Role of Family Structure in Immigrants' Economic Integration

by

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Signed: Z. Eylem Gevrek

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Dedication

To my parents, Orhan and Naciye.

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ABSTRACT

This dissertation consists of three essays that focuses on the role of family structure in shaping the economic integration of immigrants. The first essay analyzes the interaction between the labor market and the marriage market for immigrants. I examine the relationship between interethnic marriage and the labor market integration of immigrants. The main findings of this study indicate that intermarriage has a positive effect on immigrants' labor market outcomes. Intermarried immigrants earn more than their co-ethnic married counterparts. Marrying a native is associated with a wage premium of seven percent. Moreover, intermarriage premium varies across generations. Second-generation immigrants are found to receive no gain from intermarriage. The second essay investigates whether there is a significant difference in the educational attainment of second-generation immigrants associated with the presence of a native-born parent. It is important to study educational attainment of children of immigrants as human capital investment is a crucial factor for labor market success. The second essay provides evidence that children with a native-born parent have higher educational attainment than those with two immigrant parents. The third essay empirically examines the impact of culture on the work behavior of second-generation immigrant women. Using female labor force participation and total fertility rates in the country of ancestry as cultural proxies, I find that culture matters for the female labor supply. In line with the sociological literature that considers intermarriage as a sign of inclination toward cultural assimilation, I also find that the impact of cultural proxies is significantly larger for women with immigrant parents than for those with intermarried parents.

Chapter 1

Interethnic Marriage and the Labor Market Integration of Immigrants

1.1 Introduction

Social scientists consider interethnic marriage as one of the most important indicators of social and economic integration of immigrants for several reasons (Gordon 1964; Kalmijn 1998; Muttarak 2004). First, interethnic marriage helps accelerate the fading of cultural and social barriers between immigrants and natives. Second, a high level of interethnic marriage is associated with decreasing dissimilarities in labor market outcomes of immigrants and natives. Furthermore, Muttarak (2004) points out that intermarriage is not only an indicator of integration but also a primary cause of it. Although the economic integration of immigrants has been the subject of a large literature, research on the effect of intermarriage on immigrants' economic integration[1] is scarce (Kantarevic 2004; Meng and Gregory 2005; Meng and Meurs 2009).

This study aims to investigate the role of interethnic marriage in immigrants' economic integration in the Netherlands. To this end, I measure the economic performance of immigrants in terms of wages. There are at least two reasons to consider intermarriage as one of the important factors that affect the integration process of immigrants. First, having a native spouse gives access to native networks. These networks are influential in creating productive social capital that may promote immigrants' economic integration. Second, intermarried immigrants can increase their human capital accumulation, especially language proficiency and knowledge of the local labor market, through their native spouses, thus contributing positively to their labor market productivity.

Estimating the causal impact of intermarriage on wages is complicated for several reasons. First, intermarriage can be endogenous in the wage equation. Intermarried immigrants might

[1] I use the terms 'integration' and 'assimilation' interchangeably throughout the article. Interethnic marriage is defined as the union of an immigrant with a native. These unions may be in the form of legal marriages as well as de facto relationships.

be a selected sub-sample from the population of all married immigrants (Kantarevic, 2004). For instance, they may have unobserved characteristics, such as physical appearance and social skills that could also affect their labor market outcomes. Another source of endogeneity might be reverse causality. Marrying a native increases the human capital accumulation of an immigrant, thus improving the immigrant's position in the labor market, or it can be argued that the causal relationship is the opposite: favorable labor market outcomes may increase the probability of marrying a native. To endogenize the interethnic marriage decision, I use group size and sex ratio as instruments. Group size is the ratio of the number of female immigrants in the ethnic group to the total female population in the Netherlands. Sex ratio represents the number of female immigrants relative to number of male immigrants in the ethnic group. While the former captures the availability of potential spouses of the same ethnic group, the latter captures the competition for those potential spouses. The rationale for the use of these instruments as follows: The larger the size of an immigrant group, the more likely an immigrant will meet a partner from his own ethnic group and the higher the probability of marrying endogamously. The skewed sex ratios, i.e., more competition for co-ethnic spouses, encourage intermarriage. Another estimation issue is the selectivity of employment status. The sample selection problem arises as wages are observed only when individuals work. The econometric model used in the empirical analysis accounts for the potential biases resulting from the endogeneity of intermarriage and sample selection.

The data used come from the SPVA, 'Social Position and Use of Public Utilities by Immigrants'. This survey provides information on the socio-economic and socio-cultural position of the four largest ethnic minorities in the Netherlands: Turks, Moroccans, Surinamese and Antilleans. The sample used in the empirical analysis consists of first-and second-generation male immigrants.[2]

The contribution of this paper to the relevant literature is threefold. First, due to data limitations the literature on the intermarriage premium considers the unions between first- and second-generation immigrants as intermarriage. Even though second-generation immigrants are closer to the native population, they do not necessarily have the same human and

[2]I use the term 'first-generation' to refer to people who were born abroad. Second-generation is defined as those who were born in the Netherlands but have at least one foreign-born parent. Natives refer to individuals who were born in the Netherlands with both parents also born in the Netherlands.

social capital as the native population does. Therefore, treating second-generation immigrants as natives may affect the estimates of intermarriage premia. In this study, I am able to distinguish second-generation immigrants from natives as the data contain information on the parents' country of birth. Furthermore, this information allows me to test whether or not the intermarriage premium varies across generations.

Second, an important limitation of the previous literature is its failure to address two key empirical issues simultaneously. I control for both endogeneity of intermarriage and sample selection by using the discrete factor method of Mroz (1999). The discrete factor method (hereafter DFM) is a full-information maximum likelihood technique in that DFM does not impose a priori distributional assumptions on the unobserved heterogeneity, but instead it approximates the distribution of the unobserved heterogeneity with a discrete distribution where mass points and probabilities are estimated. Mroz (1999) shows that when the true distribution of error terms is joint normal, DFM performs as well as alternative estimators that assume normality and DFM is superior to normality-based estimators when the underlying distribution is non-normal.[3] Moreover, DFM outperforms 2SLS in the presence of weak instruments.

Third, an additional weakness of the previous literature is that the instruments, group size and sex ratio are measured at the time of survey under the assumption that immigrants have been exposed to the same structural factors at the time of marriage. However, this assumption is not valid if marriages took place a long time ago and structural factors changed over time. The data set I used contains information on the year of marriage. Taking advantage of this information, I construct the instruments by matching an immigrant's year of marriage with the corresponding group size and sex ratio in that year. Therefore, I am able to assess the influence of structural factors on intermarriage more accurately, making my identification strategy more credible.

To the best of my knowledge, there are only three studies that analyze the relationship between intermarriage and economic assimilation. Meng and Gregory (2005) find that intermarried immigrants assimilate faster and earn more than their endogamously married

[3]Though the DFM allows the distribution of unobserved heterogeneity to approximate a normal distribution if the data suggest it, this technique is general enough to include other distributions for unobserved heterogeneity.

counterparts in Australia. They report a substantial intermarriage premium, around 20 percent, for immigrants from non-English-speaking countries. Meng and Meurs (2009) also provide evidence that intermarried immigrants have significantly higher earnings than their co-ethnic married counterparts in France. On the other hand, Kantarevic (2004) does not find any causal relationship between earnings and intermarriage in the U.S. He tests two competing hypotheses: the productivity hypothesis and the selection hypothesis. According to the productivity hypothesis, immigrants married to native-born spouses assimilate faster than comparable immigrants who are married to foreign-born spouses. In contrast, the selection hypothesis claims that the relationship between intermarriage and economic assimilation is spurious. The effect of intermarriage on the economic assimilation disappears after accounting for selection into intermarriage. Kantarevic's empirical findings support the selection hypothesis.

The main findings of this study indicate that intermarriage has a positive effect on immigrants' labor market outcomes. Intermarried immigrants earn more than their co-ethnic married counterparts. Marrying a native is associated with a wage premium of seven percent. When the effect of intermarriage is allowed to differ between first-and second-generation immigrants, the results suggest that intermarriage has a positive but statistically insignificant impact on earnings among second generation immigrants.

The paper is organized as follows: Section 2 presents the theoretical concepts that explain why labor market outcomes differ between immigrants married to natives and those married within their own ethnic group. Section 3 provides background information on the migration history and labor market performance of the four ethnic minorities in the Netherlands. Section 4 describes the data and variables used in the empirical work. Section 5 introduces the econometric model and discusses the identification strategy. Section 6 presents the results from empirical analysis with a discussion on robustness checks while Section 7 concludes.

1.2 Theoretical Framework

Social Capital Theory places emphasis on the role of social capital on immigrants' labor market success (Aguilera 2002, 2005). It is argued that immigrants are disadvantaged in the labor market because they have a social network mostly comprising members of their

own ethnic group whose knowledge of the labor market is not as good as that of natives. Marrying a native gives access to native networks. Having access to these networks could reduce job search costs and increase the probability of finding a job with higher wages as natives are better informed about job openings and they are better positioned to find jobs. Therefore, Social Capital Theory suggests that intermarried immigrants have better labor market outcomes than those who are endogamously married.

The Family Investment Hypothesis (FIH) focuses on the role of family structure in the assimilation of immigrants (Worswick 1999; Baker and Benjamin 1997; Blau et al. 2003). The FIH suggests that the labor market assimilation profile differs across family types: immigrant families (i.e. where both spouses are immigrants) versus mixed families (i.e. where only one spouse is an immigrant). Since immigrant families are assumed to be credit-constrained, borrowing and investing activities are separated among family members such that one partner foregoes her/his own investment in human capital and takes dead-end jobs to finance the human capital investment of the other partner.[4] On the other hand, immigrant partners in mixed families who are assumed not to be credit-constrained do not need to perform the borrowing function for their families as do their counterparts in immigrant families. Therefore, immigrant partners in mixed families can invest in host country-specific human capital or afford to wait for a job with a higher wage. Those different investment behaviors across family types may explain why the labor market outcomes differ between immigrants married to immigrants and immigrants married to natives.

According to Classical Assimilation Theory, the process of assimilation begins with acculturation, i.e., adopting the culture of the native groups such as norms, practices, and values and learning the native language. Gordon (1964) suggests that acculturation is followed by structural assimilation which is defined as 'large scale entry into the cliques, clubs and institutions of the core society'. Gordon argues that structural assimilation weakens ethnic attachment and increases contact between immigrants and natives, leading to an increase in intermarriage. Intermarriage, in turn, gradually erases cultural and socioeconomic features

[4]Although in the empirical literature the male partner is typically considered to be the primary worker who invests in host country-specific human capital while the female partner is assumed to be the secondary worker who undertakes labor market activities to finance current consumption and the human capital accumulation of the primary worker, Cobb-Clark and Crossley (2004) define the primary worker as the partner with greater labor market skills and experience regardless of gender.

that had previously distinguished the immigrant groups from natives and reduces the social distance between immigrants and natives. In this framework, intermarriage is regarded as the final stage of assimilation. Therefore, Assimilation theory asserts that intermarriage has a positive effect on the labor market outcomes of immigrants through weakening ethnic attachment that hampers economic assimilation.

The Productivity Hypothesis in the marriage premium literature argues that married men can accumulate more human capital than their single counterparts through greater specialization and division of labor within a household, leading to an increase in their labor market productivity (Becker 1973). The productivity hypothesis explains why intermarriage promotes economic integration of immigrants for several reasons. First, a native spouse can contribute to human capital accumulation of an immigrant, especially by improving his language proficiency. Proficiency in the host country's language is a crucial factor in the process of immigrants' economic assimilation and social integration. Chiswick and Miller (1995, 2002) find that fluency in the host country's language increases the likelihood of immigrants' being employed and is associated with higher earnings. Second, a native spouse can also provide knowledge about the host country's customs, culture and informal rules regulating the labor market, increasing an immigrant's competitiveness in the labor market.

On the other hand, the Selection Hypothesis, an alternative to the Productivity Hypothesis, claims that more productive men are self-selected into marriage; therefore the marriage premium vanishes when this selection issue is controlled for (Nakosteen and Zimmer 1987, Stratton 2002). In our settings, the Selection Hypothesis implies that intermarried immigrants do not become more assimilated after marriage; rather they were already more assimilated before marriage. Hence, the Selection Hypothesis predicts that intermarriage does not have a causal effect on the labor market outcomes.

1.3 Background

The Netherlands has been classified as a net-immigration country since the 1960s (Belevender and Veenman 2004). Foreigners, first-and second-generation immigrants, constituted 19.4%

of the Dutch population in 2007.[5] Turks, Moroccans, Surinamese, and Antilleans are the four largest immigrant groups in the Netherlands and make up 66% of the immigrant population. First immigrants from Turkey and Morocco arrived in the Netherlands during the 1960s as a result of the Dutch government's attempt to alleviate the growing need for low-skilled workers in Dutch industry. Although the Dutch government stopped the labor recruitment program at the end of 1973, immigration from the above-named countries has continued as a result of increasing family reunification in the 1980s and marriage formation in the 1990s (Kalmijn and Van Tubergen 2007). Table 1.1 shows that Turk and Moroccan immigrants represented 2.3 % and 2% respectively of the Dutch population in 2007.

The first migration from Suriname and the Antilles, former colonies of the Netherlands, took place in the 1950s. More than 50,000 Surinamese came to the Netherlands due to political instability just before Suriname declared its independence from the Netherlands in 1975. The second immigration peak occurred in 1979 and 1980 shortly before the Dutch government introduced visa requirements to control the free movement of immigrants. At that time, approximately 30,000 Surinamese immigrated to the Netherlands. The prolonged recession through the second half of the 1990s in the Antilles led to a large-scale Antillean immigration to the Netherlands (Bevelander and Veenman 2004). Table 1.1 indicates that the Antillean population in the Netherlands is much smaller than the Surinamese population; while 2% of the total population of the Netherlands are first-and second-generation Surinamese, the Antillean population represented only 0.8% of the Dutch population in 2007.

There are some specific differences between immigrants from Suriname and the Antilles (Caribbeans) and those from Turkey and Morocco (Mediterraneans). Because Suriname and the Antilles were former Dutch colonies, the Caribbean groups are more acquainted with the Dutch society or language than the Mediterranean groups who were not exposed to the Dutch culture and language before they immigrated to the Netherlands. Moreover, Turks and Moroccans are mostly Muslim as opposed to Caribbeans, especially Antilleans, who are mainly Christian. Kalmijin and Van Tubergen (2007) point out that Mediterraneans are a more closed group than Caribbeans in the Netherlands because of these differences in

[5]In the publications of Statistics Netherlands, foreigners are defined as persons who are living in the Netherlands and of whom at least one parent is born abroad.

language and religion.

On average, the labor market position of immigrant workers lags behind that of the native Dutch. As far as employment levels are concerned, unemployment rates for the four main immigrant groups are several times as high as that for the native Dutch (Van Ours and Veenman 2005). Turks and Moroccans are the most disadvantaged, while the Caribbeans still have higher unemployment rates than the native Dutch. Bevelander and Veenman (2004) investigated the employment integration of ethnic minority males in the Netherlands from 1988 to 2002. They point out that after controlling for individual characteristics, both Caribbean and Mediterranean groups had lower employment chances in the years 1991, 1994, and 1998 compared to Dutch natives. However, Caribbeans had the same employment chances as the native Dutch in 1988 and 2002. The immigrant groups also are disadvantaged in terms of wages. Van Ours and Veenman (2005) indicate that the native Dutch have higher earnings than the aforementioned immigrant groups. The Antilleans most closely approximate the native Dutch and are followed by the Surinamese, the Turks and the Moroccans respectively.

In the literature there are several explanations for the disadvantageous labor market position of immigrants in the Netherlands. Studies focusing on the demand side of the labor market underline the existence of discrimination and prejudice in the Dutch labor market and the concentration of immigrants in particular industries that are affected more than others during recessions (Gras and Bovenkerk 1999; Kee 1995; Van Ours and Veenman 2005). Moreover, some studies emphasize the importance of institutional factors, such as policies on the labor market integration of immigrants (Reitzet et.al 1999). Van Ours and Veenman (2005) argue that the relatively poor employment position of ethnic minorities in the early 1980s in the Netherlands might be explained by the policy of the Employment Office that emphasized the preferences of employers rather than equal opportunity for workers.

On the other hand, studies focusing on the supply side of the labor market, in line with human capital theory, point out that immigrants usually lag behind the native Dutch in terms of education, country-specific skills, and language proficiency, resulting in a weak position in the labor market (Kee 1993). Applying a symmetric approach to the labor market in their analysis, Nieseng et al.(1994) suggest that half of the difference in employment chances between the native Dutch and ethnic minority groups in the Netherlands is attribuTable 1.to

differences in personal characteristics.

Another supply-side explanation emphasizes the impact of social capital on immigrants' labor market positions. Examining the role of human and social capital in immigrant employment and occupational status in the Netherlands, Van Tubergen and Kanas (2006) find that human capital has a positive impact on immigrants' labor market positions and the returns on host-country specific human capital are much higher than the returns on origin-country specific human capital. Although they find that immigrants who have more contacts with Dutch natives are less often unemployed and have a higher occupational status, this positive effect of social capital disappears considerably after human capital characteristics are controlled for. Conversely, Veenman (1998) suggests that in addition to education level, work experience and Dutch language proficiency, social contact with Dutch natives has a positive impact on the employment integration of immigrants in the Netherlands.

1.4 Data and Descriptive Statistics

The data used in this study come from the SPVA, 'Social Position and Use of Public Utilities by Immigrants'. The SPVA is a large-scale, cross-sectional[6] immigrant-specific survey (Van Ours and Veenman 2003). The aim of this survey is to collect information on the socio-economic and socio-cultural position of the four largest ethnic minorities in the Netherlands: Turks, Moroccans, Surinamese and Antilleans. In the SPVA, the main respondents are heads of households who are interviewed through an extensive questionnaire. In addition, partners and offspring aged 11 years and older are interviewed with the shortened version of the main questionnaire. The SPVA surveys contain extensive information on immigrants' labor market outcomes, their migration history, education, and cultural attitudes.

The SPVA comprises random samples of the population in thirteen cities, including the four largest in the Netherlands.[7] The first survey was conducted in 1988 and repeated thereafter in 1991, 1994, 1998, and 2002. I restrict the sample to immigrants married after

[6]The SPVA contains a small panel, about 10% of the sample. I use the sub-samples of the SPVA surveys comprising those who were interviewed for the first time.

[7]For the 1994, 1998 and 2002 surveys, in addition to the four major cities in the Netherlands (Amsterdam, Rotterdam, The Hague, and Utrecht) Almere, Alphen aan de Rjin, Bergen op Zoom, Delft, Dordrecht, Eindhoven, Enschede, Hoogezand-Sappemeer, and Tiel are included.

migration. The rationale for doing this is that immigrants who marry before they arrive in the Netherlands are not subject to the same structural factors as those who married in the Netherlands. For example, the sex ratio variable in the Netherlands in 1980 would be irrelevant for an immigrant who married in Morocco in 1980 and immigrated to the Netherlands in 1995. To apply this selection rule, I need information on the year of marriage and the year of immigration. This information was not collected for 1988 and 1991 surveys. Therefore, I make use of the surveys collected in 1994, 1998, and 2002.

The final sample includes both the first-and second-generation married male immigrants aged between 25 and 60 years, married after migration and working full-time.[8] I use the term 'first generation' to refer to people who were born abroad and then immigrated to the Netherlands. Second-generation immigrants are defined as those who were born in the Netherlands but have at least one foreign-born parent. The lower and upper age categories chosen are based on the assumption that individuals older than 24 participate in the labor market since they have typically finished their studies by that age and that individuals older than 60 leave the labor market (Bevelander and Veenman 2004). After removal of cases with incomplete information, the final sample contains 1712 marriages.[9]

I am primarily interested in two types of marriages: (i) *Exogamous marriages*; in which the immigrant's partner is native Dutch;[10] and (ii) *Endogamous marriages*; in which the immigrant's partner or her parent(s) come from the same country as the immigrant. In 35 cases the information on the birthplace of parents-in-law is missing.[11] For these cases, I utilize information on the birthplace of the partner only. Table 1.2 presents the interethnic marriage rates among ethnic groups. The overall interethnic marriage rate in the sample is

[8]I restrict the analysis to men, because information on hourly wages is available only for the heads of households. Among Turks and Moroccans typically men and only a few women are heads of households. Ninety-six percent of employed males who are married after immigration and aged between 25 and 60 are full time workers. The full-time worker is defined as someone who reports that he is working 30 hours or more a week. The final sample includes the full-time workers only.

[9]It is important to note that the final sample consists of married immigrants only. I do not model the selection into marriage as it is quite difficult to find an instrument that is related to the probability of marriage but at the same time unrelated to the probability of intermarriage and does not have a direct impact on wages. Twenty percent of immigrants aged between 25 and 60 years are single.

[10]The final sample does not include exogamous marriages with the other ethnic groups for example, Surinamese men who are married to Turkish women. There are only 67 such marriages in the final sample.

[11]For those cases, some of the partners might be treated as native while they were actually second-generation immigrants.

11%. The Antilleans appear to have the highest percentage of intermarried immigrants while the Turks have the lowest intermarriage rate. The Caribbean groups, i.e., Surinamese and Antilleans, marry exogamously more often than the Mediterranean groups, i.e., Turks and Moroccans. There are several explanations for the high rates of intermarriage in Caribbean groups (Kalmijn and Van Tubergen 2007). First, as mentioned earlier, since Suriname and the Dutch Antilles were former colonies of the Netherlands, Caribbean groups are quite familiar with the Dutch culture and language. On the other hand, the language background of the Mediterranean groups is different from that of the Caribbean groups. Turks and Moroccans were not exposed to the Dutch language before immigration. Immigrants who do not speak the language of the host country very well have fewer opportunities to interact with the native population and this would naturally decrease the propensity to intermarry. Second, religious affiliation is another important factor affecting the partner selection process. Unlike the Caribbean groups who are mainly Christian,[12] the Mediterranean groups are mostly Muslim. Islam stresses similarity in religious outlook as one of the most important traits in the partner selection process. Although in some circumstances, Muslim men are permitted to marry non-Muslim women, interfaith marriages are not recommended for the sake of religious compatibility between partners and the upbringing of children. A further explanation for the comparatively low rates of interethnic marriage in the Mediterranean groups is that among Turks and Moroccans, arranged marriages with the members of the same ethnic group are quite common. In this kind of marriage, partner selection is influenced by traditional family values.

Table 1.3 presents the definitions of the variables used in the empirical analysis. I use the logarithm of hourly wage as the measure of earnings. The hourly wage variable is constructed by the division of net monthly earnings from paid work by the monthly hours of work (weekly hours of work multiplied by four).[13] I distinguish four levels of education:

[12]There are three main ethnic subgroups of the Surinamese population: (i)*East Indians* of whom the majority of this group are Hindu; (ii) *Indonesians* who are mostly Muslim; and (iii) *Creoles* who are predominantly Christian.

[13]It is also important to note that the currency used in the Netherlands before the Euro was the Dutch guilder. The Dutch guilder expired in January 28, 2002. Thus, the data on monthly earnings collected in the 1994 and 1998 waves were in Dutch guilders. For these survey years, the Dutch guilder is converted to Euro at the rate 1 euro=2.20371 Dutch Guilders. Individuals with net monthly earnings of less than 500 Euros are excluded from the analysis.

(1) Primary education; (2) Lower secondary education; (3) Higher secondary education; and (4) University education. To control for ethnicity, I divide immigrant groups into two main categories: the Caribbean groups, i.e., Surinamese and Antilleans, and the Mediterranean groups, i.e., Turks and Moroccans, as they are homogenous in terms of religious, cultural and language background. In the SPVA, respondents were asked whether they have difficulty speaking Dutch. There are three possible answers: (1) Yes, always (2) Yes, sometimes (3) No, never. To measure language proficiency, I construct an indicator variable that takes on the value of 1 if the respondent's answer is 'No, never' and zero if his answer is 'Yes, always' or 'Yes, sometimes'.[14]

It is well-documented in the literature that the time spent in the host country, often referred to as years since migration, is an important factor influencing the assimilation process (Borjas 1994, 1999; Chiswick, 1991). Immigrants who have been in the host country for a longer time acquire more country-specific skills that affect their economic integration positively. I construct six categories for the years-since-migration variable: 0-5 years, 6-10 years, 11-15 years, 16-20 years and 21 years or more. Moreover, to control for possible variations in regional labor market conditions, I construct an indicator variable that takes on the value of 1 if the municipality in which the immigrant lives is large and zero otherwise.[15]

Next, I will discuss the construction of the two instruments used to endogenize the intermarriage decision. Sex ratio measures the number of group members of the opposite sex divided by the number of group members of the same sex aged 15-60.[16] Data are available for the period 1972-2002 on an annual basis.[17]

[14]Proficiency in the host country's language has been found to play an important role in the process of economic assimilation of immigrants (Chiswick 1991; Chiswick and Miller 1992,1995; Dustmann and Fabbri 2003). In my main analysis, I do not control for immigrants' Dutch language proficiency due to possible endogeneity between language fluency and earnings. In addition, the direction of causality between intermarriage and language fluency is ambiguous. While intermarriage increases language fluency, language fluency may also increase the likelihood of intermarriage (Meng and Gregory 2005). The complicated relationships among earnings, intermarriage and language fluency make the model more complex and necessitate a better dataset. In the Robustness Checks section, treating Dutch proficiency as exogenous in the wage equation, I examine how the results are affected when the indicator variable for speaking Dutch fluently is included in the wage equation.

