Research Article

The long-term consequences of parental divorce for children's educational attainment

Fabrizio Bernardi

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Abstract

BACKGROUND
In this paper we study the long-term consequences of parental divorce in a comparative perspective. Special attention is paid to the heterogeneity of the consequences of divorce for children's educational attainment by parental education.

OBJECTIVE
The study attempts to establish whether the parental breakup penalty for tertiary education attainment varies by socioeconomic background, and whether it depends on the societal context.

METHODS
Data are drawn from the first wave of the Generations and Gender Survey, covering 14 countries. We estimate multi-level random-slope models for the completion of tertiary education.

RESULTS
The results show that parental divorce is negatively associated with children's tertiary education attainment. Across the 14 countries considered in this study, children of separated parents have a probability of achieving a university degree that is on average seven percentage points lower than that of children from intact families. The breakup penalty is stronger for children of highly educated parents, and is independent of the degree of diffusion of divorce. In countries with early selection into educational tracks, divorce appears to have more negative consequences for the children of poorly educated mothers.

CONCLUSIONS
For children in most countries, parental divorce is associated with a lower probability of attaining a university degree. The divorce penalty is larger for children with highly

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educated parents. This equalizing pattern is accentuated in countries with a comprehensive educational system.

COMMENTS
Future research on the heterogeneous consequences of parental divorce should address the issue of self-selection into divorce, which might lead to an overestimation of the negative effect of divorce on students with highly educated parents. It should also further investigate the micro mechanisms underlying the divorce penalty.

1. Introduction

Studies of the implications of parental separation for children's well-being have consistently shown that children of divorced parents fare worse on different measures of well-being than children living in intact families (Amato 2001; Amato and Keith 1991)[3]. While there is ample evidence that divorce has negative implications for children in the short term, there is less research examining the effect on long-term socioeconomic outcomes (Liu 2007). The consequences of divorce for educational attainment may be of special importance as having a poor education may lead to other socioeconomic and health-related disadvantages, and may therefore persistently undermine an individual's life chances (Ross and Wu 1995; Shavit and Müller 1998). Until relatively recently, research linking family structure and children's well-being has not paid much attention to the moderating effects of socioeconomic background (Demo and Acock 1988). Although newer studies of the consequences of divorce have increasingly controlled for social origin, questions of whether and how the long-term parental breakup penalty for children's educational achievement is related to their socioeconomic background are still largely unanswered (McLanahan, Tach, and Schneider 2013). As Amato (2010: 661) put it, "focusing on the average effects of divorce masks the substantial degree of variability that exists in people's adjustment." Finally, possibly due to a lack of adequate data, comparative analyses of cross-country differences in the effects of divorce on children are still rare (but see Dronkers and Härkönen 2008; Engelhardt, Trappe, and Dronkers 2002; Lange, Dronkers, and Wolbers 2009; Pryor and Rodgers 2001).

In this paper, we aim to fill these gaps in the literature by focusing on the penalty associated with a parental breakup for tertiary education achievement in a comparative perspective. We do so by bringing together insights from two strands of research: studies on the consequences of divorce and family forms on the one hand, and studies

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[3] In this article we use the terms divorce, parental separation, and parental breakup as synonyms.

on educational attainment and social mobility on the other. We examine whether the diffusion of divorce and the configuration of the educational system affect the impact of parental separation on children's educational achievement, and whether these two factors also moderate the relationship between social background and the breakup penalty.

More precisely, we address the two following research questions. First, to what extent do the long-term consequences of parental separation on tertiary education attainment vary by level of parental education? In other words, we ask whether the negative consequences of parental separation for educational attainment are the same for children from highly educated families and from poorly educated families. Second, does the parental breakup penalty for children's educational attainment vary depending on the type of educational system and the level of diffusion of divorce?

We use data from the first wave of the *Generations and Gender Survey* covering 14 countries. We analyze educational attainment in different country-cohort clusters, and employ multi-level models to investigate the effects of divorce on tertiary educational achievement across institutional contexts.

1.1 Theory and hypotheses

The divorce literature has focused on four mechanisms that might explain the observed negative association between parental breakup and children's educational attainment. (Amato 2000; Conger, Conger, and Martin 2010; Magnuson and Berger 2009):[4] a reduction in economic resources following a breakup (McKeever and Wolfinger 2001); changes in parental time and in parenting practices (Beck et al. 2010; Gershoff et al. 2007); an increase in parenting stress (Beck et al. 2010; Cooper et al. 2009; Nomaguchi and Brown 2010); and a child's emotional crisis linked to parental separation (Jekielek 1998). Our key interest in this paper is to investigate how parental education might moderate these different mechanisms.

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[4] A fifth important theme that is omitted here refers to self-selection into divorce (Kim 2011). Since divorce is not a random event but is more likely to occur in troubled families, the negative association between parental divorce and children's educational outcomes may be (co)determined by some unobserved characteristics that influence both divorce and children's educational outcomes. It has also been suggested that the well-being of children from high-conflict families might actually be higher following parental breakup than if their parents had stayed together (Amato, Loomis, and Booth 1995; Jekielek 1998). The present study is of a largely descriptive nature and does not offer any counter-factual estimates on the causal effects of divorce. The use of "causal" terminology ("effect," "consequences," etc.) is purely for stylistic purposes, as our data only allow for naïve estimates of the "divorce penalty." It is worth noting in this context that quasi-experimental approaches for analyzing divorce effects are not without problems either, as it becomes difficult to derive substantial meaning from causal estimates that have been purged of all types of selection effects (cf. Sigle-Rushton et al. 2014).

To the extent that the impact of divorce on children's educational attainment is due to a loss of economic resources, we can expect it to vary across different socioeconomic backgrounds. Since highly educated parents are more likely than their less educated counterparts to have a high income and substantial savings, we might expect to find that parental breakup has less harmful consequences for the educational trajectories of their children. Moreover, we might expect to find that having a high level of education helps parents in coping with the stress of parenting and in reducing the emotional turmoil experienced by their children following a breakup (Cooper et al. 2009). Thus, it is often assumed that highly educated parents may be able to minimize the likelihood that their children, like many children of divorced parents, will have worse school results following the separation of their parents. In addition, even if the school results of the children worsen, studies on educational inequalities have shown that students from advantaged social backgrounds are more likely to have a "second chance," and are more likely to progress to the next educational level despite having below-par educational performance (Boudon 1998; Gambetta 1987). This phenomenon has been labelled the "social origin compensatory effect" (Bernardi 2012, 2014).

