Carlo F. Dondena Centre for Research on Social Dynamics

DONDENA WORKING PAPERS

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Working Paper No. 55
URL: www.dondena.unibocconi.it/wp

November 2012

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ISSN 2035-2034

Trust and Fertility Dynamics

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Abstract

We argue that fertility trends in advanced societies are in part driven by differences in trust. The argument builds around the idea that trust implies individuals and couples being willing to outsource traditional family activities to other individuals outside their own family. Trust is therefore seen as a catalyser for the process of increased female labour force participation, the diffusion of childcare facilities, and hence a halt to the continuing fertility decline. Support of this hypothesis is drawn from the World Values Survey and European Values Survey. We present evidence both from country-level regressions and from a series of multilevel analyses. We find that trust by itself is positively associated with fertility over recent decades. Moreover, trust interacts with women's education. In particular, as higher education for women has expanded, which traditionally is seen as a robust predictor for lower fertility, trust is a precondition for achieving higher fertility among those women with very high education.

Keywords

Generalized trust, low fertility, women's education, outsourcing, multilevel models.

Introduction

Over the last few decades, all developed countries have experienced fertility decline to some extent. At the same time, fertility trends have differed markedly across countries. In some countries such trends have lead to a stabilization of fertility not far from the replacement levels, while in others fertility has fallen even below the "lowest-low" fertility threshold of 1.3 children per couple. To the surprise of many observers, in several countries fertility has started increasing around 2005.

Several explanations have been offered for these trends (for a complete review see Balbo et al., 2012). We start here from some popular ideas. First, trends might be driven by "ideational change": the Second Demographic Transition thesis argues that in recent years individuals have changed their value orientations expressed by progressive independence of the members of a society giving increasing importance to their own realization (rather than to their family's or to their children's); to their psychological (rather than to their material) well-being and to their personal freedom of expression (Lesthaeghe and van de Kaa, 1986; van de Kaa, 1987; Lesthaeghe, 2010). Second, gender and institutions: trends are explained by the dynamics of gender inequality in household production and their interaction with institutional change. That is, despite women gaining higher education and greater financial independence, gender roles tend to persist, especially in the family sphere. As argued by McDonald (2000), men have not compensated women's reduced time input in household production as they are increasing their time spent in the labour market. Thus, as women are entering the labour market in increasing numbers, they are facing a double burden of housework and childrearing and market work. Only institutional change can accommodate for these changing gender roles. Indeed, Myrskylä et al. (2011) show that the recent increase in fertility is proportional to the degree of gender equality in a given society. This is of course related to a third strand of literature, the influence of family policies and welfare on fertility: it is argued that in the Nordic countries, fertility levels are higher, and have not fallen to very low levels, because the state provides ample and affordable childcare services, facilitating women to participate in the labour market but still able to realize their desired fertility levels (e.g., Neyer and Andersson, 2008; Esping-Andersen, 2009; OECD, 2012).

We argue that none of these three explanations is entirely satisfying. Despite the appealing nature of the Second Demographic Transition thesis, there is no clear evidence of changing preferences. Quite on the contrary, desired fertility has remained remarkably constant over time and countries (Sleebos 2003), so that the gap between preferences and

behaviour, i.e. the "baby gap" is seen as a policy challenge (OECD, 2012). Moreover, those countries that have progressed farthest in terms of post-modern family attitudes and behaviour are instead those that now have the highest levels of fertility (e.g., Sobotka 2008; Aassve et al. 2011). For what concerns gender, the empirical tests on this idea are still limited, and the mechanisms through which the interaction of household-level inequality and institutional change related to gender roles shape fertility has not yet been spelled out. The literature focusing on the role of family policies and welfare is also dissatisfactory in the sense that it does not add up with high fertility in Anglo-Saxon countries, exemplified by the US, UK or Australia.

In what follows, we argue that during the last four decades, the broad expansion in education – coupled with persistent cultural differences – has produced very different fertility dynamics across advanced societies. We build on established arguments concerning ideational change and gender equity, but we add another piece. Starting with the tremendous expansion in women's education – which we consider as an exogenous structural change that has taken place (and is still ongoing) in all OECD countries – the key focus lies on (generalized) trust. We argue trust is a key ingredient for facilitating childbearing and childrearing in a time when women attend higher education and take a prominent role in the labour force. A key ingredient of our thesis is that as women gain higher education, and they want to combine working life with family formation, traditional childrearing activities need to be outsourced to external institutions, being them public or private. In Scandinavian countries, a massive provision of public care institutions for young children (and for the elderly) allows such outsourcing. For instance, four decades ago – the male breadwinner model was also dominant in Scandinavian countries. The family was the key care institution, where men specialized in market work – women dealing with the care duties of the household. Today the male breadwinner model is near extinct in Scandinavian societies. In market-oriented countries, such as the U.S. and the U.K., the market has developed during the same period a series of services that allows women to combine work and family. For many seen as a paradox, fertility is today higher in those countries where the male breadwinner model is disappearing, independently on whether active policies or the market have allowed to better combine work and family.

The fact that countries developed such different fertility trends necessitate an explanation for why countries also have differed in endorsing or creating institutions that are needed to combine work and family life, and therefore for supporting fertility. Our argument is that generalized trust, highly persistent across time, and as such often considered as a

societal cultural trait, has acted as a catalyser to avoid important fertility decline during the period of educational expansion. Our thesis reconciles the paradox that fertility is high both in Nordic and Anglo-Saxon countries – despite these welfare regimes are somehow at the opposite ends of welfare state typologies (e.g., Esping-Andersen, 1990, 1999). These societies, however, are not so different when it comes to generalized trust. In Nordic countries, outsourcing of traditional family activities is to individuals operating in public institutions – in Anglo-Saxon countries to individuals operating in privately organized institutions – the latter including employment related childcare schemes. This can be seen in opposition, for instance, to Southern European, Mediterranean societies. There, generalized trust towards individuals outside one's own family is lower. As long as people do not trust other individuals – the family remains a substitute for those institutions that in other countries take care of traditional family activities – a feature which is not reconcilable with women wanting to both pursue a working career and having children. In other words, in Mediterranean countries, women gain modern attitudes as they in larger numbers gain higher education, but the lack of trust holds back diffusion of outsourcing. Despite expansion in female education, the process of combining work and family will not necessarily follow suit, hence lowering fertility.

We test out hypothesis with a set of empirical analyses, based on the World Values Survey and the European Values Survey (WVS-EVS). We consider first the macro perspective where we hold the Total Fertility Rate (TFR) against three key macro variables: GDP per capita, Female Labour Force Participation (FLP) and the enrolment rate of women in tertiary education. As shown by Luci and Thevenon (2010), consistently with Myrskylä et al (2009), they all exhibit a non-linear u-shape, indicating that in very high-developed countries – fertility is increasing. Interestingly, the interaction of these three variables with average levels of trust mimics the non-linearity of TFR. However, the critical test for our argument rests on the idea that high level of trust becomes positively related to fertility as countries develop. We therefore perform a series of multilevel regressions where the dependent variable is the number of children. Here we include individuals' level of trust as one of the explanatory variables, but importantly, we also include interactions between individual-level trust and the key aggregate measures already mentioned. We find that the interaction between trust and aggregate measures of women's education is the strongest out of the three.

The remainder of this paper is structured as follows. Section 2 provides the background and the theoretical arguments for the role of trust on fertility. Section 3 provides

descriptive analysis of the WVS-EVS together with our preliminary estimation results. Section 4 discusses our findings and its implications for future research.

Background

The role of trust

From the original interest of sociologists and political scientists, trust has attracted research in various areas including psychology and, in particular, economics (Alesina and La Ferrara 2002; Aghion, Algan, and Cahuc 2008; Aghion, Algan, Cahuc, and Shleifer 2010; Bjørnskov 2007). For instance, trust is positively associated with the quality of institutions, which in turn matters for the functioning of societies (Knack 2002). Trust fosters cooperation and acts as a lubricant, easing the way transactions are being made. There is strong association between the level of trust and economic growth (Helliwell and Putnam 1995; Knack and Kiefer 1997; Zak and Knack 2001), whereas trust correlates negatively with corruption (Uslaner 2002) and positively with the functioning of financial institutions (Guiso, Sapienza, and Zingales 2004). It is negatively associated with income inequality (Uslaner 2002) as well as crime and delinquency (Buonanno, Montolio, and Vanin 2009). It is also widely believed that trust is important for political participation and therefore critical for the functioning of democratic systems (Uslaner 2002). In sum, trust is critical for fostering civic engagement, which, broadly speaking, matters for the functioning of institutions in advanced societies.

Given the growing acceptance of the important role of trust, social scientists have also started to look into its origins. A key argument in this literature is that *generalized trust* (that is, trust to other individuals in society other than your own family relatives) is a relatively stable characteristic that does not change much over time in a given society. Hence, history matters in important ways for current levels of trust, and as such, trust is seen as an important cultural trait at the societal level. A piece of evidence is that societies that have existed longer as independent countries have had more opportunities to build up civic values and interpersonal trust, since they have had a longer history of political confrontation and debate. These ideas are well illustrated by Banfield (1958), who concluded that centuries of feudalism and servile relationship with local landowners in South of Italy created detachment of inhabitants from any form of enlarged cooperation or association outside the family, giving a pervasive sense of distrust for each other. Similarly, Putnam (1993) argues that differences between the good institutions of northern Italian cities and the poor institutions of the south have origins that trace back to the Middle Ages. According to Inglehart and Baker (2000), the

contrast between local control and domination by a remote hierarchy has important long-term consequences for interpersonal trust. Other examples include Nunn and Wantchekon (2011) who argue that the slave trade generated strong mistrust in the African nations exposed to, and that mistrust persists today. Within Europe, Durante (2010) shows that regions exposed to bad climate conditions centuries ago, and hence having a greater need for cooperation and risk sharing, exhibit higher level of trust today. Whereas environmental factors have long been considered to be *the* dominant force shaping and moulding individuals' trust (e.g. Uslaner 2002), others argue that trust might have a biological component. Indeed, recent research provides strong neurobiological and genetic evidence for a biological explanation of trust. Various studies have identified the positive impact of oxytocin on trust behaviours within experimental settings (Baumgartner et al. 2008; Kosfeld et al. 2005; Zak, Kurzban, and Matzner 2005). Furthermore, Cesarini et al. (2008) and Sturgis et al. (2010), using twin studies, show that trust has, at least in part, a genetic component. In line with these findings, another fascinating piece of research by Montag et al. (2011) identify variation in the oxytocin receptor gene which may explain why some individuals express higher levels of trust than others. This line of arguments is consistent with those arguing that trust relates to personality traits for instance (Fahr and Irlenbusch 2008). Thus, the persistence of trust may not only be driven by environmental factors but also by biological ones.

What is trust?

Before discussing the mechanism that we hypothesize connects trust and childbearing, it is useful to look more specifically at what trust actually encapsulate. It is often described as the belief in the honesty, fairness or benevolence of another party. As already mentioned, at the macro level, trust relates to economic prosperity, equality, trade and more generally the functioning of institutions. It also relates (inversely) to family ties (Alesina and Giuliano 2010), but in contrast to the concept of family ties, trust has the appealing feature of having a clear behavioural dimension. A precise way to define the meaning of trust is to consider the trust game, which bears close resemblance to Coleman's (1990) definition. Though there are many variants of the trust game (based on Berg, Dickhaut, and McCabe 1995), the basic characteristics are as follows: Two players are given equal endowments, $5 say, by an experimenter. Player A is defined as the investor and can either decide to keep her $5, which would end the game, both players receiving a payoff of $5. If on the other hand Player A passes on the $5 to the trustee (player B), the experimenter will triple the amount and player B

can then decide to keep the additional $15 for herself or return $7.50 to player B. In the first case, the payoff is ($0, $20) whereas in the latter case it is ($7.5, $12.5). Player A has a clear incentive to cooperate because the payoff is higher in the case of cooperation. Player B on the other hand has an incentive to defect, as this would give higher payoff. As is clear, the game is similar to the prisoners' dilemma. Importantly, if the trustee is trustworthy – meaning that she will reciprocate, the first player is better off compared to cases in which she did not trust. Thus, exerting trust pays off if the counterpart is trustworthy. Importantly, applying the basic economic principle of rational behaviour, the sub-game Nash equilibrium is to exit (i.e. not trust) for Player A, which leads to a payoff of $5 for both players. Evidence from experiments however, where individuals play the trust game, shows that a large proportion of agents choose to engage in trust by passing on their endowment to the trustee and a significant proportion of the trustees choose to reciprocate. In other words, the trust game very rarely ends in the Nash sub-game perfect equilibrium of "no trust". To economists, who tend to consider decision making as a result of agents' rational and selfish utility maximization, this result is rather unsettling. The underlying mechanisms for why individuals engage in trust where the trustee has an incentive to free-ride is subject to considerable research in psychology but as of yet, is not fully understood.

Whereas related and empirically correlated, it is important to bear in mind that generalized trust (i.e. trust to other individuals outside ones own family that one does not know) conceptually differs from trust in institutions. In terms of the trust game, where the trustee would be referred to as an institution, it would be natural to assume that the trustor already have specific information about its trustworthiness. Such information might arise through the media, friends or earlier encounters with the specific institution in question. Generalized trust as defined by the trust game, however, assumes no prior information about the trustworthiness of the trustee.

The empirical counterpart to the trust game is found in surveys where respondents are asked to report their level of trust to other individuals not counting friends and family relatives. Survey questionnaires differ in their formulation, but the most common formulation for generalized trust is "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" In some surveys, e.g. the World Value Survey (WVS), the possible answers are dichotomous, whereas in others, such as the European Social Survey (ESS) answers are given on a ten-point scale, with a low value reflecting low trust and high value reflecting high trust. One important issue is whether generalized trust in surveys indeed reflects behaviour as measured in the trust game. It turns

out that this is only partly the case. Several papers have compared survey-based and experimental measures of trust by analyzing the correlation between generalized trust in surveys and corresponding behaviours in the trust game for the same sample of individuals. Based on a representative sample of German households, Fehr et al. (2003) find that generalized trust significantly correlates with experimental behaviour (investor's behaviour) but not with trustworthiness (trustee's behaviour). Using a student sample, Glaeser et al. (2000) show that, on the contrary, there is not a very close match between trust behaviour as reported in the survey with that found in the laboratory. In line with Glaeser's results, Ermisch et al. (2009) find that survey and experimental measures of trust do not correlate in a sub-sample of the BHPS (representative of households with low to moderate income). However, both studies show that generalized trust as reported in surveys is a good reflection of experimental trustworthiness. Empirical evidence from a student-sample provided by Sapienza, Toldra and Zingales (2007) reports that the survey measure of trust is correlated with both experimental trust and trustworthiness. Overall, these empirical results suggest that generalized trust in surveys is related to experimental trust behaviours by capturing either trust or trustworthiness. This means that average levels of trust as aggregated from large scale surveys may not reflect accurately the extent to which individual respondents would engage in trusting behaviour if placed in a laboratory, but it does mean that if trust is high, the reciprocity by the trustees tend to be higher. Likewise, in cases where trust is low, if an individual chooses to engage in trust the likelihood of the trustee reciprocating the invested amount is lower.

Trust and fertility dynamics

Our key argument is that trust plays a crucial role in fertility dynamics as societies advance in their development, and in particular in the gender revolution, as it facilitates the work-family balance that is essential to reach near-replacement level fertility in advanced societies.

