



# Non-intact families and diverging educational destinies: A decomposition analysis for Germany, Italy, the United Kingdom and the United States



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## ARTICLE INFO

### Article history:

Received 8 October 2015

Received in revised form 8 July 2016

Accepted 12 September 2016

Available online 15 September 2016

## ABSTRACT

We examine whether the presence of non-intact families in society is related to increased inequality in educational attainment according to social background, as suggested by the 'diverging destinies' thesis. We analyze four countries, Germany, Italy, the United Kingdom, and the United States, that differ in the prevalence of non-intact families and in the strength of the negative association between growing up in a non-intact family and children's educational attainment. We use a Blinder-Oaxaca decomposition approach to calculate a 'counterfactual' estimate of differences in educational attainment between socioeconomically advantaged and disadvantaged children in the hypothetical absence of non-intact families. Contrary to the diverging destinies thesis, we find little differences between actual and 'counterfactual' levels of inequality in educational attainment in all four countries. Whereas growing-up in a non-intact family affects the individual chances of educational attainment, the overall contribution of non-intact families to aggregate levels of social background inequality appears minimal.

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## 1. Introduction

Various authors have argued that class divergence in family structure is an important engine of growing socio-economic inequality in the United States and other Western societies (Cherlin, 2014; Esping-Andersen, 2007; McLanahan and Percheski, 2008; Putnam, 2016; Wax, 2007).<sup>1</sup> In social demographic studies, this thesis is known as 'diverging destinies'. The core argument of the 'diverging destinies' thesis states that trends associated with the second demographic transition, and in particular the increase in non-intact families,<sup>2</sup> are leading to greater differences in child outcomes between children from socioeconomically advantaged and disadvantaged families (Amato et al., 2015a; Ellwood and Jencks, 2004; McLanahan, 2004; McLanahan and Percheski, 2008; Western et al., 2008). This idea is based on two widely documented observations. Firstly,

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<sup>1</sup> Authors forcefully disagree however on the main drivers of class divergence in family structure. Some focus on the worsening economic conditions of the working class (Cherlin, 2014; Putnam, 2016), while others resort to non-economic and cultural explanations (Murray, 2012; Wax, 2014).

<sup>2</sup> We define families as non-intact if children did not live with both biological parents at the end of childhood due to parental separation or single motherhood at birth. We exclude parental death from our definition of non-intact families because previous studies have not considered parental death as one of the drivers of 'diverging destinies' (Amato et al., 2015a; McLanahan, 2004). In addition, other studies have shown that parental death has different consequences on children's outcomes when compared to parental separation and single motherhood at birth (Diekmann and Engelhardt, 1999).

children who grow up in a non-intact family have on average lower educational and occupational attainment than children growing up in intact families (Amato, 2010; Kim, 2011; McLanahan and Percheski, 2008; Musick and Meier, 2010; Sun and Li, 2009). Secondly, growing up without both parents present in the household is more common for children with less educated parents than for children with highly educated parents in many countries today. (Ellwood and Jencks, 2004; Härkönen and Dronkers, 2006; McLanahan and Percheski, 2008).

When considering these two sets of findings together, one would indeed conclude that the presence of non-intact families in society affects the outcomes of children who are already socioeconomically disadvantaged more than the outcomes of advantaged children. In other words, the presence of non-intact families contributes to their 'diverging destinies' (McLanahan, 2004). This body of research, however, has so far ignored an important third factor that affects the influence of non-intact families on socioeconomic differences in child outcomes. Several studies have shown that growing up in a non-intact family might entail more negative consequences for the educational attainment of children with highly educated mothers (Bernardi and Radl, 2014; Fischer, 2007; Martin, 2012; McLanahan and Sandefur, 1994), or children who come from higher socioeconomic backgrounds in general (Biblarz and Raferty, 1993, 1999) compared to children from more disadvantaged backgrounds. If the latter finding is true, the overall contribution of non-intact families to socioeconomic background differences in attainment is not straightforward. The influence of more negative consequences of growing up in a non-intact family for children from advantaged families might actually counterbalance the influence of the larger prevalence of non-intact families among children from disadvantaged families. To the best of our knowledge, an assessment of the combined contribution of these factors to differences in attainment between socioeconomically advantaged and disadvantaged families is still lacking.

We aim to fill this gap in the literature<sup>3</sup> by addressing the following research question: to what extent can socioeconomic differences in educational attainment be explained by the presence of non-intact families in society? Or to put it differently: does the presence of non-intact families indeed enlarge the overall differences in children's educational attainment between socioeconomic groups, as suggested by the 'diverging destinies' thesis?

In the empirical part of the article, we use a Blinder-Oaxaca decomposition approach to calculate a 'counterfactual' estimate of differences in educational attainment between children of lower and higher educated mothers in the hypothetical absence of non-intact families. In comparison to a simple mediation analysis, this decomposition approach allows us to break down the overall impact of non-intact families on group differences in attainment into different parts that correspond to the premises of the 'diverging destinies' thesis, as well as the overlooked premise of heterogeneity in the effects of growing up in a non-intact family.

We perform the decomposition analysis for four countries, Germany, Italy, the UK and the US. We have chosen these countries because they differ both in the prevalence of non-intact families and on a number of other institutional dimensions that might affect the association between growing up in a non-intact family and children's outcomes (OECD, 2011, 2013). In this respect, one should note that the 'diverging destinies' thesis describes general trends linked to the second demographic transition that are most pronounced in the US but also common to most Western countries. With our four country analysis we can therefore assess the argument that the presence of non-intact families indeed enlarges inequalities in the US and test its general validity in three different European countries.

