The Impact of Family Size on Educational Attainment in Cross-Country Comparative Perspective

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Abstract

We conduct a meta-analysis of research about the impact of family size on child educational attainment in order to systematically compare the effects reported in various studies carried out in different countries. According to the resource dilution model, children who have many siblings receive less support from parents than children raised in small families. However, there is considerable heterogeneity in the effect of family size across countries. Part of this variation may be explained by different cultural conditions: less negative or even positive negative effects may be more common for countries ranking high in collectivism, where parents share the responsibility for raising children with a wide circle of relatives. Another share of the heterogeneity in effect estimates may be related to methodological differences, such as models controlling for or ignoring selectivity of large families.

Background and objectives

The relationship between family size and child educational attainment has attracted a lot of attention in social sciences. According to the resource dilution hypothesis, an additional child decreases amount of time and financial means that parents can devote per each child (Blake 1981; Downey 1995, 2001). The larger the family, the greater the dilution of parental resources, and the more limited are the educational chances of each child. Hence, parents face trade-off between quantity and educational chances of children when making decisions regarding the size of their family (Becker and Lewis 1973; Becker and Tomes 1976). The mechanism of dilution of parental resources – if it is indeed at work – plays a key role from the point of view of reproduction of social inequalities. Given that children from large families may have lower chances of receiving adequate education, and at the same time due to intergenerational transmission of fertility preferences they are likely to form large families themselves (Murphy and Knudsen 2002; Kolk 2014), their own offspring may again be disadvantaged.

A long-standing interest in the relationship between sibship size and education attainment has resulted in abundance of empirical studies on this topic. In this paper we systematize the existing empirical evidence about the influence of family size on child education attainment by means of meta-analysis, which is a form of quantitative literature overview. This methodology has been developed in order to synthesize, combine, and interpret the available empirical evidence on a certain topic. It offers a clear and systematic way to compare results of different studies and to control for the specific features of the studies that potentially have impact on their results.

A vast majority of studies carried out in the developed countries confirms a negative association between number of siblings and educational outcomes (Heer 1985; Steelman 2002). However, surprisingly, the evidence for some low- or middle-income countries is less clear (Lloyd and Gage-Brandon 1994; Lu 2009). Even though parental resources in these countries are particularly restricted and the support from the welfare state for families with children is missing, growing up in a large family does not always impede educational chances of children in these countries. This divergence in family size effects merits attention.

One of the arguments that could potentially explain the limited effect of having many siblings on child education attainment is related to the role of extended kinship network. The key assumption underlying the resource dilution is that parental material and non-material resources are constrained (Desai 1995). However, in some societies parents share the responsibility for taking care and covering financial costs of raising children with a wide circle of relatives (Shavit and Pierce 1991). Hence, the differences in cultural conditions related to collectivism and strength of family ties across kinship network may potentially explain the variation of family size. However, testing hypothesis on the moderating impact of family ties requires systematic comparisons across countries.

Another source of inconsistencies in findings across studies may be related to the spuriousness of the association between family size and child education attainment. Parental preferences regarding family size may be correlated with opportunities that parents have for offering their children favorable conditions for intellectual development (Guo and VanWey 1999). While most empirical studies control for some factors that may simultaneously affect family size and education attainment, standard regression models cannot capture all the potential confounders, such as family intellectual

climate, parental value system or family genetic heritage. Following the critique of focusing on associations between family size and child education attainment rather than on the causal effects of growing up in a large family, some researchers started to adopt quasi-experimental research design to revisit the resource dilution hypothesis. Indeed, a number of recent studies taking such methodological approach presents evidence suggesting lack of educational disadvantage among children raised in large families (see e.g. Angrist et al. 2010; Black et al. 2005; de Haan 2010; Åslund & Grönqvist 2010). However, again, these studies focus on specific countries and are therefore difficult to compare with findings presented in previous research.