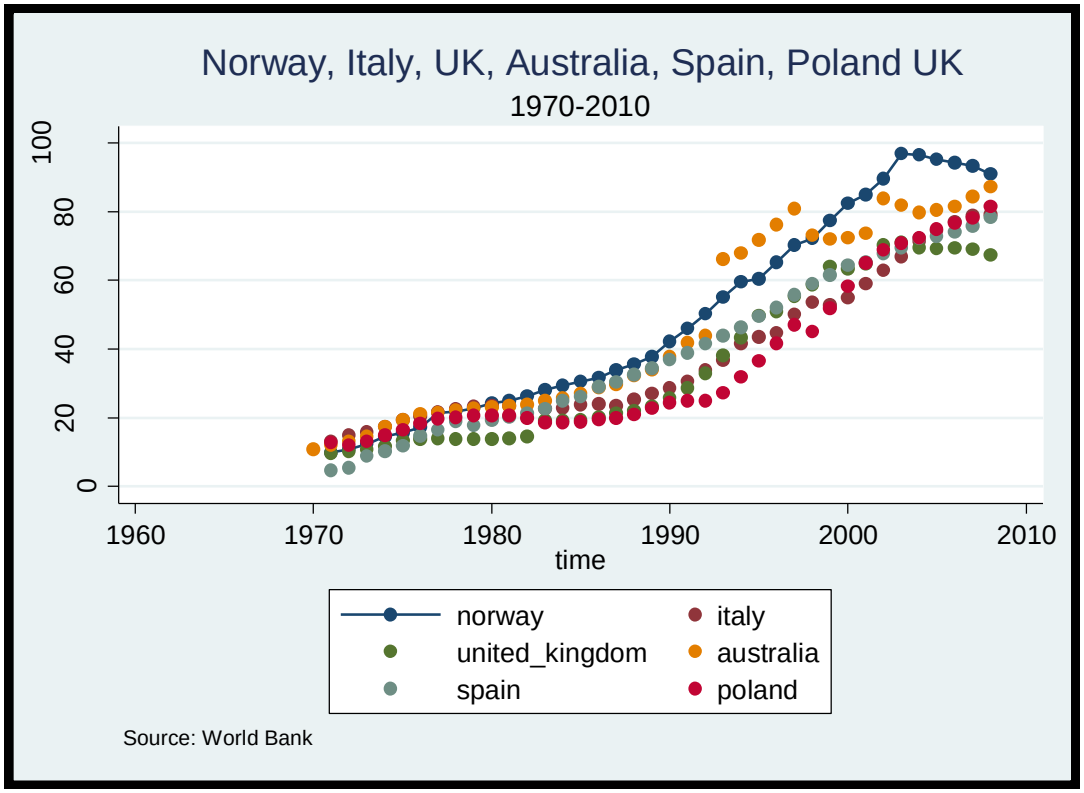
Before getting to this "direct" relationship, we discuss an indirect relationship: we know that trust has a range of benign associations with key parameters such as economic prosperity, low corruption, income equality, the functioning of democratic systems, and more broadly on the good functioning of key institutions in advanced societies. The same good functioning is now, at a cross-country level, positively correlated with fertility within advanced societies. For instance, lowest-low fertility (below 1.3 children per woman) has emerged in the Southern European countries of Italy, Spain, Portugal and Greece, to expand

towards the former communist countries of Central Europe. Germany and Austria have experienced persistently fertility levels below 1.5 during the last decades. Within the OECD, also Japan, South Korea, Singapore and Taiwan experienced lowest-low fertility. The picture is very different for Anglo-Saxon countries, here represented by the UK, US and Australia, where fertility has remained close to replacement levels. The picture is similar in the Nordic countries of Norway, Finland, Sweden, Denmark and Iceland. The noticeable outlier in continental Europe is France, with levels close to replacement.

It is not surprising, then, that if we look at very recent data, trust has a (strong) positive cross-country correlation with fertility. As we have seen, there are different explanations for the current international differences in fertility, as well for the variation in fertility dynamics. Interestingly, many of these explanations concern characteristics that correlate with trust. For instance, as documented by Myrskylä, Kohler, and Billari (2009), in recent years fertility is increasing in countries where economic prosperity is high. In developed societies where economic prosperity is relatively low, a good example being the East European countries, fertility is also very low. At the same time, trust is very low in East European countries, and much higher in more prosperous countries. Another argument is that high fertility levels in Scandinavian countries is maintained by the generous welfare state, providing rather long maternity leaves and generous financial support for families with young children. Again trust is high in those countries where welfare support is strong. Likewise, the ideas developed by McDonald (2000) concerning gender equity and fertility, is consistent with country levels of trust. On average trust is high in countries where gender equality is high, and much lower in countries where gender equality is low. Also ideational change and the development of post-modern family attitudes and behaviour is related to the Second Demographic Transition is consistent with country patterns of trust (Aassve, Bassi, and Sironi 2011). That is, countries that have progressed farthest in the Second Demographic Transition – both in terms of attitudes and behaviour – are also countries that have the highest levels of general trust.

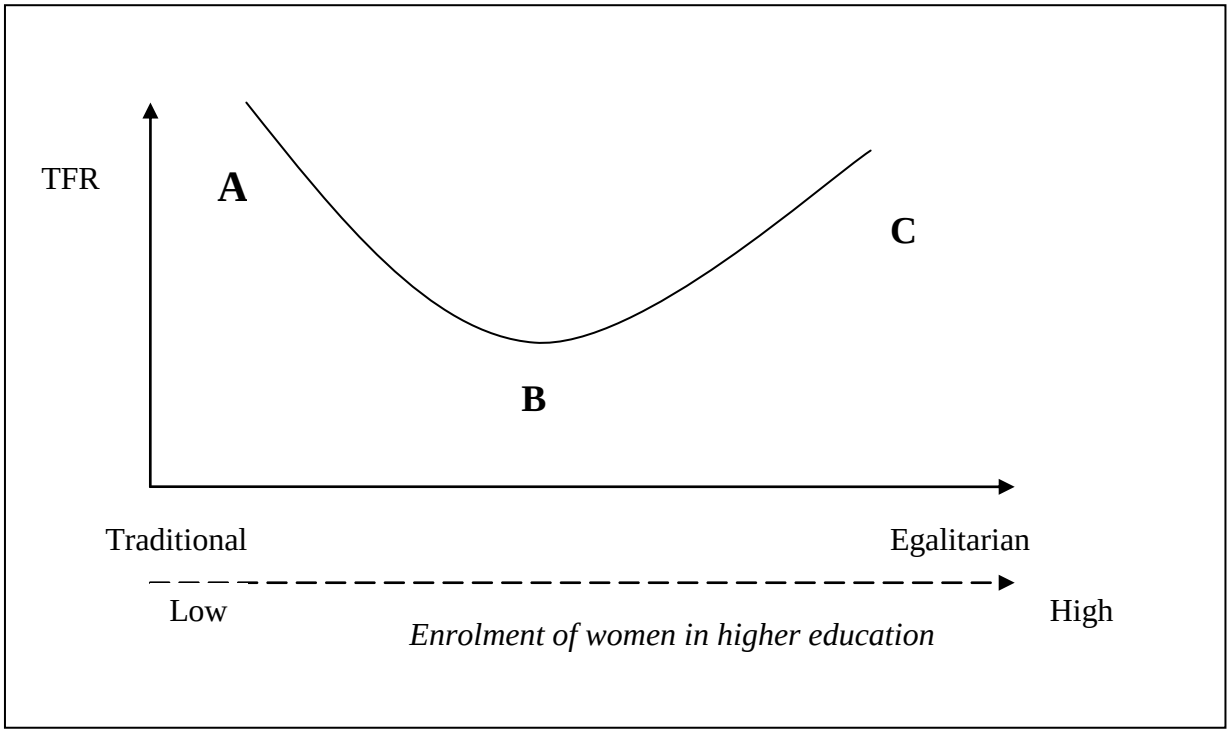
Our thesis is that generalized trust matters also directly, as it interacts crucially with the educational expansion for women. As women attend higher education in ever-greater numbers, they aspire to combine work and family, and therefore generate a greater demand for outsourcing traditional childrearing activities. It is well-known that educational expansion – and for women in particular – has indeed been fast over recent decades. Figure 1 shows the trends since 1970 for selected OECD countries.

Figure 1: Enrolment rate in Tertiary education – women (% gross)



Together with boosting labour force participation rates, women's education is having dramatic impact on women's autonomy, economic independence, attitudes and preferences. A key implication is that also women pursue, or at least would like to pursue, ambitious working careers that are not always easily compatible with childbearing. The focus on education is not new of course. Increased education especially among women is one of the most robust predictors of fertility decline (Cleland and Wilson 1987), and as a corollary, family and work incompatibilities have been touted as an important driver behind country differences in fertility (Kalwij 2010; OECD 2011). In societies where family and work compatibility is low, fertility is also low. But the key here is a potential direct effect of trust on fertility in advanced societies: generalized trust will affect the likelihood of outsourcing, and therefore fertility, as societies become more gender equal in terms of education. If trust to other individuals is low, the diffusion of outsourcing will be slow, and hence hamper the evolution and emergence of high quality care institutions, which is a precondition for high fertility. Figure 2 puts a clearer scheme to these arguments.

Figure 2: A schematic perspective of fertility and women's revolution



The area A reflects a society dominated by the male bread-winner model - a society whereby women tend to have low education and where gender equity is low – in essence a Beckerian model where men specialise in market work and women in household activities – including care for children (Becker, 1991). Point C represents the opposite of the Beckerian model - a society characterized by a high level of gender equity. Here women pursue higher education in equal manner as men – the dual-earner couple being the norm. Both the Beckerian and the Egalitarian models would predict high fertility, because in both cases behaviour is consistent with attitudes and aspirations. In the Beckerian society traditional attitudes prevail, and women's aspirations towards higher education and successful working careers are weaker – hence leading to high fertility as long as women do not work. In the egalitarian society – assuming appropriate care institutions are in place such as care children and the elderly – thereby enabling outsourcing – there is again consistency between attitudes and aspirations on one hand, and behaviour on the other.

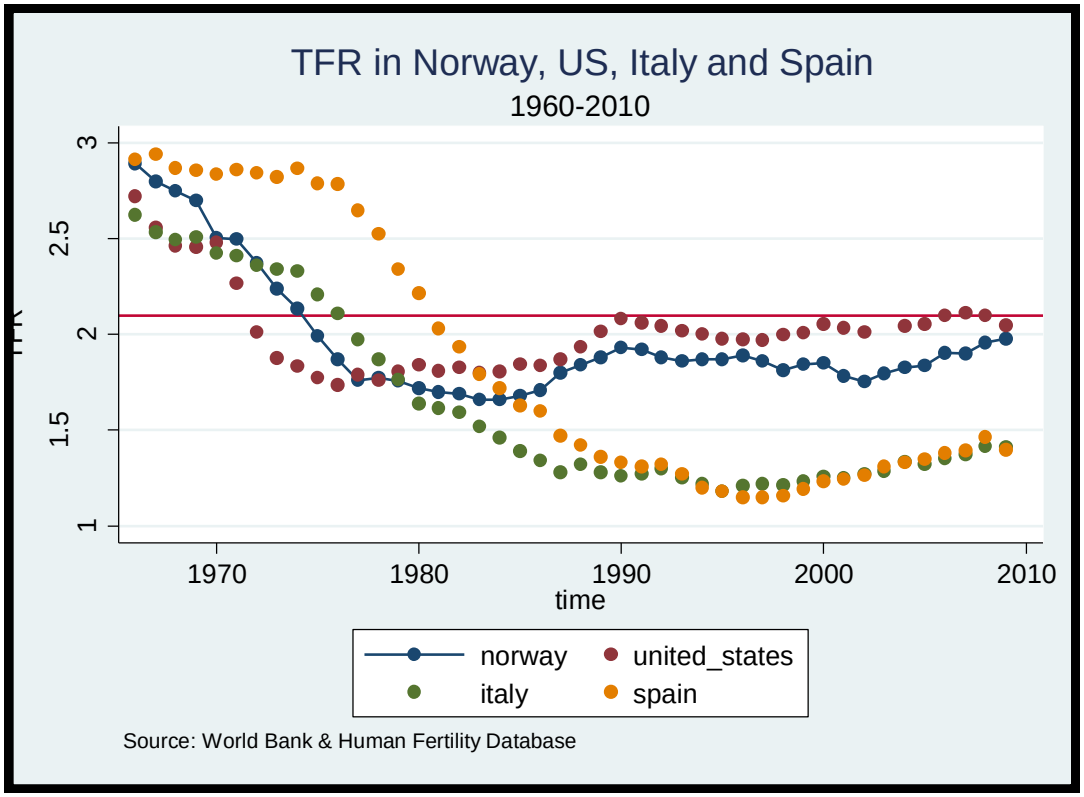
As we move from the Beckerian society to the egalitarian one – fertility is first predicted to decrease (as the Becker model predicts as women's earnings are increasing) – for then to increase in the egalitarian society. However, the shape of the fertility curve will differ across societies – and importantly it will depend on the extent individuals are willing and have the opportunity to outsource traditional family activities. Where trust is low, the development of care institutions will be slow since individuals and couples do not trust other

individuals to take care of these activities and institutions providing care for children and the elderly will in these circumstances lack diffusion. In these situations the u-shape of the fertility curve might become rather deep and long lasting in the sense that fertility is both very low and recovery might be slow. For instance, in point B in Figure 2, there would be a strong mismatch between women's work and family aspirations on one hand – and their opportunity for actually combining the two. If, in contrast, trust is high, the fertility curve will have a smaller dip and have a quicker recovery.

An important implication of our argument is that generalized trust is not a pre-condition for high fertility in the Beckerian society since here traditional family activities are in any case happening within the family unit. It is only when moving towards the Egalitarian society trust becomes critical – because outsourcing of family activities becomes a natural part of a gender equitable society. In countries where trust to other people is already high, individuals will endorse institutions to provide for those activities that traditionally belonged to the family sphere.

At this point, it is useful to look at the fertility trends for some selected countries. In Figure 3 we have plotted TFR for Norway, the US, Italy and Spain.

Figure 3: TFR for selected countries



Here we see that TFR for Norway and the US are rather similar, as are TFR for Spain and Italy, but they do follow different patterns – the latter two having a stronger dip compared to the former. Out of the four countries, Norway has the highest level of generalized trust, it is somewhat lower for the US, and significantly lower for Spain and Italy (Figure 4). Holding Figures 2 and 3 together, the suggestion is that the US and Norway are moving towards an egalitarian society quicker than what is the case for Spain and Italy. Moreover, since outsourcing is taking place more extensively in Norway and the US, fertility does not decline in the same fashion.