Based on these considerations, we might therefore expect to find that highly educated parents, who are assumed to have superior economic resources and skills for coping with their own and their children's feelings of stress, would manage to mitigate the negative long-term consequences associated with divorce for their children's educational outcomes. To recapitulate, the "compensation hypothesis" states that:

> H1: Parental separation has less harmful consequences for the educational achievement of children of highly educated parents than of children with less educated parents.

However, we might also argue that children of parents with low levels of education suffer less from divorce because their expected levels of educational attainment are already very low to begin with. In societies with marked inequalities in educational opportunity, only the most talented children from poorly educated families will manage to progress through the various educational transitions and eventually achieve a high level of education (Mare 1993). In other words, for a child from a disadvantaged socioeconomic background, the road to university is already so steeply uphill that the additional disadvantage of family breakup does not make the climb significantly more difficult. Only exceptionally talented students from poorly educated families will eventually make it to the top. They already have to overcome so many obstacles on their way through the school system that a parental breakup does not prove to be a decisive hurdle.

Evidence supporting this argument has been found in previous studies on racial differences. Studies of the United States have shown that the consequences of divorce for children are less pronounced among black families than among white families (Brown 2010; McLanahan and Bumpass 1988). Another study found that children of Caribbean origin in the Netherlands are less strongly affected by parental separation than whites (Kalmijn 2010). Kalmijn also offered an insightful and slightly different explanation for why the relative income loss associated with divorce is smaller among ethnic minorities. Specifically, he noted that poverty levels among people of Caribbean origin tend to be high regardless of family background, partly because the men are often unemployed. The essence of Kalmijn's argument is that if the dual-parent families of a given minority group are already very poor, there is not much room to sink further, and thus the children do not have much to lose from a parental breakup.

A parallel argument can also be made about the consequences of parental breakup for parenting styles and behavior. Parents with high and low levels of education differ in their parenting styles. Compared to their less educated counterparts, highly educated parents participate more in the organization of their children's after-school activities, and spend more time with their children engaging in activities that foster cognitive development and learning (Laureu 1998). A parental breakup might, however, reduce the amount of time parents have to engage in these types of activities. For instance, highly educated mothers have been found to be more likely to reduce literacy-promoting activities after experiencing a change in marital status (Beck et al. 2010). The core of the argument in this case is that children with highly educated parents can lose more learning opportunities if their parents separate. Meanwhile, the amount of time poorly educated parents spend engaging in activities that enhance the school results of their children is likely to have been low both before and after separation.

To sum up, only the most talented and motivated children from poorly educated families manage to progress to the higher levels of the educational system. On the one hand, they are a positively selected group, and this should minimize the repercussions of divorce. On the other hand, they have a lower risk of educational and occupational downward mobility because they start from a low level. Similarly, these children have less to lose from changes in parental practices following divorce. These mechanisms suggest that the negative implications of divorce should be less pronounced for children of lower socioeconomic backgrounds. The "floor effect hypothesis" thus leads us to formulate a prediction in direct opposition to that of the compensation hypothesis:

H2: Parental separation has less harmful consequences for the educational achievement of children of poorly educated parents.

With regard to cross-country differences, it has long been recognized that the structure of the educational system affects the reproduction of social inequality (Van de Werfhorst and Mijs 2010). In particular, the degree of stratification of a given educational system, defined by the system of tracking into higher and lower tier secondary schools, appears to affect social mobility. There is robust evidence that the degree of stratification of educational systems, conventionally measured by the age of first selection into different educational tracks, is positively associated with the level of inequality of educational opportunities (Horn 2009). The earlier children are assigned to diverging educational tracks according to their performance, the stronger the background effects on children's final educational attainment are (Brunello and Checchi 2006).

Linking these insights to the divorce literature, we might ask whether the consequences of a parental breakup are more negative for a student enrolled in a stratified educational system than for a student enrolled in a comprehensive system. In this context, it is worth noting that a large proportion of parental separations occur when the children are still in primary education or younger (Andersson and Dimitrov 2002). Previous research has shown that a parental break-up is associated with an immediate deterioration in school performance (Kim 2011). If the educational system is more selective based on demonstrated performance, any source of disadvantage that affects short-term academic achievement, including parental divorce, could have a magnified influence on final educational attainment. The "educational system hypothesis" thus stipulates that a drop in school performance has more long lasting consequences for the final educational attainment in stratified educational systems than it does in comprehensive systems:

> H3: The divorce penalty for achievement of tertiary education is larger in stratified educational systems.

Another possible macro-level determinant of parental separation penalties is the degree of diffusion of divorce. Several authors have defended a socio-structural argument that links the level of diffusion of a given living arrangement to its normative acceptance and institutionalization, and in turn to its impact on individual well-being and life chances (Cherlin 2004; Kalmijn 2010; Soons and Kalmijn 2009). According to this so-called "institutionalization hypothesis" (Lacey et al. 2012), the negative effects of parental separation on children are expected to be stronger in contexts in which the divorce rate is low because of the widespread normative disapproval of divorce. According to this view, single parenthood and divorce tend to be more institutionalized in those countries and cohorts in which divorce is more common. A higher incidence of divorce may translate into less stigmatization of single parents and greater acceptance

of the children of divorced parents. Moreover, there might be selection effects at work here as well: if the conditions necessary to bring about separation are more serious in nature, the parents who do get divorced might have had very serious problems in their marriage. The level of discord in the marriage might in turn have grave implications for the well-being of their children. Hence, the institutionalization hypothesis states that:

> H4: The adverse effect of a parental breakup on a child's educational attainment is smaller in those social contexts in which the experience of divorce is more common.

Finally, we are also interested in examining whether the social background differences in the consequences of divorce for children's educational attainment vary depending on the type of educational system and the level of diffusion of divorce. Although we do not develop hypotheses for these issues, in the empirical analyses we will examine the three-way interactions of social background, divorce, and, respectively, the characteristics of the educational system and the diffusion of divorce.