[15]The binary variable Bigcity takes a value of 1 if the immigrant lives in one of the four major cities in the Netherlands, Amsterdam, Rotterdam, The Hague, and Utrecht, and zero otherwise.

[16]Examining the relationships between several measures of sex ratio and family formation, Fossett and Kiecolt (1991) find that the simple sex ratio based on the total population is highly correlated with that computed for unmarried population or narrow age ranges.

[17]The data are obtained from the database of Statistics Netherlands at http://www.cbs.nl/en-

The sex ratio for an individual i from ethnic group e who married in year t can be specified as:

$$SR_{it}^{e} = \frac{n_t^{fe}}{n_t^{me}} \tag{1.1}$$

where n_t^{fe} and n_t^{me} are the number of females and males aged 15-60 respectively in the ethnic group e in year t. To construct the sex ratio variable, I match the year in which the immigrant married with the relevant group-specific sex ratio for that year.

Group size represents the number of immigrants of the opposite sex relative to the total population of the opposite sex aged 15-60. The group size for individual i from ethnic group e who married in year t can be specified as:

$$GS_{it}^{e} = \frac{n_t^{fe}}{n_t^{f}} \tag{1.2}$$

where n_t^{fe} is the number of females aged 15-60 from ethnic group e in year t and n_t^{f} is the total number of females aged 15-60 in the Netherlands in year t. I construct this variable by matching an immigrant's year of marriage with the corresponding size of the immigrant group in that year. Because the data are not available for the pre-1972 period, for immigrants who married before 1972, I use the group size and sex ratio figures for 1972.[18] In the empirical analysis, I use the log transformation to reduce the degree of skewness in group size and sex ratio variables.

Figure 1 shows how the size of the immigrant groups has grown for the period 1972-2002 in the Netherlands, while Figure 2 presents the trend in sex ratios for each of the four groups for the same period. Figure 2 indicates that although the sex ratios for Turks and Moroccans were quite unbalanced at the beginning of the period, suggesting a dramatic shortage of female immigrants, they became more balanced over time. On the other hand, the Caribbean groups, i.e. Surinamese and Antilleans, initially have much more favorable sex ratios (close to one) than Turks and Moroccans do. Interestingly, the sex ratios for Surinamese turned out to be greater than one for the post-1980 period, indicating a shortage of men.

GB/default.htm

[18]The marriage market might be geographically bounded. Since the data are not available at the province level, I measure sex ratio and group size at the nation level.

Table 1.4 presents the descriptive statistics by type of marriage, which lead to several main conclusions. First, intermarried immigrants earn more than their endogamously married counterparts. Second, intermarried and nonintermarried immigrants also differ in employment rate. In the intermarried sample, 72% of immigrants are employed while in the nonintermarried sample the employment rate is 54%. Third, the Caribbean groups, i.e., Surinamese and Antilleans, are more likely to intermarry than the Mediterranean groups, i.e., Turks and Moroccans. Fourth, intermarried immigrants are generally more educated, have spent more years in the Netherlands, and live in smaller cities compared to nonintermarried immigrants. Further, seventy-four percent of intermarried immigrants speak Dutch fluently, whereas the rate for co-ethnic married immigrants is only 38%. Finally, the generational composition of the intermarried sample is different from that of the non-intermarried sample. Second-generation immigrants seem more likely to marry exogamously than first-generation immigrants. To sum up, because the intermarried and nonintermarried immigrants differ in certain characteristics that might also affect their labor market outcomes, I control for these differences in the wage equation.

1.5 Econometric Framework

The objective of this paper is to investigate whether immigrants married to a native have better labor market outcomes than those married within their own ethnic group. To this end, the baseline earnings equation for immigrants is specified as follows:

$$ln(w_i) = X'_{1i}\beta_1 + \delta I_i + u_{1i} \tag{1.3}$$

where $ln(w_i)$ is the natural log of hourly wage for individual i; *intermarriage*, denoted by I, is a binary variable that takes on a value of one if the immigrant married a native and zero if the immigrant married within his own ethnic group. X_{1i} represents a vector of other control variables,[19]and u_{1i} is an error term.

The term δ is the primary coefficient of interest and measures the intermarriage premium. Two important issues need to be addressed in order to obtain a consistent estimate of δ.

[19] X_{1i} includes age (and its squared term), educational level, years since migration, Caribbean, bigcity, and survey year indicators. See Table 1.3 for the definitions of control variables.

First, intermarriage can be endogenous in the wage equation. It is possible that intermarried immigrants have unobserved characteristics, such as physical appearance or social skills that may also affect their labor market outcomes.[20] In order to take this endogeneity problem into account, I incorporate the intermarriage equation into the model. The intermarriage decision is specified in terms of the latent variable I_i^*:

$$I_i^* = X_{2i}'\beta_2 + u_{2i} \tag{1.4}$$

$$I_i = \begin{cases} 1 & \text{if } I_i^* \geq 0 \\ 0 & \text{if } I_i^* < 0 \end{cases}$$

where u_{2i} is an error term and X_{2i} is a vector of exogenous variables that affect the intermarriage decision. X_{2i} includes personal characteristics of individual i and instrumental variables that affect the intermarriage decision but do not have a direct wage effect. Exclusion restrictions through which the model is identified are discussed in the next section.

The other key empirical issue arises from the fact that wages are observed only for those who are working. To control for selection into employment status, the choice of employment status can be specified in terms of the latent variable E_i^*:

$$E_i^* = X_{3i}'\beta_3 + u_{3i} \tag{1.5}$$

$$E_i = \begin{cases} 1 & \text{if } E_i^* \geq 0 \\ 0 & \text{if } E_i^* < 0 \end{cases}$$

where the employment variable E_i equals one if the immigrant is employed at the time of survey and zero otherwise. X_{3i} is a vector of control variables that affect the choice of employment status and u_{3i} is an error term.

To account for both endogeneity and sample selection, this study uses the Discrete Factor Method (DFM) proposed by Mroz (1999). Although DFM is similar to standard full information maximum likelihood, it does not make a multivariate parametric assumption about the distribution of the error terms. Instead DFM imposes fewer assumptions on the distribution of correlated error terms. Using DFM, error terms can be decomposed into two parts: a component that is common to all equations and random variation.

$$u_{1i} = \alpha_1 \upsilon + \epsilon_{1i}$$

[20] For example, Hammermesh and Biddle(1994) show that physical appearance has a significant effect on earnings.

$$u_{2i} = \alpha_2 \upsilon + \epsilon_{2i} \tag{1.6}$$

$$u_{3i} = \alpha_3 \upsilon + \epsilon_{3i}$$

Under this specification, υ represents unobserved heterogeneity that results in the correlation across equations. Factor loadings (α) that can be interpreted as the coefficient of unobserved heterogeneity vary across equations. The ϵ_{1i}, ϵ_{2i} , ϵ_{3i} and υ are mutually independent and are independent of explanatory variables in the model. Moreover, ϵ_{2i} and ϵ_{3i} are assumed to follow a standard normal distribution and ϵ_{1i} is assumed to be distributed normally with mean zero and standard deviation σ.

DFM approximates the distribution of the unobserved heterogeneity with a discrete distribution. The distribution of υ is specified as follows:

$$P(\upsilon = \eta_k) = p_k \quad \text{for } k = 1....K \tag{1.7}$$

$$p_k \geq 0 \quad \forall k \quad \text{and} \quad \sum_{k=1}^{K} p_k = 1$$

where η_k are the points of support of the distribution and p_k represents the probability that υ takes on the value of each support point. The parameters of this distribution are estimated jointly with the other parameters describing the model. There is no standard theory regarding how to identify the optimal number of points of support in a finite sample. Most of the studies add points of support until the likelihood fails to improve significantly.[21] Mroz (1999) provides Monte Carlo evidence that this likelihood ratio test performs well when determining the number of points of support.

Since each equation in the model includes an intercept and factor loading parameters are estimated, the location and scale of the distribution of υ are not identified. Therefore, I normalized the values of first and last mass points to 0 and 1 respectively. Further parametrization of points of support is specified as follows to make η_k fall on $[0, 1]$.

$$\eta_k = \frac{exp(\theta_k)}{1 + exp(\theta_k)} \quad \text{for } k = 2....K - 1 \tag{1.8}$$

[21] See Picone et.al (2003); Mocan and Tekin (2002); Tekin (2007); and Van Ours (2007)

The probabilities are also parameterized such that they satisfy the nonnegativity conditions and the adding up constraint as follows:

$$p_k = \frac{\tau_k}{\sum_{k'=1}^{K} \tau_{k'}} \quad \text{where} \quad \tau_k = \begin{cases} exp(\psi_k) & \text{for } k = 1, 2....K-1 \\ 1 & \text{for } k = K \end{cases} \tag{1.9}$$

Conditional on υ, the joint density function of u_{1i} , u_{2i} and u_{3i} can be written as

$$f(u_{1i}, u_{2i}, u_{3i}|\upsilon) = \frac{1}{\sigma}\phi(\frac{u_{1i} - \alpha_1\upsilon}{\sigma})\phi(u_{2i} - \alpha_2\upsilon)\phi(u_{3i} - \alpha_3\upsilon) \tag{1.10}$$

where ϕ is the standard normal density function. If the cumulative distribution function of υ is F(υ), then the unconditional joint distribution of errors is as follows:

$$f(u_{1i}, u_{2i}, u_{3i}) = \int f(u_{1i}, u_{2i}, u_{3i}|\upsilon)\, dF(\upsilon) \tag{1.11}$$

Since the cumulative distribution of υ is approximated by the discrete distribution specified above, the joint distribution of errors is

$$f(u_{1i}, u_{2i}, u_{3i}) = \sum_{k=1}^{K} p_k \frac{1}{\sigma}\phi(\frac{u_{1i} - \alpha_1\upsilon}{\sigma})\phi(u_{2i} - \alpha_2\upsilon)\phi(u_{3i} - \alpha_3\upsilon) \tag{1.12}$$

Mroz (1999) provides Monte Carlo evidence on the performance of the Discrete Factor Method relative to other estimation methods. When the true distribution of error terms is joint normal, discrete factor estimators perform as well as estimators that assume the error terms are normally distributed. DFM estimators perform *better* than the normality-based estimators when the underlying distribution of error terms is not normal. In addition, Mroz (1999) demonstrates that the DFM outperforms 2SLS in the presence of weak instruments. The likelihood function associated with the model can be written as

$$\begin{aligned} L \;=\; & \prod_{i=1}^{N}\sum_{k=1}^{K} p_k \Phi(X'_{3i}\beta_3 + \alpha_3\eta_k)^{E_i}(1 - \Phi(X'_{3i}\beta_3 + +\alpha_3\eta_k))^{1-E_i}\Phi(X'_{2i}\beta_2 + \alpha_2\eta_k)^{I_i} \\ & \times(1 - \Phi(X'_{2i}\beta_2 + \alpha_2\eta_k))^{1-I_i}[\frac{1}{\sigma}\phi(\frac{lnw_i - X'_{1i}\beta_1 - \delta I_i - \alpha_1\eta_k}{\sigma})]^{E_i} \end{aligned} \tag{1.13}$$

where N is the sample size, K is the number of points of support to be used in approximating the distribution of the unobserved heterogeneity and Φ denotes the standard normal cdf.

1.5.1 Identification

The identification of the model is achieved through nonlinearities in the likelihood function and exclusion restrictions. In the literature of intermarriage, there are three general factors that determine intermarriage: individual preferences, influence of third parties and opportunities to meet co-ethnics and members of other groups (Kalmijn 1998, Van Tubergen and Maas 2006). People search for potential spouses with certain socioeconomic and cultural characteristics. Therefore, intermarriages are, first of all, an outcome of people's preferences. Third parties such as family and religious community might also play an important role in the partner selection process. For example, parents might pressure their children to consider only prospective spouses with similar ethnic backgrounds or some religious groups may oppose interfaith marriages. Researchers have argued that in addition to preferences and third parties, levels of intermarriage between groups are affected by opportunities to meet co-ethnics and members of other groups. Demographic and structural factors such as the size of the group, sex ratio and residential segregation influence people's daily opportunities for meeting co-ethnics and those of other groups (Blau and Schwartz 1984). To endogenize the interethnic marriage decision, I use two important structural determinants of intermarriage as instruments: group size and sex ratio. A number of studies indicate that the size of the immigrant group is an important factor affecting intermarriage decisions (Qian and Lichter 2001; Blau and Schwartz 1984; Hwang et al. 1997). The larger the size of the immigrant group, the more likely for an immigrant to meet a partner from his own ethnic group, and the lower the probability of marrying exogamously. Moreover, Van Tubergen and Kalmijn (2007) point out that immigrants who are members of a larger group more strongly identify themselves with that group and could be more easily influenced by third parties which may also increase the chance of endogamy among the members of that group. In this study the group size represents the number of immigrants of the opposite sex relative to the total population of the opposite sex. It captures the availability of spouses of the same ethnic group. The sex ratio in the marriage market is another structural factor discussed in the literature. It is defined as the number of group members of the opposite sex divided by the number of group members of the same sex. The more skewed the sex ratio in an ethnic group, the more

likely immigrants will look for potential partners outside their own ethnic group (Angrist 2002; Blau and Schwartz 1984). In other words, a shortage of marriageable co-ethnics of the opposing sex promotes intermarriage.

The existing literature on the intermarriage premium also uses the structural factors of a marriage market (group size and sex ratio) as instruments. In the literature instruments are based on the measures of structural factors at the time of survey. However, it is quite possible that immigrants have been exposed to different demographic factors at the time of marriage because they married a long time ago. Figures 1-2 clearly show that the sex ratio and group size have changed over time. For example, a Turkish immigrant who was surveyed in the 2002 wave but married in 1980 had been subject to very different structural factors at the time of marriage than those at the time of survey.[22] Because the data set contains information on the year of marriage, I construct the instruments by matching an immigrant's year of marriage with the corresponding group size and sex ratio in that year. This allows me to examine the influence of structural factors, group size and sex ratio on intermarriage more accurately.

The credibility of the identification strategy hinges on the assumption that the instruments are valid. If instruments are valid, then: (i) they must be significant determinants of the interethnic marriage decision; and (ii) they must not be determinants of labor market outcomes. As discussed above, group size and sex ratio are both important factors affecting interethnic marriage decisions. Moreover, it is unlikely that an immigrant's wage depends on the ratio of the number of group members of the opposite sex to the number of group members of the same sex. On the other hand, one can argue that the size of an immigrant group might affect the development of networks among its members. If ethnic networks had any effect on labor market earnings of immigrants, then the group size variable might not be a valid instrument. To tackle this issue, I construct a new group size variable, *group size survey*. Unlike the group size instrumental variable measured at the time of marriage, the *group size survey* reflects the situation at the time of survey. To test whether the size of the

[22] Analyzing the determinants of ethnic intermarriage among first-generation immigrants in the Netherlands, Van Tubergen and Maas (2007) underscore the importance of this methodological problem. They argue that the contextual characteristics have to be measured at the time of marriage to examine their effects on intermarriage.

immigrant group affects labor market earnings of immigrants, I estimate the wage equation by including the new group size variable. The coefficient of the new group size variable is not statistically significant at conventional levels. Therefore, even if there is a correlation between these two group size variables,[23] *group size instrument* and *group size survey*, the insignificant coefficient of the *group size survey* variable in the wage equation ensures that the *group size instrument* is validly excluded from the wage equation. To identify the employment equation, I use the number of children as an exclusion restriction. I assume that the number of children affects the probability of being employed but does not have a direct effect on the wage.

1.6 Results

I begin estimating the wage equation with OLS, treating intermarriage as exogenous. Table 1.5 presents the OLS results of the wage equation. These results may be viewed as a benchmark that sheds light on whether the effect of intermarriage on earnings persists after other observed factors are controlled for. First, I regress log hourly wages on the indicator of intermarriage status to estimate the raw intermarriage premium. In the second specification, I control for age, education level, years since migration, place of residence, *Bigcity*, ethnic groups, *Caribbean*, and survey year effect. In the third specification, I add a binary variable indicating immigrant generation, *Second Generation*, and an interaction variable which is created by the product of intermarriage and second generation dummies to test whether the intermarriage premium varies across generations.

The following conclusions can be drawn from Table 1.5. First, the raw intermarriage premium is 18 percent. However, the descriptive statistics in Table 1.4 suggest that intermarried and non-intermarried immigrants differ in certain characteristics that might also affect their earnings. After controlling for these differences, I find that the variable of primary interest, intermarriage, has a positive and statistically significant coefficient. Second, most of the other variables have the expected signs and are statistically significant. Educational level has a positive impact on earnings. The Caribbean groups, i.e., Surinamese and Antilleans,

[23] The correlation coefficient between the two variables is 0.08, 0.17, 0.12, and 0.18 for Turks, Moroccans, Antilleans and Surinamese respectively.

earn on average six percent more than the Mediterranean groups, i.e. Turks and Moroccans. In line with the earlier studies, immigrants who have been in the Netherlands for a longer period have higher earnings. The estimated coefficients on survey-year indicator variables indicate that hourly earnings are approximately 24% and 10% higher in 2002 and in 1998 respectively than those in 1994.[24] Finally, in the third specification the coefficients of second generation and interaction variables are not statistically significant.

Table 1.6 presents the DFM estimation results.[25] First, I estimate the model ignoring sample selection and only accounting for the endogeneity of intermarriage. The first two columns of Table 1.6 report parameter estimates from this endogeneity-only model. The estimation results show that the main coefficient of interest, the coefficient of the indicator for intermarriage, has the expected positive sign and is statistically significant at the 1% level. Marrying a native is associated with a wage premium of seven percent. The remaining parameter estimates of the wage equation are mostly of the expected sign and significance. Hourly earnings are an increasing and concave function of age. Education and years since migration have a positive and statistically significant effect on wages. The Caribbean groups have significantly higher earnings than the Mediterranean groups. Most importantly, the estimated coefficients of the identifying instruments, sex ratio and group size, have the expected signs and are statistically significant at the 1% level, suggesting that the larger the size of an immigrant group and the less skewed the sex ratio, the more likely immigrants are to marry endogamously.

The last three columns of Table 1.6 report parameter estimates from the DFM accounting for both endogeneity of intermarriage and sample selection. The introduction of sample selection into the model hardly affects the estimated intermarriage premium. Most of the other coefficients are consistent across the two models. Compared to the reference group (primary school graduates), college graduates have a higher probability of being intermarried. A comparison of the first and fourth columns of Table 1.6 reveals that when selection into

[24]Consumer Price Index (1994=100) in the Netherlands is 108.2 and 122.5 in 1998 and 2002 respectively (Statline, Statistics Netherlands).

[25]The DFM results are based on three points of support. I do not reject the model with three points of support in favor of the model with four points of support. The likelihood ratio test suggested by Mroz (1999) with two degrees of freedom at the 25 % significance level is used to determine whether or not the additional mass point should be added. It is also important to note that when I use four points of support, the estimated intermarriage premium is very similar to that based on three points of support.

employment is accounted for, the estimated coefficient of the Caribbean variable turns out to be statistically significant, suggesting Caribbean groups are more likely to be intermarried than Mediterranean groups. The number of children serves as an exclusion restriction in the employment equation. The coefficient of the children variable is negative and statistically significant at the 1% level, indicating that the likelihood of being employed decreases with the number of children. A possible explanation for this result could be as follows. The Netherlands has had a child benefit system since the 1940s.[26] All residents with dependent children, regardless of their income, are entitled to child benefits. The amount of the child benefit depends on the number of children in the family and their ages. The higher the number of children an immigrant has the higher is the child benefit he could receive. Therefore, the extra income obtained from the child benefit may exert a negative effect on the employment decision of an immigrant. Table 1.7 reports the parameters describing the unobserved heterogeneity. The estimated mass points and the associated probabilities indicate that the most of mass of the distribution of the unobserved heterogeneity is given to two points: 0 with probability 0.46 and 1 with probability 0.52. These results suggest that estimation methods assuming normality may not be appropriate, as the distribution of unobserved heterogeneity does not approximate a normal distribution.

To test whether the intermarriage premium differs between first-and second-generation immigrants, I include an indicator for immigrant generation and its interaction with the intermarriage variable in the wage equation. Table 1.8 presents the DFM estimation results of this specification. Intermarried first-generation immigrants earn 6.7 percent more than their co-ethnic married counterparts. The point estimate of the sum of the coefficients on intermarriage and interaction variables is positive, though not significantly so, implying that there is no intermarriage premium for second-generation immigrants.[27]. This finding is in line with my expectations. As second-generation immigrants are closer to the native population in terms of social and human capital, they may not gain from their Dutch spouses as much as first-generation immigrants.

[26]The Social Insurance Bank (Sociale Verzekeringsbank, SVB) implements the arrangement and payment of the child benefit. For more information see the following link: $http://www.svb.nl$

[27]The t-statistics for the null hypothesis that the coefficients on intermarriage and interaction variables sum to zero is 0.947.

1.6.1 Robustness Checks

I test the robustness of the results to change in the estimation techniques. First, I estimate the wage equation using two-stage least squares (2SLS) to account for the possible endogeneity of intermarriage. The first column of Table 1.9 presents the first stage estimation results while the second column presents the second stage results for 2SLS estimation of the wage equation. The estimated coefficients of the instruments have the expected sign and are statistically significant at the 1% level. The F-statistic of excluded instruments implies that instruments are jointly significant.[28] The joint and individual significance of the instruments in the first stage regression ensures that the instruments are relevant. The results of overidentification testing, the Hansen J statistic, indicate that the null hypothesis that all instruments are uncorrelated with the error term can not be rejected. In the wage equation, the main coefficient of interest, the coefficient of intermarriage, is positive and statistically significant at the 10% level. The estimated coefficient implies that intermarried immigrants on average earn 19% more than their endogamously married counterparts. [29]

Second, as an alternative to the DFM to account for the endogeneity of intermarriage and selection into employment, I use a three-equation model (TEM) proposed by Wooldridge (2002).[30] The estimation results of the TEM appear in Table 1.10. The model is identified

[28]Stock, Wright and Yogo (2002) suggest that the first-stage F statistic can be used to test whether instruments are weak or not. 2SLS inference is reliable when the first-stage F statistic is large. As a rule of thumb, for one endogenous regressor an F statistic less than 10 is cause for concern.

[29]After accounting for the endogeneity of intermarriage, I observe an increase in the intermarriage premium suggesting that unobservable characteristics that are positively correlated with the likelihood of intermarriage have a negative effect on earnings.

[30]The model consists of the following three equations:

$ln(w_i) = x'_{1i}\delta_1 + \alpha I_i + \epsilon_{i1}$ Wage Equation (1)

$I_i = x'_{2i}\delta_2 + \epsilon_{i2}$ Intermarriage Equation (2)

$E_i = 1(x'_{3i}\delta_3 + \epsilon_{i3} > 0)$ Selection Equation (3)

The first equation is the structural equation of interest. $ln(w_i)$ is the log of hourly wage for individual i, I_i is a potentially endogenous variable in equation 1 that takes on a value of one if the immigrant married a native and zero if the immigrant married within his own ethnic group. The second equation is a linear projection for the endogenous variable I_i and the third equation is the selection equation, where E_i equals one if the immigrant is employed and zero otherwise. The estimation strategy of the three-equation model can be summarized as follows. First, the selection equation is estimated as a probit model. After obtaining the estimated coefficients $\hat{\delta}_3$, I calculate the inverse mills ratios $\hat{\lambda}_{i3} = \frac{\phi(x'_{3i}\hat{\delta}_3)}{\Phi(x'_{3i}\hat{\delta}_3)}$. Second, I estimate the wage equation below by 2SLS, using instruments ($\hat{\lambda}_{i3}$, x_{2i}).

$ln(w_i) = x'_{1i}\delta_1 + \alpha_1 I_i + \gamma_{i3}\hat{\lambda}_{i3} + \nu_i$ (4)

It is important to note that all exogenous variables appear in the selection equation and are used as instruments in estimating equation (4) by 2SLS. The identification requires that at least two elements of

using the same exclusion restrictions as the DFM model. The first column in Table 1.10 presents probit estimation of the employment equation. The coefficient of children is negative and statistically significant at the 1 percent level. The second and third columns of Table 1.10 report the results for 2SLS estimation of the structural wage equation. The coefficients of the instruments, sex ratio and group size, have the expected signs and are both individually and jointly significant. The instruments also pass the Hansen J overidentification test. In the wage equation, the coefficient of intermarriage is positive and statistically significant at the 5 percent level. Intermarried immigrants earn on average 23 percent more than their co-ethnic married counterparts. Consistent with the DFM results, the coefficient of inverse mills ratio is not statistically different from zero in the wage equation, suggesting that there is no evidence of sample selection bias. In sum, 2SLS and TEM estimation results indicate that the positive effect of intermarriage on earnings is robust to change in the estimation technique.

Table 1.11 presents OLS, 2SLS, TEM and DFM estimation results for the wage equation. Given that there is no evidence of sample selection bias, it is instructive to compare the DFM results to the results employing 2SLS. Several points are worth highlighting. First, the intermarriage premium from the 2SLS method is more than twice as large as that predicted by the DFM and only marginally significant at the 10% level. The DFM leads to an increase in efficiency. Although the main coefficient of interest changes significantly when DFM is employed, most of the other parameter estimates are close to those from the 2SLS.