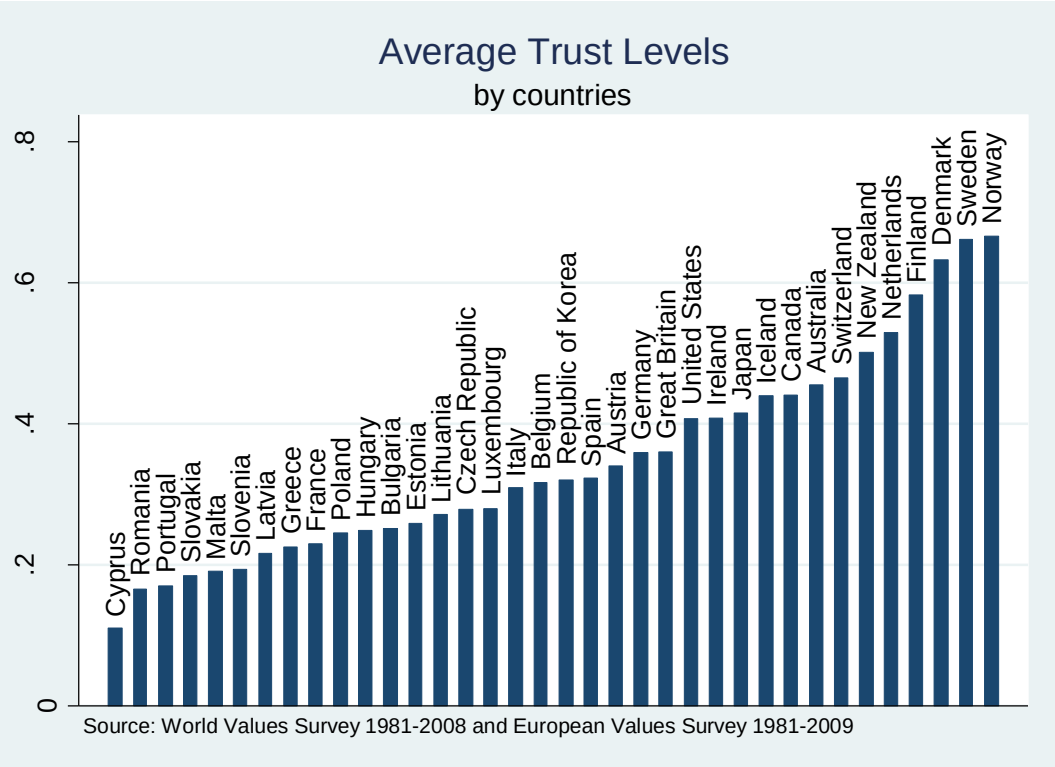
An important implication of this argument is that the willingness to outsource childrearing does not necessarily depend on the existence of an extensive welfare state. In so far individuals trust other individuals to undertake these care activities reliably and with high quality, outsourcing will take place. Thus, whether care activities are offered publicly or privately may not be critical for fertility. In the Anglo-Saxon countries, trust is put into the market. If the market can provide childcare which is acceptable to increasingly higher-educated mothers (and their often homogamous partners), individuals will be willing to use it as a potential provider of family related activities.

Data and descriptive analysis

To bring insights and empirical support to our hypothesis, we use data from the World Values Survey and the European Values Survey (WVS-EVS). The data set consists of repeated individual level surveys, the first starting in 1981 whereas the last survey was undertaken in 2009. The samples size varies, but is roughly around 1500 for each country for each wave, though not all countries participated in all rounds. The waves are conducted every fifth year but not always at the same year. We use information from 36 countries with an overall number of observations of 151. *Generalized* trust is based on the question "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?". The question offers a binary response of 0: "Can't be too careful" versus 1 "Most people can be trusted". We start the empirical analysis by generating the average level of trust for each country and for each time period when the survey was done. Taking the average across time, Figure 4 shows the mean level of trust of the 36 countries. As is clear, there is tremendous variation across countries. The Nordic countries have by far the highest levels of trust, whereas the former Soviet Union countries of East Europe have the

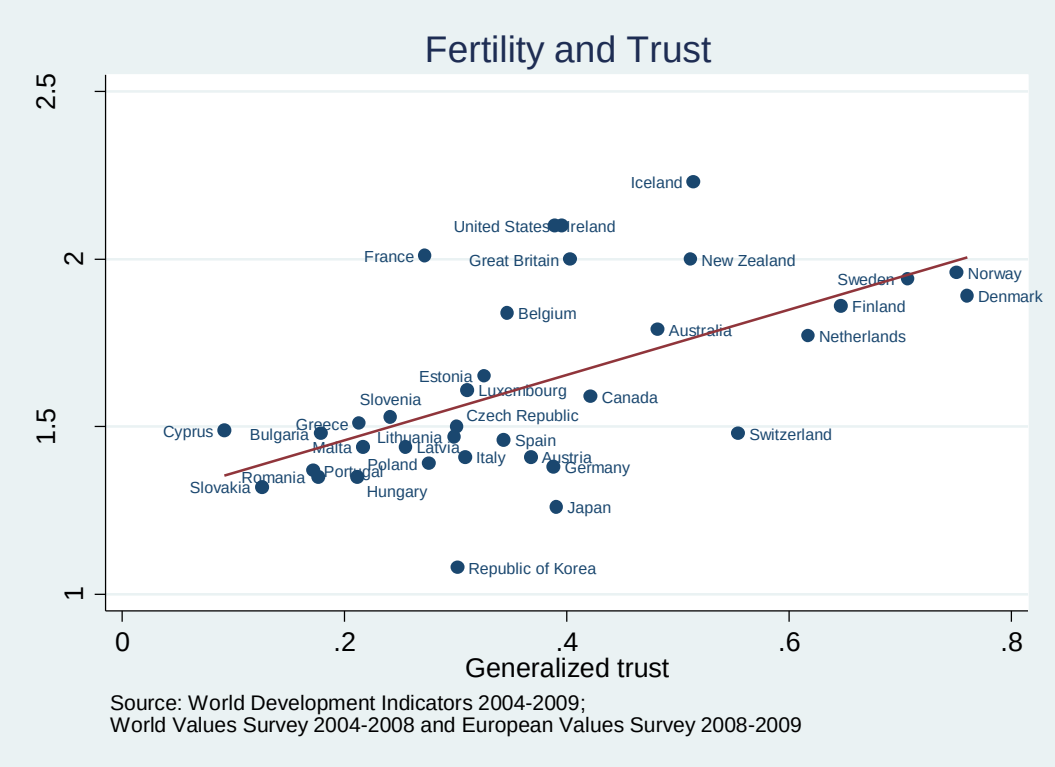
lowest – though the country with the very lowest trust value is Cyprus. It is of interest to observe that trust is also rather high in the Anglo-Saxon countries – and certainly higher than trust levels observed for the Mediterranean countries.

Figure 4: Average trust scores based on the World Values Survey and the European Values Survey



As we anticipated, the simple cross-country correlation between average generalized trust and average TFR is 0.405 and significant (Figure 5). The obvious outlier here is France, where general trust is rather low, but as we know, has a high TFR. Without France, the correlation between TFR and general trust is 0.44, and when excluding Japan and South Korea, where trust is relatively high but fertility extremely low, the correlation is 0.458.

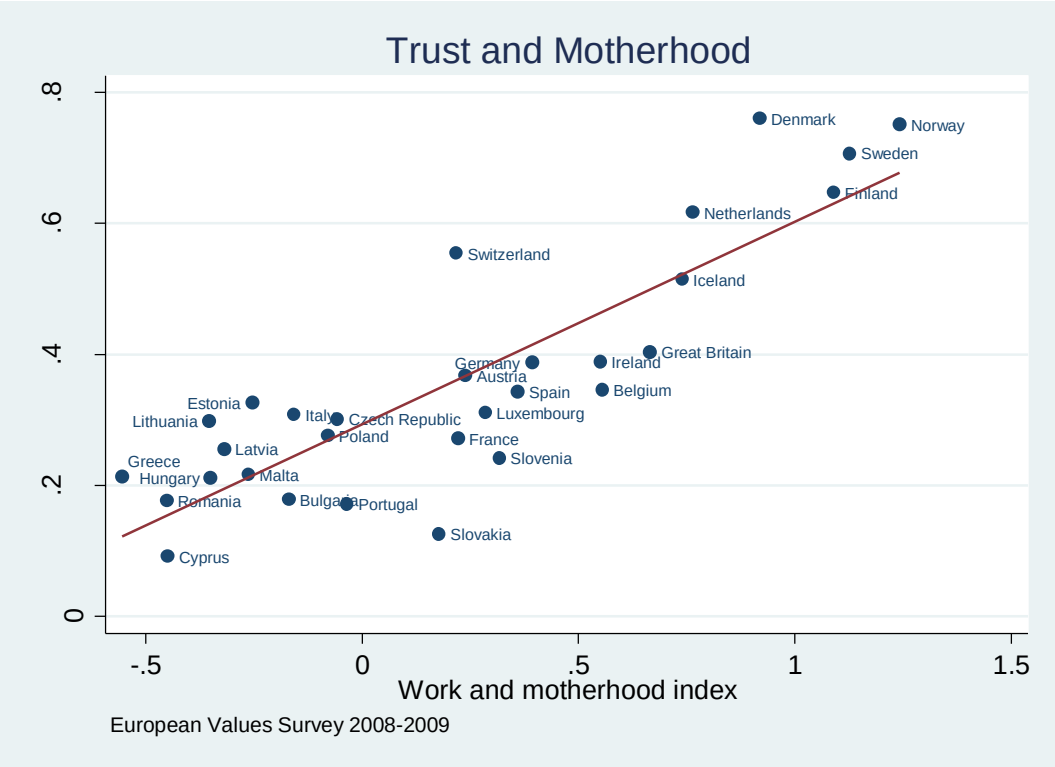
Figure 5: Total Fertility Rate against National Generalized Trust (Last wave of WVS-EVS)



The argument put forward in section 2, would imply that there is also an important correlation in advanced societies between trust and the extent to which mothers feel they can combine work and family. From the WVS-EVS we construct a "work and motherhood index" based on the following questions: 1) *"Do you think that a woman has to have children in order to be fulfilled or is this not necessary?"*2) *"A pre-school child is likely to suffer if his or her mother work." and* 3) *"A job is alright but what most women really want is a home and children".* These questions are admittedly subjective so do not objectively measure the extent family and work in a country can be combined. It does however give some indication of how mothers perceive the opportunity of combine the two. Figure 6 plots generalized trust against this index for selected EVS countries. There is a clear positive correlation between the two[1].

[1] Aassve et al (2011) using information from the European Social Survey (ESS) shows that country averages of generalized trust correlates positively with more objective measures of how the compatibility of childbearing and work. This includes various gender equality indices and availability of childcare. Also, De Ruijter and van der Lippe (2009) show, using a small Dutch couple sample, that general level of trust is positively associated to outsourcing domestic and child-care activities.

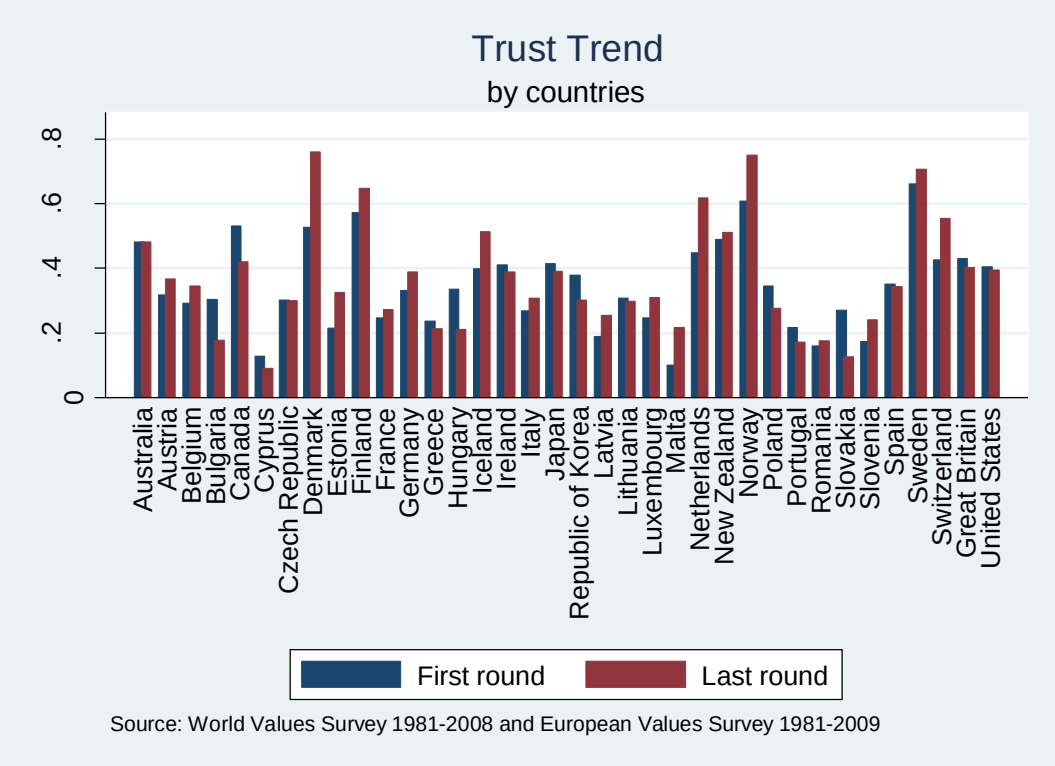
Figure 6: Average generalized trust and average work and motherhood index (European Values Survey 2008 – 2009)



Tables A1 and A2 in the Appendix provides further information about the descriptive statistics for the countries included in the analysis. For instance, Table A1 shows average levels of TFR and the mean levels of generalized trust for each country (the mean defined across time). We have also added a composite measure of confidence in institutions. The figures in parenthesis reflect the coefficient of variation (CV). As we would expect, changes in TFR are slow (reflect by the low CV), but it is interesting to see that the CV is also very low for generalized trust. This is consistent with the view that generalized trust reflects cultural traits, not changing much over time. Its persistency is highlighted when it is contrasted with the CV for confidence in institutions, which is much higher. Despite not changing much over time, it is useful to consider the trends in general trust and hold them against changes in TFR. Table A2 lists general trust measured at the first round of the WVS and the last, whereas the fourth column in Table A2 displays the difference between the two rounds. The last column displays the change in TFR over the relevant period. The results listed here are of course only indicative since the countries participate in different rounds and also differ in the amount of rounds they participate to the WVS. The trust winners are the Scandinavian countries, whereas the "losers" are the Mediterranean countries together with

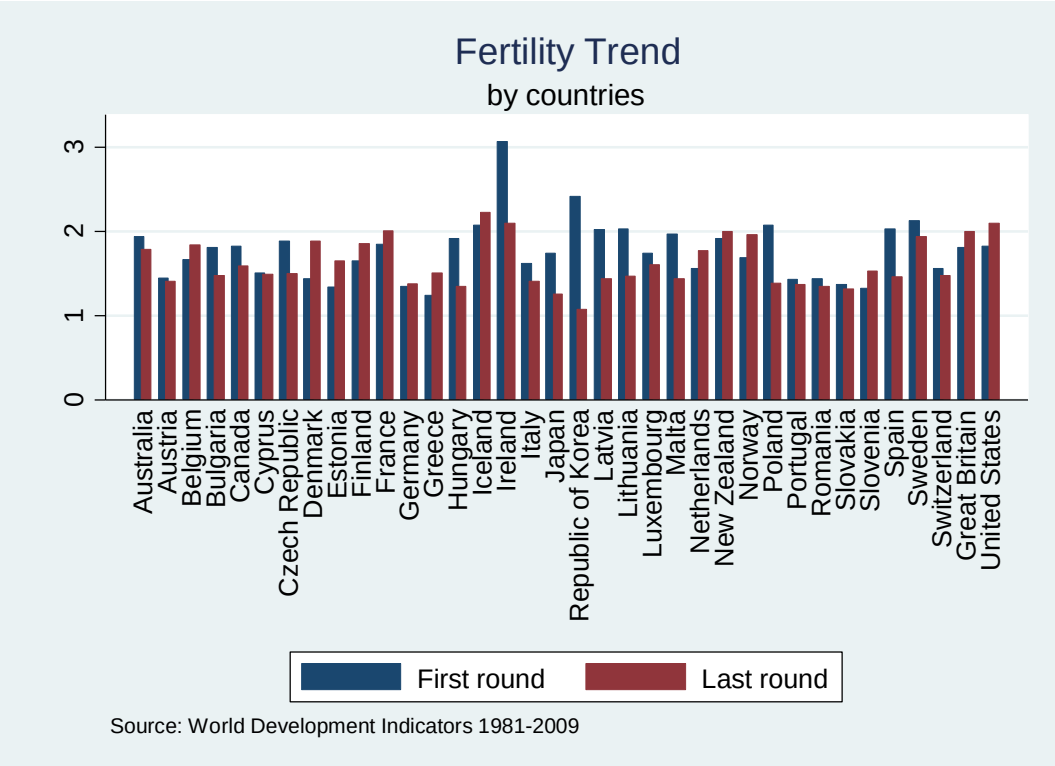
the East European countries. Also, Great Britain witnessed a significant drop in trust, though they did start from a higher level compared to the Mediterranean and East European countries. Figure 7 and 8 reflect the trends in reported in Table A2. An important insight that from Figure 7 is that despite there being differences in generalised trust across time, they are modest compared to differences across countries. In other words, the country ranking based on generalized trust is unlikely to shift much if we consider different survey rounds.

