	100	101	102	103
2. Age group:								
16-24 years	119	115	113	111	108	112	112	114
25-44 years	109	105	104	103	102	102	103	104
45-59 years	99	98	99	97	97	97	97	97
60-74 years	99	81	89	92	87	92	90	92
3. Education group:								
Low education	101	99	98	98	97	97	97	98
Middle education	107	103	102	101	101	101	101	102
High education	111	107	106	104	104	105	106	106
4. Nationality group:								
Norwegian citizens	109	105	104	102	102	102	103	104
Other Nordic citizens	114	101	105	101	100	105	107	105
Other Western citizens	108	110	107	105	106	100	101	106
Non-Western citizens	106	111	108	114	113	111	120	112
All employed in-migrants	109	105	105	102	102	102	103	104

Table 4.6g shows the average income change controlled for change in education for job-to-job mobile within the local labour markets. There are small or no variations by gender, whilst the income growth is also here disproportional with age and proportional with level of education. Non-Western citizens show a higher income growth than other national groups even after controls for change in education. The capital region shows the strongest income growth, whilst small labour areas show the lowest income growth, although still above the general level of income change for all employed in Norway. Except from the oldest age groups the income change controlled for education is mostly above the national average for local cross-sector mobile employed.

Table 4.6h shows similar results for job-to-job mobile in-migrants. The income growth controlled for change in education is generally higher for male than female in-migrants to job. The income growth is also here clearly disproportional with the age and proportional with level of education. As for local job-to-job mobile, non-Western citizens show the highest income growth at the national level. The capital region also has the strongest income growth after controls for education, whilst other regional centres, medium-sized towns and regions and small labour areas had the lowest income growth.

In the same manner table 4.6i shows the income growth controlled for education for job-to-job mobile out-migrants. At the national level the figures will be the same as in table 4.6h, but at the regional level the highest income growth was observed among out-migrants from medium-sized towns and regions and micro labour areas. Out-migrants from the capital region had the lowest income growth, and particularly among women.

An indication of differences in regional income changes controlled for change in education is shown in table 4.6j, indicating the change of income across different sectors within each typology of regions in 1994-1999. For Norway as a whole, those employed that left the sectors of pharmaceutical production, renting of office machinery, information technology and other business activities with the purpose of entering another sector experienced the strongest annual income growth after controlled for change in education. Vice versa job-to-job mobile employed entering the sectors of renting of office machinery, telecommunication, financial intermediation and electro (electric and electronic manufacturing) showed the strongest annual income growth in this respect. There is a clear tendency that those who left the non-market services increased their income more than those who entered these sectors. The dominating position of the capital region with respect to annual income growth is visible in several of the sectors and most pronounced in entries to the electro sector. This sector also showed a remarkable gap in income growth between those leaving and those entering the sector in the capital region, with a much higher income growth among those entering. Furthermore, a strong income growth has been observed among those who entered sectors such as raw material manufacturing, ICT-manufacturing and financial intermediation in regional centres with a university.

The income growth among local cross-sector mobile was, with very few exceptions, higher than the national average even after being controlled for education.

Table 4.6i. Average income change controlled for change in education of employed job-to-job mobile out-migrants 1994-1999 by gender, age, education, nationality and regional typology. Index: The average income change controlled for change in education of all employed in Norway is set at 100

Typology of region:	Capital region	Regional metropolises	Regional centres with a university	Other regional centres	Medium-sized towns and regions	Small labour areas	Micro labour areas	Norway
1. Gender:								
Men	101	106	104	105	106	106	106	105
Women	99	104	101	105	106	105	105	103
2. Age group:								
16-24 years	109	114	108	115	115	115	115	114
25-44 years	101	106	103	106	106	105	106	104
45-59 years	95	99	100	96	98	99	98	97
60-74 years	91	87	82	90	103	90	89	92
3. Education group:								
Low education	97	97	98	99	101	99	99	98
Middle education	99	103	101	103	104	103	104	102
High education	103	107	104	107	109	108	108	106
4. Nationality group:								
Norwegian citizens	101	105	103	105	106	105	106	104
Other Nordic citizens	101	103	105	107	107	119	104	105
Other Western citizens	104	106	112	106	105	113	110	106
Non-Western citizens	114	121	97	116	108	111	107	112
All employed out-migrants	101	105	103	105	106	105	106	104

In table 4.6k similar results are presented for in- and out-migrants between regions and sectors. There is a clear tendency that sectors such as financial intermediation, renting of office machinery, information technology and ICT-manufacturing showed the highest growth of income both among those who out-migrated from and in-migrated to these sectors. Furthermore, the capital region showed a much higher income growth among those in-migrated compared to those who out-migrated in most of the sectors. Especially those who out-migrated from some of the distribution services in the capital region experienced a rather low growth of income, far below the national average. On the other hand, sectors like financial intermediation, finance, renting of office machinery, information technology, other business activities, ICT-manufacturing, ICT-wholesale and pharmaceutical production predominantly contributed the most to the very high income growth amongst in-migrants to the capital region even after controlling for change in education. Furthermore, a very high income growth was observed among those who out-migrated from ICT-manufacturing and ICT-wholesale in regional centres with a university and from financial intermediation and information technology in most regional typologies outside the capital region. Otherwise, a strong income growth was observed among those who in-migrated to ICT-manufacturing in regional centres with a university, regional metropolises and small labour areas, printing

and publishing in regional centres with a university and renting of office machinery in regional metropolises. In the same manner as the tendency to higher income growth amongst those who in-migrated to jobs in the capital region in relation to those who out-migrated from jobs, the opposite phenomenon took place in the more peripheral typologies of regions.

