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Working Paper

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CReAM Discussion Paper Series, No. 09/13

Provided in Cooperation with:
Rockwool Foundation Berlin (RF Berlin)

Suggested Citation: Dronkers, Jaap; Kalmijn, Matthijs (2013) : Single-parenthood among migrant children: Determinants and consequences for educational performance, CReAM Discussion Paper Series, No. 09/13, Centre for Research & Analysis of Migration (CReAM), Department of Economics, University College London, London

This Version is available at:
https://hdl.handle.net/10419/295443

Centre for Research and Analysis of Migration

CReAM

Discussion Paper Series

CDP No 09/13

Single-parenthood among migrant children: Determinants and consequences for educational performance

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Single-parenthood among migrant children: Determinants and consequences for educational performance

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Abstract

In this paper we address both the occurrence of single-motherhood among migrant mothers in OECD countries and the effect of living in a single-mother family on the math scores of 15-year old migrant pupils in OECD countries. We use the PISA 2009 data with an international comparative perspective, which contains 14,794 migrant pupils coming from 54 origin countries (grouped into 13 origins regions) and living in 15 OECD destination countries. We select only two-parent families and single-mother families for this analysis. Pupils have a higher risk of living in a single-mother family when one parent was born in the destination country, when they speak the destination language at home, and when they have a low socio-economic status. The risk of single parenthood also coincides with the prevalence of single parenthood in the origin country but does not reflect the prevalence of single parenthood in the destination countries. After controlling for mothers' socio-economic status and migration history, migrant pupils from single-mother families score 4 point lower on the math test than migrant pupils who live with both parents. This effect does not depend on the prevalence of single parenthood in the origin or the destination country.

1. Introduction

The study of immigrants in Europe has focused on the structural, social, and cultural dimensions of integration (Esser 2009; Kalter and Granato 2002; Levels, Dronkers, and Kraaykamp 2008; Van Tubergen and Van de Werfhorst 2007). For each of these dimensions, demographic characteristics of immigrants play an important role. Within the dimension of cultural integration, for example, authors have studied changing fertility differences between natives and immigrants (Milewski 2010). Within the dimension of social integration, authors have studied intermarriage between immigrants and natives (Dribe and Lundh 2011; Van Tubergen and Maas 2007). Recently, there is also growing interest in the marriage formation of immigrants, both with respect to the (often early) timing of marriage (Huschek, Liefbroer, and de Valk 2010) and the transnational nature of the marriage market (Kalter and Schroedter 2010). One important but relatively neglected demographic aspect is family structure. For natives, there have been dramatic changes in family structure, with increasing numbers of children who experience the divorce of their parents and who grow up at least part of their youth in a single parent home. To what extent are there differences between immigrants and natives in this respect and what are the consequences of such differences for the life chances of immigrants?

Previous studies and theoretical considerations lead us to expect large differences in family structure, both between immigrants and natives and among immigrant groups themselves. First, there are cultural differences between groups. In some groups such as Africans and Caribbeans, the culture is matrifocal and there is much emphasis on the extended family. As a result, marriage is less highly valued and single parenthood in these groups is common (Morgan, McDaniel, Miller, and Preston 1993; Stack 1974). In other groups, marriage is culturally more important than it is among natives. In most Arab

countries, for example, marriage has long been early and universal and divorce is strongly disapproved of, although these patterns are now undergoing change (Goode 1963; Goode 1993; Rashad, Osman, and Roudi-Fahimi 2005). Structural factors play a role for group differences in family structure as well. High levels of unemployment among immigrant groups may make marriage less feasible for immigrant women (Lichter, McLaughlin, Kephart, and Landry 1992). Although this does not per se lead to more single parenthood, it is possible that with a shortage of suitable marriage candidates, some immigrant women decide to put motherhood before marriage (Edin and Kefalas 2005). Another structural factor has to do with the immigration process itself. Some immigrants live in single parent homes because one of their parents died in a civil war, mothers may enter the destination country while the father stays behind, and married fathers may not be living with the family because of prolonged periods of employment in the origin country (Landale, Thomas, and Van Hook 2011). There is also a growing number of young adolescents who enter the country as orphans but the volume of this immigration is probably still limited (Olde Monnikhof and Tillaart 2003). Cultural and structural factors can also work in different directions. For example, Turkish families are strong supporters of the institution of marriage but in a nontrivial number of Turkish families, the (married) father is absent.

The first goal of this contribution is to describe differences in single-motherhood between immigrant groups and to explain these with available background characteristics. We offer a more comprehensive analysis of these differences than has been presented in the past, because we use the cross-national PISA data about 15 OECD member states. In these countries, first and second generation immigrants are present from nearly all parts of the world, including the Caribbean, North America, Northern, Western and Eastern Europe, four different regions of Asia, North and sub-Saharan Africa, and Oceania (see Table 1). Some larger groups are present in multiple countries such as the Turks (in Germany and the Netherlands) and the Moroccans (in Belgium and the Netherlands). Other groups are not exactly the same across destination countries but share important features, such as the Jamaicans in Scotland and the Antilleans and (black) Surinamese in the Netherlands. Good information is available on the family structure of 15-years old pupils, who indicated with whom they normally live together (father; mother; other relatives). The advantage of this measurement of the family structure is that it measures the real living situation, as perceived by a 15-year-old child, and thus is not obscured by legal nuances (cohabitation versus marriage; de facto separation versus formal divorce). A disadvantage of this measurement is that the PISA data does not provide the reason for single-motherhood (divorce; separation; death; born outside wedlock).