One would argue that immigrants married to natives may be more likely to be employed than those married within their own ethnic group. Using DFM, I reestimate the model in which the employment equation includes the intermarriage variable. The coefficient of the intermarriage variable in the employment equation is positive but not statistically significant at the conventional levels. Furthermore, the estimated coefficient of the intermarriage variable in the wage equation is unaffected when I control for the intermarriage variable in the employment equation.[31]

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x_{2i} not be in x_{1i} (i.e., I should have at least one instrument for I_i and another exogenous variable that determines selection). The hypothesis of no selection problem can be tested using the usual 2SLS t-statistic for the coefficient of the estimated inverse mills ratio, $\hat{\gamma}_{i3}$, in equation (4). The hypothesis of no selection problem requires that the coefficient of $\hat{\lambda}_{i3}$ is statistically insignificant.

[31]The coefficient of intermarriage in the wage equation is 0.073 and is statistically significant at the 1%

To address the possibility that group size is not a valid instrument, I reestimate the model with sex ratio as the only instrument. I find that the intermarriage premium is statistically significant and very similar to that reported in Table 1.6. Moreover, the coefficient of sex ratio variable is highly significant in the intermarriage equation.

The literature suggests that lack of host country language proficiency is punished in the labor market (Chiswick 1991; Chiswick and Miller 1992, 1995; Dustmann and Fabbri 2003). Treating the Dutch proficiency variable as exogenous in the wage equation, I reestimate the model using DFM. The impact of intermarriage remains positive and statistically significant at the 1% level. Dutch proficiency has a positive and significant effect on the earnings.[32] It is also important to note that when language proficiency is included in the wage equation, the coefficient of the Caribbean indicator variable decreases in magnitude and significance, indicating that the Caribbean groups have a better Dutch proficiency than the Mediterranean groups.[33] This finding is consistent with the fact that the official language in Suriname and the Antilles is Dutch.[34] I also examine the sensitivity of results if second-generation wives are treated as natives.[35] The estimated intermarriage premium is slightly higher than that reported in Table 1.6.[36]

Meng and Gregory (2005) argue that intermarried immigrants might have higher quality labor-market attributes at the time of arrival than those who are endogamously married. If this is the case, the intermarriage premium may be a reward for better labor market quality at the time of arrival rather than reflecting economic assimilation. Although the empirical strategy I have followed accounts for the possible endogeneity of intermarriage, it is worth distinguishing the assimilation effect from the cohort quality effect at the time of arrival to test whether intermarriage results in a faster assimilation process.

Using the basic premise of the Borjas (1985) methodology, I estimate the following wage

level.

[32]In the wage equation, the estimated coefficient of intermarriage is 0.071(s.e=0.021), while the coefficient of Dutch proficiency is 0.048(s.e=0.019).

[33]In the wage equation, the coefficient of the Caribbean indicator variable is 0.038 (s.e=0.019).

[34]Although the official language is Dutch; other languages spoken in Suriname include Suriname Javanese, Sarnami Hindustani, and several Amerindian and Creole languages. In the Antilles, Papiamento, Spanish, Creole English and other local languages are also spoken.

[35]There are only 46 second-generation wives in the final sample.

[36]The coefficient of intermarriage is 0.075 and statistically significant at the 1 percent level.

equation to distinguish the assimilation effect from the cohort quality effect at the time of arrival:

$$ln(w_{it}) = X'_{it}\pi_1 + Y'_{it}\pi_2 + \varphi_1 YSM_{it} + \varphi_2 YSM_{it}I_{it} + C'_{it}\lambda_1 + C'_{it}I_{it}\lambda_2 + \varepsilon_{it} \tag{1.14}$$

where $ln(w_{it})$ is the natural log of the hourly wage for individual i at time t; X_{it} represents the vector of variables including age (and its squared term), education level, ethnic groups, and place of residence. The vector of survey year indicator variables Y_{it} is included to capture period effects. I assume that the period effects on earnings are the same for both intermarried and co-ethnic married immigrants. The variable YSM represents the number of years the immigrant has been in the Netherlands. Intermarriage, denoted by I_{it}, is a binary variable that takes on a value of one if the immigrant married a native and zero if the immigrant married within his own ethnic group. C_{it} is a set of indicator variables representing different immigration arrival cohorts: immigrants arriving in 1973-1980, 1981-1990, and 1991-2002. Immigrants arriving before 1973 are used as the reference group. The variables $YSM_{it}I_{it}$ and $C'_{it}I_{it}$ refer to interaction between the intermarriage indicator variable and YSM_{it} and C_{it} respectively. ε_{it} is an error term.

The coefficient vector λ_2 measures whether cohort quality effects differ between intermarried and co-ethnic married immigrants, while φ_2 captures the difference in the assimilation process across two groups. The estimation results of Equation (14) are reported in Table 1.12. The results are based on the sample of first-generation immigrants only. The coefficients of cohort indicator variables and their interaction with intermarriage are not statistically significant, suggesting that intermarried immigrants do not have better initial labor market quality than their nonintermarried counterparts. Like Meng and Gregory (2005), I find that the intermarriage premium increases with time spent in the Netherlands, even after controlling for the cohort quality effect at the time of arrival. The estimated coefficient on $YSM_{it}I_{it}$ implies that intermarried immigrants earn 0.2% more than their co-ethnic married counterparts for every additional year that they spend in the Netherlands. The steeper years since migration-earnings profile for intermarried immigrants provides evidence that intermarriage promotes immigrants' economic integration.

1.7 Conclusion

This study examines the relationship between interethnic marriage and the labor market integration of immigrants. Using the data from the Dutch Survey, I investigate whether intermarried immigrants perform better in the labor market than their co-ethnic married counterparts. Social Capital Theory, Productivity Hypothesis, and Assimilation Theory suggest that intermarriage promotes the economic and social integration of immigrants by increasing their knowledge about the host country's culture, language and rules regulating the labor market. Also, having a native spouse gives access to native networks. The networks may enhance social capital accumulation, which positively influences economic success of an immigrant. In line with these theoretical concepts, the empirical findings indicate that intermarriage has a positive effect on immigrants' labor market outcomes. After controlling for the possible biases resulting from the endogeneity of intermarriage and selection into employment, I find that intermarried immigrants earn, on average, seven percent more than their endogamously married counterparts. The positive effect of intermarriage on earnings is robust to changes in the estimation method and specification of the model.

Unlike previous studies that treat second-generation immigrants as natives, this study distinguishes second-generation immigrants from natives, as the data set contains information on the parents' country of birth. This information allows me to test whether or not the intermarriage premium varies across generations. I expect that second-generation immigrants do not gain from their Dutch spouses as much as first-generation immigrants, because second-generation immigrants who attended school in the Netherlands and have more skills in the Dutch language are more likely to be closer to Dutch culture than first-generation immigrants. Consistent with my expectations, the empirical findings show that there is no intermarriage premium for second-generation immigrants.

Due to data limitations, I restrict my analysis to immigrant men. However, the sociological literature suggests that there are large gender differences in social network composition. Men tend to have more diverse and extensive networks and are more able to use them as instrumental resources (Moore 1990; Marsden 1987). As Social Capital Theory implies that intermarried immigrant women receive more gain from a Dutch spouse than their male coun-

terparts, it would be interesting to test whether the intermarriage premium varies by gender. To get a better understanding of the mechanisms that explain why the marriage pattern of immigrants is such an important element in the integration process, it would also be interesting to include the sample of immigrants married to immigrants from other ethnic groups into analysis.

Table 1.1
Number of Ethnic Minorities in the Netherlands in 1990, 2002 and 2007

	1990		2002		2007	
Natives(%)	12,668,000	(81.6)	13,140,336	(81.6)	13,187,586	(80.6)
Turks(%)	206,000	(4.2)	331,000	(2.1)	368,600	(2.3)
Moroccans(%)	168,000	(3.4)	284,000	(1.8)	329,493	(2)
Surinamese(%)	237,000	(4.8)	315,000	(2)	333,504	(2)
Antilleans(%)	81,000	(1.7)	125,000	(0.8)	129.965	(0.8)
Total Population(%)	14,892,574	(100)	16,105,285	(100)	16,357,992	(100)

Source: Statline, Statistics Netherlands. Natives refer to individuals who were born in the Netherlands with both parents also born in the Netherlands.

Table 1.2
Descriptive Statistics of the Marital Behavior of the Four Ethnic Groups

	Endogamy		Exogamy	
Turks(%)	699	(45.7)	31	(17.1)
Moroccans(%)	593	(38.7)	30	(16.6)
Surinamese(%)	188	(12.3)	63	(34.8)
Antilleans(%)	51	(3.33)	57	(31.5)
Total(%)	1531	(100)	181	(100)

Source: SPVA surveys 1994, 1998, and 2002.

Table 1.3
Definition of Variables

Variable Name	Definition
Intermarriage	binary variable,=1 if the immigrant married to a native and zero if the immigrant married within his own ethnic group.
Log(hourly wage)	the logarithm of hourly wage.
Employment	binary variable,=1 if the immigrant is employed at the time of the survey.
Age	age of the immigrant at the time of the survey.
Primary	binary variable,=1 if the immigrant has a primary school diploma or no degree.
Lower secondary	binary variable,=1 if the immigrant is a lower secondary school graduate.
Higher secondary	binary variable,=1 if the immigrant is a higher secondary school graduate.
University	binary variable,=1 if the immigrant has a college degree or more.
YSM1	binary variable,=1 if duration of residence in the Netherlands is between 0-5 years.
YSM2	binary variable,=1 if duration of residence in the Netherlands is between 6-10 years.
YSM3	binary variable,=1 if duration of residence in the Netherlands is between 11-15 years.
YSM4	binary variable,=1 if duration of residence in the Netherlands is between 16-20 years.
YSM5	binary variable,=1 if duration of residence in the Netherlands is 21 years or more.
Second Generation	binary variable,=1 if the individual is a second-generation immigrant.
Caribbean	binary variable,=1 if the immigrant is from Suriname or the Antilles (the Caribbeans) and =0 if the immigrant is from Turkey or Morocco (the Mediterraneans).
Bigcity	binary variable,=1 if the immigrant lives in one of the four major cities in the Netherlands, i.e. Amsterdam, Rotterdam, The Hague, and Utrecht.
Survey1994	binary variable,=1 if the immigrant was surveyed in the 1994 wave.
Survey1998	binary variable,=1 if the immigrant was surveyed in the 1998 wave.
Survey2002	binary variable,=1 if the immigrant was surveyed in the 2002 wave.
Children	the number of children the immigrant has.
Dutch Proficiency	binary variable,=1 if the immigrant has no difficulty speaking Dutch.
Sex Ratio	the logarithm of the number of women for each man in the ethnic group aged 15-60.
Group Size	the logarithm of the number of female immigrants in the ethnic group relative to the total female population in the Netherlands aged 15-60.

Table 1.4
Descriptive Statistics

	Total Sample (N=1712)		**Endogamous Marriage (N=1531)**		**Exogamous Marriage (N=181)**	
	Mean	**Std. Dev.**	**Mean**	**Std.Dev.**	**Mean**	**Std. Dev.**
Log(hourly wage)	2.06	0.29	2.04	0.26	2.22	0.40
Employment	0.56	0.49	0.54	0.50	0.72	0.44
Age	38.4	9.06	38.2	8.99	40.3	9.47
Education Level						
Primary	0.52	0.50	0.56	0.49	0.22	0.41
Lower secondary	0.22	0.41	0.20	0.40	0.30	0.46
Higher secondary	0.17	0.38	0.17	0.37	0.22	0.42
University	0.08	0.28	0.06	0.24	0.25	0.43
Years since migration	19.7	9.32	19.2	8.72	24.5	12.4
YSM1 (0-5 years)	0.06	0.25	0.06	0.25	0.08	0.28
YSM2 (6-10 years)	0.12	0.33	0.13	0.33	0.08	0.28
YSM3 (11-15 years)	0.13	0.33	0.13	0.34	0.06	0.24
YSM4 (16-20years)	0.18	0.39	0.19	0.39	0.10	0.30
YSM5 ($>$ 20 years)	0.49	0.50	0.47	0.50	0.66	0.47
Second-generation	0.06	0.24	0.05	0.21	0.19	0.39
Caribbean	0.21	0.41	0.15	0.36	0.66	0.47
Bigcity	0.66	0.47	0.70	0.46	0.36	0.48
Survey-year Indicators						
Survey1994	0.24	0.43	0.24	0.42	0.28	0.45
Survey1998	0.47	0.50	0.47	0.49	0.42	0.50
Survey2002	0.28	0.45	0.28	0.45	0.29	0.46
Dutch Proficiency	0.42	0.49	0.38	0.48	0.74	0.44
Children	2.43	1.79	2.51	1.82	1.69	1.35

Table 1.5
Results from OLS Estimation of the Wage Equation

Log(hourly wage)	**1**	**2**	**3**
Intermarriage	0.179**	0.064*	0.058+
	(0.036)	(0.030)	(0.033)
Age		0.011	0.014
		(0.009)	(0.009)
Age^2/100		−0.011	−0.014
		(0.011)	(0.011)
Education Level			
Lower secondary		0.039**	0.038**
		(0.018)	(0.018)
Higher secondary		0.108**	0.107**
		(0.022)	(0.022)
University		0.323**	0.319**
		(0.030)	(0.030)
Years since migration			
YSM2 (6-10 years)		0.116**	0.114**
		(0.034)	(0.034)
YSM3 (11-15 years)		0.116**	0.112**
		(0.035)	(0.035)
YSM4 (16-20years)		0.212**	0.205**
		(0.033)	(0.033)
YSM5 (>20 years)		0.221**	0.205**
		(0.033)	(0.035)
Caribbean		0.062**	0.061**
		(0.020)	(0.020)
Survey2002		0.246**	0.244**
		(0.021)	(0.021)
Survey1998		0.097**	0.097**
		(0.018)	(0.018)
Bigcity		0.018	0.017
		(0.016)	(0.016)
Second Generation			0.048
			(0.040)
Intermarriage×Second Generation			-0.005
			(0.074)
R^2	0.045	0.374	0.376
Observations	971	971	971

Notes: The dependent variable is the logarithm of hourly wage. Robust standard errors are given in parentheses. **, * and + indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels respectively. Constants are not reported. The reference categories for education, years since migration, and survey year indicator variables are primary education, duration of residence between 0 and 5 years, and Survey1994 respectively.

Table 1.6
Parameter Estimates for the Discrete Factor Method

	Accounting for Endogeneity		**Accounting for Endogeneity & Selectivity**		
	Intermarriage	**Wage**	**Employment**	**Intermarriage**	**Wage**
Intermarriage	-	0.071**	-	-	0.072**
		(0.022)			(0.021)
Age	−0.027	0.017*	0.147**	−0.007	0.016+
	(0.071)	(0.008)	(0.035)	(0.047)	(0.010)
Age^2/100	0.047	−0.019+	−0.229**	0.023	−0.018+
	(0.087)	(0.011)	(0.043)	(0.057)	(0.011)
Education Level					
Lower secondary	0.300+	0.027	0.164+	0.217+	0.027
	(0.168)	(0.022)	(0.089)	(0.125)	(0.022)
Higher secondary	0.269	0.104**	0.381**	0.148	0.102**
	(0.192)	(0.020)	(0.098)	(0.144)	(0.020)
University	0.741**	0.316**	0.509**	0.650**	0.316**
	(0.183)	(0.024)	(0.142)	(0.148)	(0.024)
Years since migration					
YSM2 (6-10 years)	−0.686*	0.095**	0.387**	−0.572**	0.094*
	(0.286)	(0.043)	(0.158)	(0.196)	(0.043)
YSM3 (11-15 years)	−0.827**	0.101*	0.438**	−0.738**	0.086*
	(0.293)	(0.043)	(0.158)	(0.216)	(0.043)
YSM4(16-20years)	−0.411	0.194**	0.538**	−0.660**	0.181**
	(0.272)	(0.043)	(0.155)	(0.200)	(0.042)
YSM5 (>20 years)	−0.096	0.206**	0.593**	−0.249	0.197**
	(0.247)	(0.041)	(0.158)	(0.177)	(0.040)
Caribbean	0.267	0.053**	0.701**	0.555**	0.050**
	(0.273)	(0.018)	(0.096)	(0.144)	(0.018)
Survey2002	-	0.242**	0.511**	-	0.242**
		(0.024)	(0.096)		(0.024)
Survey1998	-	0.093**	0.347**	-	0.093**
		(0.023)	(0.083)		(0.023)
Bigcity	-	0.007	-0.026	-	0.018
		(0.016)	(0.071)		(0.016)
Sex ratio	−1.956**	-	-	−0.914**	-
	(0.597)			(0.169)	
Group size	−0.671**	-	-	−0.309**	-
	(0.148)			(0.096)	
Children	-	-	−0.055**	-	-
			(0.022)		
Observations	971	971	1712	1712	971
Log likelihood	-221.25		-1385.52		

Notes: The estimates are based on the discrete factor method with three points of support. Standard errors are given in parentheses. **, * and + indicate respectively 1%, 5% and 10% significance levels. Constants are not reported. The reference categories for education, years since migration, and survey year indicator variables are primary education, duration of residence between 0 and 5 years, and Survey1994 respectively.

Table 1.7
DFM Parameters

	Accounting for Endogeneity	
σ	0.227^{+}	
	(0.119)	
Factor Loadings		
α_1	0.057^{*}	
	(0.029)	
α_2	0.106^{*}	
	(0.052)	
	Mass Points	**Probability Weight**
1st support	0	0.508
2nd support	0.472	0.040
3rd support	1	0.450
	Accounting for Endogeneity and Sample Selection	
σ	0.217^{+}	
	(0.113)	
Factor Loadings		
α_1	0.054^{*}	
	(0.026)	
α_2	0.080^{*}	
	(0.038)	
α_3	0.006	
	(0.010)	
	Mass Points	**Probability Weight**
1st support	0	0.468
2nd support	0.479	0.002
3rd support	1	0.528

Notes: **, * and $^{+}$ indicate that the estimated coefficients are statistically significant 1%, 5% and 10% levels respectively.

Table 1.8
Parameter Estimates for the Discrete Factor Method

	Employment	**Intermarriage**	**Wage**
Intermarriage	-	-	0.067**
			(0.024)
Age	0.146**	-0.019	0.019*
	(0.035)	(0.046)	(0.009)
Age^2/100	−0.226**	0.038	−0.020+
	(0.043)	(0.057)	(0.011)
Education Level			
Lower secondary	0.184*	0.288*	0.042+
	(0.089)	(0.125)	(0.022)
Higher secondary	0.376**	0.239	0.106**
	(0.098)	(0.145)	(0.020)
University	0.507**	0.720**	0.320**
	(0.141)	(0.148)	(0.024)
Years since migration			
YSM2 (6-10 years)	0.332*	−0.536**	0.100*
	(0.158)	(0.194)	(0.043)
YSM3 (11-15 years)	0.335*	−0.682**	0.100*
	(0.158)	(0.216)	(0.043)
YSM4(16-20years)	0.466**	−0.623**	0.188**
	(0.156)	(0.199)	(0.043)
YSM5 (>20 years)	0.479**	−0.288	0.190**
	(0.159)	(0.175)	(0.042)
Caribbean	0.680**	0.602**	0.058**
	0.097	(0.144)	(0.018)
Survey2002	0.545**	-	0.246**
	(0.096)		(0.024)
Survey1998	0.376**	-	0.099**
	(0.083)		(0.023)
Bigcity	-0.077	-	0.024
	(0.0719)		(0.016)
Second Generation	-	-	0.050
			(0.040)
Intermarriage×Second Generation	-	-	-0.022
			(0.051)
Sex ratio	-	−0.887**	-
		(0.169)	
Group size	-	−0.348**	-
		(0.097)	
Children	−0.047*	-	-
	(0.022)		
Observations	1712	1712	971
Log likelihood			-1382.34
Intermarriage+Intermarriage×Second Generation=0			0.045
			(0.047)

Notes: The estimates are based on the discrete factor method with three points of support. Standard errors are given in parentheses. **, * and + indicate respectively 1%, 5% and 10% significance levels. Constants are not reported. The reference categories for education, years since migration, and survey year indicator variables are primary education, duration of residence between 0 and 5 years, and Survey1994 respectively.

Table 1.9
Results from 2SLS Estimation

	Intermarriage	**Wage**
Intermarriage	-	0.187^{+}
		(0.108)
Age	-0.020^{+}	0.013
	(0.011)	(0.009)
Age^2/100	0.028^{*}	-0.014
	(0.014)	(0.011)
Education Level		
Lower secondary	0.007	0.038^{*}
	(0.025)	(0.019)
Higher secondary	0.013	0.106^{**}
	(0.025)	(0.022)
University	0.139^{**}	0.303^{**}
	(0.032)	(0.034)
Years since migration		
YSM2 (6-10 years)	-0.070	0.125^{**}
	(0.047)	(0.036)
YSM3 (11-15 years)	-0.084^{+}	0.126^{**}
	(0.048)	(0.037)
YSM4(16-20years)	-0.042	0.216^{**}
	(0.046)	(0.034)
YSM5 (>20 years)	0.034	0.218^{**}
	(0.045)	(0.035)
Caribbean	0.141^{**}	0.031
	(0.027)	(0.035)
Survey2002	-0.097^{**}	0.257^{**}
	(0.029)	(0.023)
Survey1998	-0.092^{**}	0.108^{**}
	(0.025)	(0.021)
Bigcity	-0.138^{**}	0.036
	(0.019)	(0.022)
Instruments		
Sex ratio	-0.241^{**}	-
	(0.033)	
Group size	-0.139^{**}	-
	(0.022)	
Observations	971	971
F-statistic of excluded instruments	26.19	
(Prob> F**)**	(0.000)	
Hansen J statistic	0.009	
(Prob> $\chi^2(1)$**)**	(0.926)	

Notes: Robust standard errors are given in parentheses. **, * and $^{+}$ indicate respectively 1%, 5% and 10% significance levels. The reference categories for education, years since migration, and survey year indicator variables are primary education, duration of residence between 0 and 5 years, and Survey1994 respectively.

Table 1.10
The Three-Equation Model: Accounting for Endogeneity and Sample Selection

	Employment	**Intermarriage**	**Wage**
Intermarriage	-	-	0.230*
			(0.121)
Mills ratio (λ)	-	0.469*	0.074
		(0.229)	(0.131)
Age	0.176**	0.038	0.021
	(0.035)	(0.026)	(0.016)
Age^2/100	−0.266**	−0.054	-0.026
	(0.043)	(0.038)	(0.023)
Education Level			
Lower secondary	0.147$^+$	0.045	0.046*
	(0.088)	(0.033)	(0.023)
Higher secondary	0.365**	0.093$^+$	0.121**
	(0.096)	(0.052)	(0.035)
University	0.456**	0.22**	0.316**
	(0.136)	(0.061)	(0.040)
Years since migration			
YSM2 (6-10 years)	0.394**	0.052	0.143**
	(0.154)	(0.070)	(0.050)
YSM3 (11-15 years)	0.410**	0.046	0.145**
	(0.155)	(0.071)	(0.050)
YSM4(16-20years)	0.501**	0.115	0.236**
	(0.151)	(0.079)	(0.051)
YSM5 (>20 years)	0.542**	0.20**	0.236**
	(0.153)	(0.082)	(0.049)
Caribbean	0.657**	0.260**	0.046
	(0.111)	(0.070)	(0.045)
Survey2002	0.548**	0.050	0.283**
	(0.099)	(0.073)	(0.052)
Survey1998	0.366**	0.010	0.127**
	(0.084)	(0.053)	(0.040)
Bigcity	-0.085	−0.157**	0.039$^+$
	(0.070)	(0.021)	(0.022)
Sex ratio	-0.108	−0.290**	-
	(0.106)	(0.041)	
Group size	-0.135	−0.194**	-
	(0.088)	(0.029)	
Children	−0.075**	−0.047**	-
	(0.024)	(0.012)	
Observations	1712	971	971
F-statistic of excluded instruments		16.36	
(Prob$>$ F)		(0.000)	
Hansen J statistic		0.027	
(Prob$>\chi^2(2)$)		(0.986)	

Notes: Robust standard errors are given in parentheses. **, * and $^+$ indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels respectively. The reference categories for education, years since migration, and survey year indicator variables are primary education, duration of residence between 0 and 5 years, and Survey1994 respectively..