2. Data and methods

To examine the long-term effects of parental separation the study draws on the first wave of the *Generations and Gender Survey*[5] covering 14 countries: Australia, Austria, France, Italy, Lithuania, Norway, the Netherlands, Belgium, Hungary, Estonia, Bulgaria, Romania, Georgia, and Russia.[6] Depending on the country, the data collection took place between 2003 and 2008. We selected all respondents aged 25 years and older, yielding a total sample size of 83,048. Since the incidence of divorce varies greatly not only across countries but also over time, we decided to use a hierarchical design to account for contextual circumstances that may alter the consequences of parental separation. Specifically, we constructed 55 country-cohort clusters with four birth cohorts in each country: 1945−1954, 1955−1964, 1965−1974, and 1975−1984.[7]

The dependent variable is whether or not subjects obtained a tertiary education degree. The advantage of focusing on tertiary education attainment (ISCED 5 or more) as an outcome measure is that the dependent variable is highly comparable across countries. We present estimations of multi-level linear probability models with robust standard errors, where the upper-level units are formed by country-cohort clusters, and

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[5] For details see http://www.ggp-i.org/.
[6] The data for Germany had to be disregarded because of faulty information on parental breakup.
[7] There are no observations for the oldest cohort in Austria, which sampled a smaller age range than the rest of the countries.

where the dependent variable is whether the respondent has achieved a university degree (ISCED level 5 or 6). The model features a random slope for the breakup penalty. The choice to use multi-level linear probability models (LPM) instead of multi-level logit models was made for both practical and theoretical reasons. In our practical considerations, we took into account the fact that the coefficients of the LPM are very close to the marginal effects of the equivalent logit model if the proportion of out-of-range predictions (between zero and one) is low, as in our case (about 1%). On the other hand, it appears that when using an LPM instead a logit model, the estimation is less grueling, the interpretation of interactions is more straightforward, and it is possible to compare coefficients across models (Mood 2010). In our theoretical considerations, we observed that both the floor and the institutionalization hypotheses discussed in the previous sections are framed in terms of *absolute* variations in the divorce penalty, rather than *relative* variations. The floor and institutionalization hypotheses are therefore more directly addressed when we focus on the coefficients of an LPM rather than on the log-odds or the odds ratios of a logit model.[8]

Our independent variables of interest at the individual level are parental divorce and parental education. Divorce is measured using the survey question: "Did your biological parents ever break up?" This means that – like in most other studies – our definition of divorce includes union dissolutions that did not result in divorce (because the parents were either never married or remained married after splitting up). Subjects who responded affirmatively were then also asked about the year in which the parental separation happened. We only consider parental separations that occurred before respondents turned 18 years of age.

We use parents' level of education as an indicator for social background. We consider the highest level of educational attainment among both parents if the respondent spent their childhood with both biological parents. If the respondent lived with only one parent, the educational information refers to the parent with whom the respondent spent most of his or her childhood (until age 15). In other words, we apply either the dominance model for intact families or the respective education of the primary caring parent (who in 83% of cases is the mother). Unfortunately the GGS data provide educational information for both parents of divorced and separated families in only three of the 14 countries included in this study. This is an important limitation, and we will come back to it when discussing the sensitivity checks that have been performed. We distinguish between four levels: primary education or less (ISCED 0–1),

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[8] A possible floor effect in the divorce penalty should not be perceived as a statistical artifact based on the fact that a probability is bound to be greater than zero. If an event is relatively rare (such as, for instance, tertiary education attainment among the children of poorly educated families) and its probability is close to zero, the occurrence of other events (such as parental separation) is structurally less likely to yield large absolute effects.

lower secondary education (ISCED 2), upper or post-secondary education (ISCED 3−4), and tertiary education (ISCED 5−6).

At the macro level we include three covariates. First, the incidence of divorce is measured in terms of crude divorce rates per 1000 inhabitants. Except for a few data points that were collected from miscellaneous sources, these data come from Eurostat (2012). It would have been preferable to use cohort-adjusted divorce rates, but unfortunately these rates were not available for all countries and time points. Second, we control for enrollment rates in tertiary education using data from the Cross-National Time-Series (CNTS) Data Archive. Enrollment rates refer to the percentage of the population participating in tertiary education at any given moment. Both the divorce rates and the enrollment rates have been mean-centered. Finally, the first age of selection in the educational system is compiled from various sources (Brunello and Checchi 2006; OECD 2005), and was completed through expert consultations. It captures the age at which pupils are placed into different school tracks or educational career paths. We distinguish between the educational systems in which tracking takes place at early (at ages 10 through 12), late (at age 15 or 16), and average ages (at age 13 or 14)[9]. All of the macro-level variables are linked with individual subjects based on their year of birth, and respectively refer to the situation in a given country when the respondents were between six and 15 years old.

In order to test our hypotheses, we focus on the interactions between parental separation with socioeconomic background on the one hand, and the (cross-level) interactions of parental separation with divorce rates and the comprehensiveness of the educational system on the other.

3. Results

Table 1 shows basic descriptive statistics for the analysis sample. Country-specific samples range from 3,217 subjects in Austria to 9,687 in Norway. There is substantial cross-country variation on all variables. As for the dependent variable, the average rate of tertiary education attainment is 29%, but ranges from 12% in Romania to 45% in Russia. While the incidence of parental breakup (before age 18) is 9% on average, the lowest level is found in Italy (only 1.5%) and the highest level is found in Australia (18.6%). The distribution of parental education also varies greatly across contexts. These large country disparities underline the need for a multi-level design that allows

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[9] We have also estimated models with age of first selection specified as a continuous variable. The pattern of results is the same. In the end we present the results based on the categorical specification because it allows for a clear-cut distinction between early and late selection countries.

the relationship between parental breakup and educational attainment to vary across contexts.

