Immigration and regional unemployment rates

Case: Sweden

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ABSTRACT

The aim of this research is to examine the association between immigration and regional unemployment rates in Sweden. Taking a regional standpoint from the 290 municipalities in Sweden, the following research investigates what association immigration has had with regional unemployment rates in between 2004 and 2012, both the unemployment rate for immigrants and in general. The research question is therefore as follows: *What has the association between immigration and regional unemployment rates been for the time-period 2004 to 2012?*

The research is based on cross-sectional data from Sweden’s municipalities. The aim is to examine if immigration into the municipality, the change in average income or the change in higher education has had a positive or negative association with the change in regional unemployment rates for the time-period 2004-2012.

The research results indicate that immigration into the municipality, the change in average income and the change in higher education has had an association with regional unemployment rates in between 2004-2012. The results indicate that an increase in immigration into the municipality is associated with decreased regional unemployment rates and that the change in average income indicates a similar result, thus that an increase in average income is associated with reduced regional unemployment rates.

My research therefore concludes that immigration has had no negative association with regional unemployment rates, rather the opposite; a higher immigration has had a positive association with decreased regional unemployment rate.

*Keywords:* association, immigration, labour market, labour migration policies, average income, municipalities, regional unemployment rate for immigrants, regional unemployment rate in general.
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1. INTRODUCTION

The question of immigration has always been widely discussed and led to multiple conflicts throughout human history (BBC, 2010). The following question has been in the centre of the discussion: Has immigration a positive impact on countries or is it a burden countries cannot cope with? The question has received renewed interest since the Euro, in the aftermath of the financial crisis of 2008, put the entire EU at risk (BBC, 2010). Sweden followed many countries in EU in 2014 when they voted an anti-immigration party to be the third largest party in national parliament (BBC, 2014). Sverigedemokraterna (from now on referred to as the Swedish Democrats) claimed 49 out of the 349 seats in the Swedish parliament (BBC, 2014). Ever since their introduction into parliament in 2010, immigration as an issue has been discussed. Along with its counterparts all over Europe, the Swedish Democrats main argument is that immigration has a negative association with the national labour market, thus that immigration increase unemployment rates, and that a restriction therefore should be put on immigration (BBC 2010).

In the book Successful immigration, written by leading Swedish researchers (Carlson, Ekberg, Harzigeorgiou, Andersson Joona, Wadensjö, Klinthäll, Urban, Lundborg, Hagström and Bevelander), the position that immigration increase unemployment rates is questioned. The authors give a range of example as to why immigration is important socially, economically and culturally. In the EU they point out that the economic growth increased 0.27 % as a direct consequence of the extended mobility. The authors also highlight an example from the OECD where the immigration in between the members accounted for 39 % of the job creation (Sandelind & Ådahl, 2010). This is according to the authors due to the fact that immigrants in most cases are in a fit to work age and thereby are excellent complement to inhabitants in the respective country. The authors state that immigrants contribute with new knowledge, ideas and by often taking work inhabitants rejects.

Leading the development of labour market immigration are countries in the likes of the United States and Canada, defined as countries with high immigration and excellent economic growth (Sandahl et al., 2010). The immigration has in these countries spurred
economic growth. Georges J. Borjas (2013) investigates the following question “How do immigrants do in the U.S. labour market?” He concludes, along side Sandahl et al. (2010) that immigrants adapting well, can make a significant contribution to economic growth (Borjas, 2013, p. 331).

Alongside Sweden other countries in EU has experienced an anti-immigrant party in their parliament. In Denmark, the Danish People’s party is the third largest political party and in many ways a significant player in Danish politics (BBC, 2007). The party agree with the Swedish Democrats in stating that immigration has a negative effect on the unemployment rates in Denmark (Danish People’s Party, 2013). Research conducted by Troshchenkov in 2011 investigated the influence of immigration on the unemployment rate in Denmark and concluded that immigration had no determinable effect on the Danish labour market.

In 2008, Sweden put in place a new policy regarding labour migration. The aim was to increase both the opportunities to work in Sweden for labour workers outside EU, as well as the possibility for Swedish companies to recruit labour workers outside EU. It was reached between the four right-wing parties and the Green party (Miljöpartiet) after a proposition put forward by Sweden’s migration minister Tobias Billström (BBC, 2010). After the regulation Sweden was regarded as a more open labour market system than both Canada and the US. The regulation immediately increased the exogenous immigration to Sweden by nearly 8 %, comparing 2008 to 2009. The policy was put into new light during the spring of 2013, when the opposition leader Stefan Löfven openly criticised the policy and said it increases class segregation (DN, 2013).

The purpose of this research is to investigate what factors have had an association with regional unemployment rates in Sweden. I aim to examine if immigration, the change in average income and change in higher education in the municipality have had an association with regional unemployment rates, both for immigrants and in general. The aim is not to take a position regarding if immigration should decrease, increase or be kept constant, but instead to conclude what factors that are significant when investigating the association between immigration and regional unemployment rate, both for immigrants and in general. I have the following research question: What has the association between immigration and regional unemployment rates been for the time-period 2004 to 2012?
2. EMPIRICAL DISCUSSION AND THEORY

In this chapter I start off by highlighting recent empirical discussions on the association between immigration and labour markets, both from a Swedish and an International perspective, as well as both recent and historical development. Thereafter I will highlight relevant theory for the association between immigration and labour markets, and lastly summarize the chapter.

