


WORKING PAPER SERIES

No. 14/2002

SURVEY-BASED INDICATORS OF REGIONAL LABOUR MARKETS AND INTERREGIONAL MIGRATION IN NORWAY

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www.svt.ntnu.no/iso/wp/wp.htm

Survey-based indicators of regional labour markets and interregional migration in Norway¹

Running title: Interregional migration

This version: July 2002

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Abstract. A rich set of regional labour market variables is utilised to explain interregional migration in Norway. In particular, regional indicators of labour market pressure are computed from survey data in which respondents are asked to evaluate local job prospects in their resident municipality and the surroundings. Mean satisfaction with local job prospects reported by respondents in a region and related survey-based indicators have a positive and significant impact on net in-migration to the region, also when controlling for traditional measures of regional labour market conditions, such as regional unemployment and wage differentials. Our results suggest that surveys may provide useful information about regional labour markets.

JEL classification: J61

Key words: Interregional migration; regional labour markets; survey data

¹ All correspondence to Kåre Johansen. We would like to thank participants at seminars in Trondheim and Oslo, in particular Espen Bratberg, Eilev S. Jansen and Bjarne Strøm for helpful comments and suggestions. The usual disclaimer applies.

1. Introduction

The last decade has produced a rapidly expanding empirical literature on interregional migration. Recent studies of interregional migration flows include Pissarides and McMaster (1990), several contributions in Padoa Schioppa (1991), Blanchard and Katz (1992), Jackman and Savouri (1992), Eichengreen (1993), Gabriel et al (1993), Decressin and Fatás (1995), Westerlund (1997), Daveri and Faini (1999), Fredriksson (1999), Cannari et al (2000), Carlsen (2000) and Brunello et al (2001). Recent micro data studies of migration decisions or households' willingness to move are Pissarides and Wadsworth (1989), Hughes and McCormick (1994), Antonin and Bover (1997), Faini et al (1997), Axelsson and Westerlund (1998), Ahn et al (1999) and Ritsilä and Ovaskainen (2001). The main purpose of the contributions has been to establish whether or not labour mobility plays a substantial role in correcting regional disparities in employment opportunities.

To characterize regional labour market imbalances, all these studies use objective measures of labour market conditions, usually computed from data collected by government agencies, such as regional unemployment, labour market participation and vacancies. A radically different approach would be to compute indicators of regional labour market conditions from surveys in which respondents evaluate local employment opportunities.

We can think of several reasons why survey-based indicators of regional labour markets may perform well in analyses of population movements. First, survey-based indicators give direct information about the subjective assessments of the relevant decision-makers, that is, the households who determine whether to relocate. Survey-based indicators may therefore incorporate aspects of regional labour markets which affect migration decisions but which cannot be observed by the researcher.

Second, since survey-based indicators assign weights to different aspects of regional labour markets according to the beliefs of households, changes in the importance of factors relevant to migration decisions will automatically be incorporated. Third, households sometimes make mistakes. For instance, some households may decide to leave an area because they incorrectly believe that job prospects are better in other parts of the country. In such cases, survey-based indicators of regional labour markets, although 'wrong' in an absolute sense, may predict migration decisions better than traditional labour market variables.

Survey data can be collected at short notice and targeted at population groups of particular interest to policy makers. On the other hand, survey data also involve methodological problems: interpersonal comparison of subjective assessments may not be meaningful and aggregation of individual responses requires cardinality of the measurement scale.

In Carlsen and Johansen (2001), we show that survey-based indicators perform at least as well as traditional measures of labour market pressure in explaining regional variation in manufacturing hourly wages in Norway. In this paper, we show that survey-based indicators are also successful in explaining interregional migration flows. The study is based on six waves of an annual survey (about 75.000 respondents) in which respondents report how satisfied they are with local job prospects. We find that survey based indicators of regional employment opportunities have a positive and statistically significant impact on net immigration to the region, also when controlling for traditional measures of regional labour market conditions, including regional unemployment and wage and house price differentials. Sensitivity analyses suggest that the results are robust with respect to the definition of regional indicators of job prospects, and the estimates are stable across subsamples. The results reported in this paper and in the companion paper thus strongly suggest that surveys have a potential for providing useful information about regional labour markets.

Compared to other social sciences, there has been little research by economists using data on reported well-being. Recent studies by economists based on surveys in which respondents report their satisfaction with various aspects of life include Clark and Oswald (1994, 1996), Winkelmann and Winkelmann, (1998), Ravallion and Lokshin (1999), Blanchflower and Oswald (2000), Carlsen and Grytten (2000), Frey and Stutzer (2000), Allen and van der Velden (2001), Clark (2001) and Di Tella et al (2001a,b). These and other contributions have established that responses to questions about how satisfied people are with life as a whole or particular areas of life are not random numbers but systematically correlated with objective events and actions. Our contributions add to this conclusion by showing that regional indicators of satisfaction with job prospects are systematically related to interregional migration and regional wages.

