Rapport de recherche
Maîtrise en Sciences Economiques
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Educational Attainment of Second-Generation Immigrants in Belgium:

an estimation of the assimilation degree of immigrants based on cross section analysis

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The 20th of December 2004

Abstract

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It is now well-known facts in Belgium that high education increases the chances of finding a job and that schooling outcomes have improved in the last decade. By taking a country with large immigrant population and highly qualified labour market such as Belgium, we want to see in this paper whether the immigrants have participated in this development. It analyses the educational attainment of immigrants as a factor of assimilation. Since the immigrants have settled in this country for more than a generation now, it is interesting to verify whether their children – i.e. the second-generation immigrants- are distinguishable from natives or have reached a different educational attainment. To my knowledge, this is the first study on Belgian immigrants' education level with microeconomic data.

The literature on immigrants assimilation usually takes the salary rate as the assimilation criterion. On this basis, assimilation occurs when the salary rates of immigrants and natives converge. By taking instead the level of education attained as a factor of assimilation, we can judge better whether the immigrant is likely to assimilate in the long run.

Controlling for diverse factors such as country of origin, parental human capital, time since arrival in host country, family closeness, religion and immigrant status, we conclude that educational attainment of immigrants, in particular the second-generation, lags behind that of natives by one diploma category. This might explain their high level of unemployment and foresees a ethnic-based segregation on the Belgian labour market.

Such results call for improvement in the Belgian integration policy since immigrants' human capital will be useful to fill the upcoming demographic shortage and because they make up an ever increasing part of the population.

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Introduction

Children of immigrants represent today a relatively important share of the population in most European countries. Although they apparently find difficulties to enter the labour market, immigrants' studies predict that assimilation should take place and that the children of immigrants should be undistinguishable from natives. In this paper, we want to see in what extent they are different from natives, and in particular, whether there is a difference in educational attainments.

By taking a country with a large immigrant population and highly qualified labour market such as Belgium, we want to see whether the immigrants have participated in the improvement of schooling outcomes. Since the immigrants have settled in this country for more than a generation now, it is interesting to verify whether their children – i.e. the second-generation immigrants- are attaining the same education level than natives.

As RIPHAHN(2002) had demonstrated for second generation immigrants in Germany, we also find their educational attainment lags behind that of natives in Belgium. Should such results generalized to other European countries as well, the integration policies of immigrants would have to be reconsidered. In particular, since they make up an ever increasing part of the European population, an ethnic-based segregation of the labour market ought to be avoided. Immigrants' human capital might be crucial indeed to fill the future demographic shortage.

Facts and figures from Belgian national statistics presented in Section 1 confirm that school outcomes have steadily improved over time and that low education level is positively correlated with unemployment. They also show that immigrants unemployment rate is higher than that of natives in Belgium.

Section 2 sums up the most important papers in labour economics treating immigrants assimilation. They have introduced valuable tools for this kind of study that we will use in our empirical analysis.

Our approach is developed in Section 3: the theoretical analysis presents our methodology and the data, and it formulates our hypothesis. The empirical analysis in Section 4 presents our results and their interpretation. Section 5 concludes.

I. Facts

Let us first take a glance at Belgian national statistics presented in the graphs in the appendix[1]. Because our empirical study is based on 2002 data, we will look at the national statistics for that year only. Graph 1 shows that the majority of the working population were occupying managerial, scientific occupations or office jobs in 2002. It also shows that only 17% were employed in low qualified positions in the industry.

Looking at the age structure of the population, we can see in Graph 2 that a majority of 79% of the population between 25 and 49 years of age is employed, while a majority of 59% of the population between 15 and 24 years of age is enrolled in the education system. Because the official retirement age is 65 years old, this category represents nearly 50% of the non-active population older than 50 years old. 14% of the 25 to 49-year old are also non-active.

We can thus say that generally the Belgian labour market demands skilled individuals and that the country features a high level of education, since nearly 60% of the 15 to 24-year old are studying.

This deduction is corroborated by Graphs 3 and 4. We can see in Graph 3 that the majority of the working population older than 50 years old is less educated than the younger population groups: 30% of them have no or only primary school diploma while 44% of the 15 to 25 years old have their high school diploma. For all age categories in Graph 4, unemployed population[2] share falls when individuals have at least 3 more years of education gained in the "*écoles supérieures*" [3] or at university. These results show that schooling has increased between generations and that it reduces probabilities of unemployment.

This tendency is shown in Graph 5: the unemployed population made of highly educated individuals presents a low and stable trend since 1987, while the evolution of unemployed population with lower education seems to have been more affected by economic cycles during the nineties.

When distinguishing by population origin in Graph 6, we can see that, in 2002, 8% of the unemployed population was coming from the EU and 7% was made of other nationalities.

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[1] All graphs are based on statistics for 2002 provided by the Belgian National Institute of Statistics (INS).
[2] Where "unemployed population" is defined as the population claiming unemployment benefit.
[3] The *écoles supérieures* provide 3-year practical education and require the high school diploma. In example: nursing, teaching, marketing, secretary, laboratory assistant or accounting schools. This is why we note this type of education as "non academic degree".

Since the unemployment rate was 7.60% in 2002[4] and that 12% of the population had foreign origin, we find that the unemployment rate for the foreign population is 9.5% and that of the native population is 7.34% in 2002. Looking more closely to the main nationalities of unemployed immigrants in Graph 7, it appears that most of the unemployed foreigners are Italians, Moroccans and Turks.

These observations allow us to conclude that unemployment is explained by low educational attainment and that school outcomes have improved over generations in Belgium. Consequently, a high educational level can boost the probabilities of succeeding in the labour market.

[4] Unemployment rate equals the number of unemployed individuals aged from 15 to 64 years old, divided by the total active population (employed and unemployed).

II. Literature Review

Immigrants' assimilation studies have mainly been conducted in labour economics firstly by CHISWICK (1978) and later criticized and developed by BORJAS (1985, 1987, 1992). These studies were carried out over immigrant population in the United States and studied the wage. They have introduced valuable concepts such as *"assimilation"*, *"cohort effect"*, *"human capital"* and *"self selection"*. RIPHAHN(2002) proposes an application of these concepts in an assimilation study of immigrants in Germany and focuses rather on the education level.

1. "The effect of Americanisation on the earnings of foreign-born men", CHISWICK, 1978

In this paper, CHISWICK shows that, although immigrants earn at the beginning less than natives, their salary rate increases with the experience gained on the American labour market, where it reaches, or even exceeds, that of natives after 10 to 15 years.

The salary rate of immigrants compared to that of natives is explained by country of origin, time spent since migration and citizenship. When controlling only for variables such as education, years of work experience, residence area and number of working weeks, the immigrants' weekly salary rate is by 3% higher than that of natives but not statistically significant. However, this result gains in statistical significance when controlling also for number of years spent in the host country.

CHISWICK shows therefore that omitting the time since migration variable in immigrants' salary rate analysis can hide important differences not only between immigrants and natives, but also among immigrants themselves.

He shows the positive effect of time since migration on the immigrants' salary rate by the immigrants' capability to acquire language skill, customs and to adapt to the host country labour market' requirements after a few years. Consequently, this post migration experience explains the convergence of the immigrants' salary rate with that of natives after 10-15 years. It might as well exceeds the natives salary rate because, says CHISWICK (1978), immigrants are more willing to succeed and to invest in education in the host country, as their decision to emigrate demanded a strong determination. The migration process has thus led to a self-selection of the immigrants in the favour of the more able and motivated individuals.

