The Regional Settlement Patterns of Immigrants to Sweden 1967-2005 by Age

DANIEL RAUHUT, Ph.D.
MATS JOHANSSON, Researcher
Royal Institute of Technology (KTH),Dept. of Urban Planning and Environment, Division of Urban and Regional Studies, Stockholm, Sweden

Abstract

The aim of this study is to analyse the initial allocation of immigrants to Sweden 1967-2005 by age in a regional perspective. Vacancies, unemployment and labour market participation as well as geographical areas with many previous immigrants are included in the analysis as pull-factors.

A multivariate cross-section OLS regression model will be used to estimate the relative initial regional distribution of immigrants in Sweden in 1967, 1975, 1990 and 2005 by age. The chosen method enables to control for a subset of explanatory variables and examine the effect of a selected independent variable when estimating the regional pull-factors to immigration. This study uses data collected from Statistics Sweden (SCB) and the National Labour Market Board (AMS). The data used is regional macro data, which does not contain information on single individuals.

The overall conclusion is that previous immigrants had an impact on age groups in their initial regional settlement pattern in 1967 – 2005. Few of the other independent variables show any coefficients which are statistically separated from zero.

Keywords: immigrants, refugees, labour markets, settlement patterns

Introduction and background

The settlement patterns of the foreign-born population have changed considerably since the 1960s and 1970s, partly as an effect of the structural transformation of the Swedish economy from an industrial to a post-industrial society, partly as a consequence of the transition from labour immigration to refugee immigration (Johansson and Rauhut 2008a, 40). Until the end of 1960s, Swedish industry was in need of labour, and most labour immigrants were recruited to small to medium scale manufacturing industries in the Swedish rust belt *Bergslagen* (Värmland, Dalarna, Gävleborg, Örebro and Västmanland counties), to towns and cities in Västra Götalands county (Borås,

Trollhättan, Göteborg) and Stockholm county (SCB 2004, 21). The distribution of immigrants during this time is explained by the fact that (a) immigrants initially were recruited to economically expansive sectors in a few industrial regions (Lundh and Ohlsson 1994, 144-145) and (b) the transaction costs for obtaining a job was lower among fellow countrymen in the cities and towns than if they were scattered all over Sweden (Ekberg and Andersson 1995, 33).

The period 1970-1985 can be seen as a transition phase from labour immigration to refugee and family immigration. Since the mid-1980s until the early years of this millennium immigration to Sweden has been dominated by refugee immigrants and tied-movers (SCB 2004, 24-25). These two groups of immigrants have been concentrated to the metropolitan areas – the Stockholm, Göteborg and Malmö regions – and very unwilling to leave these areas (Ekberg and Andersson 1995, 166ff.). An attempt to spread refugees more evenly over the country was launched in 1985 with the implementation of *Hela Sverige-strategin* ("countrywide strategy for refugee reception"). The new strategy stated that a refugee no longer could settle down where he/she wanted to live, which was an attempt to limit the concentration to the metropolitan areas. From 1985 to 1994, in line with this countrywide strategy, the majority of the refugee immigrants were more than before dispersed across Sweden (SCB 2006, 25). The idea was, thus, to place the refugees in refugee centres all over Sweden in an attempt to prevent refugees to cluster in the three metropolitan regions, and to some extent this strategy was successful (SCB 2006).[1] The countrywide strategy was partially abandoned in 1994 as an evaluation showed that, although the policy was successful in spreading people initially over the country, secondary migration tended to concentrate people again over the years (Andersson 2003). Since 1994, refugees are allowed to arrange for their own living and housing and 2005 only 30 percent of new immigrants are involved in the original countrywide placement strategy (SCB 2006, 25f.).

The decisions for *secondary moves* of immigrants in Sweden, *i.e*. the geographical mobility after the *initial* settlement, have been analysed in a number of studies for refugees, tied movers and labour immigrants (Edin *et al*. 2003, 2004, Åslund 2000, 2005, Åslund and Rooth 2007, Andersson 2004, Ekberg 1993, Ekberg and Andersson 1995, Rephann and Vencatasawmy 2002, SCB 2006, 2008). Only a few studies have, however, focused on the initial settlements. Wadensjö (1973, 424) finds that the determinant for immigrants' initial settlement decision in the 1960s was vacancies and labour market conditions in general. In an analysis of the immigrants' settlement

1 When refugees receive their residence permit they are free to move anywhere in the country, which means that they move to the metropolitan regions. Refugees are registered as immigrants in the county of the refugee centre and their move to the metropolitan areas is hence classified as domestic migration. In 1994 this strategy was revised. If the refugees can arrange accommodation while waiting for their residence permit, they may settle down in any region, which, in reality, means in the metropolitan regions. The strategy "*Hela Sverige*" induces, at least theoretically, an institutional bias to the analysis for 1990 as factors such as vacancies, unemployment and employment will have little effect on the settlement pattern for a group of immigrants.

patterns in 1967, 1975, 1990 and 2005 by Rauhut and Johansson (2008, 24) vacancies did impact the choice of settlement for immigrants in Sweden in 1967, but not for the other years.

Previous research shows that persons in different age groups differ in the probability to migrate internationally; the highest probability to move is found in the group aged 20-34 followed by the age group 35-49, but at a significantly lower level. Children and persons over 50 years of age have a significantly lower probability to migrate internationally (UN 2010). As age groups might have differing motives and also are more or less dependent of other immigrants age is a factor worth consideration with regard to the settlement pattern. This is, however, an aspect in the Swedish immigration history which has not yet been fully explored.

The purpose of this study is to analyse what possible pull-factors have determined the initial regional settlement pattern of immigrants to Sweden 1967-2005 for different age groups. Vacancies, unemployment and labour market participation as well as the geographical areas with many previous immigrants are included in the analysis as pull-factors. The impact of refugee centres and metropolitan regions are also controlled for. This study proposes to answer the following two questions: (1) which factors have had impact on the initial regional settlement pattern of immigrants by age? (2) Have the determining factors changed over time for the studied immigrants of different age?