Compared to other Scandinavian studies of regional labour markets, one innovation of this study is to use genuine local labour markets as regional unit. Other studies have employed one

of the two local administrative levels, the counties or the municipalities, as regional unit. However, local labour markets generally comprise several municipalities. This is particularly so for urban areas, and most counties comprise more than one local labour market. Recently, Statistics Norway have divided the country into 90 travel-to-work areas on the basis of information about commuting flows between municipalities. On average, each travel-to-work area comprises 4.8 municipalities. This study uses these travel-to-work areas as regional unit.

The paper is organized as follows. Section 2 presents the survey data set. In Sect. 3, we examine whether interpersonal comparison of subjective assessments of regional labour markets is meaningful by correlating responses with personal characteristics of the respondents and objective measures of regional labour market conditions. Section 4 discusses some methodological issues pertaining to aggregation from individual responses and presents a set of survey-based regional labour market indicators. Section 5 presents the panel data analysis of population movements, and Sect. 6 concludes.

2. The NGI survey data set

Our main data source is the first six waves (1993-98) of the annual Municipal Survey conducted by the Norwegian Gallup Institute (NGI). Each year random samples of 25-50.000 persons above 15 are contacted. Small municipalities are somewhat oversampled in order to obtain responses from all municipalities. About 50% of those who are contacted agree to participate and return the questionnaire. Most questions relate to municipal services, but the questionnaire also includes one question about the local labour market. The question is:

How satisfied/dissatisfied are you with the prospects of getting a job or a new job in the municipality (including the surroundings)?

In the first six surveys, 74.309 out of 97.016 respondents (76.6%) answered this question. Respondents are asked to indicate a discrete number from 1 to 6, where 6 corresponds to 'very satisfied' and 1 to 'very dissatisfied'. As is evident from Table 1, answers vary considerably. 3 and 4 have the highest response frequencies, but as many as 29% of the respondents give 1 or 2 as their answer, and 25% report 5 or 6.

- Table 1 about here -

A more complete analysis of whether individual responses can be compared is presented in the next section. However, we note that variations in reported satisfaction across the business cycle are consistent with expectations: mean satisfaction (in a given year) is much lower during a recession (1993-94) than during a boom (1997-98).

The question refers to the prospects of obtaining a job in the municipality and 'the surroundings'. Given this wording of the question, we expect respondents to evaluate the possibility of obtaining a job which does not require a change of residence. We therefore believe that the question captures aspects of the regional labour market which are very relevant to migration decisions.

3. Ordered probit analysis of reported satisfaction

This section presents an ordered probit analysis explaining reported satisfaction as a function of personal attributes of the respondent and objective measures of regional labour market conditions. The purpose of the exercise is to examine whether interpersonal comparison of responses is meaningful. The sample employed in this analysis are the 63.319 respondents aged 19-66 who answered the question about regional labour markets and provided information about age, gender, education level and labour market status.

- Table 2 about here -

Table 2 presents five regional economic variables; the data sources are Statistics Norway and the national Labour Market Agency. If sufficiently disaggregated data are available, the variables are computed for the 90 Norwegian travel-to-work areas, denoted 'regions' in the following. Otherwise, the variables are registered at the county level. Total unemployment includes the short-term unemployed, the long-term unemployed (duration > 1/2 year) and participants of labour market programmes. The two variables, 'long-term ratio' and 'accommodation ratio' characterize the relative importance of the three components of total unemployment. The 'Vacancy rate' is a flow measure of vacancies; stock measures produce virtually identical results.

The following ordered probit equation is estimated:

$$Satisfaction_{jit} = \begin{cases} 6 & \text{if } Satisfaction^*_{jit} \geq \mu_5 \\ 5 & \text{if } \mu_5 > Satisfaction^*_{jit} \geq \mu_4 \\ . & \\ . & \\ 1 & \text{if } Satisfaction^*_{jit} < \mu_1 \end{cases}$$

$$Satisfaction^*_{jit} = \alpha_{0t} + \mathbf{Person}_{jit} \alpha_1 + \mathbf{Labour}_{it} \alpha_2 + \mathbf{City}_m \alpha_3 + \varepsilon_{jit}.$$

$Satisfaction_{jit}$ is the satisfaction level reported by respondent j in region i and year t , $Satisfaction^*_{jit}$ is the corresponding latent variable, \mathbf{Person}_{jit} is a vector of personal attributes, and \mathbf{Labour}_{it} is a vector of regional economic variables. \mathbf{City}_m is a vector of city size dummies registered at the municipal level which are included to control for the size and diversity of the local labour market. Year effects, α_{0t} , are included to control for unobservable factors common to regional labour markets. If unobservable factors are correlated among respondents from the same region, estimated standard errors are likely to be downward-biased (Moulton 1990). In the following, we use a robust estimator of variance which allows for regional random effects:

$$\varepsilon_{jit} = \varepsilon_i + \xi_{jit},$$

where ε_i and ξ_{jit} are assumed to be normally, identically and independently distributed.

