REGIONAL DISPARITIES IN GROSS JOB AND WORKER FLOWS IN FINLAND*

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The aim of this study is to characterize the structure and the evolution of Finnish regional labour markets in terms of gross job and worker flows using establishment-level data. There is no solid evidence that the gross job creation rate is on average lower in Eastern and Northern Finland. The rapid rise in regional unemployment disparities in the 1990s can be explained via the rise in the disparities in the gross job destruction rates across regions during the great slump of the early 1990s. There are also distinct regional differences in the adjustment of labour demand at the establishment level. (JEL: J23, R23).

1. Introduction

Market economies are in a state of continuous turbulence. Joseph A. Schumpeter (1942) called this underlying process of capitalism "creative destruction". In fact, according to the growing number of establishment-level studies, it is fair to say that the continuous reallocation and the reorganisation of scarce resources culminates in the function of labour markets, where the reallocation of resources takes the form of gross job flows (i.e. job creation and destruction), and gross worker flows (i.e. hirings and separations of workers).

This reorganisation view of labour markets underlines the fact that the pool of available jobs is not stagnant over time. Instead, the labour markets are subject to simultaneous job creation and destruction. There are two broad approaches to characterize this structural change in labour markets in terms of gross job and worker flows. The so-called excess job reallocation provides a measure of structural change among the plants of the economy. In

contrast, the fact that the available vacancies of the labour markets are also subject to various idiosyncratic shocks within plants is captured by the so-called churning rate. These key concepts of the underlying structural change of labour markets are defined in the following section of this study.

There has been a bulk of research on gross job and worker flows based on cross-country comparisions.[1] In particular, according to the theoretical model by Bertola and Rogerson (1997), the rate of job reallocation should be a decreasing function in wage dispersion. This feature of gross job flows explains part of the widely observed puzzle that the underlying turnover rates of the economies are roughly equal in Europe with respect to the United States despite the stylized fact that labour markets tend to be more regulated in Europe.[2] In contrast to these cross-country comparisions, the following study provides detailed empirical evidence for the view that there are differences in gross job and worker flows within the same country despite the presence of the same institutional characteriterics (including labour market regulations) across regions. The major advantage of the comparison of gross job and worker flows within the same country with respect to available cross-country studies is the fact that the measurement of gross job and worker flows is based on the same data across regions. This means that the emergence of measurement problems and conceptual differences do not hamper the comparison of gross and worker flows across regions.

The issues concerning regional labour markets have gained growing interest in Finland, because there has been a rapid rise in the regional disparities in unemployment rates as a part of the export-led recovery from the great depression of the early 1990s (see, for example, Böckerman, 1998; Tervo, 1998; Huovari, 1999). However, the available empirical studies on Finnish regional labour markets have

been conducted by using aggregate data on (net) employment changes.[3] The main shortcoming of these traditional investigations of aggregate outcome is that they mask the underlying establishment-level dynamics of labour demand adjustment in Finnish regional labour markets. In other words, the existing empirical studies that focus solely on (net) employment changes provide an incomplete and potentially misleading picture of regional labour markets in Finland. As will be shown in the following sections of this study, the focus on (net) employment changes gives, for instance, far too dismal a picture of the nature of high unemployment in Eastern and Northern Finland.

The aim of this study is to characterize the structure and the evolution of Finnish regional labour markets in terms of gross job and worker flows. The study explores the disparities in the regional labour market adjustment during an episode of extreme turbulence in the Finnish economy. In particular, the study is focused on the blow of the great slump of the early 1990s and the following recovery from 1994 to 1997.[4] In addition, the genuine regional elements in gross job and worker flows are separated from the effects of industry structure. Thus, this study fills an important gap in the literature on the regional labour markets in Finland. The evaluation of gross job and worker flows decomposes the net employment change and constitutes a coherent picture of regional labour markets in Finland. The study is based on detailed establishment-level analysis. The sectoral composition of the study also goes, as in Ilmakunnas and Maliranta (2000a), beyond narrow "manu-centrism", which has been a typical feature of earlier empirical investigations into gross job and worker flows.

This study has in eight parts. The first section of the study provides the applied measures of gross job and worker flows. The second section provides a brief snapshot of the so-called "basic facts" of the literature on job creation

[1] *Davis and Haltiwanger (1999) provide a summary of the literature and a discussion about various measurement and conceptual differences that hamper available comparisions of gross job and worker flows across countries.*

[2] *For example, Nickell (1998) provides some evidence for this view.*

[3] *Kangasharju and Pehkonen (2001) provide a recent analysis of growth and employment in the Finnish regions. Böckerman (2000) provides a summary of the literature.*

[4] *Caballero and Hammour (2000) stress the dynamic and the cumulative nature of restructuring in the economies.*

and destruction and gross worker flows. These basic facts of the literature constitute the hypotheses about gross job and worker flows. The third section of the study articulates the most important underlying properties of the establishment-level data. The fourth section is an investigation of gross job flows in Finnish regional labour markets. The fifth section of the study includes the elaboration of gross worker flows and the so-called churning rate. The sixth section provides an elaboration of genuine regional elements in gross job and worker flows by applying regression techniques. In addition, the section provides a discussion about the extent to which some important patterns of regional gross job and worker flows can be reduced to the differences in the industry structure of the Finnish regions by applying the 2-digit standard industry classification. The last section concludes the study.

2. The applied measures of gross job and worker flows

The gross flows of jobs and workers are measured as the number of jobs created or destroyed or workers moving in and out of establishments (i.e. hirings and separations of workers). This means that the measure of the job creation rate is calculated as follows:

$$(1) \quad JC_t = \Sigma_i \Delta E_{it}^+ / ((\Sigma_i E_{it} + \Sigma_i E_{i, t-1}) / 2),$$

where E denotes employment in firm i year t and the superscript "+" refers to positive changes. The number of employees is measured by the average of period t and $t–1$ employment. In other words, to convert time-t job creation and destruction measures to rates, job creation and destruction are divided by the average of employment at t and $t–1$ in order to achieve several technical advantages over more conventional growth rate measures (see, for example, Davis, Haltiwanger and Schuh 1996, 189–190).

Unlike the conventional growth rate measures, which divide employment change by lagged employment and range from –1.0 to ∞, the applied growth rate measure ranges from –2.0 to 2.0 and the growth rate measure is sym-

metric around zero. In addition, Baldwin and Picot (1995) argue that this average measurement also removes part of the bias induced by transitory movements of the economy.[5]

The measure of the job destruction rate is calculated as follows:

$$(2) \quad JD_t = | \Sigma_i \Delta E_{it}^- | / ((\Sigma_i E_{it} + \Sigma_i E_{i, t-1}) / 2)$$

Thus, the job destruction rate is defined as the absolute value of the sum of negative employment changes, divided by the average number of employees. The superscript "–" refers to negative changes.

The definitions of job creation and destruction mean that the net rate of change of employment (NET) is simply the difference of the measures of job creation and destruction:

$$(3) \quad NET_t = JC_t - JD_t$$

The sum of job creation and destruction rates is called the gross job reallocation rate (JR):

$$(4) \quad JR_t = JC_t + JD_t$$

The excess job reallocation rate (EJR) equals (gross) job reallocation minus the absolute value of the net employment change:

$$(5) \quad EJR_t = JR_t - | NET_t |$$

This means that excess job reallocation is an index of simultaneous job creation and destruction in the economy. Thus, it is also a natural measure of heterogeneity in the plant-level employment outcome among plants. In other words, if excess job reallocation is above zero, then the magnitude of (gross) job reallocation is above what has been necessary to accommodate the net employment changes of the regional labour markets.

Comparison of information in two consecutive years can be used for calculating the

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[5] *An important feature of the measures of job creation and destruction is fact that all jobs are considered to be equal. In other words, these measures do not take into account the underlying quality of jobs that are created and destroyed in the Finnish regions.*

number of employees who have entered a plant during the year and are still working at the same plant (see, for example, Ilmakunnas, Laaksonen and Maliranta, 1999). The sum of these employees over all plants is worker inflow, or hiring. It is also possible to identify those employees who are no longer working at a plant. This means that the sum of these employees is worker outflow, or separation.

Dividing the worker inflow and outflow in a period of time by the average of employment in periods t and $t–1$ delivers the worker inflow rate (WIF) and the worker outflow rate (WOF). The difference between WIF and WOF is the net rate of change in employment:

$$(6) \quad NET_t = WIF_t – WOF_t$$

Also, the worker flow rate (WF) is simply the sum of the hiring (WIF) and separation rates (WOF). In addition, the so-called churning rate (CF) can be defined as follows:

$$(7) \quad CF_t = WF_t – JR_t$$

The churning rate can also be called by the expression "excess worker turnover rate" for obvious reasons. These definitions mean that the churning rate ties worker flows and job flows together and, therefore, completes the picture of the underlying dynamics of labour adjustment at the establishment level in Finnish regional labour markets. In addition, the churning rate is a natural measure of the underlying structural change of regional labour markets within plants.