Table 1.11
Wage Equation Parameter Estimates

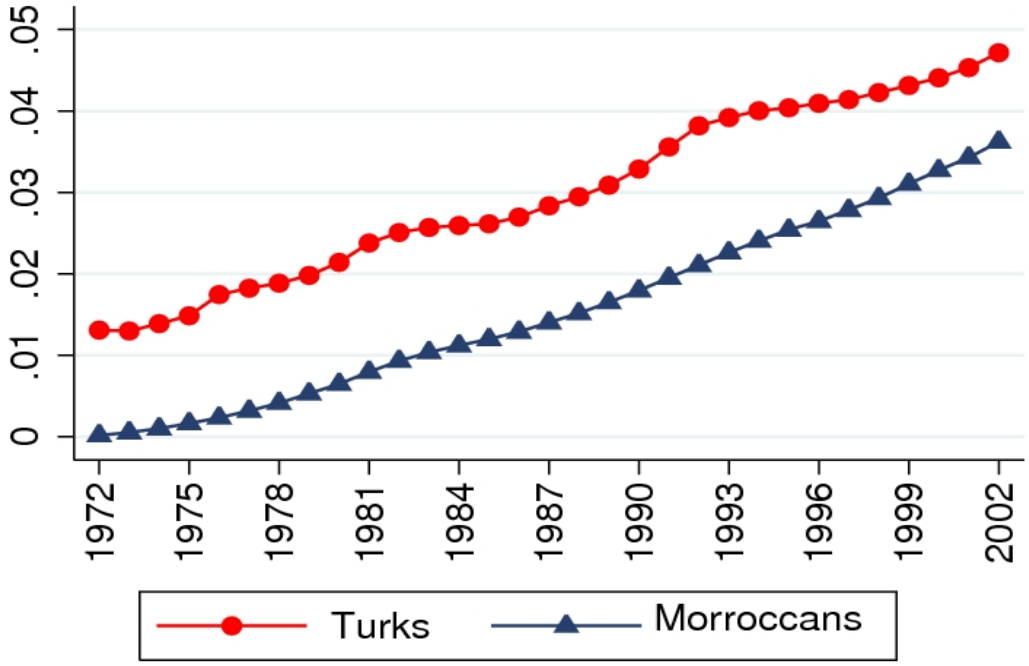
	OLS/2SLS/TEM			**Discrete Factor Method**	
	OLS	**2SLS**	**TEM**	**Endogeneity**	**Endogeneity &Selectivity**
Intermarriage	0.064*	0.187+	0.230*	0.071**	0.072**
	(0.030)	(0.108)	(0.121)	(0.022)	(0.021)
Age	0.011	0.013	0.021	0.017*	0.016+
	(0.009)	(0.009)	(0.016)	(0.008)	(0.010)
Age^2/100	−0.011	-0.014	-0.026	−0.019+	−0.018+
	(0.011)	(0.011)	(0.023)	(0.011)	(0.011)
Education Level					
Lower secondary	0.039**	0.038*	0.046*	0.027	0.027
	(0.018)	(0.019)	(0.023)	(0.022)	(0.022)
Higher secondary	0.108**	0.106**	0.121**	0.104**	0.102**
	(0.022)	(0.022)	(0.035)	(0.020)	(0.020)
University	0.323**	0.303**	0.316**	0.316**	0.316**
	(0.030)	(0.034)	(0.040)	(0.024)	(0.024)
Years since migration					
YSM2 (6-10 years)	0.116**	0.125**	0.143**	0.095**	0.094*
	(0.034)	(0.036)	(0.050)	(0.043)	(0.043)
YSM3 (11-15 years)	0.116**	0.126**	0.145**	0.101*	0.086*
	(0.035)	(0.037)	(0.050)	(0.043)	(0.043)
YSM4(16-20years)	0.212**	0.216**	0.236**	0.194**	0.181**
	(0.033)	(0.034)	(0.051)	(0.043)	(0.042)
YSM5 (>20 years)	0.221**	0.218**	0.236**	0.206**	0.197**
	(0.033)	(0.035)	(0.049)	(0.041)	(0.040)
Caribbean	0.062**	0.031	0.046	0.053**	0.050**
	(0.020)	(0.035)	(0.045)	(0.018)	(0.018)
Survey2002	0.246**	0.257**	0.283**	0.242**	0.242**
	(0.021)	(0.023)	(0.052)	(0.024)	(0.024)
Survey1998	0.097**	0.108**	0.127**	0.093**	0.093**
	(0.018)	(0.021)	(0.040)	(0.023)	(0.023)
Bigcity	0.018	0.036	0.039+	0.007	0.018
	(0.016)	(0.022)	(0.022)	(0.016)	(0.016)
Observations	971	971	971	971	971

Notes: Columns 1, 2, 3, 4, and 5 reproduce the wage equation estimates from Tables 5, 9, 8, 6, and 6 respectively. The dependent variable is the logarithm of hourly wage. Standard errors are given in parentheses. **, * and + indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels respectively. The reference categories for education, years since migration, and survey year indicator variables are primary education, duration of residence between 0 and 5 years, and Survey1994 respectively.

Table 1.12
Results from the Wage Equation (14)

	Log(hourly wage)
Age	0.022^{*}
	(0.009)
Age^2/100	-0.029^{*}
	(0.012)
Education Level	
Lower secondary	0.033^{+}
	(0.018)
Higher secondary	0.106^{**}
	(0.022)
University	0.310^{**}
	(0.031)
Caribbean	0.067^{**}
	(0.020)
Survey2002	0.229^{**}
	(0.030)
Survey1998	0.107^{**}
	(0.021)
Bigcity	0.016
	(0.016)
Cohort arrives 1973-1980	-0.011
	(0.036)
Cohort arrives 1981-1990	-0.020
	(0.054)
Cohort arrives 1991-2002	-0.081
	(0.073)
Cohort arrives 1973-1980×Intermarriage	0.001
	(0.062)
Cohort arrives 1981-1990×Intermarriage	-0.056
	(0.067)
Cohort arrives 1991-2002×Intermarriage	-0.052
	(0.068)
Years since migration	0.006^{+}
	(0.003)
Years since migration×Intermarriage	0.002^{+}
	(0.001)
R^2	0.364
Observations	889

Notes: The dependent variable is the logarithm of hourly wage. Robust standard errors are given in parentheses. **, * and $^{+}$ indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels respectively. The constant term is not reported. The reference categories for education, years since migration, and survey year indicator variables are primary education, duration of residence between 0 and 5 years, and Survey1994 respectively.



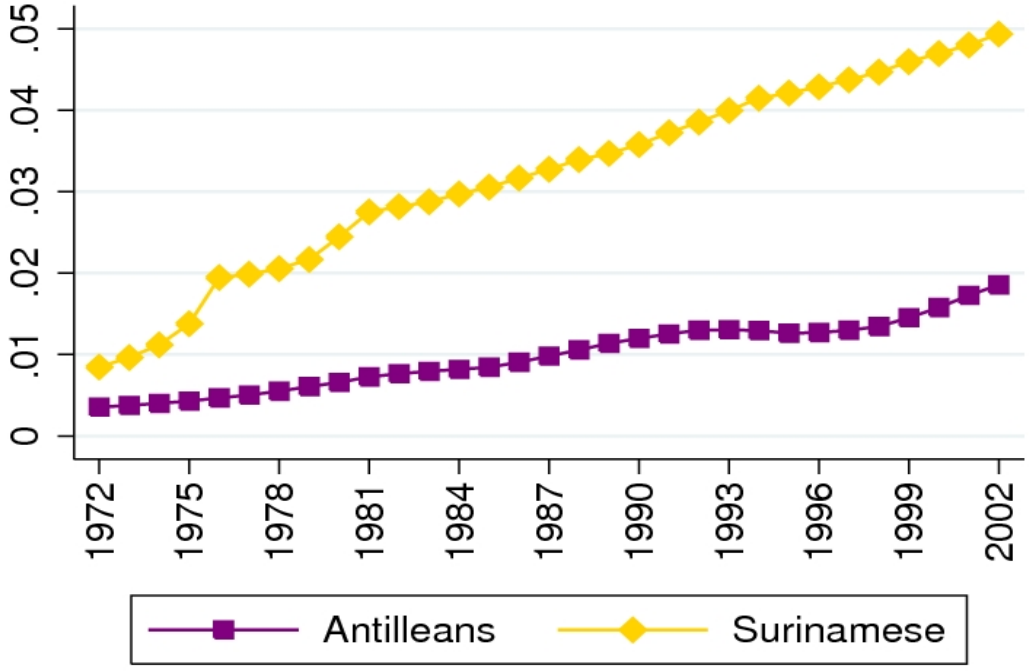
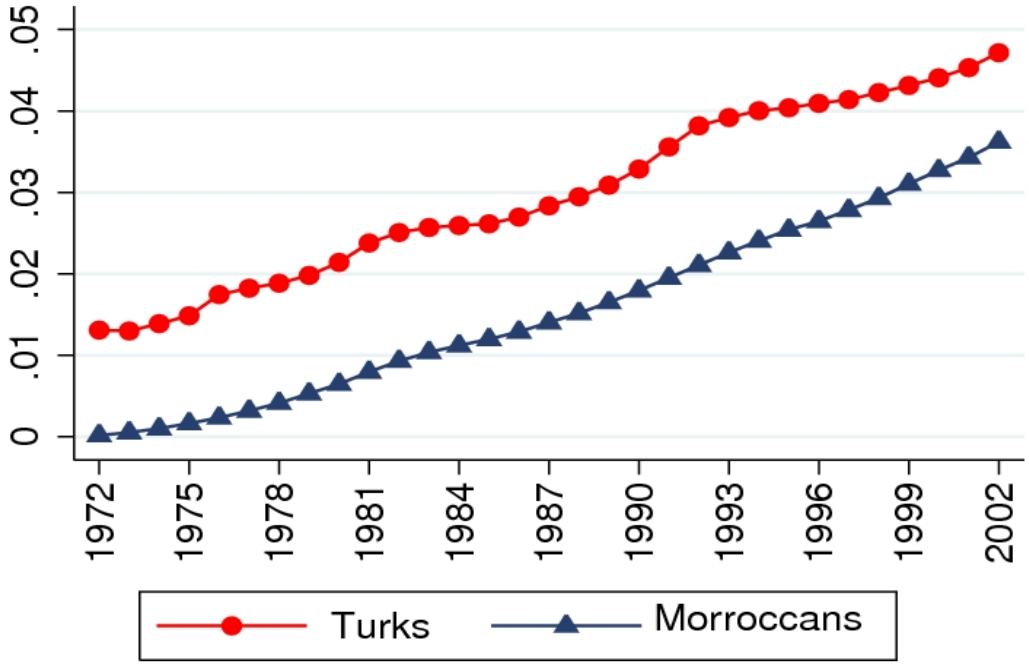


Figure 1.1
Group Size



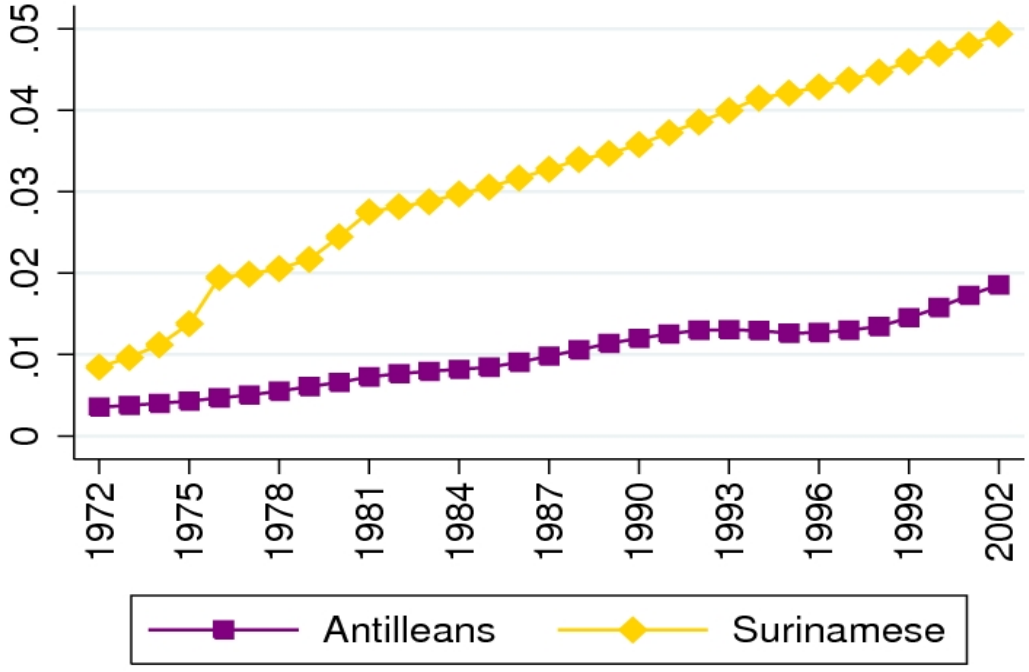


Figure 1.2
Sex Ratio

Chapter 2

Educational Attainment of Second-Generation Immigrants: The Role of Family Structure

2.1 Introduction

Understanding experiences and prospects of the children of immigrants is important to gain insights about the long-term adaptation and progress of immigrants. This study examines the educational attainment of second generation immigrants in the Netherlands by emphasizing the importance of family structure (i.e., whether only one or both parents are foreign-born) in shaping their educational achievement.[1] According to the straight-line assimilation theory, each subsequent immigrant generation achieves higher social and economic status as it become more culturally and linguistically similar to the native population (Gordon 1964). On the other hand, the segmented assimilation theory asserts that children of immigrants can follow several distinct paths of assimilation (Portes and Zhou 1993). The first is increasing acculturation and assimilation into the mainstream, which is also predicted by the straight-line assimilation theory. The second is acculturation and integration into the urban underclass, causing poverty and downward mobility. The third path is selective acculturation in which a strong attachment to cultural and ethnic background and economic assimilation go hand in hand.

The segmented assimilation theory puts emphasis on the role of family structure in shaping the assimilation of second-generation immigrants (Portes and Rumbaut 2001). According to this theory, family structure, which is considered as one of the important background factors shaping the experience of the first generation, affects the relationship between the type of assimilation experienced by immigrant parents and that experienced by their children. The relationship between parents' and children's assimilation is viewed as central to the outcomes of second-generation immigrants. For example, when children assimilate faster than their parents, called dissonant acculturation, parents' ability to supervise their children weakens

[1]The term second-generation immigrants refers to individuals who were born in the Netherlands and have at least one foreign-born parent.

and this type of acculturation causes parent-child conflict and a decrease in communication between generations.

In line with the segmented assimilation theory, which emphasizes the importance of family structure in immigrant adaptation, I distinguish between second-generation immigrants from families where only one parent is foreign-born and those from families where two parents are foreign-born. The presence of a native-born parent may have significant effects on the educational attainment of children for the following reasons. First, parental human and social capital plays an important role in a child's socioeconomic outcomes. Native-born parents are more likely than immigrants to have social networks predominantly consisting of other native-born individuals. Having access to native networks could reduce the search costs and increase the probability of finding a job as natives are better informed about job openings and they are better positioned to find jobs. On the other hand, immigrants who are mostly connected to their own ethnic network may not benefit from the positive spillovers resulting from natives' better educational and labor market outcomes. Previous studies indicate that a large social distance from the native population is associated with lower native language proficiency and residential segregation, which may have adverse effects on the socioeconomic outcomes of immigrants (Chiswick 1991; Chiswick and Miller 1996; Granovetter 1995). However, Edin et.al (2003) and Damn (2006) find that ethnic networks promote labor market outcomes of immigrants even after accounting for location sorting. Furtado (2005) also argues that connection to an ethnic network leads to more favorable socioeconomic outcomes for both immigrants and their children, as ethnic networks provide their members with information on job openings, business opportunities, and educational resources.

Second, Kao and Tienda (1995) point out that immigrant parents may differ from their native-born counterparts in terms of their behavior toward academic pursuits. They provide evidence that native-born children of foreign-born parents are best positioned to perform academically, as foreign-born parents have significantly higher educational aspirations for their children than do native-born parents. On the other hand, parental participation in scholastic activities is found to be positively correlated with offspring's educational achievement, as such participation can be seen as a reflection of parental interest in their children's

academic success. If immigrant parents are less likely to participate in such activities due to cultural and language barriers, the presence of a native-born parent may lead to favorable academic outcomes among second-generation immigrants. Third, Regan, Oaxaca, and Burghardt (2007) develop a theoretical model of optimal schooling levels that incorporates the effect of family background variables on the individual's discounting rate of interest. In their model, the discounting rate of interest, which can be interpreted as the marginal opportunity cost of an additional year of schooling, is expressed as a function of family background variables.[2] Using the premise of their theoretical model, one can argue that the discounting rate of interest may systematically differ between children of immigrant families (i.e. where both spouses are immigrants) and those of mixed families (i.e. where only one spouse is an immigrant). For example, if the discounting rate of interest was higher for children of immigrant families than that for children of mixed families, then the latter group could have a higher educational attainment than the former group. Moreover, Dustmann (2008) investigates how the probability of a permanent migration of the father affects investment in his son's education and intergenerational earnings mobility. He finds a strong correlation between the probability of fathers' permanent migration and sons' educational attainment. It is possible that parents' assessment about a permanent or temporary migration varies across family types: immigrant families and mixed families. If mixed families are less likely to move back home, then differences in parental return intentions may be another factor that explains why family structure plays an important role in the educational attainment of second-generation immigrants. In sum, the effect of having a native-born parent on the educational attainment of second-generation immigrants is theoretically ambiguous.

The data used in this study are from the SPVA, 'Social Position and Use of Public Utilities by Immigrants', a large scale, cross-sectional immigrant specific survey specifically designed to study the four largest immigrant groups in the Netherlands: Turks, Moroccans, Surinamese, and Antilleans. The sample used in the empirical analysis consists of second-generation immigrants aged between 15 and 30 years.

Investigating the effect of family structure on the educational attainment of second gener-

[2]The optimal level of schooling is established at the point where the discounting rate of interest equals the marginal rate of return to schooling.

ation immigrants, I focus on the following questions: (1) Does educational attainment differ by family structure (i.e. whether only one or both parents are foreign-born)? If so, how does the presence of a native-born parent affect their educational attainment? (2) Does the gender of the native-born parent matter? Do second-generation immigrants with a native-born mother have a higher/lower educational attainment than those with a native-born father?

Two key empirical issues have to be addressed in order to estimate the causal effect of family structure on the educational attainment of second generation immigrants. First, the sample used in the empirical analysis consists of both individuals who have completed their education and those who are currently enrolled in school. The latter group makes the estimation of the highest level of education complicated, as for these individuals final attainment is unknown, but it exceeds or equals the observed level of education. To account for the censoring problem arising from the fact that some children are enrolled in school at the time of survey, I estimate a censored ordered probit model. Second, it is possible that there are unobserved characteristics that affect both the formation of interethnic marriages and the educational attainment of children from such marriages. For example, compared to children of intermarried parents, children of immigrant parents may be better positioned to perform academically because of their parents' higher educational aspirations for children (Kao and Tienda 1995). If this is the case, the unobserved motivation effect results in inconsistent estimates. To tackle this issue, I use the methodology developed by Rivers and Voung (1988) that allows for the potential endogeneity of intermarriage in the censored ordered probit model.

Accounting for the censoring problem, the results suggest that children with a native-born father have a higher educational attainment than those with two immigrant parents. I also find that the gender of the native-born parent matters. Having a native-born mother does not make a significant difference in the educational attainment of second-generation immigrants. Interestingly, the presence of a native-born father differentially affects men's and women's educational attainment. While the relationship between having a native-born father and educational attainment is not statistically significant in the men's sample, for women having a native-born father increases the probability of attaining higher education by 17.3 percentage points. When I control for the possible endogeneity of intermarriage in

the model, the effect of having a native-born parent on the educational attainment of second-generation immigrants turns out to be statistically insignificant. However, it is important to note that the results from the Censored Ordered Probit model are not directly comparable with those from the model that accounts for both the potential endogeneity of intermarriage and the censoring problem, as the samples used in the estimations are different. Due to data limitations, the latter model uses the sample of second- generation immigrants who live with their parents. It is quite possible that home-resident second-generation immigrants may not be a random sample of all second-generation immigrants.

The outline of this study is as follows: The next section reviews the literature on the educational attainment of second generation immigrants; Section 3 describes the data used in the empirical analysis; Section 4 introduces the econometric model estimated to identify the impact of family structure on the educational attainment of second-generation immigrants; Section 5 summarizes the results; and Section 6 concludes.

2.2 Literature Review

Van Ours and Veenman (2003) investigate differences in the educational attainment of first- and second-generation immigrants in the Netherlands compared to natives without taking account of family structure. Using data from the 1998 SPVA, they find that second-generation immigrants have lower educational attainment than their native counterparts due to differences in parental education. When they account for these differences, the gap between natives and second-generation immigrants disappears to a large extent. Gang and Zimmermann (2000), on the other hand, show that parental education has no impact on the educational level of children of immigrants in Germany. In addition, they provide evidence that ethnicity matters significantly in educational attainment even after accounting for various characteristics such as parental human capital, assimilation measures, and ethnic networks. Riphahn (2003) also investigates the educational attainment of German-born children of immigrants using German census data. She shows that second-generation immigrants lag behind natives in terms of their schooling success measured by current enrollment and highest completed degree and that there is a significant increase in the educational gap between the two groups over time.

Van Ours and Veenman (2010) estimate the causal effect of interethnic marriages on the educational attainment of second-generation Moluccan immigrants in the Netherlands. Their identification strategy exploits the random allocation of Moluccan immigrants at the time of arrival, which makes the subsequent formation of interethnic marriages between Moluccans and native Dutch resemble a natural experiment. They find that children of a native mother and a Moluccan father have higher educational attainment than children of two Moluccan parents. Using the data from the March Current Population Survey, Ramakrishnan (2004) examines whether the presence of a native-born parent leads to different socioeconomic outcomes among second- generation immigrants. After controlling for age, race and gender, he finds that having a native-born parent is associated with an increase in the likelihood of graduating from high school and obtaining a college degree. Chiswick and DebBurman (2004) find that having a native-born parent has a positive impact on educational attainment. Compared to natives, second-generation immigrants with a foreign-born mother and those with a foreign-born father acquire 0.4 and 0.34 years more schooling respectively. However, the important limitation of both studies is their failure to control for parental characteristics that could influence individuals' educational outcomes and vary across family types. Furtado (2005) shows that children with a foreign-born father and a native-born mother have lower grades in school than those with two foreign-born parents. She interprets the positive effect of presence of a foreign-born mother on a child's educational achievement as an indicator of the positive effects of ethnic networks.[3] Although she controls for parents' educational level and socioeconomic status, she does not address the selection problem arising from the fact that intermarried immigrants may have some unobserved characteristics that influence their children's educational attainment.

2.3 Data and Descriptive Statistics

The data are from the SPVA, "Social Position and Use of Public Utilities by Immigrants". This survey provides information on the socioeconomic and socio-cultural position of the four

[3]Furtado (2005) assumes that immigrants who are more attached to their ethnic networks are more likely to marry within their own ethnic groups. Therefore, she considers having a foreign-born spouse as a good measure of ethnic attachment.

main immigrant groups in the Netherlands: Turks, Morroccans, Surinamese and Antilleans.[4] I use the SPVA surveys collected in 1994, 1998 and 2002.

As the goal of the article is to model educational attainment of second generation immigrants, I categorize four levels of education: primary education, lower secondary education, intermediate education and higher education. I focus on the highest educational level attained rather than on years of schooling, because in the Dutch educational system, one can attain the same educational level through different paths that involve different numbers of years of schooling. My final sample comprises second-generation immigrants aged between 15 and 30 years.[5]

The explanatory variables used in the empirical analysis are as follows. I include *age* and *age squared* to account for changes across birth cohorts. The indicator variable *Male* equals one if the immigrant is a male and zero otherwise. To control for mother's and father's education levels, I construct four indicator variables: *Primary* takes the value of one if the highest education attained by the parent is primary education or the parent has no education while *Lower Secondary*, *Intermediate* and *Higher* equal one if the highest education level attained by the parent is lower secondary education, intermediate education or higher education, respectively. The educational level of the parents may serve as a proxy for both the socioeconomic status of the family and innate ability of the child. To account for the possible quantity-quality trade-off in educational attainment, I include the *number of siblings* for each child. *Bigcity* is a dummy variable indicating whether the immigrant lives in one of the four major cities in the Netherlands: Amsterdam, Rotterdam, The Hague and Utrecht. The indicator variables *Turks*, *Moroccans*, *Surinamese*, and *Antilleans* capture the effect of ethnicity on educational attainment. To account for the censoring problem, I construct a binary variable, *Enrolled in school*, which indicates whether the immigrant is still in school or has completed her schooling at the time of survey. Finally, I include survey year dummies *Survey1994*, *Survey1998* and *Survey2002* to control for the survey year effect.

An important characteristic of the final sample is that it consists of both second-generation immigrants who live on their own and those who live with their parents. To endogenize the

[4]See Van Ours and Veenman (2003) for the detailed information on the SPVA.

[5]Full-time education is compulsory up to the child's fifteenth year in the Netherlands. See Van Ours and Veenman (2003) for an overview of the Dutch Educational system.

intermarriage decision in my model, I require information on the year of marriage and the year of immigration.[6] However, this information is available only for the latter group. Therefore, to estimate the model which accounts for both endogeneity of intermarriage and the censoring problem, I use the sample comprising second-generation immigrants who live with their parents.

Table 2.1 shows descriptive statistics for the final sample by type of family structure. I divide the final sample into two subsamples: children of two foreign-born parents (*immigrant family*) and children of intermarried parents (*mixed family*). Several conclusions can be drawn from Table 2.1. First, children of immigrant parents are more represented in the two lowest educational levels, while children of intermarried parents are more concentrated in the two highest educational levels. Second, the educational level of parents positively correlates with that of their children and mixed couples are more educated than immigrant couples. Third, fathers have a higher educational attainment than mothers in both samples. Fourth, Turks and Moroccans are less likely to intermarry than Surinamese and Antilleans. Turks and Morroccans make up only 5 percent and 6 percent respectively of the mixed family sample. Fifth, children of immigrant parents are more represented among individuals who are enrolled in school at the time of survey. Forty-one percent of children of immigrant parents have completed school at the time of survey whereas this rate is 51 percent for the children of intermarried parents.

