School of Economics and Management
Lund University
Department of Economics
M. Sc. Thesis 10p

Ethnic Intergenerational Transmission of Human Capital in Sweden

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October 2006

Abstract

The thesis examines the intergenerational transmission of three outcome variables between different ethnic groups of first and second generation immigrants in Sweden. The outcome variables studied are income, education and employment. Aggregated data is used to study the differences in the outcome variables between groups. Significant for all the outcome variables is a high level of transmission from the first generation immigrants to the second generation immigrants. As much as 56 percent of the difference in income between different ethnic groups is shown to be transmitted to the next generation.

The estimated results also show that the groups of first generation immigrants on average suffer a significant disadvantage in both income and the rate of employment compared to the native Swedes. Because of the high intergenerational transmission of human capital these disadvantages persist also among the groups of second generation immigrants. When examining education as outcome variable the picture is different. The groups of first generation immigrants on average have an educational advantage compared to the native Swedes. A lower ethnic intergenerational transmission makes much of this advantage disappear in the groups of second generation immigrants.

Keywords: Immigrants, Transmission, Human Capital, Ethnic Capital

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1. Introduction

The assumption of a parent influencing the future decisions and choices of his child is not controversial. But to what degree he influences the future of his child is not as easy to answer. As an assumption there may also be differences in the influence because of - for instance - age, sex and origin of the parent.

This thesis examines if there is such an influence from the parent to his child. More explicitly, the focus is on immigrants in Sweden and their children. While the previous research on intergenerational effects among natives or the general population in different countries is extensive, not so much research focuses on immigrants. According to the theory of George Borjas (1992) it is not only influence from the parents that is of importance when studying intergenerational transmission among immigrants. Also the average characteristics in the immigrant's group of origin, called ethnic capital, affects the future outcome. If excluding ethnic capital, when examining the intergenerational transmission among immigrants, there is a risk of underestimating the true transmission.

Immigrants in Sweden generally have lower incomes than the natives have. The reasons for the income gap may be many, language skills, cultural and social factors and also discrimination. The existence of an intergenerational transmission will then probably mean that also the immigrants' children have a lower income level than the average in the country. If there is no substantial influence from the first generation of immigrants, their children will catch up to the same income level as the children of the natives. But the income disadvantage is more likely to persist also in the generation or generations following the second generation immigrants.

Previous studies show that there is a significant transmission among the Swedish citizens. (see e.g. Björklund and Jäntti, 1997.) Hammarstedt and Palme (2006) have made one previous study on the intergenerational transmission among immigrants in Sweden. Their results are surprising, as they do not find any regression towards the mean. Instead they find divergence over the generations. The results of Hammarstedt and Palme justify the study in this thesis, as more information and evidence on such a result would be of interest.

1.1 Aim

The aim of the thesis is to examine the intergenerational transmission of human capital between different ethnic groups in Sweden. The paper focuses on the transmission between groups of first and second generation male immigrants. The aim is to examine the transmission of three different outcome variables, income, education and employment. As far as possible some extensions will be made.

1.2 Method and Material

The method used in the thesis is regression analysis on aggregated data. The data consist of two data sets of first generation immigrants and one data set of second generation immigrants. The initially large data sets are aggregated with respect to the origin of the first generation immigrants. An initial ordinary least squares regression estimates the age-adjusted differences in the outcome variables compared to the level of native Swedes. The age-adjusted differences in the outcome variable between the groups are used in the next regression to estimate the ethnic intergenerational transmission.

1.3 Restrictions

As the empirical results in this thesis are based on aggregated data, the regression analysis does not provide separately estimated effects for the parental and ethnic capital. The discussion of this issue will instead be based on results from previous studies. Furthermore, the thesis only examines the transmission between first and second generation male immigrants and not female immigrants.

1.4 Structure of Thesis

This thesis is structured as follows. In chapter 2 a short background on immigration to Sweden during the twentieth century is given. The theoretical underpinnings for the study and specification for aggregated data follow in chapter 3 and 4. In chapter 5 specific information and adjustments of the examined data sets are presented. This is followed by a summary of some previous studies in chapter 6. The empirical results are given in chapter 7, and finally followed by discussion and conclusions in chapter 8.

2. Background

The empirical results of this thesis are much influenced by the characteristics of the immigration to Sweden during the twentieth century. A short background on the immigration to Sweden during the last century will thus be of importance.

2.1 Immigration to Sweden during the Twentieth Century

The main reasons for migration to Sweden have changed over the last century. The immigrant flow depends mainly on the situation outside Sweden, but also the domestic situation and government policies are of importance. During the twentieth century immigration to Sweden has been an important factor, especially in the labour supply, but also a factor in formation of institutions and policies. The immigration to Sweden has during the century consisted of three main types of immigration. The first type, labour immigration, has been the biggest share, especially in the middle of the twentieth century. Until 1967 there was very few restrictions on the labour immigration. The second type, refugee immigration, has increased in the latter part of the twentieth century. There has in Sweden generally been a wider interpretation of who is a refugee immigrant than what was established in the 1951 Geneva Convention. Although in 1989 the first attempts to restrict the refugee immigration was made. The last and in Sweden important share of immigrants are so-called, tied movers. The tied movers are granted a visa, if they are close relatives, such as husband or wife, to a Swedish resident or have other special ties with Sweden. While at times there have been restrictions on the labour and refugee migration, the possibility for tied movers to qualify for a permanent visa in Sweden has not been much affected. (Rooth 1999)

In the beginning of the century Sweden was a net emigration country. This picture changed during the 1930s, although the immigration to Sweden during this decade was greater than the emigration from Sweden by just a small amount. The small immigration to Sweden in the early decades of the twentieth century was mainly caused by a restrictive policy towards immigrants with origins outside the Nordic countries. Sweden being relatively unharmed from the Second World War had an economic expansion and the need for labour in Sweden rose. The labour shortage, a less restrictive immigration policy and the unstable world situation, mainly in Europe, generated a great expansion of immigrants in the 1940s. The number of immigrants to Sweden more than tripled in the 1940s, compared to the 1930s, resulting in almost 200,000 immigrants during the latter decade. The main source of migration was still

the Nordic countries, but also a great number of immigrants originated in the Baltic States. (Rooth 1999)

When the economic expansion continued during the 1950s the labour shortage in Sweden called for more labour immigration. Several Swedish changes of policy in the early fifties, but also international agreements and common policies interacted and led to a continued growth of the immigration to Sweden. The focus of the agreements was on both Nordic immigrants and non-Nordic immigrants. This opened for an expanded immigration from several countries, especially labour immigration from Mediterranean countries. This increase from non-Nordic countries continued in the 1960s but the Nordic Countries were still the greatest single group of the total immigrant flow, in the 1960s exceeding 400,000 individuals. To reduce the growing part of labour immigrants from non-Nordic countries, changes in immigration policies were yet again agreed upon in the late 1960s. Before arriving in Sweden immigrants, except from the Nordic countries, now had to have arranged visa, employment and housing. Despite the policy changes, there was a new peak of immigrants in 1969 and 1970 mainly due to the economic recession in Finland. The effects of the policy change on the labour market immigration could not really be seen until the 1970s, when it was revealed by an economic recession also in Sweden. Still, the total number of immigrants did not decline by a great amount. While the share of labour market immigrants decreased, another part of the total immigrant flow increased - the refugee immigrants. Several ethnical conflicts, domestic wars and political reasons caused the growing number of refugee immigrants. During the 1970s there were also the first signs of an increasing share of non-European immigrants, which so far had been of marginal magnitude. The trend towards an increasing share of non-European immigrants continued until the early 1990s, when the ratio of European immigrants as well as the total number of European immigrants rose rapidly. Even though the ratio of immigrants from Europe increased again in the 1990s, this time a greater part were refugee immigrants compared to the earlier European immigrants mainly being labour immigrants. The main reason was the civil war in former Yugoslavia. (Rooth 1999)

2.2 Definition of Immigrants

The thesis mainly concerns two different types of immigrants, first and second generation immigrants. The definition of first generation immigrants commonly used, and also used in this thesis, is all individuals born abroad who are living in Sweden. Individuals born in Sweden, but with one, or both, parents born abroad, are defined as second generation

immigrants. Based on the data examined in this study the father of the second generation immigrant is always a first generation immigrant. Still, in some cases also the mother is a first generation immigrant. (Rooth, 1999)

3. Theory

The economic theory on intergenerational transmission among immigrants has its origin in the works of Becker and Tomes (1979). These works are based on crucial assumptions of utility maximisation of the parents, but also on assumptions of the family's endowments and market luck of the children. These assumptions give the possibility to formulate a model of intergenerational mobility. Solon (1992) later corrected this model. His biggest contribution was to correct from measurement errors that the previous models suffered from. As shown below, Borjas (1992) developed a model based on these theories that had the possibility to account for the special conditions among immigrants.

3.1 Intergenerational Mobility

To assess how an outcome variable of interest relates over generations, a frequently used and simple model evaluates the relationship over two periods of time. The outcome variable of interest, such as income, education or employment, is denoted by y, and is the only variable, except from the error term, in the regression that affects the outcome. The outcome of the child in the second time period, t+1, depends on the outcome variable of the parent in period t, both measured from the generation mean.

(1) $\qquad y_{i,t+1} = \delta \, y_{i,t} + \varepsilon_{i\,t}$

The model makes it possible to see the strength of the relationship over the two generations, or in other words how much of the outcome variable that is transmitted from the parent to the child. The value of δ, the coefficient of intergenerational transmission, contains the information about the transmission. The coefficient states how much of the parental outcome variable that is transmitted to the next generation. The error term captures all the other sources not transmitted from the parents' outcome variable, which affect the outcome of the children. According to theory and empirical findings the coefficient of intergenerational mobility takes a value between one and zero. While a coefficient equal to one means that the positions are upheld over the generations, a value equal to zero obviously means that there is no correlation. A coefficient greater than one would mean that any differences from the average in the society in the parent generation is enhanced in the second generation. On the other hand a negative coefficient would mean that any advantage in the first generation compared to the

average of the society would be turned to a disadvantage in the second generation. When the coefficient δ, as theory predicts takes a value between one and zero, the higher the value is, the greater the transmission is. For instance a value of 0.2 on the coefficient implies that, on average, 20 percent of the advantage or disadvantage of the parent is transmitted to the children in the next generation. A higher value implies a higher intergenerational transmission of the outcome variables.

The concept is quite often also considered from another point of view. Then the coefficient, yet the same, is said to measure the mobility between generations. Consequently, a higher value means less mobility and a lower value higher mobility. The issue is only conceptual but important to keep in mind when studying the topic.

3.2 Becker & Tomes, Intergenerational Transmission of Human Capital

The theoretical underpinning of equation (1) is based on the theories of Becker and Tomes (1979), who model the underlying mechanisms causing the relationship of intergenerational transmissions. In a family with only one child, the parent may decrease his own present consumption, Z_t, in order to invest in his child's human capital and adult wealth, I_{t+1}. The reason for the parent to invest in his child is that he cares for the adult wealth of his child. On the other hand, to be able to invest in the future wealth of his child, the parent has to decrease his own consumption. This choice can be written as:

(2) $U_t = U_t(Z_t, I_{t+1})$

Equation (2) states the utility function of the parent in generation t, where U_t is the utility of the parent. In the first time period, t, he can consume by himself, Z_t. The other option is to abstain from consumption and make investments in his child's human and non-human capital leading to the adult wealth of the child in the next generation, I_{t+1}. The maximisation of the parent's utility function is subject to his wealth, I_t. The parent's budget equation is:

(3) $Z_t + \Pi_t\, y_t = I_t$

where $I_{t+1} = \Pi_t\, y_t$. Thus the consumption of the parent in generation t, and the total amount of investment in the child, y_t, in physical units of foregone consumption times the price of such

unit, Π_t, is subject to the parent's wealth in generation t. If the parent chooses a higher level of consumption this consequently means less possibility of investment in the adult wealth of the child.

But in addition to the wealth created by the parents' investment, the wealth of the child is also assumed to depend on his market luck in income, u_{t+1}, and the endowment inherited from the parent, e_{t+1}.

The endowed capital is a crucial assumption in the model. The endowments are assumed to depend only on the characteristics of the parent. The endowments from the parent's characteristics include for instance the connections of the family, but also the genetic endowments (ability) inherited from the parents.

