University of Bamberg Demographic Discussion Papers

Societal Agreement on Gender Role Attitudes and Childlessness in 38 Countries

Ansgar Hudde

Otto-Friedrich-Universität Bamberg
University of Bamberg

Societal Agreement on Gender Role Attitudes and Childlessness in 38 Countries

1 Introduction

The idea that patterns of fertility and parenthood over time are a U-shaped function of societal gender relations has gained growing interest in recent years: once gender relations moved away from the male breadwinner model, childlessness increased and overall fertility decreased. That is to say, more gender equality meant less fertility. After a certain threshold is surpassed, the gender equity-fertility nexus changes its direction: more gender equality or gender equity means less childlessness and more fertility (e.g. McDonald, 2000b, 2000a; Esping-Andersen, 2009; Esping-Andersen & Billari, 2015; Goldscheider, Bernhardt, & Lappegård, 2015).

While these authors provide important contributions to the formulation of broad theoretical frameworks that link changing gender roles to changes in demographic behaviour, there is a lack of knowledge about the underlying mechanisms and little empirical evidence. The existing studies, e.g. Arpino, Esping-Andersen, and Pessin (2015) or Myrskylä, Kohler, and Billari (2011) are able to show that higher gender equality or more gender equitable attitudes are associated with higher fertility on the macro-level, but these analyses do not trace the underlying mechanisms.

Taking the framework by Esping-Andersen and Billari (2015) as point of departure, this paper develops and tests such a mechanism: the lack of macro-level, societal agreement on a specific gender role model decreases people's chance to become parents. Empirically, the degree of societal agreement on gender role attitudes is

measured as the variation in gender role attitudes in a given society. Low variation, meaning that most members of society share similar attitudes, represents great societal agreement, high variation the opposite. Multilevel models are run using the Family and Changing Gender Roles IV-module from the International Social Survey Programme 2012 (ISSP) for 38 countries. The dependent variable of interest is variation in gender role attitudes. This is measured as the standard deviation of a factor variable that measures gender role attitudes in a given country. The measure for gender role attitudes describes the opinion how given tasks or privileges, such as childcare or uptake of parental leave, should be distributed between males and females. Results show that large variation in gender role attitudes on the macro-level is significantly associated with higher final childlessness on the individual level. This holds against a number of robustness checks. Three-level models which measure gender role attitudes and their variation at the sub-national, regional level and apply country-level fixed-effects show that the observed association goes beyond unobserved country-level characteristics such as general culture, family-friendliness or social policy.

This paper offers four main contributions to the literature on gender relations and childlessness. First, it specifies and tests a mechanism that links societal gender roles to fertility. Second, the multilevel-analysis combines societal gender roles with individual fertility, ruling out that any macro-level association is driven by the composition of the populations regarding factors that influence the transition to parenthood. Third, by measuring final childlessness, the measure does not suffer from tempo distortions caused by cross-country differences in the timing of fertility. Fourth, using ISSP data from 2012 I am able to apply a measure for gender role attitudes that is more integral and unambiguous than in previous cross-country analyses.

The paper is structured as follows: section 2 and provide the theoretical and empirical background for this paper. Section 4 develops the main argument. Section

3

5 presents the data source and the applied methods; results are shown in section 6. Section 7 concludes.

2 Theoretical Approaches to Gender Relations and Fertility

A number of recent publications link gender relations to demographic behaviour. McDonald (2000b, 2000a), Esping-Andersen (2009), Esping-Andersen and Billari (2015), Goldscheider et al. (2015) and others explain changes in fertility with the transition from a gender-asymmetric towards a gender-symmetric society.[1] Many of these works are related to literature about a U-shaped relationship between social and economic development with fertility (cf. Myrskylä, Kohler, & Billari, 2009; Myrskylä, Goldstein, & Cheng, 2013; Luci-Greulich & Thévenon, 2014). For a recent discussion of these arguments from an American perspective see Cherlin (2016). McDonald (2000a, 2000b) theorizes that low fertility occurs when institutions that deal with people as individuals (as opposed to institutions that deal with people as members of families), for example in the educational system and the labour market, do adapt to the 'new role of women' and provide similar or equal opportunities for women as for men while other family-related institutions, namely the family itself, are still organized in a 'traditional' way. Fertility will recover once all institutions adopt the new gender roles and become coherent again (McDonald, 2000a).

Goldscheider et al. (2015) interpret changing gender relations as a revolution in two steps. At first women's roles in the public sphere change while men's involvement in the home remains unchanged. Issues of gender equity, a weakening of the family as

---

[1]To describe the male-breadwinner and the dual-earner gender roles various different terms are used: gender-asymmetric, traditional, old or unequal versus gender-symmetric, new, modern, gender-equal or gender-equitable. Especially the term 'gender-equitable' could be misleading though as different societies and societies at different times might regard different gender roles as equitable (cf. McDonald, 2013).

such and declining fertility are the consequence. In the second step men's role in the home changes. This reinstalls gender equity, strengthens the family and facilitates higher fertility.

Esping-Andersen and Billari (2015) present a theory which interprets a U-shaped evolution of fertility levels depending on the spreading of gender-symmetric norms and attitudes. They argue that societies move from a situation with a societal agreement on gender relations, a situation with strong gender role norms (male breadwinner and female homemaker), "through a prolonged period of uncertainty and normative confusion" towards a situation with new strong gender role norms centred around more gender-symmetric norms and the dual-career family model (Esping-Andersen & Billari, 2015, p.6). When there are strong gender related norms most members of the society share the same ideals about gender roles.

The arguments from McDonald (2000b, 2000a), Goldscheider et al. (2015) and Esping-Andersen and Billari (2015) share many common traits.[2] All claim that (Western) post World War II societies are inevitably moving from a stable societal arrangement around the male breadwinner model towards the gender equity model. Nevertheless, as all three focus on different aspects (while also discussing and including the focus of the each other), they bring along different implicit or explicit conclusions. In order for fertility to recover, all emphasize the need of vast societal change.

According to McDonald (2000b, 2000a) fertility will recover once all institutions, such as the tax system, childcare facilities or the family as such, adapt to women's new roles. Following Goldscheider et al. (2015), fertility will increase once men assume their new roles as equals in the household. According to Esping-Andersen and

---

[2]Esping-Andersen and Billari (2015) refer to previous work by McDonald several times and also stress the importance of policy. Goldscheider et al. (2015) name an argument that is very similar to Esping-Andersen and Billari (2015), namely that the first half of the gender revolution "created considerable confusion about what men and women expect from each other" (p.211), yet they only refer to Esping-Andersen and Billari (2015) in a subordinate clause on a different argument.

Billari (2015), fertility will recover once the 'normative confusion' is decreasing, that is to say: once there is a new societal *agreement* on what constitutes proper gender- and family roles.

The here established mechanism that links the societal variation in gender role attitudes to the transition to parenthood builds upon Esping-Andersen and Billari (2015). Normative change concerning gender roles can take two ideal-typical paths: either the society as a whole shifts slowly, uniformly and step-by-step in a certain direction, or the transition from one model to another causes ruptures as some member of the society adopt a new model, while others continue sticking to the old one. To give an example, the uniform scenario might look like this: in the, say, 1960s, most members of the society believe that the male-breadwinner and female-homemaker model is the right way to go. Gradual change begins, and people tend to favour more and more female employment and male involvement in the home. 20 years later the clear societal norm is that mothers work part-time while still doing most of the work in the home. Another 20 years later all members of the society favour a model in which both partners share work for pay and unpaid work in the home equally. All these changes could potentially happen in a uniform way. The implication would be that the *variation* in realized gender roles and gender role attitudes is low and constant over time. While this scenario is possible, the version in which the transition causes ruptures might seem more likely and is the one that Esping-Andersen and Billari (2015) describe in their framework. Some members of the society adhere to new gender roles while others adhere to traditional ones. Esping-Andersen and Billari (2015) state that it is an implication of this scenario that there is more *variation* in gender roles half way, when there is no model of gender relations that is the clear societal norm. This plurality of gender roles is said to produce normative confusion: there are no clear gender roles which have a strong normative pull and give members of the society (or a societal group) a guideline on what constitutes 'good', socially

6

desired and simply *normal* gender roles. Esping-Andersen and Billari (2015) do however, not give further attention to this idea of normative confusion and the lack of clear societal ideas in gender relations. They neither conceptualize it further, nor do they provide a thorough attempt to capture and measure this idea empirically.[3] The aim of this paper is to do exactly that: give further attention to the idea of normative confusion and the lack of clear societal ideas in gender relations, describe a theoretical approach in which the variation is the causal driver behind demographic behaviour, provide an operationalization of variation in attitudes and test how it is associated with people's propensity to remain childless.

---

[3]In an endnote next to a graph on the "Relationship between gender egalitarianism and partnership stability, late 1980s" Esping-Andersen and Billari (2015, p.22) discuss the comparison of two measures for the "the hegemony of gender norms: either a simple headcount (share of egalitarians in the population) or the coefficient of variation (to capture the degree of value uniformity in the population). Our estimations produce essentially the same result" (Esping-Andersen & Billari, 2015, p.26). For binary variables, coefficient of variation is no suitable indicator for the degree of uniformity or variation (Vogt & Johnson, 2011, p.59). Standard deviation or variance are measures for the degree of variation in a dummy-variable, but a distinct interpretation of variation and mean value provides little insight: variation and mean value determine each other mathematically. For each mean value, there is only one mathematically possible value for variance of standard deviation. For each value of standard deviation there are two possible corresponding mean values, one being $.5 + x$, the other $.5 - x$. An example: if the mean value of a binary variable is .75, the standard deviation is forced to be .44. A population with a standard deviation of .44 could have one of the two mean values .5+.25=.75 or .5-.25=.25. In the case of Esping-Andersen and Billari (2015) all mean values are greater than .5. Thus, within their range of data, mean values perfectly predict levels of variation and vice-versa. Using the coefficient of variation, the standard deviation divided by the mean value, is not a suitable measure for the degree of variation of a dummy variable. To give an example, let us compare two populations of each 100 individuals. Population A is egalitarian: 90 individuals hold egalitarian views, 10 non-egalitarian ones. Population B is the opposite case: 10 individuals hold egalitarian views, 90 non-egalitarian ones. Intuition and standard deviation (or variance) would suggest that both populations have the same degree of variation or hegemony in attitudes (standard deviation = .30, variance = .09). The coefficient of variation would show a very different picture: it is 3.02 for population A and .36 for population B (consider also that on binary outcomes the assignment of ones and zeros is arbitrary: there is no compelling reason why egalitarians should be coded one and non-egalitarians zero, rather than the other way around). In fact by using the coefficient of variation Esping-Andersen and Billari (2015) measure practically nothing else than the mean value: in the range of their mean values, going from around .5 to close to 1, the correlation between mean value and coefficient of variation is -.99 (tested on a dummy dataset).