3. The "basic facts" of the literature

The empirical literature on gross job and worker flows contains a number of so-called "basic facts". It is highly important to note that due to the limited availability of data, the key empirical findings of gross job and worker flows refer mainly to the (U.S.) manufacturing industries (so-called "manucentrism").[6]

The first basic fact of the literature concerns the magnitude of measured gross job flows. For example, using annual data, roughly 1 in 10 jobs are created and another 1 in 10 are destroyed each year in the U.S. manufacturing industries. It has become clear that the gross flows are large, relative to the net employment change. Job reallocation is also a large part of the total worker reallocation. In fact, most studies indicate job reallocation is about half of the total worker reallocation.

The second basic fact of the literature on job creation and destruction is the dominant role of pure plant-specific and firm-specific factors in accounting for the largely observed magnitudes of gross job and worker flows (see, for example, Haltiwanger, 1997). In other words, the idiosyncratic component is predominant and most of the excess reallocation is within narrowly defined sectors. This means that the restructuring between various sectors is only a small portion of the total reallocation of the economy (so-called "sectoral shifts").

The third fact is that most of the reallocation reflects the persistence of underlying employment changes. For example, Davis, Haltiwanger and Schuh (1996) report that roughly seven in ten newly created jobs survive for at least one year, and roughly eight in ten newly destroyed jobs fail to reappear one year later in the case of U.S. manufacturing industries. After two years, the persistence of annual job creation and destruction falls to 54% and 74%, respectively. This feature of job creation and destruction means that to the extent that plant-level employment changes are also persistent for continuing plants, they must be associated with long-term joblessness or worker reallocation across plants.

The fourth basic fact is the concentration and the lumpiness of underlying employment movements. In particular, many empirical investigations find that births and deaths account for large fractions of job creation and destruction. Births and deaths are simply the extremes of an underlying growth-rate distribution. From a

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[6] *Davis and Haltiwanger (1999) provide a list of "basic facts" of the literature on reallocation with additional references. Burda and Wyplosz (1994) provide empirical evidence on the magnitude of gross job and worker flows in Europe.*

regional point of view, a high concentration of job creation and destruction may accentuate various negative feedback effects on local economies.[7]

The fifth basic fact is about the distinct cyclicality of job creation and destruction. In the case of U.S. manufacturing, a noteworthy feature of plant-level data is the relatively volatile nature of job destruction. In particular, job destruction is more responsive to changes in activity than is the rate of job creation (see, for example, Hall, 1999). The available sample period of the longitudinal data sets for many European countries is, on the other hand, quite short, which means that a definite conclusion about relative volatility on job creation and destruction is hard to reach with existing data sets.

The sixth fact is that gross job flows indicate some systematic differences by underlying plant characteristics. In particular, the most important stylized fact is that the excess reallocation rate decreases in the size and age of the firm in the case of U.S. manufacturing industries. These systematic differences by plant characteristics are also found in a number of other countries. However, Haltiwanger and Krizan (1999) stress that the dominance of the idiosyncratic element serves as an important caution in attributing net growth to plants classified by any observable plant characteristics.

The list of these "basic facts" of the literature on gross job and worker flows reflects the underlying feature that the analysis of regional labour markets in terms of these measures is almost a neglected issue.[8] Thus, this study aims to provide the most fundamental stylized facts

about Finnish regional labour markets in terms of gross job and worker flows.

4. The Data

The Nordic countries, along with Finland, seem to have a number of advantages for the use of linked employer-employee data compared with other nations (see, for example, Ilmakunnas, Maliranta and Vainiomäki, 2001). In particular, the size of the country is quite small, which makes it possible to form various registers which cover the entire population of establishments and employees. This means that the linking process of the registers and other data sets is quite manageable.

This study uses a large longitudinal data of employees over the period from 1989 to 1997 (see Ilmakunnas and Maliranta, 2000a).[9] The calculation of gross job and worker flows is based on detailed establishment-level analysis, and Finland is divided into 20 provinces (the so-called NUTS3-level in the EU).[10] Figure 1 shows the geographic location of these provinces in Finland. The economic activity of the Finnish economy is heavily concentrated in Southern Finland. Thus, Appendix provides se-

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[7] *Ramey and Shapiro (1998) provide a number of interesting case studies on the fact that reallocation can be very costly to the local economy. For example, they find by using information on auction values that in the case of the closure of a Californian aerospace plant, the equipment resale prices averaged only 35 percent of net-of-depreciation purchase values.*

[8] *However, Eberts and Montgomery (1995) provide an analysis of job creation and destruction for the U.S. states. A major finding of the study is that over time employment fluctuations are associated primarily with job creation, but across regions employment differences are associated more with job creation. In addition, Devereux, Griffith and Simpson (1999) provide regional measures of job creation and destruction for the UK from the point of view of agglomeration.*

[9] *The data covers the period from 1987 to 1997. Linking employees to plants is a laborious and challenging task to do and it seems that in the first two or three years, when the Employment Statistics system was under construction, links were not always perfect. Consequently, worker and job flows derived from this data source may be somewhat biased upward in these years. Indeed, a comparison of job flows with Business Register data suggests that job creation and destruction rates are to some degree higher in Employment Statistics up to the year 1990, but henceforth these rates are closely in agreement with each other between two data sources (see Ilmakunnas and Maliranta, 2000b). The inclusion of the years 1988 and 1989 may thus yield a spurious view about the downward trend in the job reallocation rate.*

[10] *Romppanen (1974) provides an early investigation into gross job flows in the Finnish economy. The study covers manufacturing industries and it is based on Industrial Statistics. The study also provides some regional measures of gross job creation and destruction. However, a comparision of these results with the ones reported in the following sections of this study is not directly possible, because Romppanen (1974) has calculated the rates of gross job creation and destruction simply by dividing t–1 employment. In addition, the regions investigated by Romppanen (1974) are not the same ones as in this study.*

lected background statistics in a nutshell about the underlying economic structure of the Finnish provinces.

The study provides a representative and comprehensive picture of gross job and worker flows in Finland. The public sector is excluded from the analysis owing to the great number of practical problems in deriving the measures of gross job and worker flows. Thus, the study includes the non-farming business sector of the Finnish economy excluding social and personal services.[11] The applied plant-level data covers more than 80% of the total employment in the non-farming business sector of the Finnish economy.

Employment Statistics constitutes the backbone of this study. It compiles information about the economic activity of individuals and their background characteristics from a large number of administrative registers. Employment Statistics covers information on the employment status of the entire population in the last week of December. In the non-farming business sector of the Finnish economy there are more than 1.1 million employees in about 100 000 plants.

Employment Statistics is amended by several available registers held by Statistics Finland, for example, the Business Register.[12] The Business Register is a data base that covers registered employers and enterprises subject to VAT and their plants in Finland. In particular, the unique plant identification codes are taken from the Business Register. In addition, the Business
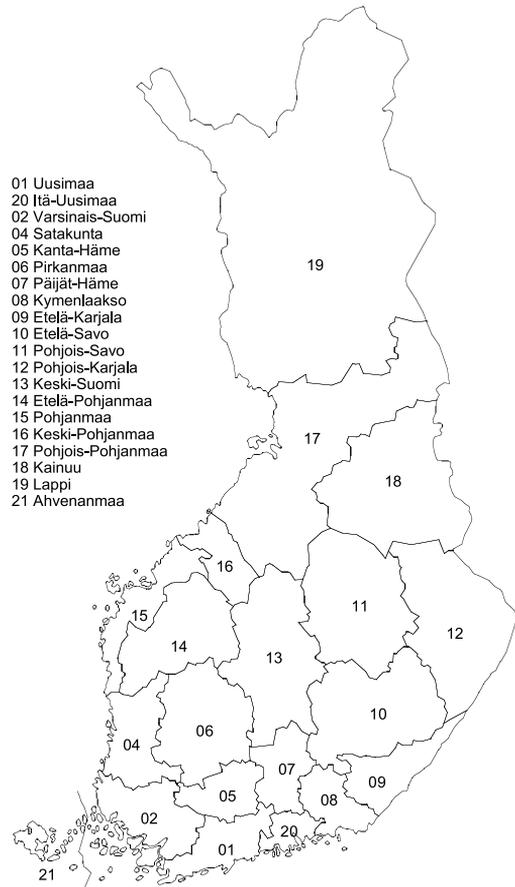

01 Uusimaa
20 Itä-Uusimaa
02 Varsinais-Suomi
04 Satakunta
05 Kanta-Häme
06 Pirkanmaa
07 Päijät-Häme
08 Kymenlaakso
09 Etelä-Karjala
10 Etelä-Savo
11 Pohjois-Savo
12 Pohjois-Karjala
13 Keski-Suomi
14 Etelä-Pohjanmaa
15 Pohjanmaa
16 Keski-Pohjanmaa
17 Pohjois-Pohjanmaa
18 Kainuu
19 Lappi
21 Ahvenanmaa

Figure 1. The location of provinces in Finland (Source: Statistics Finland).