Table 4.6j. Average income change controlled for change in education of employed job-to-job mobile within local labour markets 1994-1999 by sector and regional typology. Index: The average income change controlled for change in education of all employed in Norway is set at 100

Typology of region:	Capital region	Regional metropolises	Regional centres with a university	Other regional centres	Medium-sized towns and regions	Small labour areas	Micro labour areas	Norway
Exit from sectors locally:								
1. Primary/mining	103	103	101	100	103	103	101	102
2. Manufacturing/raw material	106	97	99	102	102	96	102	101
3. Manufacturing/labour intensive	104	104	105	97	102	102	104	101
4. Machine and transport	107	100	103	101	101	102	102	102
5. ICT-Manufacturing	100	102	100	107	100	110	103	104
6. Electro	98	103	94	103	104	102	101	101
7. Printing and publishing	103	100	102	101	102	107	102	102
8. Energy	103	109	105	102	105	104	102	105
9. Pharmaceutical production	114	104	110	109	99	111	97	113
10. Construction	102	101	100	102	101	102	101	101
11. Retail etc.	106	100	102	103	103	106	103	103
12. Hotel and restaurant	103	100	106	103	105	105	104	103
13. ICT-Wholesale	104	104	106	102	103	94	103	103
14. Other Wholesale	103	101	103	102	105	102	102	102
15. Transport	103	103	104	103	98	103	101	102
16. Post and courier activity	102	102	101	104	104	106	109	103
17. Telecommunication	106	103	101	105	106	106	103	105
18. Financial intermediation	103	93	97	104	94	97	119	101
19. Finance	104	104	104	103	105	100	103	104
20. Renting of office machinery	112	127	-	108	100	107	98	112
21. Information technology	107	105	114	105	108	104	104	106
22. Research and development	105	104	99	105	104	103	102	104
23. Other business activities	107	104	106	105	103	103	105	105
24. Membership organisations	104	101	104	103	102	103	102	103
25. Basic education	104	102	103	101	101	101	101	102
26. Higher education	106	104	106	104	101	102	104	104
27. Health and social work	103	102	102	103	104	102	102	102
28. Public administration	105	104	100	102	103	103	101	103
Entries to sectors locally:								
1. Primary/mining	104	102	106	103	103	104	101	102
2. Manufacturing/raw material	105	101	113	102	104	106	104	103
3. Manufacturing/labour intensive	104	101	103	102	105	101	103	102
4. Machine and transport	95	105	103	104	102	102	104	102
5. ICT-Manufacturing	108	103	121	106	105	101	106	106
6. Electro	123	102	99	107	96	105	109	108

Table 4.6j (continue)

Typology of region:	Capital region	Regional metropolises	Regional centres with a university	Other regional centres	Medium-sized towns and regions	Small labour areas	Micro labour areas	Norway
7. Printing and publishing	104	105	107	102	107	99	104	103
8. Energy	105	103	103	103	102	103	102	103
9. Pharmaceutical production	108	105	105	106	112	100	103	107
10. Construction	102	101	104	103	103	102	102	102
11. Retail etc.	104	101	102	103	101	101	101	102
12. Hotel and restaurant	103	104	100	102	103	103	102	103
13. ICT-Wholesale	106	105	104	103	104	103	103	105
14. Other Wholesale	106	103	104	101	103	102	102	103
15. Transport	104	103	102	104	104	102	104	103
16. Post and courier activity	103	103	107	106	106	100	101	103
17. Telecommunication	110	111	104	108	104	96	109	109
18. Financial intermediation	107	116	119	108	111	100	108	108
19. Finance	104	99	105	105	100	101	107	103
20. Renting of office machinery	113	106	-	109	112	99	100	111
21. Information technology	107	108	107	105	109	107	105	107
22. Research and development	102	103	105	103	106	89	105	101
23. Other business activities	104	104	102	102	101	102	102	103
24. Membership organisations	105	103	101	103	102	103	101	104
25. Basic education	100	100	103	100	99	102	100	100
26. Higher education	101	101	100	101	101	102	101	101
27. Health and social work	102	102	103	100	100	102	101	101
28. Public administration	101	100	101	100	100	100	101	100

Table 4.6k. Average income change controlled for change in education of employed job-to-job in- and out-migrants 1994-1999 by sector and regional typology. Index: The average income change controlled for change in education of all employed in Norway is set at 100

Typology of region:	Capital region	Regional metropolises	Regional centres with a university	Other regional centres	Medium-sized towns and regions	Small labour areas	Micro labour areas	Norway
Out-migration from sectors:								
1. Primary/mining	104	108	88	103	105	104	103	103
2. Manufacturing/raw material	102	105	99	104	103	103	106	104
3. Manufacturing/labour intensive	99	103	101	100	105	102	103	102
4. Machine and transport	101	104	99	103	102	104	105	103
5. ICT-Manufacturing	104	118	115	108	107	106	121	109
6. Electro	102	107	99	105	107	103	116	105
7. Printing and publishing	101	105	106	108	107	106	106	105
8. Energy	104	105	103	105	103	104	108	105
9. Pharmaceutical production	101	104	99	112	104	112	102	105
10. Construction	101	104	100	105	102	103	105	104
11. Retail etc.	100	105	101	104	106	105	105	104
12. Hotel and restaurant	100	105	98	104	104	103	105	103

Table 4.6k (continue)

Typology of region:	Capital region	Regional metropolises	Regional centres with a university	Other regional centres	Medium-sized towns and regions	Small labour areas	Micro labour areas	Norway
13. ICT-Wholesale	101	109	121	109	111	117	114	107
14. Other Wholesale	97	102	105	103	105	106	106	101
15. Transport	99	104	102	103	104	103	105	103
16. Post and courier activity	95	102	98	100	101	101	100	99
17. Telecommunication	102	106	102	109	111	106	107	106
18. Financial intermediation	98	134	-	131	133	118	112	114
19. Finance	100	109	107	107	109	105	109	105
20. Renting of office machinery	108	108	-	105	106	121	115	111
21. Information technology	103	111	110	116	115	116	123	111
22. Research and development	102	106	105	105	109	111	111	106
23. Other business activities	101	108	108	109	112	114	114	108
24. Membership organisations	99	103	101	102	104	105	104	102
25. Basic education	100	103	101	104	104	105	103	103
26. Higher education	101	108	111	104	108	108	108	106
27. Health and social work	101	103	100	107	106	106	106	104
28. Public administration	103	107	105	106	106	105	105	105
In-migration to sectors:								
1. Primary/mining	109	98	104	103	102	97	103	102
2. Manufacturing/raw material	109	106	100	104	102	104	104	105
3. Manufacturing/labour intensive	102	102	103	103	101	102	102	102
4. Machine and transport	105	103	100	104	101	105	104	104
5. ICT-Manufacturing	120	113	138	109	106	113	108	112
6. Electro	113	105	108	104	103	101	100	105
7. Printing and publishing	111	103	121	102	102	103	111	106
8. Energy	106	108	101	103	108	106	103	106
9. Pharmaceutical production	113	100	-	102	100	99	110	106
10. Construction	107	105	104	102	102	102	100	103
11. Retail etc.	107	104	106	103	98	100	100	103
12. Hotel and restaurant	107	105	104	101	98	100	101	103
13. ICT-Wholesale	113	108	111	106	103	100	98	108
14. Other Wholesale	109	105	106	99	101	98	98	102
15. Transport	106	104	101	102	100	102	101	103
16. Post and courier activity	104	96	101	98	97	98	93	99
17. Telecommunication	115	108	94	105	100	103	101	109
18. Financial intermediation	133	115	-	106	104	105	81	117
19. Finance	114	105	103	102	99	99	103	106
20. Renting of office machinery	120	121	-	108	104	-	-	112
21. Information technology	121	110	104	106	104	105	100	112
22. Research and development	109	106	107	100	102	104	102	105
23. Other business activities	112	106	108	101	101	102	99	105
24. Membership organisations	108	101	103	101	100	101	101	103
25. Basic education	105	103	102	101	102	101	102	102
26. Higher education	104	103	105	102	101	101	97	103
27. Health and social work	105	104	105	102	102	103	107	104
28. Public administration	107	105	105	102	103	103	106	105