3 Empirical Evidence on Gender Relations and Fertility

A number of empirical studies deal with different aspects of the interplay between gender relations and fertility in advanced societies.[4] Myrskylä et al. (2011) argue that gender equity is a necessary condition for rising fertility in highly developed societies. Evidence concerning the effect of male involvement in childcare and housework on fertility is mixed (see for example Cooke, 2004; Mills, Mencarini, Tanturri, & Begall, 2008; Miettinen, Lainiala, & Rotkirch, 2015; Kan & Hertog, 2017). Studies on the effect of social policies that promote gender equality, such as the provision of childcare, are often interpreted to have a positive effect even though many of these studies face difficulties, for example concerning endogeneity, reversed causality, the isolation of different policy measures or the distinction between timing and quantum changes in fertility (see for example Neyer ,2003 ; McDonald, 2006; Gauthier, 2007; Rindfuss, Guilkey, Morgan, and Kravdal, 2010; Luci-Greulich and Thévenon, 2013; Bauernschuster, Hener, and Rainer, 2015; [Author, year]). Even though there is a lack of studies on the effect of family-friendly policies in childlessness, as opposed to overall fertility, some studies suggest that social policy might be more important for the transition to having a second or third birth that for the transition to parenthood (Hank & Kreyenfeld, 2003; Rindfuss et al., 2010; Laroque & Salanié, 2014; Bauernschuster et al., 2015). Arpino et al. (2015) analyse changes in fertility as societies move from traditional towards new gender roles. They show that at first total fertility rate (TFR) decreases as societies become more gender equitable, but once a certain threshold is reached, the relationship turns positive. This relationship seems to be moderated by the differences in attitudes between men and women: the change

---

[4]For a general overview of research on childlessness see Tanturri et al. (2015) and Kreyenfeld and Konietzka (2017), for an overview of determinants of fertility see Balbo, Billari, and Mills (2013).

happens faster and more pronounced when the agreement between men and women is greater. I argue, it is not (only) the gap between men and women that matters, but the level of agreement within the group of peers and especially within the group of *potential partners*. My analysis further adds to this as it studies final childlessness, a measure that does not suffer from tempo distortions, unlike total fertility rate[5]. Arpino et al. (2015) measure gender role attitudes as "views regarding the proper role of women in the labour market" (p.373) alone. My analysis uses a measure that is more integral and captures attitudes towards the gendered division of different tasks and privileges, such as childcare, uptake of parental leave, and working for pay.

4 Linking Variation in Gender Role Attitudes to Fertility

Building upon the work by Esping-Andersen and Billari (2015) I establish the argument that degree of variation in gender role attitudes within societies is a causal driver behind different rates of transition to parenthood. Esping-Andersen and Billari (2015) take a longitudinal perspective and describe the transition from traditional to egalitarian gender arrangements. The mechanism that I specify becomes independent of the notion of this transition. If the degree of variation in attitudes within a society is a causal driver for cross-country differences in childlessness, countries with higher variation should have systematically higher levels of childlessness. High variation in a society might be a consequence of the transition from male bread-

---

[5]Arpino et al. (2015) apply TFR as a measure for fertility. When it is the goal to compare fertility levels over space and time, this measure is problematic as it is highly influenced by changes in the timing of fertility (see for example Bongaarts & Sobotka, 2012). As the robustness checks by Arpino et al. (2015) show (online supplementary material), some of the association they report is due to tempo distortions. To capture the tempo-distortion at least roughly, they control for changes in mean age at birth. These controls decrease effect sizes by around one third; significance decreases from the 0.1%-level to 5%-level.

winner to dual earner model (as Esping-Andersen and Billari, 2015 describe it), any other transition (see below), or any other reason, such as incoherent social policy that hinders the societal gathering behind a specific role model. The question, where the variation 'comes from', is of secondary interest for this paper (but might be of interest for future research). Beforehand it should be stressed that there is no need or reason to think of gender relations in a binary way in which people either support the male-breadwinner, 'traditional' model or to the 'egalitarian','modern' model. While there is evidence suggesting that many societies are moving towards a more gender-symmetric society, it might as well happen that some societies find stable arrangements at alternative shapings of gender relations, e.g. centred around the one-and-a-half earner model or a model with gender-symmetric roles in the labour market but gender-asymmetric roles in the home, also societies might move 'backwards', towards more traditional gender regimes.

Variation in Gender Role Attitudes and Partnership Dynamics

Most women and men are assumed to have a preference for living in a harmonious, relatively conflict-free, stable relationship and for having children.[6] Conflicts might emerge if both partners have different views on gender roles, opposing opinions on the proper behaviour of a male and a female partner, of a mother and a father. Consider two hypothetical cases of couples with different gender ideologies: (I) the woman has a more symmetric gender-ideology than the male partner. The man expects her to do most of the housework and childcare while the woman wants her partner to contribute (close to) equally. (II) The man has a more symmetric gender-ideology than the woman and expects her to contribute much to the family income, while the woman expects him to earn the lion's share of the money. The man wants to involve equally in parenting while the woman wants to be the main

---

[6]E.g. Testa (2012) shows that the personal desire to have at least one child is almost universal among men and women in all EU-countries.

decision-maker in child-rearing.

In both cases the attitudinal differences are a burden to the couple. The gap between different gender role models is expected to be especially salient when a couple has young children or is planning life with children and discussing how to organize it: Who will – if at all – stop working for pay and for how long? How should the housework be divided? Who will be the main decision maker in parenting?

It could be assumed that someone's gender ideology is – just like any other character trait – something that is partly known a priori, will partly be known once certain situations are addressed explicitly (e.g. a couple discusses who would take how much parental leave if they were to have a child), and will partly only show once a certain situation arises (e.g. a woman does not have certainty on whether her partner will regularly engage in household maintenance or childcare until the couple cohabits and has a child). This implies that any planned and discussed or actual succession to a new stage of the partnership (partnership formation as such, cohabitation, marriage, transition to parenthood, having additional children) brings along the risk of a 'bad surprise': one learns more about the partner's gender ideology and it shows that the partner has ideas on gender roles that are different and potentially conflicting and incompatible to one's own ideas. Whenever such a 'bad surprise' is experienced, be it in the stage of dating, cohabiting or after a first child, the chance of taking the next step is diminished. The risk of such a disappointment is argued to be higher, the greater the variation of gender role attitudes is within the group of *potential partners*.

In a scenario in which all potential partners have the same gender ideology, the risk of a bad surprise is zero. In a scenario with a plethora of different and conflicting views, the risk becomes great. As people may have experienced role conflicts in earlier steps of the relationships, in previous relationships, or seen them among peer couples, they will anticipate that conflicts might emerge after cohabitation and

11

especially after the birth of a child. The greater the fear of important conflicts, the lower the propensity to take the risk.

This argument builds on the stated assumption that people have, at least in the early stage of partnership formation, imperfect knowledge about the gender ideology of their potential partners and partners.

Let us for a moment assume the opposite: individuals on the dating market have perfect information on the gender ideology of themselves and of all potential partners. In this case couple formation could happen on the basis of attitudinal similarity. No matter how big the variation in attitudes, most people could find a partner with compatible attitudes (assuming low or moderate differences in the attitudinal distribution between females and males) and there would be no 'bad surprises'. Empirical results seems to reject this idea. Hohmann-Marriott (2006) shows that in the late 1980s a considerable share of American couples have divergent views towards the gendered division of paid and unpaid work and couples with great dissimilarity are more likely to split up. [Author (year)] compare attitudinal similarity in 'actual' German couples to two types of 'synthetic' couples: (1) randomly matched and (2) matched based on maximum similarity in attitudes. The actual matching of partners is much closer to being random than to being perfect in the sense of maximizing similarity. [Author (year)] conclude that either couples are, due to a lack of information, unable to find partners with suiting attitudes or do not consider gender ideology as a central dimension in choosing a partner. Either of these interpretations could be read as support for the idea that high attitudinal variation on the macro-level translates into higher dissimilarity on the couple-level, as couples are either unable or 'unwilling' to base their partner choice on similarity in gender ideology.

If the elaborated mechanism is in fact at work, individuals living in societies, in which people have a high agreement on gender-roles, should be systematically more

12

likely to progress to a first or additional child than individuals living in societies where people show very different attitudes towards gender-roles. This should persist independently of the average attitude. This leads to the hypothesis: *The greater the societal variation in gender role attitudes, the higher she chance that individuals remain childless.*

As argued, this association should show in a longitudinal as well as in a cross-sectional perspective. If a high variation in attitudes *causes* high childlessness through the elaborated mechanism, then, at one point in time, individuals in a high-variance society should be less likely to achieve parenthood than those in a low-variance society, independently of how gender relations were in these societies 20 year ago or how they will be 20 years in the future.

Variation in Gender Ideology, Peer-Group Effects and Coherence of Public Policy

At least two additional mechanisms might link variation in gender role attitudes to fertility: (1) A peer-group mechanism. If a peer group of friends, colleagues or family members consists of people preferring different gender role arrangements, they might meet each other with criticism and reproaches. A person that sees mothers mainly as homemakers and fathers as providers might brand a working-mom as a bad mother and an active father as unmanly; someone who considers a working mom and an active father desirable might brand the female homemaker as unambitious and lazy, the father that focusses on his role as provider as old fashioned. Schneider and Bujard (2013) argue that this is happening in the German case. Given the general lack of survey data that covers attitudinal information of more or less entire social networks of family, friends and colleagues, testing this mechanism empirically seems difficult.