Register follows changes in the demographic structure of plants. The entry and exit of establishments covers about 2–3% of all employees each year.[13] This means that the regional disparities in gross job and worker flows in Finland are driven mainly by continuing establishments.

The employer-employee links are determined in Employment Statistics. Thus, for each person an unique plant appearing in the Business

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[11] *The applied definition of the non-farming business sector excluding social and personal services is, in detail, as follows: mining (C), manufacturing (D), energy etc. (E), construction (F), trade (G), hotels and restaurants (H), transportation etc. (I), finance (J), and real estate, business services etc. (K). This means that agriculture, forestry and fishing (A; B), public administration (L), education (M), health and social work (N), other social and personal services (O), international organizations (Q), and industry unknown (X) are exluded from the evaluation of the regional gross job and worker flows. Ilmakunnas, Maliranta and Vainiomäki (1999) contains a more detailed elaboration of the applied data. In addition, Ilmakunnas and Maliranta (2001, 3–4) provide a discussion of the establishment-level data.*

[12] *Ilmakunnas, Maliranta and Vainiomäki (1999) provide a detailed illustration of linkage procedures in the case of Finnish manufacturing industries.*

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[13] *This estimate is somewhat sensitive to the applied source of calculations. Business registers in Finland cover even the smallest establishments. A part of the entry and the exit of establishments is masked due to the fact exits of establishments also happen between the measurement points of the data and employment is measured as an average in business registers.*
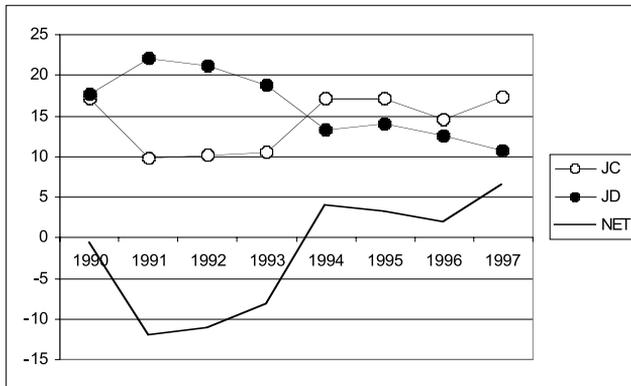
Figure 2. The evolution of gross job creation (JC), gross job destruction (JD), and the net rate of employment change (NET = JC − JD) in the Finnish economy.

Register is determined based on his/her primary employer during the last week of each year. The calculation of underlying gross job flows naturally requires the setup of a base year. Thus, the annual measures of gross job and worker flows are calculated from 1990 to 1997.

The period of this study includes the great depression of the early 1990s, which dominates the evolution of regional gross job and worker flows in Finland.[14] For instance, the slump caused a rapid decline in gross job creation and a sharp rise in the gross job destruction in the Finnish economy (Figure 2). As the figure indicates, 1991 was the year of the steepest decline in employment during the recession. The recovery from the bottom level of employment started in 1994. These movements are also heavily present in the regional measures of gross job and worker flows. It is therefore interesting to investigate the underlying fluctuations of gross job and worker flows and, in particular, to explore the disparities in the regional labour market adjustment at the establishment-level of the Finnish economy.

5. Gross job flows

5.1 Creation

The job creation rate was highest in the period from 1990 to 1997 in Pohjois-Pohjanmaa,

Lappi, Etelä-Pohjanmaa and Uusimaa (Table 1). The outstanding success of Pohjois-Pohjanmaa in terms of job creation can mainly be explained by the cluster of information technology around the region of Oulu. In contrast, the lowest job creation rate was in Ahvenanmaa, Satakunta and Päijät-Häme from 1990 to 1997. During the great depression of the early 1990s there was a sharp decline in the job creation rate across all provinces of Finland. In addition, Kainuu experienced a kind of "double dip" in terms of job creation during the 1990s.

One interesting fact is that there was no substantial rise in regional disparities as measured by employment-weighted standard deviation in terms of the job creation rate from 1990 to 1997. The level of regional disparities was lowest during the great depression of the 1990s. Also, the results indicate that there is no solid evidence at all for the widely held view that, compared with Southern Finland, the job creation rate is lower in Eastern and Northern Finland, where the average unemployment rate has been much higher than in Southern Finland during the past few decades.

5.2 Destruction

The job destruction rate was, on average, highest in Lappi in the period from 1990 to 1997, and lowest in Ahvenanmaa (Table 2). In addition, there is no evidence at all for the equally widely held view that the job destruction rate is, on average, higher in Eastern and Northern Finland.

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[14] *Honkapohja and Koskela (1999) provide a detailed analysis of the great slump of the early 1990s in Finland.*

Table 1. Job creation rate in the regions of Finland.

	1990	1991	1992	1993	1994	1995	1996	1997	AVG
Uusimaa	18.39	10.29	10.13	10.98	16.92	17.97	15.84	18.95	14.93
Varsinais-Suomi	16.59	10.51	9.62	10.56	19.99	18.49	14.60	17.85	14.78
Satakunta	13.55	9.90	10.17	8.35	18.26	12.66	10.33	13.39	12.08
Häme	15.84	8.25	7.21	9.67	15.03	18.67	14.12	17.25	13.26
Pirkanmaa	20.29	9.66	9.66	11.11	17.00	16.59	12.99	15.40	14.09
Päijät-Häme	14.39	7.64	8.43	10.71	14.83	13.75	12.37	15.54	12.21
Kymenlaakso	13.72	9.13	8.55	11.13	15.07	16.52	12.65	13.51	12.54
Etelä-Karjala	19.56	10.11	9.54	10.74	15.88	16.79	14.22	14.81	13.96
Etelä-Savo	14.78	8.78	11.13	7.88	17.77	18.76	13.88	15.11	13.51
Pohjois-Savo	15.90	9.22	9.44	11.37	17.27	16.12	16.29	17.57	14.15
Pohjois-Karjala	15.19	9.28	8.32	10.74	16.03	17.10	12.70	14.97	13.04
Keski-Suomi	18.01	9.35	10.44	9.64	15.53	16.32	12.87	15.58	13.47
Etelä-Pohjanmaa	16.66	10.05	11.01	10.87	20.70	19.01	13.93	17.47	14.96
Vaasan rannikkoseutu	16.58	9.34	10.52	11.12	16.68	14.71	16.08	16.51	13.94
Keski-Pohjanmaa	16.04	9.51	11.22	8.34	15.06	17.49	12.54	18.96	13.65
Pohjois-Pohjanmaa	15.99	11.12	11.90	12.39	19.04	22.35	16.57	19.92	16.16
Kainuu	12.76	10.04	18.43	9.53	16.02	12.14	9.86	19.26	13.51
Lappi	18.82	11.28	13.07	8.59	17.52	18.33	16.33	17.24	15.15
Itä-Uusimaa	15.08	6.52	10.01	9.45	15.78	11.08	15.66	15.42	12.38
Ahvenanmaa	14.84	7.87	12.82	5.50	8.98	8.25	7.43	12.11	9.73
STD	2.81	1.55	2.40	1.98	2.94	3.82	2.95	2.87	
AVG	17.00	9.88	11.09	10.46	17.32	17.01	14.29	17.20	
VCF	0.16	0.16	0.22	0.19	0.17	0.22	0.21	0.17	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

During the great depression of the early 1990s, there was a sharp rise in the job destruction rate in all provinces. The highest level of the job destruction rate was reached during 1991 or 1992; there were no clear-cut disparities in this respect across the provinces of Finland, except in Ahvenanmaa. The highest level of the job destruction rate was in Kainuu during the great slump of the 1990s.

The regional disparities in terms of the job destruction rate were highest during the depression. Thus, the results indicate that during the great slump of the early 1990s there was a decline in the disparities in the job creation rate across all provinces of Finland, but the pattern of job destruction was more concentrated across provinces.

5.3 Job reallocation

The magnitude of gross job reallocation was highest in Lappi, Pohjois-Pohjanmaa, and Etelä-Pohjanmaa in the period from 1990 to 1997 (Table 3). Ahvenanmaa, especially, has

been "an island of sleepy life" in terms of the reallocation of regional labour markets. There is some evidence that the lowest level of regional disparities in terms of gross job reallocation was reached during the great depression of the early 1990s.

The results also indicate that the underlying fluctuations of gross job reallocation were not countercyclical in the Finnish regions from 1988 to 1997. This result of the fluctuations of gross job flows is in sharp contrast with one of the leading models on gross job flows by Davis and Haltiwanger (1990), which argues that recessions are intensive times of restructuring in labour markets.[15]

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[15] *The fundamental tradeoff in the model by Davis and Haltiwanger (1990) is that a drop in present consumption due to reallocation activity delivers a rise in future consumption. In other words, in a recession, it is more valuable to invest in reallocation, which is an essential part of solid long-term growth. Thus, the structural change in the economy will be more intensive during recessions. This means that in terms of gross job flows, economic slowdowns are times of large job destruction and a mild decline in job creation.*

Table 2. Job destruction rate in the regions of Finland.