By including market luck and endowments, beside investments from the parent, the future wealth of the child will be a function of the three parts, investments in the child, endowments and market luck:

(4) $I_{t+1} = f(y_t, e_{t+1}, u_{t+1})$

This means that the maximisation problem of the parent will be expanded to also take into account the child's endowment and market luck. While the parent can be assumed to have good knowledge of the child's endowment, which probably will be revealed early in the child's life prior to investments in the human capital of the child are made, little is expected to be known about the market luck of the child.

It can however be shown (Becker and Tomes 1979, p. 1159) that an increase in the income of the parent will not yield an equal increase in the income of the child, as an increasing part of the parent income will be spent on own consumption.

Thus higher earnings for a specific individual will, (under the assumption of convex utility functions,) lead to higher investments in the children's human capital. From the Becker and Tomes model follows as well an unequal distribution of the children's income, even if the parents are basically identical. The effects of the endowments and the market luck cause this. But obviously the luck of the parent generation is also of importance, as a higher income in the parent generation, yields higher investments in the child. Because of the positive return to investments in education, this gives persistence in the educational attainment over generations of a family, as parents with higher education generally have higher incomes and a greater possibility of investing in the children's education.

3.3 Solon

The process of transmission as shown in model (1) has been, and still is, the foundation to empirical investigations of intergenerational effects. Solon (see for instance, Solon 1992) did show how much of the early empirical work was biased or based on unrepresentative samples. One of the problems identified and illuminated by Solon was that many studies were based on too few or too early observations of the individuals in the first generation. This causes a downward bias in the estimates of δ, i.e. in the size of intergenerational transmission, as it is not a good estimate of the long-run status.

Solon also gave more specific criticisms to some works and showed the effects of homogenous samples, which also caused a downward bias. Non-random samples had been used in many of the empirical studies, which caused a bias, most likely to underestimate the transmissions.

3.4 Borjas and Ethnic Capital

Based on the theories of Becker and Tomes, George J. Borjas (1992) introduced a new concept and economic term, generally called ethnic capital, to expand the theories to apply to immigrants. The concept was to some extent inspired by e.g. Coleman's (1988) earlier studies in sociology. Coleman points out the importance of a social capital that affects the behaviour and labour market outcomes of individuals. The effects of social capital originate in the behaviour, culture and characteristics of the group that the individual belongs to.

Borjas examines the utility maximisation of a one-person household in period t that gains utility only from their own consumption, Z_t and the human capital stock of the child, I_{t+1}, as stated in equation (2). Borjas incorporates the ethnic capital in the analysis by assuming that the importance of the average human capital stock of an ethnic group in period t, $\bar{I}_t$, as an externality affects the production of human capital, within the ethnic group. The production function for the child's future human capital stock is then a function of two different inputs. The first input is the parent's human capital stock, I_t, and the second input is the average human capital stock of the ethnic group that the immigrant belongs to, $\bar{I}_t$, or in other words the ethnic capital:

(5) $\quad\quad\quad I_{t+1} = f(I_t , \bar{I}_t)$

Borjas points out some important implications of the production function. The ethnic capital, $\bar{I}_t$, affects the future outcome as an externality. Thus, children from an ethnic group with high ethnic capital, ceteris paribus, will be exposed to factors that make them more productive in their formation of the future human capital stock. These factors can be of economic, social and cultural kind. But also the amount of the exposure, of these factors, is important for the future human capital stock of the child. (Borjas 1992, p 126)

Finally, the ethnic capital may cause a much slower regression towards the mean across generations. High values of the ethnic capital may prevent the regular convergence because of the external effect. (Borjas 1992, p 129)

4. Specification for Aggregated Data

Based on Borjas' theories, the ethnic capital of different groups is empirically estimated as the average value of an outcome variable in an ethnic group, $\bar{y}_{j,t}$. The different ethnic groups are denoted by j. By including the ethnic capital of different ethnic groups in the econometric model (1), it is extended to:

$$(6) \qquad y_{i,t+1} = \alpha_1 + \beta_1 y_{ij,t} + \beta_2 \bar{y}_{j,t} + v_{ij}$$

Thus not only the link between parent and child is important in the estimation, also the ethnic capital influences the outcome. One important finding is that if the ethnic capital actually has a major influence in the estimations of intergenerational effects, equation (1) heavily underestimates the mobility. By mathematical substitution equation (6) can be redefined from the individual level to an aggregated level.[1]

$$(7) \qquad \bar{y}_{j,t+1} = \alpha_1 + \beta \bar{y}_{j,t} + \tau_{jt}$$

The error term, τ_{jt}, is i.i.d. with zero mean and variance σ^2. Thus by rewriting the equation into an aggregated level, Solon's first objection about the unrepresentative sample does not cause biases. In other words, much of the individual fluctuation, that on the individual level has to be adjusted by numerous observations over time, disappears at the aggregated level. Since the characteristics are measured as deviations from the mean, the variation is assumed to have zero mean. Cross-sectional data, observations at only one point of time, is then enough not to cause bias in the estimation of model (7). Yet, Solon's second objection, measurement errors causing downward biases, may still be present. Equation (7) is the specification that will be estimated for the different outcome variables in this thesis.

By comparing model (6) and (7) some important implications can be made. The two regressions will estimate the same intercept term, or constant α_1. The sum of β_1 and β_2 generates the coefficient of transmission of the latter model, β. The coefficient β is defined as the ethnic intergenerational coefficient. The interpretation of β and the error term, τ_{jt}, is similar to the presentation of the coefficient of intergenerational transmission in chapter 3.1, although the ethnic intergenerational coefficient here is based on aggregated data and includes

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[1] See Appendix A.1

the ethnic capital in the analysis. The value of β shows to what extent human capital, on average, will be transmitted from first generation immigrants to the second generation of immigrants. But β does not only include the importance of the parental capital but also that of ethnic capital.

The coefficient α_1 is of economic interest as it, if taking a positive value, can be interpreted as the average improvement of the characteristics for the children, or the second generation. A negative value on the coefficient α_1, depicts a deterioration in the second generation compared to the average level of the parents.

By reformulating the intergenerational effects from individual data to aggregated data, much of the problems with cross-sectional data can be neglected. As well, as can be seen from equation (7), no biological or direct link between the father and son is necessary, as the individual data has been transformed into aggregated data. On the other hand, some information is lost, as the possibility to separate the effects from the parental and the ethnic capital disappears, when examining the aggregated data.

4.1 Age-adjustment and Deviations from Native Mean

To be able to estimate equation (7), estimations of the average deviation from the Swedish mean, for the outcome variable of interest, has to be done. This is done for both the first and second generation immigrants separately, prior to the estimation of model (7), by the regression:

$$(8) \qquad y_{ij} = \alpha_0 + \sum_{j=1}^{n_{EG}} \overline{y}_j \sum_{j=1}^{n_{EG}} EG_j + \lambda X_{ij}$$

where X_{ij} is a vector including dummy variables for each separate age group included in the data sets. This is done to adjust for differences in the raw data that can be explained by the various composition of ages and the age effects are captured by λ. EG_j is a vector of dummy variables that contains information on which ethnic group, j, the individual belongs to. The group of native Swedes is not included in the vector EG_j and the level of the native Swedes' outcome variable is thus captured by α_0. The outcome variable is summed over the number of ethnic groups n. The age-adjusted differences of the ethnic groups in the outcome variable

will then be captured by the estimated $\overline{y}_j$. These age-adjusted differences are used in equation (7) to get the result on the ethnic intergenerational transmission for each outcome variable separately.

5. Data

Examined in the thesis are two different data sets of first generation immigrants. The first data set is based on a biological link between the two generations. The second does not contain a natural link between the generations, but is constructed as an artificial parent generation. For the second generation immigrants there is only one data set included. Examined throughout the thesis are three different outcome variables, income, education and employment.

5.1 Definition of Data

The thesis examines data on male immigrants and second generation male immigrants in Sweden. The data on second generation immigrants consists of all male children, aged 24-39, of male immigrants in Sweden 2003. For every son in the data set there is also data on their biological fathers from 1980. As a reference group also native Swedish fathers and sons are included in the data sets. Totally the data sets consists of 774,611 fathers and sons. From the 1980 data set only fathers in the ages 20 to 60 are examined, as they are likely to be active on the labour market, during the year examined.

In the thesis also another data set, from 1985, is used for the groups of first generation immigrants and native Swedes. This data set, including all male immigrants and native Swedes aged 24-51, consists of in total 1,613,894 individuals. While the 1980 and 2003 data contain a direct link between the fathers and sons, there is no such link between the 1985 and 2003 samples. Logically, as the 1985 data includes all individuals in the chosen age group, the individuals in the 1985 data set need not be fathers at all. As was shown in chapter 4 such a link is not necessary for the empirical estimations. But as it is likely that there are differences in individual characteristics in the data sets, for instance of who becomes a father or not, a greater focus on the 1980 data set of first generation immigrants is reasonable.

Table 1. Descriptive summary of the data

	Explanation
First generation immigrants 1980 data set	Foreign born fathers, in the age between 20 and 60 in 1980, of the sons included in the 2003 data set.
Comparison group 1980 data set	All male Swedish born individuals aged between 20 and 60 in 1980, with a son in the 2003 data set and a Swedish born spouse.
Birth year for first generation immigrants 1980 data set	1920-1960
First generation immigrants 1985 data set	All foreign born men aged between 24 and 51 in 1985.
Comparison group 1985 data set	All men born in Sweden aged between 24 and 51 in 1985.
Birth year for first generation immigrants 1985 data set	1934-1961
Second generation immigrants 2003 data set	All sons, born in Sweden, of a first generation male immigrant. Aged between 24 and 39 in 2003.
Comparison group 2003 data set	All sons aged between 24 and 39 in 2003, with two parents born in Sweden.
Birth year for second generation immigrants 2003 data set	1964-1979

In table 2 the immigrants have been grouped according to the origin of the fathers. The data only allows making definitions of ethnic groups based on the country, or region, of origin. It would have been preferable to have more information on the background or ethnic group of the immigrants. But by using countries, or regions, of origin the characteristics of the individuals should be similar, as they generally share language and culture. Countries with more than 100 immigrants in Sweden are considered large enough to form their own group. Immigrants from countries with fewer than 100 individuals are, with respect to their origin, sorted into bigger regions, Western Europe, Eastern Europe, Southern Europe, Latin America, Africa, Asia and the Middle East. Thus these regions do not include the individuals from countries situated in these regions, that are separately represented in the data.

Table 2. Number of individuals from each country or region and average ages

	Country or region of origin	Number of individuals in 1980 and 2003 data sets	Number of individuals with Swedish mother 2003	Number of individuals with foreign mother 2003	Number of individuals 1985 data set	Average Age First Generation 1980	Average Age First Generation 1985	Average Age Second generation 2003
1	Denmark	5315	3797	1518	9555	41.2	39.5	32.5
2	Finland	27141	10428	16713	65927	37.8	37.8	31.8
3	Norway	3709	2869	840	7077	40.9	38.5	32.6
4	Iceland	102	56	46	873	37.9	34.0	30.1
5	France	450	376	74	1136	40.0	36.7	30.1
6	Holland	616	490	126	1025	41.8	39.3	32.7
7	Great Britain	1124	937	187	3758	37.9	36.3	30.5
8	Germany	5954	4729	1225	9037	40.3	41.4	32.5
9	Austria	1492	1163	329	2338	39.6	40.2	32.2
10	Western Europe	390	322	68	969	41.5	37.1	32.7
11	Bulgaria	172	89	83	406	39.8	39.6	30.1
12	Estonia	1499	1138	361	1634	44.6	45.9	34.0
13	Poland	1168	477	691	5693	39.4	36.2	30.0
14	Romania	184	105	79	947	41.2	38.1	31.1
15	Soviet Union	440	188	252	751	44.6	41.8	32.9
16	Czechoslovakia	800	393	407	2032	40.3	39.4	31.1
17	Hungary	2189	1300	889	4643	41.4	41.0	32.3
18	Eastern Europe	254	185	69	266	45.6	45.3	33.5
19	Greece	2348	835	1513	5993	37.9	37.2	30.0
20	Italy	1663	1262	401	2496	40.4	39.9	32.1
21	Yugoslavia	7112	1970	5142	14654	37.4	39.0	30.5
22	Portugal	297	152	145	950	37.4	37.1	29.9
23	Spain	1038	755	283	2103	38.2	37.7	31.0
24	Southern Europe	494	117	377	335	37.3	35.4	30.2
25	United States	785	704	81	2330	41.2	35.5	31.8
26	Canada	107	96	11	303	42.6	33.5	32.5
27	Chile	280	98	182	3314	32.9	35.4	26.4
28	Latin America	662	431	231	3820	37.3	35.5	29.2
29	Morocco	409	251	158	1242	37.3	36.4	29.4
30	Africa	1243	950	293	5604	37.3	34.9	29.1
31	India	303	183	120	1151	39.2	36.4	29.8
32	Pakistan	130	69	61	744	34.9	34.8	27.8
33	Asia	496	317	179	4356	38.2	35.2	29.3
34	Iran	187	124	63	4272	36.3	31.0	28.7
35	Palestine	169	79	90	260	36.6	40.6	28.6
36	Turkey	1818	362	1456	5802	33.9	34.0	27.8
37	Middle East	574	261	313	4555	35.6	32.2	28.3

The largest separate group of immigrants is – not surprisingly – originating from Finland. The labour emigration during the twentieth century from Finland to Sweden has been extensive, because of the economic and political situations in the countries, but also because of the unrestrictive possibility of migration between the two countries. Also the labour migration from the other Nordic countries has been of a great magnitude during the twentieth century and they represent a large share of the immigrants in Sweden, arriving prior to 1980 and 1985. Of the total number of 73,114 immigrants in the 1980 and 2003 data set, only a small share of

9.8 percent originates from outside Europe. For the 182,351 immigrants in the 1985 data set, this share has risen to 20.7 percent. This may be because of the increase of non-European immigrants, mainly refugee immigrants, during the 1970s and 1980s, but may to some extent also be caused by the different definitions of immigrants included in the data sets. As the average age of the non-European groups of immigrants generally is lower compared to the European groups of immigrants, they may not yet have had a child, but may become fathers in the future. This means that the non-European immigrants to a greater extent will be included in the 1985 data set compared to the 1980 data set.