CHISWICK (1978) demonstrates the convergence of the immigrants' salary rate with that of natives by introducing the concept of *assimilation.* This convergence is due to the immigrants' adaptation to the host country labour market. Since this adaptation improves with the number of year spent in the host country since migration, the latter is a factor of convergence as well. For this reason, there is a positive correlation between immigrants' earnings and the time since migration.

In order to analyse the performance of immigrants relative to that of natives, CHISWICK (1978) presents the following cross-section regression:

$$\log w_I = \beta_0 X_I + \beta_1 I_I + \beta_2 y_I + \varepsilon_I$$

where w_I is the salary rate of the individual I in the host country;

X_I is a vector of socio-economic characteristics such as age and education;

I_I is a binary variable equals to 1 if the individual I is born abroad and 0 if not;

y_I is the number of year spent in the host country since migration and is equal to zero if the individual is a native.

β_2 represents how the local labour market values the time spent in the home country before migration relative to the time spent in the host country. Alternatively, β_2 shows how the local labour market values more the work experience acquired in the United States than that acquired abroad.

CHISWICK (1978) finds a negative coefficient estimate for β_1 and a positive one for β_2. Such results corroborate the hypothesis that earnings increase with the assimilation process. For this reason, CHISWICK(1978) concludes that the convergence rate between immigrants and natives salary rate is the measure of the assimilation process.

2. "Assimilation, changes in cohort quality and the earnings of immigrants", BORJAS, 1985

In contrast to CHISWICK(1978), BORJAS(1985) notices that the difference in salary rate between immigrants who migrated earlier and immigrants who migrated more recently might rather indicate differences in qualifications and education level instead of a convergence process. Indeed, CHISWICK (1978) had implicitly made the hypothesis that the "quality" of immigrants did not change over successive immigrants cohorts. This hypothesis implies that a

new immigrant will earn (10 β_2)*100% less than an immigrant who has already spent 10 years in the United States.

Immigrants performances on the labour market not only depend upon the number of years spent in the host country, but also upon the performances on the labour market, the education level of their parents, and that of their parents' ethnic group. This is what BORJAS(1985) introduces as *cohort effect* in order to explain the differences in assimilation processes between immigrants arrived at different time in the host country.

BORJAS(1985) uses the same data as CHISWICK(1978)[5] and applies a similar cross section analysis on successive immigrants cohorts.

Say we have Ω cross section surveys, consisting of τ (τ= 1,..., Ω) from year T_τ.

The equation for immigrants is:

$$\log w_{l\tau} = \phi_{i\tau} X_{l\tau} + \delta_i A_{l\tau} + \alpha y_{l\tau} + \beta C_{l\tau} + \sum_{\tau=1}^{\Omega} \gamma_{i\tau} \pi_{l\tau} + \varepsilon_{l\tau}$$

And that of natives is:

$$\log w_{l\tau} = \phi_{n\tau} X_{l\tau} + \delta_n A_{l\tau} + \sum_{\tau=1}^{\Omega} \gamma_{n\tau} \pi_{l\tau} + \varepsilon_{l\tau}$$

where $w_{l\tau}$ is the individual l salary in survey τ;

$X_{l\tau}$ is a vector of socio-economic characteristics;

$A_{l\tau}$ is the individual l age at the time of survey τ;

$C_{l\tau}$ is the year at which the individual l arrived in the host country;

$\gamma_{i\tau}$ is the number of years he has spent in the host country ($\gamma_{i\tau}$=T_τ - $C_{l\tau}$);

$\pi_{l\tau}$ is a dummy variable equal to 1 if the individual l belongs to survey τ.

The convergence rate of immigrants and natives salaries is thus given by the following derivative, where age and time since migration are the only time dependent variables:

$$\alpha^* = \left.\frac{\partial \log w_l}{\partial t}\right|_{immigrant} - \left.\frac{\partial \log w_l}{\partial t}\right|_{local} = (\delta_i + \alpha) - \delta_n$$

According to CHISWICK(1978), this α^* measures the assimilation process, while coefficient β indicated the change in immigrants salary over successive cohorts and captures thus the *cohort effect*. Coefficients γ_i and γ_n measure the impact of economic conditions and period effect.

[5] « *The 1970 and 1980 Public Uses Samples* » from the US census.

We notice, however, the following identity that introduces perfect collinearity between variables $y_{l\tau}$, $C_{l\tau}$ and $\pi_{l\tau}$.:

$$y_{l\tau} = \sum_{\tau=1}^{\Omega} \pi_{\tau}(T_{\tau} - C_{l\tau})$$

The model presents thus an identification problem of coefficients α, β et γ_i. BORJAS(1985) solves this problem with the assumption that period effects are the same for natives and for immigrants:

$$\gamma_{i\tau} = \gamma_{n\tau} \quad \forall \tau$$

This estimation of the cohort effect therefore depends upon this condition.

He makes three important observations:

1. A cohort's salary rate has a weaker growth rate than in CHISWICK(1978);
2. CHISWICK(1978) overestimates the relative earnings growth of an immigrant's cohort compared to that of a natives cohort. Although both can be identical, the growth rate of an immigrants cohort's earnings will not start at the same level. In particular, the salary rate of a recent immigrants cohort will not converge with that of a similar natives cohort, because the former is not as qualified as a previous immigrants cohort.
3. BORJAS(1985) therefore concludes that there has been a decline in successive immigrants cohorts quality.

These three observations prove that assimilation studies should take into account the *cohort effect*.

3. "Self-selection and the earnings of immigrants", BORJAS, 1987

In this paper, BORJAS(1987) analyses the concept of self selection process introduced by CHISWICK(1978) according to which the immigrants are more motivated and more able to succeed on the American labour market than natives.

In BORJAS(1985), the results showed a decline in the quality of successive immigrants waves. It is thus interesting to identify which factors have changed the mechanism that selects immigrants. BORJAS(1987) wants to verify whether it is indeed the more able and motivated immigrants who are coming to the United Stated at the end of this selection mechanism.

He makes the following important observations:

1. When individuals choose to emigrate in order to maximise their earnings, neither the ability nor the motivation is decisive. Nevertheless, positive selection occurs when the following two conditions are satisfied:

   - There is a strong and positive correlation between the salary one can expect in one's home country and in the United States;
   - When human capital is weakly rewarded in the home country (which is more commonly the case in egalitarian countries), qualified workers are more likely to emigrate. In contrast, when human capital is highly rewarded in the home country (which is more often the case in developing countries), poorly qualified workers are more likely to emigrate. Consequently, the qualification level of an immigrants cohort is explained by the relative human capital return between countries.

2. Empirical analysis[6] on immigrants earnings coming from about forty countries have shown that the "country of origin" variable is significant for the performances of immigrants on the American labour market.

3. When controlling for economic and political conditions in the home country, the immigrants who were the most likely to have an important salary were those coming from countries characterised by high GDP, few salary inequalities and a competitive political system.