Figure 7: Variation in generalized trust



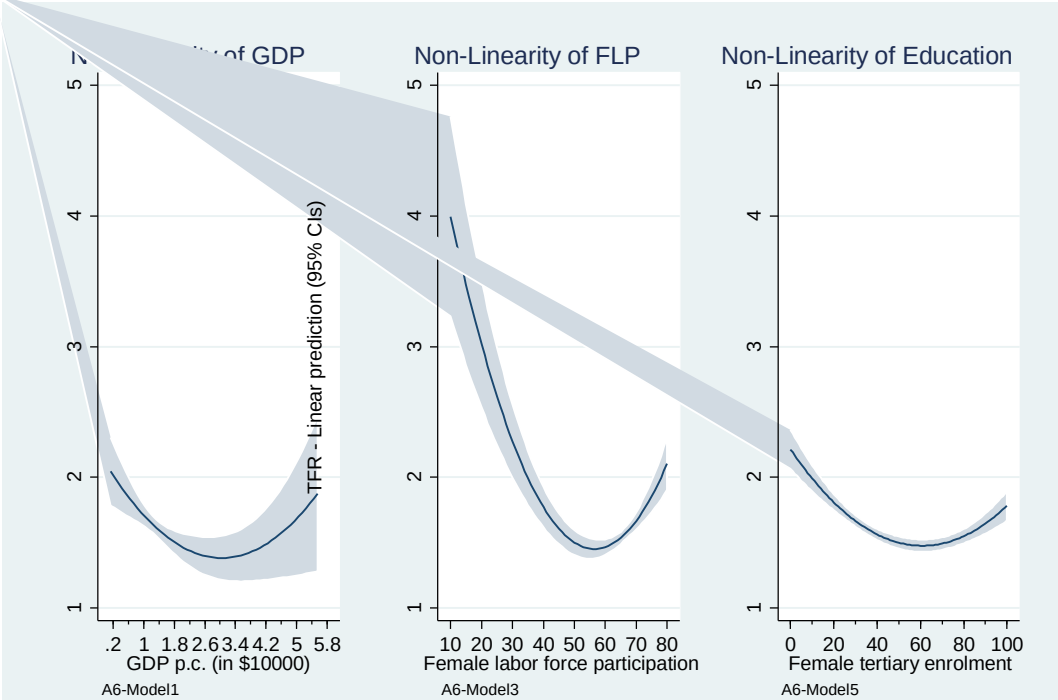
Source: World Values Survey 1981-2008 and European Values Survey 1981-2009

Figure 8: Variation in fertility



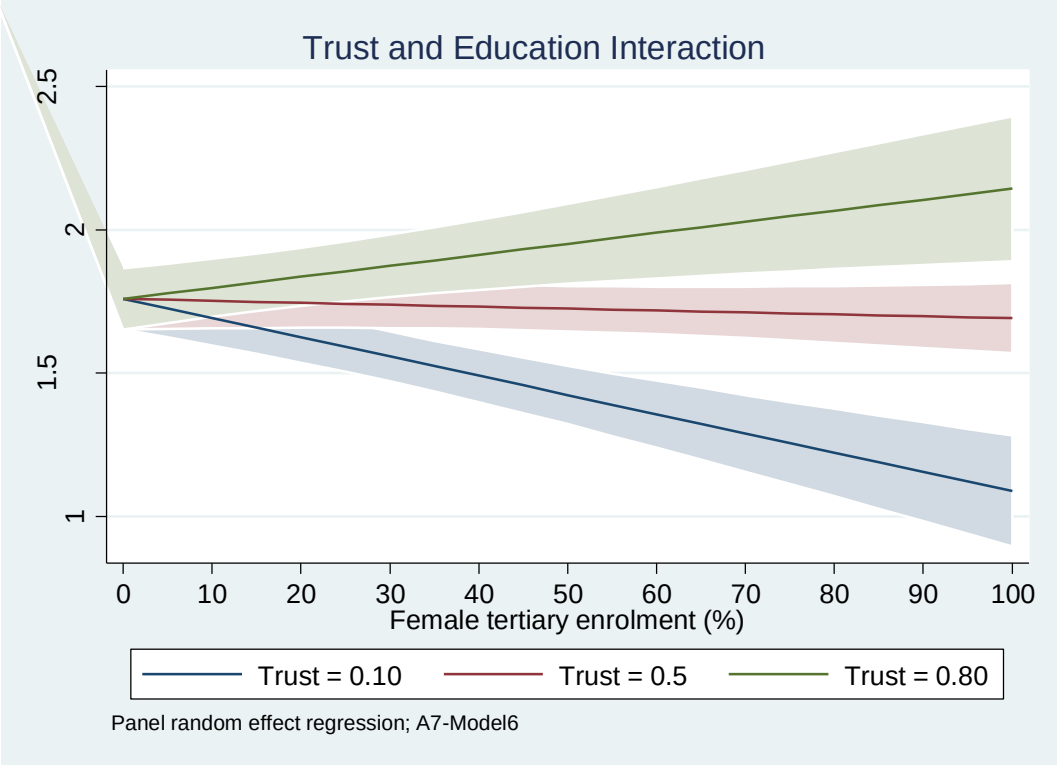
The descriptive analysis presented so far, can be enhanced by estimating simple panel regression models. Table A6 and A7 present estimation results from fixed and random effect model respectively. We illustrate graphically some of the key results from the panel regressions. Figure 9 presents the linear predictions based on – from left to right – model (1), (3) and (5) in Table A6. Each graph in Figure 9 shows, separately, the non-linear relationship between the following explanatory variables: GDP, female labor force participation and female enrolment in tertiary education and the dependent variable: TFR. The estimates reflect the non-linearity reported by Myrskylä et al (2009). That is, fertility declines with economic development, but at very high levels of development, fertility becomes positively correlated with development. Figure 9 shows that this is the case also for FLP and Female enrolment in tertiary education. Columns (2), (4) and (6) in Table A6 and A7 offer alternative specifications in that instead of including the square term of these three variables, we include their interaction with generalized trust. The estimates allude to the idea that high levels of trust associates positively with fertility. Variation in generalized trust, may therefore be a key driving force behind that non-linearity reported by Myrskylä et al (2009).

Figure 9: Predicted TFR by GDP, FLP and enrolment rate of women in tertiary education.



From Table A6, Panel fixed effect models.

Figure 10: Linear prediction of TFR by generalized trust and enrolment rate of women in tertiary education at different levels of trust.



Panel random effect regression; A7-Model6

Figure 11: Predicted TFR by generalized trust and enrolment rate of women in tertiary education.

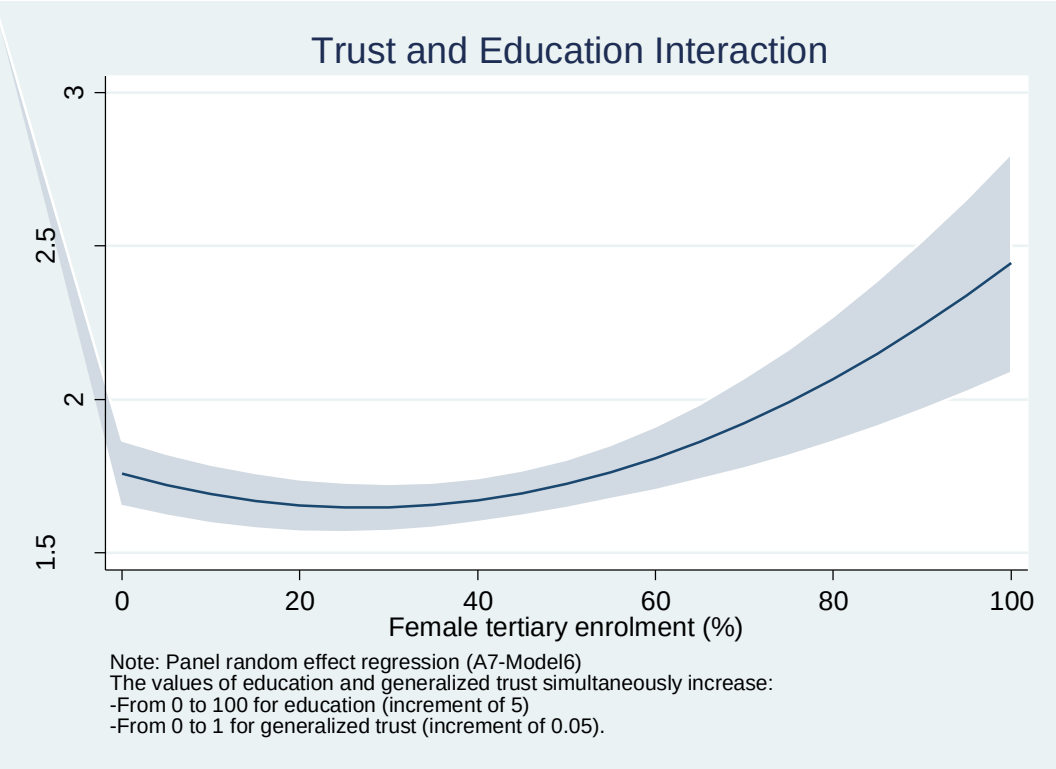


Figure 10 and 11 present the linear prediction of the interaction of generalized trust and female enrolment in tertiary education for TFR. Both the random and panel effect models predict here that when trust is very low, fertility continues to decline as education among women spreads and expands. In contrast, when trust is very high, fertility increases with educational expansion. A medium level of trust would suggest a stable level of fertility. Figure 10 exemplifies the idea. Here we make linear predictions for TFR based on different levels of female enrolment rates into tertiary education and three different scenarios of generalized trust. The shades reflect 95% confidence intervals for those predictions. As is clear, low levels of trust would generate reduction in fertility, whereas the opposite is the case for high level of trust. For a medium level of trust (here set to 0.5, which according to Figure 4, would be close to the level observed for New Zealand), the fertility trajectory remains fairly constant.

In figure 11, we present again the interaction between education and trust but here we increase gradually the values of both variables. Interestingly, the interaction term clearly replicates the non-linear pattern of TFR and this is the case independent of whether we

consider random or fixed effect estimation. This is also true for the other two explanatory variables GDP and FLP.

The panel regressions do not serve more than descriptive statistics for the way in which generalized trust affects fertility. GDP per capita, FLP and enrolment in higher education correlate strongly and all three of them correlate strongly with trust. This fact is reflected by the estimates in column (7) and (8) in Tables 1 and 2. Here all covariates are included in the same regression, and we see that the effect of GDP per capita looses significance, and in column (8) the sign is even reversed. Secondly, a quick comparison between the Fixed and Random effect estimations reveal that the coefficients between the two estimation techniques are rather different. This suggests that the explanatory variables correlate with the random effect, meaning that the estimates are biased. Consequently, the fixed effect would be the preferred one, but a serious drawback here is that there is very little variation in generalized trust over time. In other words, the fixed effect estimation does not take into account the *level* of generalized trust, which is fundamental given the argument we have developed[2]. Finally, the key weakness of the panel regression is that they do not provide a robust test for the fundamental hypothesis derived in the theoretical part, namely, to what extent does a high level of trust leads to higher fertility in settings where education expands, and in particular, women attending higher education?

Multilevel Regression analysis

In order to develop a stricter test of our trust and fertility dynamics hypothesis, we turn to the individual-level information in the WVS-EVS. We restrict the sample to include men and women aged 40 years and over, where the dependent variable is the number of children ever had. We pool all rounds of the WVS-EVS, meaning that the first observations are taken from 1981. Thus individuals incorporated in the analysis, would include respondents from the same country (though not the same respondents), for different time periods, which means different level of education, income scale[3] and FLP[4]. Testing the hypothesis requires a multilevel

[2] One alternative would be to specify a Hausman-Taylor model (Hausman and Taylor 1981), but this would mean establishing an instrument for trust, which is not straighforward.
[3] We use as an equivalent to GDP per capita the variable "Income Scale" (x047 in the dataset) from the WVS-EVS.
[4] Female labour force participation is calculated from the WVS-EVS dataset by taking the proportion of the female population ages 15-64 that is economically active (the occupational status is taken from the variable x028

framework. The estimation is implemented by a series of 3-level Poisson regression models with a natural logarithm as a link function (Skrondal A. and S. Rabe-Hesketh 2004, pp.182-183). In this case, the Poisson distribution is selected because it is better suited than standard linear regression to model our dependent variable – number of children, which is a count variable. In its simplest form, our model is specified as follows:

$$\ln(C_{irc}) = \beta_0 + \beta_1 X_{irc} + \beta_2 Z_{rc} + \beta_3 W_c + \delta_c + \varepsilon_{rc} + e_{irc},$$

Where the subscript i denotes the individual, r denotes the region, and c denotes the country. The outcome variable C_{irc} is the expected number of children for individual i. Variables are defined at each level of the data structure: X for the individual-level, Z for the region-level and W for the country-level. The variance-components of our model are specified according to the three levels: the country-specific error term is denoted by δ_c, the region-specific error term is denoted by ε_{rc} and the individual-specific error term is denoted by e_{irc}. We fit our models using IGLS estimation with second order penalised quasi-likelihood linearization as implemented by MLwiN through the STATA module *runmlwin* (STATA Module – *runmlwin* – MLwiN Version 2.25).