In this paper, we use meta-analysis tools in order to provide viable comparisons across studies carried out in different cultural and institutional contexts. We examine the heterogeneity of the effects of the number of siblings on education attainment across countries to see if strength of ties in the extended family network, decrease inequality of educational chances across families of different sizes. We also take into account differences in methodological approaches taken in specific studies. Meta-analysis bears certain advantages over the standard qualitative literature review as well as over conducting new cross-country comparative analysis that relies on single estimates. First, it allows for a quantitative assessment of the effect of interest, standardized for the across-study differences, which is not possible in the narrative overview (Stanley 2001). Second, the effect estimates obtained through meta-analysis have higher external validity than those obtained in an individual study due to generality of results across various research works (Shadish et al. 2002).

Research strategy: a meta-analysis

We conducted an overview of available published research following a three step procedure as recommended by Stuck et al. (1999). In the first step, we used Google Scholar, a universal research database, in order to identify publications presenting evidence on the impact of family size on child education attainment. Our search was restricted to articles published after 1970. Both longitudinal and cross-sectional studies were accepted for the analysis. We did not impose any geographical or research discipline-related restrictions regarding research evidence, however, we focused on studies published in English. In the second step, we checked the references in existing articles. Third, we consulted the completeness of our bibliographic list with experts and we asked them for their recommendations regarding the literature.

Using this procedure, we managed to identify 142 studies that present estimates of the effect of number of siblings on child education attainment. We coded these estimates and their standard errors and testing statistics as well as all the relevant characteristics of the study (such as sample size, country and period of collection of data used in the study, methods of analysis, control variables used). As a result, we obtained a database where each observation is an estimate of the impact of the number of siblings on child education attainment. If studies present the effects in different countries or compare effects across gender, cohorts or ethnic groups, we coded these multiple estimates separately.

In our meta-analysis, a study-specific estimate of the effect of the number of siblings on child educational attainment constitutes a statistical unit of observation. Given that studies vary in the way that educational attainment is operationalized and adopt different methods of analysis, the estimates from these studies need to be standardized. Following procedure proposed by Stanley (2001), we used the standard errors of estimates to standardize the study-specific estimates of the

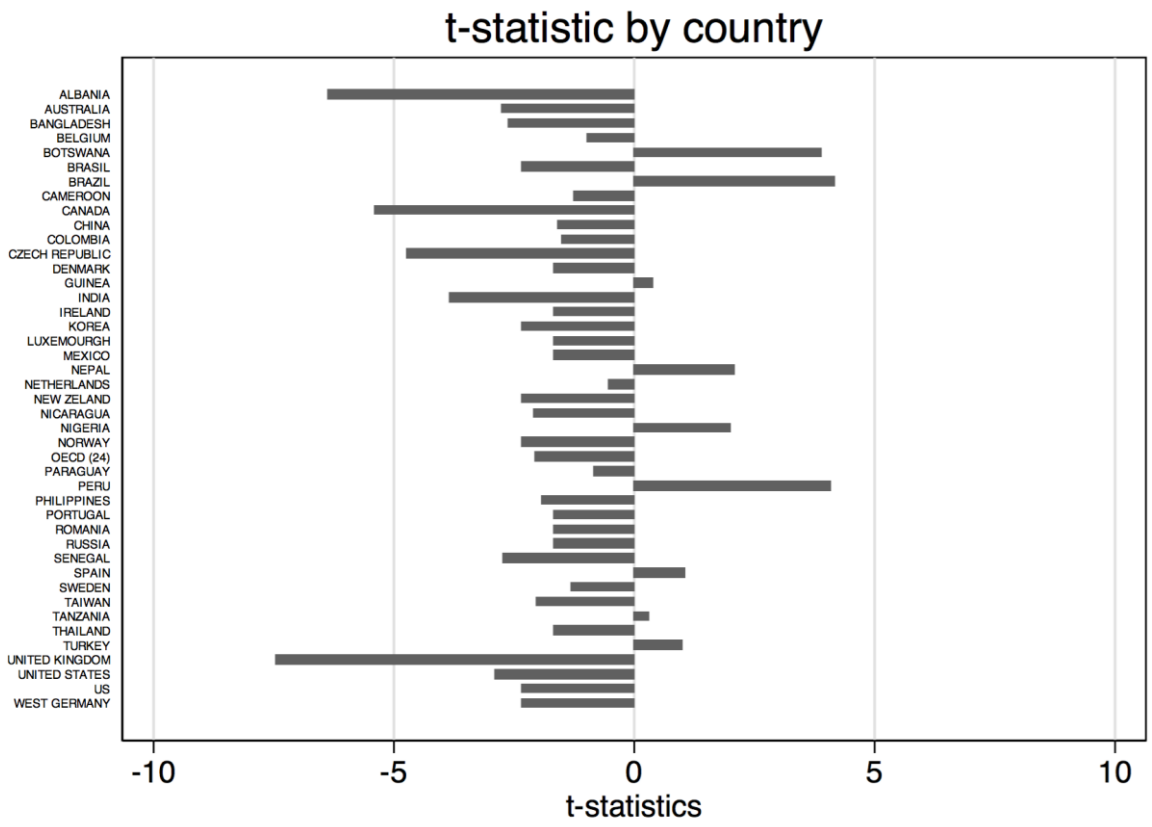
effect of the number of siblings on child educational attainment. The study-specific estimates divided by the standard errors are equal to t-statistics. Therefore, our analytic procedure is equivalent to regression where the dependent variable comprises of t-statistics of the slope coefficients from the original regressions presented in the articles and the explanatory variables capture methodological differences across studies as well as the moderating impact of the context of countries where studies were carried out.

