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Religiosity and Reproductive Decisions in Europe

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Religiosity and Reproductive Decisions in Europe

Christoph Bein

Colofon

Bein, C.

Religiosity and Reproductive Decisions in Europe

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Religiosity and Reproductive Decisions in Europe

PhD thesis

to obtain the degree of PhD at the
University of Groningen
on the authority of the
Rector Magnificus Prof. C. Wijmenga
and in accordance with
the decision by the College of Deans.

This thesis will be defended in public on

Monday 25 January 2021 at 12.45 hours

by

Christoph Bein

born on 20 September 1989
in Bad Soden am Taunus, Germany

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Das Pergament ist das der heil’ge Bronnen,

Woraus ein Trunk den Durst auf ewig stillt?

Erquickung hast du nicht gewonnen,

Wenn sie dir nicht aus eigner Seele quillt.

Johann Wolfgang von Goethe – Faust I (lines 566-569)

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Somehow, I already knew as a child that I wanted to pursue a PhD one day, even though back then, I had no idea in which subject this might be, and neither did I really know what it meant to do a PhD. Later, I grew fond of demographic topics, so Demography it should be. However, I still did not get what it actually meant to do a PhD. I only found that out while already being deep in the middle of my PhD project: A PhD is meant to be an intense journey of more than four years. Now I am at the end of this journey. And as with all journeys, its success greatly depends on your travel companions, whom I want to thank here.

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Christoph Bein, November 2020

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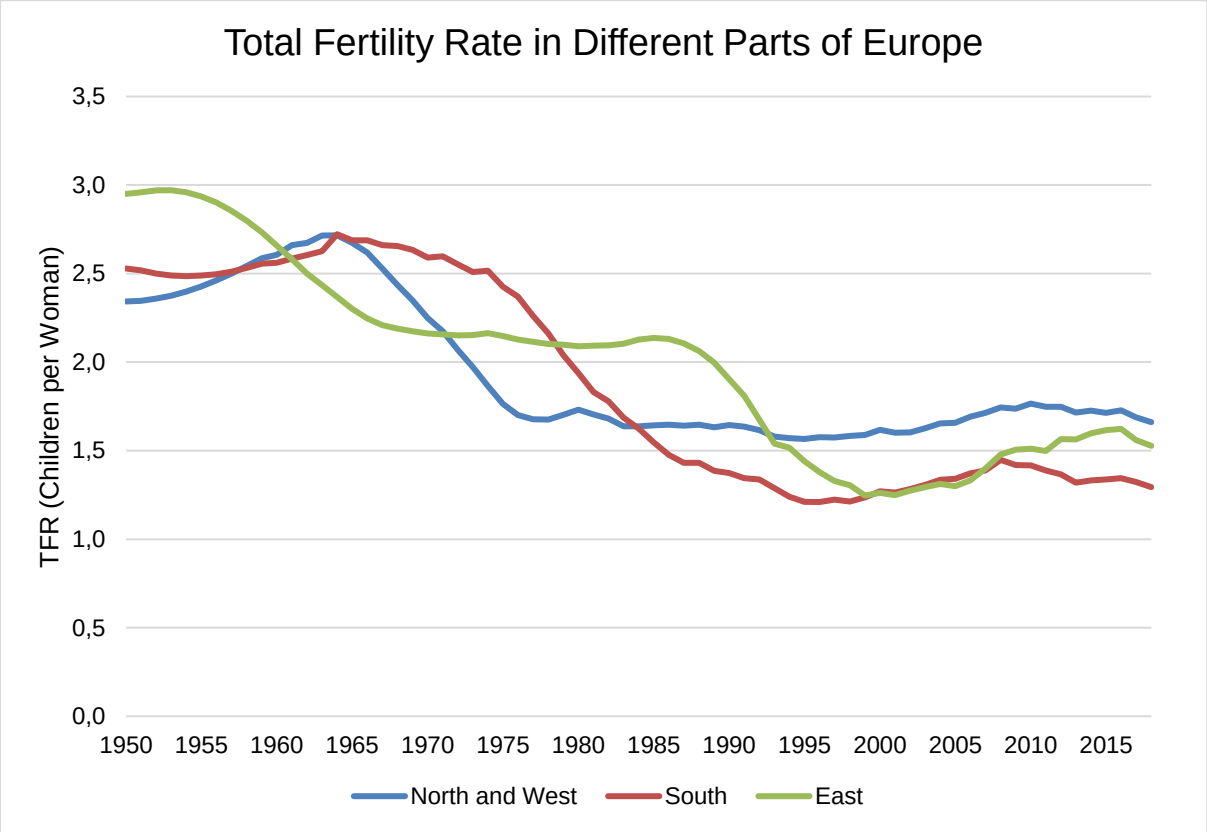
Chapter 1