A changing regional settlement pattern?

According to Johansson and Rauhut (2008a, 43-47, 2008b) the three metropolitan regions have always attracted a majority of all immigrants, but the distribution of immigrants between the remaining counties in Sweden has become more even between 1950 and 2005 (see figure 1 and table 1). Johansson and Rauhut (2008a, 50-53) find no evidence that labour immigrants and refugees have different settlement patterns and react in different ways with regard to the labour market variables. The impact of these variables decreases over time. The traditional industrial regions were overrepresented among the immigrants up to the middle of the 1970s. The transformation of the economy with deindustrialisation and the rise of the knowledge-based economy have reduced the importance of the labour market variables for all kind of immigrants concerning the settlement pattern. Instead, the most important pull-factor has been and still is the regional distribution of foreign-born people. The stock of foreign-born persons was also found to be the most important factor for the regional initial settlement patterns for 10 differing immigrant groups 1975-2005 in the study by Rauhut and Johansson (2010a, 26).

That foreign-born person's cluster in the metropolitan areas is not exceptional for Sweden. This is valid in all other Nordic countries (Eðvarðsson *et al*. 2007) as well as in most other European countries (Vandermotten *et al*. 2004, 2005). Johansson and

Rauhut (2008a, 2008b) find some evidence for a different settlement pattern between refugees and labour immigrants in their studies. Refugees are today more spread over the country than labour immigrants as a consequence of the localization of the refugee centres. This provides, however, no information on the intra-regional distribution of refugees after they have received their residence permit in Sweden and the concentration process to the big cities.[2] The structural transformation in the economy has resulted in that low-productive and unqualified industrial jobs, jobs that labour immigrants usually pick up, have almost disappeared. One indication of this is that the overrepresentation of the traditional industrial counties diminished and then was underrepresented in the last years of the investigated period. Large cities and the knowledge-based service sector have instead been more and more central for economic growth, whereas the substitution possibilities of differing kinds of labour has deceased with the exception of standardised industrial production and in the lower segment of the service sector. The result of the structural transformation is that both labour immigrants and refugees are, increasingly, headed for the large cities and metropolitan areas with a large amount of service jobs in both the upper and lower labour market segments.

The regional number of immigrants to Sweden per 1,000 inhabitants 1950-2005 is shown in figure 1. With few exceptions, most Swedish regions have experienced a relative increase between 1950 and 2005; the exceptions are the (industrial) regions of Södermanland, Västmanland and Kopparberg.

2 Immigrants have a relatively higher intensity to move than natives and that this movement is headed towards the metropolitan areas (Ekberg, 1993, 1995, SCB 2006b, Rephann & Vencatasawmy 2000).

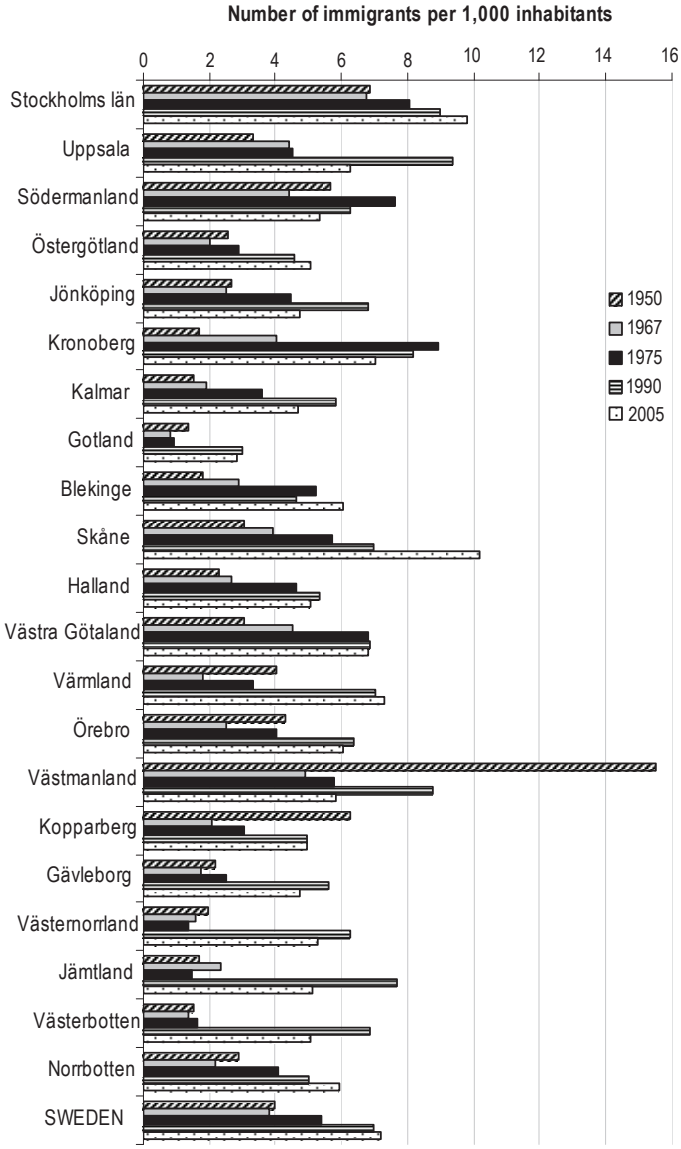

Figure 1. The regional number of immigrants to Sweden per 1000 inhabitants 1950-2005. Source: Johansson and Rauhut, 2008b.