4.6.2. The relationship between average income change/income level and specific and total labour mobility performance

We put forward the hypothesis that regions with the highest income growth also would be attractive for in-migrants, immigrants, and entries to the labour market. We also put forward the hypothesis that regions with the highest income level will be attractive for different entries to the local labour market. While the annual change in income may vary across regions over time we expect that the different levels of income are more stable across regions.

Table 4.6l shows the correlation results of the relationship between average income change and different types of gross mobility to and from job in altogether 86 Norwegian local labour markets in the strong upswing period of 1997-1998.

Table 4.6l. The relationship between average income changes controlled for change in education and gross labour mobility expressed as specific and total index of mobility performance. By type of mobility and education 1997-1998: Basis: 86 Norwegian regions

Type of mobility	Low education	Middle education	High education
Still in job locally	0.225 (0.88)	-0.098 (-0.34)	0.107 (0.20)
To job from education locally	0.006 (0.06)	0.057 (0.75)	-0.027 (-0.28)
To job from unemployment locally	-0.500 (-0.73)	-0.002 (-0.03)	0.034 (1.03)
To job from others outside the labour force locally	0.174 (0.52)	0.056 (0.46)	0.295*** (2.81)
To job from internal in-migration	0.394 (0.63)	-0.383 (-0.85)	0.724* (1.78)
To job from immigration	-0.071 (-0.20)	-6.275 (-0.80)	-1.269 (-0.40)
From job to internal out-migration	-1.152* (-1.77)	-0.092 (-0.42)	-0.843*** (-2.84)
From job to emigration	0.934 (0.57)	2.257 (0.83)	-0.633 (-0.28)
Weighted average	0.901 (0.49)	0.157 (0.47)	5.846*** (3.03)
Adjusted R ²	-0.02	-0.04	0.10

Level of significance: 99%***, 95%***, 90%*. (t-values in brackets). Number of observations=86)

A positive but not significant relationship between the ability to stay in job in the regions and change of income for employed with low and high education has been observed. This relationship is negative but not significant for employed with middle education. The relationship between income change and mobility from the educational system is rather weak for low educated persons, somewhat higher but not significant for middle educated and negative but not significant for persons with high education. The relationship between income change and recruitment from unemployment indicate negative correlation for low and mid-

dle educated persons and positive correlation for high-educated persons, but without any significance. The ability to increase the transitions from other persons outside the labour force by income change in an upswing period is definitely stronger for high-educated persons compared to low and middle educated. Whilst this correlation is positive but not significant for low and middle educated, the correlation is strong, positive and significant for high-educated persons. The relationship between recruitment to job from internal in-migration and income change is positive and significant only for high-educated persons. Income change and immigration are rather weakly correlated with negative but not significant parameters for all education groups. Out-migration from job seems to be more sensitive to income change, and are highly but negatively correlated for high-educated persons, negative with a certain significance for low educated persons and negative but not significant for middle educated persons. Job leaving through emigration shows no significance, but a positive correlation for low and middle educated persons, but negative for high-educated persons. When all the mobility measures are weighted together by the number of persons within each mobility group, the relationship between income change and total mobility is strong, positive and significant for high-educated persons, but rather weak for low and middle educated persons.

In table 4.6m we have broken down this analysis further by comparing the 43 Norwegian regions with the strongest income growth with the 43 regions with lowest income growth. The most interesting target is to analyse any differences in the mobility structure between these two groups of regions.

The relationship between income growth and the ability to stay employed in the local labour markets is positive for low and middle educated persons in regions with the highest income growth and for high-educated persons in regions with the lowest income growth. All other parameters are negative but none of them are significant. The relationship between income growth and local recruitment from the educational system is significant, but negative for persons with high education in regions with the highest income growth. For persons with low and middle education this relationship is only positive in the regions with the strongest income growth, whilst high-educated persons have a positive correlation in the regions with lowest income growth. With regard to recruitment from unemployment the figures indicate a generally positive relationship in regions with the highest income growth, and a generally negative relationship in regions with the lowest income growth, but none of these parameters are significant. The correlation is stronger for recruitment from other persons outside the labour force. Here the parameters are positive and significant for both low and high-educated persons in regions with low growth of income, and negative for low educated in regions with high growth of income. Middle educated persons have a positive correlation in regions with low growth of income but negative in regions with strong income growth. High-educated persons show positive correlation in regions with high growth of income. The results are more as could be expected for internal in-migration to regions with the lowest income growth, showing positive and some significant relationship between income growth

and in-migration to jobs for all educational groups. The parameter is also positive for high-educated persons in regions with stronger income growth, but negative for both low and middle educated persons. For immigration to job the parameters are negative for all groups in regions with weak income growth and also for high-educated persons in regions with strong income growth. Both low and middle educated persons show positive correlation in the regions with high income growth. The relationship between income change and internal out-migration from job is generally negative and significant for all groups in regions with weak growth of income, but positive but not significant for all groups in regions with stronger income growth. For emigration from job the relationship is negative for low and high-educated persons in regions with low growth of income and for middle-educated persons in the strongest income growth regions, whilst the other parameters are positive but none are significant. The relationship between annual income growth and a weighted average of all types of mobility by education gives the strongest positive effects for persons with high education in the regions with the weakest growth of income. This total relationship is also positive for high educated employed in the regions with higher income growth, but not significant. For low and middle educated employed the total relationship is rather weak.