Table 1 – Descriptive statistics for multilevel models

Variable	Mean	St. dev.	Min	Max
Number of children	2.12	1.39	0	8
Gender	0.53	0.50	0	1
Generalized trust	0.36	0.48	0	1
Regional g. trust	0.35	0.16	0.08	1.00
National g. trust	0.35	0.15	0.09	0.76
Age	57.57	11.92	40	108
Civil status	2.17	1.79	1	6
Employment status	3.04	1.86	1	8
Regional FLP	64.94	11.30	25.21	100.00
Regional FLP	64.91	10.50	32.70	88.69
Income Scale	5.10	2.59	1	10
Regional income scale	5.20	1.28	2.14	8.50
National income scale	5.20	1.25	2.28	8.50
Education	6.37	2.92	1	10
Regional female education	6.81	1.20	2.77	9.10
National female education	6.82	1.16	2.77	9.00

and the following categories are taken as "economically active": part-time, full-time, self-employed, unemployed).

The variables we used are summarized in Table 1. At the individual level, we include education[5], gender, civil status, employment status and of course respondent's level of generalized trust. At the regional and national level, we include the average of the following variables: generalized trust, female education, income scale and female labour force participation.

The regional and national variables are constructed by taking the mean of the individual data[6] from the WVS-EVS. As we can see in Table A15, the problem with using individual and macro variables from the same sample is that they tend to be highly correlated. To avoid this problem, we centre the lower level variable on the higher level mean (Skrondal and Rabe-Hesketh, 2004, p.52). Including only one variable, our model takes the following form:

$$\ln(C_{irc}) = \beta_0 + \beta_1(X_{irc} - \overline{X}_{rc}) + \beta_2(\overline{X}_{rc} - \overline{X}_c) + \beta_3\overline{X}_c + \delta_c + \varepsilon_{rc} + e_{irc}$$

In the multilevel analysis, we are primarily interested in the interaction between individuals' level of generalized and the country-level variables. For example, considering for simplicity individual generalized trust and only one country-level variable, namely female education (taking the variables as if centred), the model is:

$$\ln(C_{irc}) = \beta_0 + \beta_1 T_{irc} + \beta_2 T_{rc} + \beta_3 T_c + \chi_1 E_{irc} + \chi_2 E_{rc} + \chi_3 E_c + \alpha(T_{irc} \times E_c) + \delta_c + \varepsilon_{rc} + e_{irc}$$

The parameter of interest is α, which measures the effect of interacting the individual level characteristic (here generalized trust) with variables measured at the country level. A positive value of α suggests that individuals with high levels of trust tend to have more children as the aggregate variables increases in value.

The key parameters from the two-level and the three-level models are presented in Table 2 and 3, respectively (The full estimates results are reported in the Appendix in Table A9 and A10). In both tables, Model (1) excludes any cross-level interaction, Model (2) includes an interaction between generalized trust and national female education, Model (3) the interaction between generalized trust and female labour force participation, and Model (4) the interaction between generalized trust and national income scale. In Model (1) in both Table 2 and 3, individuals' generalized trust is positively associated with the number of children, whereas individual level education and income are negatively associated with childbearing. The national level variables measuring income and female labour force participation have very little impact on the individual measures of childbearing, while women's education at the

[5] The education variable is measured as age at which the respondent completes his or her full education (x023 in the WVS-EVS). The variable is left-truncated at age 12 and right-truncated at age 21.

[6] We construct the regional and national variables from the WVS-EVS instead of using external data to have a better geographical (regional data) and historical coverage (starting in 1981).

country-level has a significant and negative impact on the number of children. In Table 3, we observe that when including the regional-level, the regional income scale and education variables have a significant and negative effect on childbearing while regional FLP stays insignificant. The last three parameters are the ones that matter given our initial research question. The estimates give rather clear support to the idea that generalized trust matters for childbearing when women's education is diffused in both the two- and three-level models. We find that in the two-level model and three-level model the interaction between individual generalized trust and national female education level is positive and significant, whereas the other cross-level interactions are found not to be significant.

Table 2: Multi-level regression of number of children (two levels: individual and country)

Dependent variable: Number of children	(1)	(2)	(3)	(4)
Generalized trust	1.027 (0.007)***	0.954 (0.035)	0.970 (0.038)	0.990 (0.028)
National g.trust	1.000 (0.082)	1.000 (0.082)	1.001 (0.082)	0.999 (0.082)
Education	0.977 (0.001)***	0.977 (0.001)***	0.977 (0.001)***	0.977 (0.001)***
National female education	0.984 (0.007)*	0.984 (0.007)*	0.984 (0.007)*	0.983 (0.007)*
National FLP	0.999 (0.001)+	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)+
Income scale	0.990 (0.002)***	0.990 (0.002)***	0.990 (0.002)***	0.990 (0.002)***
National income scale	0.999 (0.005)	0.999 (0.005)	0.999 (0.005)	0.999 (0.005)
G.trust x National f. education		1.011 (0.005)*		
G.trust x National FLP			1.001 (0.001)	
G.trust x National income scale				1.007 (0.005)
Observations	57945	57945	57945	57945

Note: Standard errors in parenthesis, + p<0.10 * p<0.05 ** p<0.01 *** p<0.001, exponentiated coefficients
Controls: Gender, marital status, employment status and year dummies

Table 3: Multi-level regression of number of children (three levels: individual, region and country)

Dependent variable: Number of children	(1)	(2)	(3)	(4)
Generalized trust	1.028 (0.007)***	0.960 (0.036)	0.976 (0.039)	0.992 (0.028)
Regional g.trust	1.009 (0.092)	1.007 (0.092)	1.008 (0.092)	1.008 (0.092)
National g.trust	0.996 (0.082)	0.996 (0.082)	0.997 (0.082)	0.996 (0.082)
Education	0.977 (0.001)***	0.977 (0.001)***	0.977 (0.001)***	0.977 (0.001)***
Regional female education	0.940 (0.013)***	0.940 (0.013)***	0.940 (0.013)***	0.940 (0.013)***
National female education	0.983 (0.007)*	0.983 (0.007)*	0.983 (0.007)*	0.983 (0.007)*
Regional FLP	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)
National FLP	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)
Income scale	0.991 (0.002)***	0.991 (0.002)***	0.991 (0.002)***	0.991 (0.002)***
Regional income scale	0.966 (0.013)*	0.966 (0.013)*	0.966 (0.013)*	0.966 (0.013)*
National income scale	0.999 (0.005)	0.999 (0.005)	0.999 (0.005)	0.999 (0.005)
G.trust x National f. education		1.010 (0.005)+		
G.trust x National FLP			1.001 (0.001)	
G.trust x National income scale				1.007 (0.005)
Observations	57945	57945	57945	57945

Note: Standard errors in parenthesis, + p<0.10 * p<0.05 ** p<0.01 *** p<0.001, exponentiated coefficients
Controls: Gender, marital status, employment status and year dummies

In Table 4, we test the robustness of our cross-level interaction between individual generalized trust and national female education in the three-level estimation[7] (The full estimates table is reported in the Appendix in Table A11). Model (1) includes the same interaction as before between individual trust and national education. Model (2) includes an interaction between individual generalized trust and regional female education, whereas Model (3) between regional generalized trust and national female education. Finally, in Model (4), we include the three cross-level interactions. Model (1) and (4) show that, as we theoretically expected, the interaction between individual generalized trust and national women's education is the only significant interaction, even when included the other ones.

Table 4: Multi-level regression of number of children (three levels: individual, region and country) with education interactions

Dependent variable: Number of children	(1)	(2)	(3)	(4)
Generalized trust	0.960 (0.036)	1.028 (0.007)***	1.028 (0.007)***	0.960 (0.036)
Regional g.trust	1.007 (0.092)	1.009 (0.092)	0.621 (0.375)	0.617 (0.373)
National g.trust	0.996 (0.082)	0.996 (0.082)	0.996 (0.082)	0.996 (0.082)
Education	0.977 (0.001)***	0.977 (0.001)***	0.977 (0.001)***	0.977 (0.001)***
Regional female education	0.940 (0.013)***	0.940 (0.013)***	0.940 (0.013)***	0.940 (0.013)***
National female education	0.983 (0.007)*	0.983 (0.007)*	0.983 (0.007)*	0.983 (0.007)*
G.trust x National f. education	1.010 (0.005)+			1.010 (0.005)+
G.trust x Regional f. education		1.000 (0.023)		0.999 (0.023)
Regional g.trust x National f. education			1.082 (0.104)	1.082 (0.105)
Observations	57945	57945	57945	57945

Note: Standard errors in parenthesis, + p<0.10 * p<0.05 ** p<0.01 *** p<0.001, exponentiated coefficients
Controls: Gender, marital status, employment status, flp, income scale and year dummies

Discussion

In this paper we show that (generalized) trust is a key ingredient to explain the different trends that we have observed in advanced societies during the last decades. Our hypothesis builds on the idea that trust becomes important as countries develop towards a more egalitarian regime and in particular, women are entering higher education in greater numbers. The combination of work, childbearing and childrearing requires that traditional family activities gets outsourced and without it, women cannot be expected to both work and have children easily, which will result is fertility decline. Four decades ago, the male breadwinner model was also dominant in Scandinavian countries. We do not know if generalized trust in Scandinavian countries in the sixties and the seventies was higher than in Mediterranean countries since we

[7] In the Appendix, Table A12 and A13, we replicate the same models with cross-level interactions with the other two variables: FLP and income scale. We find that none of the interactions are significant.

do not have data going so far back in time. However, it is likely that this would have been the case, given the strong persistency in average generalized trust across time documented in the literature. The important point however, is that in male breadwinner society, generalized trust would not matter for fertility because the traditional family care activities were in any case undertaken within the family unit. As women started to attend higher education in greater number, there is also a greater demand for outsourcing of those family activities. Over time, infrastructure have expanded, supply feeding further demand, and social norms have been shifting. We have not been direct in specifying what such infrastructure is, but examples would be greater availability of child-care for very young children and care facilities for the elderly. Our key argument is that generalized trust acts as a catalyser in this process. If trust is high, the transition from a male bread-winner society to an egalitarian one becomes rapid, low trust - in contrast will hold it back.

The argument has important implications for our understanding of fertility dynamics. In essence, our argument suggests that the interaction between persistent cultural traits and broad structural change give rise to very different fertility dynamics. It also means that for some countries the fertility decline experienced in recent decades may be rather long lasting, or at least harder to reverse. The argument also reconciles to some extent the fact that fertility levels are both high in Social democratic countries such as Sweden and Norway, and Anglo Saxon countries, such as the US and the UK. In other words, generous public welfare provision, which is the hallmark of Scandinavian societies, is not a pre-condition for having high fertility. Our argument is more general in that the diffusion of outsourcing is the key, for which generalized trust is a key ingredient. The arguments put forward also relates to the literature concerning family ties. Here the idea is that long standing patterns of family ties matters for demographic behaviour (Reher 1998; Dalla Zuanna 2001; Dalla Zuanna and Micheli 2004; Livi-Bacci 2001), and that the centrality of the family is not necessarily beneficial for promoting fertility. Interestingly, generalized trust is inversely correlated with strong family ties. Starting from generalized trust has greater appeal however, both because it represents a clearly defined behavioural concept and because it finds its place in survey questionnaires. Our analysis would suggest that generalized trust, given its long standing persistency, is *the* triggering factor behind diverting fertility trends where family ties is a by-product of generalized trust. This finds support in the literature analysing formation of welfare states. Starting from the high level of trust observed in Scandinavian countries, Bjørnskov (2010) considers whether high level of trust is a result of the well functioning welfare state, or whether the welfare state arose as a result of already high level of trust. Using an instrumental

variable approach to control for the obvious issue of reversed causality, he argues that trust was influential in generating a high quality welfare state and not the other way around.

Our empirical analysis, through both descriptive statistics and multilevel regression techniques, provide rather strong support for our theoretical argument. In particular, our analysis focussed on the female enrolment rate in tertiary education and that the interaction with trust replicates the non-linear relationship between higher education and fertility. This makes logical sense if indeed "new" fertility as observed through the upswing in fertility trends takes place among women who postpone fertility due to completion of higher education. In other words, is it the case that the recently observed increases in fertility take place among women of older ages? There is a strong indication that this is indeed the case. Myrskylä et al. (2011) show that fertility above age 30 accounts completely for the upswing in fertility at high levels of development.

Finally, it is worth discussing the Eastern European countries. In general, they do fit the pattern in the sense that both fertility and generalized trust are very low. But the decline in fertility happened later – essentially coinciding with the fall of the iron curtain starting in the early nineties (Billinsgsley, 2010). Before the 1990s, the State provided support to families mainly in the form of maternity leaves, child allowances and childcare facilities, and as such outsourcing of traditional family activities were already in place. However, the transition period after 1990 has been characterized by a significant revision of these policies (Robila, 2004). With the collapse of the socialist regime, it appears that governments assumed a return of the male-breadwinner model – at least judging from the gradual closure of public childcare centres and, in particular, nurseries, while at the same time cutting financial transfers (Robila, 2004; Szelewa & Polakowski, 2008). Since then, female labour force participation has declined in many socialist countries, whereas the rise in female enrolment in higher education has continued to increase. The result, as with the Mediterranean countries, is lower fertility.

Our analysis does not come without caveats of course. For instance, our theoretical arguments build on a dynamic perspective starting from the male bread-winner model of the 60 and the 70s. Our data, however, starts in 1981 and not all countries where included in the World Value Survey at that time. There is consequently an inconsistency between our theoretical and empirical arguments. The survey question on generalized trust is binary, and hence rather crude compared to other surveys such as the ESS, where trust is based on the 10-point scale. There are also clear outliers that do not fit the argument. The WVS-EVS reports for instance low generalized trust in France, whereas fertility is generally high. Japan and South Korea are other two examples, where fertility is extremely low, but where generalized

trust is not very low. Consequently, we acknowledge that country specific fertility trends may very well depend on country specificities not captured in our empirical modelling. Still, from a global perspective the evidence is that generalised trust indeed matters for the broad patterns of fertility change.

Acknowledgements

The work has benefited from useful discussions with Diego Gambetta, Pearl Dykstra, Gosta Esping-Andersen, Wendy Sigle-Rushton, Letizia Mencarini, Daniela del Boca, Chris Flinn, Vincenzo Galasso, Jan van Bavel, Leif Andreassen, Thomas Siedler, Tale Hellevik, participants at Alp-pop conference in La Thuile in January 2011, the 2011 AISP-SIS conference (Ancona) and workshop participants at Nuffield College (Oxford). Arnstein Aassve gratefully acknowledges financial support from the ERC through starting grant ERC-2007-StG-201194 (CODEC). Arnstein Aassve and Francesco Billari gratefully acknowledge support from the Italian Ministry of Education, University and Research (PRIN Programme).