(2) A mediation through public policy: through the democratic process societal dis-

agreement on gender roles translates into incoherent public policies. In a country in which everyone has more or less the same attitudes on gender roles, most governments will tailor their family policies, such as tax system or the organization of caring for children and elderly, to this specific role model. A country with great differences in attitudes between or within different parties, coalitions and governments, might produce a policy-mix with measures that promote and incentivize different gender role models. In consequence neither the male-breadwinner nor the double-career family nor a family organised in any other way finds policies that match their needs. Note that this notion of incoherence in family policies differs from the argument of McDonald (2000b, 2000a), Esping-Andersen (2009) and others: while McDonald (2000b, 2000a), Esping-Andersen (2009) and others focus on discrepancies between societal gender norms and the entity of policies, this argument is on coherence *within* public policy, the question to which degree different measures in the policy mix "counteract each other by having different aims or requirements, or [...] reinforce each other by being on the same underlying logic" (Neyer & Andersson, 2008, p.702). As examples, France (Hantrais, 1994; Thévenon, 2009) or Sweden (Hoem, Prskawetz, & Neyer, 2001) have been described as more, Germany (Hantrais, 1994; Fleckenstein, 2011), Austria (Hoem et al., 2001) or Great Britain (Hantrais, 1994) as less coherent in their policies. Societal attitudes can be source and consequence of public policy (Svallfors, 2010). Gangl and Ziefle (2015) provide an example of such policy feedback as they identify a causal effect of a change in parental leave reform on subjective work commitment of women. Based on these ideas, policies could also influence the degree of variation in societal attitudes: coherent policies that are tailored around one specific model of gender relations might encourage one specific gender ideology and align societal attitudes around it, while an incoherent set of policies in which different measures support different gender ideologies might cement or even foster societal disagreement. The following sections

14

feature a test on whether the variation in attitudes – parenthood hypothesis holds net of effects of public policy.

5 Data & Methods

To identify and measure gender role attitudes, factor analysis is run on a battery of items from the Family and Changing Gender Roles IV-module from the International Social Survey Programme (ISSP) 2012. All countries that participate in the survey are studied, except for Spain and Turkey as key variables are not available for these two countries. This leaves 38 countries on all continents. For a list of all sample countries see the appendix.

Even though the ISSP is on Family and Changing Gender Roles, it does not feature a question on how many children a respondent has ever had. Parents and childless women and men are identified indirectly. The questionnaire asked respondents to only answer four questions if they "have ever had any children". Respondent who answered any of the four questions are coded as parents. Less than two percent of female and male respondents did not answer these questions but indicated to live in a household with children. They are coded as missing as it is unclear whether they live in a household with children of whom they are not the parent or whether they did not answer the questions for any other reason.

To detect final or very-close-to-final childlessness while keeping the sample reasonably large, main regression models are run for females aged 45+ and males 50+. Upper age limits are 55 for females and 60 for males. This leaves 6,305 individuals for regression analyses, observations per country range from 56 (India) to 720 (China). 89.9% of males are fathers, 92.3% of females are mothers. To produce reliable estimates, a broader age-range, 20 to 55 for females and 25 to 60 for males,

15

is chosen to compute the country- and region-level variables average and variation in attitudes. This leaves 23,017 observations in total, ranging from 227 (Canada) to 2638 (China) per country. The choice of sample creates two challenges: (1) the younger people in the age-range are not the same individuals and do not belong to the same cohort as those, for who I measure childlessness. (2) The older people in the sample, those for who I capture childlessness, might have changed their attitudes and views since their period of family-formation. Previous research suggests that gender role attitudes do change over the life-course. For example Perales, Lersch, and Baxter (2017) show how attitudes towards gender divisions of labour change over time Baxter, Buchler, Perales, and Western (2015) and how they respond to the transition to parenthood. Baxter et al. (2015) find opposing effects of ageing and the transition to parenthood: people become less 'gender-traditional' as they grow older, but more traditional after they become parents. The magnitude of these changes within an individual seem rather small in comparison to the between-individuals variation in attitudes (Baxter et al., 2015). Baxter et al. (2015) also suggest that younger cohorts are less traditional than older ones. There seems to be no single ideal way to account for the above described challenges, but two robustness checks are proposed: (1) Using attitudinal info of young people only, females aged 20 to 30 and males 25 to 35. The advantage of this selection is that these are the people that are currently in their main phase of partnership formation and transition to parenthood. On the down-side, attitudes and fertility-outcomes are not measured for the same cohort. Using this sample rules out potential ageing effects but ignores potential cohort effects. (2) Using attitudinal info from the same people that are included in the multi-level regressions. These are females aged 45 to 55 and males 50 to 60. Complementary to (1), this selection rules out potential changes over cohorts but ignores potential ageing effects. Both age restrictions bring along a decrease in number of observations to compute the macro-level variables (6,345 observations for

the young sample and 7,271 for elder sample) which might make the estimates to be less robust. If all three measures, variation in the whole population, among young people and among those with finished birth-careers, yield similar results, it could be read as strong support for the argument, that results are robust to potential distortions by cohort- or ageing effects of gender role attitudes.

Finding a measure for gender role attitudes that allows cross-country comparison is difficult (cf. Braun, 2008; Scott & Braun, 2009; Constantin & Voicu, 2015). A challenge is for example that a certain behaviour (or attitude towards such behaviour) might have different meanings in different cultural settings. For example Walby (1994) argues that the emancipatory power of female employment differs depending on the societal context. In some societies, working might enable women to achieve a similar status as men, in others it might not be enough, and again in others women might have an equal status even if they do not work. Constantin and Voicu (2015) argue that an older wave of ISSP from 2002 is generally suitable for comparative analyses of gender role attitudes but criticize the lack of questions on the believe how men and women should share tasks like childcare, elderly care or family-care. The ISSP 2012 contains two new questions which might fill this gap - see below. To identify latent factors that capture distinguishable aspects of gender role attitudes iterated principal factor analyses are run. The factors are rotated using promax rotation.[7] Table 1 lists all items that are used for factor analysis. The variation in gender role attitudes in a country or region is defined as the standard deviation of the factor variable in the given country or region.

Multilevel logistic regression models are run to test the hypothesis that a higher variation in gender role attitudes on the macro-level is associated with lower parenthood on the micro level. In all models the dependent variable is coded zero if the

---

[7]The goal is to find a convincing variable that captures gender role attitudes – and it is no problem if that variable is correlated with other measures and attitudes - so promax, which does not force the different factors to be uncorrelated, is chosen here.

respondent is childless and one if the respondent is a parent. All models control for micro-level variables sex, age, age-squared, and years of education and its square. On the macro-level all models control for the GDP of country (see for example Becker, 1981; Furuoka, 2009; Myrskylä et al., 2009, 2011; Harttgen & Vollmer, 2014; Luci-Greulich & Thévenon, 2014). This variable is introduced as a control because it is correlated with gender role attitudes (r=.78; p<.001), and with parenthood (r=-.36 p<.001). All control variables are interacted with sex of the respondent.

If the association between variation in gender role attitudes and fertility is explained by differences in public policy, the association should disappear once country-level fixed effects (dummy-variables for all countries) are introduced. Three-level models with individuals nested in regions which are nested in countries test this. Region-level variables, average and variation in attitudes, are computed for all regions with at least 100 attitudinal observations. Countries for which only one region fulfils this requirement are dropped from this analysis. 73 regions in 22 countries remain.

If the (dis)agreement between two partners and their chance of conflicts is the key, then what should matter is not the variation in the society as a whole, but in attitudes among potential partners. In an example: for a female college graduate aged 35, gender role attitudes of male graduates aged 30 to 45 might be more relevant that those of males aged 25 and without formal education. I try to isolate the attitudinal variation among *potential partners* from the variation in the whole society following the rationale: variation among potential partners is variation that can *not* be explained by character traits that typically shape dating behaviour. Among these variables are sex, age, education, religiosity, ethnicity or place of residence (e.g. Schwartz, 2013; Blossfeld, 2009). In other, more technical, words: the variation among potential partners is the variation that cannot be explained by micro-level regressions that regress sex, age etc. on gender role attitudes. For more information on the calculation of this measure, see the appendix. Two different measures are

proposed here: *unexplained variation I*, which applies micro-level regressions, run separately for each country, with the variables sex, age, education (with interactions for age and education with sex), region of residence and urban versus rural location. *Unexplained variation II* adds a measure for religiosity. Other relevant variables, such as the ethnicity of the respondent, are not available in a manner that is comparable between countries.

Table 1: List of items for factor analysis

Item	Label of item
warm relation	A working mother can establish just as warm and secure a relationship with her children as a mother who does not work.
child suffers	A pre-school child is likely to suffer if his or her mother works.
family suffers	All in all, family life suffers when the woman has a full-time job.
want home	A job is all right, but what most women really want is a home and children.
housewife	Being a housewife is just as fulfilling as working for pay.
both contribute	Both the man and woman should contribute to the household income.
men money	A man's job is to earn money; a woman's job is to look after the home and family.
work school	Do you think that women should work outside the home full-time, part-time or not at all under the following circumstances? After the youngest child starts school.
work U6	Do you think that women should work outside the home full-time, part-time or not at all under the following circumstances? When there is a child under school age.
leave divide	Consider a couple who both work full-time and now have a new born child. [...] if both are in a similar work situation and are eligible for paid leave, how should this paid leave period be divided between the mother and the father?
care best	Consider a family with a child under school age. What, in your opinion, is the best way for them to organise their family and work life?

Note: The first seven questions allow the following answers: strongly agree / agree / neither agree nor disagree / disagree / strongly disagree.
Answer categories for "leave divide" are: mother: entire leave / mother: most of the leave; father: some / both half / father: most of the leave; mother: some / father: entire leave.
Answer categories for "care best" are: Mother home; father works full-time / Mother works part-time; father works full-time / Both work full-time *or* Both work part-time / Father works part-time; mother works full-time / Father home; mother works full-time.

6 Results

Table 2 shows the results from factor analysis. Generating three factors offers a result that allows a clear interpretation. In each case a higher value on the factor represents a more 'modern' or 'gender-symmetric' attitude (women are *not* mainly regarded as homemakers, an equal gendered division of tasks and privileges is desired and mothers labour force participation is approved). All bivariate correlations between the three generated factors are positive and range between 0.60 and 0.71 on the micro-level and 0.74 and 0.88 on the macro-level.

Three Different Aspects of Gender Role Attitudes

Table 2: Result from Factor Analysis

	female homemaker	*gender division*	*mother as earner*
warm relation	.36		
child suffers	.68		
family suffers	.77		
want home		.58	
housewife		.38	
both contribute			.32
men money		.61	
work school			.58
work U6			.71
leave divide		.46	
care best		.50	

Note: Displayed numbers are factor loadings. Blanks represent loadings <.3 in absolute values.

The first factor, *female homemaker*, loads strongest on the three items on negative consequences that maternal employment might have on relationships within the family. This factor is almost unrelated to items regarding the question whether mothers should work or which parent should involve more in childcare (*work U6, work school* and *leave divide, care best*). People with a low value on this factor tend

to believe that a mother who stays at home is better for the family and the kids.

The third factor, called *mother as earner*, measures whether people think that women and mothers of young children in particular should work for pay. People with a high value in this factor believe that women in general and mothers of small children specifically should work and earn money.