Table 4.6m. The relationship between average income changes controlled for change in education and gross labour mobility measured as specific mobility performances. By segment of mobility and education 1997-1998. Basis: 86 regions in Norway broken down by 43 regions with the lowest change of incomes and 43 regions with the highest change of incomes

Level of incomes:	Low		High		Low		High	
	Low education		Middle education		Low education		High education	
Still in job locally	-0.044 (-0.20)	0.124 (0.49)	-0.485 (1.34)	0.158 (0.66)	0.441 (1.07)	-0.709 (-1.01)		
To job from education locally	-0.042 (-0.45)	0.020 (0.24)	-0.020 (-0.19)	0.064 (1.00)	0.083 (0.95)	-0.167* (1.71)		
To job from unemployment locally	-0.074 (1.06)	0.010 (0.11)	-0.070 (-0.67)	0.073 (1.32)	-0.024 (-0.91)	0.055 (1.43)		
To job from others outside the labour force locally	0.708** (2.47)	-0.575* (1.86)	0.215 (1.38)	-0.174 (-1.60)	0.190** (2.11)	0.175 (1.40)		
To job from internal in-migration	1.696** (2.30)	-0.555 (-1.33)	0.318 (0.66)	-0.584 (-1.19)	0.312 (1.04)	-0.433 (0.79)		
To job from immigration	-0.010 (-0.03)	0.396 (1.03)	-7.851 (-0.91)	5.129 (0.63)	-3.046 (-1.01)	-0.630 (-0.19)		
From job to internal out-migration	-1.732*** (-2.79)	0.010 (0.02)	-1.131** (-2.32)	0.448 (0.86)	-0.398* (-1.82)	0.220 (0.50)		
From job to emigration	-0.304 (-0.14)	1.453 (1.34)	2.413 (0.73)	-3.935 (-1.44)	-0.619 (-0.32)	1.248 (0.51)		
Weighted average	1.225 (0.73)	-1.271 (-0.80)	-0.105 (-0.27)	0.007 (0.02)	3.529** (2.02)	2.266 (1.08)		
Adjusted R ²	0.17	0.01	0.02	0.01	0.13	0.17		

Level of significance: 99%***, 95%** , 90%*. (t-values in brackets). Number of observations=43 + 43

Table 4.6n. The relationship between average income level and gross labour mobility expressed as specific and total index of mobility performance. By type of mobility and education 1997-1998: Basis: 86 Norwegian regions

Type of mobility	Low education	Middle education	High education
Still in job locally	52.592*** (3.59)	24.110 (1.28)	95.108** (2.27)
To job from education locally	-4.355 (-0.78)	17.898*** (3.53)	0.636 (0.09)
To job from unemployment locally	0.718 (0.18)	-3.500 (-0.75)	-2.960 (-1.15)
To job from others outside the labour force locally	18.779 (0.98)	8.045 (0.98)	5.018 (0.61)
To job from internal in-migration	25.783 (0.72)	16.506 (0.55)	65.619** (2.07)
To job from immigration	62.027*** (3.05)	652.525 (1.25)	584.716** (2.34)
From job to internal out-migration	-107.138*** (-2.89)	-65.091** (-2.15)	-113.236*** (-4.89)
From job to emigration	-8.425 (-0.09)	150.006 (0.83)	320.601* (1.79)
Weighted average	335.054*** (2.84)	140.265*** (5.70)	312.679 (1.59)
Adjusted R ²	0.27	0.39	0.43

Level of significance: 99%***, 95%** , 90%*. (t-values in brackets). Number of observations=86)

Table 4.6n shows correlation results of the relationship between average income level and different types of gross mobility to and from job in the same 86 Norwegian local labour markets used in the analysis above.

A positive and significant relationship has been observed between the ability to stay in job in the regions and the level of income for employed with low and high education. The relationship between income level and mobility from the educational system is positive and highly significant for middle educated employed. The relationship between income level and recruitment from unemployment shows no significance with negative correlation for middle and high educated, but a positive correlation for low educated persons. The ability to increase the transitions from other persons outside the labour force is positively correlated to the income level for all educational groups, but none of the parameters are significant. The relationship between recruitment to job from internal in-migration and income level is positive and significant only for high-educated persons. Income level and immigration are positively correlated for all educational group, but only significant for low and high educated employed. Out-migration from job seems to be the type of mobility that is most sensitive to income level, and the correlation is highly and negatively correlated for all educational groups, and especially strong for the high educated employed. Job leaving through emigration is only significant for high educated employed, although positively correlated.

Table 4.6o. The relationship between average income level and gross labour mobility measured as specific mobility performances. By segment of mobility and education 1997-1998. Basis: 86 regions in Norway broken down by 43 regions with the lowest level of incomes and 43 regions with the highest level of incomes

Level of incomes:	Low	High	Low	High	Low	High
Type of mobility	Low education		Middle education		High education	
Still in job locally	23.503** (2.65)	26.850* (1.75)	17.058 (1.22)	76.076** (2.65)	9.402 (0.43)	111.914** (2.07)
To job from education locally	0.045 (0.01)	-10.122** (-2.20)	-0.594 (-0.11)	2.099 (0.41)	-1.194 (-0.27)	-4.719 (-0.56)
To job from unemployment locally	2.496 (0.92)	2.386 (0.79)	-0.187 (-0.04)	2.324 (0.44)	-0.265 (-0.19)	-0.206 (-0.06)
To job from others outside the labour force locally	4.914 (0.40)	-5.646 (0.36)	-2.963 (-0.38)	14.830* (1.88)	-3.329 (-0.71)	-0.046 (-0.00)
To job from internal immigration	35.527 (1.56)	1.075 (0.03)	9.630 (0.35)	-21.508 (-0.72)	-13.295 (-0.71)	41.361 (1.00)
To job from immigration	3.226 (0.22)	66.952*** (3.90)	-225.069 (-0.55)	1945.320*** (3.07)	-198.464 (-1.14)	483.718** (2.01)
From job to internal out-migration	-10.722 (-0.45)	-56.082 (-1.35)	-1.959 (-0.07)	-6.975 (-0.21)	-7.558 (-0.49)	-69.533*** (-2.88)
From job to emigration	-18.242 (-0.28)	-51.012 (-0.72)	114.543 (0.83)	65.600 (0.29)	31.063 (0.29)	290.485 (1.67)
Weighted average	182.744** (2.26)	143.426* (1.75)	4.168 (0.22)	101 313*** (3.62)	-37.062 (-0.45)	304.828* (1.73)
Adjusted R ²	0.11	0.25	-0.12	0.37	-0.02	0.32

Level of significance: 99%***, 95%** , 90%*. (t-values in brackets). Number of observations=43 + 43

When all the mobility measures are weighted together by the number of persons within each mobility segment, the relationship between income level and total mobility is strong, positive and significant for low and middle educated persons, but somewhat surprisingly not significant for high educated employed.