Table 1:   Descriptive statistics by country

Country	Tertiary education attainment	Parental Breakup	Parental Education (highest level)				N
			Primary or less	Lower secondary	Upper secondary	Tertiary	
Australia	37.6%	18.6%	9.0%	48.0%	6.0%	37.0%	3,293
Austria	21.7%	12.3%	0.2%	24.2%	66.6%	9.0%	3,217
Belgium	41.7%	9.1%	33.0%	18.6%	24.7%	23.6%	4,122
Bulgaria	24.1%	6.0%	15.9%	33.8%	37.3%	13.1%	8,171
Estonia	33.0%	18.0%	9.2%	28.6%	45.8%	16.4%	3,934
France	33.4%	10.2%	1.6%	57.9%	27.5%	12.9%	5,256
Georgia	33.3%	3.2%	10.2%	15.6%	52.4%	21.8%	6,321
Hungary	18.6%	10.6%	15.6%	26.4%	40.2%	17.8%	8,898
Italy	13.2%	1.5%	63.4%	17.7%	14.4%	4.5%	6,914
Lithuania	27.2%	9.0%	27.5%	23.9%	35.5%	13.9%	5,314
Netherlands	38.7%	5.2%	20.0%	39.6%	20.9%	19.5%	4,857
Norway	39.7%	10.4%	26.9%	–	50.0%	23.1%	9,687
Romania	12.0%	5.3%	51.6%	31.1%	15.1%	2.2%	7,688
Russia	45.4%	14.2%	16.3%	29.7%	29.2%	24.8%	5,376
Total	28.7%	8.8%	23.7%	26.2%	33.7%	16.3%	83,048

Source: GGS wave 1 version 4

Table 2 shows the divorce rates and the first age of selection in the 14 countries in our sample. Depending on when the divorce regulations were liberalized, in most countries we see a rising trend in divorce at some point between 1960 and 1990.[10] Additionally, there is substantial cross-country variation, with divorce rates ranging from close to zero in Italy to around four per thousand in Russia and Estonia in 1990. The lowest age of selection, or age 10, is found in Austria; while the highest age of selection, or age 16, is found in Norway and Australia. The other countries have ages of

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[10] Only Romania has taken a different road, as it experienced a backlash because of restrictions in legislation that took place with the 1966 reform.

selection that are somewhere in between. In France, Hungary, and the Netherlands there have been educational reforms that changed the first age of selection.

Table 2: **Divorce rates and tracking ages by country and cohort**

	Divorce rate (per 1,000 inhabitants)				Age of first selection in the educational system			
	1960	1970	1980	1990	1960	1970	1980	1990
Australia	0.6	1.0	2.7	2.5	16	16	16	16
Austria	1.1	1.4	1.8	2.1	10	10	10	10
Belgium	0.5	0.7	1.5	2.0	12	12	12	12
Bulgaria	0.9	1.2	1.5	2.0	14	14	14	14
Estonia	2.1	3.2	4.1	3.7	15	15	15	15
France	0.7	0.8	1.5	1.9	13	13	16	15
Georgia	1.3	1.3	1.3	1.4	15	15	15	15
Hungary	1.7	2.2	2.6	2.4	15	15	15	11
Italy	0.3	0.3	0.2	0.5	11	14	14	14
Lithuania	0.9	2.2	3.2	3.4	14	14	14	14
Netherlands	0.5	0.8	1.8	1.9	12	12	12	13
Norway	0.7	0.9	1.6	2.4	16	16	16	16
Romania	2.0	0.4	1.5	1.4	15	15	15	15
Russia	1.5	3.0	4.2	3.8	15	15	15	15

Note: Various sources, authors' compilation.

Table 3 and Table 4 show the results of the multivariate random-slopes models. The first model shows that parental separation is associated with a decrease in university education attainment rates. On average, children whose parents divorced have a deficit of almost seven points in the probability of achieving a university degree when compared with children from intact families. Considering that the average attainment of tertiary education is 29%, a difference of seven percentage points is not large, but neither is it small. Table 3 and Table 4 also document an advantage for girls in achieving a university degree of about five percentage points. This divorce penalty is therefore about the same size as the college gender gap that has recently received a lot of academic and media attention (Becker, Hubbard, and Murphy 2010; DiPrete and

Buchman 2013),[11] and is consistent with previous research. The probability that subjects whose parents have a tertiary education will obtain a university degree is 53 percentage points higher than that of subjects whose parents' highest level of education is primary or less.

Table 3:   Multi level random-slopes model of tertiary education attainment

	Model 1		Model 2		Model 3	
	b	se	b	se	b	se
Female	.052***	(.003)	.052***	(.003)	.052***	(.003)
Parents' education (reference: primary or less)						
Lower secondary	.076***	(.004)	.076***	(.005)	.076***	(.005)
Upper secondary	.224***	(.004)	.227***	(.004)	.226***	(.004)
Tertiary	.530***	(.005)	.538***	(.005)	.538***	(.005)
Parental breakup	-.066***	(.008)	-.033*	(.014)	-.034*	(.014)
Group-specific Breakup effect (ref.: div X par.prim.)						
Breakup X parents: lower secondary			-.012	(.017)	-.012	(.017)
Breakup X parents: upper secondary			-.034*	(.016)	-.033*	(.016)
Breakup X parents: tertiary			-.084***	(.018)	-.084***	(.018)
Level-2 covariates						
Age at tracking (ref: late, 15–16)						
early (10–12)					.010	(.031)
average (13–14)					-.045	(.029)
Enrolment rate					.002	(.002)
Divorce rate					-.017	(.014)
Constant	.091***	(.012)	.089***	(.012)	.104***	(.017)
N of observ.	83,048		83,048		83,048	

Source: GGP Wave 1
+ p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Model 2 tests hypotheses 1 and 2, according to which the consequences of divorce vary depending on parents' education. The estimated interaction effects show that the negative effect on educational attainment associated with divorce becomes larger as the level of parental education increases. The divorce penalty is about 12 percentage points among those children whose parents have a university degree (-.033-.084), compared to

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[11] With regard to the media, see, for example, the following articles on the college gender gap in The Guardian and Fortune: http://www.theguardian.com/education/datablog/2013/jan/29/how-many-men-and-women-are-studying-at-my-university; http://management.fortune.cnn.com/2013/03/27/college-graduation-gender-salaries/.

three percentage points among those children whose parents have only a primary education or less. Model 2 thus shows that the negative consequences of divorce for university degree attainment are more pronounced among children with highly educated parents. A recent paper on Finland reported a similar finding (Erola and Jalovaara 2012). This result is at odds with the hypothesis of a compensation effect (H1), according to which children from a privileged background should be less affected by parental separation. It is, however, in line with the floor effect hypothesis (H2). The underlying explanation for this finding is that a divorce cannot substantially worsen the already limited educational opportunities of children who come from poorly educated families. A similar pattern has also been documented for disadvantaged ethnic minorities (Kaljmin 2010).

