Intergenerational Educational Mobility in Europe

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Abstract

We employ 2011 European Union Survey on Income and Living Conditions (EU-SILC) data for Austria to perform Markovian mobility matrix analysis and uni- and multivariate econometric analysis to study intergenerational educational mobility by gender and migration background. We find that the educational attainment of girls and migrants relative to their parents is less mobile than for boys and natives. Further, the immobility of educational attainment is enhanced by the intersection of these identities: migrant girls are the least educationally mobile group and are especially likely to follow their mothers' educational footsteps, while native boys are the most mobile, especially compared to their mothers.

Keywords: educational mobility, gender, migration, intergenerational persistence
JEL codes: J62; I24; J15; J16

I. Introduction

Social and economic advantages and disadvantages are often passed from one generation to the next. The eventual educational attainment of a child is typically highly correlated with his or her parents' educational achievement. In other words, a child's educational success is to some degree pre-determined by the level of education attained by his or her parents. This intergenerational educational immobility is a barrier to a society achieving meritocratic ideals.

While intergenerational educational persistence is a constraint faced by all, some populations may have a harder time escaping the educational track pre-set by their parents than others. Migrants to a new country may be more dependent on the educational attainment of their parents than natives, because there are fewer resources for migrants to make their own path. Gender can be a second important factor in intergenerational educational mobility: girls may be more dependent on the educational attainment of their parents than boys, and a child's same-gender parent (mothers for girls and fathers for boys) might play more of a role in determining the educational attainment of a child than the cross-gender parent, because of the transmission of gender roles set up in a family or household. Finally, the intersection of these identities – gender and migration status – may enhance the immobility faced by certain groups.

Using data for Austria from the 2011 European Union Survey on Income and Living Conditions (EU-SILC), we examine the role of gender and migration background in intergenerational educational mobility. We use a Markovian matrix analysis and uni- and multivariate econometric techniques for this study. The range of analytical techniques employed allows us to test the robustness of our results. Our analysis allows us to draw implications for policy aimed at encouraging a society with more equal educational chances for all (Schütz, Ursprung, and Wößmann, 2008).

II. Background and Literature Review

Educational attainment is highly correlated across generations in many countries around the world (Hertz et al., 2007) and in all Organisation for Economic Cooperation and Development (OECD) countries (OECD, 2010, 2012). While several background variables have been found to be related with a child's educational attainment, such as household income and wealth, parental care and skill, genetics, and pre-school attendance (Bowles and Gintis, 2002; Groves, 2005; Heckman, 2008), parental education has been found to be one of the most relevant parental variable in determining a child's educational attainment (Haveman and Wolfe, 1995; d'Addio, 2007).

The gender of a child and his or her parents also matters in educational transmission across generations (Farre and Vella, 2013; Moen, Erickson, and Dempster-McClain, 1997). Social gender roles are rules and norms attached to biological sex; they dictate how men and women "should" behave and which skills, traits, and interests men and women "should" have. Children learn gender roles in part from their parents. Children can be more likely to follow in the footsteps of their same-gender parent, as they learn gender roles first from their parents and imitate their same-gender parent. Therefore, a child's educational attainment can be more strongly related to the educational success of their same-gender parent.

The role of a descendant's and his/her parents' gender in intergenerational mobility in Austria is such that the same-gender parent-child relationships (father/son; mother/daughter) show stronger ties in intergenerational educational transmission than

cross-gender relationships (Fessler and Schnee-baum, 2012). Hence the gender of both the child and the parent are important aspects in determining intergenerational educational mobility.

The intergenerational educational mobility of natives may systematically differ from that of migrants, because of institutional differences that these populations face. As Borjas (1992) suggests, the education levels of immigrant children depends not just on their parents' educational capital but also on "ethnic capital" - the human capital of the ethnic community as a whole. If a migrant population is lower educated than the native population, then the children of the migrants will face something of a couble disadvantage. Further, if a migrant population is not well-integrated into the society in which they live, their own level of educational attainment can be particularly dependent on their parents' educational attainment, because they will not have access to the resources in society which would help advance their educational chances and they will be more dependent on private (household) investments in their education while natives can also depend on public investments (Schneeweis, 2011; Ammarmueller, 2007). Finally, the educational institutional setting into which a migrant moves can pose more of a challenge on migrants than natives; a system with early tracking in educational "careers," such as that in Austria, may be more likely to lock migrants into the same track as their parents than natives, who are familiar with the system (Bauer and Riphahn, 2006; Hanushek and Wößmann, 2012).

The existing international research has found a significant influence of migration background on intergenerational educational mobility. Lüdemann and Schwerdt (2013), for example, show that differences in the probability of native and migrant students being recommended for an academic educational track in Germany cannot be explained by differences in test scores; the authors conclude that the differences are related to the less favourable socio-economic background of migrants. Since the German and Austrian school system are quite similar, effects of migration background may be similar in Austria. However, Gang and Zimmerman (2000) found that parental education played no significant role in the educational choices of immigrants into Germany, while it was strongly important for German natives, perhaps because the sample in their study was very young (17-38 years old).