### 1.1. *Non-intact families and inequality of opportunity*

The hypothesis that non-intact families exacerbate socioeconomic background inequality in children's resources and outcomes rests on two premises (Amato et al., 2015a; McLanahan, 2004; McLanahan and Percheski, 2008). First, growing up in a non-intact family is associated to worse educational outcomes for children. Second, today, growing up in a non-intact family is or is becoming a more common experience for children of less educated mothers compared to children of higher educated mothers. A large body of evidence confirms indeed that both premises are valid for most Western countries.<sup>4</sup> There is, however, a third premise that has been partly overlooked in the literature which becomes relevant once estimating the overall contribution of non-intact families to socioeconomic differences in child outcomes. This premise is that there is no heterogeneity in the consequences of growing up in a non-intact family (Amato, 2010).

Previous studies on the consequences of parental separation for children have uncovered patterns of heterogeneity according to parental characteristics, but have not connected it to the general literature on socioeconomic disparities in life chances for children. Some studies found that parental separation has more negative implications for the cognitive development and educational attainment of children from lower socioeconomic backgrounds (Albertini and Dronkers, 2009; Augustine, 2014; Cavanagh and Huston, 2006; Grätz, 2015; Mandemakers and Kalmijn, 2014), but most studies focusing on educational attainment have documented a larger penalty for children from higher socioeconomic backgrounds (Bernardi

<sup>3</sup> We recently encountered an unpublished paper by Goldberg (2014), who addresses a similar question for the US. We developed our paper independently of Goldberg's paper and have previously investigated the heterogeneity in the effect of union dissolution by social background and sketched the idea of the decomposition for the UK in (previous versions of) Bernardi and Boertien (2016).

<sup>4</sup> For evidence on the higher prevalence of non-intact families among less educated mothers see Ellwood and Jencks, 2004; Gauthier et al., 2015; Härkönen 2016; Härkönen and Dronkers 2006; Matysiak et al., 2013. For evidence of the penalty for educational attainment for children from non-intact families see Amato 2010; Bernardi and Radl 2014; Dronkers 1999; Furstenberg and Kiernan 2001; Jonsson and Gähler 1997; Kiernan 1997; Kim 2011; McLanahan and Sandefur 1994; McLanahan and Percheski 2008; Steele et al. 2009; Strohschein 2005.

and Radl, 2014; Biblarz and Raferty, 1993, 1999; Biblarz et al., 1997; Elliott and Richards, 1991; Jonsson and Gähler, 1997; Martin, 2012; McLanahan and Sandefur, 1994).<sup>5</sup> By ignoring the possibility of heterogeneity in the effects of family structure, authors might have rushed too quickly to the conclusion that non-intact families are an important factor increasing inequality of opportunity among children of differing social backgrounds (Amato et al., 2015a; Cherlin, 2014).

In sum: there exists plenty of evidence that growing-up in a non-intact family is negatively related to children's socioeconomic outcomes, and that it is a more common experience for children from socioeconomically disadvantaged families. However, the joint contribution of these phenomena to socioeconomic background differences in attainment has not yet been quantified. In addition, the literature on the implications of demographic changes for social inequality has so far not incorporated heterogeneity in the consequences of growing up in a non-intact family into the debate. In this article, we take steps to fill these gaps. We focus on educational attainment of children, and aim to quantify the contribution of both the prevalence and (heterogeneity in) consequences of non-intact families to the attainment gap between children from different socioeconomic backgrounds.

## 1.2. A four country analysis

The argument that family structure contributes to inequality of opportunity is generally claimed to hold across various Western countries (Härkönen and Dronkers, 2006; McLanahan, 2004; McLanahan and Percheski, 2008). But, cross-national variation exists in the association of family structure both with parental socioeconomic background and child outcomes (OECD, 2011, 2013). The extent to which family structure contributes to inequality of opportunity is therefore likely to differ across countries.

In order to investigate whether the contribution of non-intact families to inequality of opportunity is similar across a variety of social contexts, we analyze four countries, Germany, Italy, the UK and the US. These countries have been selected to cover different combinations of socioeconomic differences in the prevalence of non-intact families and the impact of non-intact families on children's educational attainment. The four countries differ also on a number of other institutional dimensions relevant to our analysis such as the level of stratification of the educational system or custody regulations in the case of parental separation. A systematic comparison aiming at explaining country differences in the aggregate effect of non-intact families on inequalities in child outcomes would be overly ambitious given the number of potentially important institutional factors to be considered. We rather conceive of our study as a replication of the same decomposition in very different social contexts.

In the UK and in the US, divorce rates have already reached high levels for several decades now, and the correlation between women's education and the risk of separation has reversed over time from positive to negative. In recent cohorts, less educated women run a higher risk of being a single mother or experiencing a union dissolution. In Germany, union dissolution rates have reached high levels only recently, while in Italy they are increasing but still at a relatively low level. In both of these countries the educational gradient regarding the risk of divorce has not fully reversed (Härkönen and Dronkers, 2006; Stevenson and Wolfers, 2007; Matysiak et al., 2013). In addition to these differences, the effects of growing up in a non-intact family also seem to differ across these countries. Data from the PISA studies has shown wide variation across the four countries in the relationship between living in a single-parent family and test scores (OECD, 2011, 2013), with generally bigger effects in the UK and the US, and smaller ones in Italy and Germany.

If one considers only the prevalence of non-intact families and its average effect on attainment, we would expect the largest contribution of non-intact families to socioeconomic background differences in attainment in the United States and the United Kingdom. In these two countries non-intact families are relatively common and more prevalent among socioeconomically disadvantaged families. Moreover, the penalty for children's attainment associated with growing up in a non-intact family is there among the largest.