	1990	1991	1992	1993	1994	1995	1996	1997	AVG
Uusimaa	16.78	21.86	20.77	19.23	14.87	14.16	12.64	12.17	16.56
Varsinais-Suomi	17.65	20.51	20.36	20.05	12.82	13.54	13.27	10.08	16.04
Satakunta	16.55	20.85	22.12	15.72	11.42	11.13	12.09	8.45	14.79
Häme	16.58	19.78	21.03	18.51	11.78	14.76	12.85	10.44	15.72
Pirkanmaa	18.65	23.51	19.87	18.49	12.25	12.37	11.63	9.40	15.77
Päijät-Häme	19.13	21.07	21.58	19.34	11.21	12.18	12.51	9.50	15.82
Kymenlaakso	16.67	20.06	19.57	17.76	9.29	14.94	11.98	7.89	14.77
Etelä-Karjala	15.49	24.15	20.54	18.13	13.23	13.90	14.73	10.42	16.32
Etelä-Savo	17.67	22.37	22.16	18.72	13.37	19.25	13.34	10.03	17.11
Pohjois-Savo	18.69	23.58	24.31	18.22	14.46	15.18	14.08	11.83	17.54
Pohjois-Karjala	16.64	23.67	20.54	18.62	12.08	16.71	13.21	9.05	16.32
Keski-Suomi	19.68	20.67	24.03	18.77	12.12	13.99	10.01	8.81	16.01
Etelä-Pohjanmaa	17.75	24.79	24.68	20.90	12.32	15.96	10.91	9.51	17.10
Vaasan rannikkoseutu	18.45	20.26	21.70	17.90	12.41	12.05	10.82	10.64	15.53
Keski-Pohjanmaa	20.79	24.40	18.59	19.22	13.27	13.81	10.33	12.85	16.66
Pohjois-Pohjanmaa	20.27	22.50	22.91	19.26	14.52	15.92	13.26	10.87	17.44
Kainuu	17.82	31.10	21.31	16.77	10.06	15.34	13.32	9.31	16.88
Lappi	22.88	25.35	23.94	20.38	14.93	17.57	13.64	12.43	18.89
Itä-Uusimaa	14.38	17.67	19.20	16.20	11.65	13.93	13.20	12.5	14.84
Ahvenanmaa	18.01	12.45	10.07	12.22	8.63	5.91	12.84	5.94	10.76
STD	2.18	3.95	3.55	2.59	2.35	2.95	1.57	2.14	
AVG	18.91	23.13	22.02	19.16	13.00	14.83	13.16	10.64	
VCF	0.12	0.17	0.16	0.14	0.18	0.20	0.12	0.20	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

Table 3. Gross job reallocation rate in the regions of Finland.

	1990	1991	1992	1993	1994	1995	1996	1997	AVG
Uusimaa	35.17	32.15	30.90	30.21	31.79	32.13	28.49	32.83	31.71
Varsinais-Suomi	34.24	31.02	29.98	30.61	32.81	32.03	27.86	32.37	31.37
Satakunta	30.10	30.75	32.29	24.07	29.68	23.78	22.42	29.76	27.86
Häme	32.42	28.03	28.25	28.18	26.81	33.43	26.98	31.04	29.39
Pirkanmaa	38.95	33.17	29.52	29.61	29.24	28.96	24.63	32.60	30.84
Päijät-Häme	33.52	28.71	30.01	30.05	26.04	25.93	24.88	29.88	28.63
Kymenlaakso	30.39	29.19	28.11	28.90	24.36	31.46	24.64	28.91	28.25
Etelä-Karjala	35.06	34.25	30.08	28.86	29.11	30.69	28.95	32.46	31.18
Etelä-Savo	32.45	31.16	33.29	26.59	31.14	38.01	27.22	32.68	31.57
Pohjois-Savo	34.59	32.79	33.75	29.60	31.73	31.31	30.37	32.67	32.10
Pohjois-Karjala	31.82	32.96	28.86	29.36	28.11	33.81	25.91	30.89	30.22
Keski-Suomi	37.69	30.03	34.47	28.41	27.65	30.31	22.88	31.30	30.34
Etelä-Pohjanmaa	34.42	34.84	35.69	31.77	33.01	34.97	24.83	34.71	33.03
Vaasan rannikkoseutu	35.03	29.60	32.22	29.02	29.09	26.76	26.90	32.84	30.18
Keski-Pohjanmaa	36.83	33.91	29.81	27.56	28.33	31.30	22.87	31.26	30.23
Pohjois-Pohjanmaa	36.26	33.62	34.80	31.64	33.56	38.27	29.83	34.49	34.06
Kainuu	30.59	41.14	39.74	26.31	26.07	27.48	23.18	30.51	30.63
Lappi	41.70	36.63	37.01	28.96	32.45	35.89	29.97	34.41	34.63
Itä-Uusimaa	29.46	24.19	29.21	25.65	27.43	25.01	28.86	29.16	27.37
Ahvenanmaa	32.85	20.32	22.88	17.73	17.60	14.16	20.27	21.25	20.88
STD	4.34	5.11	4.32	4.28	4.92	6.33	3.94	4.14	
AVG	35.92	33.01	33.11	29.62	30.32	31.85	27.45	32.91	
VCF	0.12	0.15	0.13	0.14	0.16	0.2	0.14	0.13	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

Table 4. Excess reallocation rate in the regions of Finland.

	1990	1991	1992	1993	1994	1995	1996	1997	AVG
Uusimaa	33.56	20.57	20.27	21.96	29.74	28.33	25.29	24.34	25.51
Varsinais-Suomi	33.18	21.02	19.24	21.12	25.63	27.09	26.53	20.17	24.25
Satakunta	27.09	19.81	20.34	16.69	22.84	22.25	20.66	16.91	20.82
Häme	31.67	16.49	14.43	19.34	23.55	29.52	25.71	20.87	22.70
Pirkanmaa	37.30	19.32	19.31	22.22	24.50	24.74	23.27	18.80	23.68
Päijät-Häme	28.77	15.29	16.85	21.42	22.41	24.36	24.74	19.00	21.61
Kymenlaakso	27.43	18.25	17.09	22.27	18.59	29.89	23.96	15.78	21.66
Etelä-Karjala	30.99	20.21	19.08	21.47	26.46	27.80	28.43	20.84	24.41
Etelä-Savo	29.56	17.57	22.26	15.75	26.74	37.52	26.69	20.06	24.52
Pohjois-Savo	31.79	18.44	18.88	22.74	28.91	30.37	28.16	23.66	25.37
Pohjois-Karjala	30.38	18.56	16.63	21.48	24.16	33.42	25.40	18.10	23.52
Keski-Suomi	36.02	18.71	20.88	19.29	24.24	27.98	20.03	17.63	23.10
Etelä-Pohjanmaa	33.33	20.10	22.02	21.74	24.63	31.91	21.81	19.03	24.32
Vaasan rannikkoseutu	33.16	18.68	21.05	22.25	24.81	24.11	21.64	21.27	23.37
Keski-Pohjanmaa	32.08	19.02	22.44	16.69	26.54	27.62	20.65	25.70	23.84
Pohjois-Pohjanmaa	31.97	22.24	23.80	24.78	29.05	31.85	26.52	21.74	26.49
Kainuu	25.52	20.07	36.86	19.07	20.12	24.28	19.72	18.63	23.03
Lappi	37.64	22.56	26.14	17.18	29.86	35.13	27.28	24.86	27.58
Itä-Uusimaa	28.75	13.04	20.02	18.89	23.29	22.15	26.39	25.00	22.19
Ahvenanmaa	29.68	15.74	20.13	11.01	17.26	11.82	14.85	11.87	16.55
STD	4.56	3.10	4.74	3.97	4.71	6.10	4.23	4.28	
AVG	33.13	19.77	21.90	20.92	25.99	29.00	25.12	21.28	
VCF	0.14	0.16	0.22	0.19	0.18	0.21	0.17	0.20	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

5.4 Excess reallocation

The lowest level of excess reallocation (i.e. simultaneous job creation and destruction) was, on average, in Ahvenanmaa, Satakunta and Päijät-Häme from 1990 to 1997 (Table 4). The underlying magnitude of excess reallocation has not been stronger in Southern Finland with respect to Eastern and Northern Finland. In fact, the highest level of average excess reallocation has been in the province of Lappi.

There has been no continuous rise in regional disparities in terms of excess reallocation across provinces in Finland. However, the patterns with respect to the fluctuations of excess reallocation were not identical across provinces from 1988 to 1997. In some provinces (for example, the province of Keski-Suomi), there was a decline in excess reallocation during the depression, but in some provinces (for example, the province of Kainuu), there was, in fact, a rise in excess reallocation during the slump of the early 1990s. This means that the structural change of regional labour markets among plants was halted in Keski-Suomi during the depres-

sion, but in the province of Kainuu there was, instead, an acceleration of structural change among plants during the economic slowdown.