4. "Ethnic capital and intergenerational mobility", BORJAS, 1992

In assimilation theory, social, cultural and economic differences between immigrants and natives are implicitly supposed to disappear after a few generations. However, this fact is not observed in many studies[7]. Such differences seem to persist over generations and the American *melting pot* might as well be only a myth. BORJAS(1992) suggests thus that such hypothesis can be rejected. The United States are a multicultural and pluralist society, which exhibits important social, cultural and economic differences between its different ethnic groups.

In this paper, BORJAS(1992) introduces the concept of *ethnic capital*, which acts as an externality in the process of human capital accumulation. He analyses how ethnic differences in terms of qualification and revenues are transmitted between generations. If ethnic capital

[6] « The 1970 and 1980 Public Uses Samples » from the US census.
[7] BORJAS(1992) refers to PERLMANN(1988), STEINBERG(1989) and FARLEY(1990).

acts as an externality, then a generation's qualifications do not only depend upon those of the parents, but also upon those of the parents ethnic group in which they have invested in human capital.

Human capital can be measured with the average qualification level of the mother and father ethnic group. In this way, the environment quality in which one has been educated can influence one's qualifications and performances on the labour market.

In his empirical analysis[8], BORJAS(1992) shows that ethnic capital strongly influences intergenerational mobility and slows down the convergence of the ethnic groups average qualifications and performances on the American labour market between generations. As a result, such differences might persist over generations.

This result is of importance in terms of social policy. With social policy aiming the improvement of one ethnic group's average qualification level, one can also improve that of this ethnic group's future generations.

5. "Dissimilation? The educational attainment of second generation immigrants", RIPHAHN, 2002

RIPHAHN(2002) proposes an application of assimilation analysis to the German case, for this country is the first European destination of immigrants. She tests the validity of cohort and ethnic capital effects by focusing her analysis on the educational attainment of the second-generation immigrants. Although the children of the first generation immigrants represent an important part of the German population, they still find difficulties to integrate into the German labour market compared to young natives. Their unemployment rate is higher than that of natives and they seem less incline to invest in high education. Since the German labour market requires steadily more qualifications, such tendency might reduce the probabilities of the second-generation immigrants to find employment opportunities.

RIPHAHN(2002) compares the highest degree obtained by natives and second-generation immigrants and controls for cohort effect. She finds that the education level of second-generation immigrants lags behind that of natives, which might probably explain their high unemployment rate. Moreover, she observes that this education gap has increased over immigrants cohorts. Such findings contradicts BORJAS and CHISWICK hypothesis of a

[8] Analysis based on the data of the General Social Surveys and the National Longitudinal Surveys of Youth.

salary rate convergence between immigrants and natives, and suggests rather a *dissimilation* phenomenon on ethnic basis in the German labour market.

Concepts of *assimilation, cohort effect, ethnic capital* and *self selection* introduced in the previous papers are suggesting interesting factors of immigrants integration in the labour market of the host country. They are useful tools for assimilation analysis. Like Germany, Belgium has an important immigrant population, which has settled now for more than a generation. We will follow RIPHAHN's example and analyse the assimilation of immigrants in Belgium on the basis of educational attainment.

III. Theoretical Analysis

The aim of this paper is to estimate the assimilation degree of the immigrants in Belgium. Since today's labour market demands steadily highly qualified candidates, and since the educational level has improved in the last decades, we find the educational attainment of immigrants to be a preferable long term assimilation indicator in the host country than the immigrants salary rate.

Our hypothesis will be the following: if assimilation has occurred, then being of foreign origin, or having parents of foreign origin, should not be prejudicial to the individual's educational attainment.

We apply this study to Belgium because with its foreign population reaching 12%[9], it is one of the most important immigrants destination in Europe. Moreover, it has been now 40 years since the Belgian mining, iron and steel industries have launched the first "invitation" programme to Italian and Turkish workers. Now that these workers have settled and retired, their children have grown up in Belgium and have entered the labour market. The question is: are they assimilated?

The national statistics presented in the previous section allow us to conclude that unemployment is explained by low educational attainment and that school outcomes have improved over generations. We can thus take the education level as an assimilation factor, as it might well predict the chances of succeeding in the labour market. Because the unemployment rate of the foreign population exceeds that of natives, we want to check whether this difference could be explained by a low education level. Should this be the case, we may conclude that the immigrants' assimilation process is jeopardized.

In order to do this, we will take the level of education as a dependant variable explained by various factors suggested in the models we have presented in the literature review : parental human capital, measures of assimilation such as religion, immigrant status, age at migration and family ties, as well as ethnicity effect such as the origin.

We distinguish between first and second generations of immigrants because the former was born abroad and had to adapt to its host country, whereas the latter was born in the host country and thus, should a priori not have a different experience than a native. It will be

[9] MARTINIELLO, 2003.

interesting to verify whether being born in the host country just like a native does have a positive impact on assimilation. Studies presented in the previous sections have concluded that the time spent in the host country since migration was the measure of assimilation. A relatively long time spent in the host country since migration was always a key determinant to a successful immigrant's integration, when considering the immigrant's salary rate as dependent variable. When taking the highest degree obtained as dependent variable, however, RIHPHAN (2002) has demonstrated that the time since migration did not have the same effect. She questioned the assimilation hypothesis because even immigrants born in Germany still experienced a slower educational attainment than natives. We shall verify whether this is the case in Belgium too.

With this objective in mind, we will distinguish four population groups:

1. the *natives*, who have the Belgian nationality and were born in Belgium:
2. the *second generation immigrants*, who were born in Belgium but do not have the Belgian nationality;
3. the *first generation immigrants*, who were not born in Belgium and who do not have the Belgian nationality;
4. the *Belgians born abroad*, who have the Belgian nationality but were not born in Belgium. This group may include naturalized immigrants.

Our dependent variable is the highest degree obtained, ordered from 1 to 6 according to the Belgian education system:

1. *no or elementary school diploma*, which represents at most 6 years of education;
2. *intermediate high school*, for those who have the "*certificat d'enseignement secondaire inférieur*", which represents at most 9 years of education;
3. *high school*, indicating whether one has finished high school and has the "*certificat d'enseignement secondaire supérieur*", which represents at most 12 years of education;
4. *non academic degree*, for those who have a degree from a non academic institution, i.e. the *écoles supérieures* which requires the high school diploma and provides 3-year technical training. This category represents thus at most 15 years of education;

5. *university degree*, for those who obtained their "*licence*" or "*ingénieur*" degree in an academic institution, i.e. engineering, law, human sciences, pharmacology, literature, etc. They require also the high school diploma and take 4 to 5 years. This category represents at least 16 years of education;

6. *doctorate or PhD degrees*, which count at least 17 years, i.e. the longest time of education.

And we consider four groups of explanatory variables:

1. *demographic indicators*: i.e. age and gender. If the age interaction terms with immigrant status yields a negative coefficient, this would suggest that second-generation educational attainment experiences slower improvement compared to natives of the same age;

2. *assimilation effects*: variables indicating whether the individuals has grown up in a catholic environment -the most represented religion in Belgium-, the time since migration, whether the individual's parents live abroad and if he/she has strong ties with his/her family, i.e. whether they help each other in various domain such as financial or emotional support, looking after the small children or even housekeeping. The literature suggests that the deeper the integration of the household is in the host country, the higher the educational attainment is achieved;

3. *origin indicators*: we control the origin with an indicator for country of birth, sorted by geographic regions. This variable has interaction only with first generation immigrants and Belgian born abroad because natives and second generation immigrants were, by definition, born in Belgium;

4. *parental human capital*: i.e. whether the father and the mother had at least their secondary degrees and whether they had managerial or executive jobs during the youth of the individual.