One way to analyse if and in what sense the "preferences" and the settlement patterns have changed over time between different regions is to relate the regional gross immigration to the regional distribution of the Swedish population. By constructing an index relating to the regional gross immigration and the regional distribution of the population in Sweden it is possible to measure the magnitude of the regional gross immigration in order to analyse the over- or underrepresentation of immigrants in different counties. It is then possible to compare the results in order to get a hint of the

settlement changes concerning differing regions over time. The index is as shown in equation 1 below. The size index, *SI*, is estimated by dividing the share of immigrants, *I*, in the region *i* with the share of total population, *P*, in the same region:

$$SI = (I_i/P_i) *100 \qquad (1)$$

If the result is over 100 the share of gross immigrants is higher than the region *i*'s population size and vice versa. It is, thus, possible to compare the results in order to get a hint of the settlement changes for differing regions over time.

Table 1. Over- and under-representation of the regional gross immigration to Sweden 1950, 1967, 1975, 1990 and 2005 by the 1997 regional division. Index over 100, the county is overrepresented and vice versa.

County	Gross immigration Index 1950	Gross immigration Index 1967	Gross immigration Index 1975	Gross immigration Index 1990	Gross immigration Index2005
Stockholm	174,2	177,3	150,0	128,3	134,0
Uppsala	83,8	115,3	85,7	133,6	85,3
Södermanland	142,8	116,4	141,9	89,7	75,9
Östergötland	65,1	53,4	53,2	65,2	69,6
Jönköping	67,3	65,9	81,1	97,1	66,7
Kronoberg	43	103,8	161,9	116,8	95,0
Kalmar	38	50,1	65,5	83,3	65,4
Gotland	33,8	29,2	14,3	42,8	33,3
Blekinge	45,1	78,5	94,7	66,0	82,4
Skåne	77,5	103,3	108,1	99,4	139,5
Halland	58,4	67,8	85,2	76,1	68,8
Västra Götaland	77,2	118,4	124,7	98,3	94,7
Värmland	101,2	46,8	60,0	100,8	103,3
Örebro	108,5	66,5	75,8	91,1	83,3
Västmanland	392,6	129,8	106,3	125,3	79,3
Dalarna	158,7	56,2	55,9	70,9	70,0
Gävleborg	55,2	45,5	47,2	80,0	64,5
Västernorrland	48,9	42,6	24,2	89,2	74,1
Jämtland	42,3	61	25,0	110,1	71,4
Västerbotten	38,8	33,6	31,0	97,8	71,4
Norrbotten	73,6	60,6	78,1	71,4	82,1
C.V. (N=21)*	0,869	0,492	0,526	0,249	0,285
C.V. (N=18)*	0,946	0,435	0,548	0,257	0,196

**All regions (N=21) and non-metropolitan regions (N=18). Source: Johansson and Rauhut (2008b)*

Table 1 shows the relative over- and under-representation of regional gross immigration to Sweden. Stockholm County has been overrepresented when it comes to gross immigration relative to its size during the whole period analysed. Notably, the relative over-representation has declined over time. Traditional industrial regions such as Södermanland and Västmanland were over-represented at least up to the middle of the 1970s but under-represented in 2005. This change can be explained by a decreasing demand for blue-collars and low skilled labour in the manufacturing industry, something that is related to the structural transformation of the economy. These two regions are "outliers" that cannot be characterised as metropolitan counties. Unfortunately, they bias the expected correlation between size and over-/under-representation. Södermanland and Västmanland are over-represented in 1950, 1967 and 1975 with respect to the stock of foreign-born inhabitants – the Swedish industrial economy was also in zenith in the middle of the 1960s. This can thus be seen as an indication of the diminished importance of the labour market pull-factors over time and an effect of the transformation from an industrial to a post-industrial society (Johansson and Rauhut 2008a).

Skåne has changed its gross immigration relative its size from being under-represented in 1950 to being overrepresented in 2005. This can be explained by a huge immigration of refugees, and, for 2005, by the integration of the towns and regions on both sides of Öresund (between the Malmö and Copenhagen regions).

From table 1 some more general conclusions can be drawn. One is based on the development of the coefficient of variation (C.V.) that have diminished and not increased during the period 1950-2005 concerning over- or underrepresentation.[3] This is valid both for gross immigration and the stock of immigrants, which is not shown in table 1, but it is more pronounced with regard to gross immigration. In practical terms this means that the immigrants have been more equally distributed around the country even if the metropolitan areas still are the overwhelmingly dominated areas with regard to the settlement pattern of the foreign population. In what sense this is an effect of the Swedish immigration policy cannot definitively be answered by this kind of data - the diminishing C.V. can be a result of the Swedish immigration policy in the sense that the immigrants are localised all around the country in the initial phase. This policy would not have an impact on the stock as much as on the inflow as the latter is more vulnerable than the stock that has been built up during a longer period. The C.V. of the stock of foreign-born people does not drop as much as the gross immigration during the investigated years (not shown here), a fact that underline this reasoning (Johansson and Rauhut 2008b).

3 The coefficient of variation (C.V.) is defined as the ratio of the standard deviation σ to the mean μ.

Theoretical approaches and hypotheses

In modern (post-)industrial societies a constant need for workers at the bottom of the social hierarchy is an obvious phenomenon. This has also been a central ingredient since the introduction of the *Segmented Labour Market*-theories in the beginning of the 1970s (Doeringer and Piore 1971, Vietorisz and Harrison 1973, Piore 1979). The segmented labour market consists of a number of segments more or less separated from each other by various kinds of formal or informal barriers resulting in a heterogeneous and not substitutable labour force. It is a well-known fact that it is in the lower segments in particular that the new immigrants, often from developing countries, are most likely to be found and then especially in the metropolitan areas. Even if the outcome will be segregation and under-qualified jobs this is not necessary contradictory to rationality from the migrant's point view as these labour market segments are most frequent in the wider and more diversified labour markets in the metropolitan areas. This means also the phrase "big is beautiful" often is a pull-factor that is associated with potential jobs, flexibility and urban life styles.