6. Gross worker flows

6.1 Hiring

The hiring rate is a measure of the inflow of workers into the population of establishments. There were no major changes in the hiring rate from the point of view of regional disparities from 1990 to 1997 (Table 5). The lowest level of hiring is on average in Ahvenanmaa and Satakunta, and the highest in Uusimaa and Pohjois-Pohjanmaa. During the great slump of the early 1990s there was also a sharp decline in the hiring rate in all provinces of the Finnish economy.

The hiring rate can be decomposed by the sources of worker inflow. The worker inflow rate from unemployment (WIFU) displays a distinct regional pattern (Table 6). In particular, the worker inflow rate from unemployment

Table 5. Hiring rate in the regions of Finland.

	1990	1991	1992	1993	1994	1995	1996	1997	AVG
Uusimaa	35.51	22.63	20.68	21.14	28.69	31.89	29.14	32.70	27.80
Varsinais-Suomi	30.17	20.81	18.50	19.80	31.01	29.13	24.97	30.12	25.56
Satakunta	25.26	18.94	18.18	16.22	27.04	22.87	19.56	23.64	21.46
Häme	29.55	17.59	14.86	18.78	24.31	28.00	24.01	28.43	23.19
Pirkanmaa	33.15	19.02	18.04	19.30	26.59	27.14	22.39	25.97	23.95
Päijät-Häme	27.91	17.65	16.53	18.94	25.05	24.21	22.20	25.70	22.27
Kymenlaakso	25.87	18.63	16.40	19.55	24.31	26.01	22.49	23.49	22.09
Etelä-Karjala	31.86	18.48	16.82	18.12	23.78	27.47	24.08	24.64	23.16
Etelä-Savo	27.10	17.44	18.74	15.25	26.50	28.19	22.59	24.47	22.54
Pohjois-Savo	31.72	21.56	19.75	21.74	28.18	27.64	25.40	27.33	25.42
Pohjois-Karjala	28.67	18.16	15.91	17.87	25.89	25.93	20.84	24.07	22.17
Keski-Suomi	31.13	19.58	18.52	18.70	25.07	26.16	22.56	25.63	23.42
Etelä-Pohjanmaa	28.22	19.13	19.50	18.95	29.98	28.28	22.46	26.66	24.15
Vaasan rannikkoseutu	30.91	17.33	19.72	17.74	24.57	23.62	26.79	25.83	23.31
Keski-Pohjanmaa	29.22	19.39	19.25	15.11	24.16	26.71	22.23	28.10	23.02
Pohjois-Pohjanmaa	28.94	21.39	22.15	22.47	28.69	32.46	26.83	31.25	26.77
Kainuu	25.17	18.14	16.46	16.46	25.40	20.07	17.73	28.49	22.28
Lappi	31.78	22.12	21.35	16.64	27.94	28.43	26.49	28.18	25.37
Itä-Uusimaa	27.91	16.44	18.55	16.18	26.29	19.47	23.96	25.88	21.84
Ahvenanmaa	29.10	18.72	21.35	13.82	18.76	19.23	16.46	22.12	19.95
STD	4.59	2.93	3.16	3.27	3.94	5.15	4.54	4.52	
AVG	31.03	20.18	20.05	19.12	27.48	27.57	24.42	28.07	
VCF	0.15	0.15	0.16	0.17	0.14	0.19	0.19	0.16	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

Table 6. Worker inflow rate from unemployment in the regions of Finland.

	1990	1991	1992	1993	1994	1995	1996	1997	AVG
Uusimaa	0.78	0.56	1.87	3.32	6.41	5.11	3.22	5.12	3.30
Varsinais-Suomi	1.68	1.02	2.67	4.80	9.73	5.82	3.16	6.15	4.38
Satakunta	1.92	1.25	2.24	4.35	9.60	5.39	2.82	6.66	4.28
Häme	1.08	0.87	2.35	4.46	8.51	5.48	3.40	6.91	4.13
Pirkanmaa	1.76	1.26	2.91	5.08	9.07	5.72	2.93	5.91	4.33
Päijät-Häme	1.28	0.92	2.26	5.01	8.84	5.74	3.51	7.23	4.35
Kymenlaakso	1.60	1.28	2.24	4.65	8.18	5.22	3.06	5.85	4.01
Etelä-Karjala	2.04	1.06	2.02	4.50	8.07	6.19	3.16	6.63	4.21
Etelä-Savo	2.29	1.34	2.15	5.28	10.03	5.53	3.53	7.62	4.72
Pohjois-Savo	2.34	1.34	2.09	5.31	8.83	5.63	3.34	7.51	4.55
Pohjois-Karjala	2.72	1.63	2.63	5.97	9.62	5.72	3.27	7.98	4.94
Keski-Suomi	1.71	1.46	2.42	5.15	9.76	6.86	3.61	7.03	4.75
Etelä-Pohjanmaa	2.30	1.91	2.80	6.29	13.02	6.40	3.62	8.17	5.56
Vaasan rannikkoseutu	1.35	1.07	2.40	4.21	7.82	4.39	3.02	4.92	3.65
Keski-Pohjanmaa	2.07	1.61	2.59	5.52	9.53	6.77	3.90	6.71	4.84
Pohjois-Pohjanmaa	1.97	1.50	3.37	6.12	10.55	6.90	3.75	7.99	5.27
Kainuu	2.59	1.59	2.53	7.11	9.36	4.72	2.78	10.55	5.15
Lappi	2.68	1.95	3.40	6.26	9.79	6.87	4.72	8.89	5.57
Itä-Uusimaa	1.01	1.00	2.19	3.83	6.72	4.39	2.87	5.04	3.38
Ahvenanmaa	1.31	0.75	1.59	2.86	4.83	5.61	2.46	5.98	3.17
STD	0.56	0.36	0.47	1.01	1.70	0.82	0.54	1.32	
AVG	1.90	1.32	2.55	5.23	9.33	6.00	3.47	7.26	
VCF	0.30	0.27	0.18	0.19	0.18	0.14	0.16	0.18	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

seems to be at a higher level in Eastern and Northern Finland compared with Southern Finland. This regional pattern of the worker inflow from unemployment is a reflection of the fact that the average duration of unemployment spells is substantially shorter in Eastern and Northern Finland compared with Southern Finland due to the allocation of various active labour market measures to the high unemployment provinces of Eastern and Northern Finland.

6.2 Separation

The separation rate is a measure of the outflow of workers from the population of establishments. In addition, there have been no major changes in the regional disparities in separation across the provinces of Finland (Table 7). The lowest level of separation has been in Ahvenanmaa, Satakunta and Itä-Uusimaa. On the other hand, the highest level of separation has been in the provinces of Uusimaa, Lappi and Pohjois-Pohjanmaa.

Labour demand by firms can be tailored downwards during the depression at the establishment level either by reducing hirings (i.e. worker inflow) or by increasing separation (i.e. worker outflow). The results indicate that there were indeed interesting differences in the adjustment of labour demand during the great depression of the early 1990s. For example, the rapid rise in unemployment in Kainuu can be explained by a rise in the separation rate and a decline in the hiring rate during the great depression in Finland.[16] In contrast, during the same period there was no rise at all in the separation rate in the province of Uusimaa. This means that the rise in the unemployment rate in Uusimaa can be explained by a decline in the hiring rate, which, from the point of view of the

province, is an "easier" mechanism to adjust the labour demand than a rise in the separation rate.

The variation of the hiring rate instead of the separation rate is, from the point of view of union and firm insiders, a much more desirable way for establishments to tailor downwards their demand of labour during depressions. In fact, the decline in the hiring rate means that the relative bargaining position of union and firm insiders becomes even stronger during the times of economic slowdown. This is due to the fact that the inflow of unemployed workers into establishments does not in this case deteriorate the bargaining power of insiders, because the wage claims by recently unemployed workers are not as high as whose by union and firm insiders that have long-term contracts.

The separation rate can also be decomposed by the destinations of worker outflow. The worker outflow rate into unemployment (WOFU) reveals some interesting features (Table 8). The results indicate that the worker outflow rate into unemployment is highest in the province of Lappi. This observation is consistent with the earlier notion about the role of various active labour market measures in Eastern and Northern Finland.[17] In addition, it is interesting to note that by 1997 the worker outflow rate into unemployment had not yet declined to the levels before the great slump of the 1990s.