In table 4.6o we have, in the same manner as above, broken down this analysis further by comparing the 43 Norwegian regions with the highest income level with the 43 regions with lowest income level.

The relationship between income level and the ability to stay employed in the local labour market is positive and significant for low and middle educated employed in regions with the lowest income level and for all educational groups in regions with the highest income level.

The relationship between income level and local recruitment from the educational system is only significant but negative for persons with low education in regions with the highest income level. With regard to recruitment from unemployment, the figures indicate a generally positive relationship for low and middle educated employed in regions with the highest income level, but none of the

parameters are significant. The correlation for recruitment from other persons outside the labour force is only positive with a certain significance for middle educated employed in regions with the highest level of income. The results for internal in-migration to job are mostly positively correlated to the income level except from middle educated employed in regions with high level of income and high-educated persons in the regions with the lowest level of income. For immigration to job the parameters are positive and significant for all educational groups in regions with the highest level of income. The relationship between income level and internal out-migration from job is generally negative, but only significant for high-educated labour in regions with the highest level of income. For emigration from job the relationship is generally negative for low-educated employed and generally positive for middle- and high-educated persons, but none of the parameters are significant. The relationship between income level and a weighted average of all types of mobility by education gives a generally positive and significant effect for persons with low education, whilst employed with middle and high education show positive and significant correlation effects only in the regions with the highest level of income.

There is a stronger general effect of labour mobility on regional job growth than on regional income change and regional income level when we compare these results of income and mobility with previous results of employment growth and mobility (see section 4.2 above). There is especially a stronger correlation between regional net job growth and in and out-migration and others to job locally compared with regional income change and regional income level. On the other hand there is, however, a stronger correlation between immigration to job and the regional income level than between immigration and regional net job growth.

5. Main findings

The mobility performance of regional labour markets measured by gross and net labour mobility has been the main approach of this analysis. A short summary of each main section of the report follows below:

The regional labour market mobility generally:

- There has been a positive growth in employment during the whole investigation period 1994-1999 at the national level, with the strongest growth from 1996-1997 and 1997-1998, falling to a slight growth at the turn of the decade.
- The highest contribution to net employment growth derives from education to job in the local labour markets both at the national level as well as in the four main urban regions.
- The capital region of Oslo/Akershus and the region of Stavanger/Sandnes differ, however, from the other two main urban regions due to a much stronger net effect from internal migration to job.
- Both total gross labour mobility and inter-sector mobility reflects the business cycle with the highest mobility in years with strong employment growth.
- Inter-sector mobility contributes with almost 50 per cent of the total gross job-entries. Due to a strong economic growth during the investigation period gross flows of labour from outside the labour force also show a significant increase, approximately at the same level as the education-to-job flows. Recruitment from internal migration is also important, whilst the unemployment-to-job flows have a somewhat minor importance due to strong economic growth and low unemployment rates.
- The gross entries to job is, however, significantly higher in the capital region of Oslo/Akershus and in the region of Stavanger/Sandnes than in the other main urban centres of Bergen and Trondheim.
- The exit rates from job in the local labour markets are significantly higher for low educated labour compared with high educated. Middle and high-educated persons also show a much higher transition rate from education to job and unemployment to job compared with 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.

- Not surprisingly, the middle educated persons dominate most transitions in the regional labour markets, due to the fact that this group represents the majority of all employed. Higher educated persons have a stronger position in the regional transitions than their actual number should suggest, simply due to their very strong mobility.
- Taking this mobility structure into consideration, we expected that regions with a certain conformity with respect to a large set of production conditions should also show a certain conformity in gross labour mobility. The results indicate that this is only partly true, and that several regions within homogeneous groups of regions differ significantly according to total labour mobility performance. Some regions perform rather different during the time period of investigation, although the majority of regions seem to have a certain stability in their relative total mobility performance.
- Taking into consideration seven typologies of regions, the job-to-job mobility is significantly higher in the capital region than in any other region. The gross rate of local unemployed to job is highest in regional metropolises and in the micro labour areas. The gross flow from education to job, measured in relation to total stock of employed, is highest in regional metropolises. The capital region shows the highest rates from others outside the labour force to job. Gross mobility by in-migration to job is highest in regional centres with a university and in the capital region. The corresponding out-migration exit-rates are clearly lowest in the capital region and regional metropolises and highest in micro labour areas and regional centres with a university. The immigration entries and emigration exits are also highest in the capital region.
- The strong net effect of the education to job mobility is highest in medium-sized towns and regions. The net effect of internal migration to job is clearly most positive in the capital region and in regional metropolises and most negative in micro labour areas. The strong net migration effect for the capital region is, however, mostly connected to low out-migration from job. The capital region shows the strongest positive net growth of labour in the youngest age group, whilst the micro labour areas show the lowest positive net growth of young labour. The net figures for the two oldest age groups are generally negative, and most negative in medium-sized towns and regions. The positive effects of net change of employed with higher education are definitely strongest in the capital region followed by regional metropolises and other regional centres, whilst micro labour areas show negative net effects. However, the capital region shows the lowest percentage growth of the high educated employed by education mobility. The labour mobility is thus of immense importance for the employment renewal in the capital region.
- Furthermore, there were particularly strong net effects in sectors representing the so-called new economy, such as knowledge intensive business services (KIBS) and for some regions in ICT-manufacturing and ICT-wholesale. The KIBS-sectors showed the strongest net effects in the capital region and in medium-sized towns and regions. The most positive net effects of labour mobility among higher educated persons were found in the finance sector and in the KIBS-sectors, whilst primary/mining, ICT-manufacturing, distribution ser-

vices, ICT-wholesale and health and social works all showed negative net effects of labour mobility.