- Table 3 about here -

The three first columns of Table 3 present results using data for all 63.319 respondents. We first discuss the personal attributes. Whereas age and gender do not seem to matter much for respondents' evaluation of local job prospects, education level and labour market status are important. Those who have completed high school are more satisfied than people without high school, and college graduates are more satisfied than people with high school but without a college degree. People out of the labour force are less satisfied than the employed, and the unemployed are most dissatisfied. For both education level and labour market status, differences between categories are highly significant. The intervals between the estimated thresholds (μ_1 - μ_5) are in the range 0.6-0.7, implying that having a college degree relative to

being a high school dropout raises expected reported satisfaction by approximately half a unit, whereas being employed relative to being unemployed raises expected reported satisfaction by approximately one unit.

Consider next the regional economic variables. The estimated effects of total unemployment and the vacancy rate are highly significant in the expected direction, negative for unemployment and positive for vacancies. The coefficients of the other three variables are statistically insignificant. The parameter estimates imply that total unemployment must fall by about eight percentage points or somewhat less than three standard deviations to compensate for being unemployed rather than employed. The corresponding required increase in the vacancy rate is also approximately three standard deviations.

The estimated effects of the city size dummies are very significant and of large magnitude. Job prospects are considered much better in cities than in rural areas. For instance, living in the capital, Oslo, rather in the countryside, compensates for both personal unemployment and three percentage points higher regional rate of unemployment.

In column 5, we have included a proxy for the respondent's propensity to form favourable judgements. Research by psychologists has established that reported life satisfaction depends on personality traits such as extraversion, neuroticism and self-esteem (Diener et al 1999). We have computed a proxy for personality traits from the survey question about the climate. Our proxy is the generalized residual from an ordered probit regression explaining reported satisfaction with the climate as a function of personal characteristics and climate variables.¹

The question about the climate was included in the questionnaire from 1995. To assess the effect of the personality trait variable on the other variables, column 4 presents an equation without the personality trait variable but using data from the 1995-98 surveys, only. The personality trait variable has the expected positive effect on reported satisfaction with job prospects and is very significant, suggesting that personality traits are indeed important for responses to survey questions. However, comparison between columns 4 and 5 shows that the estimated effects of the other variables are hardly affected.²

The results reported in this section suggest that interpersonal comparison of subjective assessments of regional labour markets is meaningful. Reported satisfaction with regional job

prospects is systematically related to relevant personal attributes, such as education level and labour market status, as well as with regional unemployment and vacancies.

4. Regional indicators of perceived job prospects

This section addresses some methodological issues pertaining to aggregation from individual responses and proposes a set of regional indicators of job prospects, denoted ‘regional satisfaction variables’. Descriptive statistics and correlations are presented in Table 4.

A natural starting point would be to use mean satisfaction reported by respondents in a given region and year. As could be expected from the preceding analysis, mean satisfaction is positively correlated with total unemployment and negatively correlated with the vacancy rate.

One potential problem with mean satisfaction is that the variable is affected by changes in the composition of respondents since reported satisfaction depends on personal attributes of the respondents. To weed out composition effects, we compute an ‘adjusted mean satisfaction’ variable from an OLS regression explaining reported satisfaction as a function of personal attributes and region by year dummies. The coefficients of the dummies can be interpreted as mean satisfaction for given personal attributes.³

For two reasons, mean satisfaction and adjusted mean satisfaction are potentially endogenous in analyses of migration. First, firm-worker matching may create a spurious correlation between perceived job prospects and population movements as regions with high inflow of workers will tend to have a favourable match between worker skills and the skills demanded by firms. Second, employment decisions of firms depend on wages, which in turn may depend on labour supply and therefore population movements.

To examine the practical importance of mobility induced matching as a source of simultaneity bias, we have computed a regional satisfaction variable from a subset of respondents expected to be less mobile than the total population of respondents. Studies of mobility have established that recent movers are more likely to relocate than the rest of the population (Greenwood 1997). The survey questionnaire provides information about whether the respondent has lived in the municipality for more than four years. By removing recent

movers, we obtain a subsample of respondents for which mobility induced matching is likely to be less important than in the total sample of respondents. Our third regional satisfaction variable ('mean satisfaction, stayers') is mean satisfaction reported by non-movers.