The existing literature on gender or migration background in intergenerational educational mobility has generally looked at *either* gender or migration status, separately. Further, most of the studies concerned with gender in intergenerational mobility consider either the gender of the parent or the gender of the child, but not both.[1] The motivation of this paper is to study the intersectionality of gender and migrant background, giving special attention to gender inboth generations. One relevant study, Abada and Tenkorang (2009), finds that in Canada, a descendant's educational attainment is more dependent on their same-gender parent's educational attainment than that of their cross-gender parent's, as in the Austrian study cited above. Further, Abada and Tenkorang (2009) show differences in intergenerational education by country of origin for migrants and find that migrant women are more likely to obtain higher education than migrant men, although migrants as a whole are less likely to obtain a university education. The countries of origin of migrants into Canada and into Austria are quite different, though, and the only study looking at migration back-

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[1] Many papers in the intergenerational earnings literature concentrate on the gender of just the descendants or of the parent. See for example almost all papers reviewed in Solon (2002) and Haveman and Wolfe (1995), and Raaum et al. (2007).

ground and gender together in a similar country is one which studies Switzerland (Bauer and Riphahn, 2006). Bauer and Riphahn (2006) find large differences in intergenerational educational persistence, depending on the country of origin of immigrants into the country. Upward educational mobility in Switzerland appears to be higher for migrants than natives, but not for migrants of Turkish, Portuguese and former Yugoslavian origin. Women are more likely to obtain higher education – even more significantly for migrants than natives – but again there are large differences across the migrant groups in question. One more interesting finding is that educational institutions and their differences tend to influence educational mobility strongly, with mobility being higher in the French- and Italian-speaking areas in Switzerland, probably due to different educational institutions and the early tracking within the German-speaking regions.

The existing literature shows that even though papers which investigate migrant and gender aspects exist, the focus on the intersectionality of these factors has been largely missing in the literature so far. Therefore the present paper aims at exploring the link between the effects of both gender and migration status while also taking into account the gender of the parents. The importance of this topic is emphasized by the significant effects of both factors as has been shown in the existing literature but looking at them separately ignores its intertwined character and influence on intergenerational educational mobility.

III. Data

We use EU-SILC data from the special module on intergenerational mobility in 2011 for Austria for this analysis. Respondents between the ages of 25-59 were asked to provide additional information about their parents' social and economic situation. For our purposes, we use data about the educational attainment of the parents and descendents, who were asked for information about their highest attained level of education. We aggregated the given answers (9 categories) into 4 education classes that can be ranked, for descendants, mothers and fathers.[2] Along with these educational classes, the educational levels have been assigned years of schooling, needed to compute the elasticities and correlations described below. These years of schooling as provided in table A.1 are based on the minimum time necessary to attain the specific education level.[3]

The migration status variable is based on the country of birth of the respondent and his/her parents. People born in Austria with at least one parent born in Austria as well are considered as "Native Austrians." Migrants are divided into two subgroups: those with an EU background and those with a non-EU background. This difference was made to account for the differences in education and socio-economic status that these two groups show, as presented in table 1. The main focus of our analysis is on the group of so-called non-EU migrants. This group is defined as those individuals, regardless of their birthplace, whose parents (both of them) were born outside of

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[2]The 9 categories given in the questionaire (see table A.1) were aggregated into 4 classes, following the reference of Statistics Austria: a maximum of compulsory school (including not having compulsory school) = class 1 (max. compulsory school); apprenticeship, master craftsman, nursing school, medium vocational school = class 2 (vocational training/middle school); high school, higher vocational school, vocational college = class 3 (high school diploma); university = class 4 (university).

[3]Due to the complex Austrian educational system, there is no fixed number of years given to attain a certain education level. For people who have not finished compulsory education, we adopted the rule of six years, considering that almost every person has a certain minimum level of schooling which may be about 6 years. Various assumptions for years of schooling for those who did not finish compulsory education have been tested (0-8) with robust results.

[4]The "EU-15+" is composed of the standard EU-15 countries, with Switzerland, Norway, Iceland, USA, Canada and

the "EU-15+" countries.[4]. The composition of the non-EU migrant group is very diverse, but the main countries of origin are Turkey and former Yugoslavia. The second migrant group is the "EU-migrant" group. EU migrants are defined as those individuals born in Austria or another one of the EU-15+ countries, and who have neither parent born in Austria but at least one parent born in the EU-15+. Due to the limited number of observations, this group has not been included in all of the following analyses.

Table 1 shows the distribution of educational attainment for our populations of interest: boys, girls, mothers, and fathers for the native and migrant descendants (for both groups of migrants) in our sample. Non-EU migrant boys and girls are more likely than natives to be in the lowest education class and less likely to have a university degree; especially non-EU migrant boys have lower educational attainment than their same-gender native peers. For both natives and (both groups of) migrants, fathers are more highly educated than mothers: fathers are more likely to have a university degree and less likely to be in the lowest education class compared to mothers. Non-EU migrant mothers and fathers are both slightly more likely to have the lowest ("low education) or the highest ("university") educational attainment compared to their native counterparts. Nevertheless the non-EU migrant descendant population does not show higher numbers of university educated people; on the contrary, they are more likely to have lower education than natives. In other words, though a higher percentage of non-EU migrant parents have a high school diploma or above, their children are less likely to have the same educational success, compared to natives.

EU-migrants (both parents and descendants) are more highly educated than the natives. A very high percentage of the EU-migrant descendants – particularly the sons – have a university degree, and very few EU-migrants have just the lowest educational attainment.