This reasoning is in line with the human capital based migration theory where the migrants are rational, at least *ex ante*, and assumed to undertake long term calculations where migration can be seen analogical with an investment in future wellbeing (Todaro 1969, 1976, 1989, Harris and Todaro, 1970). The decision on both when and where to move includes then variables such as wage differentials, unemployment rates, travel costs, the ability to move, barriers and the psychological aspects of leaving friends and family etc. (Sjaastad 1962, Liu 1975, Todaro 1969, 1976, 1989). This kind of reasoning is however only applicable on a free labour force and not on immigrants without residence or job permits. Even if the explanatory power is less for the latter category the motives behind the migration decisions are rational from the migrant's point of view – otherwise there would be no migration.

In line with the neoclassical migration theory regional wages, vacancies and unemployment are often seen as pull-factors for the migration (Straubhaar 1988). Other factors that often are mentioned are distance and the size of people living in the cities or regions. This is more in line with the network theory of migration as well as the human capital theory but still in line with the neo-classical variant in a broader sense. These factors seem, however, to be more relevant for Swedes and people from the EU-countries than for refugees as they are often in a situation dominated by restrictions and other hindrances. The latter seems to be of utmost importance for immigrants outside the Nordic countries or the EU as they prefer to move to places where they suppose to have the best chances to get a job on formal or informal ways. It has been shown that "big is beautiful" often is a pull factor that is associated with jobs, flexibility, informality and urban life styles.

As the migrant is supposed to be rational – at least *ex ante* – this is a process that accentuates the concentration process and the skewed distribution of the immigrants in the second round even if the unemployment levels in these categories are very high. It is a well-known fact that it is particular in the lower segments that the new immigrants, refugees and often from developing countries, are most likely to be found in the "3D-jobs" – jobs that are dirty, dangerous and degrading, which the natives more or less refuse to take (Taran 2005). This development is more in line with the theories of segmented labour markets in the way that the structural changes accentuate the mismatch on the labour market and increase the discrepancy between shortages and surpluses with regard to the production factor of labour between differing labour market segments. The role of formal certificates reinforces also this development. The result will be that the labour market segmentation more and more also will be a labour market segmentation based on ethnicity that reinforces the segregation problems in especially the big cities. As has been mentioned in the introductory chapter this type of migratory movements are predominantly oriented to the big city areas but this is not contradictory to the observation that the distribution of immigrants are more evenly distributed between the counties today compared to some decades ago. Instead it might be a consequence of the structural transformation of the economy in combination of the changing composition of immigrants.

Based on the theories mentioned above the following hypotheses might then be generated:

1. Many vacancies in a region will attract immigrants of all ages,
2. High regional unemployment will repel immigrants of all ages,
3. High regional employment will attract immigrants of all ages.

Age-specific differences for these three hypotheses are more related to the economic structure and the demand for specific labour, not on vacancies, unemployment and employment *per se*.

Since immigration has continued long after the initial demand for labour subsided a hypothesis in line with the Network theory of migration is generated:

4. Previous migration flows to a region will generate more immigration. An age-specific impact on the initial settlement pattern will not be found.

These hypotheses so far apply to labour immigration, but not to a refugee immigration where the refugees are placed in refugee centres anywhere in the country; the choice of settlement is thereby determined by institutional factors. A fifth hypothesis is therefore

5. The institutional impact of the countrywide strategy for refugee reception will not have an age-specific impact on the initial settlement pattern.

Data and method

A multivariate cross-section OLS regression model will be used for estimating the relative regional distribution of immigrants in Sweden for the years 1967, 1975, 1990 and 2005. The method has been chosen because it enables us to control for a subset of explanatory variables and examine the effect of a selected independent variable when estimating the regional pull-factors to immigration. This study uses data collected from Statistics Sweden (SCB) and the National Labour Market Board (AMS). The data used is regional macro data, which means that we do not have any information on single individuals.

The dependent variable is the regional number of immigrants per 1000 inhabitants, F, by age, a, to Sweden in region i, $F(a)_i$, for year t. Data for $F(a)_i$ is available for 1975 and 2005; for 1990 the age structure of the immigrants in 1991 has been used as a proxy variable and for 1967 the age structure of the immigrants in 1971 has been used as a proxy variable.

The regional vacancy ratio, V, is commonly defined by dividing the number of vacancies in region i with the number of persons in the labour force in region i for year t. For the independent variables unemployment, U, and employment, E, the regional unemployment and employment rates are used. The accumulated regional stock of immigrants per 1000 inhabitants, S_i, refers to the regional number of foreign citizens per 1000 inhabitants for 1967 and 1975[4] and for the regional number of foreign born per 1000 inhabitants in 1990 and 2005. The heterogeneous data for S means that the results of the analysis for 1967 and 1975 are not fully comparable to the results obtained for 1990 and 2005. The independent variable for the accumulated stock of previous immigrants is also so highly correlated with the dependent variable that a first order serial correlation for 1967 and 1975 is generated.[5] To control for this heterogeneity and the first order serial correlation we insert a dummy variable (industrial regions - INDREG) in the model for 1967 and 1975. The major industrial regions (Stockholm, Uppsala, Södermanland, Östergötland, Skåne, Västra Götaland, Örebro, Västmanland, Dalarna, Gävleborg and Norrbotten) are given the value 1, while all other regions have the value 0. Since it was the industry which demanded immigrant labour these regions ought to attract immigrants (Johansson and Rauhut 2008a, 43-45, Rauhut and Johansson 2010a, 19). Indirectly this dummy controls for the stock of immigrants including those who have become Swedish citizens.