Predictions are less straightforward, however, if one also takes into account the possible heterogeneity in the penalty associated with growing up in a non-intact family. A larger penalty in the probability of achieving a university degree associated with single parenthood has, for instance, been found in the US for children from advantaged backgrounds (Biblarz and Raferty, 1993; Martin, 2012), and the same pattern emerged on average across a sample of 14 countries (Bernardi and Radl, 2014). If the larger penalty in educational attainment for children of highly educated mothers dominates the effect of the higher prevalence of non-intact families among less educated mothers, non-intact families would unexpectedly contribute to a reduction in educational attainment inequality. This would then be the case especially in Germany and Italy, where non-intact families are not (yet) more common among less educated mothers.

## 2. Material and methods

For each of the four countries, we select one dataset that provides relatively comparable measures for our purposes, and we aim to cover birth cohorts from relatively similar time periods (See Table 1). We employ the National Longitudinal Survey of Youth 1997 (NLSY97) data for the US, the Pairfam data for Germany (Huinink et al., 2011; Nauck et al., 2013), the Multiscopo Aspects of Daily Life data (2003 and 2009 waves) for Italy and the British Cohort Study (BCS) 1970 for Great Britain (Centre for

<sup>5</sup> Other studies have also documented a larger parental separation penalty in educational attainment for ethnic minorities (Kalmijn, 2010).

**Table 1**  
Descriptive statistics of the samples of this study.

	Germany		Italy		UK		US	
Birth Cohorts	1981–1983		1971–1984		1970		1979–1985	
Age at Measurement of Education	27–30		27–38		30		26–33	
Survey year Measurement Education	2010/2011		2003/2009		2000		2011/2012	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Attainment of Tertiary Education	0.37		0.18		0.27		0.33	
Age at Measurement of Education	29.0	0.9	32.1	3.1	30.0	.	29.2	1.4
Years of Education	13.6	2.3	11.4	3.2	12.5	2.4	13.0	2.3
Mother ISCED 1-2	0.14		0.78		0.54		0.22	
Mother ISCED 3-4	0.66		0.18		0.43		0.44	
Mother ISCED 5-6	0.20		0.04		0.03		0.34	
Family Intact at End Childhood	0.75		0.96		0.81		0.52	
Separation during Childhood	.		0.04		0.19		0.37	
Parents Never Lived Together	.		0.002		0.01		0.11	
Non-white (non-German)	0.16		.		0.03		0.39	
Male	0.47		0.49		0.48		0.51	
N	1885		9450		10 042		7230	

Longitudinal Studies; SN: 5558). For all analyses, we exclude cases where a parent passed away before the child reached adulthood (except for Italy where data constraints do not allow for it).

The NLSY97 followed a sample of adolescents aged 12–18 throughout their lives. The first wave took place in 1997. We select all respondents who were interviewed in round 15 of the survey (fielded in 2011–2012, around age 27–33) and provided information on educational attainment. We retrieve information on parental education and family structure from previous waves covering the period from when respondents were 12–18 years old onwards (these include retrospective information on family structure since birth).

The Pairfam data for Germany is a family panel that follows respondents from three birth cohorts and their families over time since 2008. We select all respondents from the 1981–1983 birth cohorts for Germany. Subsequently, we single out those that were interviewed in wave 3 of the survey (2010/11), which was the year in which information on parental family structure and characteristics was collected as well as information on educational attainment.

The Multiscopo data for Italy consists of two cross-sectional surveys held in 2003 and 2009 on representative samples of the Italian population. We merge both surveys and select respondents who were born in 1971–1984 and were at least 27 years of age at the time of the survey.

For Great Britain we use the British Cohort Study, a sample of children born in a particular week in April 1970 that has been followed from birth until adulthood. We select respondents still present in the survey at age 30 (year 2000) to collect information on the respondent's educational attainment. Parental characteristics and information on childhood family structure are retrieved from the survey rounds at age 5, 10, 16, 26 and 30 (including retrospective information on family structure). This selection procedure results in final sample sizes of 1885 for Germany, 9450 for Italy, 10 042 for the UK, and 7230 for the US.

We use sample weights to correct for attrition in the panel surveys for Germany and the US as well as for the sampling procedure in the case of the cross-sectional surveys in Italy.<sup>6</sup> Due to missing information on specific variables, 5.9% of cases in Germany, 4.1% in Italy, 6.9% in the UK, and 13.4% of cases in the US were lost. In a robustness check we have imputed missing values using STATA 13's *mi* commands and the results of our analyses did not change (results available upon request).

## 2.1. Variables

Our dependent variable is the respondent's educational attainment operationalized as a dummy variable, measuring whether the respondent attained tertiary education or not (International Standard Classification of Education (ISCED) categories 5–6; see Table 1).<sup>7</sup> As can be observed from the descriptive statistics in Table 1 the share of respondents attaining tertiary education differs across countries. University education might therefore not bring the same benefits and opportunities in later life in each country. We therefore also replicate the analysis using a continuous dependent variable that measures the years of education that correspond to each educational title.<sup>8</sup>

<sup>6</sup> Sample weights are not available for the British cohort study. Previous articles have used the same data and shown that biases due to selective attrition did not influence results to a large extent (Breen and Goldthorpe, 2001; Nathan, 1999).

<sup>7</sup> For Germany the variable indicated enrollment in tertiary education due to the relatively young age at measurement.

<sup>8</sup> In order to construct the variable years of education we used the ISCED 97 manual and took the lowest years normally required to attain a certain qualification (OECD, 1999).