5.2 Outcome variables

For each of the three data sets there are also three different outcome variables examined. The outcome variables of interest are income, education and employment. The definitions of the outcome variables, as well as necessary adjustments, are presented below.

5.2.1 Income

The data on the annual income in the three data sets are obtained from each relevant year. To adjust for inflation the annual incomes have been transformed to 2005 prices, using the consumer price index. (www.scb.se) The annual earnings are based only on earnings from the labour market and not for instance earnings from capital or social assistance. After adjusting for inflation, the incomes have been transformed into logarithmic values. This gives the opportunity to easily interpret the differences in income as percentage differences. It also means that individuals with an income equal to zero, during the year of interest, will not be examined in the regressions. Instead they are treated as missing values, in order not to have any impact on the estimations undertaken.

The income is only observed during the latest year for each separate data set. The aggregated data in the estimations allows the use of single observations for the individuals without underestimation in the empirical results.

5.2.2 Education

All three data sets include information on the educational level of the individuals. The two data sets on first generation immigrants have information from the old SUN-code from the

National Education Register. The old SUN-code does not provide the exact years of schooling for each individual. Instead it only shows the highest level of education obtained. To minimise these measurement errors the education data for the first generation immigrants has been estimated to the average years of schooling for each level of education. The estimates on average years of schooling are obtained from Meghir and Palme. (1999, p. 14.)

The data set on education among second generation immigrants is based on the new SUN-code from the National Education Register. The new SUN-code contains information on the exact years of schooling. Thus no estimation of the average years of schooling for each individual has been done.

5.2.3 Employment

The 1985 and 2003 data sets contain direct information on employment. The individuals are classified according to whether or not they have worked in the third week of November in the relevant year. The amount of hours worked is not examined or answered, any shorter or longer employment will mean that they have been classified as employed.

As the 1980 data set does not contain direct information of employment, other means of examining employment have been undertaken. To make this estimate, the individuals with an annual income above a certain level are considered employed, and the individuals who do not exceed the level are considered unemployed. The income level examined is set to 100,000 SEK in 2005 price level. The value of 100,000 SEK is set to define individuals with only shorter employment as unemployed. To make the regression possible the same procedure has been made for the 2003 data set of second generation immigrants. With respect to the possibility of comparing the two data sets of first generation immigrants, equivalent definitions have also been made for the 1985 data set.

The outcome variable of employment is defined to equal the value one if a person is employed. An unemployed individual equals the value of zero in the outcome variable in the individual data. At an aggregated level, when the outcome variable of employment is summed into different groups it then takes a value between one and zero, showing the ratio of employed individuals in the group.

6. Previous Studies

Although many studies have examined the intergenerational mobility of citizens in different countries, the extent of research on immigrants is scarce. The main author on intergenerational effects among immigrants is George Borjas, with several articles researching the relationship in a variety of ways. The most common outcome variable studied is earnings, since the availability of data regarding this outcome variable often is more extensive and easily accessible.

6.1 Summary of Studies on Intergenerational Transmission

Miles Corak (2006) makes an extensive summary and analysis of previous studies on intergenerational earnings mobility in some rich countries. Corak also tries to make the diverse results comparable between the countries. The reason for undertaking such a study is that empirical results on intergenerational transmission tend to vary not only between countries, caused by a variety of governmental policies in the countries and other reasons, but also tend to vary within the countries. The methodology and data used by researchers and scientists may differ immensely and cause great differences in the findings, also within countries. For instance the findings in the United States vary between approximately 0.1 and 0.6. Corak thus tries to establish a more general way to examine and interpret earlier findings within the field. Much of the concerns raised by Corak, which he seeks to abolish, are based on the measurement problems and underestimation of parental earnings as pointed out by Solon (1992). The other measurement problem, as pointed out by Corak, is the age of the parents when incomes are obtained. More specifically Corak prefers the age of fathers, or the average age of fathers, to be between 40 and 45 years of age when the data is obtained. Studies using such restrictions are given a greater impact on the preferred estimates by Corak. To correct for measurement errors regarding the underestimation of parental earnings, longitudinal data is much preferred, but Corak stresses that this can be taken into account by being aware of the measurement problem.

As earlier mentioned the majority of studies undertaken in the field of intergenerational transmissions focus only on the relationship between fathers and sons. Thus also Corak focuses on the male relationship in order to maximize the number of previous studies. The most numerous previous studies are made on US data. Corak uses the US studies to derive a model that based on the average years of the fathers' age, the number of longitudinal

observations and an indicator of when instrumental variables (IV) are used, will generate a more comparable estimate.

Table 3   Intergenerational transmissions of earnings for cross country comparisons

Country	Estimates for cross country comparisons			
	Preferred	Lower Bound	Upper Bound	Number of studies
Denmark	0.15	0.13	0.16	1
Norway	0.17	0.15	0.19	2
Finland	0.18	0.16	0.21	5
Canada	0.19	0.16	0.21	7
Sweden	0.27	0.23	0.30	4
Germany	0.32	0.27	0.25	6
France	0.41	0.35	0.45	1
United States	0.47	0.40	0.52	28
United Kingdom	0.50	0.43	0.55	5

(Source: Corak 2006; Table 1, p. 42)

Table 3 shows the preferred estimates as calculated by Corak. Sweden has a preferred estimate of 0.27 based on the results of four previous studies. Björklund and Jäntti (1997) have undertaken the study that Corak mainly bases his preferred estimate upon. As Björklund and Jäntti have used instrumental variables and the average age of fathers in their study is slightly lower than for the model derived by Corak, their original finding of 0.28 is slightly scaled down. Compared to the other countries in the study by Corak (2006) Sweden is in no way extreme. The highest transmissions of earnings are found in the United Kingdom while the other Nordic countries and Canada all report transmissions below 0.2.

6.2 Empirical findings on Ethnic Intergenerational Transmission

George Borjas has not only been of importance in the development of theories. He has also undertaken several empirical studies. In one of his papers (Borjas 2006, p 22) he finds that the ethnic intergenerational coefficient of income transmission for much of the twentieth century was around 0.5 in the US. Also in earlier studies, (Borjas 1992,1993,1994) he finds an ethnic intergenerational coefficient of income transmission that is greater than the transmission among native-born parents and their sons. In the US, also Card et al. (2000) find ethnic intergenerational income transmission that ranges from 0.5-0.6. On Canadian data Aydemir et al. (2006) find that the mobility among immigrants is similar to the mobility among natives and that the mobility is higher in Canada than the one reported for the US. Another interesting

finding by Aydemir et al (2006) is the non-existant statistical relationship between the earnings of fathers and daughters.

6.3 Empirical findings on Ethnic Intergenerational Transmission in Sweden

Hammarstedt and Palme (2006) have undertaken a prior study on intergenerational mobility on Swedish first- and second-generation immigrants, focusing on income. They examine male immigrants arriving to Sweden before 1970 and their earnings in 1975 and 1980. As an extra part of the data set, each foreign-born individual has been randomly linked with a so-called native twin, with similar characteristics.

Considering the group of second-generation immigrants, the individuals are not connected to a native twin. Instead they are compared to a group of natives, with both parents born in Sweden. The data on the second-generation immigrants observes earnings in 1997, 1998 and 1999. This data set consists of all the biological children of the first-generation immigrants examined. Throughout the article, male first generation immigrants - as well as native Swedes - between the ages of 20 and 64 are being studied.

The most striking result, which also contradicts theory in the field, (see e.g. Borjas 2006 p. 6,) is the ethnic intergenerational coefficient of income transmission between groups. Although previous empirical research as well as theory, assumes regression towards the mean, Hammarstedt and Palme find a slope coefficient of 1.425, which well exceeds one. Instead of the expected regression towards the mean, this would mean that any difference between groups in the first generation would be reinforced in the second generation. Thus a group of immigrants that is disadvantaged in earnings in the first generation would be even worse off in the second generation. As well, a group that does very well in the first generation will perform even better in the second generation.

Hammarstedt and Palme have not used a random a sample in the comparison between native Swedes and the first generation immigrants. Instead they have pooled together all the native Swedes from the various twin groups. As a contrast, the comparison group for the second generation immigrants does not consist of a native twin group, but the entire population of children to native Swedes. By not using the entire population of native Swedes or a random sample in the comparison group of the first generation immigrants, this could obviously cause bias in the result, and may be the driving force behind the unusual result. Especially since the authors, in the comparison group to the second generation immigrants, have not used the same definitions, and instead compared with the entire population of children of native Swedes.

7. Empirical Results

Previous studies on intergenerational effects, especially among immigrants, have focused on income as the only outcome variable. This study examines three different outcome variables, income, education and employment.

Because of the extensive number of observations in the data sets, fixed age effects have been used for every age group in the regressions in this thesis. That is, a vector with dummy variables for separate age groups captures the differences in the outcome variables that can be explained by the differences in the individuals' ages. It is common to use age and age square as independent parameters to adjust for age effects, instead of the fixed effects applied here. The fixed effects used, captures the differences between the age groups more specifically and are thus consistently used in the following OLS regression results presented.

7.1 Income

The age-adjusted differences in the log income, estimated by equation (8), are presented in table 4. The differences in log income are estimated in the 2005 price value. The data has not been controlled for education. The reasons are to be able to separate the analysis of the two outcome variables from each other, as well as that earlier studies do not generally control for education. Thus, in order to compare the results with earlier findings, no adjustment for educational attainment has been done.

The results show that most countries or regions of immigrants have an income disadvantage compared to native Swedes. Especially low is the income level for some of the non-European countries or regions, which can be assumed to mainly consist of refugee immigrants. The lowest observation for both data sets of first generation immigrants is the immigrant group originating from Iran. For the data set of second generation immigrants the earnings disadvantage for immigrants seems to have decreased on average. Still, second generation immigrants with origins in Turkey have an earnings disadvantage of almost 40 percent. Two groups of first generation immigrants actually have an earnings advantage compared to the native Swedes. This is the group of Estonian immigrants and the aggregated group of immigrants originating in Eastern Europe. These two groups maintain their earnings advantage in the second generation data set from 2003, but then also the Czechoslovakian immigrants have a small earnings advantage. As the data sets contain all male individuals in

the defined ages and thus are not random samples, no standard errors are presented in the results of the differences in the outcome variables.

The log income level for the native Swedes are all presented in 2005 price value. The income levels for the native Swedes, for each separate data set, are the levels from which the differences for the ethnic groups are measured.

Table 4. Age-adjusted differences in log income for first and second generation immigrants relative to native Swedes.