The first and third factor, *female homemaker* and *mother as earner*, mainly load on questions that deal with the role of women alone - and not in contrast to the role of men. Both factors might mix up gender role attitudes with general, 'ungendered' opinions on the interplay and potential conflicts between family and labour market. Probably some of those who believe that young children suffer if the mother works full-time also believe that young children suffer if the father works long hours. What might hint towards that idea that *female homemaker* captures family- rather than gender-ideology or at least mix the two is that many of those who think a woman's employment is bad for the family actually disagree with gender-separate spheres.[8] Some of those who think that mothers of young children should work, as measured by *mother as earner* might be more concerned about securing household income rather than ideals family- and gender-ideology.[9]

The second factor, labelled *gender division*, loads strongly on items that specifically ask whether a given task or privilege should be allocated to the male partner, the

---

[8]This seems to be especially valid for some European countries: in Switzerland, France or Germany more than one in four agrees to the statement that "All in all, family life suffers when the woman has a full-time job". Among those who agree with this statement, the majority rejects traditional gender-separated spheres ("A man's job is to earn money; a woman's job is to look after the home and family") and a third or more expresses gender-egalitarian childrearing-ideals (stated view that parental leave should be equally distributed between the mother and the father).

[9]This seems to be especially valid for some countries in Eastern Europe and outside of Europe. In Russia, China or Mexico the majority believes that mothers of young children should work at least part-time ("Do you think that women should work outside the home full-time, part-time or not at all under the following circumstances? When there is a child under school age."). Nevertheless, the majority of this group believe that this will actually have negative consequences for the child (agreement to: "A pre-school child is likely to suffer if his or her mother works.") Also, more than a third of those who favour maternal employment actually support gender-separate spheres (agreement to: "A man's job is to earn money; a woman's job is to look after the home and family.").

female partner or to both equally. These tasks and privileges include earning money, taking parental leave and caring for young children (*men-money*, *leave divide* and *care best*). This factor also loads on the questions whether women prefer homemaking and whether being a housewife is as fulfilling as working for pay (*want home* and *housewife*). This factor is unrelated to all questions regarding maternal employment and its consequences (*warm relation, child suffers, family suffers, work U6, work school*) and thus clearly distinguishes attitudes towards the *gendered* division of tasks from questions concerning the conflict between family and labour market. As the second factor, *gender division*, captures gendered views and gender ideology most unambiguously, it is most promising to measure gender role attitudes for the here presented work. All further analyses apply this factor.

People in the Nordic countries and in the Netherlands show highest mean scores on the factor *gender division* and more right-leaning distributions in figure 1 (Finland being somewhat of an outlier among the Nordic countries with a mean value most similar to Germany). Most gender-asymmetric views are found in countries Central and Eastern Europe and outside of Europe, such as Philippines, Russia and Latvia. The 'cluster' of countries in Central and Eastern Europe is extremely heterogeneous though. The country with the flattest curve and consequently the highest variation in attitudes is Austria, followed by Germany. The country with the lowest variation is Chile. Interestingly, the two extreme cases of low and high variation, Chile and Austria, are almost identical in their mean and median value for gender role attitudes. Over the whole sample, females have slightly more gender-symmetric views and variation is slightly bigger among females than among males. In general, between-country differences (over male and female respondents) seem to be much more salient than whithin-country differences between female and male respondents.

Figure 1: Distribution of gender role attitudes in all sample countries for males and females separately. Kernel density plots are shown.
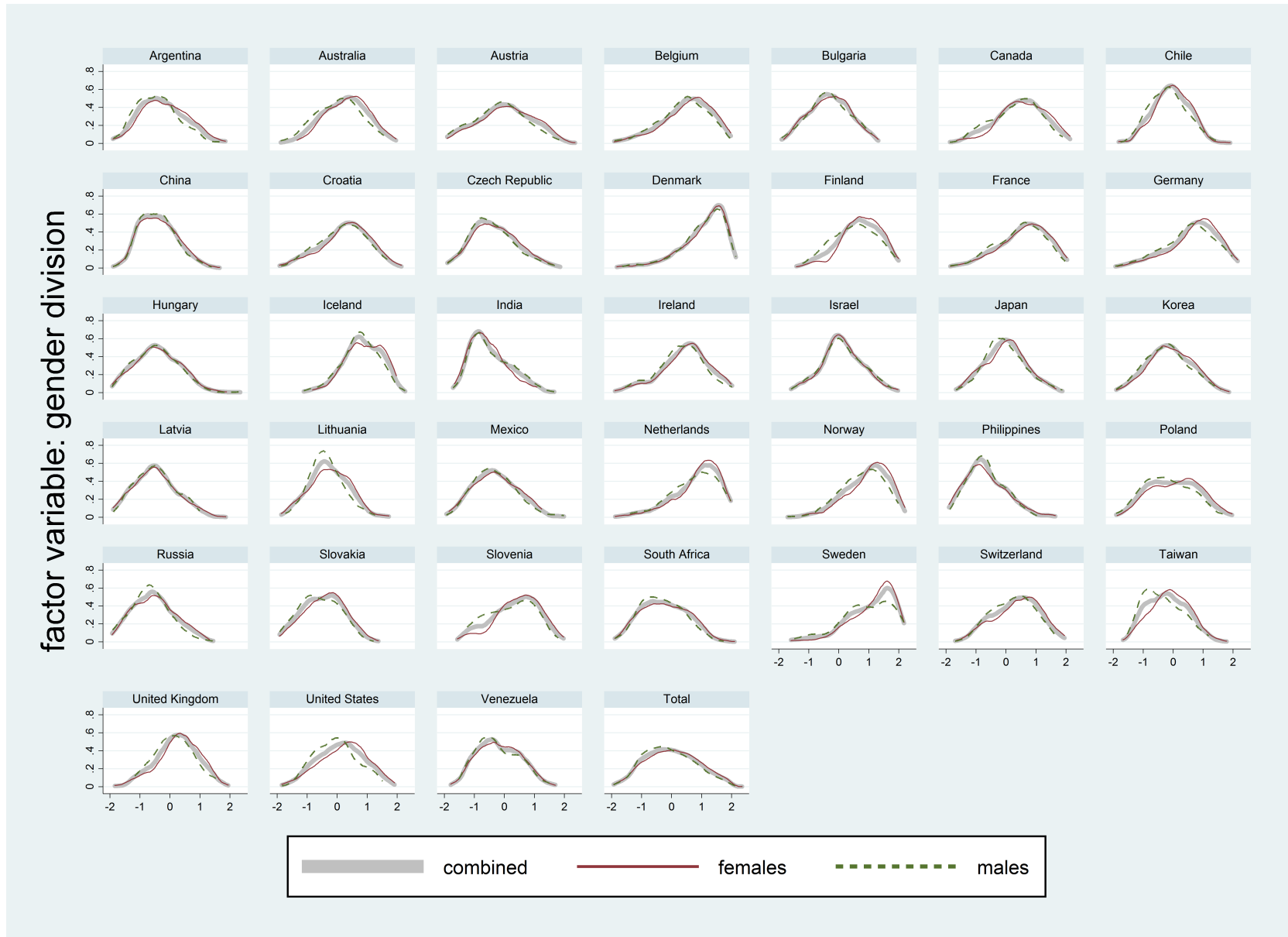
Variation in Gender Role Attitudes and Individual Childlessness

Table 2 shows the regression models to test the hypothesis that parenthood is less common, the higher the variation in gender role attitudes is in a society. This association should persist independently of the content or mean value of gender role attitudes in the society. In all models the odds ratio for variation in gender role attitudes is significant and smaller than one, which represents a negative association, as predicted. The higher the variation in attitudes, the higher the chance that respondents remain childless. The size of its odds ratio is almost constant in all presented models. Model 1 is the base model that includes relative individual gender role attitudes, measured as the deviation from the country-level mean value, the variation in gender role attitudes, measured as the standard deviation of attitudes on the macro-level, and the macro-level mean value of attitudes. For males and females combined, more gender-symmetric attitudes on the macro-level are associated with lower childlessness on the micro level. Having more gender-asymmetric attitudes than the country-average is associated with higher transitions to parenthood. Model 2 tests whether the associations between childlessness and the gender-attitudes-related variables differs between male and female respondents. It shows that none of the interaction effects is significant. Model 3 adds the square term for the average attitudes in a country to the base model. As discussed in section two, the literature suggests an U-shape association between individual parenthood and gender relations. This pattern cannot be found in the set of these countries with mainly medium or high values of gender-symmetric attitudes. Model 4 adds the gap in attitudes between men and women in the respective country (country-mean value of female respondents minus country-mean value of male respondents). The odds ratio is insignificant: the association between variation in gender role attitudes and individual fertility is not a function of differences in average attitudes between females and males.

24

Models 5 and 6 measure macro-level variables, average gender role attitudes and variation in gender role attitudes, for two age-restricted sub-sample (compare section 4). In order to rule out potential ageing-effects of change in attitudes, model 5 measures macro-level variables based on younger respondents who are currently in their main phase of partnership formation and transition to parenthood. In order to rule out potential cohort effects of change in attitudes, model 6 measures macro-level variables based on the restricted sub-sample of those, that have are aged 45+ (females) and 50+ (males). In models 5 and 6, compared to model 1, all odds ratios are consistent in size while standard errors for all variables are greater. Given that mean attitudes and variation in attitudes are calculated based on a much lower number of observations, increased standard errors should not be a surprise. Nevertheless, the negative association between variation in attitudes and individual parenthood remains statistically significant in all models.

Table 3: Logistic multilevel regressions predicting parenthood (=1) versus childlessness (=0). Odds ratios are displayed.

	base models				region-level	variation among potential partners	
	(1)	+interactions (2)	+square-term (3)	+sex-gap (4)	(5)	(6)	(7)
Individual attitudes (measured as difference from macro-level mean)							
Country-level	0.909* (0.042)	0.889 (0.058)	0.907* (0.042)	0.907* (0.042)		0.909* (0.042)	0.910* (0.045)
Region-Level					0.956 (0.0646)		
Macro-level mean-value of attitudes							
Country-level	1.314** (0.129)	1.200 (0.144)	1.172 (0.150)	1.326** (0.130)		1.273* (0.129)	1.264* (0.127)
Region-level					0.913 (0.275)		
Macro-level variation in attitudes							
Country-level: standard deviation	0.787*** (0.055)	0.828* (0.070)	0.811** (0.057)	0.802** (0.058)			
Region-level: standard deviation					0.725* (0.096)		
Country-level: unexplained variation I						0.816** (0.059)	
Country-level: unexplained variation II							0.813** (0.057)
Interaction with sex of respondent (reference: female)							
Individual attitudes (as diff. from country-mean)		1.044 (0.097)					
Country-level mean attitudes		1.202 (0.175)					
Country-level standard deviation		0.908 (0.091)					
Country-level mean-value: Square-term			1.113 (0.090)				
Diff. in attitudes betw. females and males				0.944 (0.065)			
Controls individual level	yes	yes	yes	yes	yes	yes	yes
Controls country level	yes	yes	yes	yes		yes	yes
Country-level RE	yes	yes	yes	yes		yes	yes
Region-level RE					yes		
Country-level FE					yes		
Observations: micro-level	6305	6305	6305	6305	2986	6305	6305
Observations: countries	38	38	38	38	28	38	38
Observations: regions					73		

Odds ratios displayed. Standard errors are displayed in parentheses.