Our key independent variable is the family structure in which the respondent grew up. This variable is operationalized as a dummy variable that distinguishes intact and non-intact families. For the UK, the US and Italy we consider that respondents grew up in a non-intact family if they experienced a parental separation before age 17–18 or never lived with their biological father (i.e. their mother was a single mother from the start). For these countries, we also provide descriptive statistics on the prevalence of parental separation and never having lived with the father. For Germany, due to data limitations, intact families only include respondents whose parents were still together at the time of the interview, i.e. when respondents were in their late 20s. In this way we are likely to inflate the number of non-intact families in Germany. To address concerns of comparability we also re-run the analysis for the UK and Italy using the same operationalization of family structure as used for Germany (available upon request; results were robust; data restrictions prevented this additional analysis for the US). As mentioned, respondents that experienced parental death during childhood are excluded from the analysis.

Socioeconomic background is measured firstly by a variable for mother's education and a variable for parental education in later models. For mother's education we create a categorical variable consisting of lower (ISCED 1-2; no more than lower secondary education), middle (ISCED 3-4; upper secondary education and further qualifications that are not tertiary), and higher education (ISCED 5-6; tertiary education; again using the ISCED97 scheme). For parental education we create a categorical variable with the same three levels but this time based on the highest level of education attained either by the father or the mother (using the same three categories). Our analysis is done using both versions of educational background. The former allows us to include children who never lived with their father in the analysis, while the latter allows us to look at the influence of paternal education when focusing only on non-intact families created through parental separation.

In the analysis we control for a set of variables that are not regarded as possible mediators for the effect of non-intact families on educational inequality: a dummy for gender of the child, age at measurement of educational attainment (in years and centered at the average), survey year (only for Italy; 0 = 2003; 1 = 2009), and a dummy for non-white ethnicity (in the US and the UK, non-German ethnicity in Germany).<sup>9</sup> Table 1 provides descriptive statistics for the variables we use in this study.

## 2.2. Method

We start our analysis by describing the components that determine the contribution of non-intact families to differences in educational attainment between children with lower and highly educated mothers. First, we show differences in the prevalence of non-intact families among children of higher and lower educated mothers. Then we study the association of having grown up in a non-intact family with children's educational attainment, and again show differences in the strength of these associations between children of lower and higher educated mothers. We use Linear Probability Models (LPM) and logit models when the dependent variable is the probability of attaining tertiary education and OLS regressions when the dependent variable is years of education.

Subsequently, we use the Blinder-Oaxaca method (Jann, 2008) to decompose socioeconomic background differences in attainment into several parts. On the one hand, we separately estimate the contribution of socioeconomic differences in the prevalence of non-intact families, as well as the contribution of socioeconomic differences in the strength of the effects of growing up in a non-intact family. On the other hand, we estimate the part that remains unexplained after accounting for the combined influence of these two components. We interpret this latter unexplained part of the association as the 'counterfactual' inequality in educational attainment by socioeconomic background in the hypothetical absence of non-intact families.

It is important to stress that our decomposition analysis is merely descriptive. We do not address the issue of whether growing up in a non-intact family has a causal effect on children's educational attainment and thus of whether, at the aggregate level, the presence of non-intact families contributes causally to social background inequality in educational attainment. Previous studies based on causal research designs have shown negative effects of non-intact families on children's educational attainment, especially in the US (McLanahan et al., 2013). At the same time, these studies have also documented that causal estimates tend to be smaller than raw associations. This means that our decomposition probably overestimates the causal contribution of non-intact families to inequality in educational attainment and that our findings should be interpreted as upper bound estimates. We discuss the possible influence of endogeneity on our results more in detail in the discussion.

To formalize,  $R$  represents the absolute difference in the expected probability of tertiary educational attainment  $E(Y)$  of individuals in Group  $H$  and Group  $L$  (i.e. children with highly and less educated mothers):

$$R = E(Y_H) - E(Y_L) \quad (1)$$

The question is how much of  $R$  can be explained by variable  $X$ , which distinguishes intact and non-intact families. For this purpose  $R$  can also be expressed as (Jann, 2008):

<sup>9</sup> In additional analysis, we also looked at the possible influence of two control variables for which no comparable measures were available for all countries: number of siblings (Germany; Italy; US)/co-resident children in the household as a child (UK), and whether the mother was foreign born (UK; US). Results for each country were robust to the inclusion of these variables. Since our main goal is to quantify the contribution of non-intact families to socioeconomic background differences in educational attainment, we have not included any possible mediators of the effect of growing up in a non-intact family on educational attainment in the analysis.

**Table 2**

The prevalence of intact and non-intact families by maternal education.

	Mother ISCED 1-2	Mother ISCED 3-4	Mother ISCED 5-6	Total
% Never Lived with the Biological Father				
Germany	.	.	.	.
Italy	0.1	0.2	0.3	0.2
United Kingdom	1.3	0.8	0.7	1.1
United States	14.9	9.3	6.7	9.3
% Experienced Parental Separation before Age 18				
Germany	.	.	.	.
Italy	2.7	5.7	5.4	3.2
United Kingdom	19.7	17.1	14.6	18.5
United States	42.7	36.6	29.4	35.0
% Families Intact at Age 18*				
Germany	77.1	73.0	77.8	74.7
Italy	97.3	94.3	94.6	96.6
United Kingdom	78.9	82.0	84.7	80.4
United States	42.4	54.1	63.7	55.7

Note. \* At age 27–29 for Germany.