4 For 1967 and 1975 only data for foreign citizens exists; country of birth was not registered.

5 The accumulated stock of foreign born persons in the Swedish regions, S, should be added in the model, at least on theoretical reasons (former immigration tends to generate new immigration) and the variable should be lagged with $t–n$ years. S as foreign citizens generates first order serial correlation 1967 and 1975. The main reason for this appeared to be that the independent variable S as foreign citizens is highly correlated to the dependent variable F, which results in *e.g.* inconsistent OLS-estimates, a larger R^2 than the true value and the t-statistics will be overestimated (Ramanathan 1995, 449ff.). Several actions have been taken to control for this serial correlation, but all failed. As a result, S has been excluded from the model 1967 and 1975.

The motives for migrating to Sweden differ depending on the migrant's status as labour immigrant, refugee or returning Swedish citizen. Hence, it can be assumed that their motives for settling down in a specific region may differ. So far we have only discussed variables which may affect labour immigrants; therefore we have tried to control for returning Swedish citizens and refugees by inducing dummy variables into the models.

The returning Swedish citizens differ from the other immigrant groups as they can be assumed to have ties to a specific region: the region they previously emigrated from. In recent years the group of returning natives among the immigrants has been very high: around 40 per cent of all immigrants to Sweden are returning natives (Rauhut 2007, 19). As the headquarters for multinational Swedish companies, public authorities, several major universities (exchange of academic scholars and students) etc. are situated in the three metropolitan regions, we assume that the returning Swedish citizens prefer moving back to where they have their ties. Theoretically, a variable measuring the regional number of Swedish emigrants per 1000 inhabitants could be used as proxy variable. Unfortunately, the time spent abroad, before returning to Sweden, is unknown. Therefore, we add a dummy variable (Big city - BIGCITY) into the model to control for qualitative characteristic (the wish of returning to the region of origin) of this particular immigrant group. The regions Stockholm, Skåne and Västra Götaland are given the value 1, while all other regions are given the value 0. The BIGCITY-variable might also be an indication of the attractiveness of the metropolitan areas with regard to the migratory movements and the settlement pattern of different migrant groups.

In the late 1970s and early 1980s the number of refugees to Sweden increased and they settled down in the metropolitan regions around Stockholm, Göteborg and Malmö. As mentioned earlier, in 1985 a strategy for distributing refugees evenly all over Sweden was introduced (*Hela Sverige-strategin*). The idea was to prevent refugees to cluster in the three metropolitan regions and instead distribute them to refugee centres all over Sweden. This induces an institutional bias to the analysis for 1990 as factors such as vacancies, unemployment and employment will have little effect on the settlement pattern for a significant group of immigrants. To control for this institutional bias a dummy variable (Refugee centre - REFCENT) will be added to the model for 1990 and 2005. The dummy variable is 1 for the regions which hosted large refugee centres (Södermanland, Östergötland, Värmland, Örebro, Dalarna, Gävleborg, Västernorrland, Västerbotten and Norrbotten), for all other regions the value is 0.

In line with the theoretical as well as methodological reasoning above we have constructed four models. Models 1 and 2 (equations 2 and 3) specify the initial settlement patterns for the analysed age groups in 1967 and 1975, while models 3 and 4 (equations 4 and 5) specify the initial settlement patterns for same age groups in 1990 and 2005.

$$\text{h}\ F(a_n)_{i,t} = \alpha_1 + \beta_1 \text{h}\ U_{i,t-1} + \beta_2 \text{h}\ E_{i,t-1} + \beta_3 \text{h}\ V_{i,t-1} + \beta_4 INDREG + \varepsilon \quad (2)$$

and

$$\text{h}\ F(a_n)_{i,t} = \alpha_1 + \beta_1 \text{h}\ U_{i,t-1} + \beta_2 \text{h}\ E_{i,t-1} + \beta_3 \text{h}\ V_{i,t-1} + \beta_4 BIGCITY + \varepsilon \quad (3)$$

Models 3 and 4 use accumulated regional stock of immigrants per 1000 inhabitants, S_i, instead of the dummy variable INDREG. In 1990 and 2005 problems with first order serial correlation does not exist. The dummy variables REFCENT and BIGCITY control for refugees and the returning Swedish citizens.

$$\text{h}\ F(a_n)_{i,t} = \alpha_1 + \beta_1 \text{h}\ U_{i,t-1} + \beta_2 \text{h}\ E_{i,t-1} + \beta_3 \text{h}\ V_{i,t-1} + \beta_4 \text{h}\ S_{i,t-1} + \beta_5 REFCENT + \varepsilon \quad (4)$$

and

$$\text{h}\ F(a_n)_{i,t} = \alpha_1 + \beta_1 \text{h}\ U_{i,t-1} + \beta_2 \text{h}\ E_{i,t-1} + \beta_3 \text{h}\ V_{i,t-1} + \beta_4 \text{h}\ S_{i,t-1} + \beta_5 BIGCITY + \varepsilon \quad (5)$$

The natural logarithm has been calculated for all variables (except the dummy) so the coefficients will express elasticities.

Estimations and results

Ages 0-19

The results of the estimations are shown in tables 2-6. For the age-group 0-19 the coefficient for the dummy *industrial region* shows a positive value which is statistically separated from zero at the 5%-level in 1967 (see table 2); the coefficient for the accumulated stock of immigrants, *S*, is statistically separated from zero at a 5% level for the age group 0-19 in the model 1990b. The coefficient for *S* in model 2005a is statistically separated from zero at a 0.1%-level and at a 1%-level in model 2005b. All other coefficients are inconclusive.

Table 2. Immigrants aged 0-19 per 1000 inhabitants 1967-2005. t-stat within brackets.