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Appendixes

Appendix A1: Mean and coefficient of variation of TFR, generalized trust and confidence in institutions

Country	TFR		Generalized trust		Confidence in institutions	
	Mean	CV	Mean	CV	Mean	CV
Australia	1.85	0.04	0.45	0.10	-0.13	-1.44
Austria	1.40	0.04	0.34	0.07	-0.15	-0.52
Belgium	1.69	0.06	0.32	0.09	0.10	0.87
Bulgaria	1.40	0.20	0.25	0.20	0.01	123.65
Canada	1.64	0.11	0.44	0.19	-0.21	-0.07
Cyprus	1.50	0.01	0.11	0.23	-0.08	-3.91
Czech Republic	1.51	0.24	0.28	0.09	0.18	2.77
Denmark	1.68	0.11	0.63	0.16	-0.09	-4.71
Estonia	1.44	0.13	0.26	0.23	0.09	2.70
Finland	1.76	0.04	0.58	0.09	-0.16	-1.67
France	1.89	0.06	0.23	0.14	0.04	1.81
Germany	1.36	0.02	0.36	0.07	0.07	3.45
Great Britain	1.81	0.06	0.36	0.20	-0.16	-0.83
Greece	1.38	0.14	0.23	0.07	0.15	6.19
Hungary	1.55	0.20	0.25	0.20	-0.03	-12.16
Iceland	2.15	0.07	0.44	0.12	-0.19	-1.80
Ireland	2.30	0.23	0.41	0.12	-0.29	-0.99
Italy	1.37	0.11	0.31	0.10	0.13	1.69
Japan	1.46	0.13	0.42	0.04	0.21	0.58
Latvia	1.45	0.28	0.22	0.19	0.15	3.12
Lithuania	1.61	0.18	0.27	0.15	0.22	3.15
Luxembourg	1.68	0.05	0.28	0.16	0.05	10.44
Malta	1.81	0.15	0.19	0.32	-0.01	-24.99
Netherlands	1.66	0.05	0.53	0.15	-0.02	-7.77
New Zealand	1.96	0.03	0.50	0.03	0.09	2.06
Norway	1.87	0.07	0.66	0.09	-0.37	-0.70
Poland	1.61	0.23	0.25	0.28	-0.01	-58.89
Portugal	1.43	0.05	0.17	0.27	0.01	16.68
Republic of Korea	1.59	0.32	0.32	0.13	-0.15	-3.24
Romania	1.35	0.04	0.17	0.24	0.37	1.38
Slovakia	1.34	0.02	0.18	0.41	0.19	1.26
Slovenia	1.32	0.09	0.19	0.18	0.31	0.85
Spain	1.40	0.21	0.32	0.19	0.06	2.47
Sweden	1.80	0.14	0.66	0.06	-0.15	-1.13
Switzerland	1.50	0.03	0.47	0.18	-0.03	-13.90
United States	2.00	0.05	0.41	0.15	-0.18	-1.14

Appendix A2: Winners and losers in trust and fertility

Country	Generalized trust in first round	Generalized trust in last round	TFR in first round	TFR in last round	Difference in trust	Difference in TFR
Australia	0.48	0.48	1.94	1.79	0.00	-0.15
Austria	0.32	0.37	1.45	1.41	0.05	-0.04
Belgium	0.29	0.35	1.67	1.84	0.05	0.17
Bulgaria	0.30	0.18	1.81	1.48	-0.13	-0.33
Canada	0.53	0.42	1.83	1.59	-0.11	-0.24
Cyprus	0.13	0.09	1.51	1.49	-0.04	-0.02
Czech Republic	0.30	0.30	1.89	1.50	0.00	-0.39
Denmark	0.53	0.76	1.44	1.89	0.23	0.45
Estonia	0.22	0.33	1.34	1.65	0.11	0.31
Finland	0.57	0.65	1.65	1.86	0.08	0.21
France	0.25	0.27	1.85	2.01	0.02	0.16
Germany	0.33	0.39	1.35	1.38	0.06	0.03
Great Britain	0.43	0.40	1.81	2.00	-0.03	0.19
Greece	0.24	0.21	1.24	1.51	-0.02	0.27
Hungary	0.34	0.21	1.92	1.35	-0.12	-0.57
Iceland	0.40	0.51	2.08	2.23	0.12	0.15
Ireland	0.41	0.39	3.07	2.10	-0.02	-0.97
Italy	0.27	0.31	1.62	1.41	0.04	-0.21
Japan	0.41	0.39	1.74	1.26	-0.02	-0.48
Latvia	0.19	0.26	2.02	1.44	0.06	-0.58
Lithuania	0.31	0.30	2.03	1.47	-0.01	-0.56
Luxembourg	0.25	0.31	1.74	1.61	0.06	-0.13
Malta	0.10	0.22	1.97	1.44	0.12	-0.53
Netherlands	0.45	0.62	1.56	1.77	0.17	0.21
New Zealand	0.49	0.51	1.92	2.00	0.02	0.08
Norway	0.61	0.75	1.69	1.96	0.14	0.27
Poland	0.35	0.28	2.08	1.39	-0.07	-0.69
Portugal	0.22	0.17	1.43	1.37	-0.04	-0.06
Republic of Kore	0.38	0.30	2.42	1.08	-0.08	-1.34
Romania	0.16	0.18	1.44	1.35	0.02	-0.09
Slovakia	0.27	0.13	1.37	1.32	-0.14	-0.05
Slovenia	0.17	0.24	1.33	1.53	0.07	0.20
Spain	0.35	0.34	2.03	1.46	-0.01	-0.57
Sweden	0.66	0.71	2.13	1.94	0.05	-0.19
Switzerland	0.43	0.55	1.56	1.48	0.13	-0.08
United States	0.41	0.40	1.83	2.10	-0.01	0.27

Figure 3 and 4 reflect the trends states in Table 2

Appendix A3: Total Fertility Rate against Average Generalized Trust

Country	TFR	Generalized trust
Australia	1.79	0.48
Austria	1.41	0.37
Belgium	1.84	0.35
Bulgaria	1.48	0.18
Canada	1.59	0.42
Cyprus	1.49	0.09
Czech Republic	1.50	0.30
Denmark	1.89	0.76
Estonia	1.65	0.33
Finland	1.86	0.65
France	2.01	0.27
Germany	1.38	0.39
Great Britain	2.00	0.40
Greece	1.51	0.21
Hungary	1.35	0.21
Iceland	2.23	0.51
Ireland	2.10	0.39
Italy	1.41	0.31
Japan	1.26	0.39
Latvia	1.44	0.26
Lithuania	1.47	0.30
Luxembourg	1.61	0.31
Malta	1.44	0.22
Netherlands	1.77	0.62
New Zealand	2.00	0.51
Norway	1.96	0.75
Poland	1.39	0.28
Portugal	1.37	0.17
Republic of Kore	1.08	0.30
Romania	1.35	0.18
Slovakia	1.32	0.13
Slovenia	1.53	0.24
Spain	1.46	0.34
Sweden	1.94	0.71
Switzerland	1.48	0.55
United States	2.10	0.40

Figure 5 reflects the values stated in Table 3.

Appendix A4: Average generalized trust and average work and motherhood index

Country	Generalized trust	Work and Motherhood Index
Austria	0.37	0.24
Belgium	0.35	0.56
Bulgaria	0.18	-0.17
Cyprus	0.09	-0.45
Czech Republic	0.30	-0.06
Denmark	0.76	0.92
Estonia	0.33	-0.25
Finland	0.65	1.09
France	0.27	0.22
Germany	0.39	0.39
Great Britain	0.40	0.67
Greece	0.21	-0.55
Hungary	0.21	-0.35
Iceland	0.51	0.74
Ireland	0.39	0.55
Italy	0.31	-0.16
Latvia	0.26	-0.32
Lithuania	0.30	-0.35
Luxembourg	0.31	0.29
Malta	0.22	-0.26
Netherlands	0.62	0.76
Norway	0.75	1.24
Poland	0.28	-0.08
Portugal	0.17	-0.03
Romania	0.18	-0.45
Slovakia	0.13	0.18
Slovenia	0.24	0.32
Spain	0.34	0.36
Sweden	0.71	1.13
Switzerland	0.55	0.22

Figure 6 reflects the values states in Table 4.

Appendix A5 – Variables included in the fixed and random effects models

Country	Survey year	GDP per capita (constant 2000 US)	TFR	Female labor force participation	Female enrolment in tertiary education
Australia	1981	14918.57	1.94	52.14	23.51
	1995	18670.22	1.82	64.22	71.84
	2005	23914.73	1.79	68.20	80.56
Austria	1990	19323.63	1.45	55.27	30.61
	1999	23051.88	1.34	62.36	54.43
	2008	27250.84	1.41	68.34	59.45
Belgium	1981	15472.12	1.67	44.00	22.20
	1990	18712.69	1.62	46.21	37.05
	1999	21916.69	1.62	55.85	60.88
	2009	24159.05	1.84	60.74	73.83
Bulgaria	1990	1670.59	1.81	66.75	27.99
	1997	1373.27	1.09	63.22	54.43
	1999	1486.93	1.23	61.67	55.63
	2006	2330.66	1.38	60.52	50.21
	2008	2661.33	1.48	63.36	57.94
Canada	1990	19561.88	1.83	68.41	98.80
	2000	23559.50	1.49	70.39	68.20
	2006	25885.79	1.59	73.40	54.91[b]
Cyprus	2006	14718.49	1.51	62.79	34.20
	2008	15509.50	1.49	64.50	41.71
Czech Republic	1990	5336.15	1.89	62.83	13.90
	1991	4741.23	1.86	63.73	14.27
	1998	5245.43	1.16	63.57	24.06
	1999	5321.85	1.13	63.80	26.86
	2008	7593.31	1.50	61.08	66.54
Denmark	1981	19520.70	1.44	71.74	28.30
	1990	24102.31	1.67	77.60	36.01
	1999	29069.96	1.73	75.53	64.21
	2008	32210.19	1.89	77.15	92.54
Estonia	1996	3138.32	1.34	66.67	42.55
	1999	3765.95	1.32	65.13	58.93
	2008	7023.88	1.65	70.20	80.44
Finland	1981	15500.62	1.65	69.92	31.77
	1990	19916.09	1.78	73.41	47.05
	1996	19454.31	1.76	69.26	75.91
	2000	23514.46	1.73	74.15	90.88
	2005	26409.56	1.80	72.66	100.79
	2009	26440.04	1.86	73.56	100.54

Appendix A5 – Variables included in the fixed and random effects models (cont'd)

Country	Survey year	GDP per capita (constant 2000 US$)	TFR	Female labor force participation	Female enrolment in tertiary education
France	1981	15732.99	1.85	55.35	26.23[c]
	1990	18761.26	1.77	57.74	39.24
	1999	21196.66	1.81	62.07	58.10
	2006	23199.02	2.00	64.96	62.03
	2008	23432.67	2.01	65.80	61.35
Germany	1997	21553.48	1.35	62.13	44.29
	1999	22428.94	1.36	63.27	45.63[b]
	2006	24562.30	1.33	69.06	47.57[b]
	2008	25546.85	1.38	70.78	46.22[b]
Greece	1999	11042.68	1.24	50.73	49.30
	2008	15088.96	1.51	55.41	95.48[d]
Hungary	1982	3889.71	1.92	60.23	14.91
	1991	3736.27	1.86	57.04	14.85
	1998	4212.68	1.32	50.43	34.36
	1999	4403.46	1.28	51.64	37.57
	2008	6022.01	1.35	54.76	76.82
Iceland	1984	23435.87	2.08	78.99	24.82
	1990	26543.39	2.31	81.65	29.05
	1999	30042.99	1.99	82.92	50.39
	2009	35235.27	2.23	81.13	98.62
Ireland	1981	10200.53	3.07	34.79	15.04
	1990	13838.21	2.12	42.06	25.67
	1999	23487.46	1.90	54.42	50.15
	2008	30588.75	2.10	62.84	64.11
Italy	1981	13191.83	1.62	39.63	23.43
	1990	16530.54	1.26	43.60	28.75
	1999	18591.56	1.23	45.53	52.87
	2005	19568.33	1.32	50.38	74.52
	2009	18452.14	1.41	51.83	77.43[a]
Japan	1981	23360.72	1.74	52.70	20.47
	1990	33595.25	1.54	57.05	22.84
	1995	35478.08	1.42	58.46	36.13
	2000	36789.22	1.36	59.52	43.84
	2005	38971.84	1.26	60.82	52.04
Republic of Korea	1982	3709.40	2.42	46.04	10.26
	1990	6895.47	1.59	49.71	23.49
	1996	10119.30	1.58	52.18	39.04
	2001	11710.58	1.30	52.75	62.51
	2005	13801.83	1.08	54.37	71.38

Appendix A5 – Variables included in the fixed and random effects models (cont'd)

Country	Survey year	GDP per capita (constant 2000 US$)	TFR	Female labor force participation	Female enrolment in tertiary education
Latvia	1990	3901.19	2.02	74.78	28.94
	1996	2477.31	1.16	63.79	40.70[e]
	1999	3065.49	1.16	62.26	62.87
	2008	6055.66	1.44	70.61	91.12
Lithuania	1990	4290.59	2.03	70.36	27.25
	1997	2905.28	1.47	66.11	38.66
	1999	3136.28	1.46	68.19	52.76
	2008	6041.41	1.47	65.47	94.59
Luxembourg	1999	43420.52	1.74	49.70	11.33
	2008	56187.56	1.61	58.14	10.35[a]
Malta	1983	4736.93	1.97	25.53	1.59
	1991	6905.68	2.04	26.66	11.50
	1999	9552.79	1.77	33.51	20.94
	2008	11004.60	1.44	41.35	38.20
Netherlands	1981	15750.70	1.56	48.05	23.80
	1990	18857.35	1.62	52.43	32.05
	1999	23440.33	1.65	64.31	49.67
	2006	26007.69	1.72	70.68	62.09
	2008	27369.28	1.77	73.35	63.78
New Zealand	1998	12516.12	1.92	66.96	71.67
	2004	14740.83	2.00	69.61	101.07
Norway	1982	22541.96	1.69	62.64	26.28
	1990	27576.91	1.93	69.93	42.34
	1996	33694.46	1.89	73.66	65.35
	2008	41692.69	1.96	77.29	90.92
Poland	1989	3096.65	2.08	63.55	22.79
	1990	3096.65	2.04	63.04	24.44
	1997	3873.72	1.51	58.20	47.02
	1999	4249.80	1.37	57.92	51.97
	2005	5223.67	1.24	57.99	75.00
	2008	6235.74	1.39	56.92	81.51
Portugal	1990	8838.42	1.43	58.03	25.96[f]
	1999	11066.82	1.50	62.88	51.07
	2008	11909.32	1.37	69.05	65.78
Romania	1993	1558.15	1.44	64.97	9.96[g]
	1998	1632.29	1.32	64.19	19.90
	1999	1615.93	1.30	64.02	22.73
	2005	2260.22	1.32	55.41	50.44
	2008	2844.64	1.35	55.33	75.37

Appendix A5 – Variables included in the fixed and random effects models (cont'd)

Country	Survey year	GDP per capita (constant 2000 US$)	TFR	Female labor force participation	Female enrolment in tertiary education
Slovakia	1998	5250.69	1.37	61.31	25.46
	1999	5247.86	1.33	61.96	27.67
	2008	8591.43	1.32	61.34	66.05
Slovenia	1992	7168.35	1.33	56.51	29.41
	1995	8074.46	1.29	63.13	34.42
	1999	9595.50	1.21	63.12	60.92
	2005	11913.45	1.26	65.98	94.48
	2008	13788.81	1.53	67.53	103.38
Spain	1981	8731.70	2.03	32.66	20.28
	1990	11346.17	1.33	41.41	36.90
	1995	12056.07	1.18	45.83	49.52
	1999	13844.53	1.19	49.66	61.59
	2000	14421.94	1.23	51.79	64.30
	2007	16369.13	1.40	61.38	75.85
	2008	16264.62	1.46	63.19	78.26
Sweden	1990	23488.28	2.13	81.91	33.37
	1996	23898.05	1.60	77.03	51.86
	1999	26725.78	1.50	75.37	74.75
	2006	32431.94	1.85	76.37	95.56
	2009	30786.18	1.94	77.00	88.15
Switzerland	1989	32578.52	1.56	67.60	15.83
	1996	32133.57	1.50	70.24	24.64
	2007	37934.83	1.46	75.04	45.49
	2008	38166.47	1.48	76.62	49.33
United Kingdom	1981	15411.41	1.81	55.95	14.04
	1990	20093.88	1.83	66.08	25.72
	1998	23495.51	1.71	66.83	58.53
	1999	24230.49	1.68	67.35	64.03
	2006	28354.31	1.84	69.14	69.45
	2009	27138.13	2.00	69.38	68.91
United States	1982	22310.19	1.83	61.28	59.99
	1990	28298.62	2.08	67.51	79.44
	1995	30051.12	1.98	69.35	87.64
	1999	34053.31	2.01	70.40	81.48
	2006	38341.63	2.10	68.75	95.71

TFR, GDP and Female enrolment in tertiary education from World Bank 2011 (WDI); FLP from International Labor Office 2011 (KILM). Exceptions: [a] UNESCO Institute for Statistics. [b] OECD Education Statistics (Calculated as follows: Female students enrolled in tertiary education / Female tertiary school age population). [c] 1982. [d] 2007. [e] 1997. [f] 1991. [g] 1992.