$$R = (\beta_{0H} - \beta_{0L}) + \{E(X_H) - E(X_L)\} \beta_{1L} + E(X_L)(\beta_{1H} - \beta_{1L}) + \{E(X_H) - E(X_L)\} (\beta_{1H} - \beta_{1L}) \quad (2)$$

Here  $\{E(X_H) - E(X_L)\} \beta_{1L}$  represents the difference in educational attainment due to the distinct prevalence of non-intact family structures for Groups H and L. The term  $\{E(X_H) - E(X_L)\}$  then operationalizes the first premise of the ‘diverging destinies’ argument that non-intact families are more prevalent among low educated mothers. The term  $\beta_{1L}$  expresses the consequences of growing up in a non-intact family (for lower educated mothers) and operationalizes the second premise of the ‘diverging destinies’ thesis that growing up in a non-intact family entails negative implications for educational attainment. This component of the equation would indeed be sufficient to claim that non-intact families contribute to inequalities in educational attainment under the assumption that  $\beta_{1L}$  is negative and equal to  $\beta_{1H}$ . In other words, that growing up in a non-intact family entails the same negative consequences for children of low and highly educated mothers. If  $\beta_{1L} = \beta_{1H}$  all the other terms of the decomposition go to 0.

The core motivation of our study is however that the assumption  $\beta_{1L} = \beta_{1H}$  seems unwarranted, since some studies suggest that  $\beta_{1L} < \beta_{1H}$ , i.e. that the negative consequences of growing up in a non-intact family might be smaller for children from lower socio-economic backgrounds (Bernardi and Radl, 2014; Fischer, 2007; Martin, 2012; McLanahan and Sandefur, 1994). The possible challenge to the ‘diverging destinies’ thesis is thus expressed by the term  $E(X_L)(\beta_{1H} - \beta_{1L})$  and more precisely by the difference  $(\beta_{1H} - \beta_{1L})$ , i.e. the difference in the effects of growing up in a non-intact family for Groups H and L.

Finally the term  $\{E(X_H) - E(X_L)\} (\beta_{1H} - \beta_{1L})$  expresses an interaction effect between both the prevalence of non-intact families  $(E(X_H) - E(X_L))$  and possible heterogeneity in their effects  $(\beta_{1H} - \beta_{1L})$  and is hard to interpret directly (Jann, 2008). The term  $(\beta_{0H} - \beta_{0L})$  refers to the baseline difference between both groups, which cannot be accounted for by the parts described above. This unexplained group difference will give us a ‘counterfactual’ estimate of differences between groups in the absence of non-intact families (i.e. if  $E(X_H) = E(X_L) = 0$ ). Comparing the ‘counterfactual’ estimate with the actual difference gives us an estimate of the extent to which non-intact families relate to increased or decreased socioeconomic background differences in educational attainment. The estimates of the different coefficients in equation (2) are based on two LPM models run separately for respondents with highly educated and less educated mothers.

We also perform the decomposition using a non-linear extension of the Blinder-Oaxaca method proposed by Yun (2004). In this case, the coefficients in equation (2) are based on two logit models.<sup>10</sup> Finally, we replicate the analysis for years of education as the dependent variable, using a standard linear Blinder-Oaxaca decomposition. In this specification,  $E(Y)$  refers to the expected years of education and we estimate two OLS models for the children of highly and less educated mothers.

We present our results for the probability of tertiary education attainment and for the Oaxaca-decomposition based on LPM. The results for years of education as the dependent variable and for the non-linear decomposition based on logit models are discussed in the robustness check section.

### 3. Results

In Table 2 we show differences in the prevalence of never having lived with the biological father, parental separation and intact families at about age 18 according to maternal education. Due to data limitations for Germany, we there only present

<sup>10</sup> We have used STATA 13's *oaxaca* commands with the logit option to produce the Blinder-Oaxaca decomposition based on Yun (2004).

**Table 3**  
Linear probability models explaining attainment of tertiary education by country.

	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	Germany			Italy		
<i>Maternal Education (Ref. ISCED 1-2)</i>						
Mother ISCED 3-4	0.16** [0.08/0.24]	0.16** [0.07/0.25]	0.18** [0.08/0.29]	0.21** [0.16/0.25]	0.21** [0.16/0.26]	0.21** [0.16/0.26]
Mother ISCED 5-6	0.37** [0.27/0.47]	0.37** [0.26/0.48]	0.36** [0.24/0.49]	0.43** [0.32/0.53]	0.43** [0.32/0.53]	0.43** [0.32/0.54]
Non-intact Family (Ref. intact family)		-0.11** [-0.17/-0.05]	-0.05 [-0.23/0.12]		-0.04 [-0.12/0.03]	-0.01 [-0.09/0.06]
Non-intact * ISCED 3-4			-0.10 [-0.28/0.10]			-0.09 [-0.28/0.10]
Non-intact * ISCED 5-6			0.02 [-0.21/0.25]			-0.11 [-0.51/0.30]
Constant	0.22** [0.13/0.30]	0.25** [0.16/0.34]	0.24** [0.13/0.34]	0.16** [0.13/0.18]	0.16** [0.13/0.19]	0.16** [0.13/0.18]
N	1885	1885	1885	9450	9450	9450
	United Kingdom			United States		
<i>Maternal Education (Ref. ISCED 1-2)</i>						
Mother ISCED 3-4	0.23** [0.21/0.24]	0.22** [0.21/0.24]	0.24** [0.22/0.25]	0.14** [0.11/0.17]	0.12** [0.09/0.15]	0.13** [0.09/0.18]
Mother ISCED 5-6	0.58** [0.53/0.63]	0.58** [0.53/0.63]	0.58** [0.52/0.63]	0.39** [0.36/0.42]	0.36** [0.33/0.39]	0.41** [0.36/0.45]
Non-intact Family (Ref. intact family)		-0.10** [-0.12/-0.07]	-0.07** [-0.09/-0.04]		-0.19** [-0.21/-0.17]	-0.14** [-0.19/-0.10]
Non-intact * ISCED 3-4			-0.07** [-0.11/-0.03]			-0.01 [-0.07/0.04]
Non-intact * ISCED 5-6			0.02 [-0.12/0.16]			-0.11** [-0.17/-0.05]
Constant	0.16** [0.14/0.17]	0.18** [0.16/0.19]	0.17** [0.16/0.19]	0.27* [0.03/0.51]	0.43** [0.19/0.66]	0.39** [0.16/0.63]
N	10 042	10 042	10 042	7230	7230	7230