All independent variables are standardized.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 2: Predicted probability of having at least one child in dependence of variation in gender role attitudes at mean-values of all other covariates (calculation based on model 1); combined with a bivariate country-level scatterplot of share of parents versus variation in gender role attitudes.
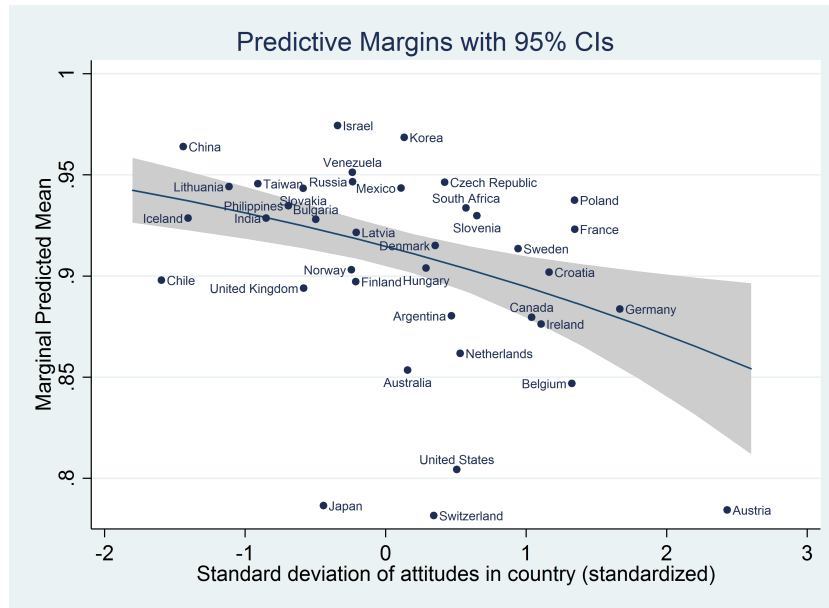

Figure 2 shows the predicted probabilities of individuals to have at least one child at different levels of macro-level variation in gender role attitudes and at global mean values on all other variables. Predicted probabilities for parenthood versus childlessness range from 85.9% for the highest value of variation in attitudes in the dataset, as observed in Austria, to 94.0% for the opposite value, as observed in Chile. Complementary, predicted probabilities of childlessness thus range from 6.0% for Chile to 14.1% for Austria. The following examples should give a – admittedly rough – intuition for the size of association, based on predicted margins of model 1: if the variation in gender role attitudes was as low in Germany as it is in the United Kingdom (the country with the second highest variation versus the country with the eighth lowest variation), progression to parity one would be predicted to be 5.2% higher. Complementary, childlessness would be predicted to be 38.0% lower.[10]

---

[10]Predicted value for parenthood and childlessness Germany: 87.9% and 12.1%, for United Kingdom: 92.5% and 7.5%. This equals a difference of 4.6%-points and a difference of 5.2% in parenthood or 38.0% in childlessness.

Variation in Gender Role Attitudes and Individual Childlessness: Variation on the Country-level, Regional Level and Among Potential Partners

As discussed in section three, there are at least two alternative mechanism that might link societal disagreement on gender roles to fertility: second, a translation of unclear gender norms into incoherent family policy with the consequence that no family, whatever gender role model it follows, finds policies tailored to their needs, and third negative sanctioning among peers who pursue different gender role models. This section is an attempt to disentangle these mechanisms.

In most countries the majority of public policies that might influence fertility behaviour are country-level policies. All individuals in a given country are affected by it, independently of their region of residence within the country.

If the association between variation in gender role attitudes and fertility is explained by differences in public policy, the association should disappear once country-level fixed effects (dummy-variables for all countries) are introduced. Model 7 is a three-level model with individuals nested in regions which are nested in countries. Average gender role attitudes and variation in attitudes are measured on the level of these regions (and not on the level of countries, as in models 1-6).[11] In the model with country-fixed effects (7) the odds ratio for variation in gender role attitudes on the regional level is similar to the odds ratio for variation on the country-level in all other models. The hypothesis – more variation means higher childlessness – holds even against controlling for public policy and other country-specific factors. The association between more gender-symmetric average attitudes on the macro-level and individual parenthood disappears.

Models 7 and 8 include two measures for variation among potential partners, as opposed to variation in the whole society in the base model. As *standard deviation of attitudes in country*, *unexplained variation I* and *unexplained variation II* are

---

[11]Running the base model with the restricted sample of model 7 brings coherent results which suggests that the sample-restriction does not confound the picture.

standardized, their odds ratios are comparable. If the variation in attitudes among potential partners – as opposed to variation in the whole society – mattes, the odds ratio for *unexplained variation II* should be smallest and the odds ratio for *standard deviation of attitudes in country* closest to zero. This pattern does not show, all odds ratios are similar in size and significance. This result does not allow any clear conclusion on whether or not it is the variation among potential partners that matters, rather than variation in the whole society.

Further robustness checks are shown in the online supplementary material. I run models excluding potentially influential cases on the macro-level and control for two macro-level indices that should capture aspects of gender equity/gender equality/female empowerment. The proposed pattern that individual fertility is a function of the variation in gender role attitudes holds in all models.

7 Discussion

While there are several studies that deal with the interplay between gender relations and fertility in some way there is still insufficient knowledge of the mechanisms behind the observed patterns. This study contributes to filling this gap by specifying and testing a model that explains how the variation in gender role attitudes links gender roles to fertility. To do so, this paper develops a theoretical framework that builds upon Esping-Andersen and Billari (2015) and explains how large variation in gender role attitudes on the macro-level translates into higher childlessness on the micro-level. The empirical analysis supports this claim: people's chance to be a parent is systematically higher when there is a greater societal agreement on a specific gender role model. The presented results hold against a number of robustness checks.

The study is innovative as it applies a much clearer and more unambiguous measure for gender role attitudes, and as it shows how – in general – the variation in variable matters for a social outcome, independently of its content or mean value.

The analysis suffers from two main shortcomings. The first is, as discussed in section 3, an issue of data-structure. The dependent variable, parenthood versus childlessness, can only be measured for people aged 45+ and 50+. The choice of sample to compute macro-level variables, mean value and variation in attitudes, is less straight forward. Three different approaches are presented, with distinct pros and cons: (1) all respondents aged 25-55 (females) and 30-60 (males). This larger age-range leaves a sufficient number of observations to compute reliable estimates, but the younger people in the age-range are not the same individuals and do not belong to the same cohort as those, for who I measure childlessness. (2) The older people in the sample, those for who I capture childlessness, might have changed their attitudes and views since their period of family-formation. Two alternative approaches are presented as robustness checks: one rules out potential ageing- but not cohort-effects, the other rules out potential cohort- but not ageing-effects. All three approaches yield almost identical results and suggest a robust association. Second, future analyses should try to disentangle different mechanisms that link the association between the variation in gender role attitudes and individual parenthood more precisely. What share of the association can be attributed to processes of partnership formation or to peer-group mechanisms? While the aim of this paper was to develop the theoretical framework and show that macro-level associations are robustly in line with theoretical predictions, future research could go into the 'second stage' and test the partnership-hypothesis using micro-level panel-data (cf. Billari, 2015). When two partners in a couple have very different and possibly incompatible (parental) gender role attitudes at one point in time, they should be less likely to become subsequently. Such micro-level analysis might also be able to consider not only the transition to

parenthood but further parity progressions. Future research could also gain greater insight into the question why societal agreement in gender role attitudes is high in some, and low in other countries.

All in all, this paper provides a substantive contribution to understanding by which mechanisms gender relations and fertility are related. While in general a pluralistic society – with a variety of different gender role models and no strong normative pressure to follow a certain 'lead model' – would be desirable, this could come at the cost of high childlessness and lower fertility. If higher levels of fertility are desired, it is upon the society and policy makers to agree on a specific gender role model and tailor policy measures around it – or to find a creative way of escaping this trade-off and reconciling a variety in gender role models with moderate or even high fertility.

References

Arpino, B., Esping-Andersen, G., & Pessin, L. (2015). How Do Changes in Gender Role Attitudes Towards Female Employment Influence Fertility? A Macro-Level Analysis. *European Sociological Review*, *31*(3), 370–382. Retrieved from http://esr.oxfordjournals.org/cgi/doi/10.1093/esr/jcv002 doi: 10.1093/esr/jcv002

Balbo, N., Billari, F. C., & Mills, M. (2013). Fertility in Advanced Societies: A Review of Research. *European Journal of Population*, *29*(1), 1–38.

Bauernschuster, S., Hener, T., & Rainer, H. (2015). Children of a (Policy) Revolution: the Introduction of Universal Child Care and Its Effect on Fertility. *Journal of the European Economic Association*, *forthcomin*.

Baxter, J., Buchler, S., Perales, F., & Western, M. (2015). A life-changing event: First births and men's and women's attitudes to mothering and gender divisions of labor. *Social Forces*, *93*(3), 989–1014.

Becker, G. S. (1981). *A Treatise on the Family*. Harvard University Press.

Billari, F. C. (2015). Integrating macro- and micro-level approaches in the explanation of population change. *Population Studies*, *69*(sup1), S11–S20.

Blossfeld, H.-P. (2009). Educational assortative marriage in comparative perspective. *Annual Review of Sociology*, *35*, 513–530.

Bongaarts, J., & Sobotka, T. (2012). A demographic explanation for the recent rise in European fertility. *Population and Development Review*, *38*(1), 83–120.

Braun, M. (2008). Using egalitarian items to measure men's and women's family roles. *Sex roles*, *59*(9-10), 644–656.