Introduction

Introduction and research context

Two major transformations of European societies have occurred in the past 60 years: A decline in fertility and a decline in religiosity. While both trends are part of a transition towards modernity as discussed below, understanding their link and relationship continues to be an important area of research.

Figure 1.1: Fertility in Europe



Source: Own calculation based on Eurostat (2019) and United Nations (2019)

The first of these trends relates to changes in the fertility level, usually captured by the total fertility rate (TFR), which is an estimate of the number of children a woman bears on average over her lifetime. Total fertility rates throughout Europe have reached unprecedentedly low levels. After the post-World-War-II baby boom, fertility steadily declined from the mid-1960s and reached below the replacement level of around 2.1 children per woman in all European countries starting from the 1970s (Eurostat, 2019). The pace of this transition differed across regions, however, as can be seen in Figure 1.1. In Northern and Western Europe, fertility declined below replacement level already in the early 1970s and has since then stayed at a level of around 1.5 to 1.8 children per woman. Southern Europe declined below replacement level a

couple of years later in comparison to Northern and Western Europe. Furthermore, fertility levels in Southern Europe declined to a lower level, bottoming out at 1.2 children per woman in the mid-1990s and having stayed below 1.5 since around 1985. In contrast, the eastern part of the continent had higher fertility rates until the political and socio-economic transformation around 1990. Due to economic challenges and changes in the welfare systems after the end of communism, fertility rates in Eastern Europe declined to a very low level. Since then, fertility levels in Eastern Europe have recovered somewhat, so that now, fertility in this region is higher than that of Southern Europe, but lower than that of Northern and Western Europe.

Table 1.1: Trend of religiosity in selected European countries (percentage share)

		1981	1990	1999	2008	2017
Share of the religiously unaffiliated	Bulgaria		65.9	30.0	26.2	24.9
	Poland		3.7	4.3	4.5	8.3
	Czechia		60.3	66.3	71.0	75.6
	Italy	6.4	14.7	17.8	18.3	20.4
	Germany*	8.9	21.0	23.4	27.3	37.7
	Sweden	6.9	18.2	24.2	33.5	38.4
Attending religious services at least once per month	Bulgaria		9.1	20.2	15.1	17.5
	Poland		83.6	78.2	71.7	65.0
	Czechia		11.8	11.7	12.5	9.0
	Italy	51.7	53.4	53.7	49.9	41.6
	Germany*	37.3	30.4	30.0	21.2	19.3
	Sweden	14.5	10.3	9.4	7.7	9.7
Believe in God	Bulgaria		40.3	66.2	75.5	79.4
	Poland		97.5	97.3	96.2	93.4
	Czechia		35.4	38.9	35.7	38.4
	Italy	89.5	90.6	93.5	90.7	84.4
	Germany*	81.9	69.1	67.8	63.3	61.4
	Sweden	60.4	45.2	53.4	45.6	36.1

Source: European Values Study Waves 1-5, *Values for 1981 only refer to Western Germany