Note. Sample weights included in Germany, Italy and US. Controls included but not shown for ethnicity, age, gender and in Italy also for survey year. 95% confidence interval in square brackets. LPM models are estimated with robust standard errors. \*\*p < 0.01; \*p < 0.05.

the proportion of intact families of origin at about age 27. It can be noted that the prevalence of children who never lived with their biological father is extremely low in Italy, low in the UK, and only sizeable in the case of the United States.<sup>11</sup>

The proportion of respondents that grew up in an intact family is the lowest in the US where only about one respondent in two did so. The proportion is highest in Italy where it amounts to 97%. In Germany and the UK about 75–80% of the respondents grew up in intact families, but the figure for Germany is likely to be overestimated given the later age at which this information was collected (additional analysis indicated that for Italy and the UK the percentage of parents who were still together by the time of interview, around respondents' age 30, amounted up to 95.3% and 73.9% respectively).

The gradient of intact families is positive in the UK and the US with the highest prevalence of intact families for respondents with highly educated mothers, and negative in Italy where individuals with a highly educated mother are more likely to have grown up in a non-intact family. In Germany, children of women who achieved a middle level of education are most likely to have grown up in a non-intact family. This is in line with earlier findings regarding the educational gradients of divorce in different countries (Härkönen and Dronkers, 2006).

Table 3 presents the association between growing up in a non-intact family and the probability of attaining tertiary education, as well as differences in the strength of this association according to maternal education. Considering that it is only relatively common in the US for children to be born into a single mother family, we only present the analysis that compares intact and non-intact families (where non-intact families include both children who never lived with their biological father and children who experienced parental separation).<sup>12</sup> In all countries, growing up in a non-intact family is related to a generally lower probability of attaining tertiary education (Models 2). The penalty is substantial and ranges from about 10 percentage points in Germany and the UK to about 20 percentage points in the US. In Italy the penalty is smaller (4%) and also not precisely estimated.

The third model for each country shows the heterogeneity in the effects of growing up in a non-intact family according to maternal education. In line with some previous studies, we also find that having grown up in a non-intact family entails the largest reduction in the probability of attaining a university degree for those with a highly educated mother in the US and Italy. However, in the latter country this effect is not statistically significant. In Germany and the UK, children with mothers who have intermediate levels of education (ISCED 3-4) show the largest 'penalties' associated with growing up in a non-intact family. It should be pointed out that in the UK only 2.8% of children in the birth cohort under study have a mother with tertiary

<sup>11</sup> In our analytical sample for the UK we underestimate the prevalence of children never living with their father due to attrition. Based on information provided in the first wave of the BCS, at age 0 the prevalence of single motherhood was about 3%. This estimate is consistent with the figures on out-of-wedlock births by Kiernan (2004), after accounting for cohabiting mothers. If selective attrition within the group of children never living with their father takes place we are, then, likely to underestimate the negative association between never living with the father and children's educational attainment.

<sup>12</sup> For the US we also performed an analysis distinguishing between different types of non-intact families and we found that the association with educational attainment (as well as its heterogeneity) is similar for parental divorce and single motherhood (results available upon request).