To illustrate these group differences, Figure 1 shows the predicted probabilities of tertiary education attainment by parental level of education with either divorced or intact families. We can see that the gap between children from divorced and intact families is larger for those whose parents have a university education than for those whose parents have only a primary education. If we look at Figure 1 from another perspective, we can see that the degree of social background inequality is greater among intact families than among divorced families.

Returning to Table 3, in the third model we add mean-centered enrollment and divorce rates as contextual covariates at level 2. We also include dummies in order to distinguish between educational systems with early, average, and late ages of selection into tracks. Country-specific enrollment rates in tertiary education in the respective decade are used here to control for educational expansion. We do not find any clear-cut associations between university degree attainment and these three contextual variables. The coefficients are small and not precise (the standard errors are large). Robustness checks involving the stepwise inclusion of the various macro-level covariates separately confirmed these results.

Figure 1: **Predicted probability of tertiary education attainment by parental divorce and parental education**
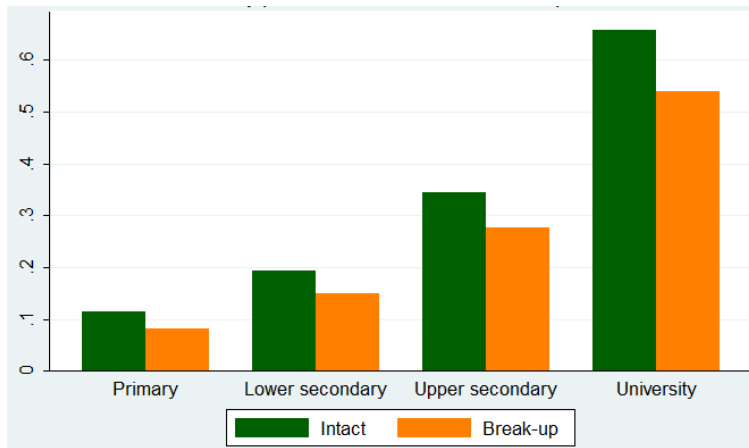
To test hypotheses 3 and 4, the next specification (Model 4 in Table 4) adds a set of cross-level interaction effects between parental divorce and the two contextual variables. The coefficient for the cross-level interaction between early age of selection and parental breakup is negative (minus three percentage points). This result gives some support to hypothesis 3, and suggests that the negative consequences of a parental breakup on educational attainment are slightly more pronounced in cases in which the educational system assigns students to tracks at an early age. But as the standard error associated with the coefficient is large, we must be cautious in interpreting the point estimate.[12] The results of model 4 also show a small negative interaction effect in terms of the degree of diffusion of divorce. This finding is surprising because it so clearly refutes the claims of the institutionalization hypothesis (H4). According to our estimates, divorce penalties for attaining a university degree seem to actually increase as divorce becomes more common.[13]

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[12] Significance tests have no meaning in terms of classic statistical inference with a non-random convenience sample of cohort by country clusters (Freedman, Pisani, and Purves 1978). It might be proposed that we use some sort of "supra-population" of cohort-by-country constellations, including possible future cases, of which the data under analysis are a specific sample. This kind of argument is, however, hardly convincing (Berk 2004). In this paper we report the standard error and the conventional symbols to highlight statistical significance, because this is still standard practice in multi-level modeling.

[13] The estimated interactive effect of divorce rates on the break-up penalty is unaffected by different model specifications. Moreover, additional analyses showed that the three-way interaction effects estimated in Model 6 do not change when models are fitted without controlling for divorce rates.

Table 4: **Multi level random-slopes model of tertiary education attainment**

	Model 4		Model 5		Model 6	
	b	**se**	**b**	**se**	**b**	**se**
Female	.052***	(.003)	.052***	(.003)	.051***	(.003)
Parents' education (reference: primary or less)						
Lower secondary	.076***	(.005)	.069***	(.006)	.070***	(.006)
Upper secondary	.226***	(.004)	.202***	(.006)	.204***	(.006)
Tertiary	.538***	(.005)	.512***	(.007)	.513***	(.007)
Parental breakup	-.028+	(.015)	-.032*	(.016)	-.018	(.018)
Group-specific Breakup effect (ref.: div X par.prim.)						
Breakup X parents: lower secondary	-.010	(.017)	-.009	(.017)	-.021	(.021)
Breakup X parents: upper secondary	-.029+	(.016)	-.022	(.016)	-.044*	(.020)
Breakup X parents: tertiary	-.079***	(.018)	-.071***	(.018)	-.084***	(.021)
Level-2 covariates						
Age at tracking (ref: late, 15–16)						
early (10–12)	.021	(.032)	-.024	(.034)	-.020	(.034)
average (13–14)	-.041	(.029)	-.070*	(.031)	-.069*	(.031)
Enrolment rate	.002	(.002)	.002	(.002)	.002	(.002)
Divorce rate	-.012	(.014)	-.013	(.014)	-.013	(.014)
Cross-level interactions						
Breakup X divorce rate	-.014+	(.008)	-.014+	(.008)	-.014+	(.007)
Breakup X early tracking	-.031	(.021)	-.033	(.021)	-.105*	(.041)
Breakup X average tracking	-.008	(.018)	-.010	(.018)	-.029	(.037)
Early tracking X parents: tertiary			.031*	(.014)	.025+	(.014)
Early tracking X parents: upper secondary			.063***	(.012)	.055***	(.013)
Early tracking X parents: lower secondary			.066***	(.012)	.065***	(.013)
Average tracking X parents: tertiary			.089***	(.013)	.091***	(.013)
Average tracking X parents: upper secondary			.053***	(.010)	.050***	(.010)
Average tracking X parents: lower secondary			-.007	(.010)	-.009	(.010)
Three-way interactions						
Breakup X par.tert X average tracking					-.021	(.049)
Breakup X par.upp.sec. X average tracking					.031	(.041)
Breakup X par.low.sec. X average tracking					.035	(.044)
Breakup X par.tert X early tracking					.100+	(.053)
Breakup X par.upp.sec. X early tracking					.116*	(.047)
Breakup X par.low.sec. X early tracking					.039	(.049)
Constant	.101***	(.017)	.118***	(.018)	.117***	(.018)
N of observ.	83,048		83,048		83,048	

Source: GGP Wave 1
+ p<0.1, * p<0.05, ** p<0.01, *** p<0.001

In Model 5 we include a set of interaction terms between parental education and the structure of the educational system, measured by the age of first selection. As expected, almost all the coefficients here are positive. In accordance with previous social mobility research (Brunello and Checchi 2006; Van de Werfhorst and Mijs 2010), the model shows that the association between parental education and children's educational achievement is stronger when the educational system has an early or an average tracking age than when it has an older tracking age.