6.3 Worker reallocation

In line with earlier observations, the measure of worker reallocation does not indicate major changes in regional disparities from 1990 to 1997 (Table 9). The magnitude of worker reallocation has been highest in Uusimaa, and the

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[16] *Ilmakunnas and Maliranta (2000a) conclude that the volatility of the hiring rate was stronger than the volatility of the separation rate during the great depression of the early 1990s in the Finnish economy. The observation is in line with a recent study using French establishment-level data by Abowd, Corbel and Kramarz (1999), which concludes that the adjustment of employment is made primarily by reducing hires, not by changing the separation rates.*

[17] *The allocation of active labour market measures is indeed heavily concentrated in Eastern and Northern Finland. The strong regional correlation of WIFU and WOFU can emerge at least for three reasons. The first reason is that the heavy doses of active labour market measures can displace other employees into the pool of unemployed persons. The second reason is that the allocation of active labour market measures can create a great number of various short-term contracts that generate the high level of worker flows into and out of unemployment. The third reason is that the during the 1990s it was possible to use active labour market measures to renew unemployment benefits that were tied to past wages.*

Table 7. Separation rate in the regions of Finland.

	1990	1991	1992	1993	1994	1995	1996	1997	AVG
Uusimaa	33.90	34.20	31.31	29.39	26.64	28.09	25.94	25.93	29.43
Varsinais-Suomi	31.23	30.81	29.24	29.29	23.84	24.18	23.64	22.36	26.82
Satakunta	28.26	29.89	30.13	23.59	20.20	21.34	21.32	18.71	24.18
Häme	30.30	29.13	28.68	27.62	21.05	24.09	22.74	21.62	25.65
Pirkanmaa	31.51	32.87	28.26	26.68	21.84	22.91	21.03	19.97	25.63
Päijät-Häme	32.65	31.07	29.68	27.57	21.42	22.64	22.34	19.66	25.88
Kymenlaakso	28.82	29.57	27.42	26.18	18.53	24.43	21.82	17.87	24.33
Etelä-Karjala	27.79	32.52	27.82	25.51	21.12	24.58	24.59	20.25	25.52
Etelä-Savo	29.99	31.02	29.77	26.09	22.10	28.68	22.06	19.39	26.14
Pohjois-Savo	34.52	35.92	34.62	28.59	25.36	26.70	23.19	21.59	28.81
Pohjois-Karjala	30.12	32.55	28.13	25.75	21.94	25.54	21.35	18.15	25.44
Keski-Suomi	32.80	30.90	32.12	27.82	21.67	23.83	19.70	18.86	25.96
Etelä-Pohjanmaa	29.31	33.87	33.17	28.98	21.60	25.23	19.44	18.70	26.29
Vaasan rannikkoseutu	32.78	28.24	30.90	24.52	20.29	20.97	21.54	19.95	24.90
Keski-Pohjanmaa	33.97	34.28	26.63	25.99	22.37	23.03	20.01	21.99	26.03
Pohjois-Pohjanmaa	33.23	32.77	33.16	29.34	24.18	26.04	23.53	22.20	28.06
Kainuu	30.23	39.21	29.68	23.70	19.44	23.27	21.20	18.54	25.66
Lappi	35.84	36.19	32.23	28.42	25.35	27.67	23.80	23.37	29.11
Itä-Uusimaa	27.21	27.59	27.74	22.93	22.15	22.32	21.50	22.96	24.30
Ahvenanmaa	32.27	23.30	18.60	20.54	18.41	16.89	21.87	15.94	20.98
STD	3.79	4.59	4.43	3.82	3.60	3.90	3.08	3.75	
AVG	32.94	33.42	30.99	27.81	23.15	25.39	23.3	21.51	
VCF	0.12	0.14	0.14	0.14	0.16	0.15	0.13	0.17	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

Table 8. Worker outflow rate into unemployment in the regions of Finland.

	1990	1991	1992	1993	1994	1995	1996	1997	AVG
Uusimaa	1.41	6.18	7.42	8.58	5.08	4.73	4.41	2.99	5.10
Varsinais-Suomi	2.38	6.81	8.37	11.36	5.07	5.13	6.02	3.77	6.11
Satakunta	2.77	6.20	7.17	9.65	4.75	5.74	7.42	4.47	6.02
Häme	2.27	6.42	8.64	10.11	5.10	5.97	6.21	3.94	6.08
Pirkanmaa	2.74	7.05	7.15	10.18	5.01	5.12	6.16	3.84	5.91
Päijät-Häme	2.55	5.90	7.15	11.74	5.82	5.75	6.53	4.39	6.23
Kymenlaakso	2.76	5.25	5.35	9.75	4.57	4.92	6.50	4.16	5.41
Etelä-Karjala	2.43	5.04	5.22	10.29	5.23	5.57	8.00	4.41	5.77
Etelä-Savo	2.09	4.18	4.74	12.58	6.16	6.95	6.74	5.00	6.06
Pohjois-Savo	2.67	4.91	5.13	11.26	6.01	6.20	6.71	4.82	5.96
Pohjois-Karjala	3.08	5.06	5.20	11.27	6.48	6.59	7.72	5.39	6.35
Keski-Suomi	2.77	5.46	6.48	11.67	6.35	6.47	6.33	4.50	6.25
Etelä-Pohjanmaa	2.99	4.98	6.34	13.96	5.61	6.42	5.96	3.97	6.28
Vaasan rannikkoseutu	2.18	4.99	4.47	8.83	3.44	4.23	4.74	3.19	4.51
Keski-Pohjanmaa	2.15	4.86	4.28	12.61	5.62	7.05	5.98	4.24	5.85
Pohjois-Pohjanmaa	3.10	6.18	7.76	11.37	6.61	5.84	6.32	4.82	6.50
Kainuu	2.81	4.90	6.31	10.94	6.01	8.06	9.09	5.16	6.66
Lappi	3.63	6.82	8.39	13.49	7.88	7.94	7.89	6.31	7.79
Itä-Uusimaa	2.20	5.65	6.89	7.80	4.11	5.03	4.26	3.69	4.95
Ahvenanmaa	1.22	2.54	3.52	5.74	4.30	3.76	4.39	2.23	3.46
STD	0.56	1.29	1.77	1.97	1.07	1.09	1.23	0.87	
AVG	2.62	5.77	6.65	11.17	5.73	6.14	6.66	4.46	
VCF	0.21	0.22	0.27	0.18	0.19	0.18	0.18	0.20	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

Table 9. Worker reallocation rate in the regions of Finland.

	1990	1991	1992	1993	1994	1995	1996	1997	AVG
Uusimaa	69.41	56.84	51.98	50.52	55.34	59.98	55.07	58.63	57.22
Varsinais-Suomi	61.40	51.62	47.74	49.08	54.85	53.30	48.60	52.48	52.38
Satakunta	53.52	48.83	48.31	39.81	47.23	44.20	40.88	42.35	45.64
Häme	59.85	46.72	43.54	46.40	45.36	52.10	46.75	50.06	48.85
Pirkanmaa	64.65	51.89	46.30	45.98	48.43	50.04	43.43	45.95	49.58
Päijät-Häme	60.56	48.72	46.21	46.51	46.47	46.86	44.54	45.37	48.16
Kymenlaakso	54.69	48.20	43.83	45.73	42.84	50.45	44.31	41.36	46.43
Etelä-Karjala	59.66	50.99	44.63	43.63	44.90	52.04	48.67	44.89	48.68
Etelä-Savo	57.09	48.46	48.51	41.34	48.60	56.87	44.65	43.86	48.67
Pohjois-Savo	66.23	57.48	54.38	50.32	53.55	54.33	48.59	48.92	54.23
Pohjois-Karjala	58.80	50.70	44.04	43.62	47.83	51.47	42.19	42.23	47.61
Keski-Suomi	63.94	50.48	50.64	46.52	46.74	50.00	42.26	44.48	49.38
Etelä-Pohjanmaa	57.52	52.99	52.68	47.93	51.58	53.51	41.90	45.36	50.43
Vaasan rannikkoseutu	63.69	45.57	50.62	42.26	44.85	44.59	48.33	45.78	48.21
Keski-Pohjanmaa	63.18	53.67	45.88	41.10	46.53	49.74	42.24	50.09	49.05
Pohjois-Pohjanmaa	62.17	54.15	55.31	51.81	52.87	58.50	50.36	53.44	54.83
Kainuu	55.40	57.35	56.47	40.15	44.84	43.34	38.93	47.03	47.94
Lappi	67.61	58.31	53.58	45.06	53.28	56.09	50.29	51.55	54.47
Itä-Uusimaa	55.12	44.03	46.29	39.12	48.44	41.79	45.46	48.84	46.14
Ahvenanmaa	61.38	42.02	39.95	34.36	37.17	36.12	38.33	38.05	40.92
STD	8.03	7.03	6.42	6.89	7.27	8.77	7.30	8.11	
AVG	63.98	53.60	51.03	46.93	50.64	52.96	47.72	49.59	
VCF	0.13	0.13	0.13	0.15	0.14	0.17	0.15	0.16	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

lowest worker reallocation rate has been in the provinces of Ahvenanmaa, Itä-Uusimaa and Kymenlaakso. The results also indicate that the worker reallocation rate was indeed procyclical from 1990 to 1997.