The three variables - mean satisfaction, adjusted mean satisfaction and mean satisfaction, stayers - are highly correlated (correlations ≥ 0.96), suggesting that neither composition effects nor simultaneity bias due to mobility induced matching are of practical importance. We will, however, employ all three variables in our analysis of interregional migration flows as a robustness check. Due to the interdependence of employment opportunities and population movements via wages, all regional satisfaction variables will be instrumented.

The last issue we consider is the measurement scale. The three satisfaction variables require the response categories to be equally spaced in the sense that the subjective distance between 1 and 2 equals the subjective distance between 2 and 3, etc. An indicator which may be more robust to variation in subjective distance between response categories is the share of respondents who rank the regional labour market above a threshold, for instance the median response category (= 3). Another alternative is to divide the scale into more than two intervals and compute the share of respondents for each interval.

Both approaches are considered. Table 4 presents summary statistics for mean satisfaction, adjusted mean satisfaction, the share of respondents reporting satisfaction above 3 (Satisfaction456), the share of respondents reporting 5 or 6 (Satisfaction56) and the share of respondents reporting 3 or 4 (Satisfaction34). With the exception of Satisfaction34, all satisfaction variables are highly correlated with each other, negatively correlated with total unemployment and positively correlated with the vacancy rate.

5. Panel data analysis of migration

We now examine how the regional satisfaction variables perform in explaining interregional migration. In Norway, the municipality's social security office registers all population movements to and from the municipality. Since every municipality is uniquely assigned to one and only one region, we are able to compute net flows for each region. Our dependent variable, Inmigration_{it} , is net in-migration to region i in year t scaled by beginning-of-year population in percentage. For the sample employed in the analysis, the standard deviation of Inmigration_{it} is 0.67 (the mean is close to zero), and the mean and standard deviation of the absolute value of Inmigration_{it} are 0.52 and 0.45, respectively.

The explanatory variables include the regional satisfaction variables, the regional economic variables presented in Table 2, regional wages and regional housing prices. Annual regional data on wages are available for manufacturing industries only. Our wage variable, Wage_{it} , is the nominal hourly manufacturing wage rate. We would have preferred to use real rather than nominal wages, but regional price indices are unfortunately not available for Norway.

A proxy for the price of housing in a region is obtained from Statistics Norway's data base of transactions of owned-occupied houses. Annual hedonic regressions are estimated explaining the per m^2 price as a function of housing attributes and regional dummies. Our variable, $\text{Housing price}_{it}$, is the mean per m^2 price of a standardized apartment in region i and year t . The wage and housing price variables are scaled by the national average in the respective years. Compared to the other regional economic variables, there is limited regional variation in wages and housing prices; the standard deviations are, respectively, 0.11 and 0.15.

The analysis is based on 89 (out of 90) regions for which a complete set of explanatory variables is available. Since the variables are first-differenced (see below), the sample period is 1994-98.

Our empirical specification follows closely Pissarides and McMaster (1990). The basic panel data equation to be estimated is:

$$\begin{aligned} \text{Inmigration}_{it} = & \alpha_1 \text{Mean satisfaction}_{it} + \log(\text{Labour}_{it}) \alpha_2 \\ & + \alpha_3 \log(\text{Wage}_{it}) + \alpha_4 \log(\text{Housing price}_{it}) + \alpha_{0i} + \varepsilon_{it}. \end{aligned}$$

Mean satisfaction_{it} is the deviation of mean satisfaction in region *i* and year *t* from the national mean in year *t*. **Labour**_{it} is a vector of regional economic variables scaled by the national means. α_{0i} is a set of regional fixed effects and ϵ_{it} is a random disturbance assumed to be identically and independently distributed. We also present equations with the log of mean satisfaction as regressor.

All explanatory variables may be affected by population flows and should therefore be considered potentially endogenous. To obtain consistent estimates, we apply the generalized method of moments (GMM) estimator suggested by Arellano and Bond (1991). The model is first-differenced to remove the regional fixed effects. In the absence of second-order correlation in the first-differenced residuals, endogenous variables lagged two or more years are valid instruments. Our set of instruments includes the second and third lag of all explanatory variables. When data are available, explanatory variables registered earlier than 1993 are included among the instruments.

Preliminary analyses suggest that: i) the explanatory variables other than the regional satisfaction variables perform best when entered in logs, ii) contemporaneous variables generally perform better than lags, and iii) the coefficient of the lagged dependent variable is small and insignificant when included. Since our main conclusions appear to be very robust across alternative specifications, we present only specifications excluding lags in order to conserve space.⁴

- Table 5 about here -

Table 5 reports one-step robust GMM results for the maintained model as well as parsimonious versions. The Arellano and Bond (1991) m_2 statistics, testing the null of no second-order correlation in the differenced residuals, are all below critical values, and the Sargan (1958) test for instrumental validity looks comfortable. The m_1 statistics indicate negative first-order serial correlation, suggesting that the levels of the error terms are white noise. The tests based on the minimised GMM criterion function (the D statistic in Newey and West, 1987) do not reject the null that equations 5.2 and 5.4 are valid simplifications of their corresponding maintained counterparts.