Finally, in model 6 we introduce a set of three-way interaction effects of parental divorce, social origin, and the age of first selection in the educational system. In this specification, we find positive effects for the interaction terms of early age of first selection, parental education, and parental breakup. Accordingly, in countries where tracking takes place at a young age, the tertiary education attainment of children whose parents have upper secondary or tertiary education is relatively less affected by parental divorce.

To get a clearer look at these group specificities across societal contexts, Figure 2 shows the estimated divorce penalty for children with high and low levels of parental education, respectively; with early, average, and late selection into diverging tracks. The bars in Figure 2 express the differences in the predicted probability of obtaining tertiary education between children of divorced parents and children from intact families in each origin group. The differences in Figure 2 are all negative, which means that in cases with divorce the probability of achieving a university degree is smaller throughout.

In comprehensive educational systems with a late age of first selection (age 15 or 16) there are virtually no adverse effects for children whose parents only have a primary education, whereas the divorce penalty for children from highly educated families is much larger, at 10 percentage points. Strikingly, the pattern is almost reversed in countries with very early selection. The probability of obtaining a college degree among children from poorly educated families is reduced by 12 percentage points in educational systems with an early age of selection (ages 10 to 12), while the corresponding reduction in attainment rates among children from advantaged social backgrounds is slightly smaller. Overall, Figure 2 suggests that the relative disadvantage stemming from divorce grows larger for children from lower social backgrounds the earlier the educational system places children into qualitatively different tracks. The pattern is less clear for children from higher social backgrounds, for whom the differences in the divorce penalty across societal contexts are less pronounced, and do not follow a linear pattern in terms of the age of selection.

Figure 2: **Difference in the predicted probability of attainment of tertiary degree for respondents from divorced families when compared to intact families by level of parental education and tracking age**
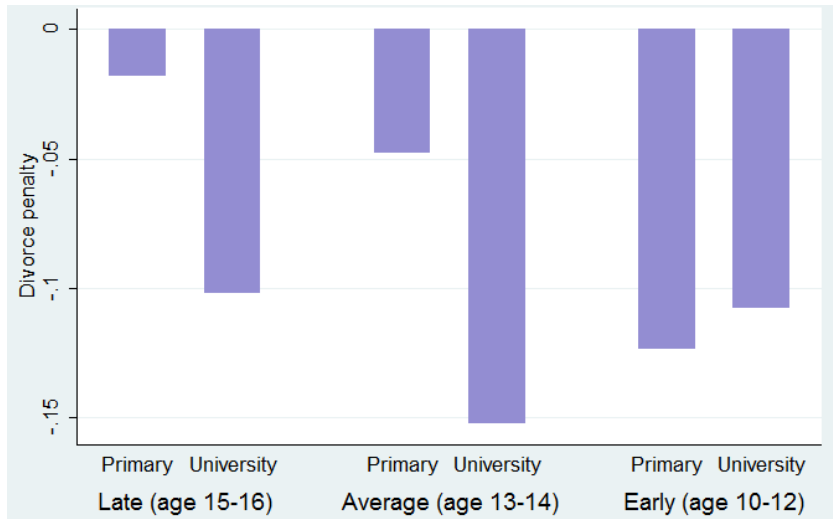
3.1 Sensitivity checks

All of the analyses have been replicated with multi-level (random slopes) logit models rather than with a multi-level (random slopes) linear probability model (see Table A.1 in appendix). The main conclusions are the same when the divorce penalty in the educational attainment is measured in terms of log-odds. A second sensitivity analysis consisted of considering educational attainment in general instead of focusing only on university degree attainment. With this aim in mind, we have recoded the respondents' educational level into the average number of years required to achieve that educational level. The results of the analysis with this different specification of the dependent variable have an overall pattern similar to that of the findings for the attainment of a university degree (Table A.2). Most importantly, we again find a larger divorce penalty among children with highly educated parents, which provides further support for hypothesis 2.

Finally, unlike the rest of the sample, three countries participating in the Generations and Gender Survey – Estonia, Hungary, and Italy – provide information on the educational levels of both parents for divorced families. In Table A.3 of the appendix we have replicated the analyses for these three countries, while also taking

into account the education of the absent parent. The first model specification enables us to validate the robustness of our previous findings when using the dominance principle to measure the highest level of parental education with full information on both parents. The estimated coefficients for the origin-specific breakup penalty turn out to be markedly similar to those obtained for the full set of countries with only partial information on the education of divorced parents (Table 3, model 2).

When we consider the educational level of the mother and father separately (models 2 and 3), we also find that the divorce penalty is larger for children of highly educated parents, regardless of whether it is measured with reference to the level of education of the mother or the father. The same result is confirmed overall when we jointly consider the mother's and the father's levels of education (model 5), although in this latter case the estimates are not statistically significant due to multicollinearity and large standard errors.

4. Conclusions

In this paper we were interested in gaining a better understanding of to what extent the negative consequences for children associated with parental divorce depend on the social origins of the families, and on the societal context. First, we found that parental breakup is associated with negative long-term consequences for children's educational attainment. On average across countries and cohorts, we found a parental breakup penalty of about seven percentage points for the chances of attaining a university degree. Second, this penalty is not uniform, but varies by socioeconomic background and across countries and cohorts. More precisely, our findings suggest that parental divorce tends to be more detrimental for children of highly educated parents: for them, a divorce is associated with a 12-percentage-point drop in the probability of attaining a university degree. Interestingly, a recent study by Erola and Jalovaara (2012) found a similar result for Finland. Moreover, we showed that the socioeconomic background penalty associated with parental breakup varies depending on the level of stratification of the educational system. On average, we found that the divorce penalty is larger (about three additional percentage points) if selection takes place early. It should be emphasized, however, that this estimate was not precise enough to allow us to draw firm conclusions on this point. After further scrutinizing the interaction between parental breakup, social background, and age of selection, we found that if selection into different educational tracks takes place early, a larger divorce penalty is observed for children from poorly educated families. As a result, in stratified educational systems, the divorce penalty barely changes according to parental level of education.