- The net effects of labour mobility and education mobility may work in the same direction or in opposite directions. Especially in the strong growth sectors of finance and KIBS the labour mobility contributes positively and thus in the same direction as education mobility. In non-market services there was a tendency towards positive net effects of education mobility but a negative net effect of labour mobility of high-educated labour in small and micro labour areas.
- In many transitions there are strong variations across the regional typologies. The best total mobility performance is found in the capital region for all education levels, whilst the weakest total mobility performance was observed in the micro labour areas. The high mobility performance in the capital region is positively affected by the education to job mobility, whilst the opposite is found in the micro labour areas.
- We should also expect that local labour markets within each typology of regions show a certain conformity with respect to total gross labour mobility. There are, however, partly uneven total mobility structures across regions within the same typology. It is a tendency that regions showing a good or bad total mobility performance within each typology of regions also do so each year or most of the years during the period 1994-1999. Many of the regions showing less extreme mobility performances within each typology as an average during the time period, have a strong tendency towards varying their total mobility performance during the time period. The stability of labour mobility seems to be weaker among these regions compared with regions showing more extreme mobility performances. The strongest deviation in total labour mobility performance across regions is, however, found among small labour areas and micro labour areas.
- The main trend separating the best performing regions from the weakest performing regions within each regional typology seems to be connected to the ability to employ persons from the educational system. This in turn reflects the optimism or pessimism of the persons involved to become still settled or not within the local labour markets. A weak performance in employing the young and new graduates is, as we could expect, connected to higher than average out-migration from job.

The knowledge intensive business service(KIBS)-sectors specifically:

- The four main city regions include approximately 60 per cent of the total national employment in the KIBS-sectors. During the 1990s there have been a tendency towards increased concentration.
- The increase in employment in the KIBS-sectors has been much higher than the average increase in employment during the 1990s, with strongest growth in the capital region of Oslo and Akershus.
- There is generally a higher gross mobility in the KIBS-sectors compared with the total economy. The size of the differences seems to be positively correlated to the business cycle.

- The job-to-job mobility represented above 50 per cent of all gross mobility to the KIBS-sectors at the end of the 1990s. Transitions directly from the educational system are definitely of importance, but the recruitment from in-migration to job is generally of even higher importance.
- The city of Oslo and the region of Stavanger/Sandnes show the highest gross mobility in KIBS among the central regions, whilst the region of Trondheim shows the lowest gross mobility. The most visible difference between the main urban regions is found in in-migration to KIBS, which is definitely of highest importance in Oslo. The recruitment of persons from other sectors, from outside the labour force and through immigration is clearly higher in Oslo and Stavanger/Sandnes than in Bergen and Trondheim.
- The highest gross recruitment to KIBS derives from finance, retail etc., ICT-wholesale, machine and transport production and construction and from non-market services like health and social care and public administration.
- The transition from education to job definitely increases when we turn from gross to net entries to KIBS. The very strong importance of recruitment through gross job-to-job mobility was balanced by high gross out-flows to other sectors from 1994-1997. Towards the end of the 1990s the net recruitment to KIBS from job-to-job mobility definitely increased in a very tight labour market. Sectors like retail etc., hotel and restaurant, post and courier activities and the non-market services almost generally contributed positively to the net job-to-job mobility in the KIBS-sectors, whilst sectors like finance, machine and transport production, construction and ICT-wholesale all contributed strongly to the net job-to-job mobility in the KIBS-sectors but in changing directions dependent on the time period.
- The centralized character of the internal migration processes is clearly documented by generally positive net effects for the KIBS-sectors in the four main urban regions. The capital region of Oslo/Akershus generally shows positive net in-migration to the KIBS-sectors from all other counties during the whole period 1994-1999. A large part of the migration of labour to the KIBS-sectors are recruited from the largest university and high school regions, but a positive neighbourhood effect is also clearly present in the main urban regions.
- On average, employed persons in the KIBS-sectors have about 1.5 years more education than the average education level of all employed in Norway. Trondheim and Oslo show the highest education level of KIBS-employed, whilst Stavanger/Sandnes has the lowest education level of the four main urban regions. The effects of both labour mobility and education mobility are generally positive, with the strongest effect in the capital region and in medium-sized towns and regions.
- During the 1990s the average age of employed in the KIBS-sectors fell both absolutely and in relation to employed in other sectors of the economy. Trondheim and Bergen showed an average age of KIBS-employed above the national average, whilst Stavanger/Sandnes and especially Oslo showed a lower than average age.
- The capital region of Oslo/Akershus shows the best total performance of mobility in the KIBS-sectors both for middle and especially for high-educated la-

bour. For low educated labour only the region of Stavanger/Sandnes shows mobility performance above the national average. The region of Trondheim shows a lower than average total mobility performance for all three education levels.

Labour mobility in different citizen groups:

- The level of gross mobility to job is generally lower among Norwegian citizens compared with all other main citizen groups. The highest gross mobility is generally found among non-Western citizens reflecting a strong flexibility but also a more marginal and thus less stable position in the labour markets.
- The relatively higher total gross mobility in Oslo/Akershus and Stavanger/Sandnes is mainly due to a relatively higher mobility to job among Norwegian citizens.
- Strong mobility behaviour deviations have been observed across the citizen groups. The probability of leaving a job within the local labour market is much higher among non-Western citizens compared with all other citizen groups. Norwegian citizens show a much higher ability to go from the education system into an ordinary job compared with all other groups. The highest turnover rate from unemployment to job is found among other Western citizens. Other Nordic persons show a much higher ability to find a job among persons outside the labour force than all other citizen groups. The highest mobility rates of internal migration are definitely found among non-Western citizens both concerning in-migration to job as well as out-migration from job. Norwegian citizens are more geographically stable than all other national groups. Immigration to job and emigration from job are, as expected, much more pronounced by non-Norwegian citizens.
- The capital region of Oslo/Akershus and the region of Stavanger/Sandnes show a positive total mobility performance for all citizen groups. In Oslo/Akershus the best total mobility performance is found among other Nordic and Norwegian citizens, whilst in Stavanger/Sandnes other Nordic citizens show the best performance followed by an evenly distributed mobility performance among all other citizen groups. Bergen also shows above total average mobility performance for Norwegian citizens but below average total performance for all other citizen groups. In Trondheim, the total average mobility performance is below the national average for all citizen groups.

"Brain gain" or "brain-drain" in the regional labour market mobility:

- The highest level of education was found in the non-market services of basic and higher education, research and development, information technology, other business services, public administration and pharmaceutical production. The lowest level of education was observed in the primary sectors of agriculture, forestry and fishing, mining, labour intensive manufacturing and in post and courier activity.
- The capital region and regional metropolises showed the highest education level in most sectors. Vice versa the lowest education level was found in medium-sized towns and regions, small labour areas and micro labour areas.