Data are from a longitudinal households survey conducted yearly since 1991 by the Universities of Antwerp and Liege. They gather biographical information of 11.347 individuals consisting of education, income, values, hobbies, health, family life, labour market experience, etc. We used the most recent survey from 2002, to which we implemented pieces

of information stored in previous surveys. Only individuals older than 25 years old were considered to make sure they had completed their education at the time of the survey.

The regressions are estimated using an ordered probit model for 9,808 observations in models 1 and 2, and for 8,758 observations in models 3 to 6. We find the following results in Table 3. We choose to apply such model in this analysis because the dependent variable is ordered from 1 to 6.

The next section presents the results of this cross section analysis.

IV. Empirical Analysis

In this section, we test empirically the education determinants of second generation immigrants compared to that of natives, with the four groups of explanatory variables and their interaction terms with each population sample: natives, second generation, first generation, and Belgian born abroad.

Table 1 presents the distribution of the dependent variable among population groups. The majority of natives and second generation immigrants have their high school diploma, although an important 25.12% of second generation immigrants have no or only the primary school diploma compared to only 13.87% for natives. The share of second generation immigrants older than 25 years old having the lowest education level is thus two times bigger than that of natives. Besides, the percentage of second generation immigrants that have graduated from an "*école supérieure*" or university is significantly lower than that of natives. Note that the representation percentage of the first generation immigrants decreases as we climb the education categories. The native population is thus slightly more educated than the second generation, and significantly more educated than the first generation immigrants.

Table 2 displays descriptive statistics on the explanatory variables. All samples are approximately 53 years old and have the same gender representation. A high majority of 92% of the first generation individuals have parents living abroad, followed closely by 87% of the second generation sample. Only 50% of the first generation group has grown up in a catholic environment, whereas it has been the case for a vast 87% of the second generation immigrants. Family solidarity is rather weak in all samples. First generation immigrants and Belgians born abroad have in average spent 32 years in Belgium, so we can estimate the average age at migration to be around 20 years old. They have mostly been coming from OECD countries and from Middle East or North African countries. Interestingly, only 4% of the first generation immigrants were coming from other African countries, against 13% of the Belgian born abroad sample. We can thus say that, in our sample, 13% of the immigrants born in African countries have taken the Belgian citizenship. Less than 5% of them are coming from Latin America and Asia, therefore we will drop these two origin samples in our analysis. Regarding parental human capital, second generation immigrants are the most likely to have parents who finished high school, while natives are the most likely to have parents occupying a managerial or executive job.

The regressions are separated in models (1) to (6), in order to test stepwise each group of explanatory variables. Ordered probit models are indeed quite sensitive to the number of variables used. There is 9,808 observations in models (1) and (2) and 8,758 in models (3) to (6).

In model (1), a linear age effect, a control for gender, immigrant status and the interaction terms are considered. It yields significantly negative coefficients estimate for each immigrant status. The age interaction term with second generation status informs us that, at age 30, second generation immigrants education level is below that of 30-year old natives by a half diploma category[10]. We can also note that in all samples men seem to be slightly more likely to attain a higher education level than women.

In model (2), we control for a simple assimilation variable "parents living abroad" indicating whether the parents live in a foreign country. We find that the effect of having parents living abroad on second generation immigrants' educational attainment is negative: it yields a lag of 0.2 diploma category compared to natives[11].

In model (3), we control for all assimilation variables except for time since migration and this incurs a loss of 1,050 observations. This model yields interesting results regarding assimilation effects for the second generation. Firstly, we find that catholic upbringing has a positive effect on education attainment: it increases by 0.26 diploma category the second generation immigrant's education level[12]. Secondly, as we have seen in model (2), having parents living abroad has also a negative effect on education attainment of immigrants. Thirdly, we find a positive effect for "family solidarity" except in the second generation samples: having close family ties reduces by 0.2 diploma category the education level of second generation immigrants[13]. This indicates that we should perhaps interpret "family solidarity" rather as an ethnic capital factor than an assimilation factor. Living in a family that has strong ties could discourage the second generation individuals to integrate in the host culture.

In model (4), we test for origin effect for first generation immigrants and Belgian born abroad - the only groups of individuals not born in Belgium- with country of birth. Countries of birth have been sorted in 6 geographic regions:

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[10] Computed as: "*second generation immigrant+(30)*(second generation immigrant*age)*"=-0.467;
[11] Computed as: "*parents living abroad+(second generation immigrant*parents living abroad)*"=-0.19;
[12] Computed as: "*catholic upbringing+(second generation immigrant*catholic upbringing)*"=-0.26;
[13] Computed as: "*family solidarity+(second generation immigrant*family solidarity)*"=-0.017;

1. OECD countries: the EU with 15 countries (other than Belgium), Switzerland, Norway, the USA and Canada;
2. the Eastern European countries, including the ten new EU members, Russia, Turkey and Malta;
3. Middle East and North African countries;
4. other African countries;
5. Latin America;
6. Asian countries.

Since we have seen in Table 2 that very few of the first generation immigrants and the Belgian born abroad were coming from Latin America and Asia, these origins have been omitted from the regression model.

Again, coefficient for "parents living abroad" and "family solidarity" are negative. Regarding the origin of the first generation individuals, they all have a negative effect on education attainment. Considering now the origin of Belgians born abroad, only those born in OECD, Middle East or North African countries are likely to have a lower education level compared to that of natives.

In model (5), we control for all assimilation variables including "time since migration", as well as for parental human capital. We found a very small and negative coefficient estimate for "time since migration" variables of both immigrants groups which is rather unexpected. This variable gives the number of years spent in Belgium since migration and is equal to zero for natives and second generation immigrants. Although immigrants studies have generally demonstrated that this variable had a positive effect on assimilation indicator such as the salary rate, we find here that it does not work that way for educational attainment. Indeed, we have seen in Table 2 that first generation immigrants and born abroad Belgians came in Belgium when they were between around 20 years old and thus, had already completed their schooling in their home country before migrating. Consequently, a negative coefficient might rather indicates that older individuals had lower education level or that the immigrants arrived earlier in the host country were less educated than the most recent generations of immigrants, where the formers have not made up their education in the host country either.

Coefficients for parental human capital are significantly positive in all samples except for the mother's occupation, which is negative. Having a mother occupying a qualified position in the childhood might be negatively correlated with educational attainment, if we suppose that a working mother spends less time supervising her children's homework.

The father's human capital has a positive effect on educational attainment in all groups, although it is weaker in the second generation sample. The marginal effect of the father's education for instance is a gain in nearly one diploma category for the first generation immigrants[14] and 0.61 for the Belgians born abroad[15]. For the second generation immigrants, however, the father's education yields only a gain of 0.37 diploma category[16]. These results are rather surprising since we have shown in Table 2 that this group was the most likely to have a high parental human capital. This contradiction could prove that the second generation's human capital is nearly completely depreciated upon migration.