— Table 1 about here —

The transmission of parents' to children's education is shown in the mobility matrices in figure 1. These transition matrices show the probability of achieving a certain level of education (matrix columns are ranked from 1-4 - lowest to highest), given the education of the parents (matrix rows ranked 1-4 - lowest to highest). We therefore divide our sample by gender of the descendants, gender of the parents, and the descendant's migration status into 12 subgroups. These subgroups show the mobility patterns by gender and detect the influence of either parent (father or mother) separately on the education of their sons or daughters. Furthermore this method allows us to describe differences in educational transition between native Austrians and migrants. Again, due to the limited number of observations for the EU-migrants, we focus on natives and non-EU migrants exclusively. Therefore, any reference to "migrants" refers to non-EU migrants unless explicitly stated otherwise.

— Figure 1 about here —

A simple description of one matrix will illustrate the usefulness and very informative nature of these matrices. Looking at the first matrix in the top left of figure 1, which shows the education of the native sons given the education of their fathers, reveals that only 8% of native boys whose father had the lowest level of

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Australia as additions to the group.These 6 extra countries are included to compile the "EU-15+" group because the countries in that group share a similar level of economic development. Therefore, the educational and socio-economic background of the migrants from the EU-15+ may be closer to native Austrians' than the non-EU migrant group, as can be seen in table 1

educational attainment achieve a university degree. In contrast, 54% of native boys whose fathers are university educated have themselves achieved a university degree. Comparisons by gender and migration background are made below.

While the plurality of descendents do land in the same education class as their parents (between 25.4-53.6%, depending on gender and migration background; see table A.2), there is quite a bit of mobility. Each descendant falls into one of three categories: upwardly mobile, downwardly mobile, or no change. In the case of an educational class movement from parent to child, table A.2 also shows the number of classes the the descendant moved away from his/parent. Most intergenerational educational mobility is upward instead of downward; there are more students with a higher education class than their parents than there are students with a lower educational class than their parents. Migrants – both EU and non-EU – are more likely to be downwardly mobile than native Austrians. For all descendants, though, moving down two or three classes happens very rarely compared to the amount of upward movement by the same amount. Further, most movement is only a one-class change, which is surely a function of the fact that the majority of people are in groups where they can only move one of two classes (only people in the lowest or highest class *could* move three classes), but it is also a result of intergenerational educational persistence in general. Since most intergenerational educational mobility is upward, we consider more mobility, or less persistence, to be a positive social development. We therefore discuss immobility as a hinderance to human capital accumulation.

IV. Methods and Results

The analysis of the mobility matrices in Figure 1 can be performed in different ways, with one of them being mobility indices which measure the extent of the connection between the parental education and the education of the descendants. These indices measure the extent to which the matrices show mobility out of the parents' education class; in other words, they calculate, in various forms, the amount of observations on the off-diagonal of the matrix. The Shorrock's Index uses the trace of a matrix P and is calculated as

$$M^S(P) = \frac{n - trace(P)}{n - 1},$$

where n is the number of rows/columns. The Deteminant Index $M^D(P)$, as the name suggests, employs the matrix P's determinant to calculate

$$M^D(P) = 1 - det(P)^{\frac{1}{n-1}}.$$

The average jump and normalized average jump indeces consider the number of classes that descendants move away from their parents.[5] The second index, is the so-called Determinant Index and the Average Jump and Normalised Average Jump Indices conclude table 2. The latter two take into account not only whether the descendent has a different education compared to that of the parent, but also whether the descendent moved up or down one, two or three classes, therefore not only looking at the change itself but also at the level of the change in intergenerational education. The Normalised Average Jump also takes into account the size of the matrix, enabling the comparison of differently sized matrices. Table 2 presents the indices of 8 of the 12 matrices of figure 1 (excluding EU- migrants), ranked orderly based on the Shorrock's Index.

— Table 2 about here —

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[5]For more information on these indices and their mathematical background see, for example, Shorrocks (1978).

All of these indices have values between zero and one, with zero meaning no mobility at all, implying that the education of the parent perfectly determines the education of the child, and one meaning that independent of parental education, the descendent is equally likely to end up in any of the four education categories. Therefore, higher index numbers indicate higher mobility or independence of one's parent's education.

Ranked according to the Shorrock's Index, table 2 shows that sons are the most mobile group and natives are more mobile than migrants, although this is only true for the same gender comparison. Native sons are more mobile than migrant sons, but migrant sons are still more mobile than native daughters, with migrant daughters being the most immobile group. This general pattern is the same for all indices and supports the analysis of the descriptive data with sons being more independent of parental education than daughters, and migrants being less mobile compared to natives. It can also be seen that for migrant daughters, mothers' education serves as a stronger determinant of educational attainment than fathers' education, which is not true for sons and only to a very small extent for native daughters. For sons, the educational attainment of the father always plays a stronger role in determining the descendant's education than the mother's, independent of migration status. Interestingly the numbers reveal a big span, implying that differences in gender and migration status make a big difference for intergenerational educational mobility.