A	B. Father's origin	C. Differences in log income First generation immigrants, 1980 data set	D. Differences in log income First generation immigrants, 1985 data set	E. Differences in log income Second generation immigrants 2003 data set
	Income level native Swedes	*11.12*	*11.60*	*11.54*
1	Denmark	-0.11	-0.12	-0.06
2	Finland	-0.09	-0.19	-0.05
3	Norway	-0.01	-0.10	-0.07
4	Iceland	-0.02	-0.24	-0.02
5	France	-0.25	-0.32	-0.22
6	Holland	-0.07	-0.13	-0.10
7	Great Britain	-0.16	-0.21	-0.19
8	Germany	-0.03	-0.03	-0.02
9	Austria	-0.06	-0.02	-0.05
10	Western Europe	-0.01	-0.14	-0.04
11	Bulgaria	-0.24	-0.61	-0.12
12	Estonia	0.11	0.16	0.06
13	Poland	-0.19	-0.39	-0.18
14	Romania	-0.12	-0.44	-0.26
15	Soviet Union	-0.11	-0.23	-0.09
16	Czechoslovakia	-0.08	-0.15	0.02
17	Hungary	-0.14	-0.20	-0.12
18	Eastern Europe	0.15	0.13	0.04
19	Greece	-0.30	-0.62	-0.23
20	Italy	-0.25	-0.29	-0.17
21	Yugoslavia	-0.19	-0.36	-0.12
22	Portugal	-0.24	-0.32	-0.14
23	Spain	-0.27	-0.33	-0.16
24	Southern Europe	-0.18	-0.50	-0.15
25	United States	-0.18	-0.44	-0.25
26	Canada	-0.16	-0.34	-0.09
27	Chile	-0.62	-0.73	-0.35
28	Latin America	-0.46	-0.80	-0.33
29	Morocco	-0.43	-0.66	-0.25
30	Africa	-0.44	-0.70	-0.28
31	India	-0.17	-0.35	-0.25
32	Pakistan	-0.26	-0.66	-0.45
33	Asia	-0.34	-0.49	-0.17
34	Iran	-0.69	-1.06	-0.37
35	Palestine	-0.32	-0.75	-0.22
36	Turkey	-0.31	-0.70	-0.38
37	Middle East	-0.38	-0.96	-0.25

By running an OLS regression on the differences in log income between the immigrant groups, as presented in equation (7), estimates of the ethnic intergenerational coefficient of income transmission are given. As shown in table 5 the result differs by almost twenty percentage points between the two data sets of first generation immigrants. Both regressions yield significant results at a 1 percent significance level, for the ethnic intergenerational coefficient. But even if the difference between the two coefficients is large, both coefficients show a substantial transmission of differences in income. In the worst case, based on the 1980 and 2003 data sets, on average more than 56 percent of the difference between first generation immigrants and native Swedes will be transmitted to the second generation. The 1985 data show that more than a third of the difference will be transmitted to the second generation. In other words this can also be interpreted as a low mobility between the group of immigrants compared to the native Swedes. Thus, much of the earnings disadvantage in the first generation will persist in the second generation of immigrants.

The intercept terms, or constants, of the regressions are shown to be negative for both regressions, which would mean a relative deterioration for the second generation immigrants compared to first generation immigrants. But in the case of the 1985 data set, the intercept term is not significant. In the 1980 data set the intercept term is significant only at a 5 percent level.

Table 5. Intergenerational transmission of income

Specification	Constant	Ethnic Intergenerational coefficient	R^2
First generation 1980 and second generation 2003, age-adjusted	**-0.048**** *0.019*	**0.563*** *0.068*	0.659
First generation 1985 and second generation 2003, age-adjusted	-0.025 *0.019*	0.360* *0.039*	0.712

(* = Significant at 1% level   ** = Significant at 5% level)

As the estimations are based only on two variables, differences in income for first and second generation immigrants, compared to native Swedes, this gives the possibility to examine the variables in figures. In the figures the values of the ethnic groups of the first generation immigrants, compared to the mean of the native Swedes, are represented on the x-axis of the figures. Consequently the values of the groups of second generation immigrants, relative to native Swedes, are shown on the y-axis of the figures.

As can be seen from figure 1 and 2, the groups of first generation immigrants in the 1985 data set has a greater spread of differences in income compared to the 1980 data set. As the

differences in income presented in the figures between the second generation immigrants are both based on the same estimation from the 2003 data set, they take the same values.

Figure 1 shows that there are some observations that may be considered outliers. Both groups with the highest income disadvantage in the second generation, Turkey and Pakistan, differ noticeably from the rest of the observations. Also the two groups with the highest income disadvantage in the first generation, Iran and Chile, differ to some extent from the other observations. The 1980 data set also generates a lower R^2 value than the estimations based on the 1985 data set. (See table 5.) But both data sets generate highly significant estimates of the ethnic intergenerational coefficient.

Because of the presence of a real link between fathers and sons, the preferred ethnic intergenerational coefficient of income transmission is based on the 1980 and 2003 data sets. The result then shows that, on average, there is a high transmission of differences in income between the fathers and sons of immigrants. More than fifty percent of the first generation difference in income will, on average, persist in the second generation. The preferred result also shows a significant deterioration of income, almost five percent, in the second generation compared to the average level of the native Swedes. Although the preferred result shows a high transmission of income, there is a significant evidence of regression towards the mean. This means that the ethnic groups in the data set on average get closer to the income level of the native Swedes over generations. In other words, the second generation immigrants "catch up" with the sons of the native Swedes. But this seems to be a slow process and much of the income differences persist over the generations of first and second generation immigrants.

Figure 1. Age-adjusted differences in income of first generation immigrants 1980 data set and differences in income of second generation immigrants 2003
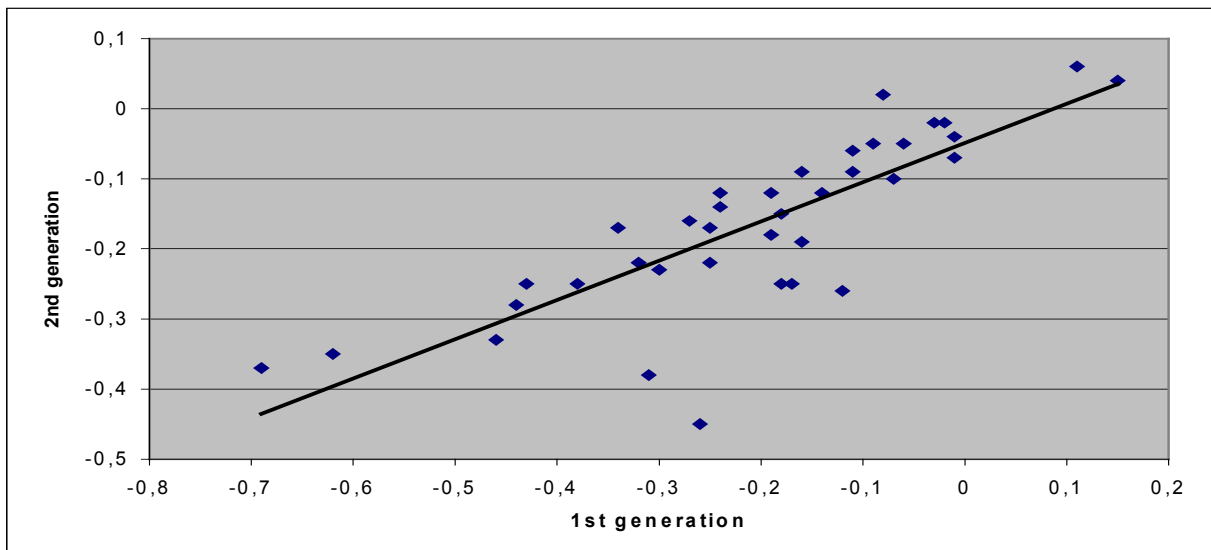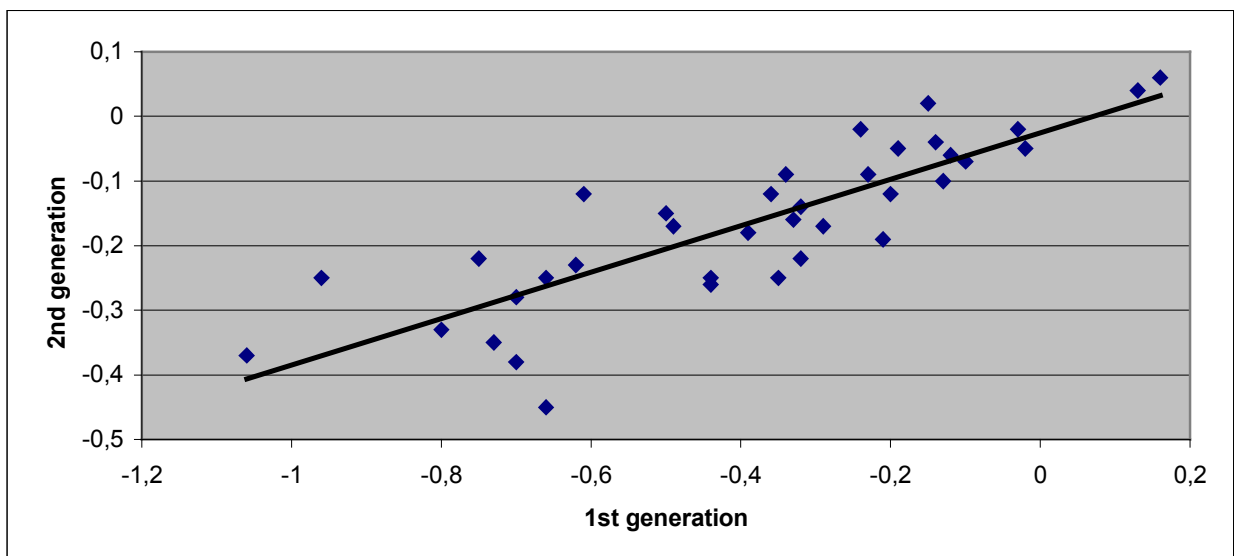

Figure 2. Age-adjusted differences in income of first generation immigrants 1985 data set and differences in income of second generation immigrants 2003 data set

7.2 Education

Education as a measure has the advantage of less measurement errors and smaller differences in the observations according to the time of data collection. But very young individuals may still be in the phase of education and thus a source of measurement error. In this study, correction has therefore been made with fixed age effects, which should eliminate any possible measurement error. But also a higher age level has been chosen to eliminate this problem.

The level of education among the ethnic groups in Sweden, especially the first generation immigrants, varies heavily as seen in table 6. Although the different data sets cannot be directly compared, because of the differences in some characteristics such as age, the patterns are generally the same in the data sets. Considering both the 1980 and the 1985 data set of first generation immigrants the majority of ethnic groups, on average, have a higher level of education than the native Swedes. In some cases, for instance India and Iran in the 1980 data set, the advantage of the ethnic group is more than three years of education.

The Finnish immigrants are the most numerous in the data sets, and they are also the group, except for those from Greece and Turkey in the 1980 data sets, that has the lowest average level of education. This agrees well with the picture of Finns as being mainly low-skilled labour immigrants during the prosperous decades in Sweden.

The educational level of the ethnic groups of second generation immigrants does not differ from that of the native Swedes to the same extent as for the first generation immigrants. Turkey has the lowest level of education while India has the highest level, both with about one year difference from the native mean. The less dispersed observations in the groups of second generation immigrants may have a natural cause. The second generation immigrants all attend Swedish schools, and are thus part of the same system. This is not the case for the first generation immigrants, and results in a greater dispersion.

The presented results on the educational level of the native Swedes are not directly comparable as they represent the youngest age group of each sample, because of the fixed age effects used in the OLS regressions, and the different age groups defined in the samples. For instance, the data on the 1985 first generation native Swedes represents average years of schooling for those of the age of 24 in 1985, while the 1980 data represents average years of schooling for a twenty years old individual in 1980.