In model (6), we control for all groups of variables together. We find the same results regarding assimilation, origin and parental human capital effects. Computing again the marginal effects, we find now that, at age 30, educational attainment of second generation immigrants surpasses that of natives by about 2 diploma categories[17]. However, the same effect on 20-year old individuals drops to only one diploma category[18]. The effect of having parents living abroad and of having important family solidarity entails also smaller losses of respectively -0.16[19] and -0.05[20] diploma category, whereas the effect of a catholic upbringing yields a gain of 0.03[21] diploma category. The father's human capital is again important in all groups, although weaker for second generation immigrants.

However, we ought to be careful with the interpretations of the last model because the more explanatory variables are added to an ordered probit regression, the less significant coefficient estimates become. Indeed, too many variables increase the risk of multicollinearity.

As a conclusion of models (1) to (6), second generation immigrants' educational attainment lags behind that of natives of the same age, although this lag disappears when controlling for

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[14] Computed as: *« father had high school degree+(first generation immigrant*father had high school degree) »*=0.82;
[15] Computed as: *« father had high school degree+(Belgian born abroad*father had high school degree)"*=0.61;
[16] Computed as: *« father had high school degree+(second generation immigrant*father had high school degree »*=0.37;
[17] Computed as : « second generation immigrant+(30)*(second generation immigrant*age) »=1.82 ;
[18] Computed as: « second generation immigrant+(20)*(second generation immigrant*age) »=1.09;
[19] Computed as: *"parents living abroad+(second generation immigrant*parents living abroad)"*=-0.15;
[20] Computed as: *"family solidarity+(second generation immigrant*family solidarity)"*=-0.05;
[21] Computed as: *"catholic upbringing+(second generation immigrant*catholic upbringing)"*=-0.03;

assimilation, origin and parental human capital effects. In younger samples, however, these effects might not be able to explain totally the divergence of educational attainment between second generation immigrants and natives. In average, second generation immigrant men who were brought up in a catholic family, whose parents are living in Belgium too and whose father had at least his secondary school diploma and had a managerial or executive job, are the most likely to attain a high level of education in Belgium.

V. Conclusion

This paper presents a succinct assimilation analysis of immigrants in Belgium. We chose to apply such analysis to this country because 12% of the Belgian population has foreign origin and it is, with Germany, an important destination for immigrants in Europe. Moreover, immigrants have now settled there for more than a generation.

We have focused on educational attainment as a factor of integration because we have noticed that high education level increases the chances of success on the labour market. By comparing the educational attainment of an immigrant with that of a native, we can identify the degree of assimilation. Also, we have considered the second generation of immigrants in particular because they are a priori the most susceptible to be assimilated. Assimilation theory is indeed based on the fact that the longest time spent in the host country is a key determinant to the immigrant's integration. Since second generation immigrants were born in Belgium and thus have spent there the longest possible time, they should a priori be completely assimilated and indistinguishable from natives.

As suggested by BORJAS (1992), longitudinal studies over immigrants assimilation should control for the *assimilation effect* by taking into account the time spent in the host country since migration, the immigrant status (i.e. whether the individual is a *first* or a *second* generation immigrant), and for the e*thnic capital* with variables indicating for instance the origin. Moreover, we chose to control for characteristics such as whether the immigrant grew up in a catholic environment and an indicator of the nearness with the parents, in order to see the immigrants' closeness with the Belgian culture. We have also controlled for whether the father and the mother had qualified jobs and finished high school during the individual's youth, for it has been demonstrated that *parental human capital* can strongly influence educational attainment of the children.

Our dependant variable is the highest degree obtained, ordered accordingly to the Belgian education system from one -for none or primary school diploma- to six -for PhD or equivalent degree. We control for the different groups of explanatory variables and their interaction terms with each generation status using ordered probit regressions.

Firstly, we find that second generation immigrants' education level lags behind that of native of the same age by a half diploma category. When controlling for all four explanatory variables groups, however, this education lag disappears. We can thus say that assimilation,

origin and parental human capital effects are explaining the educational attainment of second generation immigrants.

On other matters, we find that the "family solidarity" variable that we counted as an assimilation variable was on the contrary an ethnic capital variable indicating the importance given to the home culture of the immigrant. In fact, "family solidarity" had a negative effect on the second generation's educational attainment. As if the weaker the link with the home culture, the better the school outcomes. Moreover, the "time since migration" variable that is only applicable to first generation immigrants and to Belgians born abroad, had a negative impact on the education level. This might suggest that older immigrants were less educated than the new ones and that they have neither come to Belgium in order to make up their education.

Regarding parental human capital effects, we can make the interesting observation that the father's human capital has a positive effect on educational attainment in all groups, except that of the second generation immigrants. Since this group was also the most likely to have a high parental human capital, this observation forces us to conclude that parental human capital is completely depreciated upon migration.

Finally, concerning the origin effect, only immigrants born in OECD, Middle East or North African countries seemed the most likely to attain a lower education level compared to natives.

Since a developed ethnic group facilitates immigrants' assimilation, it could have been interesting to test for ethnic network, using for instance the size of the parents' ethnic group at birth. In order to confirm the origin effect on assimilation, we could furthermore have compared the origin of first generation immigrants with that of second generation immigrants' parents. According to the literature on immigrants studies, we should also have theoretically tested for the time since household arrival in Belgium instead of the time since migration of the individual himself. Unfortunately, all these data were not available.

In the same respect, we have explained in the literature review that it is pointless to study immigrants' assimilation without taking into account the *cohort effect*. Immigration waves ought to be differentiated across time, because they represent cohorts with different characteristics. In particular, BORJAS(1985) had demonstrated that the qualifications of immigrant cohorts have decreased over time in the United States. However, since we have

only used cross section data in this analysis, we have not been able to observe a change in educational attainments of immigrants over immigrant cohorts.

It could also have been interesting to order the highest degree obtained by field of education instead of ordering them from 1 to 6 by number of years of education required. In fact, it takes the same number of years to attend a plumbing school than a traditional secondary school, except that the latter prepares for higher education promising a qualified job, what the former does not. Knowing which type of education the second generation immigrants would have decided to follow could also have helped determining whether there might be an ethnic-based segregation between highly and poorly qualified jobs.

In conclusion, we have found that the educational attainment of second generation immigrants is diverging from that of natives of the same age. Consequently, the assimilation hypothesis is questionable in Belgium. As a further analysis, it would be interesting to identify the *causes* of this education level lag. Meanwhile, progress have to be made in the Belgian integration policies because the immigrants' human capital will be the only solution to the upcoming demographic shortage, especially knowing that immigration will only be increasing in the future.