The second goal is to study the consequences of family structure for the educational performance of the migrants' children. Many studies have shown that children from single parent families perform less well in education than children from intact families. Negative effects are found for a range of educational outcomes (Amato and Cheadle 2008; Fischer 2004; Fomby and Cherlin 2007; Jonsson and Gähler 1997; McLanahan and Sandefur 1994; Pong, Dronkers, and Hampden-Thompson 2003). An important question is whether the effects of family structure on educational performance are different for natives and immigrants and whether they vary among immigrant groups themselves. If effects of family structure are similar across groups, differences in the prevalence of single parenthood are immediately relevant for understanding ethnic and racial inequality. The lower school achievement of children in black immigrant groups, for example, could then in part be attributed to the fact that single parenthood is more common among these children's families. If, on the other hand, effects are smaller in groups where single parenthood is more common—a possibility which will be discussed theoretically below—consequences for inequality will be relatively minor.

Some previous studies have examined effects of family structure for different ethnic and racial groups, but most of these come from the United States. McLanahan and Sandefur (1994) find smaller effects of single parenthood on the risk of high school dropout and the risk of divorce for blacks than for whites (McLanahan and Sandefur 1994). Heard (2007) finds smaller effects of exposure to single parenthood on students' grade point average for blacks than for whites (Heard 2007). Thomas et al. find that the effect of single parenthood on delinquency of adolescents is smaller for blacks than for whites (Thomas, Farrell, and Barnes 1996). There are also contrasting findings, however. For example, Sun and Li (2007), using longitudinal data, find few significant racial differences in the effects of parental divorce on child's behavioral problems and school achievement (Sun and Li 2007).

There are few European studies of the problem. An exception is a study by Kalmijn (2010b) who compared people from Surinamese and Antillean origins (Caribbeans) in the Netherlands to the native Dutch. He found similar effects of parental divorce on adult children's socioeconomic outcomes but weaker effects for Caribbeans on children's demographic behavior, such as the risk of divorce, leaving home, and contact frequency with the father (Kalmijn 2010b). Qualitative studies of problem behavior among black Surinamese in the Netherlands also suggest weaker effects of single parenthood on child well-being and point to high levels of involvement of children in the extended family (Distelbrink 2000). Dronkers & De Lange (2012) found that 15-year-old children of migrant single mother families in OECD countries had a higher math score than comparable children of migrant two-parent families.

Our second research question is to what extent the effects of single-motherhood on the educational performance of children differ among different immigrant groups, simultaneously controlled for the levels of single-motherhood of their origin countries and the levels of single-motherhood of the natives in their destination countries.

Since migration is intrinsically a transnational phenomenon, it should be studied accordingly (Portes, 1999). Migrant parents and children from various countries of origin move to various countries of destination. Therefore, instead of relying on observations of multiple-origin groups in a single destination or single-origin groups in multiple destinations, our analyses simultaneously compare multiple origins in multiple destinations. Since this design disentangles the effects of the characteristics of the countries from which migrants come from (origin effects) and the characteristics of the countries to which they migrate (destination effects), it is extremely useful in gaining insight into the factors influencing migrant outcomes such as educational performance. This paper applies this double comparative perspective, based on a multilevel approach, as developed by van Tubergen, and others (van Tubergen and Kalmijn 2005; Van Tubergen, Maas, and Flap 2004).

2. Background and hypotheses

Most studies have demonstrated that there are negative effects of parental divorce and living in a single parent home on child outcomes. These effects are found in the U.S. and in Europe, they are found for a wide range of outcomes, and they hold up in more stringent longitudinal designs, suggesting that selection bias does not play a dominant role (Cherlin, Furstenberg, Chase-Lansdale Jr., Kiernan, Robins, Morrison, and Teitler 1991; Cherlin, Chase-Lansdale, and McRae 1998; Dronkers 1999; Fischer 2004; Jonsson and Gähler 1997; Manski, Sandefur, McLanahan, and Powers 1992; McLanahan and Sandefur 1994; Sigle-Rushton, Hobcraft, and Kiernan 2005; Strohschein 2005). The effects are not always very large, however, and there is also considerable heterogeneity in the effects. The effects are typically explained in terms of changes in economic resources of the family on the one hand, and changes in parenting

practices on the other hand (McLanahan and Sandefur 1994; Thomson, Hanson, and McLanahan 1994).

For migrants, the effect of single parenthood may have a double meaning. On the one hand we might expect that being raised in a single parent home makes migrants more vulnerable, on the other hand, a divorce of the migrant parents might indicate a higher level of integration into the destination society. After all, the majority of the migrants in OECD countries origins come from countries with lower divorce rates (Dronkers & Kornder, 2013). To some extent, a divorce by these migrants means that this aspect of the destination culture has become acceptable. This higher level of integration of the divorced migrant parents might also contribute to higher educational performance of their children, thus reducing a possible negative of single parenthood itself.

In the present paper, the focus is not only on the effect of single parenthood at the individual level, but also at the contextual level. Immigrant groups vary in the degree to which single parenthood occurs, and this may have implications for child educational performance as well as for the effect of single parenthood. The contextual perspective can be summarized with the so-called institutionalization hypothesis, i.e., the notion that the effects of single parenthood and divorce on child well-being are weaker in contexts where such family forms and behaviors are more common. This general argument has not only been made for variations among immigrant and ethnic groups, in particular for blacks (Kalmijn 2010b; Thomas, Farrell, and Barnes 1996), but also for variation across countries (Dronkers and Harkonen 2008; Kalmijn 2010a) and across time periods (Sigle-Rushton, Hobcraft, and Kiernan 2005).

Several reasons have been suggested to explain the institutionalization hypothesis. One argument concerns the role of normative (dis)approval. The more common single parenthood is in a group, the less normative disapproval there is of that behavior in the group. Disapproval might have important consequences for children's educational outcomes. If their family situation is regarded as deviant, this may negatively affect their self-esteem and thus their educational performance. In addition, when there are more children from single parent families, children who live in such families can discuss the problems they experience with other children who have similar experiences. Because family disruption can be a traumatic experience for children, sharing experiences is important for their well-being and thus educational performance.