Cherlin, A. J. (2016). A Happy Ending to a Half a Century of Family Change? *Population and Development Review*, *42*(1), 121–129.

Constantin, A., & Voicu, M. (2015). Attitudes Towards Gender Roles in

Cross-Cultural Surveys: Content Validity and Cross-Cultural Measurement Invariance. *Social Indicators Research*, *123*(3), 733–751. Retrieved from `http://link.springer.com/10.1007/s11205-014-0758-8` doi: 10.1007/s11205-014-0758-8

Cooke, L. P. (2004). The gendered division of labor and family outcomes in Germany. *Journal of Marriage and Family*, *66*(5), 1246–1259.

Esping-Andersen, G. (2009). *Incomplete revolution: Adapting welfare states to women's new roles*. Polity.

Esping-Andersen, G., & Billari, F. C. (2015). Re-theorizing Family Demographics. *Population and Development Review*, *41*(1), 1–31.

Fleckenstein, T. (2011). The politics of ideas in welfare state transformation: Christian democracy and the reform of family policy in Germany. *Social Politics: International Studies in Gender, State & Society*, *18*(4), 543–571.

Furuoka, F. (2009). Looking for a J-shaped development-fertility relationship: Do advances in development really reverse fertility declines. *Economics Bulletin*, *29*(4), 3067–3074.

Gangl, M., & Ziefle, A. (2015). The Making of a Good Woman: Extended Parental Leave Entitlements and Mothers' Work Commitment in Germany 1. *American Journal of Sociology*, *121*(2), 511–563.

Gauthier, A. H. (2007). The impact of family policies on fertility in industrialized countries: a review of the literature. *Population Research and Policy Review*, *26*(3), 323–346.

Goldscheider, F., Bernhardt, E., & Lappegård, T. (2015). The Gender Revolution: A Framework for Understanding Changing Family and Demographic Behavior. *Population and Development Review*, *41*(2), 207–239.

Hank, K., & Kreyenfeld, M. (2003). A multilevel analysis of child care and women's fertility decisions in Western Germany. *Journal of Marriage and Family*, *65*,

584–596. doi: 10.1111/j.1741-3737.2003.00584.x

Hantrais, L. (1994). Comparing family policy in Britain, France and Germany. *Journal of social policy*, *23*(02), 135–160.

Harttgen, K., & Vollmer, S. (2014). A reversal in the relationship of human development with fertility? *Demography*.

Hausmann, R., Zahidi, S., Tyson, L., Hausmann, R., Schwab, K., & Tyson, L. D. (2006). The Global Gender Gap Report 2006..

Hoem, J. M., Prskawetz, A., & Neyer, G. (2001). Autonomy or conservative adjustment? The effect of public policies and educational attainment on third births in Austria, 1975-96. *Population Studies*, *55*(3), 249–261.

Hohmann-Marriott, B. E. (2006). Shared beliefs and the union stability of married and cohabiting couples. *Journal of marriage and family*, *68*(4), 1015–1028.

ISSP Research Group. (2015). *International Social Survey Programme: Family and Changing Gender Roles IV-ISSP 2012. GESIS Data Archive, Cologne. ZA5900 Data file Version 2.0.0.*

Kan, M.-Y., & Hertog, E. (2017, feb). Domestic division of labour and fertility preference in China, Japan, South Korea, and Taiwan. *Demographic Research*, *36*(18), 557–588. Retrieved from `http://www.demographic-research.org/volumes/vol36/18/`

Kreyenfeld, M., & Konietzka, D. (2017). Analyzing Childlessness. In *Childlessness in europe: Contexts, causes, and consequences* (pp. 3–15). Springer.

Laroque, G., & Salanié, B. (2014, mar). Identifying the Response of Fertility to Financial Incentives. *Journal of Applied Econometrics*, *29*(2), 314–332.

Luci-Greulich, A., & Thévenon, O. (2013). The Impact of Family Policies on Fertility Trends in Developed Countries. *European Journal of Population*, *29*(4), 387–416.

Luci-Greulich, A., & Thévenon, O. (2014). Does Economic Advancement 'Cause'

a Re-increase in Fertility? An Empirical Analysis for OECD Countries (1960-2007). *European Journal of Population*, *30*(2), 187–221.

McDonald, P. (2000a). Gender equity in theories of fertility transition. *Population and Development Review*, *26*(3), 427–439.

McDonald, P. (2000b). Gender equity, social institutions and the future of fertility. *Journal of Population Research*, *17*(1), 1–16.

McDonald, P. (2006). Low fertility and the state: The efficacy of policy. *Population and Development Review*, *32*(3), 485–510.

McDonald, P. (2013). Societal foundations for explaining low fertility: Gender equity. *Demographic Research*, *28*(34), 981–994.

Meer, T. V. D., & Grotenhuis, T. (2010). Influential Cases in Multilevel Modeling : A Methodological Comment. (April 2006). doi: 10.1177/0003122409359166

Miettinen, A., Lainiala, L., & Rotkirch, A. (2015). Women's housework decreases fertility Evidence from a longitudinal study among Finnish couples. *Acta Sociologica*, *58*(2), 139–154.

Mills, M. (2010). Gender Roles, Gender (In)equality and Fertility: An Empirical Test of Five Gender Equity Indices. *Canadian Studies in Population*, *37*(3-4), 445–474.

Mills, M., Mencarini, L., Tanturri, M. L., & Begall, K. (2008). Gender Equity and Fertility Intentions in Italy and the Netherlands. *Demographic Research*, *18*, 1–26.

Myrskylä, M., Goldstein, J. R., & Cheng, Y. H. A. (2013). New cohort fertility forecasts for the developed world: Rises, falls, and reversals. *Population and Development Review*, *39*(1), 31–56. doi: 10.1111/j.1728-4457.2013.00572.x

Myrskylä, M., Kohler, H.-P., & Billari, F. C. (2009). Advances in development reverse fertility declines. *Nature*, *460*(7256), 741–743. doi: 10.1038/nature08230

Myrskylä, M., Kohler, H.-P., & Billari, F. C. (2011). *High Development and Fertility: Fertility at Older Reproductive Ages and Gender Equality Explain the Positive Link* (Vol. 017).

Neyer, G. (2003). Family policies and low fertility in Western Europe. *Journal of Population and Social Security*, *1*, 46–93.

Neyer, G., & Andersson, G. (2008). Consequences of family policies on childbearing behavior: effects or artifacts? *Population and Development Review*, *34*(4), 699–724.

Perales, F., Lersch, P. M., & Baxter, J. (2017). Birth Cohort, Ageing and Gender Ideology: Lessons from British and Australian Panel Data. *Life Course Centre Working Paper Series*(2017-01).

Rindfuss, R. R., Guilkey, D. K., Morgan, S. P., & Kravdal, Ø. (2010). Childcare availability and fertility in Norway. *Population and Development Review*, *36*(4), 725–748. doi: 10.1111/j.1728-4457.2010.00355.x

Schneider, N., & Bujard, M. (2013). Das "Gedöns" und die Geschlechter. *Zeit Online*.

Schwartz, C. R. (2013). Trends and variation in assortative mating: Causes and consequences. *Annual Review of Sociology*, *39*, 451–470.

Scott, J., & Braun, M. (2009). Changing Public Views of Gender Roles in seven nations: 1988-2002.

Social Watch. (2007). *Gender Equity Index (GEI) values in 2007.* Retrieved from `http://www.socialwatch.org/node/9358`

Svallfors, S. (2010). Policy feedback, generational replacement, and attitudes to state intervention: Eastern and Western Germany, 1990âĂŞ2006. *European Political Science Review*, *2*(01), 119–135.

Tanturri, M. L., Mills, M., Rotkirch, A., Sobotka, T., Takács, J., Miettinen, A., . . . Nasiri, D. (2015). *State-of-the-art report. Childlessness in Europe* (Tech.

Rep.).

Testa, M. (2012). *Family sizes in Europe: evidence from the 2011 Eurobarometer survey.* Retrieved from `http://www.oeaw.ac.at/vid/download/edrp_2_2012.pdf`

The World Bank. (2015). *World Development Indicators* (Tech. Rep.). United Nations.

Thévenon, O. (2009). Does fertility respond to work and family reconciliation policies in France? *Fertility and public policy: How to reverse the trend of declining birth rates*.

Vogt, W. P., & Johnson, R. B. (2011). *Dictionary of Statistics & Methodology: A Nontechnical Guide for the Social Sciences: A Nontechnical Guide for the Social Sciences.* Sage.

Walby, S. (1994). Methodological and theoretical issues in the comparitive analysis of gender relations in Western Europe. *Environment and Planning A*, *26*(9), 1339–1354.

8 Appendix

Scatterplots: Gender Role Attitudes, Variation in Gender Role Attitudes and Childlessness