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Data

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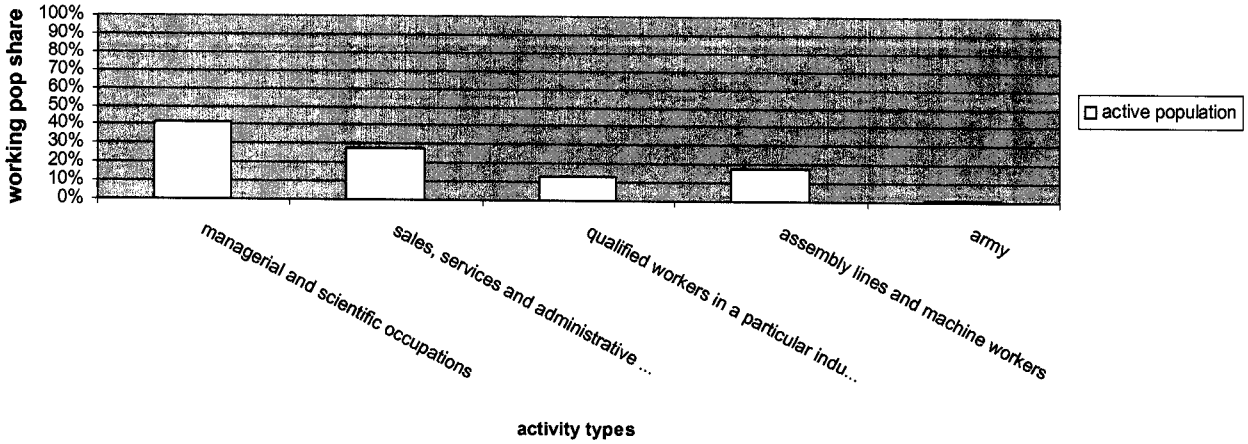
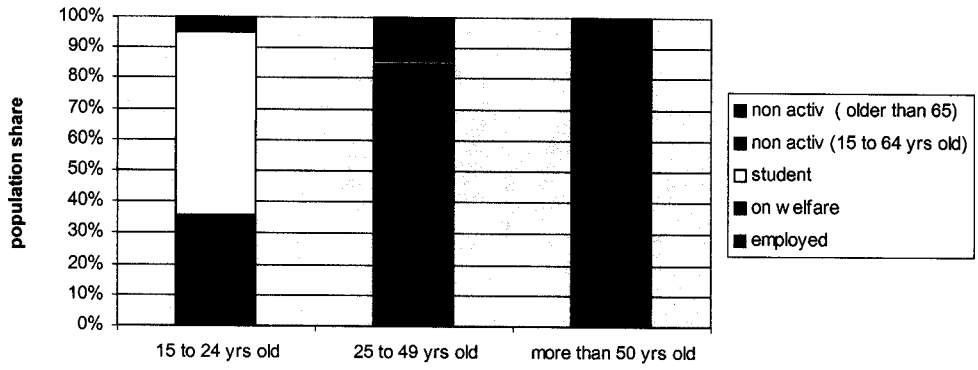
VII. Appendix

Graph 1: working population share by type of occupation[@]

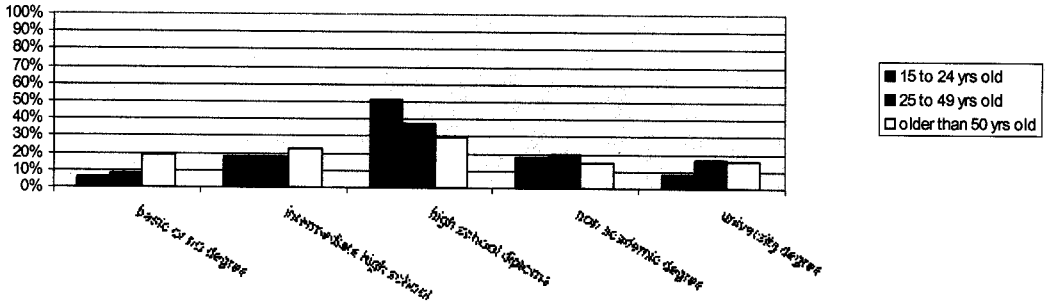


Graph 2 : population share by age and activity types[@]

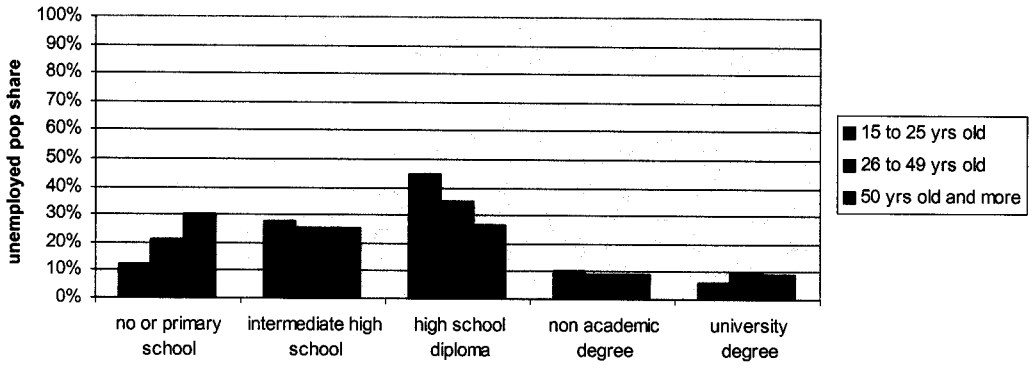


[@] Source : INS, 2002.

Graph 3 : working population share* by age and education level@

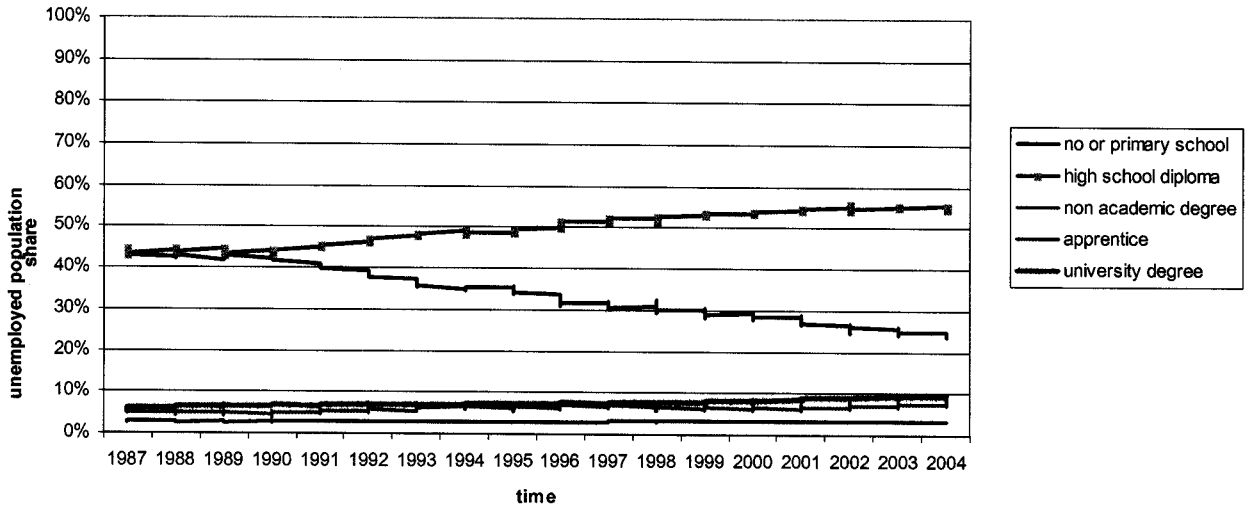


Graph 4 : unemployed population share* by age and education level@

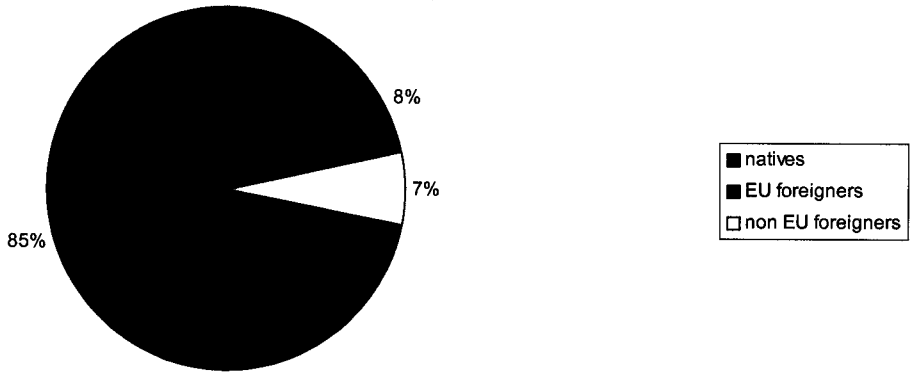


* All age groups sum up to 100%.
@ Source : INS, 2002.