2.1 Swedish perspective

Jan Ekberg’s (2010) takes a historical perspective on regional differences in immigrants’ unemployment rates. The author describes that the unemployment rate among immigrants during the 50s, 60s and 70s were roughly on the same level as the entire labour force. After the 70s the unemployment rate for immigrants increased and reached its culm at almost 20 % in 1997. After 1997 the unemployment rate decreased to 8.5 % in 2000 (Jan Ekberg, 2010). The unemployment rate for immigrants is for 2012 at 16 % (SCB, 2013). Ekberg (2010) does not take a position on the desirable level of unemployment, but rather describe the development in unemployment rates for immigrants. Ekberg (2010, pp. 42-44) furthermore states that immigration has no significant effect on the unemployment rates for immigrants. Ekberg and Hammarstedt (2002), suggest a number of explanations as to why the unemployment rate among immigrants in Sweden has increased. (i) The Swedish labour market has developed from an industrial-based labour market to a service-based one, which has led to an increased demand for specific knowledge in the Swedish society (in terms of knowledge in written and spoken language and laws and regulations). (ii) The composition of immigrants has changed; immigrants coming to Sweden are from a previously small immigration group, which the authors argue has led to a discrimination of non-European immigrants, as pointed out by previous research done by Arai, Regner & Schröder (1999), and Grand & Szulkin (2000) and Rooth (2001) (Ekberg and Hammarstedt, 2002).

Hammarstedt and Ekberg (2002) also highlight, what they call faults in the integration policies in Sweden. For example that the responsibility to place immigrants was handed from the AMS (Arbetsförmedlingen) to the State immigration agency (Statens invandrarverk), which resulted in a prioritization of social integration instead of labour
market integration. The authors also examine “The whole Sweden strategy”, used under the 80s and 90s. The strategy’s main aim was to place immigrants throughout Sweden and lower the concentration of immigrants in one place, in order for the immigrants to adapt quicker to the Swedish society (Ekberg & Hammarstedt, 2002). In the end some municipalities therefore took many immigrants, and the placing was thereby not based on job opportunities. Edin, Fredriksson & Åslund (2000) concludes in their research that “The whole Sweden strategy” collectively was a failure and that it only increased the unemployment rate for immigrants.

Ekberg (2010) also compares regional differences in unemployment amongst immigrants. The region western Småland is named as a place with successful labour market integration while the Malmö/Landskrona region with high unemployment for immigrants is looked at as an example of failed labour market integration. The unemployment in the big city regions Göteborg, Stockholm and Malmö is compared to small-entrepreneur districts and Sweden as a whole (2002, research done by SCB, p. 50). The research concludes large differences, where the small-entrepreneur districts have higher unemployment for immigrants. The research highlights a few reasons for the large differences. The first one is, along Ekberg and Hammarstedts (2002) conclusions, that more specific knowledge in the Swedish society is required in the small-entrepreneur districts, and that the lack of knowledge hinder immigrants in the big city regions. Ekberg (2010) comments this by stating that the explanations given in the research are relevant, but at the same time not explanatory for the whole differences among regions. Ekberg (2010) concludes by saying that more research is necessary to fully explain the regional differences in the unemployment rate for immigrants (Ekberg, 2010).

2.2 USA perspective

From an International perspective the common example has been to look at the US as both a successful and unsuccessful example of labour market integration for immigrants. Various articles have been conducted by using US as a basis. Correa (2012) is one author that investigates the current state in the immigration into the US, the increase in immigration from Latin America and how development is likely to proceed. The author argues that immigration is positive for the US from many aspects, especially from a labour market perspective.
David Card (1990) describes in the article “The impact of the Mariel boatlift on the Miami labour market” a particular event in US history where a high immigration rate in Miami had virtually no effect on the unemployment rate. In his article Card (1990, p. 245) starts off by stating that one of the chief concerns of immigration policy-makers is the extent to which immigrants depress the labour market opportunities of less-skilled natives. He mentions that despite that the common presumption is that an inflow of immigrants substantially reduces native wages, existing empirical studies at the time suggests that the effect is small. Card (1990) lists the following researches: Greenwood & McDowell (1986), Grossman (1982), Borjas (1987) and Lalonde & Topel (1987). In these four studies, there are two leading explanations for this finding. (i) Immigrants have overall only slightly lower working skills in comparison to the native population. (ii) The choice of location for the immigrants is in largely based on the expected supply of labour market opportunities, thus areas with low unemployment attract immigrants. They stress that a natural experiment with an exogenous increase in supply of immigrants to a particular labour market is needed.

“The impact of the Mariel boatlift on the Miami labour market” is such an experiment. Card (1990) uses the four articles to form his own research in which he investigates the experiences in the Miami labour market in the aftermath of the Mariel Boatlift. From May to September 1980 around 120,000 to 125,000 Cuban immigrants arrived in Miami on chartered boats. The background to the arrival was Fidel Castro’s unexpected statement on the 20th of April where he declared that all Cubans wishing to immigrate to the US were free to leave form the port of Mariel. Of the 125,000 Cubans who left, fifty percent permanently settled in Miami. Of which 45,000 were added to the Miami labour force, an increase of 7 % and a 20 % increase among Cuban workers in Miami. Card’s (1990) paper summarizes the effects of the Mariel boatlift by trying to measure changes in wages and unemployment rates for less-skilled workers in the Miami labour market. As a basis for his analyse Card uses micro-data ranging from 1979-1985. The relevant data is taken from the Current Population Survey (CPS). The CPS is a statistical survey that among other things provides a monthly report on the employment situation in the United States. The United States Census Bureau carries out the survey on assignment
from the Bureau of Labour Statistics (BLS). Card (1990) states three main reasons for the use of the CPS statistics. (1) The sample from the Miami area is large, on average 1200 individuals per month. (2) Comprehensive data just before the Mariel boatlift is available. (3) Cubans are separately identifiable in the CPS. It is in other words possible for Card to measure the effects on the Miami labour market for the two groups separately immigrants and natives, both in terms of wages and unemployment rates.