- The most pronounced "brain-gain" sectors were found among telecommunication, printing and publishing and higher education institutions, whilst the sectors which predominantly experienced "de-qualification" through local cross sector mobility were pharmaceutical production, hotel and restaurant and retail, recreation, culture and sport.
- There was a certain divergence of education improvement by labour mobility within the local labour markets totally, showing a "brain-gain" in all regions except from the capital region. This may be seen in light of a very tight labour market in the capital region forcing the employers to search for labour among more marginal parts of the labour force, but partly also due to "brain-gain" effects through the migration processes.
- The results support a very strong "brain-gain" effect in the capital region through inter-regional migration. All other regional typologies show mostly a "brain-drain" through the migration processes. The strongest "brain-drain" through migration was observed in medium-sized towns and regions, small labour areas and micro labour areas. The national figures indicate, however, that the net effects of all gross labour migration within the country contributed to an education improvement of the employment in all years of the investigation period.
- Renting of office machinery, electro (electric and electronic manufacturing), machine and transport production, energy and pharmaceutical production experienced the highest "brain gain" through the migration processes, whilst the most pronounced "brain-drain" sectors through migration were research and development, post and courier activity, hotel and restaurant, primary/mining and the non-market services of basic education.
- 12 out of 86 regions experienced a positive net-migration to job and a positive "brain-gain" effect through migration. Another 12 regions had positive net immigration to job, but suffered from negative employment improvement through migration. Furthermore, 27 regions showed negative net-migration to job, but partly compensated this by a "brain-gain" through the migration processes. The remaining 35 regions experienced both negative net-migration to job as well as a "brain-drain" through the migration processes.

Income change by education and regional labour market mobility :

- The results indicate a clear tendency that non-mobile employed had a weaker income growth compared with employed persons that were mobile within or between the regional labour markets. Furthermore the results reveal a remarkably higher income growth among those employed increasing their level of education irrespective of whether they are labour market mobile or not.
- Not surprisingly the highest income growth is found in the capital region. Somewhat more surprisingly small labour areas also experienced income growth above the national average, partly due to a relatively high income growth among education mobile employed.
- Education mobile men had a somewhat higher income growth compared with education mobile women among job-to-job mobile employed within the local labour markets, whilst the income growth among non-education mobile show

small or no gender differences. The dominance of male versus female income growth was most pronounced in the capital region and for education mobile also in regional metropolises and other regional centres and for non-education mobile in regional centres with a university. In medium-sized towns and regions and small labour areas the female income growth indicates a somewhat higher returns to education. The annual income growth among local labour mobile employed is clearly disproportional with age, but proportional with education level.

- The income growth of in-migrants is almost generally higher than for local cross sector mobile employed. The return to education for in-migrants is high in regional centres with a university, regional metropolises and the capital region, whilst medium-sized towns and regions had the lowest return. For non-education mobile in-migrants the income growth was most pronounced in the capital region.
- It is a clear tendency that out-migrants from less central regions show the best return to education. Out-migrants from micro labour areas show both higher returns to education as well as higher income growth for non-education mobile than out-migrants from any other regional typologies. Even out-migrants from the capital region show a higher income growth than the average for all employed persons in the nation, but a lower income growth than most other out-migrants from other regions.
- The highest income growth for education mobile local cross-sector mobile occurred among employed persons leaving information technology, and among non-education mobile leaving pharmaceutical production. The most pronounced a destination sector with respect to income growth is for education mobile research and development and for non-educational mobile information technology. In the capital region local entries to information technology and energy resulted in a high income growth.
- The conclusion above is valid even after controlling the income changes for changes in education level. There are small or no variations by gender in income growth controlled for education among cross-sector mobile employed within the local labour markets. Mobile non-Western citizens showed higher income growth than other national groups both within and between regions, although from a lower than average income level. The capital region shows the strongest income growth of local mobile, whilst the small labour areas show the lowest income growth, although still above the general level of income change controlled for education for all employed in Norway. The income growth controlled for change in education is generally higher for male than female in-migrants to job. The capital region has also the strongest income growth of in-migrants when controlled for education, whilst other regional centres, medium-sized towns and regions and small labour areas had the lowest income growth in this respect. The highest income growth was observed among out-migrants from medium-sized towns and regions and from micro labour areas. Out-migrants from the capital region had the lowest income growth when controlled for education, and especially among women.

- There is a clear tendency that those who left the non-market services increased their income more than those who entered these sectors even when controlled for education. The dominating position of the capital region with respect to annual income growth among local cross-sector mobile is visible in quite many of the sectors. There is a clear tendency that sectors like financial intermediation, renting of office machinery, information technology and ICT-manufacturing showed the highest growth of income both among those who out-migrated from as well as in-migrated to these sectors. Furthermore, the capital region showed a much higher income growth among those who in-migrated compared to those who out-migrated in most of the sectors. Sectors like financial intermediation, finance, renting of office machinery, information technology, other business activities, ICT-manufacturing, ICT-wholesale and pharmaceutical production predominantly contributed to the very high income growth amongst in-migrants to the capital region even when controlled for change in education.

Relationship between employment growth and regional labour market mobility:

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

- The results indicate that there are strong differences between different types of gross mobility and the regional employment growth as well as between different personal groups and sectors.
- Measured as total gross mobility by education there was a somewhat higher correlation between employment growth and gross labour mobility for high-educated labour compared with middle and low educated labour. Low and high educated labour show a positive and highly significant correlation for the ability to stay in job in the local labour markets and for recruitment to job from outside the labour force. Very high estimates are found for internal gross migration with high and positive correlation between employment growth and in-migration to job for all educational groups, but highest for high educated labour. The highest and most significant estimates are, however, found for gross out-migration from job, showing a high and negative correlation between employment growth and the ability to out-migrate, and especially then for high-educated labour. The highly significant and negative estimates for out-migration and job-growth may support the hypothesis that employed persons have more information of the situation at their own local labour market compared with all other local labour markets, thus regulating the out-

migration processes closer to the regional business cycles than the corresponding in-migration processes.