A second argument is that in groups where single parenthood is more common, mechanisms have been developed that may compensate for the effects of single parenthood. In the case of African Americans, Jamaicans in Great Britain and Caribbeans in the Netherlands, for example, it has been argued that the culture is matrifocal. Because mothers play a more important role in the upbringing of children than fathers in this culture, the loss of the father as a social resource could be less problematic. Moreover, greater emphasis on extended family, and in particular on grandmothers, but also on aunts and nieces, may reduce some of the negative social consequences of single parenthood (Kalmijn 2010b; Stack 1974). Other family members in these groups are more likely to provide support and control, thereby compensating for the negative effects of single parenthood.

We conclude our discussion with six hypotheses, which are related to the migration history (H1, H4), the family-form context of the origin country (H2, H5), and the family-form context of the destination countries (H3, H6). All hypotheses only apply to migrant mothers and their children. The first group of three hypotheses focuses on the odds for a migrant mother to become a single mother instead of a two-parent family:

H1. Migrant mothers who are more integrated in the culture of their destination country have a higher risk to be a single-mother.

H2. The higher the prevalence of single-mother families from the origin region, the higher the risk of female migrants to be a single-mother *(origin effect)*.[1]

H3. The higher the prevalence of single-mother families in the destination country, the higher the risk of female migrants to be a single-mother *(destination effect)*.

The second group of hypotheses focuses on the effect of single-motherhood on the educational performance of migrant children. We formulate only hypotheses about the interaction between the family-form context and single-motherhood, because that is the focus of our paper. Following the institutionalization thesis, we argue that there will both be interactions with the prevalence of single parenthood in the origin *and* in the destination:

H4. Among migrants, single motherhood has a negative effect on the educational performance of their children.

H5. The higher the prevalence of single-mother families from the origin region, the smaller is the negative effect of single-motherhood on educational performance *(origin interaction effect)*.

H6. The higher the prevalence of single-mother families in the destination country, the smaller is the negative effect of single-motherhood on educational performance *(destination interaction effect)*.

3. Data

3.1. PISA 2009

Since 2000, the OECD has conducted large-scale tri-annual tests among 15-year-olds living in its member and partner states to assess pupils' mathematical, reading, and scientific literacy. In doing so, the OECD has aimed to determine the extent to which pupils near the end of their compulsory education have acquired knowledge and skills essential for full participation in society. Alongside information on pupils' educational performance, PISA provides information on their individual characteristics (e.g., parental education and careers, resources available at home, languages spoken at home, and the birth countries of both the parents and the pupil) through the administration of pupil and principal questionnaires. This paper uses the latest PISA wave of 2009 (OECD, 2010).

3.2. Pupils' region of origin and migrant status

Since specific information on the country of birth of both a pupil and the parents is necessary to determine the pupil's country of origin, destination countries that did not allow enough specificity in birth countries were omitted. Data from 17 of all OECD countries were useful for the analysis (but we deleted two OECD countries: Turkey, because it had fewer than 50 male and female migrant pupils with a known origin country, and Mexico, because it is an outlier in many aspects).[2] All OECD destination countries with relevant information about the countries of birth are given in Table 2.

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[1] Note that this effect is tautological in our study because we measure the prevalence of single parenthood with the PISA data and hence, using immigrants only (e.g., Turks in the Netherlands and not Turks in Turkey). Our main concern to include this effect is to estimate the – not tautological – effect of single parenthood in the destination. Moreover, the hypothesis is not tautological if we could have measured the prevalence of single parenthood in the origin countries themselves.

[2] The OECD allows participating countries to propose their own birth country categories. As a result, the origin countries of the different destination countries depend partly on the quality of the available categories. To account for this possible bias, we compared, as much as possible, the origin countries in PISA with national statistics. In most cases the largest migrant groups identified by the statistical offices are also represented in our PISA data. Since the PISA data do not oversample migrant pupils, smaller migrant groups (if asked for) are

[Table 1 about here]

To determine a pupil's *country of origin*, several decision rules were used based upon the pupil's birth country and the birth countries of both parents.[3] To capture as many respondents as possible, we also included aggregate origin areas or combinations of countries that were sufficiently specific as countries of origin for the purpose of this analysis. Most destination countries allowed for the selection of at least one aggregate origin area or a combination of countries (e.g., *one of the former USSR republics*). To simplify the analysis and to decrease the instability of our outcomes due to small numbers, we combined the countries of origin into 14 regions of origin based upon a slightly adjusted version of the United Nations Statistics Division's composition of macro geographical regions (see Figure 1). The composition of origin regions is as follows. North America: the United States of America. Caribbean: the Caribbean and the Netherland Antilles. Northern Europe: Denmark, Estonia, United Kingdom, and Sweden. Western Europe: Austria, Belgium, France, Germany, Liechtenstein, the Netherlands, and Switzerland. Eastern Europe: Belarus, the Czech Republic, Poland, Romania, the Russian Federation, the Slovak Republic, the Ukraine, one of the former USSR republics, and an Eastern European country outside the European Union.

[Figure 1 about here]

In total, using decision rules to identify pupils' origin regions and migrant status yields a sample of 16,956 migrant pupils originating from 45 different origin countries and regions. Table 1 gives the list of all 13 origin regions; Dronkers & Kornder (2013) provides the full list of 54 origins countries.

3.3. Family form

A disadvantage of PISA is that it lacks information about the cause of single parenthood or guardianship of one the parents. Although we assume that in most OECD countries divorce or separation is the most common reason for single parenthood of parents of 15-year old children, there might be other reasons for growing up in a single-parent family (with or without a guardian), i.e., birth out of wedlock without a following marriage or cohabitation, and death of one of the parents. However, parents of 15-year old children are generally still too young to die, and the number of people who (intentionally or unintentionally) become a single parent already prior to childbirth will be rather low, except among African and Caribbean groups.