Appendix A6 –Panel fixed effect regressions

Dependent variable: TFR	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP per capita	-0.479	-0.341					-0.156	0.069
	(0.152)**	(0.094)***					(0.202)	(0.193)
GDP squared	0.079						0.008	
	(0.029)**						(0.028)	
Generalized trust * GDP		0.479						-0.417
		(0.150)**						(0.366)
FLP			-0.133	-0.010			-0.089	-0.002
			(0.020)***	(0.005)*			(0.018)***	(0.007)
FLP squared			0.001				0.001	
			(0.000)***				(0.000)***	
Generalized trust * FLP				0.019				0.021
				(0.006)**				(0.011)+
Wom in Tert edu (EDUC)					-0.024	-0.008	-0.021	-0.008
					(0.003)***	(0.002)***	(0.003)***	(0.003)**
EDUC squared					0.000		0.000	
					(0.000)***		(0.000)***	
Generalized trust * EDUC						0.014		0.014
						(0.004)***		(0.008)+
Observations	151	151	151	151	151	151	151	151

Standard errors in parenthesis
+ p<0.10 * p<0.05 ** p<0.01 *** p<0.001

Appendix A7 – Panel random effect regression

Dependent variable: TFR	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP per capita	0.029	-0.108					0.142	0.197
	(0.088)	(0.058)+					(0.079)+	(0.086)*
GDP squared	0.001						-0.027	
	(0.019)						(0.016)+	
Generalized trust * GDP		0.292						-0.623
		(0.103)**						(0.243)*
FLP			-0.115	-0.009			-0.081	-0.005
			(0.016)***	(0.003)**			(0.015)***	(0.004)
FLP squared			0.001				0.001	
			(0.000)***				(0.000)***	
Generalized trust * FLP				0.015				0.020
				(0.003)***				(0.008)**
Wom in Tert edu (EDUC)					-0.024	-0.008	-0.022	-0.009
					(0.003)***	(0.001)***	(0.003)***	(0.002)***
EDUC squared					0.000		0.000	
					(0.000)***		(0.000)***	
Generalized trust * EDUC						0.015		0.017
						(0.003)***		(0.006)**
Observations	151	151	151	151	151	151	151	151

Standard errors in parenthesis
+ p<0.10 * p<0.05 ** p<0.01 *** p<0.001

Appendix 8 – Descriptive statistics for the multilevel models

Country	Num Obs	Number of Children		Generalized Trust		Education			Income Scale		
	N	Mean	St Dev	Mean	St Dev	Mean	Min	Max	Mean	Min	Max
Australia	1544	2.38	1.51	0.48	0.50	6.44	1	10	5.12	1	10
Austria	1488	2.05	1.41	0.36	0.48	5.81	1	10	5.88	1	10
Belgium	1739	2.08	1.44	0.32	0.47	6.81	1	10	6.05	1	10
Bulgaria	1967	1.81	0.78	0.21	0.41	6.73	1	10	3.09	1	10
Canada	2161	2.41	1.77	0.41	0.49	7.31	1	10	5.16	1	10
Cyprus	1014	2.52	1.36	0.10	0.30	4.98	1	10	5.71	1	10
Czech Republic	2277	2.02	1.04	0.29	0.45	6.47	1	10	4.21	1	10
Denmark	1693	2.18	1.31	0.67	0.47	6.38	1	10	6.22	1	10
East Germany	1792	1.90	1.22	0.33	0.47	5.63	1	10	4.50	1	10
Estonia	1399	1.77	1.08	0.30	0.46	7.74	1	10	3.71	1	10
Finland	2061	2.10	1.54	0.57	0.50	7.58	1	10	5.49	1	10
France	2072	2.29	1.52	0.24	0.43	6.04	1	10	5.18	1	10
Great Britain	1889	1.66	1.49	0.37	0.48	5.80	1	10	6.14	1	10
Greece	1093	1.92	1.03	0.21	0.41	5.19	1	10	5.21	1	10
Hungary	1308	1.93	1.04	0.21	0.41	5.74	1	10	3.59	1	9
Iceland	1152	3.05	1.62	0.48	0.50	7.50	1	10	5.99	1	10
Ireland	1060	3.08	2.25	0.40	0.49	4.90	1	10	5.92	1	10
Italy	1729	1.89	1.20	0.35	0.48	5.23	1	10	5.17	1	10
Japan	2306	2.09	1.01	0.42	0.49	7.16	1	10	5.11	1	10
Latvia	1350	1.73	1.14	0.21	0.41	7.77	1	10	3.07	1	10
Lithuania	1161	1.95	1.12	0.27	0.44	7.83	1	10	3.63	1	9
Luxembourg	858	1.89	1.20	0.33	0.47	6.29	1	10	7.35	1	10
Malta	1091	2.39	1.73	0.21	0.41	4.44	1	10	4.47	1	10
Netherlands	2293	2.19	1.52	0.54	0.50	6.30	1	10	6.15	1	10
Norway	1016	2.29	1.44	0.59	0.49	4.48	1	10	5.74	1	10
Poland	1271	2.24	1.38	0.23	0.42	6.66	1	10	3.70	1	10
Portugal	454	1.89	1.39	0.19	0.39	3.04	1	10	5.18	1	10
Republic of Korea	600	2.35	1.07	0.29	0.45	7.54	1	10	4.68	1	10
Romania	2240	2.16	1.34	0.16	0.37	5.83	1	10	4.51	1	10
Slovakia	1751	2.30	1.30	0.16	0.36	6.45	1	10	4.20	1	10
Slovenia	1473	1.93	0.99	0.20	0.40	6.69	1	10	4.96	1	10
Spain	2659	2.30	1.55	0.30	0.46	3.94	1	10	4.19	1	10
Sweden	2750	2.02	1.12	0.67	0.47	7.98	1	10	6.27	1	10
Switzerland	1902	1.90	1.32	0.51	0.50	7.50	1	10	6.48	1	10
United States	1176	2.54	1.74	0.42	0.49	8.35	1	10	6.13	1	10
West Germany	2156	1.87	1.31	0.35	0.48	5.90	1	10	5.60	1	10

Source: Own calculations from the World Values Survey and the European Values Survey

Appendix 8 – Descriptive statistics for the multilevel models (cont'd)

Country	% Female	% Female Labor Force Participation		Age at Survey Year		Survey years
	Mean	Mean	St Dev	Mean	St Dev	
Australia	0.50	64.52	6.27	64.67	6.43	1995, 2005
Austria	0.56	58.92	5.89	58.92	5.89	1999, 2008
Belgium	0.52	65.29	2.72	65.29	2.72	1999, 2009
Bulgaria	0.56	70.57	4.74	70.57	4.74	1999, 2006, 2008
Canada	0.58	72.34	2.82	72.45	2.92	2000, 2006
Cyprus	0.53	59.75	3.80	59.84	3.70	2006, 2008
Czech Republic	0.55	68.15	6.92	68.15	6.92	1990, 1999, 2008
Denmark	0.48	74.98	4.60	74.98	4.60	1981, 1999, 2008
East Germany	0.55	72.85	3.23	72.85	3.23	1999, 2006, 2008
Estonia	0.65	75.27	1.90	75.27	1.90	1999, 2008
Finland	0.49	68.80	4.49	68.85	4.42	1996, 2000, 2005, 2009
France	0.50	65.22	5.83	65.22	5.83	1999, 2006, 2008
Great Britain	0.52	64.08	4.60	64.08	4.60	1998, 1999, 2006, 2009
Greece	0.55	54.63	2.50	54.67	2.57	1999, 2008
Hungary	0.54	59.46	4.59	59.46	4.59	1999, 2009
Iceland	0.48	77.31	4.24	77.31	4.24	1984, 1999, 2008
Ireland	0.54	55.65	5.64	55.94	5.58	1981, 1999, 2009
Italy	0.51	58.27	2.09	58.27	2.09	1999, 2005, 2009
Japan	0.49	59.95	2.97	59.95	2.97	1990, 1995, 2000, 2005
Latvia	0.62	69.43	4.52	69.43	4.52	1999, 2008
Lithuania	0.52	72.68	0.30	72.68	0.30	1999, 2008
Luxembourg	0.47	56.56	1.28	56.56	1.28	1999, 2008
Malta	0.54	36.74	1.68	36.74	1.68	1983, 1999, 2008
Netherlands	0.52	63.55	11.79	63.55	11.79	1981, 1999, 2006, 2008
Norway	0.49	74.69	5.37	74.69	5.37	1982, 1996
Poland	0.55	62.62	0.36	62.62	0.36	1999, 2008
Portugal	0.60	73.90	0.00	73.90	0.00	2008
Republic of Korea	0.51	38.31	0.00	38.31	0.00	2005
Romania	0.55	48.06	0.33	48.06	0.33	1999, 2005, 2008
Slovakia	0.56	73.53	6.52	73.53	6.52	1990, 1999, 2008
Slovenia	0.55	64.07	2.91	64.07	2.91	1999, 2005, 2008
Spain	0.53	52.24	10.12	52.24	10.12	1990, 1995, 1999, 2000, 2007, 2008
Sweden	0.50	78.25	1.96	78.25	1.96	1996, 1999, 2006, 2009
Switzerland	0.52	71.57	4.67	71.57	4.67	1996, 2007, 2008
United States	0.54	74.37	3.11	74.37	3.11	1995, 1999
West Germany	0.54	60.98	7.96	60.98	7.96	1981, 1999, 2006, 2008

Source: Own calculations from the World Values Survey and the European Values Survey

Appendix A9 – Multi-level regression of number of children (two levels: individual and country)

Dependent variable: Number of children	(1)	(2)	(3)	(4)
Fixed Part				
Gender (0=male)	0.994 (0.006)	0.994 (0.006)	0.994 (0.006)	0.994 (0.006)
Marital status (Married)				
Living together as married	0.764 (0.016)***	0.764 (0.016)***	0.764 (0.016)***	0.764 (0.016)***
Divorced	0.849 (0.009)***	0.849 (0.009)***	0.849 (0.009)***	0.849 (0.009)***
Separated	0.875 (0.020)***	0.875 (0.020)***	0.875 (0.020)***	0.875 (0.020)***
Widowed	0.995 (0.009)	0.995 (0.009)	0.995 (0.009)	0.995 (0.009)
Single/Never married	0.181 (0.004)***	0.181 (0.004)***	0.181 (0.004)***	0.181 (0.004)***
Employment status (Full time)				
Part time	1.058 (0.013)***	1.058 (0.013)***	1.058 (0.013)***	1.057 (0.013)***
Self employed	1.057 (0.014)***	1.057 (0.014)***	1.057 (0.014)***	1.057 (0.014)***
Retired	1.067 (0.008)***	1.067 (0.008)***	1.067 (0.008)***	1.067 (0.008)***
Housewife	1.145 (0.013)***	1.145 (0.013)***	1.145 (0.013)***	1.145 (0.013)***
Students	1.082 (0.077)	1.082 (0.077)	1.081 (0.077)	1.081 (0.077)
Unemployed	1.025 (0.016)	1.025 (0.017)	1.025 (0.017)	1.024 (0.016)
Other	1.057 (0.022)**	1.057 (0.022)**	1.057 (0.022)**	1.057 (0.022)**
Generalized trust	1.027 (0.007)***	0.954 (0.035)	0.970 (0.038)	0.990 (0.028)
National g.trust	1.000 (0.082)	1.000 (0.082)	1.001 (0.082)	0.999 (0.082)
Education	0.977 (0.001)***	0.977 (0.001)***	0.977 (0.001)***	0.977 (0.001)***
National female education	0.984 (0.007)*	0.984 (0.007)*	0.984 (0.007)*	0.983 (0.007)*
National FLP	0.999 (0.001)+	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)+
Income scale	0.990 (0.002)***	0.990 (0.002)***	0.990 (0.002)***	0.990 (0.002)***
National income scale	0.999 (0.005)	0.999 (0.005)	0.999 (0.005)	0.999 (0.005)
G.trust x National f. education		1.011 (0.005)*		
G.trust x National FLP			1.001 (0.001)	
G.trust x National income scale				1.007 (0.005)
Year dummy	Yes	Yes	Yes	Yes
Constant	2.717 (0.169)***	2.714 (0.169)***	2.712 (0.169)***	2.719 (0.169)***
Random Part				
Country level	0.018 (0.004)***	0.018 (0.004)***	0.018 (0.004)***	0.018 (0.004)***
Observations	57945	57945	57945	57945

Note: Standard errors in parenthesis, + p<0.10 * p<0.05 ** p<0.01 *** p<0.001, exponentiated coefficients

Appendix A10 – Multi-level regression of number of children (three levels: individual, region and country)