	1967a	1967b	1975a	1975b	1990a	1990b	2005a	2005b
Constant	7,706 (,585)	10,913 (,635)	-12,426 (-,848)	-7,539 (-,448)	-10,211 (-,495)	-11,602 (-,573)	4,554 (,537)	6,066 (,666)
ln V_{t-1}	,335 (1,522)	-,011 (-,042)	,196 (,963)	,160 (,688)	-,140 (-,549)	-,156 (-,628)	,052 (,275)	-,012 (-,063)
ln U_{t-1}	-,475 (-1,871)	-,162 (-,637)	-,358 (-1,537)	-,328 (-1,277)	,069 (,180)	,114 (,311)	-,029 (-,120)	,064 (,271)
ln E_{t-1}	-,207 (-,836)	-,215 (-,694)	,164 (,716)	,094 (,362)	,179 (,458)	,200 (,522)	-,232 (-,839)	-,271 (-,922)
ln S_{t-1}					,465 (1,926)	,587* (2,184)	,855*** (4,086)	,769** (3,185)
Indreg	,605* (2,448)		,366 (,077)					
Refcentr					,164 (,579)		,253 (1,256)	
Bigcity		,412 (1,314)		,125 (,503)		-,271 (-,983)		,102 (,458)
Adj-R^2	,152	-,052	,259	,108	-,020	,020	,430	,379
D-W	2,055	1,585	2,348	1,906	2,332	2,338	1,593	1,896
d.f.	16	16	16	16	15	15	15	15

*** Statistically significant at 0.1%-level
** Statistically significant at 1%-level
* Statistically significant at 5%-level

The statistically significant results for the age group 0-19 show that this age group has settled down where previous immigrants have settled down. Hence, this indicates that this age group most likely is a group of tied movers. If, for instance, persons in their late teens immigrated to Sweden due to labour market pull factors, vacancies, *V*, ought to have shown coefficients that are statistically separated from zero. This is also shown by the low adjusted R^2-value; the negative value for the adjusted R^2-value indicates that the models are misspecified.[6] For tied-movers these results are expected.

Ages 20-34

The coefficients for the dummy *industrial region* show positive values for the age group 20-34 that are statistically separated from zero at the 1%-level in 1967 and at the 5%-level in 1975 (see table 3). The accumulated stock of immigrants, *S*, shows a coefficient which is statistically separated from zero at a 5%-level in 1990 for this age group.

6 According to Ramanathan (1995, 168) "a negative [adjusted R^2] indicates that the model does not describe the data-generating process adequately".

Table 3. Immigrants aged 20-34 per 1000 inhabitants 1967-2005. *t*-stat within brackets.

	1967a	**1967b**	**1975a**	**1975b**	**1990a**	**1990b**	**2005a**	**2005b**
Constant	5,060 (,342)	8,664 (,428)	-7,530 (-,465)	,896 (,045)	-19,313 (-,905)	-17,337 (-,792)	16,645 (1,858)	21,805** (2,968)
ln V_{t-1}	,380 (1,809)	-,011 (-,041)	,269 (1,406)	,213 (,903)	-,089 (-,398)	-,116 (-,515)	-,028 (-,166)	-,088 (-,653)
ln U_{t-1}	-,350 (-1,445)	,009 (,035)	-,348 (-1,589)	-,304 (-1,172)	-,045 (-,132)	,030 (,089)	-,122 (-,569)	-,220 (-1,360)
ln E_{t-1}	-,143 (-,606)	-,141 (-,456)	,064 (,298)	-,038 (-,144)	,292 (,854	,260 (,743)	-,533* (-2,155)	-,647** (-3,222)
ln S_{t-1}					,552* (2,616)	,573* (2,337)	,960*** (5,125)	,749*** (4,543)
Indreg	,699** (2,959)		,486* (2,669)					
Refcentr					,215 (,868)		-,031 (-,174)	
Bigcity		,455 (1,450)		,198 (,791)		-,054 (-,216)		,447** (2,946)
Adj-R^2	,227	-,057	,346	,091	,222	,185	,543	,710
D-W	1,837	1,305	2,056	1,468	2,013	1,918	1,644	1,774
d.f.	16	16	16	16	15	15	15	15

*** Statistically significant at 0.1%-level
** Statistically significant at 1%-level
* Statistically significant at 5%-level

For 2005 several coefficients are statistically separated from zero. The coefficient if employment, *E*, is negative and statistically separated from zero at a 5%-level in model 2005a and at a 1%-level in model 2005b. This result indicates that the lower employment rate in a region, the more immigrants aged 20-34. Some of the regions with many and large refugee centres have low employment rates. If the immigrants in this age group are refugees and are placed in the regions with refugee centres the dummy variable for refugee centres ought to have shown a coefficient which is statistically separated from zero; instead, the coefficient is inconclusive. A second possible explanation for the statistically significant coefficient for *E* may be that the share of international students is high in the age group 20-34; the regions with large and well-reputed universities also have low employment rates (students push the employment rate down).

The coefficient for BIGCITY in the 2005b model is statistically separated from zero at a 1%-level, indicating that the three metropolitan regions attracted immigrants, both returning Swedish citizens as well as foreign citizens. The coefficient for *S* in model is statistically separated from zero at a 0.1%-level in both model 2005a and 2005b. In other words, previous immigrants attract new immigrants.

Ages 35-49

For the age-group 35-49 the coefficient for the dummy INDREG shows a positive value which is statistically separated from zero at the 5%-level in model 1967a (see table 4). Since the adjusted R^2-value is low this model does not explain much. In the model 1975a none of the coefficients are statistically separated from zero, but the adjusted R^2-value is relatively high. Again, this model does not explain much for the initial settlement patterns of immigrants aged 35-49 in 1967 and 1975.

Table 4. Immigrants aged 35-49 per 1000 inhabitants 1967-2005. *t*-stat within brackets.