Table 6. Age-adjusted differences in educational attainment between groups of first and second generation immigrants compared to native Swedes

A. B. Father's origin	C. Differences in education First generation immigrants, 1980 data set	D. Differences in education First generation immigrants, 1985 data set	E. Differences in education Second generation immigrants 2003 data set
Educational level of native Swedes	*10.55*	*11.05*	*12.20*
1 Denmark	-0.38	0.03	-0.59
2 Finland	-1.13	-0.95	-0.55
3 Norway	0.31	0.48	-0.19
4 Iceland	2.77	2.67	0.29
5 France	2.16	1.67	0.48
6 Holland	1.92	1.75	0.22
7 Great Britain	1.74	2.02	0.29
8 Germany	1.14	1.06	0.22
9 Austria	1.23	0.99	0.17
10 Western Europe	1.72	1.80	0.37
11 Bulgaria	0.88	1.49	0.06
12 Estonia	1.65	1.67	0.69
13 Poland	1.81	1.85	0.28
14 Romania	1.53	1.61	0.09
15 Soviet Union	0.62	1.28	0.19
16 Czechoslovakia	2.00	1.96	0.56
17 Hungary	1.08	1.07	0.09
18 Eastern Europe	1.75	1.89	0.58
19 Greece	-1.37	-0.15	-0.28
20 Italy	-0.45	-0.21	-0.26
21 Yugoslavia	-0.78	-0.66	-0.36
22 Portugal	-0.60	-0.09	-0.29
23 Spain	-0.26	0.16	-0.21
24 Southern Europe	-0.81	0.63	-0.25
25 United States	2.65	2.50	0.40
26 Canada	1.90	1.17	0.48
27 Chile	2.08	0.63	-0.22
28 Latin America	1.96	1.17	-0.04
29 Morocco	-0.82	-0.18	-0.48
30 Africa	1.42	1.16	-0.09
31 India	3.21	2.31	0.91
32 Pakistan	1.23	0.81	0.46
33 Asia	1.95	1.35	0.62
34 Iran	3.06	1.37	0.53
35 Palestine	1.06	1.24	-0.21
36 Turkey	-1.31	-0.23	-1.03
37 Middle East	0.06	0.79	-0.18

The estimates of the ethnic intergenerational coefficient of educational transmission are based on the age adjusted differences in education in table 6. The result from the 1980 data set combined with the 2003 data set on second generation immigrants, shows that there is a significant transmission of educational attainment between the groups. (See table 7.) The

transmission is lower compared to the transmission of earnings, but still about 27 percent of the differences in educational level is transmitted to the second generation.

The estimated transmission, based on the 1985 and 2003 data sets, is higher than that from the 1980 data set; close to forty percent.

Table 7. Ethnic intergenerational coefficient of educational transmission

Specification	Constant	Ethnic Intergenerational coefficient	R^2
First generation 1980 and second generation 2003, age-adjusted	**-0.200*** *0.048*	**0.272*** *0.030*	0.706
First generation 1985 and second generation 2003, age-adjusted	-0.316* *0.063*	0.377* *0.046*	0.657

(* = Significant at 1% level   ** = Significant at 5% level)

The constant, or intercept term, shows that also in the case of education there is on average a significant deterioration of the educational level of the second generation immigrants compared to the groups of first generation immigrants. The result from the first generation immigrants in 1980 and the second generation immigrants yield a deterioration of about 0.2 years of educational attainment. The deterioration from the 1985 and 2003 data sets is higher and exceeds 0.3 years.

The initially large sets of data have been transformed to a much smaller sample of aggregated data. This also makes the OLS regressions more affected by single, outlying observations. As seen in figure 3 and 4 the data contains no groups that can be considered real outliers and that could single-handedly influence the results. It is also important to notice that the scales of the figures are not the same. In both cases Turkey is probably the most conspicuous observation as the group, especially in the second generation, has a low level of educational attainment relative to the educational level of the native Swedes.

The estimated slopes of the regression lines represent the ethnic intergenerational coefficients of education. Both estimated coefficients have positive slope coefficients, although the results as presented in table 7 are not exactly the same from the different samples. An evident result is the existence of regression towards the mean, in this case indicating that educational differences as compared to native Swedes are decreased over the two generations of immigrants in Sweden.

The 1985 data set on first generation immigrants gives later observation on the educational attainment than the 1980 data set. This is preferable as the level of education of the

individuals may increase over time. The difference in time of the two observations is only five years. The average age of the individuals in the different ethnic groups is about 40 years in the 1980 data set. (See table 2.) The average age based on the 1985 data set is generally slightly lower, as a result of not including individuals over 51 years of age. Because of the age composition of the 1980 data set and the real link between the fathers and sons the preferred estimate of the ethnic intergenerational coefficient of educational transmission is based on the 1980 and 2003 data sets, even though the 1985 data set contains later observations of the educational level.

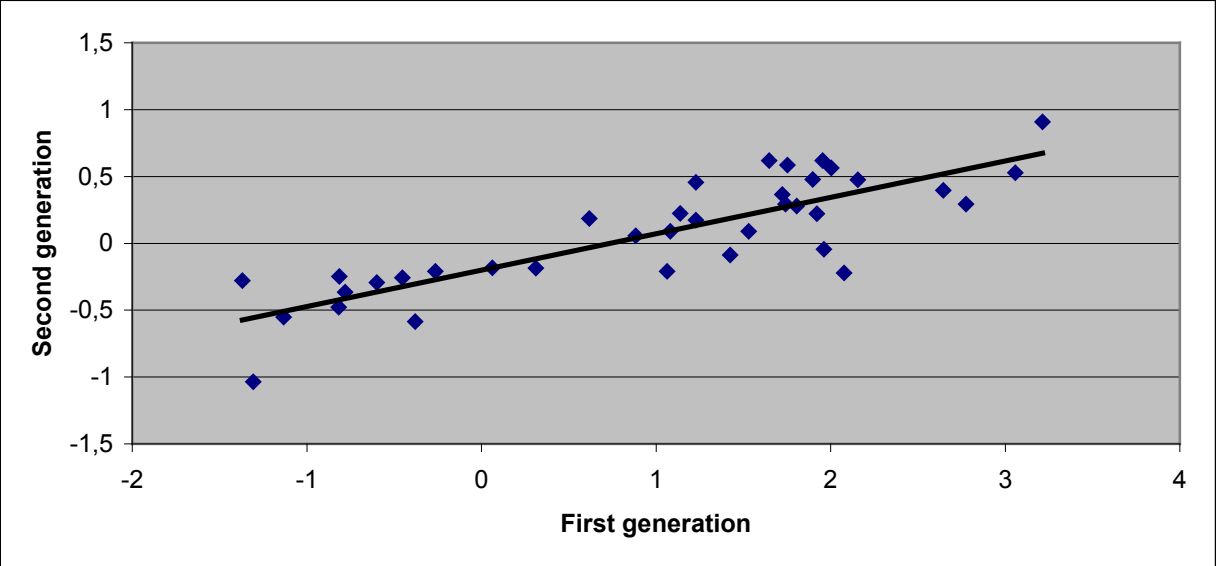*Figure 3. Age-adjusted differences in education 1980 versus differences in education 2003*
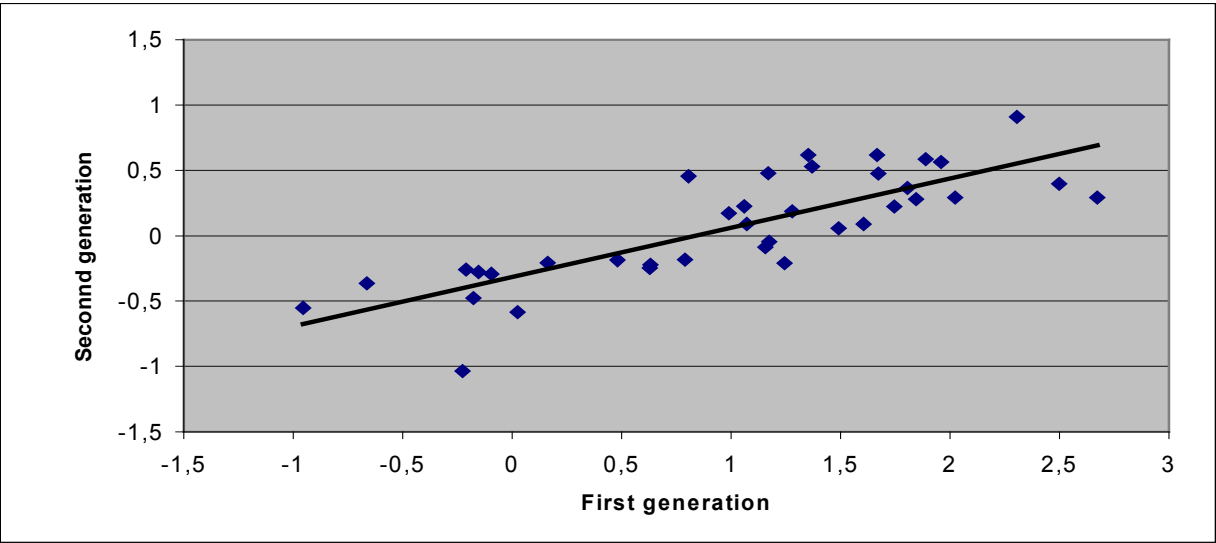

Figure 4. Age-adjusted differences in education 1985 versus differences in education 2003

7.3 Employment

As only the 1985 and 2003 data contain direct information on employment, an artificial employment variable has also been constructed for the data sets. This is defined as an individual being employed if the annual earnings exceed 100,000 SEK.[2] Correspondingly, if the annual earnings are lower than this value the individual is considered as unemployed. The differences in the rates of employment between the ethnic groups of immigrants are measured relative to the corresponding rate of employment of the native Swedes in the data sets.

The rates of employment for the native Swedes in table 8 are to be interpreted carefully. As the data has been adjusted for age, according to equation (8), the definitions of the employment rates differ. For instance, the results in column C show the rate of employment for 20 years old native Swedes in 1980, where being employed means having an annual income greater than 100,000 SEK in 2005 price value. In column D the employment rate is relevant for male native Swedes being 24 years of age in 1985, based on the direct information on employment in the relevant year.

Table 8 shows a great deal of variation in the rate of employment. As was the case for earnings in chapter 7.1, people from Estonia and Eastern Europe also when it comes to employment have the highest ratios in both generations. As well, the groups with low earnings in the preceding chapter are the ones with the lowest employment ratios. This is of course not surprising as the two outcome variables are closely linked.

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[2] Other values examined see table A1 in appendix A.2

Table 8. Age-adjusted differences in the rate of employment for both first- and second-generation immigrants relative to native Swedes

A	B. Father's origin	C. Differences in employment First generation immigrants, 1980 data set. Employed if income >100,000 SEK	D. Differences in employment First generation immigrants 1985 data set	E. Differences in employment First generation immigrants, 1985 data set. Employed if income >100,000 SEK	F. Differences in employment Second generation immigrants 2003 data set.	G. Differences in employment Second generation immigrants 2003 data set. Employed if income >100,000 SEK
	Rate of employment native Swedes	*0.41*	*0.84*	*0.69*	*0.70*	*0.57*
1	Denmark	-0.07	-0.08	-0.11	-0.05	-0.05
2	Finland	-0.04	-0.08	-0.09	-0.05	-0.04
3	Norway	-0.07	-0.15	-0.16	-0.05	-0.05
4	Iceland	-0.10	-0.20	-0.23	-0.12	-0.08
5	France	-0.20	-0.20	-0.23	-0.14	-0.15
6	Holland	-0.09	-0.10	-0.11	-0.08	-0.09
7	Great Britain	-0.16	-0.12	-0.17	-0.09	-0.12
8	Germany	-0.05	-0.05	-0.06	-0.04	-0.04
9	Austria	-0.07	-0.04	-0.06	-0.04	-0.04
10	Western Europe	-0.06	-0.14	-0.18	-0.05	-0.05
11	Bulgaria	-0.14	-0.22	-0.31	-0.19	-0.18
12	Estonia	0.01	-0.01	0.04	-0.02	-0.01
13	Poland	-0.12	-0.18	-0.25	-0.14	-0.15
14	Romania	-0.07	-0.21	-0.28	-0.12	-0.14
15	Soviet Union	-0.05	-0.12	-0.14	-0.09	-0.08
16	Czechoslovakia	-0.05	-0.10	-0.13	-0.06	-0.08
17	Hungary	-0.07	-0.09	-0.13	-0.07	-0.08
18	Eastern Europe	0.01	0.004	0.05	-0.03	0.003
19	Greece	-0.19	-0.25	-0.36	-0.15	-0.19
20	Italy	-0.15	-0.12	-0.19	-0.07	-0.10
21	Yugoslavia	-0.07	-0.12	-0.18	-0.09	-0.10
22	Portugal	-0.13	-0.10	-0.15	-0.08	-0.07
23	Spain	-0.16	-0.15	-0.18	-0.11	-0.12
24	Southern Europe	-0.04	-0.24	-0.33	-0.09	-0.10
25	United States	-0.18	-0.24	-0.30	-0.10	-0.12
26	Canada	-0.11	-0.22	-0.25	-0.10	-0.13
27	Chile	-0.40	-0.18	-0.31	-0.14	-0.19
28	Latin America	-0.31	-0.27	-0.39	-0.16	-0.17
29	Morocco	-0.21	-0.18	-0.31	-0.16	-0.19
30	Africa	-0.27	-0.25	-0.35	-0.18	-0.19
31	India	-0.18	-0.14	-0.21	-0.15	-0.15
32	Pakistan	-0.11	-0.20	-0.32	-0.22	-0.26
33	Asia	-0.17	-0.23	-0.29	-0.10	-0.13
34	Iran	-0.44	-0.48	-0.56	-0.22	-0.21
35	Palestine	-0.18	-0.31	-0.37	-0.13	-0.14
36	Turkey	-0.15	-0.19	-0.38	-0.12	-0.22
37	Middle East	-0.20	-0.40	-0.53	-0.15	-0.18

The estimates of the ethnic intergenerational coefficient of employment transmission from the 1980 and 2003 data sets show, as was the case for earnings and education, a significant transmission of the rate of employment. (See table 9.) Also the two estimates based on the

1985 and 2003 data sets show a significant transmission of the rate of employment. All the three estimates show that the transmission is about 40 percent. An average ethnic group has an employment rate disadvantage of about 0.2 in the first generation. This means that such a group, on average, will still have an employment disadvantage in the second generation of immigrants, compared to the level of the sons of the native Swedes. For such a group the rate of employment disadvantage in the second generation is close to eight percent, based on an ethnic intergenerational coefficient equal to 0.4.