Mean satisfaction has the expected positive effect on net in-migration. Mean satisfaction performs best when entered in level, but the coefficient is highly significant with t-values that exceed four in every equation. The estimated effect on migration flows is substantial. The coefficient reported in equation 5.2 implies that an increase in mean satisfaction by one standard deviation raises net in-migration by 0.48, which is of the same magnitude as mean absolute net in-migration and about two thirds of the standard deviation of net in-migration. By comparison, a one standard deviation decrease in total unemployment relative to the national mean raises net in-migration by 0.40. The corresponding effects of the vacancy rate and housing prices are, respectively, 0.28 and 0.22.

Before reporting some robustness checks, we comment briefly on the other regional variables. The negative and significant effect of unemployment on net in-migration is consistent with the findings of most panel data studies of interregional migration, including the Scandinavian studies by Westerlund (1997), Fredriksson (1999) and Carlsen (2000). Few studies have used data on labour market programmes. Fredriksson (1999) is an exception, and the small and insignificant coefficient of the accommodation ratio conforms well with his conclusion that labour market programmes do not seem to impede regional adjustment substantially. The positive (but only borderly significant) effect of the long-term ratio is consistent with the notion that a high share of long-term unemployed implies less competition for jobs for a given level of unemployment, see e.g. Layard et al (1991).

Few studies of interregional migration have employed data on vacancies or hirings. Jackman and Savouri (1991) is an exception, and the positive and significant coefficient of the vacancy rate in our equations conforms well with their findings. We do not find any effect of wages on migration, possibly because we are forced to use nominal rather than real wages. Finally, the estimated effect of housing prices is negative as expected and significant in every equation.

Our first robustness check is to estimate equation 5.2 for two subperiods, 1994-96 and 1996-98 (not reported). It turns out that the estimated effect of mean satisfaction is very stable over time: the coefficients (t-values) of mean satisfaction are, respectively, 1.010 (3.50) and 1.061 (3.42). To check whether the effect of mean satisfaction is sensitive to sample variation in the cross section dimension, we also estimated the equations on subsamples removing one county (out of 19 counties) at a time. Again, the estimated effects of mean satisfaction appear to be very stable across subsamples; for instance, the estimate based on equation 5.2 is between

1.05 and 1.15 in 16 out of 19 subsamples. In both experiments, the estimated effects of the other variables are fairly stable, although less robust than the estimate of mean satisfaction.

- Table 6 about here -

Table 6 reports GMM estimates for equations with other regional satisfaction variables. The estimated effect of adjusted mean satisfaction and mean satisfaction, stayers, are virtually identical to that of mean satisfaction. The share of respondents reporting satisfaction above 3 (Satisfaction456) has also a positive and highly significant impact on net in-migration; the quantitative effect is comparable to that of mean satisfaction.

Two regional satisfaction variables are included in equation 6.3, Satisfaction34 and Satisfaction56. The reported results are consistent with expectations: both coefficients are positive and statistically significant and the coefficient of Satisfaction56 is the larger. Thus, an increase in the share of respondents reporting 3 or 4 relative to the share reporting 1 or 2 as well as an increase in the share reporting 5 or 6 relative to the share reporting 3 or 4 have a positive effect on net in-migration.

- Table 7 about here -

Table 7 reports migration regressions for different population groups according to age, gender and education level. For each group, we present two equations: one with the mean satisfaction variable employed in Table 5, and one equation with mean satisfaction reported by respondents in the population group. As is evident from Table 7, the mean satisfaction variable based on the entire sample of respondents generally performs best. We can think of two reasons for this: the number of respondents in each region by year cell is larger, and migration decisions of members of the same household but which belong to different population groups will generally be correlated.

With one exception, the estimated effect of mean satisfaction is very similar between population groups. The exception is people 40 and above for which the coefficient of mean satisfaction is small and insignificant. For the other subsamples, mean satisfaction has a positive and significant or borderline significant effect on net in-migration.

6. Conclusion

Economists have traditionally been sceptical to subjective measures of well-being. However, during the last years economists have used survey data in which people report their satisfaction with life as a whole or certain areas of life to study a range of topics, including the cost of unemployment and inflation, the value of direct democracy, whether absolute or relative income matters for job satisfaction and the relation between public spending and satisfaction with public services. The results reported in this paper and in the companion paper (Carlsen and Johansen 2001) suggest that survey data also have a potential for providing useful information about regional labour markets. Reported satisfaction with local job prospects is correlated with relevant personal characteristics as well as with objective measures of regional employment opportunities. Regional indicators of job prospects computed from survey data perform well in explaining interregional migration and regional wages, also when controlling for traditional measures of regional labour market conditions. These conclusions survive a number of robustness checks.