6.4 Churning

The elaboration of gross job and worker flows together delivers a complete picture of labour demand adjustment in the regional labour markets of Finland. As noted earlier, the so-called churning rate is also a natural measure of underlying structural change within plants. The magnitude of structural change measured by the churning rate is high in Uusimaa compared with the other regions of Finland (Table 10). This means that the intensity of structural change within plants is indeed high in Uusimaa, where the unemployment rate has been low with respect to the other provinces of Finland. In addition, there was a sharp decline in the churning rate in all provinces during the great

depression of the 1990s. The level of the churning rate has been permanently lower since the great slump of the early 1990s.

The high churning rate in Uusimaa can be explained by the high level of education of workers, the diversity of the production structure, and the large geographical scope of regional labour markets. In addition, migration from the rest of the country to Uusimaa can give a boost to churning in Uusimaa, because most of the immigrants are young and well-educated.[18] In contrast, Kainuu has the lowest level of the churning rate, where the unemployment rate has been highest among the regions of Finland during the past few decades.

The results therefore support the view that one of the most important underlying structur-

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[18] *A related study, by Böckerman and Piekkola (2001), finds that the churning rate is higher for employees with a higher university education compared with employees with only basic education. The churning rate is also higher for the young employees of the Finnish economy.*

Table 10. Churning rate in the regions of Finland.

	1990	1991	1992	1993	1994	1995	1996	1997	AVG
Uusimaa	34.24	24.69	21.08	20.32	23.55	27.85	26.59	27.51	25.73
Varsinais-Suomi	27.16	20.60	17.76	18.47	22.05	21.27	20.74	24.54	21.57
Satakunta	23.42	18.08	16.02	15.74	17.55	20.42	18.46	20.51	18.78
Häme	27.43	18.69	15.29	18.21	18.55	18.66	19.78	22.37	19.87
Pirkanmaa	25.71	18.72	16.78	16.37	19.18	21.08	18.80	21.15	19.72
Päijät-Häme	27.04	20.01	16.20	16.46	20.44	20.93	19.66	20.33	20.13
Kymenlaakso	24.30	19.01	15.71	16.84	18.48	18.98	19.67	19.97	19.12
Etelä-Karjala	24.60	16.74	14.55	14.77	15.79	21.35	19.72	19.65	18.40
Etelä-Savo	24.63	17.30	15.22	14.75	17.46	18.86	17.43	18.72	18.05
Pohjois-Savo	31.64	24.69	20.63	20.73	21.82	23.02	18.21	19.52	22.53
Pohjois-Karjala	26.97	17.75	15.18	14.26	19.72	17.66	16.28	18.21	18.25
Keski-Suomi	26.25	20.45	16.17	18.11	19.09	19.69	19.38	20.09	19.90
Etelä-Pohjanmaa	23.10	18.15	16.98	16.16	18.57	18.54	17.07	18.38	18.37
Vaasan rannikkoseutu	28.66	15.97	18.40	13.24	15.76	17.83	21.43	18.63	18.74
Keski-Pohjanmaa	26.36	19.76	16.07	13.53	18.20	18.44	19.37	18.29	18.75
Pohjois-Pohjanmaa	25.92	20.54	20.51	20.16	19.30	20.23	20.53	22.65	21.23
Kainuu	24.82	16.21	16.73	13.85	18.77	15.86	15.75	18.45	17.56
Lappi	25.92	21.68	16.57	16.10	20.84	20.20	20.32	21.89	20.44
Itä-Uusimaa	25.66	19.84	17.08	13.47	21.02	16.79	16.60	20.91	18.92
Ahvenanmaa	28.53	21.70	17.07	16.64	19.57	21.97	18.07	20.00	20.44
STD	4.59	3.67	2.99	3.32	3.21	4.27	4.00	4.09	
AVG	28.06	20.59	17.92	17.31	20.32	21.11	20.28	21.74	
VCF	0.16	0.18	0.17	0.19	0.16	0.20	0.20	0.19	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

al features that explain the high unemployment rate of Kainuu is the fact that structural change does not "revitalize" the economic structure of the region enough. In fact, the recent empirical investigation by Ilmakunnas, Maliranta and Vainiomäki (1999) indicates that a rise in the churning rate gives a boost to the productivity at the establishment level after controlling for other key factors (such as the education of workers) that affect the productivity of establishments. This observation is in line with productivity measures based on regional GDP data that indicate that labour productivity is indeed higher in Uusimaa with respect to the other provinces of Finland. In fact, an investigation of regional disparities in labour productivity by Maliranta (1997) indicates that the level of productivity in Uusimaa is much higher compared with the other regions of Finland after controlling for other key factors. Thus, it can be argued that the underlying disparities in churning rates is one of the missing pieces of the productivity puzzle of Finnish regions.

7. The elements of gross job and worker flows

This section separates the genuine regional elements in the measures of gross job and worker flows from the effects of years and industry-structure in the Finnish regions. The ANOVA is based on the 2-digit standard industry classification that includes 46 industries in twenty provinces of Finland over the period from 1990 to 1997. The results from the employment-weighted regressions in which the regional measures of gross job and worker flows along with the net rate of employment change are explained by dummy variables that are attached to years, industries and regions are summarized in Table 11. Several interesting conclusions can be drawn from these regressions. The dummy variables can explain from 35 up to 63% of the total variation of gross job and worker flows across regions, years and industries. The dummy variables can explain 38% of the net employment change in

Table 11. The results from employment-weighted regressions that evaluate and decompose the effects of years, industries and regions to the regional measures of gross job and worker flows in Finland.

	JC	JD	NET	EJR	WIF	WIFU	WOF	WOFU	CF
R^2	35.0	39.8	37.7	39.0	50.6	63.0	49.3	61.3	54.7
Decomposition:									
Years	35.3	38.0	79.5	13.8	30.4	48.1	23.2	30.6	22.1
Industries	62.7	60.5	20.0	83.5	66.0	48.1	73.8	66.8	64.9
Regions	2.0	1.5	0.4	2.7	3.6	3.8	3.0	2.6	13.1

R^2 refers to the sum of squares of the model (in which the regional measure of gross job and worker flow is explained by dummy variables attached to years, industries and regions by applying the 2-digit standard industry classification) divided by the total sum of squares. The following rows decompose the explained part of the variation in the measure of gross and worker flow to elements.

the Finnish regions, which is close to the results concerning the measures of gross job and worker flows.

The decomposition of the explained variation (i.e. the sum of squares) into variation from years, from industry structure and from regions in gross job and worker flows provides additional patterns. Keeping in mind the extreme volatility of economic activity from 1990 to 1997 in the Finnish economy, it is not a great surprise at all that an important part (80%) of the explained variation in net growth rates can be attributed to years. Also, industry structures have been subject to changes, indicated by the fact that divergence in employment growth rates across industries constitutes one fifth of the explained variation. Regional differences, on the other hand, have a minor role to play when one is explaining employment growth.

However, there are many differences in the intensity of intra-industry restructuring, which is best indicated by the high share of the explained variation (84%) of EJR attributable to industry dummies.[19] Differences in EJR across regions are somewhat larger than in the case of

net growth rates in relative terms, but still quite small. It is worth noting that, in contrast to other indicators of labour market dynamics, a significant proportion (13%) of the explained variation in the churning rates can be ascribed to regional effects as distinct from industry or year effects.

All in all, the regression results indicate that the underlying regional elements are minor with respect to the effects arising from years and industry structure, but despite this fact there are also some genuine regional elements in gross job and worker flows in Finland. The role of these genuine regional elements is most important in the case of the churning rate.

These regression results also shed light on some specific issues of regional labour markets in Finland.[20] Before the industry-structure of the Finnish regions has been taken into account, the net rate of employment change is lowest in the provinces of Lappi, Pohjois-Karjala, Etelä-Savo, Pohjois-Savo and Päijät-Häme (see also Tables 1 and 2). This feature is reflected in the high unemployment rate of these provinces (see Appendix). In contrast, the net rate of employment change is highest in the province of Pohjois-Pohjanmaa, Uusimaa and Varsinais-Suomi. However, a striking finding of these regression results is that, after taking into account the industry structure of the regions, the regional disparities in the net employment changes vanish almost completely. In fact, the results indicate

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[19] *This finding may reflect the fact that the amount of intra-industry heterogeneity varies across industries identified in the classification scheme that is applied here. It contains industries whose plants are relatively homogeneous in the sense that the industry is specialised in the production of few types of products. Some other industries, on the other hand, are characterised by large product variety and heterogenous plants specialised in the production of different products. Divergence in the employment growth among plants can be expected to be higher when plants operate different markets.*

[20] *The detailed results from these regressions are available upon request from the authors.*

that only the province of Lappi has had significantly poorer net employment growth than others, when the industry structure is controlled. The provinces of Uusimaa and Pohjois-Pohjanmaa remain only major positive outliers. In other words, the differences in net employment growth rates between regions in the period from 1990 to 1997 can be reduced mainly to the differences in the industry structures of the regions.