A second intuitive approach to examining intergenerational educational mobility is the so-called educational elasticity. To calculate the educational elasticity between two generations, we transform our educational attainment variables into the minimum number of years necessary to obtain that level of education. Those conversion rates are provided in the Appendix

in table A.1. The model used to obtain the educational elasticity can be written as

$$E_i^d = \alpha + \hat{\beta} E_i^p + \varepsilon_i \text{ for } i = 1, 2, \ldots, N \quad (1)$$

where E is the educational attainment of each of the observations i, for descendant d and parent p, and ε_i is a normally distributed error term. The OLS coefficient $\hat{\beta}$ is

$$\hat{\beta} = \hat{\rho}_{dp} \frac{\hat{\sigma}_d}{\hat{\sigma}_p}$$

where $\hat{\sigma}_d$ and $\hat{\sigma}_p$ represent the variance in the educational distribution of the descendant and parent populations, respectively, and $\hat{\rho}_{dp}$ is the covariance of the descendant and parent population. This exposition makes it clear to see that a change in $\hat{\beta}$ may not necessarily be due to a change in the relationship between the educational attainment of the two generations; the distribution of the educational attainment of either population would also change the elasticity $\hat{\beta}$. To account for this fact, we calculate so-called educational correlations $\hat{\gamma}$, which normalize the educational attainment of a population by the standard deviation of their educational distribution (Black and Devereux, 2011):

$$\frac{E_i^d}{\hat{\sigma}_d} = \alpha + \hat{\gamma} \frac{E_i^p}{\hat{\sigma}_p} + \varepsilon_i \text{ for } i = 1, 2, \ldots, N \quad (2)$$

The results in table 3 show that the correlation numbers are smaller than the elasticities for everyone except non-EU migrant boys - implying that the connection between parental education and one's own appears to be smaller once the calculation is adjusted for distributional effects. The reason for this is that the educational distribution of the descendants is different from that of the parents; the overall education level is higher for the younger cohorts and the distribution became more widely dispersed over time. The group of non-EU migrant sons is the only exception; while their education level has risen, the distribution of their

educational attainment became less dispersed. Analyzing the estimates for the educational correlation, one can see that similar to the mobility indices, women's educational outcomes are more strongly related to their parents' education attainment than men's, and there is more persistence between the educational attainment of migrant and their parents than there is between natives and their parents. The educational attainment of migrant women is particularly strongly correlated with their parents' educational attainment. Again it can be seen that the educational attainment of native Austrian women is more strongly correlated with their parents' education attainment than migrant men's educational attainment is correlated with their parents' educational attanment, meaning that the intergenerational persistence of educational attainment is stronger for native women than migrant men. Interestingly, the educational attainment of migrant women is strongly correlated with the education of their mothers, while this is not true for Austrian women; men's (independent of their migration status) educational attainment is always more strongly correlated with the educational level of their fathers. These results therefore parallel those obtained by the matrix analyses.

— Table 3 about here —

As a final measure of intergenerational educational mobility, we use an ordered logit regression to investigate the relationship between gender and migration background on the educational persistence of male and female descendants. Consider the following heavily interacted logistic model predicting the likelihood of ending in any of the four education classes EC in classes j (1 is primary school; 2 is secondary school; 3 is high school; and 4 is university), depending on gender G (0 if male; 1 if female), migration background MB (0 if native; 1 if migrant), parental education class PEC in classes j_k for parents $k = 1$ (father) and $k = 2$ (mother), and the three different effects in m of age (A), residence in a city (C), and pre-school attendance (P), brought together as ACP, for person i:

$$
\begin{aligned}
P(y_i^{EC} = j) = f(&\theta G + \eta MB + \Psi_k PEC_k \\
&+ \Omega_m ACP + (\gamma(G*MB)) \\
&+ (\kappa(G*PEC_k)) \\
&+ (\lambda(G*ACP)) \\
&+ (\phi(MB*PEC_k)) \\
&+ (\alpha(MB*ACP)) \\
&+ (\Delta(G*MB*PEC_k)) \\
&+ (\Gamma(G*MB*ACP))
\end{aligned}
$$

(3)

The model controls for a descendant's age because of the changing educational distribution over time. Pre-school attendance is included because that has a strong influence on later educational outcomes (Heckman, 2008; OECD, 2010). Finally, a dummy variable indicating whether the descendant lives in a city is included, because being in a city often offers more opportunity for educational advancement.[6] The results of this exercise, predicting the average marginal effects of each of the dependent variables on the likelihood of a person ending in education class 1, 2, 3, or 4, are presented in table 4.

—Table 4 about here —

Three main results can be seen from table 4. First, the differences in educational attainment for the four populations (native men; native women; migrant men; and migrant women) can be read straight away. The top row of the first page of the table (the results for the "Non-EU migrant" variable) shows that non-EU migrant men are 26.3 (29.3) percentage points more likely than native men to have a primary

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[6]Migration background here once more only includes non-EU migrants; age controls for one additional year of age; and the population cut-off for living in a city is 10,000.

(secondary) school education, and 32.5 (23.1) percentage points less likely have a high school (university) education. On the other hand, the educational differences in the male versus female populations are not large enough to be statistically significant; the top row of the second page of the table shows that women are not significantly more or less likely than the men in their own migration group (native or migrant) to be in any of the four education classes.[7]

Second, the effects of age, pre-school attendance, and residence in a city have differing effects on the likelihood of ending up in the four education classes for the individuals in the four populations. The effect of age for migrants shows that additional years of age correspond to a lower likelihood of having either of the two lower education classes, and a higher likelihood of being in the higher education classes. In other words, older migrants seem to have better educational outcomes than younger ones. For women, the opposite is true: additional years of age correspond to a higher likelihood that a woman ends up with either of the two lower education classes and a lower likelihood that she is in either of the two higher education classes. Given the changes in the educational distribution over time, this is clear: younger women are more highly educated than older women. The intersection of these two – the effect of age for migrant women – is a combination of the two counteracting effects. Since the coefficients on the migration variable are larger than the coefficients on the gender variable, the effect of age for migrant women seems to be closer to its effect on migrant men than it is on native women. This means that younger migrant women are more likely to have low education, but additional years of age increase the likelihood of obtaining a higher education.