An important advantage of the measurement of family form in PISA is that students were asked with whom they regularly live at home, and they were offered a number of possible persons, whom they could all tick.[4] This way, the real family form in the eye of the students is measured instead of the formal situation, as reported by interested parents or authorities. Parents who separated after cohabitation (instead of marriage) before the child reaches the age of 15 are measured in the same way as formally divorced parents. Since

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understandably not always present in our data. There are no indications that this selectivity (only the largest migrant categories of the destination countries) has produced a bias, because small migrant categories in the destination countries hardly influence the results.

[3] The decision rules are available on request from the first author.

[4] In the 2009 wave the precise question was "Who usually lives at home with you? a) Mother or female guardian (e.g., stepmother or foster mother); b) Father or other male guardian (e.g., stepfather or foster father); c) brother; d) sister; e) other family (e.g. cousin, grandparents)".

separation after cohabitation has more or less the same effect on children as compared to divorce after marriage (Dronkers & Härkönen 2008; Härkönen & Dronkers 2006), the PISA data provide a more accurate picture in countries where cohabitation with children is common. Married parents, who stopped living together before the 15-year old student participates in the PISA survey, are also treated in the same way as formally divorced parents. This feature is especially relevant for catholic countries like Italy, Ireland, Portugal and Spain, where a formal divorce is still difficult to obtain. A disadvantage is that some children may live without a parent temporarily (e.g. fishermen, fathers working in the origin country). We believe, however, that this risk is small, as some students still will indicate that they live with both parents *usually*.

We created dummy variables indicating a two-parent family (mother and father) or a single-mother family. Of migrant children, 12% to 13% is living with a single mother (first and second generation) and this is more or less comparable to natives (see Tables 1 and 2). We have chosen to exclude other single-parent family forms, as they were not very common among the migrants in the OECD countries involved. This later restriction decreases our final sample to 14,794 children of migrants.

[Tables 1 & 2 about here]

3.4. Math score

This study focuses on math abilities because these tend to be less culturally biased than reading abilities, especially for migrants' children. PISA used item response modelling to measure the math skills, which implies the estimation of five plausible math values for each pupil. We averaged these plausible values and computed the standard error of this average math score, in order to take into account the variance between these five plausible values. PISA standardized the plausible scores using an average of 500 and a standard deviation of 100 for all OECD pupils (native and non-native). We weighted the migrants so that each OECD destination country has the same number of migrants (1000), to avoid OECD countries with large sample sizes or with large numbers of migrants dominating the analyses without increasing the total numbers of migrants in the sample.

Table 3 reports the math scores of migrants' children in all the available OECD destination countries, separately for generation and family form. Table 4 shows the math scores of migrants' children in all the origin regions.

[Tables 3 & 4 about here]

These four tables show that there is sufficient cross-destination and cross-origin variation in single-motherhood among migrant parents in the educational performance of migrant pupils from two-parents families and single-mother families for further combined multilevel analysis with a double perspective.

3.5. Individual-level variables

Table 5 summarizes all relevant micro and macro variables, including the minimum and maximum scores and the mean and standard deviation for pupils with a migration background and a known country or area of origin.

[Table 5 about here]

After identification of a pupil's country of origin, we identify the pupil's migrant status. Pupils with at least one parent born in a country different from the destination country were identified as migrants. Migrant pupils were classified as *Child born in origin country* (reference category) when they were born outside the destination country and as *Second generation migrant* when the pupil was born in the destination country but at least one of their parents was born abroad. Our generation measure deviates from that of Portes and Rumbaut (2001), who classify migrant generation status based on age upon arrival in the destination country. However, we believe that this distinction is cross-nationally clearer and less likely to underestimate the importance of pre-school socialization. Note that the age of arrival is not available in PISA so that we cannot make further distinctions among first generation migrants (cf., Song and Robert 2010; Dronkers and de Heus 2013a, 2013b).

The dummy variable *official language of destination country spoken at home* distinguishes between migrant children who speak one of their destination country's official languages at home and those who speak a foreign language.

We use a number of additional variables to account for the status of migrant pupils. First, we control for the pupils' parental environment by using an *index of the socio-economic status of the mother*. This variable represents a composite index created by us of the mother's occupational status (Ganzeboom, de Graaf, Treiman, & de Leeuw, 1992), the mother's educational level (United Nations Educational, Scientific and Cultural Organization, 2006), and the presence of any material wealth at the pupils' homes. This combination of the mother occupational status and educational level together with material wealth at home produces a strong indicator of parental environment (OECD, 2010). By using only the features of mothers and not those of the fathers, we avoid to underestimate the socio-economic position of single-mothers, because fathers tend to have a higher socio-economic position than mothers. If one or more of these variables were missing for a respondent, we imputed the value by taking the average of the prior pupil and the next after sorting all cases. The three indicators were combined into one standardized and centered score by unrotated factor-analysis.

Second, we included a dummy variable labelled *one parent born in destination country* to identify pupils who had one migrant and one native-born parent; pupils with two non-native parents represent the reference group. These parents can also be seen as having entered a mixed marriage (a marriage with a native born person). Note that children in single-mother families also answered questions about the country of birth of their father. This is a way of controlling for the effects of having a presumably stronger relation with the society and culture of the destination country when one parent is a native.

Third, the type of municipality were the pupils attends secondary school: big city and city. The combination of the other types (town to village) is the reference category.

3.6. Macro variables.

Percentage native single-mother families in destination country: We derived this indicator from the PISA 2009 data, using only the native pupils to estimate this percentage. The advantage of this procedure is that the percentage is not polluted by cross-national differences in cohabitation, marriage, separation and divorce.