Miami was ahead of the Mariel boatlift the most immigrant intensive region in the entire country, with 35.5% being foreign-born. The national average was at the time 6.1%. Of the 35.5% foreign-born residents 56% were Cubans. Card highlights the characteristics, in terms of education and occupation for the four groups of investigation in the Miami labour force in 1979: white non-Hispanics; black non-Hispanics; Cubans (foreign-born and native-born); and other Hispanics.

**THE MARIEL BOATLIFT**

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*Notes: White and black groups exclude Hispanics. Hispanic group includes all Hispanics other than Cubans. Less-skilled service workers include cleaning and food service workers. More-skilled service workers include health service, personal service, and protective service workers.*

*Source: Based on samples of employed workers in the outgoing rotation groups of the Current Population Survey in 1979.*

**Table 1.** The investigated population in Card’s research.

Source: Card (1990)

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At the time of the Mariel boatlift observers describes an increase in the homicide rate of roughly 50% (As referred to in Card: Wilbanks 1984:142). An incident that caused national attention was the three-day riot in May 1980 killing 13. An investigation sponsored by the government concluded that one cause of the riots was the intense labour market competition. As a whole the unemployment rate in Miami rose from 5% in April to 7.1% in July, the effect followed the national average and it can thereby not be solely as an effect of the Mariel immigration. On the other hand was the perception that, due to joblessness among less-skilled natives the Mariel immigration had a negative effect on the unemployment rate in Miami. Card analyses the effect on wages, expressed in real earnings, as a consequence of the Mariel immigration and presents that the CPS data provides no evidence of a negative impact on real earnings. The wage for whites was actually kept constant in contrast to the general decline in real earnings experienced on a national level. When it comes to unemployment rates the general conclusion is the same as for wages. It is thus no evidence that the Mariel immigration had an effect on the unemployment rate for either whites or blacks. The decline in the employment rate for blacks was instead due to a cyclical downturn. The unemployment rate for Cubans shows an opposed situation where the unemployment rate in Miami increased with 3 percentages above what was to be expected on the basis of earlier research. Card describes that this easily could be the result of the addition of people to the Cuban population (Card (1990)).
Table 2. Unemployment rates during the years of Card’s investigation.

Source: Card (1990)

David Card summarizes his findings by stating that the immigration in connection with the Mariel boatlift had no essential effect on the wages or employment of non-Cubans working in the Miami labour market. He also states, as his second conclusion that the immigration had no strong effect on the real earnings wages of other Cubans. In his ending discussion he tries to answer the question, derived from his conclusions of: How the Miami labour market absorbed a 7% increase in the labour force? One answer is that the Mariel immigrants might have offsets other immigrants who otherwise would have moved to Miami had the boatlift not occurred. Card (1990) is able to prove this fact by presenting that Miami had a 1.4% increase as the time of the boatlift and the rest of Florida an average increase of 3.4%. As Cards puts it “The greater slowdown in Miami suggest that the Boatlift may have actually held back long-run population growth in Miami”. In conclusion Card (1990) states that his research regarding the experiences from the Miami labour market in the aftermath of the Mariel Boatlift provides a natural experiment when evaluating immigrants effect on the native labour force and the local labour market.
David Cards article “The impact of the Mariel boatlift on the Miami labour market” works as a basis for my research. I want to investigate what affect the policy regarding labour migration, put into place in 2008, has had for the unemployment rate for immigrants and inhabitants in Sweden. I want to do so by, in accordance with Card, compare and measure the association as difference in between the years of comparison. Card uses 1979 and 1984 as the basis for his article and builds his discussion around the differences in between the years. For my research I want to compare 2004 and 2012, in order to spot differences and investigate what association the new policy, as one source of variation, has had on my model analysing regional differences in unemployment for immigrants. According to Cards article I can assume that some regional labour markets might be unaffected with an increase in the labour force. Cards (1990) research laid the ground for further investigation, moving away from the common assumption that immigration has a negative association on the local labour market. As a follow-up, David Card (2005) analyses in his article “Is the new immigration really so bad?” data from 2000 Census and conclude that immigration had no effect on real wages or unemployment rates.

2.3 Theory

In terms of theory there are, in particular theories from a microeconomic perspective, whom investigate the labour market from an individual perspective. Although my research takes a regional perspective in explaining a general pattern, it is in my opinion relevant to include theories from the labour workers perspective.

Björklund, Holmlund & Wadensjö present in their book, “The labour market” (Arbetsmarknaden) a number of discrimination theories, and describes that there are a lot of research indicating that some individuals have difficulty in acquiring employment, although these individuals are as qualified as the rest of the labour workers. The authors give an explanation to the preference discrimination theory, and describe three different types (Björklund et al., 2006, pp. 147-148): (i) Employer discrimination, which means that the employer does not hire a particular labour worker because she belongs to a certain social group. (ii) Employee discrimination arises when employees of a particular employer do not want to work with individuals from a certain social group, making the company not hiring those individuals belonging to that social
group. (iii) Consumer discrimination is when the consumers do no want to buy or do business with the company, if they have employees of that certain social group (Björklund et al., 2006, pp. 147-148). Another discrimination theory, as highlighted by Björklund et al. (2006, pp. 150-151), is the statistical discrimination, which relates to the fact that employers find it costly to gather information for particular workers, and the employer therefore rejects these individuals ahead of labour workers who have a statistically high productivity.