Dependent variable: Number of children	(1)	(2)	(3)	(4)
Fixed Part				
Gender (0=male)	0.995 (0.006)	0.995 (0.006)	0.995 (0.006)	0.995 (0.006)
Marital status (Married)				
Living together as married	0.764 (0.016)***	0.764 (0.016)***	0.764 (0.016)***	0.764 (0.016)***
Divorced	0.851 (0.010)***	0.852 (0.010)***	0.852 (0.010)***	0.852 (0.010)***
Separated	0.878 (0.020)***	0.878 (0.020)***	0.878 (0.020)***	0.878 (0.020)***
Widowed	0.997 (0.009)	0.997 (0.009)	0.997 (0.009)	0.997 (0.009)
Single/Never married	0.181 (0.004)***	0.181 (0.004)***	0.181 (0.004)***	0.181 (0.004)***
Employment status (Full time)				
Part time	1.057 (0.013)***	1.058 (0.013)***	1.057 (0.013)***	1.057 (0.013)***
Self employed	1.058 (0.014)***	1.058 (0.014)***	1.058 (0.014)***	1.058 (0.014)***
Retired	1.068 (0.008)***	1.069 (0.008)***	1.069 (0.008)***	1.068 (0.008)***
Housewife	1.144 (0.013)***	1.144 (0.013)***	1.144 (0.013)***	1.144 (0.013)***
Students	1.083 (0.077)	1.084 (0.077)	1.083 (0.077)	1.083 (0.077)
Unemployed	1.024 (0.017)	1.024 (0.017)	1.024 (0.017)	1.024 (0.017)
Other	1.056 (0.022)**	1.056 (0.022)**	1.057 (0.022)**	1.056 (0.022)**
Generalized trust	1.028 (0.007)***	0.960 (0.036)	0.976 (0.039)	0.992 (0.028)
Regional g.trust	1.009 (0.092)	1.007 (0.092)	1.008 (0.092)	1.008 (0.092)
National g.trust	0.996 (0.082)	0.996 (0.082)	0.997 (0.082)	0.996 (0.082)
Education	0.977 (0.001)***	0.977 (0.001)***	0.977 (0.001)***	0.977 (0.001)***
Regional female education	0.940 (0.013)***	0.940 (0.013)***	0.940 (0.013)***	0.940 (0.013)***
National female education	0.983 (0.007)*	0.983 (0.007)*	0.983 (0.007)*	0.983 (0.007)*
Regional FLP	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)
National FLP	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)
Income scale	0.991 (0.002)***	0.991 (0.002)***	0.991 (0.002)***	0.991 (0.002)***
Regional income scale	0.966 (0.013)*	0.966 (0.013)*	0.966 (0.013)*	0.966 (0.013)*
National income scale	0.999 (0.005)	0.999 (0.005)	0.999 (0.005)	0.999 (0.005)
G.trust x National f. education		1.010 (0.005)+		
G.trust x National FLP			1.001 (0.001)	
G.trust x National income scale				1.007 (0.005)
Year dummy	Yes	Yes	Yes	Yes
Constant	2.722 (0.170)***	2.719 (0.170)***	2.718 (0.170)***	2.724 (0.171)***
Random Part				
Country level	0.016 (0.004)***	0.016 (0.004)***	0.016 (0.004)***	0.016 (0.004)***
Regional level	0.002 (0.001)***	0.002 (0.001)***	0.002 (0.001)***	0.002 (0.001)***
Observations	57945	57945	57945	57945

Note: Standard errors in parenthesis, + p<0.10 * p<0.05 ** p<0.01 *** p<0.001, exponentiated coefficients

Appendix A11 – Multi-level regression of number of children with education interactions (three levels: individual, region and country)

Dependent variable: Number of children	(1)	(2)	(3)	(4)
Fixed Part				
Gender (0=male)	0.995 (0.006)	0.995 (0.006)	0.995 (0.006)	0.995 (0.006)
Marital status (Married)				
Living together as married	0.764 (0.016)***	0.764 (0.016)***	0.764 (0.016)***	0.764 (0.016)***
Divorced	0.852 (0.010)***	0.851 (0.010)***	0.851 (0.010)***	0.852 (0.010)***
Separated	0.878 (0.020)***	0.878 (0.020)***	0.878 (0.020)***	0.878 (0.020)***
Widowed	0.997 (0.009)	0.997 (0.009)	0.997 (0.009)	0.997 (0.009)
Single/Never married	0.181 (0.004)***	0.181 (0.004)***	0.181 (0.004)***	0.181 (0.004)***
Employment status (Full time)				
Part time	1.058 (0.013)***	1.057 (0.013)***	1.057 (0.013)***	1.058 (0.013)***
Self employed	1.058 (0.014)***	1.058 (0.014)***	1.058 (0.014)***	1.058 (0.014)***
Retired	1.069 (0.008)***	1.068 (0.008)***	1.068 (0.008)***	1.069 (0.008)***
Housewife	1.144 (0.013)***	1.144 (0.013)***	1.144 (0.013)***	1.144 (0.013)***
Students	1.084 (0.077)	1.083 (0.077)	1.083 (0.077)	1.083 (0.077)
Unemployed	1.024 (0.017)	1.024 (0.017)	1.024 (0.017)	1.024 (0.017)
Other	1.056 (0.022)**	1.056 (0.022)**	1.056 (0.022)*	1.056 (0.022)**
Generalized trust	0.960 (0.036)	1.028 (0.007)***	1.028 (0.007)***	0.960 (0.036)
Regional g.trust	1.007 (0.092)	1.009 (0.092)	0.621 (0.375)	0.617 (0.373)
National g.trust	0.996 (0.082)	0.996 (0.082)	0.996 (0.082)	0.996 (0.082)
Education	0.977 (0.001)***	0.977 (0.001)***	0.977 (0.001)***	0.977 (0.001)***
Regional female education	0.940 (0.013)***	0.940 (0.013)***	0.940 (0.013)***	0.940 (0.013)***
National female education	0.983 (0.007)*	0.983 (0.007)*	0.983 (0.007)*	0.983 (0.007)*
Regional FLP	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)
National FLP	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)
Income scale	0.991 (0.002)***	0.991 (0.002)***	0.991 (0.002)***	0.991 (0.002)***
Regional income scale	0.966 (0.013)*	0.966 (0.013)*	0.965 (0.013)**	0.965 (0.013)**
National income scale	0.999 (0.005)	0.999 (0.005)	0.999 (0.005)	0.999 (0.005)
G.trust x National f. education	1.010 (0.005)+			1.010 (0.005)+
G.trust x Regional f. education		1.000 (0.023)		0.999 (0.023)
Regional g.trust x National f. education			1.082 (0.104)	1.082 (0.105)
Year dummy	Yes	Yes	Yes	Yes
Constant	2.719 (0.170)***	2.722 (0.170)***	2.721 (0.170)***	2.718 (0.170)***
Random Part				
Country level	0.016 (0.004)***	0.016 (0.004)***	0.016 (0.004)***	0.016 (0.004)***
Regional level	0.002 (0.001)***	0.002 (0.001)***	0.002 (0.001)***	0.002 (0.001)***
Observations	57945	57945	57945	57945

Note: Standard errors in parenthesis, + p<0.10 * p<0.05 ** p<0.01 *** p<0.001, exponentiated coefficients

Appendix A12 – Multi-level regression of number of children with FLP interactions (three levels: individual, region and country)

Dependent variable: Number of children	(1)	(2)	(3)	(4)
Fixed Part				
Gender (0=male)	0.995 (0.006)	0.995 (0.006)	0.995 (0.006)	0.995 (0.006)
Marital status (Married)				
Living together as married	0.764 (0.016)***	0.764 (0.016)***	0.764 (0.016)***	0.764 (0.016)***
Divorced	0.852 (0.010)***	0.851 (0.010)***	0.852 (0.010)***	0.852 (0.010)***
Separated	0.878 (0.020)***	0.878 (0.020)***	0.878 (0.020)***	0.878 (0.020)***
Widowed	0.997 (0.009)	0.997 (0.009)	0.997 (0.009)	0.997 (0.009)
Single/Never married	0.181 (0.004)***	0.181 (0.004)***	0.181 (0.004)***	0.181 (0.004)***
Employment status (Full time)				
Part time	1.057 (0.013)***	1.057 (0.013)***	1.057 (0.013)***	1.057 (0.013)***
Self employed	1.058 (0.014)***	1.058 (0.014)***	1.058 (0.014)***	1.058 (0.014)***
Retired	1.069 (0.008)***	1.068 (0.008)***	1.069 (0.008)***	1.069 (0.008)***
Housewife	1.144 (0.013)***	1.144 (0.013)***	1.144 (0.013)***	1.144 (0.013)***
Students	1.083 (0.077)	1.083 (0.077)	1.083 (0.077)	1.083 (0.077)
Unemployed	1.024 (0.017)	1.024 (0.017)	1.024 (0.017)	1.024 (0.017)
Other	1.057 (0.022)**	1.056 (0.022)**	1.056 (0.022)**	1.057 (0.022)**
Generalized trust	0.976 (0.039)	1.028 (0.007)***	1.028 (0.007)***	0.976 (0.039)
Regional g.trust	1.008 (0.092)	1.009 (0.092)	0.719 (0.439)	0.717 (0.438)
National g.trust	0.997 (0.082)	0.997 (0.082)	0.996 (0.082)	0.997 (0.082)
Education	0.977 (0.001)***	0.977 (0.001)***	0.977 (0.001)***	0.977 (0.001)***
Regional female education	0.940 (0.013)***	0.940 (0.013)***	0.940 (0.013)***	0.940 (0.013)***
National female education	0.983 (0.007)*	0.983 (0.007)*	0.983 (0.007)*	0.983 (0.007)*
Regional FLP	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)
National FLP	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)
Income scale	0.991 (0.002)***	0.991 (0.002)***	0.991 (0.002)***	0.991 (0.002)***
Regional income scale	0.966 (0.013)*	0.966 (0.013)*	0.966 (0.013)**	0.966 (0.013)**
National income scale	0.999 (0.005)	0.999 (0.005)	0.999 (0.005)	0.999 (0.005)
G.trust x National FLP	1.001 (0.001)			1.001 (0.001)
G.trust x Regional FLP		1.001 (0.002)		1.001 (0.002)
Regional g.trust x National FLP			1.005 (0.010)	1.005 (0.010)
Year dummy	Yes	Yes	Yes	Yes
Constant	2.718 (0.170)***	2.722 (0.170)***	2.722 (0.170)***	2.719 (0.170)***
Random Part				
Country level	0.016 (0.004)***	0.016 (0.004)***	0.016 (0.004)***	0.016 (0.004)***
Regional level	0.002 (0.001)***	0.002 (0.001)***	0.002 (0.001)***	0.002 (0.001)***
Observations	57945	57945	57945	57945

Note: Standard errors in parenthesis, + p<0.10 * p<0.05 ** p<0.01 *** p<0.001, exponentiated coefficients

Appendix A13 – Multi-level regression of number of children with income interactions (three levels: individual, region and country)

Dependent variable: Number of children	(1)	(2)	(3)	(4)
Fixed Part				
Gender (0=male)	0.995 (0.006)	0.995 (0.006)	0.995 (0.006)	0.995 (0.006)
Marital status (Married)				
Living together as married	0.764 (0.016)***	0.764 (0.016)***	0.764 (0.016)***	0.764 (0.016)***
Divorced	0.852 (0.010)***	0.852 (0.010)***	0.851 (0.010)***	0.852 (0.010)***
Separated	0.878 (0.020)***	0.878 (0.020)***	0.878 (0.020)***	0.878 (0.020)***
Widowed	0.997 (0.009)	0.997 (0.009)	0.997 (0.009)	0.997 (0.009)
Single/Never married	0.181 (0.004)***	0.181 (0.004)***	0.181 (0.004)***	0.181 (0.004)***
Employment status (Full time)				
Part time	1.057 (0.013)***	1.057 (0.013)***	1.057 (0.013)***	1.057 (0.013)***
Self employed	1.058 (0.014)***	1.058 (0.014)***	1.058 (0.014)***	1.058 (0.014)***
Retired	1.068 (0.008)***	1.068 (0.008)***	1.068 (0.008)***	1.068 (0.008)***
Housewife	1.144 (0.013)***	1.144 (0.013)***	1.144 (0.013)***	1.144 (0.013)***
Students	1.083 (0.077)	1.083 (0.077)	1.083 (0.077)	1.083 (0.077)
Unemployed	1.024 (0.017)	1.024 (0.017)	1.024 (0.017)	1.024 (0.017)
Other	1.056 (0.022)**	1.056 (0.022)*	1.056 (0.022)*	1.056 (0.022)**
Generalized trust	0.992 (0.028)	1.028 (0.007)***	1.028 (0.007)***	0.992 (0.028)
Regional g.trust	1.008 (0.092)	1.008 (0.092)	1.189 (0.453)	1.184 (0.451)
National g.trust	0.996 (0.082)	0.996 (0.082)	0.997 (0.082)	0.995 (0.082)
Education	0.977 (0.001)***	0.977 (0.001)***	0.977 (0.001)***	0.977 (0.001)***
Regional female education	0.940 (0.013)***	0.940 (0.013)***	0.939 (0.013)***	0.939 (0.013)***
National female education	0.983 (0.007)*	0.983 (0.007)*	0.983 (0.007)*	0.983 (0.007)*
Regional FLP	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)
National FLP	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)	0.999 (0.001)
Income scale	0.991 (0.002)***	0.991 (0.002)***	0.991 (0.002)***	0.991 (0.002)***
Regional income scale	0.966 (0.013)*	0.966 (0.013)*	0.967 (0.013)*	0.967 (0.013)*
National income scale	0.999 (0.005)	0.999 (0.005)	0.999 (0.005)	0.999 (0.005)
G.trust x National income scale	1.007 (0.005)			1.007 (0.005)
G.trust x Regional income scale		1.009 (0.021)		1.009 (0.021)
Regional g.trust x National income scale			0.969 (0.070)	0.969 (0.070)
Year dummy	Yes	Yes	Yes	Yes
Constant	2.724 (0.171)***	2.722 (0.170)***	2.723 (0.170)***	2.725 (0.171)***
Random Part				
Country level	0.016 (0.004)***	0.016 (0.004)***	0.016 (0.004)***	0.016 (0.004)***
Regional level	0.002 (0.001)***	0.002 (0.001)***	0.002 (0.001)***	0.002 (0.001)***
Observations	57945	57945	57945	57945

Note: Standard errors in parenthesis, + p<0.10 * p<0.05 ** p<0.01 *** p<0.001, exponentiated coefficients

Appendix A14 – Variance Decomposition

	IRC		IC	
	Var	Δ Var (%)	Var	Δ Var (%)
No covariates				
Country level	0.015	-	0.019	-
	(0.004)***		(0.005)***	
Regional level	0.005	-		
	(0.001)***			
Model 1 - No interaction				
Country level	0.016	0.07	0.018	-0.06
	(0.004)***		(0.004)***	
Regional level	0.002	-0.60		
	(0.001)***			
Model 2 - Education interaction				
Country level	0.016	0.07	0.018	-0.06
	(0.004)***		(0.004)***	
Regional level	0.002	-0.60		
	(0.001)***			
Model 3 - FLP interaction				
Country level	0.016	0.07	0.018	-0.06
	(0.004)***		(0.004)***	
Regional level	0.002	-0.60		
	(0.001)***			
Model 4 - Income interaction				
Country level	0.016	0.07	0.018	-0.06
	(0.004)***		(0.004)***	
Regional level	0.002	-0.60		
	(0.001)***			

Note: Standard errors in parenthesis * p<0.05 ** p<0.01 *** p<0.001
IRC (individual, region and country); IC (individual and country)

Appendix A15 – Correlation Matrix

	G. trust	Reg. g.trust	Nat. g.trust	Inc. Scale	Reg. inc	Nat. inc	Educ	Reg. female educ	Nat. female educ	Reg. FLP	Nat. FLP
G. trust	1.000										
Reg. g.trust	0.330	1.000									
Nat. g.trust	0.321	0.968	1.000								
Inc. Scale	0.211	0.280	0.277	1.000							
Reg. inc	0.178	0.480	0.469	0.518	1.000						
Nat. inc	0.174	0.470	0.482	0.505	0.971	1.000					
Educ	0.172	0.131	0.127	0.317	0.053	0.042	1.000				
Reg. female educ	0.108	0.301	0.296	0.075	0.107	0.087	0.427	1.000			
Nat. female educ	0.105	0.293	0.303	0.061	0.082	0.087	0.418	0.971	1.000		
Reg. FLP	0.143	0.400	0.399	0.119	0.191	0.168	0.214	0.422	0.415	1.000	
Nat. FLP	0.148	0.415	0.430	0.113	0.173	0.179	0.222	0.437	0.449	0.926	1.000