Percentage single-mother families from origin region: We derived this indicator from the PISA 2009 data, using only the migrants' pupils to estimate this percentage. Note that not all origin countries offer comparable data on family composition, which is the main reason why we obtain this measure from the PISA data. Note that this leads to an upward bias in the effect of the prevalence of single parenthood in the origin on the risk of single parenthood at the

individual level. Ideally, we would have measured this in the origin country but such data are not available for all origin countries.
Religion: To take into account the origin countries' religious backgrounds (which are related to values and norms about marriage and divorce), dummy variables were created to indicate whether or not at least 40% of the countries' inhabitants are Latin Christian, Eastern Orthodox (Ethiopia, Macedonia, Greece, Romania, the USSR), Hinduism (India), or Islamic (Afghanistan, Albania, Bangladesh, Iran, Iraq, Lebanon, Maghreb, Pakistan, Somalia, Turkey). Countries in which no religious denomination has the support of at least 40% of the population are classified as non-religious (China, the Czech Republic, Estonia, Korea, Vietnam). Similarly, if two religious groups are represented by at least 40% of the population, the country is regarded as mixed (e.g., Bosnia and Herzegovina, Suriname). Due to our combination of countries with diverse religions (e.g., the former Yugoslavia and USSR), these religious macro variables become variables at the individual level.
Native math score of the country of destination: We use one other macro indicator for the destination countries: the *native math score.* This indicator is the average PISA score of the total native male or female population. This variable serves to approximate the quality of the destination country's educational system.

3.7. *Methods*

Using individual-level techniques on data with multiple levels will underestimate the standard errors of the macro level effects and parameters can then misleadingly appear to be significant (Raudenbush & Bryk, 2002; Snijders & Bosker, 1999). Cross-classified multilevel regression analyses are appropriate for analyzing non-hierarchically structured data. We used iterative generalized least squares estimation techniques from the statistical analysis program MLwiN to estimate the models. Although originally designed to fit hierarchical models, the iterative generalized least squares approach can also be adapted to non-hierarchical data structures. The two highest levels (origin and destination) are non-hierarchical, the lower hierarchical level is the pupil-level. At the lowest level we include the standard error of the average of the five plausible values on math test as an error term of the dependent variable. The variance at this lowest level is fixed at 1.00. This procedure results in a measurement model of the next level of pupils (see Hox, 2002), which results into a more reliable estimation of the true score of the dependent variable.

4. Findings

4.1. The risk to be a migrant single-mother of a 15-year-old pupil

Table 1 shows the percentages single-mother families of a 15-year-old pupil by origin region. Although the numbers of migrant mothers are small for some regions (Caribbean; North America), the numbers of migrant mothers from all other regions are large enough to be reliable. The same holds for the percentages single mothers of a 15-year-old pupil by destination country (Table 2). Although the numbers of migrant mothers are small for one destination country (Scotland), the numbers of migrant mothers in all other destination countries are large enough to be reliable. The percentages make clear that the variations between destinations, between origins, and between generations are large enough to justify a cross-classified multilevel analysis of the risk to be a migrant single-mother of a 15-year-old pupil.

Table 6 shows the cross-classified multilevel logistic regression with the risk for migrant pupils to be living in a single-mother rather than two-parent family. The empty model

1 shows that there is only significant variance at the origin level, but not at the destination level. Because the destination countries included cover a smaller region of the world, this is plausible. We add the individual characteristics of the migrant mother and child to the equation in model 2. The results support our first hypothesis which argued that migrant mothers who are more integrated in the culture of their destination country – as indicated here by a partner who was born in the destination country and speaking the destination language at home with children – have a higher risk to be a single-mother. There also is a negative effect of socio-economic status of the mother on the risk to be a single-mother; similar negative status effects were found among natives in countries with high divorce- and separation rates (Härkönen and Dronkers 2006; Kalmijn 2013).

In models 3 to 5 we add the prevalence of single-mother families in the origin region and the destination countries separately or combined. The results support the second hypothesis, which is as one would expect: The more prevalent single-mother families from the origin region, the higher the risk of female migrants to be a single-mother. More interesting, however, is that we find no context effect of the destination: The prevalence of single-mother families in the destination country does not increase the risk of female migrants to be a single-mother. So far, these results suggest that group differences in family structure have more to do with where the groups originated than with the country in which they are living. Note, however, that the religious composition of the origin country does not affect the risk of being a single mother.

4.2. The math score of migrants' children from single mother families.

Tables 3 and 4 show the math scores of migrant pupils from mother-father families and single-mother families (by origin region in Table 3, by destination country in Table 4). There is sufficient variation in these math scores, but pupils from single-mother families do not always score substantially lower than the analogous pupils from two-parent families. In fact, these tables show that there are considerable differences in the 'single-parenthood math gap' across origins and, to a lesser extent, across destinations.

In Table 6, we examine the effect of living in a single-mother family on the math score of a 15-year-old migrant pupil. Without any control for other independent variables, living in a single-mother family decreases the math score with 6.8 points. Controlling for the individual characteristics of mother and child in model 2 makes the effect of living in a single-mother family smaller (4.3). Hence, 37% of the gap is due to underlying background differences between the two types of families. An important component of this explanation lies in the finding that migrant single-mothers have a lower socio-economic status than migrant mothers in two-parent families (Table 5). The remaining gap, however, is still statistically significant. This result supports our fourth hypothesis. The single-motherhood disadvantage for migrants is not trivial in magnitude. The difference is 4.3 points on the math scale, and this is about two-thirds of the difference in math score between the migrant generations (b = 6.5). This result does not change if we add the average math score of the natives in the destination countries (model 3).