Table 9. Intergenerational transmission of employment

Specification	Constant	Ethnic Intergenerational coefficient	R^2
First generation 1980 and second generation 2003, age-adjusted. Employed if income exceeds 100,000 SEK	-0.057* *0.012*	0.454* *0.074*	0.520
First generation 1985 and second generation 2003, age-adjusted	**-0.038*** *0.011*	**0.406*** *0.057*	0.588
First generation 1985 and second generation 2003, age-adjusted. Employed if income exceeds 100,000 SEK	-0.028** *0.011*	0.394* *0.041*	0.725

(* = Significant at 1% level   ** = Significant at 5% level)

Following the same pattern as the results on income and education, there is a deterioration of the employment rate for the groups of second generation immigrants compared to the first generation immigrants. This is the case for all the estimated results on the employment rate, and the results are significant. The highest level of deterioration is given by the 1980 data set, at almost six percentage points.

While the previous outcome variables of education and earnings have generally shown results that are not considered to have any outliers potentially affecting the results, this could be the case for the employment variable. In both figure 5 and 6 it is easy to see that there are some observations that might affect the results in a significant way.

As a result of the wider variation of observations in the employment outcome, the R^2 values, as seen in table 9, for two of the definitions are lower than in the previous results. The coefficient of the ethnic intergenerational coefficient is in all three cases highly significant.

In figure 5 based on the 1980 data set, the first generation groups with the highest disadvantage in the employment rate, Iran and Chile, differ from the other groups of immigrants. The group of Pakistan immigrants has the highest employment disadvantage in the second generation, and may as well be considered a potential outlier. Still, the regression

yields highly significant results for both the constant and the ethnic intergenerational coefficient.

Also in the 1985 data set, that is based on direct information on employment, there are some potential outliers. (See figure 6.) The group of immigrants from Iran and the aggregated group from the Middle East, have much higher negative differences in the employment rate than the other groups. The results of the regression in table 9 are however highly significant.

The results of the 1985 and 2003 data set, when defining employment as an income greater than 100,000 SEK can be seen in figure 7. The deviations of all groups of immigrants from the estimated slope are not of any great magnitude. There are thus no potential outliers in the estimation of the results. This is in line with the high R^2 value. (See Table 9.)

As there is only one estimate based on direct employment information, this is the preferred result on the ethnic intergenerational coefficient of employment transmission. This result is not based on a biological link between the first and second generation, but such a link is not necessary when examining the intergenerational transmission on aggregated data. The preferred result gives a significant estimate of the ethnic intergenerational coefficient at 0.41. Also the deterioration, for the groups of second generation immigrants, at almost 4 percentage points, is highly significant.

Figure 5. Age-adjusted differences in the rate of employment from the 1980 and 2003 data sets. (Employment if income greater than 100,000 SEK)
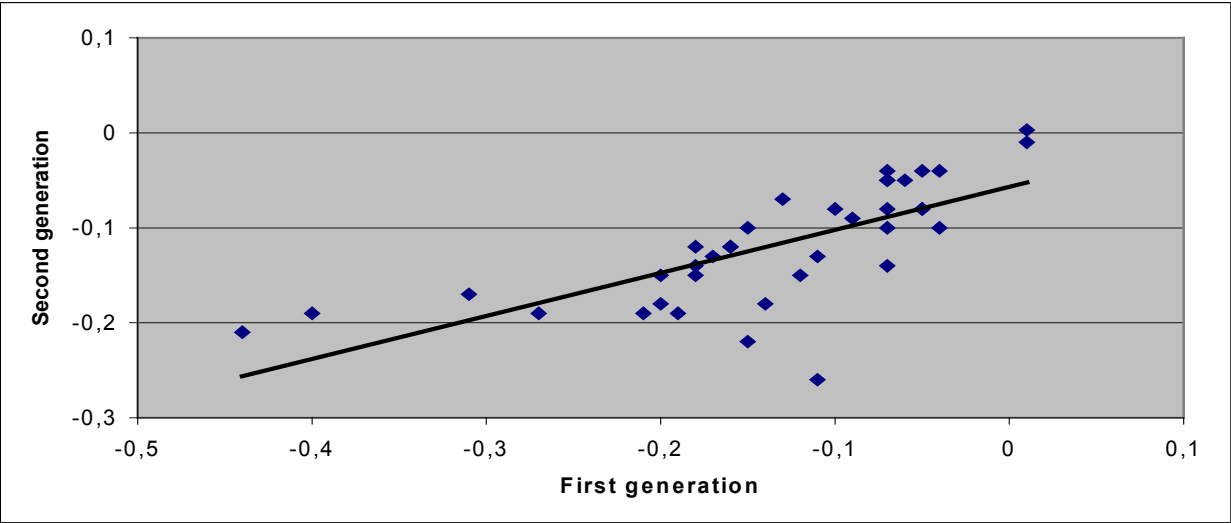
Figure 6. Age-adjusted differences in the rate of employment from the 1985 and 2003 data sets.
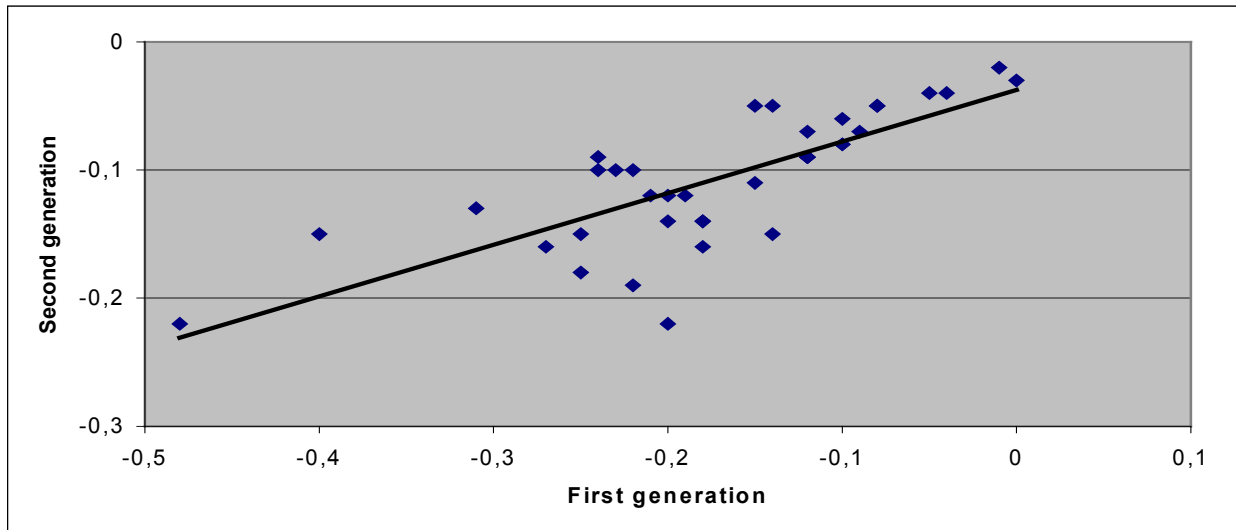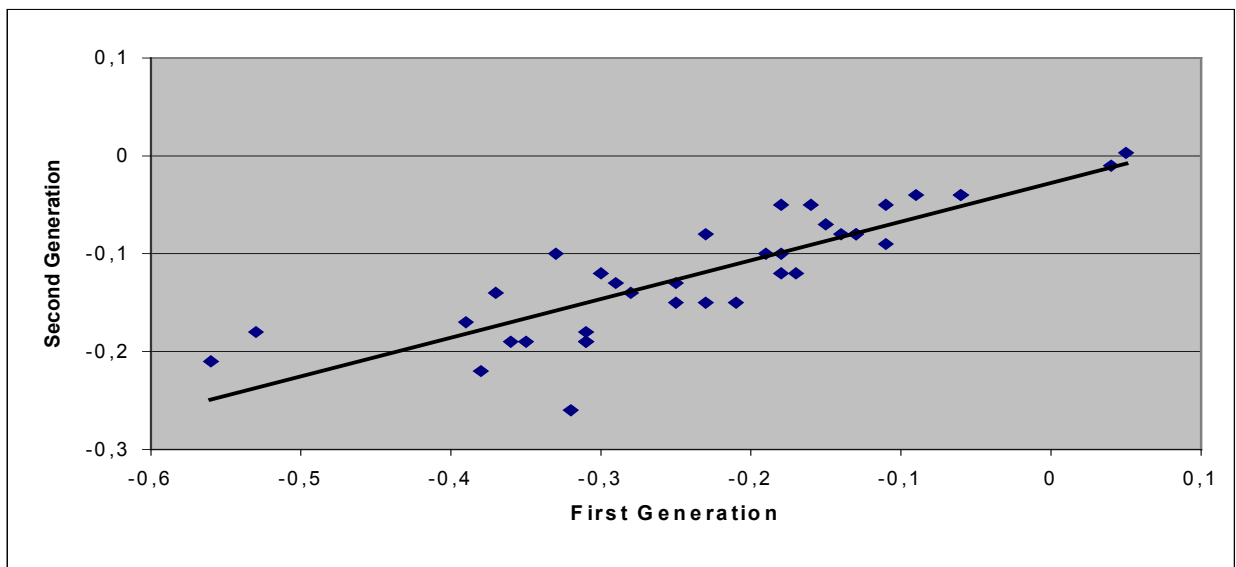

Figure 7. Age-adjusted differences in the rate of employment from the 1985 and 2003 data sets. (Employment if income greater than 100,000 SEK)

7.4 Extensions

The results in chapter 7.1-7.3 on the different outcome variables show a significant regression towards the mean for all different specifications. For the preferred result on income there will be made some further exploration. The aim is to separate different effects within the previous empirical findings in this thesis.

7.4.1 Differences between Immigrant Groups

To see if there is any difference between the groups due for example to discrimination an attempt to separate the effects for different groups of immigrants is done. The estimations are based on several important assumptions. The less discriminated groups of immigrants are assumed to be the ones originating from the Nordic Countries, Western Europe and North America.[3] The other groups, from Eastern Europe, Southern Europe, Latin America, Africa, Asia and the Middle East, are assumed to be more discriminated on the Swedish labour market. It should however be noted that the reasons for any differences may not necessarily be discrimination, such factors as differences in language skills and differences in the social and cultural capital could also be the cause. The groups of immigrants from countries or regions closer to Sweden may have greater resemblance to the characteristics of the native Swedes in these factors, which makes it easier to adapt to the labour market. But the same factors may also be the reason for – if existing – discrimination. Any attempt to disentangle these effects is not made.

The estimates are based on the log income for first generation immigrants in the 1980 data set and second generation immigrants in the 2003 data set. These groups gave the preferred result of 0.563 for the ethnic intergenerational coefficient. (See chapter 7.1)

The results in table 10 show a higher transmission of income in the less discriminated groups.[4] The result is also higher than the preferred result in table 5, while the more discriminated groups have a transmission of income similar to the result presented in table 5. But the less discriminated group performs on average much better in the first generation, as can be seen from figures 8 and 9. Thus the income advantage for the less discriminated groups, compared to the more discriminated groups, in the first generation is likely to persist to the second generation of immigrants. The more discriminated groups suffer an income disadvantage of such magnitude in the first generation that it will not disappear in the second generation, compared to the less discriminated groups, although the transmission is lower. The reason may be a higher level of discrimination, but also the greater difference to the characteristics of the native Swedes may be causing the patterns. Still, both the less and the more discriminated groups have very high intergenerational transmissions.