The effects of attending pre-school and living in a city both have positive effects on educational outcomes: they diminish the likelihood of finishing school with a primary or secondary education, and increase the likelihood of having a high school or university education. These effects are especially pronounced for migrant women. Living in a city makes migrant women an additional six to eight percentage points more likely to have a high school or university education, and about seven percentage points less likely to be in either of the lower two educational classes. This effect for migrant women is in addition to the positive effects of living in a city on educational outcomes for the entire population.

Third, parental education has different effects on the educational outcomes of the four populations. Studying the overall effect of mothers and fathers having education beyond primary school (by looking at the coefficients for the reference category), more highly educated parents clearly have a positive effect on the chances of obtaining a high school or university degree. The effect of parental education is a bit stronger when looking at the father compared to the mother; a descendant is 13.8 percentage points more likely to have a university degree when the father has a high school degree compared to if the father had a primary school education, but just 10.3 percentage points more likely to have a university degree when the mother has a high school instead of primary education. For all outcomes and for all levels of parental education, the father's educational attainment has a stronger effect on the descendant education than the mother's education does. These effects are true for the reference category (native men) and confirm what we found with the other methodological approaches above.

[7]Note that migrant women are less likely than native men to have a university degree, for example, and this difference is captured in the "non-EU migrant" variable. If migrant women's gender had an additional effect on the likelihood of obtaining a university degree, we would have observed that in the "women interation" coefficient.

For migrant male descendants, the effects are slightly different. In the reference group, there was no statistically significant effect of a father having a secondary school education on the descendant's education. For migrant males, on the other hand, the effect is statistically significant, and strong: when fathers of migrant men have a secondary instead of a primary education, the decendants are 8.4 percentage points less likely to have a primary school education, 10.4 percentage points more likely to have a high school education, and 7.4 percentage points more likely to have a university degree. Thus, even a relatively small amount of additional education for fathers significantly helps the educational attainment of migrant men. On the other hand, the marginal effect of the mother having a secondary instead of primary education is close to zero for migrant men. The effect of a mother's high school or university education is correlated with higher educational outcomes for migrant sons as much as for native sons, but a secondary instead of primary school education for mothers does not have a significant impact on migrant sons' educational outcomes.

The effect of parental education on a descendant's educational outcomes differs for native women (the "female" row on the second page of table 4) and native men in two significant ways. First, when fathers have a secondary instead of a primary school education, native women are less likely to have a primary or secondary school education themselves, and more likely to have a high school or university education. Thus, the secondary school education of fathers is significantly helpful for both migrant men and native women, but the magnitude of the effect for migrant men is stronger. Second, the educational outcomes of native women are significantly positively affected by a mother being university educated. Native women are an additional nine percentage points more likely to be university educated when their mothers

have a university degree instead of a primary school education, and are almost 13 percentage points more likely to have a high school degree in the same case. These effects are in addition to the already strong and positive effects of mothers with university degrees that native men face.

Finally, the educational outcomes of migrant women are most clearly boosted when their mothers have a secondary school education instead of a primary school education. When this is true, migrant women are between 13.6 and 15.1 percentage points less likely to have primary or secondary school education themselves, and a striking 11.9-16.8 percentage points more likely to have a high school or university education.

Overall, we see that the effect of the mother's education is stronger for female descendants than for male descendants, and that the educational outcomes of migrant descendants are additionally aided by fathers (for both men and women) and mothers (for women) with a secondary school instead of a primary school education.

V. Discussion and Conclusions

The findings of the various techniques employed in this paper show similar trends, suggesting rather robust results. First, descendants' educational attainment is more strongly correlated with their same-gender parent's education level than their cross-gender parent's. Secondly, educational mobility is generally lower for migrants than for natives, meaning that migrants are more likely to have the same educational attainment as their parents.

Perhaps the most interesting findings in this paper are the results of the intersection between gender and migration background in intergenerational educational mobility. Migrant women, who face a "double disadvantage" in that they are members of two marginal-

ized populations, are by far the most immobile group. Their educational success is more heavily dependent on their parents' – and especially their mothers' – educational attainment than any other group. Austrian boys have the lowest persistence in educational attainment relative to their parents.

Interestingly, it is migrant boys who are generally the next most mobile group. This means that migrant boys are more educationally mobile than native girls – suggesting that gender is the more constraining factor to educational mobility compared to migration background. Apart from the effects of parental education it is living in a city, age, and pre-school attendance that have significant influence on educational outcomes. Pre-school attendance has an especially strong effect on the probability that migrants will achieve higher than just compulsory education, supporting existing literature on the effect of early-childhood education (Heckman, 2008; OECD, 2010).

This paper addressed the intersectionality of gender and migration background and its effects on intergenerational educational mobility. The finding that gender overrules migration background in terms of immobility is one that cannot be found in the literature so far. This indicates that being a female migrant in Austria means having the lowest educational mobility, whereas male migrants are even more mobile than female natives. Hence migrants coming to Austria either already show a strong discrepancy within gender or they quickly adjust. Higher education of women and policy aimed at increasing the educational attainment of migrant women could consequently improve educational mobility for this group.