Calvó-Armentol & Jackson (2004, p. 2) put forward another explanation stating that the more people one has in ones network, the greater are the chances of being hired. The theory is based on the argument that networking leads to jobs. Individuals in a network where the majority is employed have a increased probability of being employed. The authors bring up the example of the insider- and outsider-theory where individuals with good networks (often natives) have high probabilities of being employed, whereas outsiders (often, immigrants) have a low probability due to the fact that less peoples are employed.

2.4 Summary empirical discussion and theory

There have been numerous researches investigating the association between immigration and all aspects of society, in particular the association with the labour market and the unemployment rate. In my research I intend to connect Card (1990) and the authors discussion regarding what effect an increase in immigration, the Mariel boatlift, has had on the regional labour market in Miami. In this research the increase in immigration is, opposed to Card (1990), not solely investigated as due to a single labour migration policy. The labour migration policy from 2008 is in this research only one possible explanation for the variation in immigration between 2004-2012. As this research not aim to measure the effect of immigration, but instead the association between immigration and regional unemployment rates, this research is inadequate to draw causality conclusions. This research measures the association between immigration and the change in regional unemployment rate for both immigrants and in general.

In the Analysis chapter I discuss how the empirical results relates to the theories highlighted in the above chapter.
3. DATA

In the following chapter I discuss the variables I have chosen for the three regressions. First I describe my data collection, after which I describe the dependent variables and finally a detailed description of the independent variables used for the three regressions.

I have used data from secondary sources. Data has been collected from SCB (Statistiska Central Byrån), Kommun och Landstingsdatabasen (Kolada) and Valmyndigheten, which all are accessible online. (In English: Statistics Sweden, Municipality - and County Council database and the Swedish Election authority.)

3.1. Dependent variables

As a basis for the research I have three regressions, and three dependent variables: (i) The change in the regional unemployment for immigrants as a change in percent between 2004-2012, (ii) the change in regional unemployment in general measured as a change in percent in between 2004-2012 and lastly (iii) the change in average income for the municipality. For the change in unemployment amongst immigrants I follow SCB’s definition and define immigrant as all people not born in Sweden (SCB, 2013). An important note to take into consideration is that this can include both an immigrant from outside Europe as well as a neighbouring country. As stated, the geographical and social familiarity makes them having totally different opportunities to adapt in the Swedish labour market (Björklund et al. 2006). In my research I realize that this is a broad spectrum, but my research is concerned with the differences in the change in general unemployment amongst immigrants, and not differences between immigrant groups. I calculate the regional unemployment rate for immigrants and in general, as a change between 2004 and 2012.

2 www.scb.se  
3 www.kolada.se  
4 www.val.se
3.2. Independent variables

The independent variables are different factors that I consider have had an association with the change in regional unemployment rates. The data is a measure of the change between 2004-2012. Below follows a detailed description of the three independent variables. For two independent variables I have used respective logarithm in order to measure the relative change. Studenmund (2011, pp. 217-220) states that the logarithm is a perfect tool when analysing movements in dependent variable that measure changes expressed in percent.

3.2.1 Immigration

The data set for immigration was collected from the publicly available SCB. I withdrew data of immigration for each of the 290 municipalities as real number for 2004 and 2012, and calculated the logarithm for each. For example, Umeå had an immigration of 11 531 people in 2004-2012, which expressed, as a logarithm equals 9.35. As mentioned I used the logarithm in order to more accurately measure the relative change in immigration between the municipalities. Indirectly the variable also measures the change in number of immigrants, since it measures the total change in between 2004-2012. My research aim is to investigate the association between immigration on regional unemployment rates and answers the following question: What has the association between immigration and regional unemployment rates been for the time-period 2004-2012, both for immigrants and in general?

3.2.2 Change in average income

I want to investigate the association between average income and the change in regional unemployment rates. Card (1990) suggests that the common economic argument is that unemployment rates should increase when the average income decreases. Card (1990) also reasons that average income decrease with an increase in exogenous immigration. In my data collection I took real numbers from SCB, in order to measure the change in average income, and transferred the data into its respective logarithm. The data taken as real numbers from SCB are inflation-adjusted, as to withdraw the decrease in the value of money. To illustrate the variable we can again look at Umeå municipality where the average income changed from an annual of 205 000 SEK in 2008 to 228 800 SEK in 2012, the difference is an increase of 23 800 SEK. The difference between 2004 and
2008 is an increase of 36 010 SEK. The logarithm of 23 800 is 10.07 and the logarithm is 10.49 for 36 010. The numbers included in the variable is therefore 10.07 for 2004 and 10.49. Both numbers are included for the regressions when measuring the change in unemployment rates for immigrants and in general. SCB (2013) provides evidence in favour of a continuous income increase between 2004 and 2012 and I will therefore have no problem with negative numbers in the variable. For the third regression model I have the change in average income as the dependent variable in order to examine the association between immigration and average income in the municipality. The variable aim to answer the following questions: Has the change in average income had an association with the unemployment rate for immigrants and in general?

3.2.3 Change in higher education 2004-2012

The data set for higher education was collected from the publicly available SCB. I withdrew data measuring higher education as a percentage of the total population in the municipality, and measured the change in between 2004 and 2012. For example, Växjö had a higher education as a percentage of the total population of 39.9 % in 2004, and 45.6 % in 2012. This example generates therefore a variable for Växjö municipality of 5.7 %. The variable aim to answer the following questions: Has the change in higher education in the municipality had a positive or negative association with unemployment rates for immigrants and in general?