	1967a	1967b	1975a	1975b	1990a	1990b	2005a	2005b
Constant	5,415 (,335)	13,147 (,650)	-10,40 (-,612)	-2,893 (-,150)	-7,402 (-,452)	-7,206 (-,437)	,560 (,061)	5,115 (,627)
ln V $_{t-1}$	,357 (1,600)	-,018 (-,067)	,280 (1,436)	,227 (1,025)	-,172 (-,950)	-,187 (-1,042)	,132 (,664)	,090 (,535)
ln U $_{t-1}$	-,431 (-1,676)	-,123 (-,496)	-,408 (-1,829)	-,371 (-1,522)	,021 (,079)	,065 (,244)	,192 (,769)	,045 (,223)
ln E $_{t-1}$	-,162 (-,645)	-,227 (-,753)	,081 (,372)	-,007 (-,026)	,079 (,284)	,073 (,264)	-,117 (-,406)	-,229 (-,916)
ln S $_{t-1}$					,808*** (4,737)	,857*** (4,399)	,729** (3,355)	,525* (2,554)
Indreg	,578* (2,307)		,353 (1,899)					
Refcentr					,137 (,683)		-,136 (-,649)	
Bigcity		,497 (1,631)		,191 (,814)		-,111 (-,555)		,464* (2,454)
Adj-R^2	,129	,004	,319	,199	,491	,485	,385	,549
D-W	1,942	1,480	2,222	1,848	2,429	2,452	1,837	2,203
d.f.	16	16	16	16	15	15	15	15

*** Statistically significant at 0.1%-level
** Statistically significant at 1%-level
* Statistically significant at 5%-level

The differences in model 1990a and 1990b are very small. The coefficient for the accumulated stock of immigrants, *S*, is statistically separated from zero at a 0.1%-level in both models, the adjusted R^2-value is just below 0.5 in both models. The settlement patterns of this age group in 1990 can be explained by the accumulated stock of immigrants, *i.e*. previous immigrants attract new immigrants.

Ages 50-64

In the models 1967a, 1967b, 1975b, 2005a and 2005b none of the coefficients are statistically separated from zero for the age group 50-64. In model 1975a the coefficient for the employment rate, *E*, is positive and statistically separated from zero at a 5%-level. This would indicate that regions with high employment rates attracted immigrants aged 50-64 in 1975. The adjusted R^2-value shows that this model can explain just less than 15% of the variation of the regional initial settlement patterns for this age group.

Table 5. Immigrants aged 50-64 per 1000 inhabitants 1967-2005. *t*-stat within brackets.

	1967a	**1967b**	**1975a**	**1975b**	**1990a**	**1990b**	**2005a**	**2005b**
Constant	5,794 (,339)	14,267 (,697)	-44,934* (-2,303)	-37,652 (-1,814)	18,132 (,714)	20,527 (,783)	7,899 (,527)	12,218 (,822)
ln V $_{t-1}$	,235 (1,020)	-,079 (-,306)	,020 (,093)	-,038 (-,164)	,009 (,057)	-,013 (-,087)	,319 (1,401)	,308 (1,415)
ln U $_{t-1}$	-,535A (-2,014)	-,292 (-1,195)	-,009 (-,035)	,026 (,103)	-,250 (-1,092)	-,190 (-,837)	-,099 (-,344)	-,246 (-,945)
ln E $_{t-1}$	-,165 (-,636)	-,248 (-,834)	,530* (2,160)	,446 (1,725)	-,224 (-,968)	-,247 (-1,034)	-,277 (-,842)	-,353 (-1,092)
ln S $_{t-1}$					,873*** (6,109)	,899*** (5,366)	,469 (1,881)	,337 (1,271)
Indreg	,445 (,105)		,233 (1,120)					
Refcentr					,175 (1,041)		-,193 (-,803)	
Bigcity		,442 (1,470)		,211 (,857)		-,062 (-,359)		,332 (1,360)
Adj-R^2	,072	,031	,147	,120	,642	,620	,192	,250
D-W	2,483	2,359	2,496	2,490	2,269	2,122	1,580	1,548
d.f.	16	16	16	16	15	15	15	15

*** Statistically significant at 0.1%-level
** Statistically significant at 1%-level
* Statistically significant at 5%-level

The results for 1990 show that previous immigration attracts new immigrants; the coefficient for S is statistically separated from zero at a 0.1%-level in both models for 1990. The adjusted R^2 values show that this model explains more than 60% of the variation of the regional initial settlement patterns for this age group. Since the immigrants in 1990 were not dominated by labour immigrants, but refugees, the results for 1990 actually indicate that these immigrants were tied-movers to previous immigrants. Many of them were most likely also refugees.

Ages 65+

For the age group 65+ all models, except the models for 1990, do not have any coefficients that are statistically separated from zero. Furthermore, the adjusted R^2-value is very low, and even negative, which indicates that the models do not explain much of the variance in the initial settlement patterns of immigrants in this age group. Since persons aged 65+ years hardly immigrate to Sweden because of pull factors at the labour market, we assume that they are tied movers. If they are tied movers the obtained results in the models are expected.

Table 6. Immigrants aged 65+ per 1000 inhabitants 1967-2005. *t*-stat within brackets.