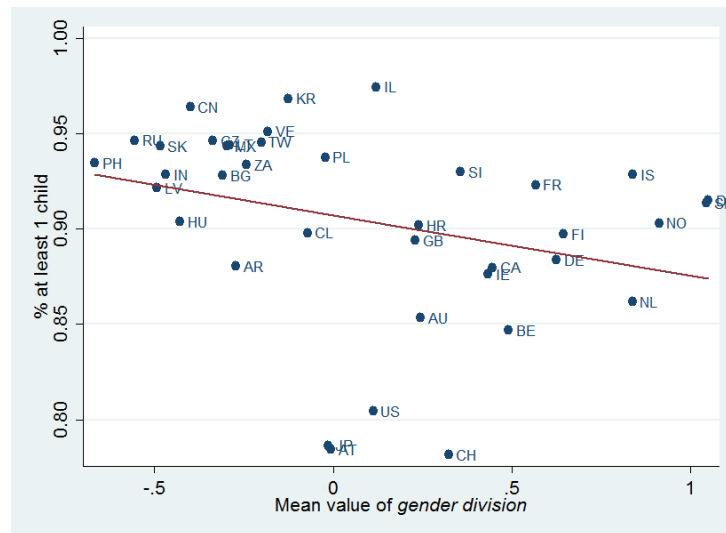
Figure 3: Share of population with at least one child and mean value of the factor gender division. r = -0.23; N.S.
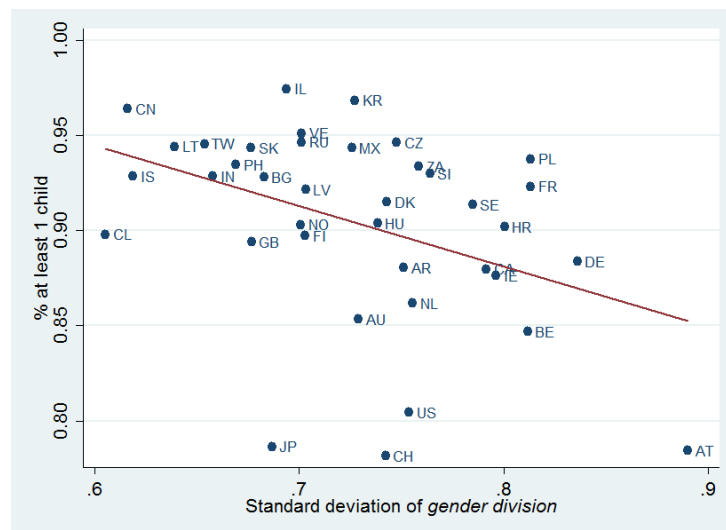
Figure 4: Share of population with at least one child and standard deviation of the factor gender division. r = -0.39; p > .05.
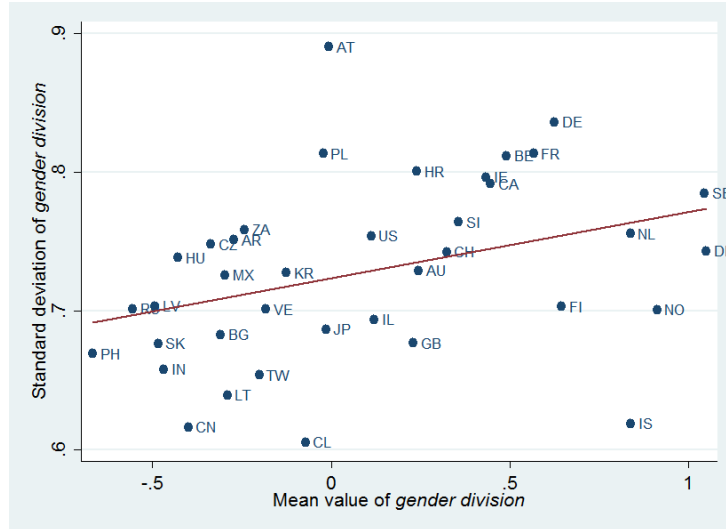
Figure 5: Standard deviation and mean value of the factor gender division. r = .38; p < .05.

Control Variables and Their Sources

Two macro-level indices for gender equity are introduced, including their square values. For a discussion of these measures in relation to fertility, see Mills (2010). Mills (2010) also discusses two additional indices which could not be introduced in this analysis as they are not available for a large number of sample countries. The Global Gender Gap Index (GGG) is drawn from (Hausmann et al., 2006) and refers to the year 2004, the first year that is available. The Gender Equity Index (GEI) is drawn from Social Watch (2007) and refers to the year 2007, the earliest year for which comprehensive data are available. Data for the Gross Domestic Product (GDP) are drawn from The World Bank (2015) and refer to the year 2000, as data is not available for all countries for earlier years.

Models for Further Robustness Checks

Table 1 shows the models for further robustness checks. Model 1 is the base model, as shown in the Article. Models 2 and 3 are the base model, run for only female and only male individuals respectively. Direction and magnitude of association of all gender-related variables with childlessness are the same for female and male respon-

dents. The association between variation in attitudes and childlessness is significant for male and female respondents. Individual attitudes are insignificant in both modes. Macro-level attitudes are only significant for males. These declines in significance might be driven by decreased number of observations. In a joint model with interactions between sex of respondent and gender-related variables, none of the interactions is significant (not shown here). Models 4 and 5 introduce gender-related macro-level indices. Model 4 controls for,The Global Gender Gap Index (GGG), which "assesses the level of equality between women and men [...] within the four critical categories – economic-, educational-, political and health- based criteria" (Hausmann et al., 2006, p.3) (this index is not available for Taiwan and Venezuela). Model 5 controls for the Gender Equity Index (GEI) which should measure gender equality and/or gender equity (Social Watch (2007) use both terms to describe the index) in three dimensions: "economic activity, empowerment and education" Social Watch (2007) (this index is not available for Taiwan, India, Korea, South Africa and Venezuela). With the given control variables, there is no significant association between Global Gender Gap or Gender Equity Index with individual childlessness. Models 6 to 8 are run without influential cases on the macro-level, as suggested by Meer and Grotenhuis (2010). Model 6 excludes Chile, the country with a Cook's D above the cut off value. Model 7 excludes all countries with DFBETA above the cut off value for the variable variation in gender role attitudes (Chile and Austria). Model 8 excludes all countries with DFBETA above the cut off value for any (control) variable (Chile, China, Norway, United States, Austria, Germany, Croatia, Japan, and Ireland). The main association between variation in gender role attitudes and individual fertility is significant at the 5%-level in all models and significant at the 1%-level in all joint models for males and females.

Table 4: Logistic multilevel regressions predicting parenthood (=1) versus childlessness (=0). Robustness Checks and Sensitivity Analysis. Odds ratios are displayed.

	Sex-separate analyses		Alternative macro-vars		Add macro-controls		Drop influential macro-level cases		
	females (8)	males (9)	younger subs. (10)	older subs. (11)	GGG (12)	GEI (13)	Cook's D (14)	DFBETA I (15)	DFBETA II (16)
Individual attitudes (measured as difference from country-level mean)									
Individual attitudes	0.888 (0.058)	0.928 (0.062)	0.911* (0.043)	0.908* (0.043)	0.907* (0.043)	0.912 (0.045)	0.906* (0.043)	0.927 (0.046)	0.922 (0.0523)
Country-level mean-value of attitudes									
Full age-range	1.207 (0.136)	1.446** (0.179)			1.344** (0.153)	1.315* (0.143)	1.406*** (0.114)	1.417*** (0.131)	1.375* (0.180)
Younger sub-sample			1.228* (0.120)						
Older sub-sample				1.254* (0.132)					
Country-level standard deviation of attitudes									
Full age-range	0.836* (0.065)	0.736*** (0.064)			0.794** (0.057)	0.791*** (0.054)	0.724*** (0.042)	0.717***(0.053)	0.752** (0.075)
Younger sub-sample			0.832** (0.056)						
Older sub-sample				0.847* (0.062)					
Additional controls on the macro-level									
Global Gender Gap Index					0.977 (0.080)				
Gender Equity Index						1.033 (0.084)			
Controls individual level	yes	yes	yes	yes	yes	yes	yes	yes	yes
Controls country level	yes	yes	yes	yes	yes	yes	yes	yes	yes
Country-level RE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations: micro-level	3593	2712	6305	6305	5980	5431	6060	5907	4384
Observations: countries	38	38	38	38	36	33	37	36	29

Standard errors are displayed in parentheses. All independent variables are standardized.
Model 8: Model run for female respondents only.
Model 9: Model run for male respondents only.
Model 10: Macro-level variables computed based on younger sub-sample (cf. section Data & Methods, p. 17 in current version).
Model 11: Macro-level variables computed based on older sub-sample (cf. section Data & Methods, p. 17 in current version).
Model 12: Controlling for Global Gender Gap Index (GGG) 2006.
Model 13: Controlling for The Gender Equity Index (GEI) 2007.
Model 14: Deletion of influential cases: dropped if Cook's D above the cut off value (Chile).
Model 15: Deletion of influential cases: dropped if DFBETA for variation in gender role attituds is above cut off value (Chile and Austria).
Model 16: Deletion of influential cases: dropped if DFBETA for in any (control) variable is above cut off value (Chile, China, Norway, United States, Austria, Germany, Croatia, Japan, and Ireland).
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 6: Comparing the measures *standard deviation* with *unexplained variation I & II*. All variables are standardized.
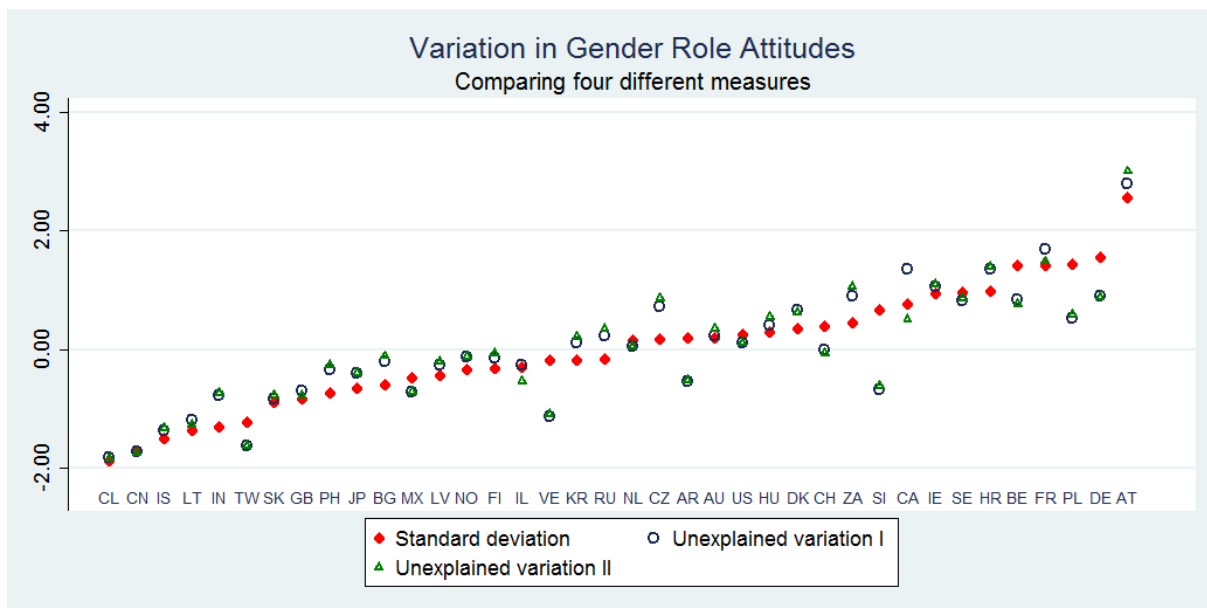
Calculation of *unexplained variation I & II*

Unexplained variation I & II are attempts to capture the variation in gender role attitudes that is *not* explained by individual characteristics which typically shape partner markets. The goal is to have a measure for the variation in attitudes among potential partners.