Endnotes

¹ We use the generalized residual (Gourieroux et al 1987) as the residual is not observed when actual satisfaction (as opposed to reported satisfaction) is a latent variable.

² The question about labour market status was changed in 1995. This may explain why the coefficient of personal unemployment decreases considerably from column 3 to column 4.

³ We consider an employed male aged 30-34.

⁴ Since the sum of net in-migration rates is not exactly equal to zero, we have included time dummies for every year in preliminary analyses. The coefficients of the time dummies were, however, always small and insignificant, and exclusion of the dummies did not affect the results in any substantial way.

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Table 1. Distribution of reported satisfaction

Response categories	1	2	3	4	5	6	Total
Number of respondents	9.866	11.899	17.105	16.731	11.687	7.021	74.309
% of respondents	13.3	16.0	23.0	22.5	15.7	9.4	100
Year	1993	1994	1995	1996	1997	1998	
Mean satisfaction	2.89	2.76	3.34	3.49	3.60	3.75	

Table 2. Description of regional economic variables

Variable	Description	Mean	St.dev
Unemployment variables:			
Total unemployment	Sum of registered unemployed and labour market slots scaled by labour force	0.072	0.031
Long-term ratio	Long-term unemployed (duration $\geq 1/2$ year) scaled by registered unemployed	0.288	0.061
Accommodation ratio	Labour market slots scaled by total unemployment	0.309	0.075
Participation rate	Labour force scaled by population aged 16-66	0.658	0.037
Vacancy rate	Annual inflow of vacancies scaled by labour force	0.172	0.050

Note: Long-term ratio and vacancy rate are registered at the county level (114 data points). The other variables are registered at the regional level (540 data points).

Table 3. Ordered probit analysis of reported satisfaction

	Mean	(3.1)	(3.2)	(3.3)	(3.4)	(3.5)
<i>Personal attributes:</i>						
Age 20-24		Reference category				
Age 25-29	0.119	0.015 (0.626)	0.016 (0.634)	0.015 (0.588)	0.016 (0.551)	0.009 (0.315)
Age 30-34	0.149	0.035 (1.343)	0.035 (1.338)	0.034 (1.302)	0.022 (0.783)	0.011 (0.384)
Age 35-39	0.149	0.044 (1.823)	0.044 (1.818)	0.042 (1.750)	0.027 (1.043)	0.022 (0.843)
Age 40-44	0.135	0.013 (0.541)	0.013 (0.538)	0.011 (0.474)	-0.022 (0.752)	-0.027 (0.939)
Age 45-49	0.123	-0.015 (0.619)	-0.015 (0.619)	-0.017 (0.714)	-0.052 (1.981)	-0.054 (2.008)
Age 50-54	0.111	-0.052 (2.039)	-0.052 (2.007)	-0.054 (2.122)	-0.091 (3.099)	-0.095 (3.204)
Age 55-59	0.075	-0.001 (0.044)	-0.001 (0.042)	-0.002 (0.078)	-0.036 (1.187)	-0.041 (1.331)
Age 60-66	0.080	0.186 (6.209)	0.186 (6.153)	0.185 (6.208)	0.157 (4.874)	0.154 (4.684)
Female	0.506	Reference category				
Male	0.494	0.006 (0.414)	0.007 (0.415)	0.007 (0.450)	0.007 (0.404)	0.009 (0.529)
Not high school	0.169	Reference category				
High school	0.487	0.052 (4.048)	0.052 (4.087)	0.051 (4.010)	0.044 (3.011)	0.041 (2.780)
College	0.344	0.319 (12.42)	0.320 (12.40)	0.320 (12.38)	0.293 (9.449)	0.289 (9.095)
Employed	0.814	Reference category				
Not in labour force	0.148	-0.191 (12.61)	-0.192 (12.62)	-0.193 (12.60)	-0.186 (10.43)	-0.181 (9.932)
Unemployed	0.038	-0.618 (18.16)	-0.618 (18.19)	-0.618 (18.23)	-0.839 (18.82)	-0.842 (19.00)
<i>Regional economic variables:</i>						
Unemployment variables:						
Total unemployment		-7.586 (7.624)	-7.921 (8.116)	-7.614 (7.343)	-8.069 (5.815)	-7.912 (5.616)
Long-term ratio		-0.838 (1.908)	-0.784 (1.637)			
Accommodation ratio		0.034 (0.073)				
Participation rate		0.401 (0.453)				
Vacancy rate		3.373 (4.214)	3.434 (4.398)	4.062 (6.802)	3.659 (5.013)	3.570 (4.735)