3.2.4 Initial value of the dependent variables in 2004

In order to offset any other association than the change in between 2004-2012, I included an independent variable measuring the initial value of the dependent variable. I do not want the dependent variables and the regression models to be influenced by the initial value of the dependent variable. The aim is, on the contrary to examine the association between regional unemployment rates in general and for immigrants, as well as the change in average income as a change in between 2004-2012. I have therefore included the initial value of the dependent variable for all three regressions.
4. EMPIRICAL MODEL

In the upcoming chapter I explain my empirical models, and how it relates to the research question.

In order to investigate what association immigration has had on regional unemployment rates I take three regressions into account. All three regressions use the same empirical model. The first two investigate what association immigration has had with regional unemployment rates, for immigrants and in general. The third model examine whether immigration has had an association with average income in the municipality. For all three models a standardized regression model is applied, and \( Y_1, Z_1 \) and \( Q_1 \) are the dependent variables, which is the change in regional unemployment rate for immigrants and in general between 2004-2012 as well as the change in average income 2004-2012. In all three regressions I include the dependent variables initial value in 2004. This is done in order to offset eventual associations other than the change of the dependent variables in between 2004-2012. This is expressed with parameter \( \beta_4 \) in the first two regressions, and as \( \beta_3 \) in the third. \( \beta_0, \beta_1, \beta_2 \) and \( \beta_3 \) are parameters that are estimated for the regressions.

4.1 The change in regional unemployment rates for immigrants

The first regression model tests if immigration; the change in average income and the change in higher education have had an association with the change in regional unemployment rate for immigrants, 2004-2012.

\[
Y_1 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon_i
\]

Explanation
\( Y_1 = \) Change in regional unemployment rates for immigrants 2004-2012
\( X_1 = \) Immigration 2004-2012
\( X_2 = \) Change in average income 2004-2012
\( X_3 = \) Change in higher education 2004-2012
\( X_4 = \) Regional unemployment for immigrants 2004
\( \varepsilon_i = \) Error term

4.2 The change in regional unemployment rates in general
The second regression tests if immigration; the change in average income and higher education have had an association with the change in regional unemployment rate in general in between 2004 and 2012.

\[ Z_1 = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon_i \]

**Explanation**
- \( Z_1 \): Change in regional unemployment rates in general 2004-2012
- \( X_1 \): Immigration 2004-2012
- \( X_2 \): Change in average income 2004-2012
- \( X_3 \): Change in higher education 2004-2012
- \( X_4 \): Regional unemployment rates in general 2004
- \( \epsilon_i \): Error term

### 4.3 The change in average income

In the third regression I test the association between immigration and the change in average income. I want to examine what association immigration and the change in higher education 2004-2012, has had with the change in average income in between 2004-2012.

The empirical model is estimated according to the following:

\[ Q_1 = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \epsilon_i \]

**Explanation**
- \( Q_1 \): Change in average income 2004-2012
- \( X_1 \): Immigration 2004-2012
- \( X_2 \): Change in higher education 2004-2012
- \( X_3 \): Average income 2004
- \( \epsilon_i \): Error term

### 4.4 Choice of empirical model

I apply the OLS-model, which is one of the most commonly used models for regression estimates (Studenmund, 2011, p. 35). The OLS-model estimates coefficients for the selected independent variables so that the sum of the squared residuals is minimized. The model yields the most accurate estimate given that seven assumptions hold (Studenmund, 2011, p. 35). Of those seven, the three commonly tested for are multicorrelation, serial correlation and heteroskedacity (Studenmund, 2011, p. 93-101).
(i) Serial correlation arises in time-series data and since my research only uses cross-sectional data, this is not a concern for me. (ii) Multicollinearity describes a situation in which two or more independent variables are highly correlated, where one is when the variables explain the exact same movement in the dependent variable, and a value below 0.8 is, according to Studenmund (2011, p. 258), in most cases considered as indicating low and acceptable value. Studenmund (2011, p. 258) also emphasis that a VIF-value under 4 is considered acceptable for multicollinearity. (iii) Heteroskedacity is when the variances of the error term for a regression differ. It is often present in cross-sectional data, and I will therefore include relevant testing in my research.

In the empirical model I have chosen the data for all three regressions expressed in terms of the change in between 2004-2012. I have included the initial value of the dependent variable in order to offset the possible impact of the initial value in the regressions. By including the initial value of the dependent variable, the results from all three regressions only measure the change in between 2004-2012. The use of logarithm is done, in accordance with Studenmund (2011), in order to minimize the absolute differences in the data. This is relevant since there are wide gaps in between municipalities in terms of absolute numbers, for example in the data for the absolute change in immigration.

In SPSS, using the OLS-model I can test the independent variables to conclude which ones, with a statistical significance, have an association with the dependent variable. A statistical significance is often referred to as a significance level of 5 %, which in other words means that one can conclude with a 95% accuracy that a specific independent variable have an affect on the dependent variable (Studenmund, 2011, pp. 133-134). In order to determine the significance level one looks for values in the t-distribution corresponding to different significance levels. Alongside previous research and commonly used techniques, I will use a 95 % confidence level, corresponding to a 0.05 significance level.

According to Studenmund (2001, p. 140) the decision rule is the t-value for which you make a decision to reject or accept a null hypothesis. Researchers compare the decision rule with relevant number in the t-distribution, and make a decision of whether to accept
or reject the null hypotheses. For my research I look for a t-value above or below ±1.960.