In general, meta-regression may include variables reflecting the differences in the contextual dimensions of considered studies implemented either as country group dummies or as indicators of cross-country variation. We use country group dummies representing differences in the economic development and levels of income. Moreover, we use indicators that capture the cross-country differences in cultural conditions. Specifically, we use an indicator of collectivism across societies proposed by Hofstede (1997) which measures the degree to which members of extended family network are "integrated into strong, cohesive in-groups, which throughout people's lifetime continue to protect them in exchange for unquestioning loyalty". In collectivist societies, members of the extended family network are normatively obliged to provide support for their relatives. Countries with collectivist culture can be contrasted with individualistic societies, where the ties between individuals are loose and families function as nuclear entities rather than components of an extended network (Triandis 1993; Georgas et al. 2001). In such countries, caregiving responsibilities and support for the dependent family members remain constrained to the members of nuclear family or are taken over by the state (Reher 1998; Kalmijn and Saraceno 2008; Pyke and Bengtson 1996; Viazzo 2010). Using the measure of collectivism we can distinguish countries and regions which stand out with the strength and resilience of family loyalties and allegiances. Hence, we test whether the opportunities for receiving support from kins and relatives moderates the resource dilution effect of large sibship size.

Preliminary findings

According to our preliminary results, there is substantial cross-country variation in the effect of family size (cp. Figure 1). In most studies, these effects are negative and statistically negative. However, there are a number of studies where the estimated effects are not statistically significant or even positive. Positive effects can be observed in some African and Latin American countries, which score high on collectivism scales, whereas more negative effects can be observed in Western European and Anglosaxon countries, which tend to be individualistic. However, these cross-country differences can be to some extent mediated by different methodological aspects of the study, such the number of control variables, sample size or the choice between analytic techniques that either take into account or disregard simultaneity of family size and educational chances of children.

Figure 1. The country-specific mean t-statistics of the effects of family size on child education attainment across studies.



Overall, our study will contribute to the on-going debate on the way the economic and cultural context mediate social stratification. Moreover, the results from this analysis regarding the impact of the research design on outcomes of analysis of educational chances may be useful for demographers interested in applying methods of causal inference in population studies.

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