Table 2.2 presents descriptive statistics for the sample of second-generation immigrants who have completed their schooling. It appears that second-generation immigrants with a native-born parent and an immigrant parent do better in terms of educational attainment than those with two immigrant parents. Table 2.2 provides evidence on the intergenerational transmission of educational attainment. Intermarried couples have higher levels of educational attainment than immigrant couples. For example, mothers with higher education make up 4 percent of the immigrant-family sample, while in the mixed-family sample, 18 percent of the mothers have attained higher education. Fathers with primary education constitute 75 percent of the immigrant-family sample and only 6 percent of the mixed-family

[6]I use sex ratio and group size at the time of marriage as instruments. See Gevrek (2010) for the construction of the instruments used to endogeneize the intermarriage decision.

sample. It is also important to note that the educational attainment of fathers is higher than that of mothers in both the mixed-family sample, and immigrant-family sample and males are more represented in the immigrant-family sample.

Table 2.3 provides the descriptive statistics for the sample comprising second-generation immigrants who reside with their parents. Unlike Table 2.1 and Table 2.2, the distribution of the educational attainment of second-generation immigrants does not differ considerably between the immigrant-family sample and mixed-family sample. Information on mother's education is missing for 9 percent of the sample and observations with missing values for father's education make up 5 percent of the sample. Therefore, I include two dummy variables to control for missing values for parental education. Parental education level varies by family type. The educational attainment of intermarried couples is higher than the educational attainment of immigrant couples. Children of immigrant parents have more siblings than children of intermarried parents.[7] Moreover, they appear to be more represented among the individuals who are still enrolled in school at the time of survey and among those who live in a big city.

2.4 Econometric Model

An individual's desired level of education E_i^* depends on a number of explanatory variables X_i:

$$E_i^* = X_i'\beta + u_i \tag{2.1}$$

where β is a vector of unknown parameters to be estimated and u_i is an error term. In practice, we do not observe desired level of education E_i^*. However, for individuals who have finished schooling, the observed (actual) level of education E_i is specified as follows

$$E_i = \begin{cases} 1\text{=Primary education} \quad \text{if } E_i^* \leq \mu_0 \\ 2\text{=Lower secondary education} \quad \text{if } \mu_0 < E_i^* \leq \mu_1 \\ 3\text{=Intermediate education} \quad \text{if } \mu_1 < E_i^* \leq \mu_2 \\ 4\text{=Higher education} \quad \text{if } E_i^* > \mu_2 \end{cases} \tag{2.2}$$

[7]Information on the number of siblings is available only for the sample of second-generation immigrants who live with their parents.

The μs are threshold parameters to be estimated with β. Assuming that u_i is the normally distributed error term with zero mean and variance equal to one, we can write the educational attainment probabilities:

$$\begin{aligned} Prob(E_i = 1) &= \Phi(\mu_0 - X_i'\beta) \\ Prob(E_i = 2) &= \Phi(\mu_1 - X_i'\beta) - \Phi(\mu_0 - X_i'\beta) \\ Prob(E_i = 3) &= \Phi(\mu_2 - X_i'\beta) - \Phi(\mu_1 - X_i'\beta) \\ Prob(E_i = 4) &= 1 - \Phi(\mu_2 - X_i'\beta) \end{aligned} \tag{2.3}$$

where Φ denotes the standard normal cdf. While the desired level of education equals the observed level of education for individuals who are not currently enrolled in school, for individuals who are currently enrolled in school, the desired level of education E_i^* is unknown, but exceeds the observed level of education. To account for these right-censored observations, E_i^s is defined for individuals who are currently enrolled in school at the time of the survey as follows:

$$E_i^s = \begin{cases} 1\text{=Primary education} \quad \text{if } E_i^* > -\infty \\ 2\text{=Lower secondary education} \quad \text{if } E_i^* > \mu_0 \\ 3\text{=Intermediate education} \quad \text{if } E_i^* > \mu_1 \\ 4\text{=Higher education} \quad \text{if } E_i^* > \mu_2 \end{cases} \tag{2.4}$$

The corresponding educational attainment probabilities for the censored observations are

$$\begin{aligned} Prob(E_i^s = 1) &= 1 \\ Prob(E_i^s = 2) &= 1 - \Phi(\mu_0 - X_i'\beta) \\ Prob(E_i^s = 3) &= 1 - \Phi(\mu_1 - X_i'\beta) \\ Prob(E_i^s = 4) &= 1 - \Phi(\mu_2 - X_i'\beta) \end{aligned} \tag{2.5}$$

The censored ordered probit model allows currently enrolled students and those who have completed their schooling to contribute separately to the likelihood function.[8] The

[8]The censored ordered probit model was proposed by King and Lillard (1987). See Holmes (2003), Maitra (2003), Ranasinghe and Hartog (2002) and Chanudhuri and Roy (2009) for the application of this estimation strategy.

log-likelihood function associated with the model can be written as

$$\begin{aligned} logL &= (1-S_i)\{\sum_{E_i=1} log[\Phi(\mu_0 - X_i'\beta)] + \sum_{E_i=2} log[\Phi(\mu_1 - X_i'\beta) - \Phi(\mu_0 - X_i'\beta)] \\ &+ \sum_{E_i=3} log[\Phi(\mu_2 - X_i'\beta) - \Phi(\mu_1 - X_i'\beta)]\} + S_i\{\sum_{E_i=1} log(1) + \sum_{E_i=2} log[1 - \Phi(\mu_0 - X_i'\beta)] \\ &+ \sum_{E_i=3} log[1 - \Phi(\mu_2 - X_i'\beta)]\} + \sum_{E_i=4} log[1 - \Phi(\mu_2 - X_i'\beta)] \end{aligned} \tag{2.6}$$

where S_i is a binary variable indicating whether the individual is currently enrolled in school. The regressors comprising the vector X are a constant; age and its square; dummies indicating individual's ethnicity, place of residence, gender, and parental education level, the number of siblings, survey-year dummies and an binary variable indicating the family structure (i.e. whether only one or both parents are foreign-born).

The second empirical issue arises from the possible endogeneity of intermarriage. Individuals who choose to intermarry may have unobserved characteristics that influence their children's educational attainment. To address the endogeneity of intermarriage within the censored ordered probit model, I follow the methodology proposed by Rivers and Vuong (1988). The procedure consists of two steps. First, I regress the endogenous variable (family structure) on the instruments and the other exogenous variables and generate residuals from the first-step regression. In the second step, the residuals from the first step are included as an additional regressor in the censored ordered probit estimation. Rivers and Vuong (1988) show that the estimated coefficient of residuals term in the second step can be used to construct the test for exogeneity. The hypothesis of no endogeneity requires that the estimated coefficent on the residuals term be statistically insignificant. Comparing the Rivers-Vuong approach to the Maximum likelihood estimation (MLE), Wooldridge (2002) points out that although the Rivers-Vuong method is less efficient than the MLE, it has important computational advantages in terms of the initial test of endogeneity. He suggests that if exogeneity is rejected in the model, it is worth doing the MLE. The estimates obtained from Rivers and Vuong's method are referred to as IV-Censored Ordered Probit estimates.

To endogeneize the intermarriage decision, I use two important structural determinants of intermarriage as instruments: group size and sex ratio. Group size represents the number of immigrants of the opposite sex relative to the total population of the opposite sex. Sex

ratio can be defined as the number of group members of the opposite sex divided by the number of group members of the same sex. The larger the size of an immigrant group and the less skewed is sex ratio, the more likely immigrants are to marry within their own ethnic group. The construction of instruments is unique in that they are measured at the time of marriage.[9] My identification strategy is based on the assumption that group size and sex ratio at the time of marriage are significant determinants of the intermarriage decision; however, they do not have a direct effect on the educational attainment of children.

Gang and Zimmermann (2000) show that ethnic network size has a positive impact on the educational attainment of second-generation immigrants in Germany. One can argue that this evidence may create a potential threat to the validity of group size as an instrument. However, I believe that the construction of instruments alleviates this concern for several reasons. Instruments are based on measures of structural factors at the time of marriage. My identification strategy also takes advantage of the fact that parents make their marriage choices long before children make their educational choices. For example, suppose that a Turkish man married a Dutch native in 1975 and they had a child in 1980; also suppose that this mixed family was interviewed in the 2002 wave. The identifying assumption tells us that the educational attainment of the child in 2002 is not affected by the group size variable in 1975. Obviously, my argument is credible if group size changed over time. Gevrek (2010) shows that the size of immigrant groups does change for the period 1972-2002 in the Netherlands. Moreover, to account for the possibility that group size is not a valid instrument, I estimate the model with sex ratio as the only instrument.

2.5 Results

2.5.1 Censored Ordered Probit

This section presents estimation results based on the econometric model that accounts for only the censoring problem. The estimations are carried out through two specifications. In the first specification, the main variable of interest is *Mixed family*, which takes the value of one if the second-generation immigrant is from a family made up of a native-born parent and

[9]See the identification section of Chapter 1 for detailed information on the construction of instruments.

a foreign-born parent and zero if the second-generation immigrant is from a family made up of two foreign-born parents. In the second specification, I construct two indicator variables to distinguish second-generation immigrants with a native-born mother from those with a native-born father.[10] The second specification allows me to test whether the gender of the native-born parent plays an important role in educational attainment.

Table 2.4 shows censored ordered probit estimates of the educational attainment of second-generation immigrants for two specifications in three samples. The magnitude of the ordered probit coefficient does not have a simple interpretation. While the direction of the effect of an explanatory variable on the probabilities of attaining the highest and lowest educational levels can be determined by the sign of the estimated coefficient, one needs to examine the marginal effects to determine the direction of the effect for the intermediate categories (Wooldridge, 2002). Tables 2.5, 2.6 and 2.7 present the corresponding marginal effects for the pooled sample of men and women, the sample of men and the sample of women respectively.

Columns 1 and 2 of Table 2.4 report the results from the pooled sample of men and women. The coefficient of *Mixed family* is positive and statistically significant at the 5 percent level. Column 4 of Table 2.5 indicate that having a native born parent is associated with a 5.5 percentage point increase in the probability of attaining higher education. The effect of ethnicity on educational attainment is statistically significant. Relative to Turks, the probability of having higher education is higher by 8.4 percentage points for Moroccans. The corresponding increases in the probability are 6.1 percentage points if the second-generation immigrant is Surinamese and 5.8 percentage points if the second-generation immigrant is Antillean. Parental education has a positive and statistically significant effect on the educational attainment of children. It is worth noting that the effect of education of the father is stronger than that of the mother. For example, compared to the reference category (having a father with primary education or no education), having a father with higher education increases the probability of attaining higher education by 27 percentage points while the

[10] *Native-born mother* takes the value of one if the gender of the native-born parent is a female and zero otherwise. *Native-born father* equals one if the native-born parent is a male and zero otherwise. In the final sample, 96 second-generation immigrants are from mixed families with a native-born father and 165 of them are from mixed families with a native-born mother.

corresponding increase in the probability is 19.7 percentage points if the mother has higher education. The second column of Table 2.4 indicates that second-generation immigrants with a native-born father have the highest educational attainment. The coefficient of *Native-born father* is positive and statistically significant at the 1 percent level. Column 8 of Table 2.5 shows that having a native-born father increases the probability of attaining higher education by 14.1 percentage points. The second column of Table 2.4 also reveals that having a native-born mother does not have a statistically significant effect on the educational attainment of second-generation immigrants. The coefficient of *Native-born mother* is positive but statistically insignificant.

Columns 3-6 of Table 2.4 reveal that the presence of a native-born parent differentially affects men's and women's educational attainment. While the relationship between having a native-born parent and educational attainment is not statistically significant in the men's sample, column 8 of Table 2.7 indicates that for women having a native-born father increases the probability of attaining higher education by 17.3 percentage points. In the women's sub-sample both father's and mother's educational levels have a positive and statistically significant effect on the educational attainment of children, whereas in the men's sub-sample the effect of mother's education on educational attainment is statistically insignificant.

Table 2.8 reports ordered probit estimates of the educational attainment of second generation immigrants who have completed their schooling.[11] The estimations are carried out through two specifications in three samples. Tables 2.9, 2.10, and 2.11 present the marginal effects for the combined sample of women and men, the sample of men and the sample of women respectively. Column 1 of Table 2.8 shows that the variable of primary interest, *Mixed family*, has a positive and statistically significant coefficient implying that relative to children of immigrant parents, children of intermarried parents are more likely to attain higher education. The marginal effects in Table 2.9 indicate that having a native-born parent has a negative effect on the probabilities of having the two lowest educational levels (primary education and lower secondary education). The probability of having higher education is 7 percentage points higher and the probability of having primary education is 9.7 percentage

[11]Second-generation immigrants who have completed their schooling refer to those who are not currently enrolled in school at the time of survey.

points lower for children of intermarried parents. The coefficient of *Age* is positive and statistically significant, suggesting that the probability of attaining higher education increases with age. Surinamese and Moroccans have a higher educational attainment than Turks. Relative to being Turk, being Moroccan increases the probability of attaining higher education by 3.7 percentage points and being Surinamese increases the corresponding probability by 3.5 percentage points. Father's education has a positive and statistically significant effect on the educational attainment second generation immigrants. For instance, compared to the reference category (the father having primary education or no education), the probability of attaining higher education is higher by 6.2 percentage points for children of fathers with lower secondary education and is higher by 10.8 percentage points for children of fathers with intermediate education and is higher by 16.8 percentage points for children of fathers with higher education. The effect of fathers' education appears stronger than the effect of mothers' education. Only mothers with higher education have a positive and statistically significant effect on the educational attainment of their children.

Column 2 of Table 2.8 indicates that the gender of the native-born parent matters. Second-generation immigrants with a native-born father outperform those with two immigrant parents. The marginal effects presented in Table 2.9 show that having a native-born father increases the probability of attaining higher education by 15.9 percentage points. Consistent with the results reported in Column 2 of Table 2.4, the effect of having a native-born mother on the educational attainment of second generation immigrants is positive but statistically insignificant.

Columns 4 and 6 of Table 2.8 show that the gender of a native-born parent has a differential effect on the educational attainment of men and women. Native-born mothers have a positive and significant effect on the educational attainment of their sons while native-born fathers have a positive and significant effect on the educational attainment of their daughters. Moreover, the effect of a native-born father is stronger than that of a native-born mother in terms of both significance and magnitude. Table 2.10 indicates that having a native-born mother increases the probability that men will attain higher education by 5.6 percentage points, and Table 2.11 shows that having a native-born father is associated with a 16.2 percentage point increase in the probability that women will attain higher education.

2.5.2 IV-Censored Ordered Probit

This section discusses estimation results from the model that accounts for both the potential endogeneity of intermarriage and the censoring issue. The results are based on the sample comprising second generation immigrants who live with their parents, because information on parents' year of marriage is not available for second-generation immigrants who live on their own and this information is crucial in the construction of instruments. To allow for the potential endogeneity of intermarriage within the censored ordered probit model, I use the methodology of Rivers and Vuong (1988). In the first stage of the procedure, I regress the potentially endogeneous variable (*Mixed family*) on the instruments and other exogenous regressors. In the second stage of the procedure, I include the residuals coming from the first stage as an extra explanatory variable in the censored ordered probit estimation. The null hypothesis of no endogeneity can be rejected when the coefficient of the residuals is statistically significant.

Table 2.12 presents the first stage OLS results for the potentially endogenous variable, *Mixed family*, which takes the value of one if the immigrant parent married a native [12] and zero if the immigrant parent married within his/her own ethnic group. Estimations are carried out through two specifications. The first specification uses both group size and sex ratio as instruments, while sex ratio is the only instrument in the second specification. The results indicate that an increase in education leads to an increase in the probability of being intermarried. The coefficient of the *Caribbean* variable is positive and statistically significant at the 1 percent level, implying that Surinamese and Antilleans are more likely to be intermarried than Turks and Moroccans.[13] *Years since migration* has a positive and statistically significant coefficient, suggesting that immigrants who have been in the Netherlands for a longer period are more likely to intermarry. Most importantly, the estimated coefficients of the instruments *group size* and *sex ratio* have the expected negative signs and are statistically significant at the 1 percent level.

Table 2.13 presents the IV-Censored Ordered Probit estimates of the impact of hav-

[12] Natives refer to those who were born in the Netherlands with both parents also born in the Netherlands

[13] *Caribbean* is a binary variable that equals one if the immigrant parent is from Suriname or the Antilles and zero if the immigrant parent is from Turkey or Morocco.

ing a native-born parent on the educational attainment of second- generation immigrants. Columns 1 and 2 use residuals obtained from specifications (1) and (2) of Table 2.12 respectively. The coefficient of *Mixed family* is positive but statistically insignificant. The effect of having a native-born parent on the educational attainment of second generation immigrants turns out to be statistically insignificant when I account for the possible endogeneity of intermarriage. Several explanations could account for the insignificant effect. First, recall that IV-Censored Ordered estimation results are based on the sample of second-generation immigrants who live with their parents. Home-resident second-generation immigrants may be a selected sub-sample from the population of all second-generation immigrants. For example, a comparison of Tables 2.1 and 2.3 reveals that second-generation immigrants who live with their parents are more likely to be male, younger, and less educated; and are more likely to be represented among individuals who are still enrolled in school at the time of survey. Forty-two percent of the final sample have completed their schooling compared to only 20 percent in the sample of second-generation immigrants residing with their parents. Second, results from Tables 2.4 and 2.8 suggest that the gender of the native-born parent matters. Children with a native-born father have higher educational attainment than those with two immigrant parents, while the presence of a native-born mother does not make a significant difference in the educational attainment of second-generation immigrants. Children with a native-born father are underrepresented in the sample of home-resident second-generation immigrants. Out of 87 mixed families, only 10 families are made up of a native-born father and a foreign-born mother. Therefore, the exclusion of second-generation immigrants who live on their own from the analysis may lead to a sample selection bias.

Table 2.13 also shows that the coefficient of *Residual* is statistically insignificant, implying that the null hypothesis of exogeneity of *Mixed family* can not be rejected. *Number of Siblings* has a negative and statistically significant coefficient suggesting that children with more siblings have a lower educational attainment. The marginal effects presented in Table 2.14 indicate that each additional sibling reduces the probability of attaining higher education by 1.2 percentage points. The probability of attaining higher education is 9 percentage points higher for Moroccans relative to Turks. Unlike the results from previous estimations, parental education does not have a significant effect on the educational attainment of children. All

of the parental education dummies are positive but statistically insignificant. Moreover, the coefficient of *Male* is negative and statistically significant at the 1 percent level. Table 2.14 shows that the probability of attaining higher education is lower by 12.5 percentage points for males.

2.6 Conclusion

This study investigates the impact of having a native-born parent on the educational attainment of second-generation immigrants in the Netherlands. Several mechanisms account for the impact of a native-born parent on educational outcomes of second-generation immigrants. First, native-born parents may play a more important role in supervising their children's educational careers, as they have greater knowledge of and experience with the Dutch educational system. Second, access and exposure to native networks could lead to more favorable educational outcomes for children because of positive spillovers arising from natives' better educational and labor market outcomes. Third, intermarriage with a native spouse facilitates immigrants' sociocultural assimilation and thus improves their labor market integration. The intermarriage premium literature provides evidence that intermarried immigrants have higher earnings and better native language skills than their coethnic married counterparts (Meng and Gregory 2005; Meng and Meurs 2009). Therefore, better socioeconomic outcomes of an intermarried immigrant parent may also have a positive effect on the educational attainment of children. On the other hand, the Immigrant Optimism Hypothesis suggests that immigrant parents have higher educational aspirations for their children than their native-born counterparts (Kao and Tienda 1995). If so, then the presence of a native-born parent could have an adverse impact on children's educational outcomes. Moreover, connection to an ethnic network may have a positive effect on socioeconomic outcomes of both immigrants and their children, as ethnic networks provide their members with social support and information on job openings, business opportunities and educational resources.

I address two key empirical issues to estimate the causal effect of having one or two foreign-born parents on the educational attainment of second- generation immigrants. The first issue is censoring in the data resulting from the fact that some children are enrolled in school at the time of the survey. Failure to distinguish the enrolled children from those who

have completed their schooling could lead to inconsistent estimates, as we do not observe the final educational attainment for children who are still in school. I use a censored ordered probit model to account for right-censoring of enrolled children. Censored ordered probit estimation results suggest that children with a native-born father have a higher educational attainment than those with two immigrant parents. However, having a native-born mother does not make a significant difference in the educational attainment of second-generation immigrants. Interestingly, the presence of a native-born father has a differential impact on the educational attainment of men and women. While the relationship between having a native-born father and educational attainment is not statistically significant in the men's sample, for women having a native-born father increases the probability of attaining higher education by 17.3 percentage points.

The second issue arises from the endogeneity of intermarriage. It is possible that individuals who choose to intermarry have unobserved characteristics that influence their children's educational attainment. Once I control for the endogeneity of intermarriage within the censored ordered probit model, the positive effect of having a native-born parent becomes statistically insignificant. Note that we cannot directly compare results from the Censored Ordered Probit model with those from the IV-Censored Ordered Probit Model, as the latter model uses only the sample of second generation immigrants who reside with their parents due to data limitations. Descriptive statistics reveal that home-resident second-generation immigrants are more likely to be male, younger, and less educated; and appear to be more represented among enrolled children. Therefore, they may be a selected sub-sample from the population of all second-generation immigrants. Moreover, Censored Ordered Probit results suggest that the gender of the native-born parent matters. Having a native-born father makes a difference while the impact of having a native-born mother is not statistically significant. Children with a native-born father are underrepresented in the sample of home-resident second-generation immigrants. Therefore, the exclusion of second-generation immigrants who live on their own from the analysis may make IV-Censored Ordered Probit estimates subject to sample selection bias.

Table 2.1
Descriptive Statistics for the Sample of Second-Generation Immigrants Currently enrolled in School and those who Completed Schooling

	Total Sample (N=2841)		**Immigrant Family** (N=2580)		**Mixed Family** (N=261)	
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Educational Level						
Primary	0.39	0.48	0.41	0.49	0.17	0.37
Lower secondary	0.27	0.44	0.28	0.45	0.21	0.40
Intermediate	0.28	0.44	0.27	0.44	0.40	0.49
Higher	0.06	0.23	0.04	0.20	0.22	0.41
Age	20.8	4.33	20.5	4.27	23.01	4.38
Male	0.47	0.50	0.47	0.50	0.47	0.50
Mother's Educational Level						
Primary	0.73	0.44	0.78	0.41	0.18	0.38
Lower secondary	0.13	0.34	0.11	0.31	0.38	0.48
Intermediate	0.08	0.26	0.07	0.24	0.19	0.39
Higher	0.06	0.23	0.04	0.19	0.24	0.42
Father's Educational Level						
Primary	0.64	0.47	0.69	0.46	0.14	0.35
Lower secondary	0.15	0.36	0.15	0.35	0.24	0.42
Intermediate	0.11	0.30	0.09	0.29	0.24	0.42
Higher	0.09	0.29	0.07	0.24	0.38	0.48
Turks	0.38	0.48	0.41	0.49	0.05	0.23
Moroccans	0.30	0.46	0.33	0.47	0.06	0.24
Surinamese	0.21	0.40	0.20	0.40	0.31	0.46
Antilleans	0.09	0.29	0.05	0.21	0.56	0.49
Enrolled in School	0.58	0.49	0.59	0.49	0.49	0.50
Bigcity	0.67	0.46	0.68	0.46	0.60	0.49

Table 2.2
Descriptive Statistics for the Sample of Second-Generation Immigrants who Completed Schooling

	Total Sample (N=1190)		**Immigrant Family** (N=1058)		**Mixed Family** (N=132)	
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Educational Level						
Primary	0.23	0.42	0.25	0.43	0.08	0.27
Lower secondary	0.32	0.46	0.34	0.47	0.20	0.39
Intermediate	0.34	0.47	0.33	0.47	0.37	0.48
Higher	0.11	0.31	0.08	0.26	0.35	0.47
Age	23.9	3.47	23.8	3.44	25.2	3.44
Male	0.46	0.49	0.47	0.49	0.37	0.48
Mother's Educational Level						
Primary	0.75	0.43	0.82	0.38	0.20	0.40
Lower secondary	0.14	0.34	0.10	0.30	0.43	0.49
Intermediate	0.05	0.22	0.04	0.19	0.19	0.39
Higher	0.06	0.22	0.04	0.19	0.18	0.38
Father's Educational Level						
Primary	0.68	0.46	0.75	0.43	0.17	0.38
Lower secondary	0.14	0.34	0.12	0.33	0.23	0.42
Intermediate	0.10	0.29	0.07	0.25	0.30	0.46
Higher	0.08	0.27	0.06	0.23	0.30	0.45
Turks	0.42	0.49	0.46	0.49	0.07	0.25
Moroccans	0.25	0.43	0.28	0.44	0.07	0.26
Surinamese	0.22	0.41	0.21	0.41	0.30	0.45
Antilleans	0.11	0.30	0.05	0.21	0.56	0.49
Bigcity	0.63	0.48	0.64	0.48	0.61	0.48

Table 2.3
Descriptive Statistics for the Sample of second-Generation Immigrants who Live with their Parents