Apart from policy aimed at improving educational attainment and awareness of migrant women, such practices should be implemented for migrants in general as well as for native women. With all of these groups being less mobile compared to native Austrian men, it is these groups that deserve particular attention in order to improve their educational mobility relative to their parents. Since the existing literature has focused on either gender or migration background in intergenerational educational persistence, the intersectional approach taken in this study presents new findings, which further call for similar investigation in different countries, with different groups of migrants, and over time. Above all it is this intersectionality of personal characteristics that defines intergenerational educational mobility, thus to fully understand this intersectionality means that researchers should study different aspects of identity, separately and in their intersections, to get a more complete picture of persistence in educational outcomes across generations.

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VI. Tables and Figures

Table 1: *Educational Distribution*

	Natives		Non-EU-Migrants		EU-Migrants	
	Observations	Weighted Percent	Observations	Weighted Percent	Observations	Weighted Percent
Male Descendants						
Low Education	188	8.7	96	24.4	2	2.6
Vocational	1510	59.2	198	52.9	24	30.4
High School	439	17.1	69	16.4	13	14.6
University	417	15.1	34	6.3	40	52.5
Female Descendants						
Low Education	395	15.4	191	40.0	7	9.1
Vocational	1339	49.9	149	27.4	28	36.1
High School	525	19.2	125	22.1	17	21.8
University	442	15.6	65	10.5	28	33.0
Fathers						
Low Education	1972	37.9	512	55.1	40	22.9
Vocational	2610	49.4	256	30.0	65	41.8
High School	339	6.5	79	7.4	16	11.5
University	334	6.3	80	7.4	38	23.8
Mothers						
Low Education	3026	58.1	675	74.6	58	33.6
Vocational	1767	33.2	118	12.7	55	35.6
High School	313	6.0	89	8.4	21	15.2
University	149	2.7	45	4.3	25	15.7
Total (descendant) observations	5255		927		159	

Figure 1: *Transition Matrices*
Natives

$$
P^{f \to s} = \begin{bmatrix} 0.13 & 0.67 & 0.13 & 0.08 \\ 0.07 & 0.65 & 0.17 & 0.11 \\ 0.01 & 0.26 & 0.29 & 0.44 \\ 0.04 & 0.14 & 0.28 & 0.54 \end{bmatrix}
\qquad
P^{m \to s} = \begin{bmatrix} 0.12 & 0.68 & 0.11 & 0.08 \\ 0.04 & 0.54 & 0.24 & 0.18 \\ 0.02 & 0.22 & 0.30 & 0.46 \\ 0.05 & 0.15 & 0.25 & 0.56 \end{bmatrix}
$$

$$
P^{f \to d} = \begin{bmatrix} 0.29 & 0.53 & 0.12 & 0.07 \\ 0.08 & 0.56 & 0.21 & 0.14 \\ 0.05 & 0.19 & 0.35 & 0.41 \\ 0.02 & 0.07 & 0.32 & 0.60 \end{bmatrix}
\qquad
P^{m \to d} = \begin{bmatrix} 0.23 & 0.57 & 0.12 & 0.08 \\ 0.05 & 0.48 & 0.28 & 0.19 \\ 0.04 & 0.15 & 0.34 & 0.47 \\ 0.01 & 0.04 & 0.22 & 0.72 \end{bmatrix}
$$

Non-EU migrants

$$
P^{f \to s} = \begin{bmatrix} 0.36 & 0.51 & 0.09 & 0.03 \\ 0.11 & 0.66 & 0.18 & 0.04 \\ 0.06 & 0.33 & 0.40 & 0.21 \\ 0.07 & 0.31 & 0.36 & 0.25 \end{bmatrix}
\qquad
P^{m \to s} = \begin{bmatrix} 0.29 & 0.56 & 0.12 & 0.04 \\ 0.11 & 0.60 & 0.27 & 0.03 \\ 0.05 & 0.19 & 0.43 & 0.33 \\ 0.02 & 0.37 & 0.38 & 0.23 \end{bmatrix}
$$

$$
P^{f \to d} = \begin{bmatrix} 0.60 & 0.24 & 0.12 & 0.03 \\ 0.20 & 0.41 & 0.32 & 0.08 \\ 0.04 & 0.13 & 0.54 & 0.29 \\ 0.04 & 0.14 & 0.29 & 0.53 \end{bmatrix}
\qquad
P^{m \to d} = \begin{bmatrix} 0.54 & 0.28 & 0.15 & 0.03 \\ 0.08 & 0.45 & 0.31 & 0.16 \\ 0.07 & 0.05 & 0.59 & 0.30 \\ 0.00 & 0.03 & 0.29 & 0.68 \end{bmatrix}
$$

EU migrants

$$
P^{f \to s} = \begin{bmatrix} 0.00 & 0.44 & 0.19 & 0.37 \\ 0.06 & 0.45 & 0.08 & 0.40 \\ 0.00 & 0.00 & 0.00 & 1.00 \\ 0.00 & 0.05 & 0.30 & 0.65 \end{bmatrix}
\qquad
P^{m \to s} = \begin{bmatrix} 0.00 & 0.41 & 0.21 & 0.38 \\ 0.07 & 0.33 & 0.08 & 0.52 \\ 0.00 & 0.26 & 0.12 & 0.62 \\ 0.00 & 0.06 & 0.20 & 0.74 \end{bmatrix}
$$

$$
P^{f \to d} = \begin{bmatrix} 0.13 & 0.56 & 0.10 & 0.21 \\ 0.10 & 0.51 & 0.27 & 0.11 \\ 0.17 & 0.00 & 0.28 & 0.55 \\ 0.00 & 0.08 & 0.22 & 0.70 \end{bmatrix}
\qquad
P^{m \to d} = \begin{bmatrix} 0.17 & 0.56 & 0.14 & 0.14 \\ 0.04 & 0.48 & 0.28 & 0.20 \\ 0.11 & 0.05 & 0.32 & 0.52 \\ 0.00 & 0.00 & 0.17 & 0.83 \end{bmatrix}
$$