In model 4 and 5 we add the percentages single-mother families in the origin regions or the percentages native single-mother families in the destination countries and their interactions with single-motherhood at the individual level. These cross-level interactions are not significant and thus we have to reject our fifth and sixth hypothesis. The effect of single motherhood does not depend on the prevalence of such families in either the origin or the destination context. We also find no main effect of the prevalence of single motherhood in the origin country. We do, however, find a main effect of the destination context. Being a migrant pupil in countries with high percentages of (native) single-mother families seems to be

positive for the math score. One speculation about this unexpected outcome lies in gender roles. Gender equality seems to be important characteristic of modern societies and positively affects the educational performance of male and female migrant pupils (see Dronkers & Kornder, 2013). Higher percentages of single-mother families are positively related with higher levels of gender equality and thus might indirectly indicate the gender equality of the destination countries. Note that the average math score of natives in the destination is taken into account. This adjust for country differences in the overall math score.

The control variables have effects that are in the expected direction and that have been observed in other studies as well. Math scores are higher on average for second generation migrants, for migrants who have one native born parent, for migrants where the destination language is spoken at home, and for migrants living in cities. The socio-economic status of the mother also has a strong positive effect on her child's math score; the standardized coefficient is beta = .24 (calculated as b x sd_x / sd_y).

5. Summary and discussion

In this paper we address both the occurrence of single-motherhood among migrant mothers in OECD countries and the effect of living in a single-mother family on the math scores of 15-year old migrant pupils in OECD countries. We use the PISA 2009 data with an international comparative perspective, which contains 14,794 migrant pupils/mothers coming from 54 origin countries and living in 15 OECD destination countries.

We find that migrant mothers who are more integrated in the culture of the destination country (as indicated by a partner who was born in the destination country (a mixed marriage) and speaking the destination language at home with the children) have a higher risk to be a single-mother at the moment her child is 15 years old. This result supports our first hypothesis. This confirmation cannot be explained by mothers' socio-economic status. Even though a higher socio-economic status is usually seen as evidence of more integration, socio-economic status itself actually decreases the odds to become a single-mother. The later result is in line with the idea of Goode (1963, 1993) that in modern societies, partners with less socio-economic resources would be less able to overcome the unavoidable crises in their relationship due to this lack of resources and thus have a higher chance to become a single-parent. The prevalence of single-mother families in the destination countries is not significant related with the odds of a migrant mother to become a single-mother. This contradicts our fourth hypothesis and suggests that migrants as a group do not adapt – at least not quickly – to the destination patterns of demographic behavior. The adaptation is more individual in nature, as indicated by the effects of language customs and mixed marriage.

We find that that the single-motherhood disadvantage for migrants is 4.3 points on the math scale, which is about two-thirds of the difference in math score between the generations (and hence, not trivial). This result supports our fourth hypothesis that single motherhood has a negative effect on the educational performance of her children. The difference of 4.3 points is smaller than what generally is found for native pupils with the PISA data. Dronkers and De Lange (2012), for example, find that the differences for native pupils are around twice as large, although the models used are obviously not fully comparable. This is suggestive for our idea that for migrants, single parenthood also has 'positive' associations, in the sense of being more integrated. Of course, other designs, using both natives and migrants, must be used to confirm this speculation.

The context of the family-form in the origin and the destination countries seems irrelevant for the educational performance gap between children of migrant single-mother families and migrant two-parent families. This contradict our fifth and sixth hypotheses which argued that more institutionalization would lead to a smaller penalty of growing up in a

single-parent family. Dronkers and De Lange (2012) suggested that the smaller difference in educational performance between the migrants' pupils in single-mother family and in two-parent families might be caused by the origin context of the migrants. Given the rejection of the fifth and sixth hypotheses, the origin context is not a good explanation. Another explanation of this smaller difference might be that being a migrant single-mother in OECD countries is an indication of a higher level of integration by the mother or positive selectivity into single-motherhood, which is not measured by mothers' socio-economic status, the context of origin and destination or the migration history.

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Figure 1. United Nations geographical subregions

Table 1: Percentages of single-mother families of 15-year-old pupils by origin region (migrants)

Origin region	Generation (N in parentheses)	% single-mother family
North America	First generation migrant (49)	1.2
	Second generation migrant (84)	22.6
Caribbean	First generation migrant (5)	8.0
	Second generation migrant (28)	17.9
Northern Europe	First generation migrant (416)	8.2
	Second generation migrant (1579)	13.0
Western Europe	First generation migrant (775)	15.1
	Second generation migrant (1688)	15.7
Eastern Europe	First generation migrant (281)	15.3
	Second generation migrant (328)	11.6
Southern Europe	First generation migrant (1166)	7.9
	Second generation migrant (3209)	12.4
North Africa	First generation migrant (39)	7.7
	Second generation migrant (386)	14.8
Sub-Saharan Africa	First generation migrant (346)	16.5
	Second generation migrant (828)	18.5
West Asia	First generation migrant (229)	8.7
	Second generation migrant (1333)	8.8
South Asia	First generation migrant (125)	4.8
	Second generation migrant (172)	8.7
East Asia	First generation migrant (272)	19.1
	Second generation migrant (236)	11.9
Southeast Asia	First generation migrant (64)	6.3
	Second generation migrant (101)	1.9
Oceania	First generation migrant (247)	15.8
	Second generation migrant (579)	14.9
Total	First generation migrant (4014)	11.9
	Second generation migrant (10551)	13.2

Source: PISA 2009 own computations

Table 2: Percentages of single-mother families of 15-year-old pupils by destination country