	Total Sample (N=1029)		**Immigrant Family** (N=942)		**Mixed Family** (N=87)	
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Educational Level						
Primary	0.56	0.49	0.58	0.49	0.40	0.49
Lower secondary	0.24	0.42	0.24	0.42	0.24	0.43
Intermediate	0.18	0.38	0.16	0.37	0.32	0.46
Higher	0.02	0.13	0.02	0.12	0.03	0.18
Age	17.8	2.66	17.7	2.61	18.9	2.98
Male	0.52	0.50	0.51	0.50	0.54	0.50
Mother's Educational Level						
Primary	0.65	0.47	0.70	0.45	0.16	0.36
Lower secondary	0.13	0.33	0.11	0.31	0.38	0.48
Intermediate	0.09	0.28	0.08	0.27	0.11	0.32
Higher	0.04	0.19	0.03	0.16	0.15	0.35
Missing	0.09	0.28	0.08	0.26	0.20	0.39
Father's Educational Level						
Primary	0.57	0.49	0.60	0.48	0.18	0.38
Lower secondary	0.19	0.39	0.18	0.38	0.34	0.47
Intermediate	0.12	0.32	0.12	0.32	0.16	0.36
Higher	0.07	0.26	0.05	0.22	0.28	0.44
Missing	0.05	0.20	0.05	0.20	0.04	0.18
Turks	0.39	0.48	0.42	0.49	0.06	0.23
Moroccans	0.36	0.48	0.39	0.48	0.09	0.29
Surinamese	0.18	0.38	0.15	0.36	0.45	0.50
Antilleans	0.07	0.24	0.04	0.18	0.40	0.49
Enrolled in School	0.80	0.40	0.81	0.39	0.68	0.46
Bigcity	0.69	0.46	0.71	0.45	0.55	0.50
Number of Siblings	2.92	1.90	3.04	1.90	1.52	1.18

Table 2.4
Censored Ordered Probit Estimates of Educational Attainment of Second-Generation Immigrants

	All		**Men**		**Women**	
	(1)	**(2)**	**(1)**	**(2)**	**(1)**	**(2)**
Mixed family	0.217*	-	0.256	-	0.235	-
	(0.111)		(0.169)		(0.154)	
Native-born mother	-	0.043	-	0.260	-	-0.214
		(0.133)		(0.176)		(0.223)
Native-born father	-	0.490**	-	0.225	-	0.559**
		(0.162)		(0.526)		(0.182)
Age	−0.086	−0.083	0.155	0.155	−0.281*	−0.283*
	(0.088)	(0.088)	(0.130)	(0.130)	(0.126)	(0.126)
Age^2	0.001	0.001	-0.003	-0.003	0.005*	0.005*
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Male	−0.023	−0.002	-	-	-	-
	(0.055)	(0.056)				
Moroccans	0.336**	0.340**	0.334**	0.334**	0.372**	0.379**
	(0.067)	(0.067)	(0.098)	(0.098)	(0.094)	(0.094)
Surinamese	0.238**	0.242**	0.183	0.183	0.320**	0.328**
	(0.086)	(0.086)	(0.129)	0.129	(0.119)	(0.119)
Antilleans	0.241+	0.248+	0.386*	0.384*	0.182	0.188
	(0.130)	(0.130)	(0.189)	(0.191)	(0.185)	(0.188)
Mother's Educational Level						
Lower secondary	0.133	0.135	-0.005	-0.005	0.257+	0.257+
	(0.108)	(0.107)	(0.156)	(0.158)	(0.151)	(0.154)
Intermediate	0.358**	0.348**	0.101	0.101	0.674**	0.641**
	(0.132)	(0.132)	(0.193)	(0.194)	(0.193)	(0.194)
Higher	0.654**	0.632**	0.189	0.190	1.006**	0.948**
	(0.149)	(0.150)	(0.224)	(0.224)	(0.223)	(0.225)
Father's Educational Level						
Lower secondary	0.351**	0.367**	0.327**	0.326**	0.370**	0.414**
	(0.095)	(0.096)	(0.130)	(0.131)	0.145	(0.148)
Intermediate	0.550**	0.539**	0.715**	0.716**	0.401**	0.377**
	(0.108)	(0.108)	(0.167)	(0.168)	(0.156)	(0.156)
Higher	0.862**	0.868**	0.765**	0.764**	0.917**	0.900**
	(0.129)	(0.131)	(0.181)	(0.182)	(0.198)	(0.203)
Bigcity	0.106+	0.093	0.091	0.091	0.086	0.056
	(0.058)	(0.058)	(0.086)	(0.086)	(0.081)	(0.081)
Survey2002	0.170*	0.178*	-0.003	-0.003	0.332**	0.352**
	(0.084)	(0.084)	(0.123)	(0.123)	(0.117)	(0.118)
Survey1998	0.021	0.020	-0.044	-0.044	0.071	0.073
	(0.076)	(0.076)	(0.114)	(0.114)	(0.106)	0.106
Constant	1.693+	1.661+	-1.167	-1.164	4.021**	4.077**
	(1.026)	(1.025)	(1.487)	(1.488)	(1.476)	(1.475)
Observations	2841	2841	1351	1351	1490	1490
Number Censored	1651	1651	806	806	845	845
Log Likelihood	−1788	−1785	-844	-844	-925	-920
μ_1	0.879**	0.880**	0.939**	0.939**	0.848**	0.849**
	(0.032)	(0.032)	(0.048)	(0.048)	(0.045)	(0.045)
μ_2	2.263**	2.269**	2.300**	2.300**	2.287**	2.303**
	(0.055)	(0.055)	(0.084)	(0.084)	(0.075)	(0.076)

Notes: **, * and + indicate that the estimated coefficients are statistically significant 1%, 5% and 10% levels respectively.

Table 2.5

Marginal Effects from Censored Ordered Probit Estimates of Educational Attainment of Second-Generation Immigrants

	All							
	(1)				**(2)**			
	E=1	**E=2**	**E=3**	**E=4**	**E=1**	**E=2**	**E=3**	**E=4**
Mixed family	-0.035	-0.042	0.022	0.055	-	-	-	-
Native-born mother	-	-	-	-	-0.007	-0.008	0.005	0.010
Native-born father	-	-	-	-	-0.067	-0.096	0.022	0.141
Age	0.016	0.016	-0.011	-0.020	0.015	0.015	-0.011	-0.019
Age^2	-0.0003	-0.0003	0.0002	0.0004	-0.0003	-0.0003	0.0002	0.0004
Male	0.004	0.004	-0.003	-0.005	0.004	0.004	-0.003	-0.005
Moroccans	-0.057	-0.064	0.037	0.084	-0.058	-0.065	0.038	0.085
Surinamese	-0.041	-0.047	0.027	0.061	-0.041	-0.046	0.027	0.060
Antilleans	-0.037	-0.044	0.023	0.058	-0.040	-0.048	0.024	0.064
Mother's Educational Level								
Lower secondary	-0.022	-0.025	0.015	0.032	-0.023	-0.026	0.016	0.033
Intermediate	-0.052	-0.067	0.027	0.092	-0.053	-0.068	0.027	0.093
Higher	-0.083	-0.126	0.012	0.197	-0.081	-0.122	0.014	0.188
Father's Educational Level								
Lower secondary	-0.055	-0.069	0.031	0.093	-0.057	-0.071	0.032	0.097
Intermediate	-0.076	-0.106	0.027	0.156	-0.076	-0.105	0.027	0.153
Higher	-0.101	-0.162	-0.005	0.270	-0.102	-0.162	-0.005	0.270
Bigcity	-0.019	-0.019	0.015	0.024	-0.017	-0.017	0.013	0.021
Survey2002	-0.030	-0.033	0.022	0.041	-0.031	-0.034	0.022	0.043
Survey1998	-0.003	-0.003	0.002	0.004	-0.003	-0.004	0.002	0.004

Table 2.6

Marginal Effects from Censored Ordered Probit Estimates of Educational Attainment of Second-Generation Immigrants

	Men							
	(1)				**(2)**			
	E=1	**E=2**	**E=3**	**E=4**	**E=1**	**E=2**	**E=3**	**E=4**
Mixed family	-0.047	-0.050	0.039	0.058	-	-	-	-
Native-born mother	-	-	-	-	-0.048	-0.051	0.039	0.059
Native-born father	-	-	-	-	-0.041	-0.044	0.034	0.051
Age	-0.032	-0.028	0.029	0.031	-0.032	-0.028	0.029	0.031
Age^2	0.0006	0.0006	-0.0006	-0.0006	0.0006	0.0006	-0.0006	-0.0006
Moroccans	-0.064	-0.063	0.055	0.073	-0.064	-0.063	0.055	0.073
Surinamese	-0.036	-0.034	0.031	0.039	-0.036	-0.034	0.031	0.039
Antilleans	-0.066	-0.077	0.050	0.093	-0.066	-0.076	0.050	0.092
Mother's Educational Level								
Lower secondary	0.001	0.001	-0.001	-0.001	0.001	0.0009	-0.001	-0.001
Intermediate	-0.020	-0.019	0.017	0.021	-0.020	-0.019	0.017	0.021
Higher	-0.036	-0.036	0.030	0.042	-0.036	-0.036	0.030	0.042
Father's Educational Level								
Lower secondary	-0.060	-0.063	0.049	0.074	-0.060	-0.063	0.049	0.074
Intermediate	-0.106	-0.143	0.057	0.192	-0.106	-0.144	0.057	0.193
Higher	-0.110	-0.153	0.053	0.210	-0.110	-0.153	0.053	0.210
Bigcity	-0.019	-0.016	0.017	0.018	-0.019	-0.016	0.017	0.018
Survey2002	0.0007	0.0006	-0.0007	-0.0007	0.0007	0.0006	-0.0007	-0.0007
Survey1998	0.009	0.008	-0.008	-0.009	0.009	0.008	-0.008	-0.009

Table 2.7

Marginal Effects from Censored Ordered Probit Estimates of Educational Attainment of Second-Generation Immigrants

	Women							
	(1)				**(2)**			
	E=1	**E=2**	**E=3**	**E=4**	**E=1**	**E=2**	**E=3**	**E=4**
Mixed family	-0.033	-0.045	0.012	0.066	-	-	-	-
Native-born mother	-	-	-	-	0.038	0.039	-0.029	-0.049
Native-born father	-	-	-	-	-0.062	-0.104	-0.006	0.173
Age	0.045	0.053	-0.026	-0.072	0.045	0.054	-0.027	-0.072
Age^2	-0.0009	-0.0010	0.0005	0.0014	-0.0009	-0.0010	0.0005	0.0014
Moroccans	-0.054	-0.071	0.023	0.101	-0.055	-0.072	0.024	0.103
Surinamese	-0.045	-0.061	0.017	0.089	-0.046	-0.063	0.018	0.090
Antilleans	-0.026	-0.035	0.011	0.050	-0.027	-0.036	0.012	0.051
Mother's Educational Level								
Lower secondary	-0.036	-0.049	0.013	0.071	-0.036	-0.049	0.014	0.071
Intermediate	-0.073	-0.123	-0.017	0.214	-0.070	-0.118	-0.012	0.201
Higher	-0.087	-0.167	-0.088	0.344	-0.084	-0.161	-0.073	0.319
Father's Educational Level								
Lower secondary	-0.049	-0.070	0.013	0.106	-0.054	-0.079	0.013	0.119
Intermediate	-0.051	-0.076	0.010	0.117	-0.049	-0.072	0.012	0.109
Higher	-0.088	-0.158	-0.057	0.304	-0.086	-0.156	-0.052	0.296
Bigcity	-0.014	-0.016	0.008	0.022	-0.009	-0.010	0.005	0.014
Survey2002	-0.049	-0.063	0.022	0.090	-0.051	-0.067	0.024	0.095
Survey1998	-0.011	-0.013	0.006	0.018	-0.011	-0.013	0.006	0.018

Table 2.8
Ordered Probit Estimates of Educational Attainment of Second-Generation Immigrants who Completed Schooling

	All		**Men**		**Women**	
	(1)	**(2)**	**(1)**	**(2)**	**(1)**	**(2)**
Mixed family	0.411**	-	0.407*	-	0.459**	-
	(0.127)		(0.196)		(0.171)	
Native-born mother	-	0.203	-	0.377+	-	0.073
		(0.151)		(0.210)		(0.228)
Native-born father	-	0.716**	-	0.567	-	0.753**
		(0.177)		(0.458)		(0.207)
Age	1.542**	0.546**	0.964**	0.967**	0.214	0.214
	(0.119)	(0.119)	(0.181)	(0.181)	(0.163)	(0.163)
Age^2	−0.009**	−0.010**	−0.018**	−0.018**	-0.003	-0.003
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Male	−0.050	−0.027	-	-	-	-
	(0.064)	(0.064)				
Moroccans	0.252**	0.260**	0.171	0.171	0.370**	0.380**
	(0.081)	(0.081)	(0.121)	(0.121)	(0.111)	(0.111)
Surinamese	0.232*	0.236**	0.115	0.116	0.377**	0.384**
	(0.099)	(0.099)	(0.149)	(0.149)	(0.137)	(0.137)
Antilleans	0.109	0.115	0.180	0.195	0.093	0.098
	(0.145)	(0.145)	(0.231)	(0.234)	(0.194)	(0.195)
Mother's Educational Level						
Lower secondary	0.083	0.085	-0.053	-0.057	0.207	0.211
	(0.120)	(0.120)	(0.185)	(0.185)	(0.161)	(0.161)
Intermediate	0.247	0.230	0.065	0.066	0.542*	0.516*
	(0.168)	(0.168)	(0.258)	(0.258)	(0.230)	(0.231)
Higher	0.673**	0.662**	0.176	0.169	1.023**	0.975**
	(0.179)	(0.180)	(0.286)	(0.287)	(0.236)	(0.238)
Father's Educational Level						
Lower secondary	0.375**	0.399**	0.367**	0.370**	0.391**	0.438**
	(0.108)	(0.108)	(0.155)	(0.156)	(0.153)	(0.155)
Intermediate	0.573**	0.557**	0.800**	0.797**	0.422*	0.391*
	(0.124)	(0.125)	(0.191)	(0.191)	(0.171)	(0.172)
Higher	0.793**	0.805**	0.617**	0.625**	0.875**	0.862**
	(0.156)	(0.157)	(0.238)	(0.239)	(0.212)	(0.212)
Bigcity	0.074	0.057	0.076	0.075	0.029	0.002
	(0.066)	(0.066)	(0.099)	(0.099)	(0.091)	(0.091)
Survey2002	0.319**	0.330**	0.311*	0.311*	0.339**	0.362**
	(0.096)	(0.097)	(0.145)	(0.145)	(0.131)	(0.132)
Survey1998	0.114	0.117	0.180	0.180	0.049	0.055
	(0.091)	(0.091)	(0.139)	(0.139)	(0.122)	(0.122)
Constant	−6.919**	−6.955**	−12.155**	−12.192**	-2.846	-2.807
	(1.409)	(1.409)	(2.136)	(2.139)	(1.933)	(1.935)
Observations	1190	1190	545	545	645	645
Log Likelihood	−1399	−1395	-631	-631	-747	-743
μ_1	0.994**	0.995**	1.102**	1.102**	0.935**	0.936**
	(0.037)	(0.037)	(0.057)	(0.057)	(0.051)	(0.051)
μ_2	2.324**	2.330**	2.405**	2.405**	2.328**	2.343**
	(0.058)	(0.059)	(0.087)	(0.087)	(0.082)	(0.083)

Notes: **, * and + indicate that the estimated coefficients are statistically significant 1%, 5% and 10% levels respectively.

Table 2.9

Marginal Effects from Ordered Probit Estimates of Educational Attainment of Second-Generation Immigrants who Completed Schooling

	All							
	(1)				**(2)**			
	E=1	**E=2**	**E=3**	**E=4**	**E=1**	**E=2**	**E=3**	**E=4**
Mixed family	−0.097	−0.065	0.092	0.070	-	-	-	-
Native-born mother	-	-	-	-	−0.051	−0.029	0.049	0.031
Native-born father	-	-	-	-	−0.142	−0.132	0.124	0.149
Age	−0.149	−0.065	0.140	0.074	−0.149	−0.066	0.141	0.074
Age^2	0.002	0.001	−0.002	−0.001	0.002	0.001	−0.002	-0.001
Male	0.013	0.006	−0.013	−0.006	0.007	0.003	−0.007	−0.003
Moroccans	−0.065	−0.034	0.062	0.037	−0.067	−0.036	0.064	0.039
Surinamese	−0.060	−0.032	0.057	0.035	−0.061	-0.032	0.058	0.035
Antilleans	−0.028	−0.014	0.027	0.016	−0.030	−0.015	0.028	0.016
Mother's Educational Level								
Lower secondary	−0.022	−0.010	0.021	0.011	−0.022	−0.011	0.021	0.012
Intermediate	−0.061	−0.037	0.058	0.039	−0.057	−0.034	0.055	0.036
Higher	−0.137	−0.122	0.122	0.137	−0.132	−0.116	0.120	0.128
Father's Educational Level								
Lower secondary	−0.090	−0.058	0.086	0.062	−0.095	−0.062	0.091	0.067
Intermediate	−0.125	−0.098	0.116	0.108	−0.122	−0.095	0.114	0.103
Higher	−0.156	−0.145	0.134	0.168	-0.157	−0.148	0.135	0.170
Bigcity	−0.020	−0.008	0.019	0.010	−0.015	−0.006	0.014	0.007
Survey2002	−0.084	−0.042	0.079	0.046	−0.086	−0.044	0.082	0.048
Survey1998	−0.031	−0.013	0.029	0.015	−0.032	−0.014	0.030	0.016

Table 2.10

Marginal Effects from Ordered Probit Estimates of Educational Attainment of Second-Generation Immigrants who Completed Schooling

	Men							
	(1)				**(2)**			
	E=1	**E=2**	**E=3**	**E=4**	**E=1**	**E=2**	**E=3**	**E=4**
Mixed family	−0.097	−0.063	0.098	0.061	-	-	-	-
Native-born mother	-	-	-	-	−0.091	−0.057	0.092	0.056
Native-born father	-	-	-	-	−0.121	−0.102	0.123^{+}	0.100
Age	−0.269	−0.102	0.258	0.113	−0.270	−0.102	0.259	0.114
Age^2	0.005	0.001	−0.004	−0.002	0.005	0.001	−0.004	−0.002
Moroccans	−0.046	−0.020	0.045	0.021	−0.046	−0.020	0.045	0.021
Surinamese	−0.031	−0.013	0.030	0.014	−0.031	−0.013	0.030	0.014
Antilleans	−0.047	−0.023	0.046	0.023	−0.050	−0.025	0.050	0.026
Mother's Educational Level								
Lower secondary	0.015	0.005	-0.014	-0.006	0.016	0.005	-0.015	-0.006
Intermediate	−0.017	−0.007	0.017	0.008	−0.018	−0.007	0.017	0.008
Higher	−0.045	−0.023	0.045	0.023	−0.044	−0.022	0.044	0.022
Father's Educational Level								
Lower secondary	−0.091	−0.053	0.091	0.052	−0.092	−0.053	0.092	0.053
Intermediate	−0.161	−0.148	0.158	0.151	−0.160	−0.148	0.157	0.151
Higher	−0.133	−0.108	0.135	0.107	−0.135	−0.110	0.136	0.108
Bigcity	-0.021	-0.007	0.020	0.008	-0.021	-0.007	0.020	0.008
Survey2002	−0.084	−0.036	0.081	0.039	−0.084	−0.036	0.081	0.039
Survey1998	−0.050	−0.019	0.048	0.021	−0.050	−0.019	0.048	0.021

Table 2.11

Marginal Effects from Ordered Probit Estimates of Educational Attainment of Second-Generation Immigrants who Completed Schooling

	Women							
	(1)				**(2)**			
	E=1	**E=2**	**E=3**	**E=4**	**E=1**	**E=2**	**E=3**	**E=4**
Mixed family	−0.102	−0.077	0.095	0.084	-	-	-	-
Native-born mother	-	-	-	-	−0.018	−0.010	0.018	0.011
Native-born father	-	-	-	-	−0.143	−0.138	0.119	0.162
Age	−0.056	−0.028	0.054	0.031	−0.056	−0.029	0.054	0.030
Age^2	0.000	0.000	−0.000	−0.000	0.000	0.000	−0.000	−0.000
Moroccans	−0.090	−0.056	0.085	0.060	−0.092	−0.058	0.088	0.061
Surinamese	−0.090	−0.058	0.086	0.063	−0.091	−0.060	0.087	0.063
Antilleans	−0.024	−0.013	0.023	0.014	−0.025	−0.014	0.024	0.014
Mother's Educational Level								
Lower secondary	−0.051	−0.031	0.048	0.033	−0.051	−0.032	0.050	0.033
Intermediate	−0.112	−0.096	0.101	0.108	−0.107	−0.091	0.099	0.100
Higher	−0.170	−0.191	0.109	0.251	−0.164	−0.183	0.114	0.233
Father's Educational Level								
Lower secondary	−0.089	−0.064	0.084	0.069	−0.097	−0.073	0.092	0.078
Intermediate	−0.095	−0.070	0.088	0.076	−0.088	−0.065	0.084	0.069
Higher	−0.160	−0.161	0.123	0.198	−0.157	−0.159	0.124	0.192
Bigcity	-0.007	-0.003	0.007	0.004	-0.000	-0.000	0.000	0.000
Survey2002	−0.085	−0.049	0.081	0.053	−0.090	−0.053	0.087	0.056
Survey1998	-0.013	-0.006	0.012	0.007	-0.014	-0.007	0.014	0.007

Table 2.12
First-Stage OLS Estimates for Mixed Family

	(1)	**(2)**
Age	-0.009	-0.007
	(0.013)	(0.013)
Age^2/100	0.011	0.009
	(0.013)	(0.013)
Male	0.028	0.035
	(0.028)	(0.029)
Educational Level		
Lower secondary	0.070**	0.065**
	(0.022)	(0.022)
Intermediate	0.021	0.018
	(0.027)	(0.028)
Higher	0.122*	0.119*
	((0.056)	(0.057)
Caribbean	0.126**	0.199**
	(0.034)	(0.033)
Years since migration	0.007*	0.007*
	(0.003)	(0.003)
Survey2002	-0.039	-0.033
	(0.029)	(0.030)
Survey1998	-0.027	-0.021
	(0.023)	(0.023)
Bigcity	-0.021	-0.018
	(0.017)	(0.018)
Sex Ratio	−0.117**	−0.023**
	(0.021)	(0.07)
Group Size	−0.074**	-
	(0.015)	
Observations	1029	1029
R^2	0.253	0.230

Notes: The dependent variable is *Mixed family*, which takes the value of one if the immigrant parent married a native and zero if the immigrant parent married within his/her own ethnic group. Robust standard errors are given in parentheses. **, * and $^+$ indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels respectively. The constant term is not reported. The reference categories for education, and survey year indicator variables are primary education, and Survey1994 respectively. I use the log transformation to reduce the degree of skewness in group size and sex ratio variables.

Table 2.13
IV-Censored Ordered Probit Estimates of Educational Attainment of Second-Generation Immigrants

	(1)	**(2)**
Mixed family	0.273	0.282
	(1.145)	(1.530)
Age	-0.307	-0.311
	(0.283)	(0.286)
Age^2	0.007	0.007
	(0.006)	(0.006)
Male	-0.609^{**}	-0.611^{**}
	(0.129)	(0.129)
Moroccans	0.405^{*}	0.440^{*}
	(0.173)	(0.177)
Surinamese	0.174	0.184
	(0.387)	0.433
Antilleans	0.283	0.329
	(0.536)	(0.518)
Mother's Educational Level		
Lower secondary	0.054	0.053
	(0.242)	(0.241)
Intermediate	0.090	0.094
	(0.322)	(0.320)
Higher	0.793	0.800
	(0.559)	(0.559)
Father's Educational Level		
Lower secondary	0.200	0.201
	(0.203)	(0.210)
Intermediate	0.440	0.447
	(0.362)	(0.360)
Higher	0.492	0.490
	(0.314)	(0.348)
Survey2002	0.454^{*}	0.459^{*}
	(0.193)	(0.192)
Survey1998	0.148	0.151
	0.194	(0.194)
Number of Siblings	-0.062^{+}	-0.062^{+}
	(0.038)	(0.038)
Residual	-0.480	-0.483
	(1.176)	(1.570)
Constant	4.265	4.293
	(2.924)	(2.945)
Observations	1029	1029
Number censored	818	818
Log Likelihood	-348	-348
μ_1	0.941^{**}	0.941^{**}
	(0.078)	(0.078)
μ_2	2.582^{**}	2.581^{**}
	(0.151)	(0.153)

Notes: **, * and $^{+}$ indicate that the estimated coefficients are statistically significant 1%, 5% and 10% levels respectively. Two dummies indicating missing values for parental education are not reported.