- The results show a rather strong correlation between gross mobility to job and net employment growth in the youngest age group. The high correlation may reflect the fact that much of the mobility in this age group includes the first entry to the labour market, and that this flow is higher in the regions experiencing the strongest net growth of employment. The oldest age group of persons 60-74 years shows a somewhat higher correlation between net job growth and gross mobility to job than persons in the age group 25-59 years. This may reflect the fact that in spite of very low gross mobility to job the older persons are encouraged more to do so when and where the local labour market is most tight.
- The highest correlation between net job growth and gross mobility to job is, however, found when we break down the results by sectors with high and positive correlation for sectors representing the so-called "new economy", and especially then for telecommunication. On the other hand, much of the bottleneck problems experienced in the public health services may be reflected by a relatively low correlation between the regional job growth and the gross mobility in health and social work. The weakest correlation is, however, found in the sector of retail, recreation, culture and sport.
- A separate analysis of the sector knowledge intensive business services (KIBS) reveals a much stronger correlation between regional employment growth and gross labour mobility compared with the economy in general. All educational groups show a significant and negative correlation of exits from job within the local labour markets. The highest and most positive correlation is, however, found for entries from job locally, revealing a very efficient cross-sector mobility to KIBS within the local labour markets with increasing employment.
- The positive correlation for in-migration to KIBS and the negative correlation for out-migration from KIBS are also significant, and especially for high-educated labour.
- The relationship between net job growth and gross labour mobility is definitely most pronounced for Norwegian citizens compared with other national groups. All national groups show, however, a negative correlation between job growth and out-migration from job, but Norwegian citizens show a relatively higher correlation for in-migration to job, for unemployment to job locally, to job from the educational system and for the ability to stay in job locally.

Relationship between the change and level of income and regional labour market mobility:

Finally, we have carried out an analysis investigating the relationship between regional annual income change and labour mobility and between the level of regional income and gross mobility to and from job. The main hypothesis is that persons move to jobs in regions and sectors showing the strongest income

growth as well as the highest income level, whilst the opposite is the tendency for regions and sectors showing low income growth and income level.

- Measured as total gross mobility by education, there was a much higher correlation between annual income change and gross labour mobility for the high educated employed compared with middle and low educated labour. The strongest and most positive and significant correlation between income change and labour mobility among high-educated persons was found in local mobility to job of persons outside the labour force and for in-migration to job, while the strongest negative correlation was found for internal out-migration from job. All educational groups showed, however, a significant and negative correlation between income change and out-migration from job in regions with the lowest income change.
- For low and middle educated persons the relationship between the level of income and gross labour mobility was remarkably higher than for income change and mobility. For high-educated labour the mobility seems to be more sensitive to differences in the annual change of income.
- The strongest, most positive and significant correlation between regional income level and labour mobility was found in the ability to stay in job within the local labour markets for low educated labour, the ability to turn from education to job in the local labour markets among middle educated labour and for immigration to job among low educated persons. The strongest negative correlation was found in internal out-migration from job for all educational groups and especially then among high educated employed.
- There is a stronger general effect of labour mobility on regional job growth than on regional income change and regional income levels.

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Appendix A

Regional classification of twelve groups of regions (see tables 3.1 and 3.2 in section 3):

<p>Regional group 1: Stavanger/Sandnes Oslo/Akershus Bergen Trondheim</p> <p>-----</p> <p>Regional group 2: Jæren Egersund Florø Ålesund Ulsteinvik Søndre Sunnhordland Nordre Sunnhordland Haugesund Lyngdal/Farsund Mandal</p> <p>-----</p> <p>Regional group 3: Rørvik Finnsnes Brønnøysund Sandnessjøen Nord-Troms Vesterålen Lofoten Brekstad</p> <p>-----</p> <p>Regional group 4: Midt-Gudbrandsdalen Frøya/Hitra Surnadal Nord-Gudbrandsdalen</p> <p>-----</p> <p>Regional group 5: Tromsø Lillehammer Bodø Harstad Narvik</p>	<p>Regional group 6: Vadsø Alta Hammerfest Kirkenes</p> <p>-----</p> <p>Regional group 7: Molde Namsos Ørsta/Volda Setesdal Andselv Levanger/Verdalsøra</p> <p>-----</p> <p>Regional group 8: Tønsberg/Horten Moss Fredrikstad/Sarpsborg Sandefjord/Larvik Skien/Porsgrunn Kristiansand</p> <p>-----</p> <p>Regional group 9: Rjukan Nordfjord Førde Høyanger Sogndal/Årdal Flekkefjord Odda Mosjøen Sunnalsøra</p> <p>-----</p> <p>Regional group 10: Kongsvinger Gjøvik Hamar Elverum Notodden/Bø Halden Kragerø Kristiansund</p>	<p>Regional group 11: Drammen Hadeland Sande/Svelvik Askim/Mysen Hønefoss Kongsberg Stjørdalshalsen Holmestrand Lillesand Risør Arendal Mo i Rana</p> <p>-----</p> <p>Regional group 12: Røros Valdres Hallingdal Oppdal Orkanger Tynset Vest-Telemark Voss Grong Steinkjer</p>
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Appendix B

Seven regional typologies: (see table 3.3 in section 3)

<p>1. Capital region Oslo/Akershus -----</p> <p>2. Regional metropolises Stavanger/Sandnes Bergen Trondheim -----</p> <p>3. Regional centres with a university Tromsø -----</p> <p>4. Other regional centres Drammen Ålesund Molde Tønsberg/Horten Haugesund Fredrikstad/Sarpsborg Sogndal/Årdal Lillesand Hamar Sandefjord/Larvik Lillehammer Bodø Skien/Porsgrunn Vadsø Arendal Kristiansand Steinkjer</p>	<p>5. Medium sized towns and regions Hadeland Askim/Mysen Hønefoss Søndre Sunnhordland Nordre Sunnhordland Kongsvinger Moss Stjørdalshalsen Gjøvik Harstad Levanger/Verdalsøra -----</p> <p>6. Small labour areas Jæren Egersund Sande/Svelvik Florø Kongsberg Orkanger Holmestrand Flekkefjord Ørsta/Volda Notodden/Bø Sandnessjøen Mandal Halden Kristiansund</p>	<p>7. Micro labour areas Røros Midt-Gudbrandsdalen Valdres Hallingdal Rjukan Nordfjord Frøya/Hitra Førde Ulstein Oppdal/Rennebu Høyanger Tynset Vest-Telemark Rørvik Surnadal Nord-Gudbrandsdalen Namsos Finnsnes Brønnøysund Lyngdal/Farsund Odda Risør Setesdal Voss Elverum Grong Andselv Nord-Troms Vesterålen Alta Mosjøen Lofoten Hammerfest Mo i Rana Brekstad Narvik Kragerø Sunnalsøra Kirkenes</p>
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