This decline of fertility in Europe since the 1960s has been accompanied by secularization and a gradual retreat of religion from the daily life of Europeans (Voas and Doebler, 2011). This trend of secularization has been observed all over Europe (Voas, 2009). Northern and Western European countries can be seen as the forerunners in this trend. In Germany, for example, the share of people not affiliated with any religion rose from around 5% in the 1950s (Storch, 2003) to 38% in 2018 (fowid, 2019b). Table 1.1 shows some trends of religious affiliation and religiosity for some additional countries (EVS, 2020a; EVS, 2020b). In both Sweden and Germany, a marked trend towards less frequent churchgoing and belief in God as well as a higher share of the unaffiliated, can be observed between 1981 and 2017. Southern Europe, exemplified by Italy in Table 1.1, followed suit in this trend with a delay. For that reason, Italy

is still a rather religious country in the European comparison. In Eastern Europe, trends in religious affiliation and religiosity have been more complex. Secularization was supported and even enforced by the governments during the communist period (Storch, 2003; Froese, 2004). In some Eastern European countries, there was evidence of a religious revival after the fall of communism. This was explained by the removal of barriers against religious institutions, economic hardship, but also by the active role of the Church in bringing down the communist regimes, for example in Poland (Hetnal, 1999). To this day, Poland remains one of the most religious countries in Europe. Bulgaria is an example of a country that was rather secularized in 1990, but then experienced a marked religious revival in the period afterwards. In some other highly secularized countries like Czechia, there was no sign of a religious revival however, and nowadays Czechia is one of the least religious countries of Europe.

Different explanations have been put forward for the trend of secularization across Europe. Higher levels of education and a greater availability of information has led to the rise of other authorities like science and technology at the expense of religious institutions, which have lost their status as the sole authority (Inglehart and Norris, 2003). It has also been argued that the rise of individualism has contributed to the decreasing influence of religious institutions, as religiosity is increasingly seen as an individual matter and can take forms unrelated to churches or other forms of organized religion (Pollack, 2008). The advancement of globalization and the increasing number of options and views available to individuals also links to individualism (Halman and Draulans, 2006). These factors have also contributed to a weakening of social norms, leading to lower general religiosity and turning religion more and more into a private matter.

In view of these two trends – fertility decline and secularization – the issue arises to what extent and in which ways these trends are related. Despite its loss of influence in European societies, religiosity is still a powerful determinant of fertility on the individual level, however. Numerous studies found that higher individual-level religiosity is associated with higher fertility (Adserà, 2006b; Philipov and Berghammer, 2007; Hubert, 2015; Peri-Rotem, 2016), meaning that differences in religiosity could explain differences in fertility. The fact that even in a secularized context like Europe, religiosity still exerts an influence on fertility on the individual level merits even further investigation. In this thesis, the focus is therefore not only on further analysing the influence of religiosity on fertility, but also on investigating deeper the mechanisms of how religiosity affects reproductive decisions. Examining the influence of

religiosity on reproductive decisions is also a promising pathway of one of the big quests in demography – explaining low fertility in Europe.

The main goals of this thesis are therefore to answer the following research questions: ***What role does religiosity play as an individual-level determinant of fertility in contemporary Europe, and what are the mechanisms behind the influence of religiosity on fertility?***

The rest of this introductory chapter is structured as following: The next part provides a brief overview of research on the relationship between religiosity and fertility and possible explanations that were put forward by the researchers. This part also highlights the gaps in research this thesis aims to fill. This is followed by a presentation of the research questions, or "puzzle pieces" that are tackled in this thesis. The next part of this introduction chapter presents the data sources used and some methodological considerations. The last part of this chapter summarizes the most important contributions of this thesis.