In other words, our findings indicated that when the level of stratification in an educational system is low, parental divorce tends to reduce inequality of educational opportunities. It therefore seems that the characteristics of the educational system, and particularly the extent of early tracking, play key roles in mediating the consequences of parental breakup. On the other hand, our empirical evidence did not confirm the institutionalization hypothesis, which states that the adverse consequences of divorce are smaller in societies in which divorce rates are high. While this idea may be intuitive, our results did not support the assumption that a high degree of diffusion of divorce would, via diminished social stigma, lead to lower penalties for divorce. Our models yielded the opposite finding, suggesting that the divorce penalty might be larger in countries and cohorts in which divorce is more diffused (although the respective coefficient is only marginally significant). This finding may reflect the fact that in the initial period after divorce is legalized in a given context, it is mostly used by social elites who may well be capable of protecting their offspring from any negative repercussions.

In order to compare various countries in this study, we had to forego the option of directly testing the micro mechanism driving the heterogeneity in divorce penalty by social background. Thus, the main limitation of this study is that we were only able to consider the educational level of the parent (the mother in the large majority of the cases) co-residing with the child after divorce. We therefore have not been able to investigate directly the mechanisms of economic and occupational downward mobility that may contribute to the large divorce penalty observed for the children of highly educated single parents.

Similarly, we did not have sufficient data to control for further differences between children of divorced parents and children from intact families, which may induce selection effects (Bhrolcháin 2001; Kim 2011; Steele, Sigle-Rushton, and Kravdal 2009). Of major relevance for our conclusions is the fact that, in recent years, a negative educational gradient in the risk of divorce has been documented in the majority of countries (Amato and James 2010; Lyngstad and Jalovaara 2010). Divorcing parents with high and low levels of education might therefore differ in terms of unobserved factors that could affect the children's educational attainment. If, for instance, highly educated parents are less likely to divorce and do so only when there is a very high degree of conflict in the relationship, then their children might be selected on negative unobserved characteristics that might also explain their larger penalty in educational attainment. To complicate matters further, the educational gradient has changed over time from positive to negative, making it difficult to predict the implications for the potential biases due to selection into divorce in a cross-cohort study like this one (Bernardi and Martínez Pastor 2011; Härkönen and Dronkers 2006; Matysiak, Styrc, and Vignoli 2011).

These concluding observations suggest the need for additional research on the social background gradient in the divorce penalty which draws on more information about the social background of both parents, and which is based on research designs that permit the analysis of the endogenous nature of divorce when studying its consequences.

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Appendix

Table A1: Multi-level random-slopes logit model of tertiary education attainment

	Model 1 b	se	Model 2 b	se	Model 3 b	se	Model 4 b	se	Model 5 b	se	Model 6 b	se
Female	.317***	(.017)	.317***	(.017)	.317***	(.017)	.317***	(.017)	.317***	(.017)	.317***	(.017)
Parents' education (reference: primary or less)												
Lower secondary	.610***	(.032)	.615***	(.033)	.615***	(.033)	.614***	(.033)	.541***	(.044)	.551***	(.045)
Upper secondary	1.448***	(.030)	1.454***	(.031)	1.453***	(.031)	1.451***	(.031)	1.280***	(.040)	1.301***	(.041)
Tertiary	2.771***	(.033)	2.796***	(.033)	2.795***	(.034)	2.793***	(.034)	2.626***	(.044)	2.641***	(.045)
Parental breakup	-.378***	(.043)	-.217+	(.043)	-.226*	(.112)	-.184	(.116)	-.236*	(.116)	-.047	(.125)
Group-specific Breakup effect (ref.: div X par.prim.)												
Breakup X parents: low. sec.			-.111	(.129)	-.109	(.129)	-.100	(.129)	-.070	(.130)	-.222	(.150)
Breakup X parents: upp. sec.			-.126	(.118)	-.118	(.119)	-.096	(.119)	-.026	(.120)	-.275*	(.135)
Breakup X parents: tertiary			-.302*	(.124)	-.294*	(.125)	-.276*	(.125)	-.204	(.126)	-.394**	(.141)
Level-2 covariates												
Age at tracking (ref: late, 15-16)												
early (10-12)					.120	(.178)	.150	(.176)	.0140	(.185)	.051	(.185)
average (13-14)					-.227	(.160)	-.214	(.161)	-.632***	(.173)	-.607***	(.173)
Enrolment rate					.016+	(.009)	.015+	(.009)	.016+	(.009)	.017+	(.009)
Divorce rate					-.078	(.078)	-.063	(.079)	-.075	(.079)	-.077	(.079)
Cross-level interactions												
Breakup X divorce rate							-.077+	(.041)	-.080+	(.041)	-.078+	(.040)
Breakup X early tracking							-.182	(.115)	-.176	(.114)	-1.088**	(.362)
Breakup X average tracking							-.056	(.103)	-.092	(.105)	-.776+	(.413)
Early tracking X parents: tertiary									-.019	(.084)	-.066	(.087)
Early tracking X parents: upp. sec.									.143+	(.076)	.081	(.078)
Early tracking X parents: low. sec.									.247**	(.079)	.226**	(.081)
Aver. tracking X parents: tertiary									.713***	(.085)	.695***	(.087)
Aver. tracking X parents: upp. sec.									.580***	(.075)	.543***	(.076)
Aver. tracking X parents: low. sec.									.160*	(.080)	.134	(.081)
Three-way interactions												
Breakup X par.tert X aver. tracking											.583	(.445)
Breakup X par.upp.sec. X aver. tracking											.802+	(.428)
Breakup X par.low.sec. X aver. tracking											.735	(.452)
Breakup X par.tert X early tracking											1.005*	(.400)
Breakup X par.upp.sec. X early tracking											1.177**	(.383)
Breakup X par.low.sec. X early tracking											.631	(.409)
Constant	-2.294***	(.072)	-2.303***	(.072)	-2.231***	(.097)	-2.239***	(.098)	-2.105***	(.101)	-2.118***	(.101)
N of observ.	83,048		83,048		83,048		83,048		83,048		83,048	

Source: GGP Wave 1.