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[3] The groups of immigrants from Denmark, Finland, Norway, Iceland, France, Holland, Great Britain, Germany, Austria, Italy, Spain, Western Europe, USA and Canada
[4] For estimates of age-adjusted differences in log income see table A2 in Appendix A.3

Table 10. Intergenerational transmission of income, less and more discriminated groups

Specification	Constant	Ethnic Intergenerational coefficient	R²
First generation 1980 and second generation 2003, age-adjusted, less discriminated groups	-0.025 *0.020*	0.693* *0.133*	0.693
First generation 1980 and second generation 2003, age-adjusted, more discriminated groups	-0.063 *0.030*	0.526* *0.094*	0.601

(* = Significant at 1% level   ** = Significant at 5% level)

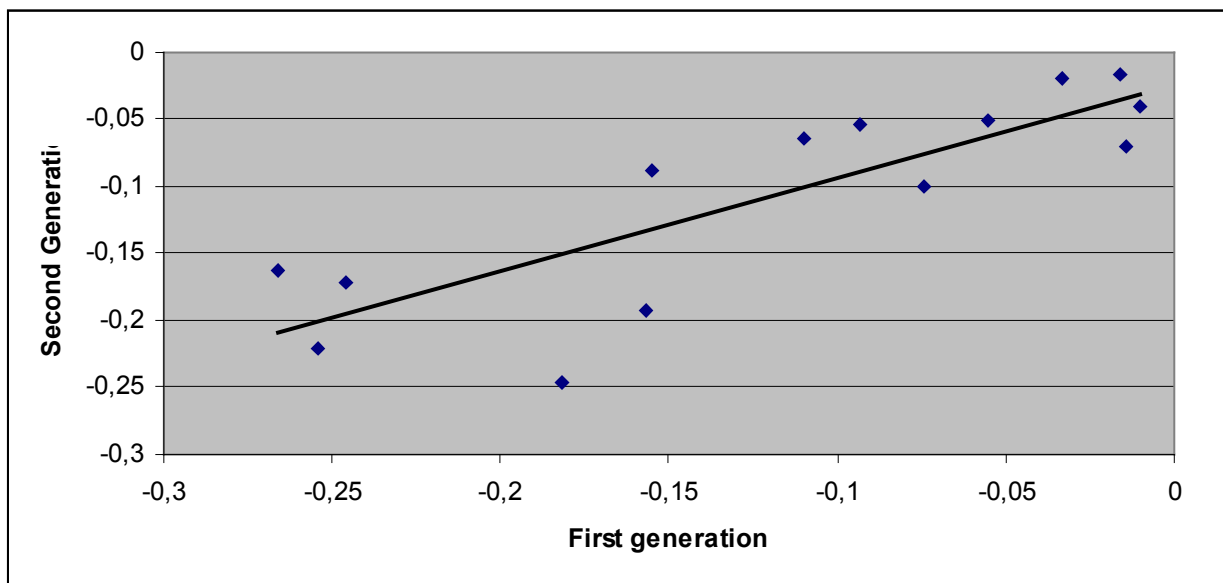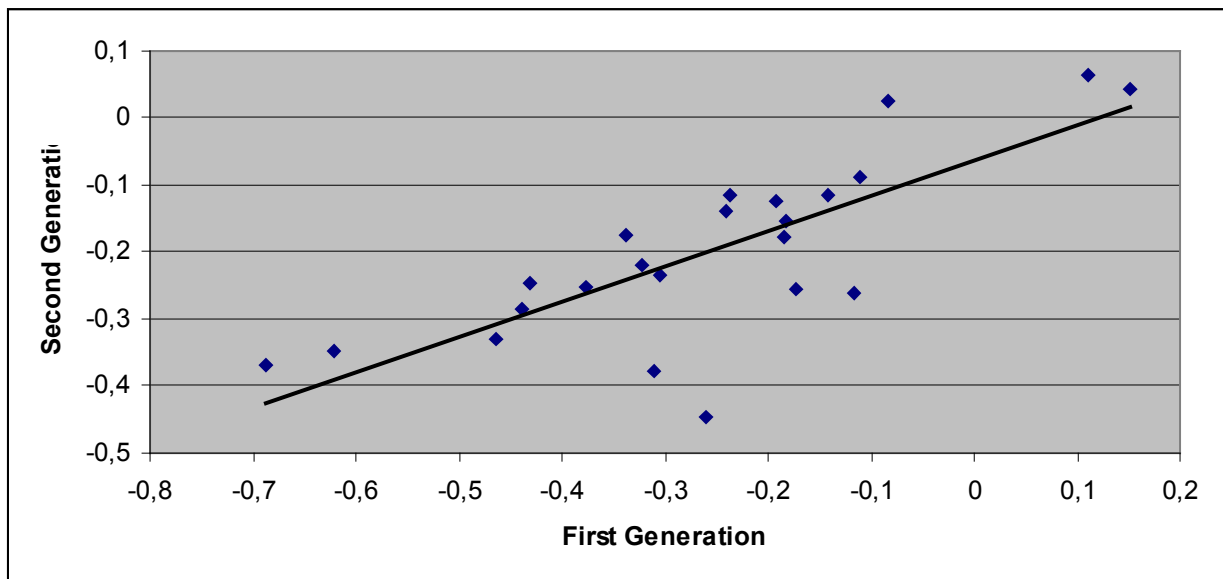*Figure 8. Age-adjusted differences in income, less discriminated groups*

Figure 9. Age-adjusted differences in income, more discriminated groups

7.4.2 Importance of Mother's Origin

The data sets from 1980 and 2003 allow a further distinction between the groups of immigrants. There is data on the origin of the spouse of the first generation immigrants. (Which also means the mother of the second generation immigrant.) The data sets are divided into subgroups, one where the mother is born in a country other than Sweden and one where the mother is born in Sweden.[5] Note that the origin of the mother born in a country other than Sweden does not have to be the same as the origin of the immigrant father. No such distinction has been made.[6]

Table 11 shows that the ethnic intergenerational coefficient of income transmission is very similar for the two groups. There is a slightly higher transmission for the group with a foreign-born mother. Both groups also have a high deterioration of incomes in the second generation.

Figures 10 and 11 show that on average there might be a small earnings disadvantage for the groups with a foreign born mother, compared to the groups with a mother born in Sweden. This pattern, and the slightly higher transmission, yields on average slightly higher earnings disadvantage also in the second generation. But the effect is small. Thus the importance of the origin of the mother is very small, or of no importance at all.

Table 11. Ethnic Intergenerational transmission of income

Specification	Constant	Ethnic Intergenerational coefficient	R^2
First generation 1980 and second generation 2003, age-adjusted, foreign born Mother	-0.081** *0.036*	0.561* *0.118*	0.392
First generation 1980 and second generation 2003, age-adjusted, Mother born in Sweden	-0.073** *0.018*	0.511* *0.069*	0.611

(* = Significant at 1% level   ** = Significant at 5% level)

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[5] For estimates of age-adjusted differences in log income see table A3 in Appendix A.4
[6] See table 2 for number of individuals included in each group

Figure 10. Age-adjusted differences in income, foreign born Mother
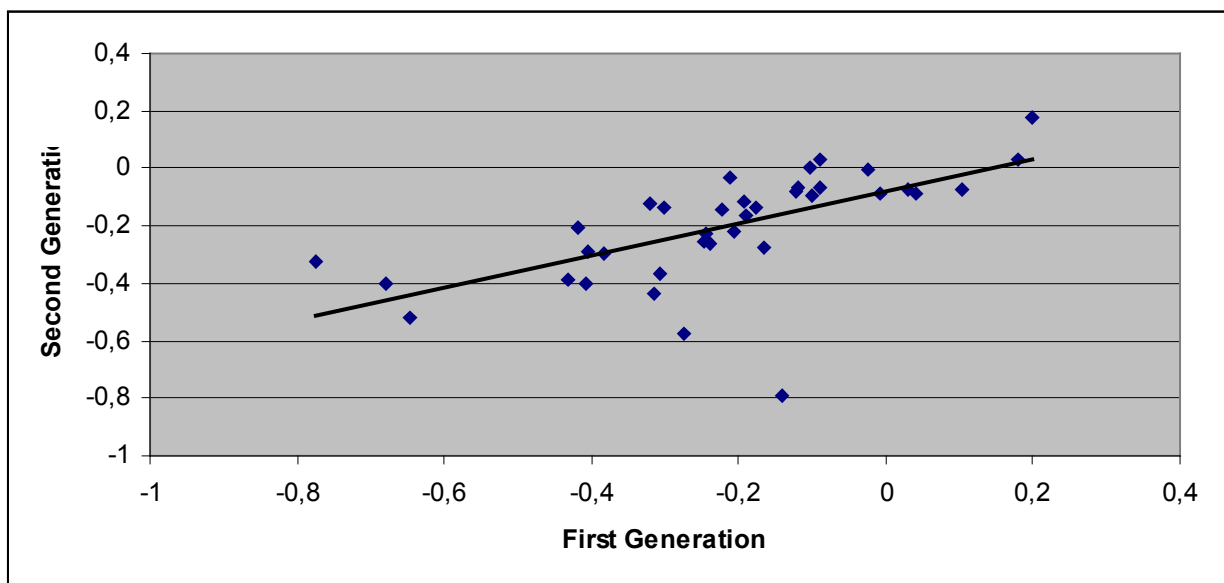
Figure 11. Age-adjusted differences in income, Mother born in Sweden
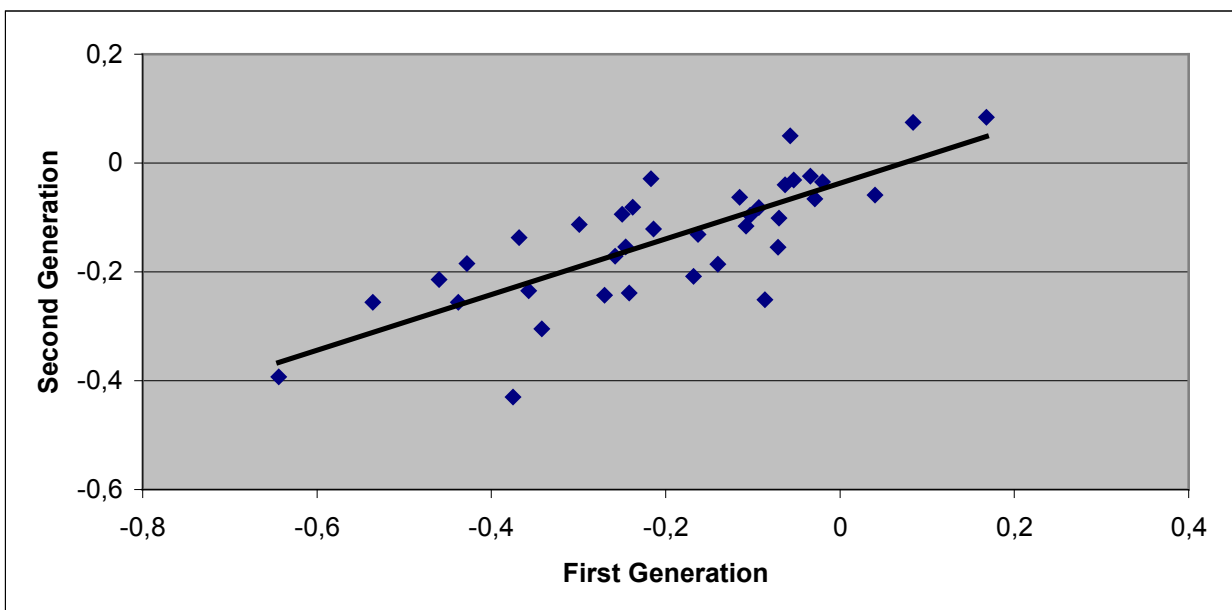
7.5 The Role of Ethnic Capital

Based on the same data sets examined in this thesis Eriksson (2006) has undertaken a study that separates the effects of the ethnic capital and the parental capital. Eriksson has undertaken his study on individual data and not aggregated data. This gives the opportunity of separating the effects of the ethnic capital and the parental capital.