4.5 Criticism of empirical model

In order for the OLS-model to yield the most accurate results it is, as mentioned above, necessary that the seven assumptions hold. If one or more of the seven assumptions do not hold, the OLS-model will not yield the most accurate results. In my research I have no reason to believe that the serial correlation will have an impact on my regression, since I use cross-sectional, not time-series data where serial correlation is most common (Studenmund, 2011 pp. 304-305). In order to detect heteroskedasicy and multicollinearity I include relevant tests in my regression, followed by a discussion on how the two have been circumvented. For the heteroskedasicy I plot the unstandardized residuals squared against the independent variables and look for signs commonly present in heteroskedasicy, as for the multicorrelation I will discuss the results derived from the OLS-model and more specifically the Pearson plot for correlation and discuss the independent variables relative correlation to each other.

In my research I am not, in opposite to Card (1990), able to draw conclusions of whether immigration has a positive or negative effect on regional unemployment rates. It is not possible in my research to investigate the causality relation between immigration and regional unemployment rates. This is due to two factors. The first one is that there could be a tendency of immigrants to move to geographical areas where there are job opportunities, or move to municipalities with establish communities. Secondly it could also be other factors explaining the change in regional unemployment rates 2004-2012, for example growth in the general economy, job creation and legislative easing. In my research I can only therefore conclude whether there is a positive or negative association between immigration and regional unemployment rates.
5. EMPIRICAL RESULTS

In this chapter I present the three regressions results. As mentioned I have conducted three regressions: (i) Regression measuring the association between immigration and the change in the unemployment rate for immigrants. (ii) Regression measuring the association between immigration and the change in the unemployment rate in general. (iii) Regression measuring if the change in average income has had an association with immigration. The aim with this chapter is to provide results that lay the ground for my analysis.

5.1 Initial comments

The purpose of this research is to answer if there is an association between immigration and regional unemployment rates. The aim is also to investigate if average income has had an association with the change in regional unemployment rates. The research question is: What has the association between immigration and regional unemployment rates been for the time-period 2004 to 2012?

At first impression the independent variables in the first regression model: immigration, change in average income and change in higher education were all significant at the 95% confidence level, indicating that I am able to analyse and facilitate conclusions for the first regression. The second regression measured the same independent variables against the change in regional unemployment rate in general. At first impression the results indicated that all variables, the change in average income, immigration and the change in higher education proved to be statistically significant. In the third regression all independent variables proved to be associated with the change in average income.

5.2 The change in regional unemployment rate for immigrants

In connection to theory and empirical evidence, both in Sweden and internationally, I expected the first regressions independent variables to indicate statistical significance and explain the dependent variable. Following established supply and demand reasoning (Samuelson, 1983) I could expect immigration to have a negative association with unemployment rates. Immigration increases the supply of the labour force, which makes a higher employment level necessary in order to keep the unemployment level constant,
most likely resulting in a higher unemployment. As highlighted in chapter 2, Card (1990) and Calvó-Armengol & Jackson (2004) argues the opposite, that immigration in fact has no negative effect, rather a positive effect on regional unemployment rates. As this research only investigate association between immigration and unemployment rates, it is also possible that the association is explained by other factors not covered in this research, for example that immigrants want to move to municipalities with low unemployment rates. These factors can contribute to an increased positive association between immigration and unemployment rates, and thereby influence the results. These contradicting arguments made my expectation for the first regression two-folded.

<table>
<thead>
<tr>
<th>Dependent variable: Change in unemployment rate for immigrants 2004-2012</th>
<th>Overall test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explanatory variables</td>
<td>Coefficients</td>
</tr>
<tr>
<td>Immigration 2004-2012</td>
<td>-0.272</td>
</tr>
<tr>
<td>Change in aver. income 2004-2012</td>
<td>-1.088</td>
</tr>
<tr>
<td>Change in higher edu. 2004-2012</td>
<td>-1.428</td>
</tr>
<tr>
<td>Unemp. rate immi. 2004</td>
<td>6.351</td>
</tr>
<tr>
<td>R-square</td>
<td>0.375</td>
</tr>
<tr>
<td>df</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Change in unemployment rate for immigrants
Source: Created by the author (2013)

The summarizing output for the first regression is presented in Table 3. The R-square value is 0.375, which in accordance with Studenmund (2011) and previous research is regarded as a relatively high explanatory value, thus stating that my independent variables cover 0.375 of the movement in the change in unemployment rate for immigrants. In accordance with my overall expectations, the explanatory variables showed a significant relation to the change in regional unemployment rate for immigrants.

Immigration had a negative coefficient indicating that a higher immigration level corresponds to a lower unemployment rate for immigrants, concluded at the 95% confidence interval. As mentioned in section 4.5, the results should not be discussed as the effect of immigration on regional unemployment rates, but instead the association
between immigration and regional unemployment rates. A higher immigration into a municipality with a relatively high number of immigrants could be a contributing factor to a lower unemployment rate. Thus, immigration into municipalities in which immigrants have established communities where they help each other find job. Another contributing factor could be that immigrants choose municipality based on job opportunities. This could, as mentioned above, be another source of variation.