Graph 5: unemployed population evolution by education level[@]

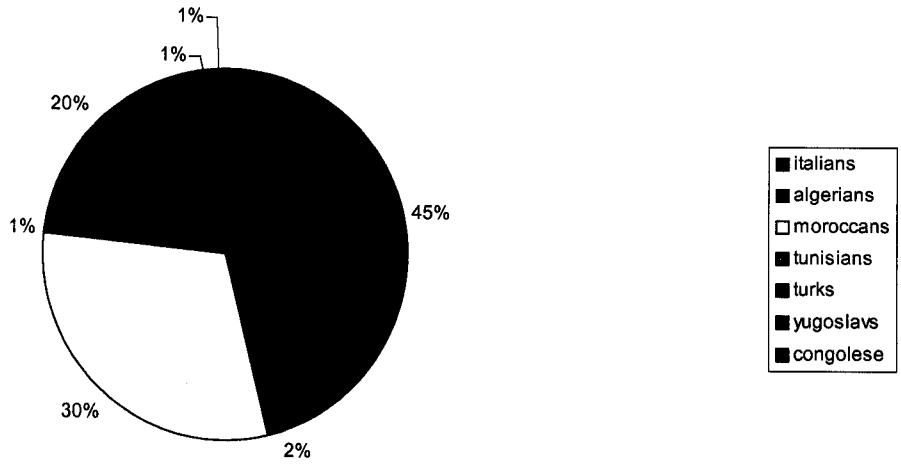


Graph 6 : unemployed population share by origin (2002)[@]



[@] Source : INS, 2002.

Graph 7: unemployed foreign population share by nationality (2002)[@]



[@] Source : INS, 2002.

Table 1: distribution of the dependant variables (in percent)

population groups:

"natives":	individuals born in Belgium having the Belgian nationality
"second generation":	individuals born in Belgium having a foreign nationality
"first generation":	individuals not born in Belgium and having a foreign nationality
"Belgians born abroad":	individuals not born in Belgium and having the Belgian nationality

highest degree obtained:

1-no or primary school:	maximum 6 years of schooling
2-intermediatef high school:	maximum 9 years of schooling
3-high school diploma:	maximum 12 years of schooling
4-non academic degree:	maximum 15 years of education
5-university degree:	maximum 16 years of education
6-PhD or doctorate:	more than 17 years of education

	population groups				
highest degree obtained	**natives**	**second generation**	**first generation**	**Belgians born abroad**	**Total**
1	68,27	19,72	4,49	7,52	100
	13,87	**25,12**	**35,5**	**20,38**	**16,13**
2	80,18	13,32	1,72	4,79	100
	19,8	**20,61**	**16,5**	**15,75**	**19,59**
3	80,14	13,1	1,32	5,44	100
	31,98	**32,77**	**20,5**	**28,94**	**31,66**
4	84,25	9,49	0,89	5,36	100
	15,74	**11,11**	**6,5**	**13,36**	**14,82**
5	82,85	7,92	2,22	7,01	100
	15,33	**9,18**	**16**	**17,29**	**14,68**
6	83,66	4,9	3,27	8,17	100
	3,29	**1,21**	**5**	**4,28**	**3,12**
Total	79,35	12,66	2,04	5,95	100
	100	**100**	**100**	**100**	**100**

Table 2: Explanatory variables in models 1 to 6

	mean	standard deviation
DEMOGRAPHIC EFFECT		
age °	52,10	17,53
age *second generation	55,70	20,03
age *first generation	53,18	16,46
age *Belgian born abroad	53,82	15,24
male	0,48	0,50
male*second generation	0,50	0,50
male*first generation	0,51	0,50
male*Belgian born abroad	0,45	0,50
ASSIMILATION EFFECT		
parents living abroad	0,63	0,48
parents ...abroad*second generation	0,87	0,33
parents ...abroad*first generation	0,92	0,27
parents ...abroad*Belgian born abroad	0,75	0,43
catholic upbringing	0,85	0,36
catholic upbringing*second generation	0,87	0,34
catholic upbringing*first generation	0,50	0,50
catholic upbringing*Belgian born abroad	0,64	0,48
family solidarity °°	1,26	0,44
family solidarity*second generation	1,04	0,19
family solidarity*first generation	1,05	0,22
family solidarity*Belgian born abroad	1,36	0,48
time since migration^ *first generation	28,78	16,82
time since migration*Belgian born abroad	35,86	16,19
ORIGIN EFFECT		
born in OECD country*first generation	0,46	0,50
born in OECD country*Belgian born abroad	0,57	0,50
born in east European country*first generation	0,06	0,23
born in east European country*Belgian born abroad	0,06	0,23
born in Middle East or North Africa*first generation	0,17	0,38
born ... North Africa*Belgian born abroad	0,15	0,36
born in other African country*first generation	0,04	0,20
born in other African country*Belgian born abroad	0,13	0,33
born in Latin America*first generation	0,01	0,10
born in Latin America*Belgian born abroad	0,02	0,12
born in Asia*first generation	0,05	0,21
born in Asia*Belgian born abroad	0,02	0,12

PARENTAL HUMAN CAPITAL EFFECT		
father had high school degree	0,53	0,50
father ...degree*second generation	0,67	0,47
father ...degree*first generation	0,55	0,50
father ...degree*Belgian born abroad	0,51	0,50
mother had high school degree	0,47	0,50
mother ...degree*second generation	0,63	0,48
mother ...degree*first generation	0,52	0,50
mother ...degree*Belgian born abroad	0,45	0,50
father had qualified job ^^	0,69	0,46
father ...job*second generation	0,64	0,48
father ...job*first generation	0,55	0,50
father ...job*Belgian born abroad	0,70	0,46
mother had qualified job ^^	0,66	0,48
mother ...job*second generation	0,60	0,49
mother ...job*first generation	0,45	0,50
mother ...job*Belgian born abroad	0,58	0,49
number of observations	10 441	
natives	8 031	
second generation	1 619	
first generation	207	
Belgian born abroad	584	

(°): "*age*" is given in years;
(°°): "*family solidarity*" indicates level of solidarity in the family : it ranges from 1-weak, 2-average to 3-strong;
(^): "*time since migration*" is given in years;
(^^) these variables indicate whether the mother and the father occupied executive or managerial position in the individual's youth.