The definitions used for the different outcome variables are the same as in this thesis, except for income, where Eriksson uses the average income from three different years for the first generation immigrants. This has been done to avoid bias. (See chapter 3.3.) The empirical study is undertaken by estimation of equation (6) as shown in chapter 4. The estimations have been made on the 2003 and 1980 data sets as these data sets include the biological link between the fathers and their sons.

Eriksson finds that the ethnic capital is of importance for all outcome variables, although the magnitude varies. The smallest effect of ethnic capital is found for education. The effect of the ethnic capital is only 0.08 but the estimate is highly significant. The effect of parental capital equals the difference between the finding of a transmission of 0.272 (see table 7) and the effect of the ethnic capital. In the case of educational transmission among the immigrants, the parental capital seems to play a more important role than the ethnic capital.

When studying the role of ethnic capital in income transmission, Eriksson finds an effect of ethnic capital, which equals 0.35. This value is clearly higher than that for education. But such a comparison should be made carefully, as the scaling and definitions of the outcome variables are different.

For the third outcome variable, employment, Eriksson defines an individual as employed when the annual income exceeds 100,000 SEK. As he uses the 1980 and 2003 data sets this is similar to the definitions for to the findings of an ethnic intergenerational coefficient of 0.454 as presented in table 9. Eriksson finds that the magnitude of the effect of the ethnic capital, for the definition used, equals 0.35. In the case of employment the ethnic capital is found to be of very large importance compared to the parental capital.

8. Discussion and Conclusions

The empirical results in chapter 7 show that there are significant ethnic intergenerational transmissions for all the three outcome variables examined in this thesis. In most cases there is also a significant deterioration for the second generation of immigrants compared to the first generation immigrants for the outcome variables.

The aggregated results in this study show that the magnitude of the ethnic intergenerational coefficient of earnings transmission is approximately 0.56 based on the 1980 data set. The later data set used, from 1985, show a significantly lower transmission equal to 0.36. The underlying factors for such great discrepancy in the results can be explained by differences in the age of fathers included, whether only directly linked fathers and sons are examined and the different years when the observations are made. One of the reasons why there is a substantial difference between the 1980 and the 1985 data sets, is that the 1985 data set also includes immigrants who do not have children in the 2003 second generation data set. They may have had children, but then their children may not be included in the age group studied for the second generation immigrants. The case may also be that they have not had children at all. As well there is a greater ratio of non-European immigrants and thus probably refugee immigrants in the 1985 data set, which also may cause a difference in the empirical findings.

The result of the outcome variable income shows that the magnitude of the parental capital[7] is close to 0.2, which is supported by earlier empirical findings. (Corak 2006) This also means that there is a great underestimation of the intergenerational transmission among immigrants if the ethnic capital is not taken into account and that the groups of immigrants may be disadvantaged for many generations to come. But there is also a substantial difference when comparing the empirical results to the earlier study made by Hammarstedt and Palme (2006) on the estimation of the ethnic intergenerational coefficient of income transmission. As mentioned in this study their result is probably biased by a non-random sample in the selection of the first generation immigrants. As a contrast to their study, the result of this thesis shows that there is actually a significant regression towards the mean between first and second generation immigrants.

The finding on the ethnic intergenerational transmission of educational attainment is significant. The magnitude of the transmission is, as far as a comparison is possible, smaller than for the other outcome variables examined. Education is the only outcome variable where the groups of first generation immigrants on average actually have an advantage compared to

the native Swedes. The smaller magnitude of the educational transmission causes a fast regression towards the mean, and the educational advantage of the immigrants is likely to disappear within only a few generations. The high degree of regression towards the mean may be caused by the second generation immigrants attending Swedish schools and the Swedish educational system, as the second generation immigrants are the first to go to the same schools in the same educational system as the native Swedes.

When studying the ethnic intergenerational transmission of employment, there are also findings of regression towards the mean. The transmission is estimated to a magnitude of about 0.4, which also shows that there is a high degree of transmission among the groups of immigrants. But the findings also show that for most of the immigrant groups there is a substantial disadvantage in the rate of employment, which may cause the differences in the rate of employment to persist for many generations.

The empirical results thus show that even though the groups of first generation immigrants on average may have an educational advantage compared to the native Swedes, they are disadvantaged considering income and the rate of employment. The lower level of ethnic intergenerational transmission of education, as far as a comparison is possible to income and rate of employment, shows that the educational advantage is likely to disappear quite fast, while the disadvantages in income and rate of employment may persist for many generations.

There may be many reasons for these patterns found. The reason for the low level of educational transmission may as earlier mentioned follow from the second generation immigrants attending the Swedish educational system. Although many empirical findings of a positive return to schooling, (see e.g. Trostel et al 2002,) the immigrants as earlier mentioned on average have lower income levels than the Native Swedes. Whether these discrepancies exist because of less Swedish-specific capital, that the education of the immigrant is not well matched for the Swedish labour market or because of discrimination is hard to answer. What though can be seen from the empirical results in this thesis is that these disadvantages to a high degree are likely to persist over many generations.

The empirical results in the thesis also show that the ethnic intergenerational transmission of income differs if the immigrant groups are divided into sub-samples. A sub-sample of group of immigrants that are assumed to be more alike the native Swedes regarding culture, religion and languages, show a higher transmission than the less similar groups. The less similar groups are though on average more disadvantaged in the first generation, something that may be a sign of more discrimination towards these groups.

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[7] See chapter 7.5

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Appendix

A.1

(9) $\qquad y_{i,t+1} = \alpha_1 + \beta_1 y_{ij,t} + \beta_2 \bar{y}_{j,t} + v_{ij}$

Which gives;

$$\sum_{i=1}^{n_j} y_{i,t+1} = n_j \alpha_1 + \beta_1 \sum_{i=1}^{n_j} y_{ij,t} + n_j \beta_2 \bar{y}_{jt}$$

As $\displaystyle\sum_{i=1}^{n_j} y_{ij,t} = n_j \bar{y}_{jt}$ it follows that

$$\sum_{i=1}^{n_j} y_{ij,t+1} = n_j \alpha_1 + n_j \beta_1 \bar{y}_{jt} + n_j \beta_2 \bar{y}_{jt} = n_j (\alpha_1 + (\beta_1 + \beta_2)\bar{y}_{jt}) \text{ and}$$

$$\frac{1}{n_j} \sum_{i=1}^{n_j} y_{ij,t+1} = \alpha_1 + (\beta_1 + \beta_2)\bar{y}_{jt} \quad \text{which equals,}$$

(10) $\qquad \bar{y}_{j,t+1} = \alpha_1 + \beta \bar{y}_{j,t} + \tau_{jt}$

A.2

Table A1. Intergenerational transmission of employment

Specification	Constant	Ethnic Intergenerational coefficient	R^2
First generation 1980 and second generation 2003, age-adjusted. Employed if income exceeds 30,000 SEK	-0.064* *0.016*	0.550** *0.206*	0.169
First generation 1985 and second generation 2003, age-adjusted. Employed if income exceeds 30,000 SEK	-0.043* *0.010*	0.360* *0.053*	0.573
First generation 1980 and second generation 2003, age-adjusted. Employed if income exceeds 60,000 SEK	-0.051* *0.014*	0.578* *0.125*	0.378
First generation 1985 and second generation 2003, age-adjusted. Employed if income exceeds 60,000 SEK	-0.035* *0.010*	0.370* *0.045*	0.658
First generation 1980 and second generation 2003, age-adjusted. Employed if income exceeds 75,000 SEK	-0.054* *0.012*	0.510* *0.093*	0.462
First generation 1985 and second generation 2003, age-adjusted. Employed if income exceeds 75,000 SEK	-0.034* *0.010*	0.368* *0.042*	0.684

(* = Significant at 1% level   ** = Significant at 5% level)

A.3

Table A2. Age-adjusted differences in log income for first and second generation immigrants, less and more discriminated, relative to native Swedes.

A. Father's origin, less discriminated groups	B. Differences in log income first generation immigrants, 1980 data set	C. Differences in log income second generation immigrants, 2003 data set	D. Father's origin, more discriminated groups	E. Differences in log income first generation immigrants, 1980 data set	F. Differences in log income second generation immigrants, 2003 data set
Income Level native Swedes	*11.13*	*11.54*	*Income Level native Swedes*	*11.17*	*11.53*
Denmark	-0.11	-0.06	Bulgaria	-0.24	-0.12
Finland	-0.09	-0.05	Estonia	0.11	0.06
Norway	-0.01	-0.07	Poland	-0.18	-0.18
Iceland	-0.02	-0.02	Romania	-0.12	-0.26
France	-0.25	-0.22	Soviet Union	-0.11	-0.09
Holland	-0.07	-0.10	Czechoslovakia	-0.08	0.02
Great Britain	-0.16	-0.19	Hungary	-0.14	-0.12
Germany	-0.03	-0.02	Eastern Europe	0.15	0.04
Austria	-0.06	-0.05	Greece	-0.30	-0.23
Italy	-0.25	-0.17	Yugoslavia	-0.19	-0.12
Spain	-0.27	-0.16	Portugal	-0.24	-0.14
Western Europe	-0.01	-0.04	Southern Europe	-0.18	-0.16
United States	-0.18	-0.25	Chile	-0.62	-0.35
Canada	-0.16	-0.09	Latin America	-0.46	-0.33
			Morocco	-0.43	-0.25
			Africa	-0.44	-0.28
			India	-0.17	-0.26
			Pakistan	-0.26	-0.45
			Asia	-0.34	-0.17
			Iran	-0.69	-0.37
			Palestine	-0.32	-0.22
			Turkey	-0.31	-0.38
			Middle East	-0.38	-0.25

A.4

Table A3. Age-adjusted differences in log income for first and second generation immigrants relative to native Swedes.

A	B. Father's origin	C. Differences in log income first generation immigrants, 1980 data set. Foreign born spouse	D. Differences in log income Second generation immigrants, 2003 data set. Foreign born mother	E. Differences in log income first generation immigrants, 1980 data set. Swedish born spouse	F. Differences in log income Second generation immigrants, 2003 data set. Swedish born mother
	Income level native Swedes	*11.86*	*11.54*	*11.87*	*11.54*
1	Denmark	-0.09	-0.07	-0.11	-0.06
2	Finland	-0.12	-0.07	-0.05	-0.03
3	Norway	0.04	-0.08	-0.03	-0.07
4	Iceland	-0.09	0.03	0.04	-0.06
5	France	-0.32	-0.12	-0.24	-0.24
6	Holland	-0.10	-0.09	-0.07	-0.10
7	Great Britain	-0.21	-0.22	-0.14	-0.19
8	Germany	-0.03	0.00	-0.03	-0.02
9	Austria	-0.01	-0.09	-0.06	-0.04
10	Western Europe	0.03	-0.07	-0.02	-0.03
11	Bulgaria	-0.22	-0.14	-0.25	-0.09
12	Estonia	0.18	0.03	0.08	0.08
13	Poland	-0.25	-0.25	-0.09	-0.08
14	Romania	-0.17	-0.28	-0.09	-0.25
15	Soviet Union	-0.12	-0.08	-0.10	-0.10
16	Czechoslovakia	-0.10	0.00	-0.06	0.05
17	Hungary	-0.19	-0.12	-0.11	-0.12
18	Eastern Europe	0.11	-0.07	0.17	0.08
19	Greece	-0.24	-0.26	-0.43	-0.18
20	Italy	-0.24	-0.23	-0.25	-0.15
21	Yugoslavia	-0.18	-0.14	-0.24	-0.08
22	Portugal	-0.21	-0.03	-0.27	-0.24
23	Spain	-0.30	-0.14	-0.26	-0.17
24	Southern Europe	-0.19	-0.16	-0.16	-0.13
25	United States	-0.27	-0.58	-0.17	-0.21
26	Canada	0.20	0.18	-0.21	-0.12
27	Chile	-0.68	-0.40	-0.54	-0.26
28	Latin America	-0.65	-0.52	-0.36	-0.23
29	Morocco	-0.38	-0.30	-0.46	-0.21
30	Africa	-0.43	-0.39	-0.44	-0.26
31	India	-0.31	-0.44	-0.07	-0.15
32	Pakistan	-0.14	-0.79	-0.37	-0.14
33	Asia	-0.40	-0.29	-0.30	-0.11
34	Iran	-0.77	-0.32	-0.64	-0.39
35	Palestine	-0.41	-0.40	-0.22	-0.03
36	Turkey	-0.31	-0.37	-0.37	-0.43
37	Middle East	-0.42	-0.20	-0.34	-0.31