	1967a	1967b	1975a	1975b	1990a	1990b	2005a	2005b
Constant	-5,690 (-,491)	7,216 (,581)	-22,952 (-1,776)	-18,085 (-1,401)	9,105 (,278)	12,213 (,373)	2,276 (,116)	7,105 (,362)
ln V_{t-1}	,257 (1,001)	,035 (,136)	-,042 (-,175)	-,130 (-,550)	-,076 (-,445)	-,084 (-,498)	,245 (,983)	,197 (,822)
ln U_{t-1}	-,113 (-,382)	-,068 (-,280)	-,033 (-,121)	,005 (,020)	-,366 (-1,419)	-,346 (-1,390)	-,084 (-,269)	-,114 (-,398)
ln E_{t-1}	,019 (,066)	-,277 (-,934)	,413 (1,548)	,322 (1,218)	-,128 (-,487)	-,151 (-,577)	-,158 (-,439)	-,229 (-,643)
ln S_{t-1}					,752*** (4,656)	,719*** (3,930)	,505 (1,852)	,371 (1,269)
Indreg	-,008 (-,029)		-,076 (-,336)					
Refcentr					,047 (,248)		,044 (,168)	
Bigcity		,528 (1,764)		,330 (1,311)		,069 (,369)		,265 (,985)
Adj-R^2	-,150	,037	-,011	,081	,543	,546	, ,033	,090
D-W	2,251	2,483	2,693	2,700	1,973	2,104	1,782	1,952
d.f.	16	16	16	16	15	15	15	15

*** Statistically significant at 0.1%-level
** Statistically significant at 1%-level
* Statistically significant at 5%-level

The results for models 1990a and 1990b for the age group 65+ years are very similar to the results for the age group 50-64 years in 1990: the coefficient for the accumulated stock of immigrants, *S*, is statistically separated from zero at a 0.1%-level in both models for 1990. According to the adjusted R^2-value the models for the age group 65+ years explain about 55% of the variance in the initial settlement patterns of this age group. The most reasonable conclusion is that the accumulated stock of immigrants has attracted more immigrants aged 65+ and we can assume that this age group is dominated by tied-movers.

Concluding remarks

As have been shown above, almost no statistically significant coefficients were obtained in this study regarding the labour market variables. High unemployment rates *(U)* did not repel any age group in their initial regional settlement decision 1967-2005. With two exceptions, high employment rates *(E)* did not influence the immigrants by age when they settled down in Sweden for any of the studied years; the exceptions are 1975 for the age group 50-64 and 2005 for the age group 20-34. High vacancy rates *(V)* did not attract any age group in their initial regional settlement decision for any of the studied years. This implies that the labour market hypotheses (no 1-3) are not confirmed and other factors are more important concerning the immigrants' settlement patterns.

The metropolitan regions have attracted immigrants in the age groups 20-34 and 35-49 in 2005, but not for the other years. This might be a consequence of the abolishing of *Hela Sverige-strategin* that gave the immigrants free choice to settle down outside the refugee centres if they had social networks that guaranteed their living conditions. It is possible that these relations were more frequent among the age groups 20-34 and 35-49, age groups that are more willing to move than other groups. This confirm hypothesis no 4 at least for 2005. On the other hand, the dummy variable *refugee centre (REFCENT)* shows neither any result for the differing age groups that is statistically significant for the studied period. While Rauhut and Johansson (2010a) showed that some refugee groups had statistically significant coefficients for *refugee centre*, Rauhut and Johansson (2010b) did not find any significant differences regarding sex for *refugee centre*. In line with the findings in Rauhut and Johansson (2010b) it can be concluded that in an *age perspective* the initial settlement patterns may be inconclusive or irrelevant; as the refugees do not decide themselves where to settle, age differences in the settlement patterns cannot be expected. Consequently, hypothesis no 5 is not confirmed.

The coefficients for the *accumulated stock of immigrants (S)* are positive and statistically significant in most estimations during 1990 and 2005. The overall conclusion regarding the new immigrants' regional settlement patterns is that the amount of previous immigration and the stock of foreign-born people can be seen as a pull-factor. The findings confirm, thus, the well-known fact – hypothesis no 4 – that immigrants prefer to settle down in areas with a high share of earlier immigrants and foreign-born people. This seems especially to be the case in the active ages (20-49) but this seems to be the case even for tied-movers in the ages 0-19.

Due to the heterogeneity in the variable for the accumulated stock of immigrants *(S)* in 1967 and 1975 compared to *S* in 1990 and 2005 a dummy, *industrial regions (INDREG)*, was inserted into the models for 1967 and 1975. It was in the old industrial regions where blue-collar immigrant workers primarily were demanded 1967-1975 in relative terms, so this dummy variable enables us indirectly to control for the accumulated stock of immigrants. The dummy *industrial regions* show positive coefficients, which are statistically separated from zero in 1967 and 1975 for the age-groups 0-19, 20-34 and

35-49 years. Two remarks must, however, be made: (1) the models for 1967 actually explain very little of the variance of initial settlement patterns for all age-groups, and (2) a majority of the persons in the age-group 0-19 years can be assumed to be tied-movers. Besides that the age-group 20-34 years were attracted by industrial regions in 1975 it is difficult to detect any major age-specific differences in the initial settlement patterns for any age group. This finding confirms also hypothesis no 4. The conclusion regarding the impact of previous immigration on the initial regional settlement pattern is that of previous immigration matters. Previous immigrants had an impact on age groups in their initial regional settlement pattern in 1967–2005.

Although the existence of migration networks is very difficult to measure (Schoorl 1995, 6), a possible indicator for the presence of immigrant networks is the accumulated regional stock of foreign-born persons. Despite this, it can be assumed that if the accumulated regional stock of foreign-born persons is high and then the presence of immigrant networks something that will attract new immigrants (Åslund 2000).

This study indicates that the traditional neoclassical push-pull theories concerning labour market conditions seem, thus, to be of low relevance in explanation of the immigrants' initial settlement patterns and the factors behind it. This is not surprising as immigrants and especially refugees are not affected by economic conditions in the same way as natives and blue-collar workers from abroad. The labour market factors have almost negligible effects on the immigrants' settlement pattern. This implies that the traditional push- and pull-theories are of less relevance to explain the settlement pattern of immigrants today – at least concerning the initial settlement. Instead the network theory appears to have more explanatory power – as well as the segmented labour market theories regarding the initial settlement in Sweden. Whether this is a qualified guess or not is worth further and more in-depth research not only from a sociological approach but also from an economic and historical research approach.

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SOS Befolkningsförändringar del 3

SOS Befolkningsstatistik

SOS Folkmängd del 3

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