Destination	Nativity and generation (N in parentheses)	% single-mother family
Australia	Native (9036)	12.5
	First generation migrant (764)	1.7
	Second generation migrant (1896)	12.5
Austria	Native (4991)	13.0
	First generation migrant (192)	15.1
	Second generation migrant (719)	11.7
Belgium	Native (5627)	1.6
	First generation migrant (423)	11.8
	Second generation migrant (885)	15.5
Denmark	Native (4182)	12.3
	First generation migrant (171)	11.1
	Second generation migrant (661)	1.3
Finland	Native (5051)	14.2
	First generation migrant (44)	25.0
	Second generation migrant (140)	17.9
Germany	Native (3289)	13.2
	First generation migrant (201)	1.5
	Second generation migrant (520)	8.1
Greece	Native (4067)	6.7
	First generation migrant (213)	1.8
	Second generation migrant (133)	6.8
Liechtenstein	Native (96)	14.6
	First generation migrant (68)	16.2
	Second generation migrant (126)	15.1
Luxembourg	Native (2018)	11.3
	First generation migrant (562)	9.8
	Second generation migrant (1350)	12.4
Netherlands	Native (3671)	9.1
	First generation migrant (87)	26.4
	Second generation migrant (467)	18.4
New Zealand	Native (2881)	17.8
	First generation migrant (457)	13.8
	Second generation migrant (531)	15.4
Norway	Native (3922)	9.2
	First generation migrant (21)	19.1
	Second generation migrant (108)	11.1
Portugal	Native (4559)	1.1
	First generation migrant (133)	2.3
	Second generation migrant (585)	16.9
Scotland	Native (2108)	14.9
	First generation migrant (18)	16.7
	Second generation migrant (46)	23.9
Switzerland	Native (7132)	12.8
	First generation migrant (738)	9.9
	Second generation migrant (2535)	14.1
Total	Native (62630)	11.9
	First generation migrant (4092)	12.1
	Second generation migrant (10702)	13.4

Source: PISA 2009 own computations.

Table 3: Math score of pupils in single-mother families and mother-father families by origin region

Origin region	Generation	Math score Mother-father family	Math score Single-mother family
North America	First generation migrant	549	499
	Second generation migrant	547	509
Caribbean	First generation migrant	501	500
	Second generation migrant	499	459
Northern Europe	First generation migrant	546	568
	Second generation migrant	528	530
Western Europe	First generation migrant	532	524
	Second generation migrant	536	520
Eastern Europe	First generation migrant	477	495
	Second generation migrant	500	490
Southern Europe	First generation migrant	441	448
	Second generation migrant	479	480
North Africa	First generation migrant	466	449
	Second generation migrant	469	463
Sub-Saharan Africa	First generation migrant	496	444
	Second generation migrant	506	484
West Asia	First generation migrant	426	443
	Second generation migrant	441	441
South Asia	First generation migrant	488	481
	Second generation migrant	493	486
East Asia	First generation migrant	563	578
	Second generation migrant	586	571
Southeast Asia	First generation migrant	509	490
	Second generation migrant	517	476
Oceania	First generation migrant	484	492
	Second generation migrant	513	482

Source: PISA 2009 own computation
Note: red: Mother-father > Single-mother; blue Mother-father < Single-mother.

Table 4: Math score of pupils in single-mother families and mother-father families by destination country

Destination	Generation	Math score Mother-father family	Math score Single-parent family
Australia	First generation migrant	528	521
	Second generation migrant	533	521
Austria	First generation migrant	457	484
	Second generation migrant	463	479
Belgium	First generation migrant	493	498
	Second generation migrant	494	497
Denmark	First generation migrant	405	439
	Second generation migrant	428	427
Finland	First generation migrant	506	546
	Second generation migrant	528	500
Germany	First generation migrant	476	473
	Second generation migrant	479	488
Greece	First generation migrant	416	440
	Second generation migrant	454	458
Liechtenstein	First generation migrant	549	505
	Second generation migrant	544	535
Luxembourg	First generation migrant	472	464
	Second generation migrant	473	453
Netherlands	First generation migrant	508	473
	Second generation migrant	501	500
New Zealand	First generation migrant	546	561
	Second generation migrant	534	517
Norway	First generation migrant	482	551
	Second generation migrant	496	497
Portugal	First generation migrant	461	466
	Second generation migrant	505	496
Scotland	First generation migrant	541	585
	Second generation migrant	531	507
Switzerland	First generation migrant	472	490
	Second generation migrant	510	504

Source: PISA 2009 own computation
Note: red: Mother-father > Single-mother; blue Mother-father < Single-mother.

Table 5: Descriptive statistics. total. two-parent families and single-mother families

Total N=14794	Minimum	Maximum	Mean	Std. Deviation
Child born in destination	.00	1.00	.72	.45
Math score	168	870	496	94
Destination language spoken at home	.00	1.00	.59	.49
Female	.00	1.00	.50	.50
City	.00	1.00	.20	.40
Big City	.00	1.00	.15	.36
Mother Only	.00	1.00	.13	.34
Average native math score destination	477	551	527	19
Percentage single-mothers destination country	.18	.07	.12	.02
Percentage single-mothers origin region	.27	.07	.13	.03
Socio-economic status mother	-3.40	3.24	.00	1.00
Latin Christian origin	.00	1.00	.64	.48
Eastern Christian origin	.00	1.00	.10	.30
Non religion origin	.00	1.00	.04	.19
Hinduism origin	.00	1.00	.01	.09
Mixed religion origin	.00	1.00	.04	.20
Islam origin	.00	1.00	.17	.38
One parent born inside destination	.00	1.00	.39	.49