Table 2.14

Marginal Effects from IV-Censored Ordered Probit Estimates of Educational Attainment of Second-Generation Immigrants

	(1)				(2)			
	E=1	**E=2**	**E=3**	**E=4**	**E=1**	**E=2**	**E=3**	**E=4**
Mixed family	-0.034	-0.057	0.029	0.062	-0.035	-0.059	0.029	0.065
Age	0.045	0.064	-0.047	-0.062	0.045	0.065	-0.048	-0.063
Age^2	-0.001	-0.001	0.001	0.001	-0.001	-0.001	0.001	0.001
Male	0.089	0.124	-0.089	-0.125	0.089	0.124	-0.089	-0.125
Moroccans	-0.055	-0.084	0.052	0.087	-0.059	-0.091	0.056	0.095
Surinamese	-0.023	-0.036	0.022	0.037	-0.024	-0.039	0.024	0.040
Antilleans	-0.034	-0.059	0.028	0.065	-0.039	-0.069	0.030	0.078
Mother's Educational Level								
Lower secondary	-0.007	-0.011	0.008	0.011	-0.007	-0.011	0.008	0.011
Intermediate	-0.012	-0.019	0.012	0.019	-0.013	-0.019	0.013	0.019
Higher	-0.068	-0.152	-0.006	0.227	-0.068	-0.153	-0.008	0.230
Father's Educational Level								
Lower secondary	-0.026	-0.042	0.025	0.043	-0.027	-0.042	0.025	0.043
Intermediate	-0.051	-0.091	0.036	0.106	-0.051	-0.093	0.036	0.108
Higher	-0.053	-0.101	0.030	0.124	-0.053	-0.101	0.030	0.123
Bigcity	-0.030	-0.041	0.033	0.038	-0.030	-0.040	0.033	0.038
Survey2002	-0.063	-0.094	0.061	0.096	-0.064	-0.095	0.062	0.097
Survey1998	-0.021	-0.031	0.022	0.030	-0.021	-0.031	0.022	0.031
Number of Siblings	0.009	0.013	-0.009	-0.012	0.009	0.013	-0.009	-0.012
Residual	0.070	0.100	-0.074	-0.096	0.070	0.101	-0.074	-0.097

Chapter 3

Culture, Intermarriage, and Differentials in Second-Generation Immigrant Women's Labor Supply

3.1 Introduction

Female labor force participation varies substantially across countries.[1] What can explain these large differences? Existing literature stresses the importance of differences in human capital, economic conditions, institutions and cultural norms. The latter represent views about women's roles in society, ideal family size, and the education of women, which vary systematically across countries. Cross-country studies attempt to isolate the effect of culture from economic and institutional factors by controlling for differences in the economic environment of the country of origin and by identifying the residual with culture. However, these studies suffer from omitted variable and endogeneity problems due to the difficulty of summarizing the economic environment faced by agents with a few aggregate variables (Fernandez 2008).

The recent research on the role of culture in explaining variation in economic outcomes focuses on immigrants within a single country and uses home country variables to separate the effects of culture from those of economic variables and institutions. Fernandez and Fogli (2006, 2009) investigate the effect of culture on the fertility and work behavior of married second-generation American women in 1970.[2] They test the hypothesis that attitudes towards women's role in society and towards ideal family size culturally differ across countries and that this culture is likely to be transmitted intergenerationally and explain systematic differences in female labor force participation and fertility even if individuals were raised in the U.S. They use past values of female labor force participation and total fertility rates from the woman's country of ancestry as cultural proxies.

They argue that the female labor force participation rate (hereafter, LFP) in the country

[1] Female labor force participation rate in 2003 in OECD countries ranged from 20 percent in Turkey to 81 percent in Iceland.

[2] Second-generation Americans are defined as individuals born in the U.S. with two foreign-born parents.

of ancestry reflects the market work decisions of women and therefore depends on women's individual characteristics, such as whether they are married or having children, and the economic and institutional environment, including availability of day care, markets, and the legal framework. This aggregate variable is also likely to depend on women's preferences and beliefs, their culture. That is, it may depend on how a woman perceives her role in the household, whether she thinks that her children will benefit or suffer from having a working mother. If cross-country differences in the value of this aggregate variable are able to explain why, in the US, women from one ancestry work more than women from another ancestry after controlling for their individual and economic attributes, then only the cultural component of the female LFP in the country of ancestry can be responsible for this correlation. The economic and institutional components of this variable should no longer be relevant for second-generation American women who live in a country with a different economic and institutional environment.[3] Their empirical findings indicate that the cultural proxies are significant in explaining both how much second-generation American women work and their fertility. Women whose parents are from higher female LFP countries work more and women whose parents are from higher total fertility rate countries have more children.

In this study, following the approach of Fernandez and Fogli (2009), we attempt to examine the role of culture on the work behavior of second- generation immigrant women in Canada.[4] Second-generation immigrants born and raised in Canada share the same markets and institutions; however, they potentially differ in their cultural heritage. To isolate the effects of culture from those due to strictly economic factors and institutions, we also use female labor force participation and total fertility rates in the country of ancestry as our cultural proxies. Those measures should depend on economic conditions, institutions and cultural norms in the country of ancestry, but if they are significant in the determination of economic outcomes of second-generation immigrants, who have been exposed to different

[3]As discussed in Fernandez and Fogli (2009) this approach has its own problems. Immigrants may not represent their home country population. Their beliefs and preferences may be significantly different from the country average. Moreover, immigrants may be subject to several shocks resulting from immigration such as language difficulties, discrimination which could cause them to deviate from their traditional behavior. However, Fernandez and Fogli (2009) point out that all the factors mentioned above create a bias towards finding culture to be insignificant.

[4]Guiso et al. (2006) define culture as a set of beliefs and values that ethnic, religious and social groups transmit fairly unchanged from generation to generation.

economic conditions and institutions, only the cultural component should be relevant. Our empirical strategy exploits intergenerational transmission of culture. When people emigrate, they bring with them some aspects of their home culture and pass on their culture to the next generation. Bisin and Verdier (2001) introduce a theoretical model of intergenerational transmission of cultural traits in which the acquisition of culture-specific preferences by children is determined by the interaction between socialization inside the family and socialization outside the family, the cultural and social environments in which children live. Fernandez et al. (2004) examine the transmission of cultural beliefs within the family. Using several data sets, they show that men whose mothers worked have a significantly higher probability of having a wife who works. Their findings provide evidence that family attitudes and their intergenerational transmission are important factors in the increase in women's involvement in the formal labor market over time.[5]

Analyzing the role of marriage in the development of cultural traits of children, Bisin and Verdier (2000) argue that each individual's choice of spouse plays an important role in her/his ability to transmit his/her set of cultural traits to any eventual children. The interaction of the direct socialization efforts of parents, such as spending time with children or choosing appropriate neighborhoods and acquaintances, and the indirect influence of society toward assimilation determine the effective socialization of children to a particular ethnic trait. Families in which parents share the same cultural traits have a more efficient socialization technology for their shared trait while families with mixed cultural parents may have difficulty passing on a consistent ethnic culture to their children as the spouse favors a different set of traits and peers and role models are usually chosen from the population at large. In line with the economic analysis of the intergenerational transmission of ethnic traits through family socialization and marriage in Bisin and Verdier (2000), we hypothesize that the impact of the cultural proxies is stronger for women who have two foreign-born parents with the same ethnic background than for those with one foreign-born parent, as children of intermarried parents are culturally more assimilated than children of immigrant

[5]Examining intergenerational transmission of fertility, human capital and work behavior of immigrants to their US-born children, Blau et. al (2008) find that the immigrant generation's fertility and labor supply have a positive and significant effect on second-generation women's fertility and labor supply, respectively.

parents.[6]

There is a large sociological literature that considers intermarriage as the crucial sign of behavioral and cultural assimilation (Gordon 1964; Pagnini and Morgan 1990; Qian (1999); Qian and Lichter 2001). To the best of our knowledge, however, this study is the first that empirically examines the role of intermarriage in intergenerational cultural transmission.

Using female labor force participation rate (LFP) relative to male LFP and total fertility rate (TFR) in the country of ancestry as our cultural proxies, we find that culture plays an important role in explaining the work behavior of women with immigrant parents from the same ethnic background. Our findings suggest that women whose parents are from countries where women have high relative labor force participation rates work significantly more and women whose parents were born in countries where women have more children work significantly less. A one standard deviation increase in relative female LFP corresponds to an approximately 3 percent increase in hours worked per week. An increase in TFR by one standard deviation, on the other hand, is associated with an approximately 3 percent decrease in hours worked per week.

Consistent with our expectations, we also find that the impact of cultural proxies is significantly larger for women with immigrant parents than for those with intermarried parents. Moreover, in the latter sample, the gender of the immigrant parent matters. Intermarried immigrant fathers appear to play a more important role in transmitting their culture to their daughters than intermarried immigrant mothers.

This study is organized as follows. The next section reviews studies that examine the impact of culture on economic outcomes by using immigrants. Section 3 describes the data and variables used in the empirical analysis. Section 4 introduces our empirical model and presents results. Section 5 provides robustness tests of our findings while Section 6 concludes.

[6]Fernandez and Fogli (2009) use 1970 U.S. Census which only reports the father's country of birth when both parents are foreign-born. Because our data set contains information on both mother's and father's country of birth, we are able to distinguish individuals with two foreign-born parents from those with only one foreign-born parent. Therefore, this information allows us to examine the role of intermarriage in intergenerational cultural transmission.

3.2 Literature Review

Carroll, Rhee and Rhee (1994) investigate the impact of culture on savings behavior of first-generation immigrants in Canada. Using data from the Canadian *Survey of Family Expenditures*, they do not find a significant effect of culture on saving patterns of immigrants. However, the authors point out that their conclusions must be viewed as tentative due to data limitations arising from non-availability of information on the country of origin and poor measures of wealth.[7] Reimers (1985) analyzes variation in the labor force participation rates of first- and second-generation married immigrant women in the US across ethnic groups. She argues that cultural differences may lead to systematic differences in the work behavior of married immigrant women. Reimers (1985) provides evidence that culture plays a significant role in explaining the variation in married women's labor supply across immigrant groups.

Unlike Carroll, Rhee and Rhee (1994) and Reimers (1985) who use dummy variables for immigrants' region of origin as a proxy for culture, Fernandez and Fogli (2006, 2009) use past values of economic variables in the country of origin as a measure of culture to study the impact of culture on work and fertility behavior of second generation immigrants in the US. They show that culture plays an important role in the determination of those two outcomes.[8]

Alesina and Guiliano (2007) examine the importance of culture, as measured by the strength of family ties, on economic outcomes among second generation immigrants in the US. They construct their cultural proxy using individual responses from the World Value Survey of the role of family and the need for love and respect from children toward their parents for over 70 countries. Their results indicate that strong family ties are associated with more home production of goods and services and less labor market participation for women.[9]

[7]The authors are able to identify immigrants by the region of origin rather than country of origin due to data limitations. The data set used in their empirical analysis divides immigrants' countries of origin the following regions: North and West Europe (with the United States), South and East Europe, China and Southeast Asia, Other Asia and Other Countries.

[8]See Fernandez and Fogli (2009) for a review of the empirical literature on the impact of culture on economic outcomes. Guiso et al. (2006)provide a review that examines both theoretically and empirically the impact of culture on economic outcomes .

[9]Guiliano (2007) tests whether culture plays an important role in determining living arrangements of second-generation immigrants in the US. Using living arrangements in the country of origin as a measure of culture, she shows that living arrangements of second-generation immigrants in the US are significantly affected by cultural norms.

Antecol (2001) examines the effect of cultural factors on variation in the gender wage gap among immigrants in the U.S. The author uses home country variables as a measure of culture. Her findings suggest that there exists a positive correlation between variation in the gender wage gap of first generation immigrants in the US and the corresponding variations in the home country gender wage gap, indicating the importance of cultural factors. Using the similar strategy, Antecol (2000) finds that for first generation immigrants over half of the overall variation in the gender gap in labor force participation rates across immigrant groups can be explained by home country labor force participation rates.[10] Blau et. al (2008) also examine the impact of source country characteristics on the labor supply assimilation profiles of married immigrant women and men in the US. The authors find that women migrating from countries where women have high relative labor force participation rates works significantly more than those coming from countries with lower relative female labor supply rates. However, men's labor supply assimilation paths are unaffected by source country female labor supply. Their findings suggest that cultural norms such as traditional gender roles may be important factors in immigrant women's labor market assimilation profile.

3.3 Data and Descriptive Statistics

The data used in our empirical analysis are from the 2001 Canadian Census Public Use Microdata File (PUMF) based on a 2.7% sample of the population enumerated in the census. We focus on second-generation women aged between 20 and 60 years. Second-generation immigrants are defined as those who were born in Canada and have at least one foreign-born parent. The PUMF provides information on the birthplace of the respondent's parents. This information allows us to distinguish children of immigrant parents from those of intermarried parents. The sample of second-generation immigrants with two immigrant parents consists of those with both parents who have the same ethnicity. Moreover, second-generation immigrants who are attending school either full-time or part-time are excluded from the analysis.

We use the 2000 values of female labor force participation rate (LFP) and total fertility

[10]The gender gap in labor force participation rates (LFPR) is defined as the male LFPR minus the female LFPR

rate (TFR) from women's countries of ancestry as our cultural proxies.[11] Female LFP and TFR in the country of ancestry are the result of economic and institutional features of a society and cultural norms, such as views about male and female roles in society and the education of women. However, only the latter remain relevant for second-generation immigrant women as they live in Canada where they experience a different economic and institutional environment. Following Blau et al. (2008), we measure female labor force participation rate in the country of ancestry relative to male labor force participation rate to alleviate problems in measuring the labor force.[12] The data on the female LFP and male LFP in the country of ancestry are from the International Labor Organization (ILO). Female LFP and male LFP are the rate of economically active population for women and men respectively.[13] The data on the total fertility rate (TFR) are from the United Nations *Demographic Yearbook*. The total fertility rate is the average number of children a hypothetical cohort of women would have by the end of their reproductive period if they were subject during their whole lives to the fertility rates of a given historical period and if they were not subject to mortality. It is expressed as children per woman.

The census asks respondents to report the birthplace of their parents. However, the responses to these questions have been aggregated into five categories: Born in Canada, Born outside of Canada (United States, Europe, Asia, Other countries and regions) to preserve confidentiality. We use the ethnic origin question in the census to determine a woman's country of ancestry.[14]

[11] As stated in Fernandez (2007), it is not clear, a priori, whether we should use measures of culture that are contemporaneous or measures of culture that their parents brought when they immigrated to Canada. She discusses that if culture is evolving slowly over time, then the values that parents transmit are best reflected in what counterparts of these women are doing in the country of ancestry in 2000. It would be ideal to use both contemporaneous and past cultural values of their country of ancestry. Since we do not have information on parents' year of migration we use the values of cultural proxies from 2000.

[12] We find similar results when we use female LFP in the country of ancestry rather than relative female LFP. Male LFP in 2000 does not show large variation. Male LFP in 2000 is, on average, 56 with a standard deviation of 3.3. Moreover, the Spearman correlation across countries for female LFP and relative female LFP is 0.95.

[13] The ILO provides a database that contains estimates and projections of the total population, the activity rates and the economically active population (labor force) by sex for the period 1950-2010 at ten-year intervals and for the year 1995. The economically active population consists of all persons who furnish the supply of labor for the production of goods and services (employed and unemployed, including first-time job seekers). The rates are calculated for individuals older than 10.

[14] In the 2001 Census respondents were asked "To which ethnic or cultural group(s) did this person's ancestors belong?" The ethnic origin question gives 25 examples: Canadian, French, English, Chinese,

Our final sample consists of 11345 women and 18 countries of ancestry. In Table 3.1, we aggregate observations by country of ancestry. Column 1 shows female labor force participation rate relative to male labor force participation rate in 2000. FemaleLFP/MaleLFP ranges between 0.876 and 0.401. China has the highest rate while Lebanon has the lowest one. Column 2 of Table 3.1 shows the TFR in 2000. It varies from 3.5 children in the Philippines to 1.1 children in Ukraine.

To examine the role of intermarriage in intergenerational cultural transmission, we divide the final sample into two subsamples: second-generation immigrant women with two immigrant parents from the same ethnic background (immigrant family) and those with only one immigrant parent (mixed family). We use the number of hours worked in the previous week as a measure of labor supply. Columns 4 and 6 in Table 3.1 show the average number of hours worked per week by country of ancestry for second-generation immigrant women with two immigrant parents and those with only one immigrant parent, respectively. In the immigrant-family sample, women with Lebanese parents work 21.1 hours on average while women with Korean parents, on average, work 38.3 hours. In the mixed-family sample, women with an Indian parent have the lowest number of hours worked per week (11.6 hours), while women with a Korean parent have the highest (42.5 hours).[15]

Table 3.2 shows the descriptive statistics for the final sample by type of family. The women in the immigrant-family sample are, on average, 37 years old whereas the average age is 44 in the mixed-family sample. Most of the women in our sample live in Ontario, the second largest province in Canada. It appears that women with immigrant parents have a higher educational attainment than those with intermarried parents. For example, women

Italian, German, Scottish, Irish, Cree, Micmac, Metis, Eskimo, East Indian, Ukrainian, Dutch, Polish, Portuguese, Filipino, Jewish, Greek, Jamaican, Vietnamese, Lebanese, Chilean and Somali. Respondents were required to write their ethnic origin(s) in four write-in spaces. Responses can be divided into two categories: selected single responses (persons who provided one ethnic origin only) and selected multiple response categories (persons who reported more than one ethnic origin). It is important to note that there is no double counting of the population in this variable. Persons who provided more than one ethnic origin are included in only one of the multiple-response categories. The sum of single and multiple responses is equal to the total population. See the 2001 Canadian Census PUMF Individuals File User Documentation for the multiple-response categories. We exclude those whose responses are categorized into the broader groupings such as African origins or Eastern European origins from which a country of ancestry can not be determined.

[15]Note that in the mixed-family sample, there are four countries with fewer than 10 observations. To check the robustness of our results, we exclude those countries from the analysis. Their exclusion does not affect the results.

with no degree make up 22.6 percent of the mixed-family sample and only 12.2 percent of the immigrant-family sample. 25.6 percent of women in the latter sample have at least university degree while women with at least university degree constitute 19.6 percent of the former sample. Table 3.2 indicates that over the 60 percent of women in both samples are married.

3.4 Empirical Strategy and Results

In this section, we test the following hypotheses: **Hypothesis 1**: Culture matters to an important economic variable: female labor supply. This hypothesis implies that our cultural proxies play an important role in explaining the variation in women's labor supply. **Hypothesis 2**: The impact of the cultural proxies is larger for women who have two immigrant parents with the same ethnic background than for those with one immigrant parent. In line with the sociological literature suggesting that intermarriage reduces the ability of families to transmit a consistent ethnic culture to their children and thus acts as an agent of assimilation, we expect that the latter group is culturally more assimilated than the former group.

The empirical model is given by:

$$W_{ij}^{*} = \alpha_0 + X_i'\beta_1 + C_j'\beta_2 + \varepsilon_{ij} \tag{3.1}$$

$$W_{ij} = \begin{cases} 0 & \text{if} \quad W_{ij}^{*} \preceq 0 \\ W_{ij}^{*} & \text{if} \quad W_{ij}^{*} > 0 \end{cases}$$

where W_{ij} is the number of hours worked in the previous week by a woman i who is of ancestry j. W_{ij} takes a value of zero for women who do not work or a positive value for the number of hours worked. X_i includes age and its square, dummies indicating the woman's educational level, marital status and place of residence. C_j contains the proxies for culture, the female labor force participation rate (LFP) relative to male LFP and total fertility rate (TFR) from women's countries of ancestry in 2000. Standard errors are corrected for clustering at the country of ancestry level, as the main variables of interest, cultural proxies, only vary with country of ancestry. To account for all the information in W_{ij} properly, we

fit the model with the Tobit estimation method under the assumption that ε_{ij} is normally distributed with mean zero and standard deviation σ.

Tables 3.3 and 3.4 show the OLS and Tobit estimation results for women with immigrant parents respectively. The estimations are carried out through two specifications. The first specification uses only the relative female LFP in the country of ancestry as a proxy for culture, while the second specification also includes TFR in the country of ancestry as a cultural proxy.

Column 1 of Table 3.3 indicates that the estimated coefficient of the relative female LFP in the country of ancestry (FemaleLFP/MaleLFP) has the expected positive sign and is statistically significant at the 5 percent level, implying that women whose parents come from countries where women have high relative labor force participation rates work significantly more than those whose parents come from countries with lower relative female labor force participation rates. Column 2 of Table 3.3 shows that when we include TFR as a cultural proxy as well, the coefficient of relative female LFP decreases slightly in magnitude but remains statistically significant at the 5 percent level. The coefficient of TFR is negative and statistically significant at the 5 percent level indicating that women whose parents were born in countries where women have more children work significantly less themselves. Standardized OLS coefficients imply that a one standard deviation increase in the relative female LFP leads to an increase of 0.51 hours worked per week, while a one standard deviation increase in TFR leads to a decrease of 0.62 hours worked per week.[16] Table 3.3 also indicates that educational level has a positive impact on women's labor supply. For example, a woman who has at least a university degree works, on average, ten hours more per week than a woman who does not have any degree. Being married is associated, on average, with a decrease of 7 hours worked per week.

Columns 1-3 of Table 3.4 report coefficients from the Tobit regression, and corresponding marginal effects of each explanatory variable on the probability that the observation is uncensored and on the expected number of hours worked per week given that the individual has not been censored for the first specification, respectively. Columns 4-6 of Table 3.4 reports the estimation results for the second specification. Several conclusions can be drawn from

[16]The listcoef command in STATA gives an extensive output regarding standardized coefficients.

Table 3.5. First, and most importantly, the estimated coefficients of cultural proxies have the expected signs and are statistically significant at the 1 percent level. A one standard deviation increase in the relative female LFP in the country of ancestry leads to an increase of 0.75 hours worked per week, which is about 20 percent of the variation in hours worked per week across ancestries. An increase in TFR by one standard deviation, on the other hand, is associated with a decrease of 0.79 hours worked per week. Second, most of the other variables have the expected sign and are statistically significant. The number of hours worked per week is an increasing and concave function of age. There is a significant positive relationship between education and the number of hours worked per week. Married and widowed women work less than their single counterparts.

Tables 3.5 and 3.6 report the OLS and Tobit estimation results for women with intermarried parents respectively. Column 1 of Table 3.5 indicates that the coefficient of relative female LFP in the country of ancestry is positive but statistically insignificant at the conventional levels. When we use both relative female LFP and TFR as cultural proxies, the coefficient of relative female LFP remains statistically insignificant. TFR has a negative coefficient and it is statistically significant at the 10 percent level. A one standard deviation increase in TFR leads to a decrease of 0.49 hours worked per week. A comparison of Tables 3.3 and 3.5 reveals that the impact of our cultural proxies is significantly larger for women with immigrant parents than for those with intermarried parents.

Consistent with our expectations, Tobit results in Table 3.6 show that cultural proxies do not have statistically significant explanatory power in the work behavior of second-generation immigrant women with intermarried parents. This finding provides evidence that women with intermarried parents are culturally more assimilated than those of immigrant parents. Language is an integral part of culture and it is the most important tool for transmitting culture from one generation to another. The census asks respondents to report their mother tongue, which refers to the first language learned at home in childhood and still understood by the individual at the time of survey. In line with our findings, the descriptive statistics indicate that forty-six percent of women with immigrant parents report that their mother tongue is one of the non-official languages, while this rate for women with intermarried

parents is only nine percent. [17]

To test whether the gender of the immigrant parent may make a difference in intergenerational cultural transmission, we divide the sample of women with intermarried parents into two groups: women with an immigrant mother and a native father and those with an immigrant father and a native mother. Tables 3.7 and 3.8 report Tobit results for those two sub-samples.

Tables 3.7 and 3.8 indicate that the coefficients of cultural proxies are not statistically significant in the sample of women with an immigrant mother and a native father, while in the sample of women with a native mother and an immigrant father, only the coefficient of TFR is statistically significant at the 5 percent level, indicating that women whose fathers were born in countries where women have more children work significantly less themselves. The findings in Tables 3.7 and 3.8 suggest that the gender of the immigrant parent matters. Intermarried immigrant fathers play a more important role in transmitting an ethnic culture to their daughters than intermarried immigrant mothers.

3.5 Robustness Checks

As an alternative approach, we use dummy variables for women's country of ancestry as a proxy for culture. Fernandez and Fogli (2009) point out that the advantage of this approach is that it allows us to capture different aspects of culture other than those captured by female labor force participation and total fertility rates in the country of ancestry. However, it suffers from not being explicit as to why it may make a difference to be of Lebanese rather than, say, German ancestry. Table 3.10 reports the coefficients of country-of-ancestry dummy variables. The reference country is Lebanon, which has the lowest relative female LFP in 2000. We use the sample of women with immigrant parents as the cultural proxies are significant in this sample.[18] In the labor supply regression, we control for age, educational level, marital status and place of residence.

Table 3.10 shows that the coefficients of country-of-ancestry dummies are statistically

[17] Official languages are English and French

[18] We also estimated the same regression for women with intermarried parents. In line with our previous findings, we found that the coefficients of country-of-ancestry dummies are statistically insignificant.

significant at the 1 percent level. The magnitude of the country-of-ancestry effect ranges from 1.95 to 12.4. As compared to women with Lebanese ancestry, women with Korean ancestry work, on average, 12.4 hours more per week while those with Israeli ancestry work, on average, only 1.95 hours more.

To examine whether the cultural proxies are significant in explaining the variation in the country fixed effect, we regress the estimated coefficients of country-of-ancestry dummies on our cultural proxies.[19] Table 3.11 reports the OLS results. The coefficient of the relative female LFP is positive and statistically significant at the 10 percent level. A one standard deviation increase in the relative female LFP corresponds to an increase of 1.21 in the country fixed effect, which is about 44 percent of the variation in the country-of-ancestry effect.[20] Likewise, TFR plays an important role in explaining the variation in the country fixed effect. The estimated coefficient of TFR implies that a one standard deviation increase in TFR leads to a decrease of 1.25 in the country fixed effect which represents approximately 46 percent of the variation in the country-of-ancestry effect. Unfortunately, our data set does not contain information on the educational levels of parents. As discussed in Fernandez and Fogli (2009) parental education may differ in a systematic fashion by country of ancestry in a way that is correlated with the cultural proxies. For example, countries with higher female labor force participation may tend to have emigrants with higher human capital. Therefore, the differences in parental education levels may result in differences in unobserved human capital.[21] Fernandez and Fogli (2009) argue that if the cultural proxy were correlated with the systematic differences in unobserved human capital, then it should have explanatory power in the wage equation. They estimate the standard Mincer regression and show that their cultural proxy does not help predict women's wages. In order to test that our results are not driven by unobserved human capital, we did the same exercise. Table 3.9 shows the results from the standard Mincerian wage equation accounting for potential selection into the workforce. We assume that marital status affects whether a woman participates in the

[19] We estimate the following model

$D_j = \delta_1 + \delta_2 C_j + \epsilon_j$

where D_j is the coefficient on the country j dummy variable reported in Table 3.10, C_j is the cultural proxy and ϵ_j is an error term.