Figure 1. Germany

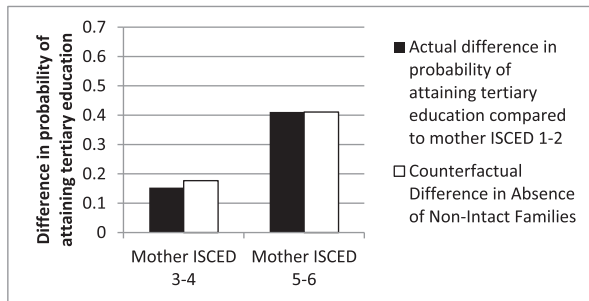


Figure 2. Italy

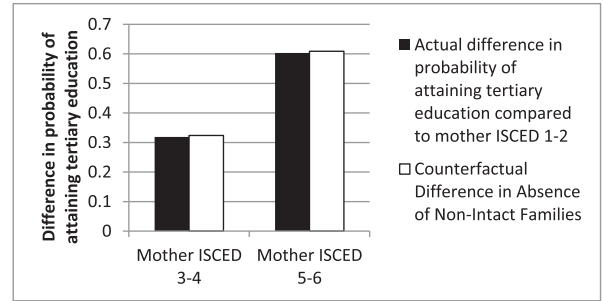


Figure 3. UK

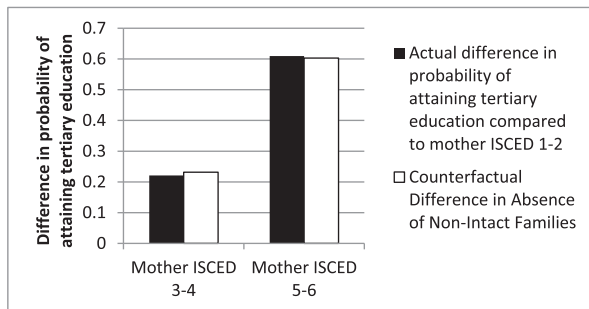
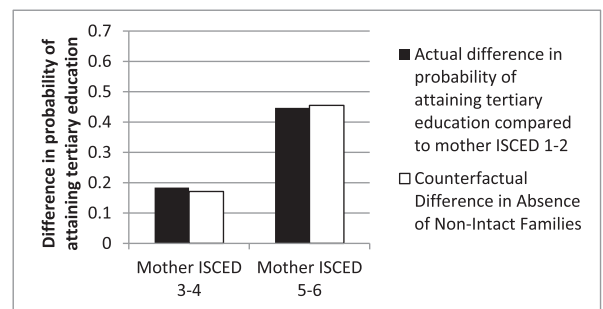


Figure 4. US



Note. The counterfactual difference is based on the part unexplained by Blinder-Oaxaca decomposition once non-intact families and its effects according to parental education are accounted for. Adjusted for gender, age (centered on average), ethnicity and survey year (in Italy).

Fig. 1. (1–4) Actual and counterfactual differences in the probability of attaining tertiary education compared to children of less educated mothers (ISCED 1-2).

education (ISCED 5-6; See Table 1). Therefore the general pattern seems similar to that of the US, with the children of the least educated mothers having the smallest ‘penalties’.

Finally, we put the previous steps of the analysis together and estimate the extent to which non-intact families contribute to the overall differences in educational attainment between children of lower and higher education mothers. We decompose the observed differences using the Oaxaca-Blinder decomposition described in the Method section. Table 2 describes differences in the prevalence of non-intact families according to maternal education and Table 3 indicates the differing consequences for attaining a university degree of having grown up in a non-intact family. Netting out these contributions allows us to calculate the ‘counterfactual’ differences in attainment for the hypothetical situation that all respondents would have grown up in intact families. Fig. 1 displays the results of the decomposition analysis of the differences in tertiary education attainment according to maternal education. The black bars refer to the actual observed difference in the probability of attaining tertiary education between respondents born to a lower, middle or highly educated mother. The white bars refer to the ‘counterfactual’ differences, i.e.  $(\beta_{0H} - \beta_{0L})$  of equation (2) discussed above.

The results indicate, overall, very little differences between actual and counterfactual estimates. The only small differences are found between the counterfactual and actual figures for children of middle educated mothers compared to those of less educated mothers in Germany and the US. In the hypothetical absence of non-intact families, differences in attainment are expected to be slightly higher in Germany (absolute difference in probabilities of 0.02), and slightly lower in the United States than the actual differences (absolute difference of  $-0.01$ ). The main story is however that, while growing up in a non-intact family affects the individual chances of educational attainment (as shown in Table 3 for US, UK and Germany), the overall contribution of non-intact families to aggregate social background differences in educational attainment appears null or minimal.

Why is this the case? The contributions of the different components to the decomposition analysis are displayed in Table A1 of the Online Appendix. In Italy, the prevalence and effects of growing up in a non-intact family are too low to have an impact on socioeconomic background inequality in attainment. In Germany there is no correlation between socioeconomic background and growing up in a non-intact family, and there is also no heterogeneity in the consequences of growing up in a non-intact family. In the United States we find a higher prevalence of non-intact families among less educated mothers, which would account for about 10 percent of observed differences in educational attainment between children of lower and higher educated mothers (See Table A1). But, the negative consequences of growing up in non-intact families for educational



attainment are larger for respondents with highly educated mothers. The heterogeneity in the consequences of growing up in an intact family compensates for its higher prevalence among less educated mothers. The overall contribution of non-intact families to socioeconomic background differences in educational attainment is therefore nihil. The United Kingdom shows a similar pattern to the US, albeit with both components of prevalence and heterogeneity in effects contributing relatively less.

### 3.1. Robustness checks

The results of several robustness checks are available in the Online Appendix. First, [Figs. A1 to A4](#) in the Online Appendix display the corresponding results of the Oaxaca–Blinder linear decomposition when looking at years of education instead of at the probability of tertiary education attainment. Also, when using this different specification of the dependent variable there is no amplifying effect of non-intact families on the observed inequality in attainment according to socioeconomic background in the four countries ([Figs. A1 to A4, Online Appendix](#)).

Second, results are robust when using the dummy for tertiary education attainment as the dependent variable but employing logit models instead of LPM and the non-linear Oaxaca–Blinder decomposition based on [Yun \(2004\)](#) (See [Figs. B1 to B4 in the Online Appendix](#)).

Third, when taking into account father's education in addition to mother's education, results do not change. For this analysis, children who never lived with their father are excluded. Parental education is defined as the highest level of education obtained by either the respondent's father or the mother (ISCED 1–2; ISCED 3–4; or ISCED 5–6). [Figs. C1–C4](#) in the Online Appendix summarize these sets of results. In another specification, the consequences of parental separation are investigated depending on educational homogamy/heterogamy of the parents (with categories: both ISCED 1–2, both ISCED 3–4, both ISCED 5–6, father more educated, and mother more educated). Our main conclusion was that non-intact families contribute little to observed differences in the probability of university attainment between children of lower and higher educated mothers. This conclusion holds also if one considers parental education defined as the highest level of education of the father and mother, as well as when considering homogeneous versus heterogamous types of parental education.