Two-parents families N=12865	Minimum	Maximum	Mean	Std. Deviation
Child born in destination	.00	1.00	.72	.45
Math score	168	870	496	94
Destination language spoken at home	.00	1.00	.57	.49
Female	.00	1.00	.50	.50
City	.00	1.00	.19	.39
Big City	.00	1.00	.15	.36
Average native math score destination	477	551	527	19
Percentage single-mothers destination country	.18	.07	.12	.02
Percentage single-mothers origin region	.27	.07	.13	.03
Socio-economic status mother	-2.86	3.24	.01	1.01
Latin Christian origin	.00	1.00	.63	.48
Eastern Christian origin	.00	1.00	.11	.31
Non religion origin	.00	1.00	.04	.18
Hinduism origin	.00	1.00	.01	.10
Mixed religion origin	.00	1.00	.04	.20
Islam origin	.00	1.00	.18	.38
One parent born inside destination	.00	1.00	.38	.48

Single-mother N=1929	Minimum	Maximum	Mean	Std. Deviation
Child born in destination	.00	1.00	.74	.44
Math score	229	759	495	91
Destination language spoken at home	.00	1.00	.68	.47
Female	.00	1.00	.53	.50
City	.00	1.00	.22	.42
Big City	.00	1.00	.14	.35
Average native math score destination	478	551	527	20
Percentage single-mothers destination country	.18	.07	.12	.02
Percentage single-mothers origin region	.27	.07	.14	.03
Socio-economic status mother	-3.40	2.99	-.06	.93
Latin Christian origin	.00	1.00	.71	.46
Eastern Christian origin	.00	1.00	.07	.26
Non religion origin	.00	1.00	.04	.20
Hinduism origin	.00	1.00	.00	.05
Mixed religion origin	.00	1.00	.04	.21
Islam origin	.00	1.00	.13	.34
One parent born inside destination	.00	1.00	.47	.50

Source: PISA 2009 own computation

Table 6: Multilevel logistic regression of living in a single-mother family of 15-year old migrant pupils in OECD countries (N=14794).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	-1.77** (.08)	-2.09** (.09)	-2.18** (.03)	-2.09** (.09)	-2.19** (.08)	-2.24** (.10)
Second generation (vs. first generation)		-.02 (.06)	-.01 (.06)	-.02 (.06)	-.01 (.06)	-.01 (.06)
One parent born inside destination		.21** (.06)	.21** (.06)	.21** (.06)	.21** (.06)	.22** (.06)
Destination language spoken at home (vs. origin language spoken)		.41** (.06)	.39** (.06)	.41** (.06)	.39** (.06)	.40** (.06)
Socio-economic status of mother		-.28** (.03)	-.28** (.03)	-.28** (.03)	-.28** (.03)	-.28** (.03)
% Native single-mother families in destination countries (centered)				.70 (1.56)	1.75 (1.54)	1.23 (1.60)
% Single-mother families in origin region (centered)			7.46** (1.51)		7.66** (1.49)	7.41** (1.63)
Latin Christian origin (ref.)						
Eastern Christian origin						.17 (.21)
No religion origin						.39 (.26)
Hinduism origin						-.58 (.58)
Mixed origin						-.03 (.23)
Islam origin						.01 (.18)
Variance origin level	.20** (.06)	.24** (.06)	.12** (.04)	.24** (.06)	.12** (.04)	.10** (.03)
Variance destination level	.02 (.02)	.00 (.01)	.01 (.01)	.00 (.00)	.00 (.01)	.00 (.01)

Source: PISA 2009 own computations.
* $p < .05$; ** $p < .01$.

Table 7: Multilevel linear regression of math scores of 15-year old migrant pupils in OECD countries (N=14794).

	Model 1	Model 1	Model 1	Model 1	Model 1	Model 1
Constant	498.2** (5.8)	479.2** (4.5)	48.0** (4.5)	479.8** (4.5)	479.7** (4.3)	479.3** (104.1)
Single-mother family (vs. mother-father family)	-6.8** (2.0)	-4.3** (2.0)	-4.4** (2.0)	-4.1** (2.0)	-4.3** (2.0)	-4.4** (2.0)
Female		-15.3** (1.3)	-15.2** (1.3)	-15.9** (1.3)	-15.2** (1.3)	-15.2** (1.3)
Second generation (vs. first generation)		6.5** (1.7)	6.3** (1.7)	6.3** (1.7)	6.3** (1.7)	6.3** (1.7)
One parent born inside destination		8.3** (1.7)	8.3** (1.7)	8.2** (1.7)	8.3** (1.7)	8.3** (1.7)
Destination language in home (vs. origin language)		26.1** (1.8)	26.1** (1.8)	26.0** (1.8)	26.2** (1.8)	26.1** (1.8)
Socio-economic status mother		23.2** (.8)	23.3** (.8)	23.2** (.8)	23.3** (.8)	23.3** (.8)
City (vs. village)		3.8* (1.9)	3.9** (1.9)	3.9** (1.9)	3.9** (1.9)	3.9** (1.8)
Big city (vs. village)		4.9** (2.2)	5.1** (2.2)	5.1** (2.2)	5.0** (2.2)	5.0** (2.2)
Average native math score (centered)			.70** (.1)	.7** (.1)	.6** (.1)	.6** (.1)
% Single-mother in origin regions (centered)				59.3 (96.2)		79.3 (91.3)
* interaction with single-mother individual level				-41.5 (57.8)		
% Native single-mother in destination countries (centered)					292.5** (105.6)	291.3** (104.8)
* interaction with single-mother individual level					-78.6 (92.5)	
Variance origin level	1254 (356)	515 (191)	621 (179)	604 (175)	551 (164)	519 (158)
Variance destination level	610 (153)	489 (123)	259 (75)	259 (75)	254 (73)	256 (74)
Variance at pupil level	6574 (92)	5906 (84)	5909 (84)	5909 (84)	5906 (84)	5907 (84)
Variance at test level	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Log likelihood	173034	171651	171632	171631	171624	171624

Source: PISA 2009 own computations. * p < .05; ** p < .01.