[20] The average country-of-ancestry effect is 6.70 with a standard deviation of 2.74.

[21] If intergenerational transmission of education takes place then controlling for the woman's education level may alleviate the problem of unobserved human capital.

labor force but does not have a direct effect on the wage.[22] We regress log hourly wages on education dummies, potential experience, potential experience squared, place of residence dummies and cultural proxies. The hourly wage variable is constructed by the division of gross annual wage and salary income in 2000 by the annual hours of work (the number of weeks worked in 2000 multiplied by the number of hours worked in the reference week).[23] According to the minimum wage database of Human Resources and Skills Development of Canada, the minimum wage in British Colombia for adult workers is eight Canadian dollars which is the highest rate in 2000 across provinces. Therefore, individuals with an hourly wage of less than eight Canadian dollars are excluded from analysis.[24] Like Fernandez and Fogli (2009), we find that our cultural proxies are not statistically significant in predicting women's wages, providing evidence that our results are not driven by unobserved human capital.

Table 3.1 shows that in the mixed family sample there are four countries with fewer than 10 observations: India, Jamaica, the Philippines and South Korea. We examine whether our results are robust to the exclusion of those countries from our analysis. Excluding these small numbers of observations does not change our results.

3.6 Conclusion

This study empirically examines the effect of culture on an important economic variable: female labor supply. Using relative female LFP and TFR in the country of ancestry as our cultural proxies, we investigate whether culture plays an important role in explaining the work behavior of second-generation immigrant women in Canada. The rationale for using these variables as our cultural proxies is that when individuals emigrate, they bring with them some aspects of their home culture and transmit their culture to the next generation.

[22]The results of the selection equations are not reported. We find that marital status has an explanatory power in the selection equation. As expected, being married is associated with a decrease in the probability of being in the labor force.

[23]We assume that the number of hours worked in the week preceding Census day (May 15, 2001) represents the average weekly hours worked.

[24]See the detailed information on hourly minimum wages in Canada for adult workers since 1965 at this link:

$$http://srv116.services.gc.ca/dimt-wid/sm-mw/rpt2.aspx?lang=engdec=1$$

.The inclusion of those observations does not change the results.

Female LFP and TFR in the country of ancestry reflect economic conditions, institutions and cultural norms in society. If the cultural proxies have a significant effect on the work outcome of second-generation Canadian women, then only the cultural component of these variables should be responsible for this significant relationship, as second-generation immigrant women live in Canada with a different economic and institutional environment.

We also examine the impact of intermarriage on intergenerational cultural transmission. In the sociological literature, marrying outside one's own ethnic group is accepted as the most tangible and visible form of behavioral and cultural assimilation. In line with this literature, we test whether the impact of the cultural proxies is larger for women with immigrant parents from the same ethnic background than for those with intermarried parents.

Our findings provide evidence that culture matters for the female labor supply. The cultural proxies are significant in explaining how much second-generation Canadian women with immigrant parents work. Women whose parents are from higher relative female LFP countries work more and women whose parents are from higher TFR countries work less. A one standard deviation increase in the relative female LFP in the country of ancestry leads to an increase of 0.75 hours worked per week, which is approximately 20 percent of the variation in hours worked per week across ancestries. An increase in TFR by one standard deviation, on the other hand, corresponds to a decrease of 0.79 hours worked per week.

Consistent with the sociological literature that considers intermarriage as a sign of inclination toward cultural assimilation, we find that the impact of cultural proxies is significantly stronger for women with immigrant parents compared to those with intermarried parents. Moreover, our empirical findings provide evidence that the gender of the immigrant parent matters in intergenerational cultural transmission. Intermarried immigrant fathers play a more important role in transmitting their culture to their daughters than intermarried immigrant mothers.

Table 3.1
Cultural Proxies

			Immigrant Family (N=8085)		**Mixed Family** (N=3260)	
	FemaleLFP/MaleLFP	**TFR**	**Observations**	**HoursWorked**	**Observations**	**HoursWorked**
China	0.876	1.700	379	32.43	45	32.46
France	0.779	1.883	75	29.7	139	23.17
Germany	0.705	1.346	875	26.68	459	24.66
Greece	0.589	1.277	435	28.27	28	21.46
Hungary	0.735	1.295	155	26.60	62	30.67
India	0.508	3.113	204	27.74	6	11.66
Ireland	0.526	1.969	204	28.88	204	24.35
Israel	0.692	2.906	153	22.16	148	25.6
Italy	0.592	1.286	2416	28.58	247	28.51
Jamaica	0.866	2.628	76	28.06	3	33.33
Lebanon	0.401	2.319	76	21.11	11	25.18
Netherlands	0.670	1.726	975	26.44	158	28.77
Philippines	0.617	3.543	69	30.92	5	27.4
Poland	0.820	1.251	280	28.32	88	24.17
Portugal	0.729	1.454	436	31.32	11	25.81
South Korea	0.781	1.242	26	38.30	2	42.50
United Kingdom	0.759	1.695	973	26.35	1354	25.75
Ukraine	0.829	1.153	278	26.72	290	25.92
Mean	0.688	1.877	449.1	28.25	181.1	26.74
Standard deviation	0.133	0.729	579.1	3.76	318.1	6.128

Notes: The descriptive statistics represent the average and standard deviation of country means as observations are grouped by country of ancestry.

Table 3.2
Descriptive Statistics

	Immigrant Family (N=8085)		**Mixed Family** (N=3260)	
	Mean	**Std.Dev.**	**Mean**	**Std.Dev.**
Hours worked	27.90	18.84	25.86	19.75
Age	37.03	9.219	43.82	11.00
Educational level				
No degree	0.122	0.327	0.226	0.418
High School Certificate	0.265	0.441	0.257	0.437
Trade Certificate	0.078	0.268	0.086	0.280
College Certificate	0.251	0.434	0.209	0.497
University Certificate	0.025	0.158	0.023	0.149
$\geq$ University Degree	0.256	0.436	0.196	0.397
Marital Status				
Divorced	0.066	0.248	0.107	0.310
Married	0.646	0.478	0.660	0.473
Single	0.277	0.447	0.205	0.404
Widowed	0.010	0.099	0.026	0.159
Place of Residence				
Quebec	0.114	0.318	0.080	0.272
Ontario	0.596	0.490	0.461	0.498
Manitoba	0.035	0.185	0.065	0.248
Saskatchewan	0.012	0.109	0.050	0.218
Alberta	0.096	0.294	0.172	0.377
British Columbia	0.145	0.352	0.168	0.374

Table 3.3
OLS Estimates of Weekly Hours Worked for Women with Immigrant Parents

	Hours worked	
	(1)	**(2)**
FemaleLFP/MaleLFP	5.891*	5.295*
	(2.732)	(2.493)
TFR	-	−1.390*
		(0.577)
Age	1.051**	0.971**
	(0.236)	(0.235)
Age^2	−0.014**	−0.013**
	(0.002)	(0.002)
Educational level		
High School Certificate	5.707**	5.709**
	(0.643)	(0.635)
Trade Certificate	7.043**	6.976**
	(0.673)	(0.665)
College Certificate	8.301**	8.297**
	(0.976)	(0.973)
University Certificate	8.070**	8.080**
	(1.747)	(1.761)
$\geq$ University Degree	10.07**	10.16**
	(1.037)	(1.030)
Marital Status		
Divorced	−0.511	−0.545
	(1.013)	(1.000)
Married	−7.130**	−7.175**
	(0.741)	(0.733)
Widowed	−7.223**	−7.175**
	(2.150)	(2.148)
R^2	0.072	0.073
Observations	8085	8085

Notes: The dependent variable is the number of hours worked in the previous week. **, * and $^+$ indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels respectively. Robust standard errors corrected for clustering at the country of ancestry level are given in parentheses. The constant term and place of residence indicator variables are not reported. The reference categories for the education and marital status indicator variables are no degree and single respectively.

Table 3.4

Tobit Estimates of Weekly Hours Worked for Women with Immigrant Parents

	Hours worked (hw)					
	(1)			**(2)**		
	Coefficient	**Pr(hw>0)**	**E(hw|hw>0)**	**Coefficient**	**Pr(hw>0)**	**E(hw|hw>0)**
FemaleLFP/MaleLFP	8.444**	0.081**	5.517**	7.708**	0.074**	5.038**
	(0.335)	(0.033)	(2.263)	(3.074)	(0.029)	(2.029)
TFR	-	-	-	−1.789**	−0.017**	−1.169**
				(0.720)	(0.006)	(0.470)
Age	1.544**	0.014**	1.008**	1.441**	0.013**	0.942**
	(0.335)	(0.003)	(0.206)	(0.335)	(0.003)	(0.209)
Age^2	−0.021**	−0.0002**	−0.014**	−0.020**	−0.0001**	−0.013**
	(0.003)	(0.0000)	(0.002)	(0.003)	(0.0000)	(0.002)
Educational level						
High School Certificate	8.411**	0.073**	5.705**	8.416**	0.073**	5.711**
	(0.921)	(0.007)	(0.674)	(0.914)	(0.007)	(0.662)
Trade Certificate	10.18**	0.079**	7.201**	10.10**	0.078**	7.144**
	(0.934)	(0.006)	(0.696)	(0.921)	(0.006)	(0.691)
College Certificate	11.80**	0.098**	8.147**	11.80**	0.098**	8.149**
	(1.370)	(0.009)	(1.026)	(1.369)	(0.009)	(1.016)
University Certificate	11.25**	0.082**	8.104**	11.27**	0.082**	8.117**
	(2.471)	(0.012)	(1.997)	(2.488)	(0.012)	(1.995)
≥ University Degree	13.77**	0.113**	9.580**	13.89**	0.113**	9.665**
	(1.434)	(0.009)	(1.123)	(1.439)	(0.009)	(1.110)
Marital Status						
Divorced	-0.760	-0.007	-0.493	-0.805	-0.007	-0.523
	(1.264)	(0.012)	(0.813)	(1.246)	(0.012)	(0.802)
Married	−8.751**	−0.079**	−5.859**	−8.809**	−0.080**	−5.900**
	(0.904)	(0.008)	(0.605)	(0.890)	(0.008)	(0.598)
Widowed	−9.708**	−0.114**	−5.754**	−9.648**	−0.113**	−5.724**
	(3.195)	(0.044)	(1.729)	(3.194)	(0.044)	(1.724)
Observations	8085	8085	8085	8085	8085	8085
Log-likelihood value	-30069.6			-30065.3		

Notes: The dependent variable is the number of hours worked in the previous week. **, * and $^+$ indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels respectively. Robust standard errors corrected for clustering at the country of ancestry level are given in parentheses. The constant term and place of residence indicator variables are not reported. The reference categories for the education and marital status indicator variables are no degree and single respectively.

Table 3.5
OLS Estimates of Weekly Hours Worked for Women with Intermarried Parents

	Hours worked	
	(1)	**(2)**
FemaleLFP/MaleLFP	4.765	3.549
	(3.604)	(3.243)
TFR	-	-1.292^{+}
		(0.740)
Age	1.569^{**}	1.573^{**}
	(0.227)	(0.226)
Age^2	-0.020^{**}	-0.020^{**}
	(0.002)	(0.002)
Educational level		
High School Certificate	5.281^{**}	5.260^{**}
	(0.624)	(0.626)
Trade Certificate	5.291^{**}	5.268^{**}
	(1.154)	(1.144)
College Certificate	6.954^{**}	6.972^{**}
	(0.933)	(0.931)
University Certificate	6.823^{**}	6.859^{**}
	(1.709)	(1.691)
$\geq$ University Degree	9.018^{**}	9.165^{**}
	(0.785)	(0.773)
Marital Status		
Divorced	-2.059^{+}	-2.045^{+}
	(1.202)	(1.209)
Married	-4.937^{**}	-4.960^{**}
	(0.857)	(0.852)
Widowed	-6.412^{**}	-6.432^{**}
	(2.000)	(1.980)
R^2	0.066	0.067
Observations	3260	3260

Notes: The dependent variable is the number of hours worked in the previous week. **, * and $^{+}$ indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels respectively. Robust standard errors corrected for clustering at the country of ancestry level are given in parentheses. The constant term and place of residence indicator variables are not reported. The reference categories for the education and marital status indicator variables are no degree and single respectively.

Table 3.6

Tobit Estimates of Weekly Hours Worked for Women with Intermarried Parents

	Hours worked (hw)					
	(1)			**(2)**		
	Coefficient	**Pr(hw>0)**	**E(hw|hw>0)**	**Coefficient**	**Pr(hw>0)**	**E(hw|hw>0)**
FemaleLFP/MaleLFP	5.260	0.057	3.084	4.163	0.045	2.441
	(4.730)	(0.051)	(2.747)	(4.492)	(0.049)	(2.612)
TFR	-	-	-	-1.187	-0.012	-0.696
				(0.968)	(0.010)	(0.574)
Age	2.302**	0.025**	1.350**	2.304**	0.025**	1.351**
	(0.313)	(0.003)	(0.172)	(0.313)	(0.003)	(0.170)
Age^2	−0.029**	−0.0003**	−0.017**	−0.029**	−0.0003**	−0.017**
	(0.003)	(0.0000)	(0.001)	(0.003)	(0.0000)	(0.001)
Educational level						
High School Certificate	8.129**	0.082**	4.953**	8.110**	0.082**	4.942**
	(0.894)	(0.009)	(0.568)	(0.898)	(0.009)	(0.569)
Trade Certificate	8.315**	0.080**	5.208**	8.296**	0.080**	5.196**
	(1.508)	(0.012)	(1.040)	(1.498)	(0.012)	(1.033)
College Certificate	10.25**	0.100**	6.368**	10.26**	0.100**	6.378**
	(1.206)	(0.010)	(0.805)	(1.205)	(0.010)	(0.795)
University Certificate	10.74**	0.096**	6.938**	10.77**	0.097**	6.961**
	(2.111)	(0.014)	(1.512)	(2.100)	(0.014)	(1.511)
≥ University Degree	12.81**	0.121**	8.094**	12.95**	0.122**	8.187**
	(0.963)	(0.008)	(0.627)	(0.960)	(0.008)	(0.643)
Marital Status						
Divorced	-2.508	-0.028	-1.442	-2.493	-0.028	-1.434
	(1.631)	(0.019)	(0.927)	(1.636)	(0.019)	(0.929)
Married	−6.192**	−0.065**	−3.702**	−6.212**	−0.065**	−3.715**
	(1.169)	(0.011)	(0.732)	(1.165)	(0.012)	(0.725)
Widowed	−8.367**	−0.102**	−4.529**	−8.379**	−0.103*	−4.536**
	(3.123)	(0.042)	(1.570)	(3.102)	(0.042)	(1.558)
Observations	3260	3260	3260	3260	3260	3260
Log-likelihood value	-11784.6			-11784.1		

Notes: The dependent variable is the number of hours worked in the previous week. **, * and $^+$ indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels respectively. Robust standard errors corrected for clustering at the country of ancestry level are given in parentheses. The constant term and place of residence indicator variables are not reported. The reference categories for the education and marital status indicator variables are no degree and single respectively.

Table 3.7

Tobit Estimates of Weekly Work Hours for Women with a Native-Born Father and an Immigrant Mother

	Hours worked (hw)					
	(1)			**(2)**		
	Coefficient	**Pr(hw>0)**	**E(hw|hw>0)**	**Coefficient**	**Pr(hw>0)**	**E(hw|hw>0)**
FemaleLFP/MaleLFP	8.901	0.093	5.377	9.442	0.099	5.703
	(6.734)	(0.070)	(4.07)	(6.664)	(0.070)	(4.015)
TFR	-	-	-	0.451	0.004	5.703
				(1.711)	(0.018)	(4.015)
Age	2.772**	0.029**	1.674**	2.781**	0.029**	1.680**
	(0.670)	(0.007)	(0.395)	(0.691)	(0.007)	(0.402)
Age^2	−0.035**	−0.0003**	−0.021**	−0.036**	−0.0003**	−0.021**
	(0.008)	(0.0000)	(0.004)	(0.008)	(0.0000)	(0.004)
Educational level						
High School Certificate	6.741**	0.066**	4.201**	6.748**	0.066**	4.206**
	(2.321)	(0.021)	(1.506)	(2.318)	(0.021)	(1.504)
Trade Certificate	10.318**	0.091**	6.752**	10.30**	0.091**	6.745**
	(1.153)	(0.009)	(0.812)	(1.155)	(0.009)	(0.813)
College Certificate	9.100**	0.085**	5.805**	9.072**	0.085**	5.786**
	(2.289)	(0.019)	(1.535)	(2.282)	(0.019)	(1.534)
University Certificate	15.706**	0.121**	10.865**	15.69**	0.121**	10.85**
	(4.358)	(0.023)	(3.335)	(4.359)	(0.023)	(3.337)
≥ University Degree	13.47**	0.121**	8.772**	13.435**	0.121**	8.741**
	(2.191)	(0.017)	(1.538)	(2.167)	(0.017)	(1.526)
Marital Status						
Divorced	-4.654	-0.052	−2.709$^+$	-4.653	-0.052	−2.708$^+$
	(2.958)	(0.035)	(1.643)	(2.957)	(0.035)	(1.643)
Married	−7.982**	−0.080**	−4.947**	−7.968**	−0.079**	−4.938**
	(1.570)	(0.015)	(0.963)	(1.556)	(0.015)	(0.957)
Widowed	−6.694**	−0.078*	−3.794**	−6.673**	−0.078*	−3.783**
	(2.505)	(0.033)	(1.294)	(2.473)	(0.032)	(1.278)
Observations	1236	1236	1236	1236	1236	1236
Log-likelihood value	-4518.13			-4518.11		

Notes: The dependent variable is the number of hours worked in the previous week. **, * and $^+$ indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels respectively. Robust standard errors corrected for clustering at the country of ancestry level are given in parentheses. The constant term and place of residence indicator variables are not reported. The reference categories for the education and marital status indicator variables are no degree and single respectively.

Table 3.8

Tobit Estimates of Weekly Hours Worked for Women with a Native-Born Mother and an Immigrant Father

	Hours worked (hw)					
	(1)			**(2)**		
	Coefficient	**Pr(hw>0)**	**E(hw|hw>0)**	**Coefficient**	**Pr(hw>0)**	**E(hw|hw>0)**
FemaleLFP/MaleLFP	3.308	0.036	1.909	1.245	0.013	0.718
	(6.960)	(0.077)	(4.002)	(6.333)	(0.070)	(3.654)
TFR	-	-	-	-2.485^{*}	-0.027^{*}	-1.434^{*}
				(1.282)	(0.014)	(0.746)
Age	2.018^{**}	0.022^{**}	1.164^{**}	2.044^{**}	0.022^{**}	1.180^{**}
	(0.373)	(0.004)	(0.211)	(0.364)	(0.004)	(0.204)
Age^2	-0.026^{**}	-0.0002^{**}	-0.015^{**}	-0.026^{**}	-0.0002^{**}	-0.015^{**}
	(0.004)	(0.0000)	(0.002)	(0.004)	(0.0000)	(0.002)
Educational level						
High School Certificate	9.239^{**}	0.095^{**}	5.571^{**}	9.209^{**}	0.095^{**}	5.555^{**}
	(1.417)	(0.013)	(0.883)	(1.437)	(0.013)	(0.904)
Trade Certificate	7.263^{**}	0.072^{**}	4.443^{**}	7.174^{**}	0.072^{**}	4.388^{**}
	(2.276)	(0.019)	(1.524)	(2.228)	(0.019)	(1.489)
College Certificate	11.17^{**}	0.111^{**}	6.846^{**}	11.15^{**}	0.111^{**}	6.837^{**}
	(1.236)	(0.010)	(0.839)	(1.222)	(0.011)	(0.815)
University Certificate	7.854^{**}	0.076^{**}	4.872^{**}	7.920^{**}	0.077^{**}	4.917^{**}
	(2.009)	(0.016)	(1.369)	(2.061)	(0.016)	(1.417)
$\geq$ University Degree	12.601^{**}	0.122^{**}	7.838^{**}	12.90^{**}	0.124^{**}	8.043^{**}
	(1.775)	(0.015)	(1.149)	(1.639)	(0.014)	(1.063)
Marital Status						
Divorced	-1.024	-0.011	-0.586	-0.964	-0.010	-0.552
	(2.567)	(0.029)	(1.464)	(2.550)	(0.029)	(1.455)
Married	-4.976^{*}	-0.054^{*}	-2.916^{*}	-4.987^{*}	-0.054^{*}	-2.924^{*}
	(2.070)	(0.021)	(1.265)	(2.051)	(0.021)	(1.249)
Widowed	-9.279^{*}	-0.117^{*}	-4.898^{*}	-9.229^{*}	-0.116^{*}	-4.876^{*}
	(4.165)	(0.058)	(2.043)	(4.108)	(0.057)	(2.014)
Observations	2024	2024	2024	2024	2024	2024
Log-likelihood value	-7257.06			-7255.90		

Notes: The dependent variable is the number of hours worked in the previous week. **, * and $^{+}$ indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels respectively. Robust standard errors corrected for clustering at the country of ancestry level are given in parentheses. The constant term and place of residence indicator variables are not reported. The reference categories for the education and marital status indicator variables are no degree and single respectively.

Table 3.9
Wage Equation Parameter Estimates

	Log(hourly wage)			
	Women with immigrant parents		**Women with intermarried parents**	
	(1)	**(2)**	**(1)**	**(2)**
FemaleLFP/MaleLFP	0.086	0.095	0.185	0.188
	(0.088)	(0.093)	(0.164)	(0.157)
TFR	-	0.024	-	0.006
		(0.023)		(0.044)
Educational level				
High School Certificate	0.232**	0.232**	0.274**	0.274**
	(0.028)	(0.028)	(0.053)	(0.053)
Trade Certificate	0.173**	0.173**	0.281**	0.281**
	(0.038)	(0.039)	(0.073)	(0.073)
College Certificate	0.361**	0.361**	0.352**	0.352**
	(0.030)	(0.030)	(0.074)	(0.074)
University Certificate	0.430**	0.430**	0.395**	0.395**
	(0.058)	(0.058)	(0.055)	(0.056)
$\geq$ University Degree	0.663**	0.062**	0.649**	0.648**
	(0.031)	(0.030)	(0.074)	(0.074)
Experience	0.036**	0.037**	0.041**	0.041**
	(0.002)	(0.002)	(0.004)	(0.004)
Experience^2/100	−0.079**	−0.080**	−0.094**	−0.094**
	(0.007)	(0.007)	(0.009)	(0.009)
Observations	7359	7359	2939	2939
Uncensored observations	4900	4900	1784	1784
Log pseudolikelihood	-7730	-7729	-3155	-3155
LR test for ρ=0	573.6	566.8	318.5	313.5
(Prob$>\chi^2(1)$)	(0.000)	(0.000)	(0.000)	(0.000)

Notes: The dependent variable is the logarithm of hourly wage. **, * and $^+$ indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels respectively. Robust standard errors corrected for clustering at the country of ancestry level are given in parentheses. The constant term and place of residence indicator variables are not reported. The reference category for the education indicator variables is no degree.

Table 3.10
Country of Ancestry Dummies

	Hours worked	
	Coefficient	**Standard Error**
Age	1.045**	0.270
Age^2	−0.014**	0.003
Educational level		
High School Certificate	5.764**	0.632
Trade Certificate	7.035**	0.653
College Certificate	8.341**	0.957
University Certificate	8.120**	1.797
≥ University Degree	10.25**	1.062
Marital Status		
Divorced	−0.408	1.006
Married	−7.106**	0.706
Widowed	−7.040**	2.128
United Kingdom	6.660**	0.694
Ireland	8.267**	0.557
France	7.797**	0.474
Germany	6.874**	0.668
Netherlands	6.139**	0.674
Ukraine	7.591**	0.669
Poland	7.449**	0.611
Hungary	5.783**	0.640
Portugal	10.30**	0.263
Italy	6.987**	0.401
Greece	6.015**	0.307
Israel	1.955**	0.504
Jamaica	5.469**	0.395
India	5.171**	0.287
China	8.622**	0.448
Philippines	7.174**	0.331
South Korea	12.42**	0.423
Observations	8085	
R^2	0.077	

Notes: The dependent variable is the number of hours worked in the previous week. **, * and $^+$ indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels respectively. Robust standard errors corrected for clustering at the country of ancestry level are given in parentheses. The constant term and place of residence indicator variables are not reported. The reference categories for the education, marital status and country of ancestry indicator variables are no degree, single, and Lebanon, respectively.

Table 3.11
The Relationship between Country-of-Ancestry Effects and Cultural Proxies

	Country-of-Ancestry Effect	
FemaleLFP/MaleLFP	9.320^{+}	-
	(5.123)	
TFR	-	-1.719^{+}
		(0.913)
Observations	18	18
R^2	0.195	0.209

Notes: The dependent variable is the estimated coefficients of country-of-ancestry dummies reported in Table 3.3.10. Robust standard errors are given in parentheses. **, * and $^{+}$ indicate that the estimated coefficients are statistically significant at the 1%, 5% and 10% levels respectively. The constant term is not reported.

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