## 4. Discussion

In this article, we have analysed the possible role that non-intact families play in amplifying differences in educational attainment between children from disadvantaged and advantaged socioeconomic backgrounds. Growing up without both parents present in the household has become increasingly common in Western societies and is more common for children with less educated parents compared to higher educated parents in many countries today. The widely documented relationship between non-intact families and children's lower educational outcomes has raised concerns that family structure might have become a factor amplifying inequality of opportunity in several Western countries ([Ellwood and Jencks, 2004](#); [Härkönen and Dronkers, 2006](#); [McLanahan, 2004](#); [McLanahan and Percheski, 2008](#)). Family dynamics would then widen social background inequality leading to 'diverging destinies' for children born to less and highly educated mothers.

The results of this article show, however, that non-intact families do not exacerbate socioeconomic inequality in educational attainment for birth cohorts from the 1970s and 1980s in Germany, Italy, the UK and the US. This is not to suggest that demographic change is not important for children's educational outcomes. Quite to the contrary, the results of our study do confirm that on the individual level growing up in a non-intact family is related to a generally lower educational attainment. Furthermore, it is clear that many already disadvantaged children are put at an extra disadvantage by growing up in a non-intact family. However, when looking at inequality in educational attainment at the aggregate level, the attainment gap between children of low and highly educated mothers is not bigger due to the presence of non-intact families. These results are robust to different specifications of the dependent variable and to the decomposition method employed.

The result also held across four countries. Whereas growing up in a non-intact family is more common for children with less educated mothers in the UK and the US and is related to lower educational attainment, its consequences for educational attainment tend to be more negative for children from higher educational backgrounds. The differential prevalence of non-intact families and the differential consequences of growing up in a non-intact family according to maternal education cancel each other out, leading to an overall neutral role of non-intact families for the observed educational inequality in the UK and the US. In Italy the prevalence of non-intact families is still so low in the cohort under study that its contribution to the overall level of educational inequality can only be minimal, whereas in Germany no clear educational gradient in non-intact families can be observed.

The question arises to what extent the observation made in this study, of a relatively small role played by family structure in inequality of opportunity, is generalizable to other contexts. The four countries (Germany, Italy, the UK and the US) that we have included in our study differ considerably in both the overall prevalence of non-intact families and differences in its prevalence according to mother's education, as well as in a number of other institutional dimensions (for instance the level of stratification of their educational systems). The fact that we do not find in any of the countries that non-intact families are associated with an amplification of differences in educational attainment according to parental education makes us more confident that our core finding might apply also to other countries.

Nevertheless, an amplifying effect of non-intact families on intergenerational inequality, in line with the diverging destinies thesis, is likely to be observed if a high prevalence of non-intact families exists, a negative socioeconomic gradient in the prevalence of non-intact families is in place, and when there is no heterogeneity in the effects of growing up in a non-intact

family. These three conditions do not hold, at the same time, for the birth cohorts in the four countries considered in the article. Future research might, then, focus on other countries or birth cohorts where these conditions could be fulfilled. For instance, the latter condition (no heterogeneity) was found to hold in the case of the German birth cohorts under study, but the former two (high prevalence and negative educational gradient) were not. As divorce spreads and the educational gradient of divorce is expected to change from positive to negative (Härkönen and Dronkers, 2006), an amplifying effect on inequality might be found in more recent cohorts in Germany. This would be the case, however, only if the condition of no heterogeneity is maintained.

In this paper, we have not addressed issues of causality. If non-intact families are in general negatively selected in terms of unobserved characteristics that could affect child outcomes (e.g. family conflict, income), we are likely to have overestimated the negative effects of growing up in a non-intact family on child outcomes in our analysis. Hence, our conclusion that the overall contribution of non-intact families to the aggregate level of social background inequality is minimal would be supported even more. However, if selection into non-intact families also differs between socioeconomic groups, and children from socioeconomically advantaged families are more negatively selected within their subgroup, the heterogeneity in effects of growing up in a non-intact family could be an artefact of differential selection into family structures according to maternal education. Future studies could look further into these questions of causality. But, even if heterogeneity in effects were entirely absent, non-intact families seem to explain at most only about 10 percent of the differences in tertiary educational attainment between children of higher and lower educated mothers (which is the contribution of the differential prevalence of non-intact families according to maternal education in the United States).

Future studies could also investigate other children's outcomes. We only studied educational attainment, but it could be that family structure amplifies inequality of opportunity if one considers occupational attainment, income or wealth.

To conclude, our results question the concern that the increasing prevalence of non-intact families and its socioeconomic correlates lead to children's 'diverging destinies,' at least as far as their educational attainment is concerned. This might be seen as a surprising conclusion given that much existing research builds on the assumption that family structure is an important factor strengthening inequality of opportunity (Amato et al., 2015a; Cherlin, 2014; McLanahan and Percheski, 2008; Western et al., 2008). At the same time, a recent study on the United States did not find an association between the prevalence of single motherhood and the average levels of cognitive ability at the state-level either (Amato et al., 2015b). This was found despite a strong correlation between single parenthood and cognitive ability on the individual level. In combination with those findings, the results of this study suggest that whereas family structure is an important factor determining life chances at the individual level, its effects on aggregate outcomes at the societal level might be limited. Future research could look further into the validity of this claim.

## Acknowledgement

This work was supported by funding from the European Union's Seventh Framework Programme for the research project Families and Societies [FP7/2007–2013 grant agreement no. 320116]. We would like to thank Koen Geven for his assistance in the empirical analysis, as well as Paul Bauer, Juho Härkönen, Kristian Karlson, Katy Morris and Jan Skopek for comments on previous drafts of this article and useful suggestions on the decomposition approach.

## Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.ssrresearch.2016.09.004>.

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