The change in average income showed a statically influence on the dependent variable with a negative coefficient, indicating that the change in average income has had a positive association on unemployment rate for immigrants. Thus, a relatively high increase in the change in average income corresponds to a decrease in the change in unemployment rate for immigrants. In reverse interpreted as lower average income increases the unemployment amongst immigrants. In figure 1 I have plotted the change in average income to the change in unemployment rate for immigrants:

![Figure 1](image)

**Figure 1.** Independent variable – Change in average income.

Source: Created by the author (2013)

The change in higher education also had a negative coefficient, which is interpreted as the higher the change in higher education, the lower the unemployment rates.
The distribution of my dependent variable, the change in unemployment rate for immigrants, follows a normal distribution, as presented below:

![Distribution of the change in unemployment rate for immigrants.](image)

**Figure 2.** Distribution of the change in the unemployment rate for immigrants.

Source: Created by the author (2013)

5.2 The change in regional unemployment rate in general

For the second regression, measuring the association between immigration and the general unemployment rate, I expected immigration to have a negative association with regional unemployment rates. Thus, I expected that a high immigration would correspond to an increase in the general unemployment rate. The change in average income, would in my view have a positive impact on the unemployment rate, an increase in average income would correspond to a decrease in unemployment rates. I expected the change in higher education to have a positive impact on the unemployment rates, thus a higher education in the municipality corresponds to a lower level of unemployment rate. This because a higher education level often corresponds to an increase in municipality employment (Jan Ekberg, 2010).
Dependent variable: Change in unemployment rate in general 2004-2012

<table>
<thead>
<tr>
<th>Overall test</th>
<th>Coefficients</th>
<th>t-stat</th>
<th>Sig.level</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textit{Explanatory variables}</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immigration 2004-2012</td>
<td>-0.111</td>
<td>-2.107</td>
<td>0.036</td>
</tr>
<tr>
<td>Change in ave. income 2004-2012</td>
<td>-1.814</td>
<td>-8.262</td>
<td>0.000</td>
</tr>
<tr>
<td>Change in higher edu. 2004-2012</td>
<td>-3.133</td>
<td>-5.752</td>
<td>0.000</td>
</tr>
<tr>
<td>Unemp. rate gene. 2004</td>
<td>7.551</td>
<td>0.542</td>
<td>0.441</td>
</tr>
<tr>
<td>R-square</td>
<td></td>
<td>0.341</td>
<td></td>
</tr>
<tr>
<td>df</td>
<td></td>
<td></td>
<td>579</td>
</tr>
</tbody>
</table>

\textbf{Table 4.} Change in unemployment rate in general

Source: Created by the author (2013)

The first impression for the second regression was that the three independent variables had a statistical significance. Immigration had a negative coefficient of -0.111, indicating that an increase in immigration is associated with decreased unemployment rates in general. The coefficient of -0.111 can be interpreted as the effect the independent variable, immigration 2004-2012, have on the dependent variable, the change in unemployment rate in general 2004-2012. The change in average income had a negative coefficient of -1.814, also indicating that the variable has had a positive association with the unemployment rate in general, thus a higher change in average income in the municipality corresponds to a lower unemployment rate. As discussed in the first regression the association could be a factor of immigrants choosing a municipality based on, for example, job opportunities and personal network.

The change in higher education had a positive association with the general unemployment rate, indicating that the higher the change in education, the lower regional unemployment rate. The R-square value is 0.341, indicating that the overall explanatory my independent variables have on the dependent, is relatively high. This is not of high importance since the aim not is to explain all movement in the dependent variable.
5.3 The change in average income

For the third regression the aim was to measure what independent variables has had an association with the change in average income in the municipality. In particular I wanted to investigate if the independent variable, immigration, had an association with the dependent variable, the change in average income. I expected, in contrast to Cards (1990) reasoning, that the higher the immigration the lower the increase in average income, thus that a higher immigration leads to a lower average income. Card (1990) could however in his research point to the fact that this necessarily not is the case, an increase in immigration do not necessarily correspond to a decrease in average income. The prominent economic argument (Samuelson, 1983) is however that the higher the supply of labour workers, higher immigration, the lower the wage paid by the employers since supply exceeds demand. However, if immigrants move to municipalities with increasing average income, this could be a factor of association.
From the results for the third regression I can conclude that there is an association between the change in average income and immigration. The results generated a positive coefficient indicating that immigration has a positive impact on the change in average income, thus a higher immigration correspond to a higher change in average income. It should however be stated that the corresponding connection between average income and unemployment rates could be reversed, thus that the lower the unemployment rates the higher the average income since more people are actually working. For results see Table 5 below:

<table>
<thead>
<tr>
<th>Dependent variable: Change in average income 2004-2012</th>
<th>Overall test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explanatory variables</td>
<td>Coefficients</td>
</tr>
<tr>
<td>Immigration 2004-2012</td>
<td>0.058</td>
</tr>
<tr>
<td>Change in higher edu. 2004-2012</td>
<td>2.702</td>
</tr>
<tr>
<td>Ave.income in 2004</td>
<td>8.431</td>
</tr>
<tr>
<td>R-square</td>
<td>0.241</td>
</tr>
<tr>
<td>df</td>
<td></td>
</tr>
</tbody>
</table>

Table 5. Average income to immigration.
Source: Created by the author (2013)
Although the existence of some outliers contributes to significant results, the plot below can be interpreted as the larger increase in immigration the higher the change in average income:

![Figure 4. Average income to immigration](source: Created by the author (2013))

### 5.5 Empirical summary

Summarizing my empirical results I can present that immigration has an overall positive association with the unemployment rate both for immigrants and in general, a higher immigration corresponds to a lower unemployment rate. There are differences between regional unemployment for immigrants and in general, but in summary they correspond the same result, that immigration has a positive association with unemployment rates both in general and for immigrants. As discussed in all three sections above, the results should be discussed in terms of associations between the variables, because the variables can have a mutual effect on each other and that there are other sources of variation between the variables.