Table 2: *Matrix Mobility Indices*

	Shorrock's	Determinant	Average Jump	NAJ
Native Mother - Son	0.825 *(1)*	0.909 *(2)*	0.799 *(1)*	0.400 *(1)*
Non-EU Mother - Son	0.818 *(2)*	0.868 *(3)*	0.783 *(2)*	0.391 *(2)*
Native Father - Son	0.797 *(3)*	0.931 *(1)*	0.753 *(4)*	0.377 *(4)*
Non-EU Father - Son	0.774 *(4)*	0.850 *(4)*	0.760 *(3)*	0.380 *(3)*
Native Mother - Daughter	0.743 *(5)*	0.794 *(6)*	0.701 *(5)*	0.351 *(5)*
Native Father - Daughter	0.734 *(6)*	0.810 *(5)*	0.689 *(6)*	0.344 *(6)*
Non-EU Father - Daughter	0.643 *(7)*	0.679 *(7)*	0.615 *(7)*	0.308 *(7)*
Non-EU Mother - Daughter	0.581 *(8)*	0.597 *(8)*	0.553 *(8)*	0.276 *(8)*

Notes: Calculated on weighted Austrian EU-SILC 2011 data. Sorted by Shorrock's Index, where higher indeces represent more mobility.

Table 3: *Elasticities and Correlations - Ranked by Correlation*

	Elasticity	Correlation	Sample Size
Non-EU Mother - Son	0.302	0.352 (1)	397
Native Mother - Son	0.517	0.352 (1)	2554
Native Father - Son	0.452	0.394 (3)	2554
Non-EU Father - Son	0.331	0.401 (4)	397
Native Mother - Daughter	0.682	0.430 (5)	2701
Native Father - Daughter	0.554	0.435 (6)	2701
Non-EU Father - Daughter	0.592	0.581 (7)	530
Non-EU Mother - Daughter	0.650	0.611 (8)	530

Notes: Calculated on weighted Austrian EU-SILC 2011 data. Sorted by correlation, where lower values represent more mobility.

Table 4: *Ordered Logit Model, Predicting Marginal Effects*

	Primary School		Secondary School		High School		University	
	Reference (native men)	Migration Interaction	Reference (native men)	Migration Interaction	Reference (native men)	Migration Interaction	Reference (native men)	Migration Interaction
Non-EU Migrant		0.263***		0.293***		-0.325***		-0.231***
		(0.0583)		(0.0678)		(0.0729)		(0.0524)
Father - 2	-0.00473	-0.0842***	-0.00527	-0.0937***	0.00585	0.104***	0.00416	0.0739***
	(0.00905)	(0.0246)	(0.0101)	(0.0273)	(0.0112)	(0.0303)	(0.00794)	(0.0214)
Father - 3	-0.158***	-0.0359	-0.176***	-0.0399	0.195***	0.0443	0.138***	0.0315
	(0.0209)	(0.0410)	(0.0247)	(0.0457)	(0.0265)	(0.0507)	(0.0183)	(0.0360)
Father - 4	-0.154***	-0.00684	-0.172***	-0.00761	0.191***	0.00845	0.136***	0.00600
	(0.0230)	(0.0473)	(0.0265)	(0.0527)	(0.0285)	(0.0585)	(0.0202)	(0.0416)
Mother - 2	-0.0621***	0.0655*	-0.0692***	0.0729*	0.0768***	-0.0809*	0.0546***	-0.0575*
	(0.0101)	(0.0378)	(0.0111)	(0.0419)	(0.0123)	(0.0466)	(0.00869)	(0.0331)
Mother - 3	-0.118***	-0.0562	-0.131***	-0.0626	0.146***	0.0695	0.103***	0.0494
	(0.0232)	(0.0372)	(0.0264)	(0.0414)	(0.0290)	(0.0459)	(0.0202)	(0.0327)
Mother - 4	-0.128***	0.0334	-0.143***	0.0372	0.158***	-0.0412	0.113***	-0.0293
	(0.0321)	(0.0682)	(0.0362)	(0.0759)	(0.0398)	(0.0843)	(0.0281)	(0.0599)
Age	-0.000269	-0.00394***	-0.000299	-0.00439***	0.000332	0.00487***	0.000236	0.00346***
	(0.000510)	(0.00128)	(0.000562)	(0.00147)	(0.000627)	(0.00160)	(0.000444)	(0.00115)
Pre-School	-0.0256***	-0.0309	-0.0285***	-0.0344	0.0316***	0.0381	0.0224***	0.0271
	(0.00910)	(0.0231)	(0.0101)	(0.0256)	(0.0112)	(0.0284)	(0.00794)	(0.0202)
City	-0.0417***	0.0311	-0.0464***	0.0347	0.0515***	-0.0385	0.0366***	-0.0273
	(0.00959)	(0.0254)	(0.0112)	(0.0284)	(0.0120)	(0.0315)	(0.00862)	(0.0224)

Continued on next page...