City size dummies:

< 5 000 (or rural area)	0.443		Reference category			
10 000 – 5 000	0.132	0.238 (5.409)	0.244 (6.158)	0.243 (5.917)	0.296 (6.798)	0.320 (7.354)
50 000 – 10 000	0.217	0.368 (7.384)	0.373 (7.547)	0.356 (7.095)	0.455 (8.548)	0.480 (9.031)
> 50 000 (except Oslo)	0.158	0.612 (8.826)	0.624 (8.501)	0.612 (8.396)	0.693 (8.702)	0.751 (9.070)
Oslo	0.050	0.935 (6.560)	0.932 (6.639)	0.759 (10.92)	0.944 (10.74)	1.002 (10.89)

Personality trait variable:

Generalized residual					0.141 (10.89)
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Estimated cut-off points:

μ_1	-0.847	-1.129	-0.790	-0.896	-0.890
μ_2	-0.210	-0.493	-0.154	-0.224	-0.221
μ_3	0.453	0.170	0.509	0.445	0.453
μ_4	1.129	0.846	1.185	1.138	1.154
μ_5	1.844	1.562	1.901	1.897	1.922
Log L	-104572	-104576	-104597	-78758	-76921
Log L at zero	-110891	-110891	-110891	-83087	-81564
Number of respondents	63319	63319	63319	47759	46897

Notes: t-statistics (absolute values) corrected for regional random effects in parentheses.

Long-term ratio and vacancy rate are measured at the county level. The other regional economic variables are measured at the regional level. Time dummies included in all equations. Sample period is 1993-98 in (3.1)-(3.3) and 1995-98 in (3.4)-(3.5).

Table 4. Description of regional satisfaction variables

Variable	Description	Mean	St.dev.				
Mean satisfaction	Average reported satisfaction	3.123	0.516				
Adjusted mean satisfaction	Average reported satisfaction adjusted for personal attributes	3.044	0.501				
Mean satisfaction, stayers	Average reported satisfaction by residents who have lived at least 4 years in the municipality	3.073	0.556				
Satisfaction456	Share of respondents reporting satisfaction ≥ 4	0.397	0.152				
Satisfaction56	Share of respondents reporting satisfaction ≥ 5	0.186	0.115				
Satisfaction34	Share of respondents reporting satisfaction = 3 or satisfaction = 4	0.455	0.088				
Correlations							
	Mean satisfaction	Adjusted mean satisfaction	Mean satisfaction, stayers	Satisfaction 456	Satisfaction 56	Satisfaction 34	Total unemployment
Adjusted mean satisfaction	0.997						
Mean satisfaction, stayers	0.965	0.960					
Satisfaction456	0.975	0.972	0.936				
Satisfaction56	0.920	0.916	0.877	0.900			
Satisfaction34	0.334	0.336	0.346	0.306	-0.040		
Total unemployment	-0.643	-0.633	-0.672	-0.614	-0.545	-0.304	
Vacancy rate	0.441	0.428	0.439	0.448	0.433	0.043	-0.402

Table 5. Determinants of net in-migration

	(5.1)	(5.2)	(5.3)	(5.4)
Mean satisfaction	1.137 (4.81)	1.119 (4.88)	-	-
log (Mean satisfaction)	-	-	2.726 (4.35)	2.731 (4.49)
log (Total unemployment)	-1.722 (2.56)	-1.642 (2.79)	-1.500 (2.25)	-1.531 (2.72)
log (Long-term ratio)	1.353 (1.83)	1.375 (2.02)	1.368 (1.82)	1.392 (1.99)
log (Accommodation ratio)	0.168 (0.26)	-	0.110 (0.18)	-
log (Participation rate)	-0.500 (0.13)	-	0.387 (0.11)	-
log (Vacancy rate)	1.557 (2.10)	1.682 (2.41)	1.807 (2.41)	1.853 (2.63)
log (Wage)	-0.639 (0.39)	-	-0.537 (0.34)	-
log (Housing prices)	-1.522 (2.14)	-1.548 (2.17)	-1.870 (2.68)	-1.875 (2.68)
Diagnostics:				
AR(1)	-5.335	-5.325	-5.485	-5.466
AR(2)	-0.255	-0.107	-0.583	-0.389
Sargan (p-value)	0.786	0.837	0.643	0.697
Test against previous (p-value)	-	0.842	-	0.938