The change in average income had a positive association with general unemployment rates. It had a positive association with the overall regression measuring the
unemployment rate amongst immigrants. The change in higher education had a positive association with both the regional unemployment rates for immigrants and in general.

5.6 Classical assumptions

As stated the OLS-model yields the most accurate results if the seven classical assumptions holds, according to Studenmund (2011, pp. 93-101). I described that the three most common ones are serial correlation, multicollinearity and heteroskedasticity. Studenmund (2011, pp. 93-101) states that serial correlation often exists in time-series data, and as I use cross-sectional data, the potential problem of serial correlation is of no concern. As for multicollinearity I have, as highlighted, (see Empirical model), looked for values above 0.8 in the Pearson correlations output in SPSS, and none of my independent variables coincide above 0.6. In terms of heteroskedasticity I have plotted the unstandardized residuals of my independent variables, and none is subject to the problem om heteroskedasticity (see Appendix I).
6. ANALYSIS

In the following chapter I compare the empirical results with previous research and spot both differences and similarities. In particular I highlight similarities with Cards (1990) research and investigate if our conclusions coincide.

In 2008, Sweden had a new labour migration policy put into place. It allowed for immigrants outside of EU to easier come to Sweden to work. The aim was to increase immigrants’ possibility to work, and Swedish companies’ possibility to employ. The policy had a positive outcome; it increased immigration into Sweden, but at the same time increased the pressure on municipalities and their regional labour markets. The aim with this research was to investigate whether immigration, in particular the labour migration policy has had an association with regional labour markets. As noted throughout this research, the labour migration policy from 2008 is however only one source of variation and this should be taken into account when reviewing the results. The aim was in particular to investigate what the association has been between immigration and regional unemployment rates in the municipalities, and look for a general pattern of association between immigration and unemployment.

In this research I am able to state that immigration has had a positive association with regional unemployment rates, between 2004 and 2012. A higher immigration corresponds to a lower unemployment rate, both for immigrants and in general. For the change in average income I am able to describe a general pattern in which an increase in the average income yields a decrease in unemployment rates, thus a positive association. For the change in higher education my research presents evidence stating that the unemployment rates are lower in those municipalities that have seen an increase in higher education.

In relation to previous research, the results go in line with Troshchenkov’s (2011) research. The authors’ research stated that immigration had no negative effect on the of unemployment rates. In my research I can take the results one step further than Troshchenkov (2011), by stating that immigration, not only has no negative association, it actually has a positive association with unemployment rates.

The results also follow Jan Ekberg’s (2010) reasoning by concluding that immigration has no negative association with unemployment rate for immigrants. In terms of Ekberg
and Hammarstedt (2002) explanations for why unemployment rates for immigrants has increased the results indicate that the authors reasoning is ever present. The discrimination theories that Björklund et al. ´s (2006) presents are in many ways relevant to this research since they shed light on why there is a difference between general unemployment and unemployment for immigrants. This research does not highlight such differences, although we do know it exists, but in the overall context it is of most importance to note this fact. This research lastly indicate that Calvó-Armengol & Jackson (2004) argument that the more people in ones network, the higher likelihood of being hired, might hold. The results show that municipalities with higher immigration have lower unemployment rates.

In accordance with Card´s (1990) reasoning I looked for a general pattern of association in measuring the association with one particular event, the enhanced labour migration policy from 2008. It should be noted that this research only uses the labour migration policy as one source for the variation in immigration. Alongside Card (1990) I can present empirical evidence that immigration in fact have no negative association with regional unemployment rates, that the change in average income in fact is higher for those municipalities with a substantial immigration and that the increase in immigration has had no negative association with regional labour markets.

In order to graphically illustrate the findings I have plotted the independent variable immigration against the change in unemployment rate, both for immigrants and in general:
Figure 5. The association between immigration and regional unemployment rates for immigrants.
Source: Created by the author (2013)

Figure 6. The association between immigration and regional unemployment rates in general.
Source: Created by the author (2013)
7. CONCLUSIONS

What has the association between immigration and regional unemployment rates been for the time-period 2004 to 2012?

The purpose with this research was to investigate what association there has been between immigration and regional unemployment rates, both for immigrants and in general. The research aimed to go along previous research in concluding whether or not the enhanced labour migration policy from 2008 has had an association with regional unemployment rates in Sweden. I furthermore wanted to examine if the differences in average income amongst the municipalities was associated with regional unemployment rates. In my research I am able to draw three conclusions:

- Immigration has a positive association with regional unemployment rates, both for immigrants and in general. \textit{Higher immigration corresponds to a decrease in unemployment rates.} \\
- Average income has a positive association with unemployment rates. \textit{An increase in average income decreases the unemployment rates.} \\
- A higher education in the municipality corresponds to lower unemployment rates, both in general and for immigrants.

7.1 Recommendations for further research

In order to investigate what the entire association between immigration and the labour market in Sweden is, a recommendation for further research is to include municipality specific variables. This research aim was to examine general patterns in the regional labour market, and was not set out to investigate factors specific for each municipality. One example could be to include an independent variable for municipalities with a historically high immigration level, in the likes of Södertälje municipality. This in order for the research to further asses what association immigration has had the regional labour market. Another recommendation could be to distinct different immigrants, for example distinguishes between immigrants from outside Europe and those from neighbouring countries. As previous research indicate, municipalities with a high number of immigrants from Finland, in contrast to Iraq would probably have a lower unemployment amongst immigrants, since the adaption into the Swedish society is of less hassle.
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Published literature


Articles


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**Websites**


Testing for heteroskedasticity by plotting the unstandardized residuals to the independent variables. In the following plots there are no signs of heteroskedasticity.