Regression analysis, however, reveals that a large share of the differences in gross job and worker flows that were described in the earlier parts of this study cannot be explained by the industry-structure of the Finnish regions. For instance, worker outflow into unemployment as well as worker inflow from unemployment has been particularly high in Lappi. Controls for industry structure even reinforce this conclusion. Some other provinces have also relatively high unemployment flows that cannot be explained by industry-structures. They include Pohjois-Pohjanmaa and Kainuu in Northern Finland, for example. In addition, the regression results with the industry controls confirm the earlier finding that the churning rate has indeed been low in the eastern parts of Finland, especially in the province of Kainuu.

8. Conclusions

The magnitude of gross job and worker flows is large, relative to net employment change in the Finnish economy from the regional point of view. This observation corresponds to the first so-called basic fact in the literature on gross job and worker flows. This means that there is a great deal of gross job creation in the declining regions with a high average unemployment rate in Eastern and Northern Finland. In addition, there is a great amount of gross job destruction in the growing regions with low average unemployment in Southern Finland. The earlier empirical literature on the Finnish regional labour markets has been totally silent about this underlying dynamics at the establishment level of the economy. Thus, this study provided extensive evidence for the view that stresses the enormous heterogeneity of regional labour market adjust-

ment in Finland in contrast to the earlier literature that has been focused solely on (net) employment changes.

The gross job reallocation rate has not been countercyclical by using establishment-level data from the provinces of Finland. This observation is not in line with the established "basic facts" of the literature on gross job and worker flows. One explanation is that the establishment-level data of this study includes a number of non-manufacturing industries.[21] In addition, the extreme depression of the 1990s caused a sharp crash in gross job creation rates across the Finnish regions. The fluctuation of worker reallocation has been procyclical in the Finnish regions over the period of investigation as in a number of other countries. In addition, job reallocation is a large part of total worker reallocation in the Finnish regions.

The elaboration of gross job and worker flows reveals a number of regional patterns that are impossible to detect by focusing solely on (net) employment changes. These patterns of gross job and worker flows emerge despite the presence of the same institutional characteristics (including labour market regulations) across regions in Finland. However, there are distinct regional differencies, for example, in the intensity of active labour market measures. In particular, there is no solid evidence at all for the widely held view that the job creation rate is, on average, lower in Eastern and Northern Finland, where the unemployment rate has been much higher than in Southern Finland during the past few decades.

The rapid rise in regional unemployment rate disparities during the slump of the early 1990s (from 1991 to 1993) can be explained by the sharp rise in the regional disparities in job destruction rates and in separation rates of workers. In contrast, during the slump of the 1990s, there was a decline in regional disparities in job creation rates and in hiring rates of workers. The highest level of job destruction at the bottom of the slump was in the provinces of East-

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[21] *In particular, a survey of the literature by Davis and Haltiwanger (1999) indicates that manufacturing industries tend to exhibit greater volatility of job destruction relative to job creation than non-manufacturing industries.*

ern and Northern Finland. In fact, in 1991 almost a third of the jobs in the selected industries of this study were destroyed in the province of Kainuu. In contrast to the adjustment of labour markets in the slump of the early 1990s, during the recovery of the economy (from 1994 to 1997), there has been a decline in the regional disparities in job destruction rates and in separation rates of workers, but a rise in the regional disparities of job creation rates and hiring rates of workers.

An explanation of this regional concentration of job destruction during the slump of the early 1990s is the presence of the fatter left-hand tail of low-productivity jobs in Eastern and Northern Finland. Thus, the extreme economic slowdown of the early 1990s that hit all regions of Finland caused perhaps a more intensive time of "cleansing" in Eastern and Northern Finland compared with Southern Finland, outlined in the model by Caballero and Hammour (1994), when outdated or unprofitable techniques were pruned out of the production system. Findings about the concentration of job creation, in turn, suggests that jobs destroyed during the slump are disproportionally reallocated during the recovery to regions that have favourable conditions for job creation. Those factors are likely to include a skilled labour force and technological spillovers from surrounding firms that are fuelled by agglomeration, to list the two most obvious candidates. In fact, Maliranta (2001) has argued that job destruction in low and job creation in high productivity plants have positively contributed the aggregate productivity of Finnish manufacturing since the late 1980s. These empirical findings obtained are in keeping with the conjecture that this productivity-enhancing restructuring at the plant level has had an interesting regional dimension.

There are interesting differences in the adjustment of labour demand during the great slump of the early 1990s. For example, the rapid rise in unemployment in Kainuu can be explained by a rise in the separation rate and a decline in the hiring rate during the great depression in Finland. In contrast, during the same period there was no rise at all in the separation rate in the province of Uusimaa, which consti-

tutes the core of economic activity in Finland. This means that the rise in the unemployment rate in Uusimaa can be explained by a decline in the hiring rate, which, from the point of view of the province, is a less painful mechanism to adjust the labour demand than a rise in the separation rate.

The magnitude of structural change measured by the churning rate is high in Uusimaa compared with the other provinces of Finland. This means that the intensity of structural change within plants is indeed high in Uusimaa, where the unemployment rate has been low with respect to the other regions of Finland. On the other hand, Kainuu has the lowest level of the churning rate, and the unemployment rate has been highest during the past few decades. This observation is in line with the matching models in the tradition by Mortensen and Pissarides (1994), according to which the high level of churning (i.e. excess worker reallocation) is a manifestation of an intensive matching process, which eventually delivers a lower equilibrium unemployment rate. The regression results indicate that these differences cannot be reduced to the industry structure of the regions. Thus, the results support the view that one of the most important underlying structural features that explain the high unemployment rate of Kainuu is the fact that the structural change within plants does not "revitalize" the economic structure of the region enough.

There are genuine regional elements in gross job and worker flows after taking account of the variation of these measures from years and from industry structure despite the fact that the extreme volatility of economic activity over the period of the investigation means that much of the explained variation in gross job and worker flows can be attributed to years (and also to industries). The role of these genuine regional elements is most important in the case of the churning rate. In particular, the patterns of gross job and worker flows that were characterized in this study cannot be explained by the industry structure of the Finnish regions. In contrast, the regional differences in net employment growth rates in the period from 1990 to 1997 can be reduced mainly to the differences in the industry structures of the regions.

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Appendix

Selected background statistics for the provinces of Finland (NUTS3).

	Share of employment in the Finnish economy*, %	Average unemployment rate**, %	Employment in the primary sectors***, %	Employment in manufacturing, %	Employment in construction, %	Employment in trade and transportation, %	Employment in private services, %	Employment in public services, %
Uusimaa	32.79	8.9	0.7	14.8	5.7	28.4	27.5	23.0
Varsinais-Suomi	9.00	10.4	4.9	26.0	6.8	20.8	17.7	23.9
Satakunta	4.71	13.1	6.4	28.9	6.0	19.9	15.5	23.3
Häme	2.89	11.3	6.0	24.7	6.5	19.7	17.2	26.0
Pirkanmaa	8.86	12.7	3.4	27.9	6.1	20.0	18.4	24.2
Päijät-Häme	4.15	14.2	4.4	28.0	6.8	20.9	17.2	22.7
Kymenlaakso	3.85	12.7	5.4	23.8	6.8	23.4	16.5	24.1
Etelä-Karjala	2.66	12.7	6.3	24.7	6.7	21.6	16.7	24.1
Etelä-Savo	2.31	13.2	11.8	17.7	5.9	20.1	15.9	28.6
Pohjois-Savo	3.73	13.8	9.5	18.2	5.3	19.7	18.3	29.1
Pohjois-Karjala	2.25	15.6	9.3	20.0	5.6	18.9	16.6	29.5
Keski-Suomi	4.09	14.7	6.3	23.4	6.2	18.5	18.5	27.1
Etelä-Pohjanmaa	2.84	12.3	12.8	23.1	5.9	19.7	14.3	24.3
Vaasan rannikkoseutu	3.19	9.3	8.9	26.5	4.9	18.2	15.9	25.6
Keski-Pohjanmaa	1.07	11.7	12.5	20.2	6.3	20.2	15.4	25.4
Pohjois-Pohjanmaa	5.36	14.1	6.9	24.1	6.2	19.2	16.9	26.8
Kainuu	1.14	17.7	9.4	16.8	5.5	19.4	18.1	30.7
Lappi	2.67	17.2	6.3	16.4	6.3	22.1	18.3	30.7
Itä-Uusimaa	1.68	8.2	6.0	28.4	7.8	19.4	16.7	21.8
Ahvenanmaa	0.72	2.7	4.7	8.7	5.4	43.0	15.4	22.8

*   This column refers to the average share of employment in the province from 1988 to 1997 with respect to the whole Finnish economy. (These calculations by authors cover the selected industries of this study.)

**   This column refers to the average unemployment rate from 1990 to 1999 (Source: Statistics Finland).

***   The following columns about the employment shares of the main sectors in the Finnish provinces (NUTS3) are based on the situation in 2000. The primary sectors cover agriculture, forestry and fishing (A; B). (Source: Statistics Finland).