Table 4: *Continued from previous page*

	Primary School		Secondary School		High School		University	
	Female Interaction	Female and Migration Interaction	Female Interaction	Female and Migration Interaction	Female Interaction	Female and Migration Interaction	Female Interaction	Female and Migration Interaction
Female	-0.0170	0.00227	-0.0188	0.00253	0.0209	-0.00281	0.0149	-0.00199
	(0.0371)	(0.0821)	(0.0407)	(0.0914)	(0.0454)	(0.101)	(0.0323)	(0.0721)
Father - 2	-0.0543***	0.0112	-0.0604***	0.0125	0.0670***	-0.0139	0.0476***	-0.00986
	(0.0140)	(0.0420)	(0.0155)	(0.0467)	(0.0172)	(0.0519)	(0.0122)	(0.0369)
Father - 3	-0.00498	-0.0370	-0.00555	-0.0412	0.00616	0.0457	0.00438	0.0325
	(0.0286)	(0.0628)	(0.0319)	(0.0699)	(0.0353)	(0.0775)	(0.0251)	(0.0551)
Father - 4	-0.0447	0.0254	-0.0497	0.0282	0.0552	-0.0313	0.0392	-0.0223
	(0.0318)	(0.0769)	(0.0355)	(0.0856)	(0.0393)	(0.0950)	(0.0279)	(0.0675)
Mother - 2	-0.0113	-0.136***	-0.0126	-0.151***	0.0139	0.168***	0.00990	0.119***
	(0.0143)	(0.0523)	(0.0160)	(0.0578)	(0.0177)	(0.0642)	(0.0126)	(0.0457)
Mother - 3	-0.0386	0.0245	-0.0429	0.0273	0.0476	-0.0302	0.0339	-0.0215
	(0.0304)	(0.0609)	(0.0339)	(0.0679)	(0.0375)	(0.0753)	(0.0268)	(0.0535)
Mother - 4	-0.103**	-0.132	-0.115**	-0.147	0.128**	0.163	0.0908**	0.116
	(0.0461)	(0.0998)	(0.0515)	(0.111)	(0.0569)	(0.123)	(0.0406)	(0.0874)
Age	0.00177**	0.00138	0.00197**	0.00154	-0.00219**	-0.00171	-0.00156**	-0.00121
	(0.000725)	(0.00175)	(0.000797)	(0.00196)	(0.000890)	(0.00217)	(0.000628)	(0.00154)
Pre-School	-0.0195	0.0177	-0.0217	0.0197	0.0241	-0.0219	0.0171	-0.0155
	(0.0132)	(0.0363)	(0.0147)	(0.0404)	(0.0163)	(0.0448)	(0.0116)	(0.0319)
City	0.0141	-0.0669*	0.0157	-0.0745*	-0.0175	0.0826*	-0.0124	0.0587*
	(0.0133)	(0.0361)	(0.0149)	(0.0405)	(0.0164)	(0.0447)	(0.0117)	(0.0319)

Notes: Ordered logit model predicting average marginal effects. Father and mothers with the lowest education class are reference categories.

19

A. APPENDIX

Table A.1: *Years of schooling*

		years of schooling
no compulsory schooling	*(kein Pflichtschulabschluss)*	*6*
compulsory school	*(Pflichtschule)*	*9*
apprenticeship	*(Lehre)*	*10*
master craftsman	*(Meister)*	*12.5*
nursing school	*(Krankenpflegeschule)*	*11.5*
medium vocational school	*(BMS)*	*11*
high school	*(AHS)*	*12*
higher vocational school	*(BHS)*	*13*
vocational college	*(BHS-Kolleg)*	*14*
university	*(Universität)*	*16*

Table A.2: *Directions of Education Class Mobility*

	N	Upwardly Mobile (%)	Upwardly Mobile 1 class	2 classes	3 classes	Downwarly Mobile (%)	Downwardly Mobile 1 class	2 classes	3 classes	No move Not Mobile (%)
Natives										
Father - Son	2554	49.2	36.3	10.1	2.9	8.6	7.2	1.1	0.3	42.2
Mother - Son	2554	67.5	50.1	12.5	4.9	4.0	3.2	0.6	0.1	28.6
Father - Daughter	2701	47.7	33.4	11.6	2.7	7.7	7.0	0.7	0.1	44.6
Mother - Daughter	2701	63.2	45.1	13.5	4.5	3.5	3.2	0.3	0.0	33.3
Non-EU Migrants										
Father - Son	397	43.3	35.2	6.3	1.8	11.5	8.6	2.4	0.5	45.2
Mother - Son	397	61.5	49.3	9.5	2.8	5.9	4.0	1.9	0.1	32.6
Father - Daughter	530	35.5	24.6	9.1	1.8	11.0	9.2	1.5	0.3	53.5
Mother - Daughter	530	42.7	27.6	12.9	2.1	3.7	3.0	0.8	0.0	53.6
EU Migrants										
Father - Son	79	55.8	26.0	21.6	8.2	10.3	9.3	1.1	0.0	33.8
Mother - Son	79	64.3	25.4	26.9	12.0	10.3	9.4	1.0	0.0	25.4
Father - Daughter	80	41.5	29.9	6.8	4.9	13.7	9.9	3.8	0.0	44.8
Mother - Daughter	80	53.3	36.9	11.6	4.9	6.8	5.0	1.8	0.0	39.9

Notes: Calculated on weighted Austrian EU-SILC 2011 data. Sample sizes unweighted.