As mating behaviour is clearly structured by factors like age, education, religion, ethnicity or place of residence, the goal is to measure the variation in attitudes that persists net of these factors. Take for example a society that consists of strongly segregated sub-groups, be they segregation by education, religion, ethnicity, space/region or something else, and mating happens generally within these groups. If within these groups members have a strong agreement on gender roles but the content of these roles differs strongly between these two groups, potential partners and partners (within the same group) should all share similar opinions. In this case the first measure, the standard variation in the whole society, would be large, while the second measure, the variation controlling for factors that might seg-

regate, would be small. Due to this it would be expected that the second measure is the better predictor of fertility. The measure is computed as follows: micro-level OLS-regressions are run for each country separately. The dependent variable is the factor that measures gender role attitudes, the independent variables are characteristics that should influence mating behaviour. The within-variation, the variation among potential partners, is the variation that is not explained by the country-level regressions: the mean squares (MS; calculated as the sum of squares (SS) divided by the respective degrees of freedom). Two sub-models were presented in section 6. The first, *unexplained variation I* includes the variables sex, age, years of education (with interaction for age and education with sex), region of residence and type of place of residence (urban vs. rural). The second measure, *unexplained variation II*, adds a measure for religiosity as a dummy variable which is one if the respondent visits religious services at least once a month and zero otherwise. From a theoretical perspective it would be desirable to include a number of other measures as well. Such an example is race or ethnicity but information on this question differs so strongly from one country to another, so the inclusion of such a variable does not seem promising (some countries provide information on the ethnic group of the respondent (e.g. Great Britain, Ireland, Russia), on whether the respondent or respondents' parents were born in the country (e.g. France, Australia, Denmark), of which cultural group or country of origin the ancestors are (Canada, USA), which caste they belong to (India) whether or not the respondent belongs to a minority group (Iceland) or provide no information at all (Austria).

Figure 7 shows two examples of such micro-level regressions. Figure 6 compares how the countries 'rank' on the four different measures *standard deviation* compare with *unexplained variation I & II*. It shows that for example in Poland *standard deviation* and *unexplained variation I* differ a lot. This means that in Poland a large share of the variation in gender role attitudes is explained by sex, age and

education (adjusted r^2 in the micro-level regression model for *unexplained variation I*: .23). The opposite is the case for Czech Republic (adjusted r^2 in the micro-level regression model for *unexplained variation I*: .02).

Figure 7: Micro-level regression: calculating *unexplained variation I* for Poland and *unexplained variation II* for the United States.; Depdent variable: factor *gender division*.

```
. * unexplained variation I for POLAND:
.
. reg gender      male      age       educyrs        male_age        male_educyrs        ///
> i.region_numeric          urban                         if cntry2 == "PL"
```

Source	SS	df	MS			
Model	73.1045117	12	6.09204264			
Residual	211.874655	405	.523147296			
Total	284.979167	417	.683403277			

Number of obs = 418
F(12, 405) = 11.64
Prob > F = 0.0000
R-squared = 0.2565
Adj R-squared = 0.2345
Root MSE = .72329

unexplained variation I

gender	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
male	-.0338542	.5682518	-0.06	0.953	-1.150946	1.083237
age	.0015015	.0052838	0.28	0.776	-.0088856	.0118885
educyrs	.0911851	.0151795	6.01	0.000	.0613446	.1210256
male_age	-.0140162	.0086314	-1.62	0.105	-.0309843	.0029518
male_educyrs	.0327446	.0247556	1.32	0.187	-.015921	.0814101
region_numeric						
Malopolska (South-East)	-.0359325	.1272008	-0.28	0.778	-.2859887	.2141237
North-East & East	-.061949	.1285646	-0.48	0.630	-.3146863	.1907883
Pomorze (North)	-.1228683	.1478046	-0.83	0.406	-.4134284	.1676918
Silesia (South-West)	.0110261	.1302632	0.08	0.933	-.2450504	.2671027
West	-.2535522	.1409842	-1.80	0.073	-.5307045	.0236001
Wielkopolska (Central-West)	.039985	.1307385	0.31	0.760	-.2170259	.2969959
urban	.1226924	.0790151	1.55	0.121	-.0326385	.2780233
_cons	-1.227254	.3178896	-3.86	0.000	-1.852173	-.6023339

```
.
.
. * unexplained variation II for UNITED STATES:
.
. reg gender      male      age       educyrs        male_age        male_educyrs        ///
> i.region_numeric          urban          i.rel2          if cntry2 == "US"
```

Source	SS	df	MS			
Model	36.4829846	15	2.43219897			
Residual	165.348619	349	.473778278			
Total	201.831604	364	.554482428			

Number of obs = 365
F(15, 349) = 5.13
Prob > F = 0.0000
R-squared = 0.1808
Adj R-squared = 0.1455
Root MSE = .68832

unexplained variation II

gender	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
male	.7289687	.4993068	1.46	0.145	-.2530602	1.710998
age	.002004	.0052619	0.38	0.704	-.008345	.0123531
educyrs	.0872249	.0164894	5.29	0.000	.0547938	.1196559
male_age	-.0118805	.0084076	-1.41	0.159	-.0284165	.0046556
male_educyrs	-.0329513	.0250035	-1.32	0.188	-.0821277	.0162252
region_numeric						
US2	-.0062808	.2170029	-0.03	0.977	-.4330788	.4205172
US3	-.1479815	.2054491	-0.72	0.472	-.5520556	.2560925
US4	.1199272	.238201	0.50	0.615	-.3485628	.5884172
US5	-.1862732	.2049764	-0.91	0.364	-.5894175	.2168712
US6	-.2444578	.239475	-1.02	0.308	-.7154536	.226538
US7	-.2175729	.2168079	-1.00	0.316	-.6439874	.2088415
US8	-.0363265	.2251677	-0.16	0.872	-.4791828	.4065298
US9	-.2086897	.2166256	-0.96	0.336	-.6347456	.2173663
urban	.0112935	.120104	0.09	0.925	-.2249252	.2475122
1.rel2	-.2126828	.0746598	-2.85	0.005	-.3595224	-.0658432
_cons	-.8063798	.4016129	-2.01	0.045	-1.596266	-.0164936

Table 5: Summary table

Country	share parents	gender division	female homemaker	mother as earner	standard deviation	gender gap	unexpl. var. I	unexpl. var. II	GGG 2004	GEI 2007	N
Argentina	0.88	-0.63	-1.32	-1.10	0.47	0.27	-0.40	-0.38	0.68	0.70	117
Australia	0.85	0.47	0.30	-0.69	0.16	0.34	-0.01	0.09	0.72	0.76	116
Austria	0.78	-0.06	-0.53	-1.23	2.43	0.25	2.76	2.93	0.70	0.72	153
Belgium	0.85	1.00	0.46	0.53	1.32	0.20	0.63	0.53	0.71	0.74	222
Bulgaria	0.93	-0.71	-0.75	-0.20	-0.50	0.04	-0.24	-0.17	0.69	0.74	111
Canada	0.88	0.90	0.84	0.22	1.04	0.25	1.24	0.74	0.72	0.75	108
Chile	0.90	-0.20	-1.32	-0.88	-1.59	0.16	-1.82	-1.81	0.65	0.62	245
China	0.96	-0.90	-0.66	-0.19	-1.44	0.05	-1.75	-1.74	0.66	0.61	720
Taiwan	0.95	-0.48	0.13	0.16	-0.91	0.26	-1.62	-1.60			202
Croatia	0.90	0.46	0.32	0.84	1.16	0.15	1.51	1.58	0.71	0.73	163
Czech Republic	0.95	-0.76	0.04	-0.37	0.42	0.11	0.88	1.02	0.67	0.69	242
Denmark	0.92	2.18	2.16	2.24	0.35	0.04	0.62	0.50	0.75	0.79	153
Finland	0.90	1.32	1.66	1.60	-0.21	0.27	-0.21	-0.15	0.80	0.84	107
France	0.92	1.16	0.64	0.54	1.35	0.17	1.66	1.39	0.65	0.64	234
Germany	0.88	1.28	0.97	0.46	1.67	0.21	1.07	1.08	0.75	0.80	189
Hungary	0.90	-0.96	-0.78	-0.35	0.29	0.05	0.32	0.43	0.67	0.70	156
Iceland	0.93	1.74	1.58	1.93	-1.40	0.15	-1.44	-1.43	0.78	0.79	126
India	0.93	-1.04	-1.13	-0.94	-0.85	-0.13	-0.49	-0.44	0.60		56
Ireland	0.88	0.87	0.58	-0.06	1.11	0.16	1.23	1.25	0.73	0.69	105
Israel	0.97	0.21	-0.43	0.53	-0.34	0.01	-0.50	-0.75	0.69	0.73	117
Japan	0.79	-0.08	0.54	-1.60	-0.44	0.02	-0.36	-0.37	0.64	0.60	89
Korea	0.97	-0.32	-1.28	-1.01	0.13	0.14	0.10	0.19	0.62		222
Latvia	0.92	-1.10	-1.04	-0.89	-0.21	0.00	-0.14	-0.06	0.71	0.76	191
Lithuania	0.94	-0.67	-0.61	-0.57	-1.11	0.13	-1.11	-1.22	0.71	0.77	161
Mexico	0.94	-0.68	-1.71	-1.29	0.11	0.03	-0.27	-0.24	0.65	0.61	106
Netherlands	0.86	1.73	0.88	0.04	0.53	0.12	0.17	0.10	0.72	0.77	123
Norway	0.90	1.89	1.42	1.70	-0.24	0.24	-0.18	-0.16	0.80	0.83	165
Philippines	0.93	-1.47	-1.44	-1.10	-0.69	-0.00	-0.45	-0.37	0.75	0.76	153
Poland	0.94	-0.10	0.03	-0.45	1.34	0.30	0.48	0.51	0.68	0.72	128
Russia	0.95	-1.23	-1.13	-0.71	-0.24	0.15	0.09	0.20	0.68	0.71	187
Slovakia	0.94	-1.08	-0.16	0.20	-0.59	0.20	-0.78	-0.73	0.68	0.70	194
Slovenia	0.93	0.71	0.56	1.53	0.65	0.28	-0.79	-0.74	0.67	0.72	114
South Africa	0.93	-0.56	-0.08	0.50	0.57	0.10	0.98	1.13	0.71		271
Sweden	0.91	2.17	1.79	1.89	0.94	0.24	0.68	0.66	0.81	0.89	104
Switzerland	0.78	0.64	-0.05	-0.26	0.34	0.17	-0.09	-0.12	0.70	0.67	174
United Kingdom	0.89	0.44	0.48	-0.28	-0.58	0.18	-0.72	-0.81	0.74	0.74	66
United States	0.80	0.19	0.11	0.24	0.51	0.27	0.21	0.15	0.70	0.74	92
Venezuela	0.95	-0.44	-1.08	-1.01	-0.24	0.06	-1.23	-1.18			123