Notes: Dependent variable is net in-migration to region i in year t , as percentage of beginning-of-year population. Mean satisfaction is defined as $(\text{Mean satisfaction})_{it} - (\text{Mean satisfaction})_t$, $\log(\text{Mean Satisfaction})$ is defined as $\log(\text{Mean satisfaction})_{it} - \log(\text{Mean satisfaction})_t$ where $(\text{Mean satisfaction})_t$ is the national average. The remaining determinants are defined as $\log(X_{it}) - \log(X_t)$ where X_t is the national average. t -statistics based on robust one-step standard errors in parentheses. Estimation method is GMM, cf. Arellano and Bond (1991). AR(i) is the Arellano and Bond (1991) test for serial correlation of order i based on the transformed residuals, asymptotic normal. Sargan is the Sargan (1958) test for instrumental validity. Sample period is 1994 – 1998, number of regions is 89. The test of restrictions is based on the minimised GMM criterion, see Newey and West (1987)

Table 6. Additional migration regressions

	(6.1)	(6.2)	(6.3)	(6.4)
Adjusted mean satisfaction	1.107 (4.76)	-	-	-
Mean satisfaction, stayers	-	1.033 (4.96)	-	-
Satisfaction456	-	-	3.331 (4.16)	-
Satisfaction34	-	-	-	1.961 (2.73)
Satisfaction56	-	-	-	4.426 (5.26)
log (Total unemployment)	-1.811 (3.13)	-1.836 (3.29)	-1.434 (2.32)	-1.718 (2.90)
log (Long-term ratio)	1.470 (2.15)	1.116 (1.61)	0.871 (1.31)	1.255 (1.99)
log (Vacancy rate)	1.677 (2.41)	1.276 (1.84)	1.527 (2.06)	1.755 (2.54)
log (Housing prices)	-1.526 (2.14)	-1.291 (1.86)	-1.967 (2.45)	-1.174 (1.74)
Diagnostics:				
AR(1)	-5.391	-5.303	-5.031	-5.383
AR(2)	-0.043	-0.775	-0.616	0.460
Sargan (p-value)	0.844	0.769	0.672	0.893

Notes: The satisfaction variables are defined as deviations from national means. See also notes to Table 5.

Table 7. Migration regressions for different sub-groups

	Age 16 - 66		Age 16 - 39		Age > 40		Male		Female		College degree		Not College degree	
Mean satisfaction	1.162 (4.56)	-	1.867 (3.77)	-	-0.007 (0.05)	-	0.856 (2.38)	-	1.027 (3.56)	-	1.267 (1.89)	-	0.881 (2.52)	-
Group specific mean satisfaction	-	0.991 (4.32)	-	0.788 (2.34)	-	-0.127 (1.00)	-	0.487 (1.72)	-	0.923 (3.88)	-	0.132 (0.39)	-	0.747 (2.55)
log (Total unemployment)	-1.598 (2.43)	-1.445 (2.23)	-1.895 (1.83)	-2.438 (2.51)	-0.858 (2.76)	-0.869 (2.65)	-1.801 (3.09)	-1.989 (3.42)	-1.591 (2.68)	-1.824 (3.13)	-0.101 (0.07)	-1.146 (0.76)	-2.513 (3.26)	-2.731 (3.69)
log (Long-term ratio)	1.446 (1.84)	1.201 (1.56)	1.916 (1.76)	1.171 (1.01)	-0.217 (0.56)	-0.338 (0.94)	1.333 (1.43)	0.900 (1.03)	0.611 (0.84)	0.707 (0.87)	1.104 (0.71)	0.349 (0.23)	1.111 (1.25)	0.971 (1.04)
log (Vacancy rate)	2.162 (2.64)	2.490 (2.85)	2.886 (2.94)	2.931 (2.92)	0.216 (0.70)	0.181 (0.56)	1.904 (2.87)	1.991 (2.69)	1.122 (1.74)	0.646 (1.02)	2.034 (1.40)	2.325 (1.53)	2.066 (2.76)	1.890 (2.43)
log (Housing prices)	-1.828 (1.42)	-1.679 (2.14)	-2.931 (2.47)	-2.639 (2.18)	-0.832 (2.30)	-0.862 (2.32)	-1.852 (2.43)	-2.042 (2.45)	-1.874 (2.31)	-2.189 (2.49)	-3.710 (2.27)	-3.605 (2.18)	-1.915 (2.11)	-1.795 (1.88)
Diagnostics:														
AR(1)	-5.374	-5.455	-4.992	-4.786	-5.587	-5.645	-4.539	-4.272	-5.156	-5.196	-4.907	-4.736	-5.289	-5.270
AR(2)	0.206	-0.382	0.533	0.164	0.507	0.244	-0.510	-0.923	-0.089	-0.439	0.830	0.859	-0.305	-0.435
Sargan (p-value)	0.695	0.723	0.817	0.706	0.922	0.881	0.477	0.541	0.887	0.875	0.616	0.681	0.685	0.672

Notes: The satisfaction variables are defined as deviations from national means. See also notes to Table 5.