Table 3: Estimation results: ordered probit on educational degree attained

	model 1	model 2	model 3	model 4	model 5	model 6
IMMIGRANT STATUS						
second generation immigrant (0/1)	-0,354	-0,505	-0,313	-0,313	-0,379	-0,379
	0,098	*0,138*	*0,283*	*0,283*	*0,292*	*0,292*
first generation immigrant (0/1)	-0,902	-2,124	-1,442	0,893	-0,696	2,341
	0,371	*0,496*	*1,041*	*1,323*	*1,583*	*1,897*
Belgian born abroad (0/1)	-0,167	-0,264	-0,200	0,007	0,367	0,499
	0,168	*0,225*	*0,302*	*0,330*	*0,438*	*0,462*
DEMOGRAPHIC EFFECTS						
age	-0,023	-0,019	-0,021	-0,021	-0,017	-0,017
	0,001	*0,001*	*0,001*	*0,001*	*0,001*	*0,001*
age*second generation immigrant	-0,004	0,023	0,046	0,046	0,073	0,073
	0,017	*0,018*	*0,020*	*0,020*	*0,024*	*0,024*
age*first generation immigrant	0,117	0,192	0,129	0,159	0,037	0,115
	0,063	*0,065*	*0,091*	*0,101*	*0,118*	*0,130*
age*Belgian born abroad	0,025	0,040	0,019	0,025	-0,048	-0,037
	0,030	*0,032*	*0,035*	*0,036*	*0,047*	*0,048*
male (0/1)	0,082	0,090	0,090	0,091	0,097	0,098
	0,024	*0,024*	*0,025*	*0,025*	*0,025*	*0,025*
male*second generation immigrant	0,061	0,057	0,045	0,045	0,039	0,039
	0,063	*0,063*	*0,072*	*0,072*	*0,072*	*0,072*
male*first generation immigrant	0,247	0,207	0,213	0,498	0,225	0,583
	0,202	*0,202*	*0,306*	*0,322*	*0,314*	*0,335*
male*Belgian born abroad	0,066	0,053	0,060	0,065	0,142	0,154
	0,091	*0,091*	*0,097*	*0,098*	*0,098*	*0,099*
ASSIMILATION EFFECTS						
parents living abroad (0/1)	-	-0,271	-0,233	-0,234	-0,257	-0,258
	-	*0,028*	*0,029*	*0,029*	*0,029*	*0,029*
parents ...abroad*second generation	-	0,073	0,056	0,056	0,101	0,101
	-	*0,087*	*0,110*	*0,110*	*0,113*	*0,113*
parents ...abroad*first generation	-	1,048	0,864	1,135	0,916	1,087
	-	*0,299*	*0,460*	*0,499*	*0,512*	*0,546*
parents ...abroad*Belgian born abroad	-	0,071	0,109	0,225	0,104	0,172
	-	*0,111*	*0,119*	*0,122*	*0,124*	*0,126*
catholic upbringing (0/1)	-	-	0,104	0,105	0,117	0,117
	-	-	*0,035*	*0,035*	*0,035*	*0,035*
catholic upbringing*second generation	-	-	0,156	0,156	0,189	0,189
	-	-	*0,098*	*0,099*	*0,099*	*0,099*
catholic upbringing*first generation	-	-	-0,376	-0,753	-0,492	-0,854
	-	-	*0,320*	*0,426*	*0,349*	*0,445*
catholic upbringing*Belgian born abroad	-	-	0,117	-0,102	0,040	-0,142
	-	-	*0,105*	*0,117*	*0,108*	*0,120*
family solidarity	-	-	0,369	0,370	0,341	0,342
	-	-	*0,028*	*0,028*	*0,028*	*0,028*
family solidarity*second generation	-	-	-0,387	-0,388	-0,394	-0,395
	-	-	*0,182*	*0,182*	*0,183*	*0,183*
family solidarity*first generation	-	-	0,093	0,480	-0,082	0,101
	-	-	*0,594*	*0,605*	*0,713*	*0,739*
family solidarity*Belgian born abroad	-	-	-0,021	-0,042	-0,100	-0,107
	-	-	*0,099*	*0,100*	*0,102*	*0,102*
time since migration *first generation	-	-	-	-	-0,011	-0,016
	-	-	-	-	*0,013*	*0,014*
time since migration*Belgian born abroad	-	-	-	-	-0,009	-0,009

	-	-	-	-	*0,004*	*0,004*
ORIGIN EFFECT						
born in OECD country*first generation	-	-	-	-3,265	-	-3,423
	-	-	-	*0,862*	-	*0,959*
born in east European country*first generation	-	-	-	-3,332	-	-3,375
	-	-	-	*1,012*	-	*1,056*
born in Middle East or North Africa*first generation	-	-	-	-4,078	-	-4,239
	-	-	-	*1,007*	-	*1,139*
born in other African country*first generation	-	-	-	-0,849	-	-1,237
	-	-	-	*1,045*	-	*1,081*
born in OECD country*Belgian born abroad	-	-	-	-0,195	-	-0,062
	-	-	-	*0,162*	-	*0,165*
born in east European country*Belgian born abroad	-	-	-	0,071	-	0,218
	-	-	-	*0,241*	-	*0,244*
born ... North Africa*Belgian born abroad	-	-	-	-0,734	-	-0,580
	-	-	-	*0,203*	-	*0,206*
born in other African country*Belgian born abroad	-	-	-	0,308	-	0,215
	-	-	-	*0,193*	-	*0,195*
PARENTAL HUMAN CAPITAL						
father had high school degree	-	-	-	-	0,416	0,417
	-	-	-	-	*0,035*	*0,035*
mother had high school degree	-	-	-	-	0,025	0,025
	-	-	-	-	*0,035*	*0,035*
father had qualified job	-	-	-	-	0,309	0,310
	-	-	-	-	*0,042*	*0,042*
mother had qualified job	-	-	-	-	-0,256	-0,257
	-	-	-	-	*0,041*	*0,041*
father ...degree*second generation	-	-	-	-	-0,042	-0,042
	-	-	-	-	*0,113*	*0,113*
mother ...degree*second generation	-	-	-	-	-0,023	-0,023
	-	-	-	-	*0,123*	*0,123*
father ...job*second generation	-	-	-	-	-0,090	-0,090
	-	-	-	-	*0,102*	*0,102*
mother ...job*second generation	-	-	-	-	-0,193	-0,193
	-	-	-	-	*0,110*	*0,110*
father ...degree*first generation	-	-	-	-	0,412	-0,591
	-	-	-	-	*0,488*	*0,586*
mother ...degree*first generation	-	-	-	-	-0,208	0,125
	-	-	-	-	*0,494*	*0,555*
father ...job*first generation	-	-	-	-	0,704	0,006
	-	-	-	-	*0,444*	*0,501*
mother ...job*first generation	-	-	-	-	-0,653	0,239
	-	-	-	-	*0,456*	*0,542*
father ...degree*Belgian born abroad	-	-	-	-	0,194	0,145
	-	-	-	-	*0,148*	*0,151*
mother ...degree*Belgian born abroad	-	-	-	-	0,140	0,097
	-	-	-	-	*0,151*	*0,152*
father ...job*Belgian born abroad	-	-	-	-	0,072	0,104
	-	-	-	-	*0,144*	*0,145*
mother ...job*Belgian born abroad	-	-	-	-	0,044	0,025
	-	-	-	-	*0,133*	*0,134*