+ p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Table A2: Multi-level random-slope model of years of education

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	b	se	b	se	b	se	b	se	b	se	b	se
Female	.181***	(-.021)	.181***	(-.021)	.181***	(-.021)	.181***	(-.021)	.181***	(-.021)	.181***	(.021)
Parents' education (reference: primary or less)												
Lower secondary	1.388***	(-.033)	1.395***	(-.034)	1.393***	(-.034)	1.393***	(-.034)	1.133***	(-.046)	1.145***	(-.047)
Upper secondary	2.766***	(-.032)	2.773***	(-.033)	2.770***	(-.033)	2.768***	(-.033)	2.294***	(-.044)	2.314***	(-.044)
Tertiary	4.604***	(-.038)	4.637***	(-.039)	4.633***	(-.039)	4.631***	(-.039)	4.122***	(-.051)	4.133***	(-.052)
Parental breakup	-.620***	(-.061)	-.474***	(-.111)	-.483***	(-.111)	-.447***	(-.121)	-.530***	(-.121)	-.374***	(-.137)
Group-specific Breakup effect (ref.: div X par.prim.)												
Breakup X parents: lower secondary			-.117	(-.128)	-.116	(-.128)	-.109	(-.129)	-.046	(-.129)	-.205	(-.160)
Breakup X parents: upper secondary			-.121	(-.119)	-.120	(-.119)	-.105	(-.121)	.018	(-.121)	-.208	(-.147)
Breakup X parents: tertiary			-.352**	(-.132)	-.352**	(-.133)	-.338*	(-.134)	-.193	(-.134)	-.340*	(-.160)
Level-2 covariates												
Age at tracking (ref: late, 15-16)												
early (10-12)					-.282	(-.261)	-.252	(-.262)	-1.110***	(-.267)	-1.081***	(-.267)
average (13-14)					-.361	(-.240)	-.364	(-.240)	-1.035***	(-.244)	-1.016***	(-.244)
Enrolment rate					.018	(-.013)	.019	(-.013)	.021	(-.013)	.022+	(-.013)
Divorce rate					.125	(-.116)	.128	(-.117)	.102	(-.115)	.097	(-.115)
Cross-level interactions												
Breakup X divorce rate							-.048	(-.063)	-.054	(-.063)	-.051	(-.062)
Breakup X early tracking							-.274	(-.173)	-.286+	(-.172)	-.821**	(-.316)
Breakup X average tracking							.017	(-.153)	-.010	(-.152)	-.436	(-.282)
Early tracking X parents: tertiary									1.123***	(-.103)	1.084***	(-.106)
Early tracking X parents: upper secondary									1.160***	(-.092)	1.102***	(-.095)
Early tracking X parents: lower secondary									.920***	(-.091)	.901***	(-.094)
Average tracking X parents: tertiary									1.242***	(-.094)	1.235***	(-.097)
Average tracking X parents: upper secondary									.580***	(-.075)	.543***	(-.076)
Average tracking X parents: lower secondary									.160*	(-.080)	.134+	(.081)
Three-way interactions												
Breakup X par.tert X average tracking											.235	(-.366)
Breakup X par.upp.sec. X average tracking											.595+	(-.308)
Breakup X par.low.sec. X average tracking											.535	(-.327)
Breakup X par.tert X early tracking											.631	(-.393)
Breakup X par.upp.sec. X early tracking											.815*	(-.351)
Breakup X par.low.sec. X early tracking											.407	(-.368)
Constant	1.108***	(-.002)	1.108***	(-.002)	1.108***	(-.002)	1.108***	(-.002)	1.106***	(-.002)	1.106***	(-.002)
N of observ.	83,448		83,448		83,448		83,448		83,448		83,448	

Source: GGP Wave 1.
+ p<.1, * p<.05, ** p<.01, *** p<.001

Table A3: **Linear probability models of tertiary education attainment in Estonia, Hungary, and Italy**

	Model 1		Model 2		Model 3		Model 4	
	b	se	b	se	b	se	b	se
Female	.060***	(.005)	.062***	(-.005)	.061***	(-.005)	.062***	(-.005)
Parental breakup	-.015	(.017)	-.019	(-.017)	-.015	(-.021)	-.012	(-.021)
Parents' education (reference: primary or less)								
Lower secondary	.082***	(-.007)						
Upper secondary	.205***	(-.008)						
Tertiary	.515***	(-.012)						
Group-specific Breakup effect (ref.: div X par.prim.)								
Breakup X parents: lower secondary	-.041+	(-.023)						
Breakup X parents: upper secondary	-.043+	(-.022)						
Breakup X parents: tertiary	-.100**	(-.033)						
Mother's education (ref.: primary or less)								
Lower secondary			.091***	(-.007)			.038***	(-.009)
Upper secondary			.248***	(-.009)			.146***	(-.012)
Tertiary			.505***	(-.014)			.324***	(-.017)
Interation of Breakup and Mother's education (ref.: breakup X mother prim.)								
Breakup X mother: lower secondary			-.028	(-.022)			-.002	(-.033)
Breakup X mother: upper secondary			-.067**	(-.024)			-.036	(-.037)
Breakup X mother: tertiary			-.084*	(-.038)			-.027	(-.05)
Father's education (ref.: primary or less)								
Lower secondary					.081***	(-.007)	.054***	(-.009)
Upper secondary					.210***	(-.008)	.119***	(-.011)
Tertiary					.541***	(-.014)	.325***	(-.018)
Interation of Breakup and Father's education (ref.: breakup X father prim.)								
Breakup X father: lower secondary					-.041	(-.026)	-.041	(-.036)
Breakup X father: upper secondary					-.047+	(-.026)	-.036	(-.039)
Breakup X father: tertiary					-.085+	(-.046)	-.050	(-.057)
Country (ref. Hungary)								
Italy	.065***	(-.006)	.063***	(-.007)	.049***	(-.007)	.052***	(-.007)
Estonia	.141***	(-.008)	.137***	(-.008)	.147***	(-.008)	.142***	(-.008)
Constant	-.008	(-.007)	.016*	(-.007)	.007	(-.007)	-.010	(-.007)
adj. R-squared	.166		.147		.152		.172	
N of observ.	19,746		19,503		19,498		19,255	

Source: GGP Wave 1.
   + p<0.1, * p<0.05, ** p<0.01, *** p<0.001
Note: Models control for birth cohort.