Theoretical background

The relationship between religion and fertility is already a very old topic in demographic research. In the West, most earlier studies on the topic focused on differences in reproductive behaviour between religious denominations. The most extensive research has been conducted on the situation in the US, where numerous studies, mostly conducted in the 1950s and 1960s, aimed at explaining the higher fertility of Catholics and the lower fertility of Jews in comparison to the Protestant majority (e.g. Burch, 1966; Zimmer and Goldscheider, 1966). Those differences, that were found for both fertility behaviour and fertility ideals, were explained among others by the different attitudes towards contraception and differences in pronatalist doctrines (Westoff *et al.*, 1963; Barnett, 1965; Jones and Nortman, 1968), the different socio-economic status of adherents (Freedman *et al.*, 1961) and the status of some religious groups as a minority (Day, 1968; Goldscheider and Uhlenberg, 1969). In Europe, the results mirrored those of the US, with Catholics having had higher fertility than Protestants (van Poppel, 1985), in some cases like 1960s Northern Ireland even twice as high as Protestants (Jones and Nortman, 1968). The end of the baby boom led to a convergence of fertility between these religious groups (Westoff and Jones, 1979). In the US, Westoff and Jones (1979) explained this convergence of Catholic fertility with the Protestants by the assimilation of Catholics into the mainstream society and the receding influence of the Catholic church.

The convergence of fertility across the religious groups in the West also led to a change in the focus of demographic research. While in some cases, for example for Muslims in Europe (Westoff and Frejka, 2007) or in regional fertility analyses (Bujard and Scheller, 2017), group-differences in fertility remain relevant, most recent studies on the topic focus on the relationship between fertility and individual religiosity in order to capture the increasing heterogeneity in religious practice and belief.

In the theoretical sense, religiosity can impact fertility since many religions have pronatalist religious doctrines in place. This becomes not only apparent in Bible verses like *"be fruitful and multiply"* (Genesis 1:28), or *"Behold, children are a heritage from the Lord, the fruit of the womb a reward. Like arrows in the hand of a warrior are the children of one's youth. Blessed is the man who fills his quiver with them!"* (Psalm 127:3-5), but also in other religious teachings that regard children as an important goal in life (Fagley, 1965). In some Christian denominations like Catholicism, a decidedly critical stance of contraceptives adds to this influence on fertility (Srikanthan and Reid, 2008).

The roots of religious pronatalism, i.e. why religions would be interested in encouraging their followers to have children, essentially lie in the desire of religions to grow their number of followers. Religions are able to grow their number of followers in two different ways – by conversion, or by their followers having children, who will then inherit the religious beliefs of their parents (Kaufmann, 2010). In the initial growth phase of a religion, growth by convincing people to convert to the religion is important. In the long run however, it has been argued that religions who were able to convince their followers to have many children were more successful in growing their numbers (Blume, 2008; Kaufmann, 2010). In the long history of religious competition, those religions that do have pronatalist doctrines in place, prevailed, while those that did not, were less successful in spreading and gaining a large number of believers.

The influence of these direct pronatalist doctrines, summarized under the term "particularized theology", has however been deemed not enough to fully explain why the highly religious demonstrate higher fertility than the less religious (Goldscheider, 1971; McQuillan, 2004). Several other channels of how religiosity influences fertility have been suggested. For example, it has been noted that many religions also propagate traditional gender roles and idealize the role of women to be carers for their children (Sherkat, 2000; Lehrer, 2004; Goldscheider, 2006). In addition, McQuillan (2004) stressed the role of religious institutions and indicated that the

extent of their influence is also decisive in spreading pronatalist ideas in society. Religious institutions however serve another purpose as well – they also make it possible that adherents of religions come in frequent contact with other adherents who might believe in pronatalist doctrines as well, thus strengthening their influence on childbearing decisions (Krause *et al.*, 2001; Philipov and Berghammer, 2007; Peri-Rotem, 2016).

Based on these theoretical thoughts, many recent studies have been conducted in a wide range of topics and covering different aspects of the relationship between religiosity and fertility. A general positive relationship between religiosity and fertility has been shown for different indicators of religiosity. For the frequency of attending religious services this relationship has been demonstrated by Berghammer (2012) in the Netherlands, by Prioux and Régnier-Loilier (2008) and Baudin (2015) for France, and by Peri-Rotem (2016) for these two countries as well as Britain. In a study on the US, Zhang (2008) found a positive effect of religious beliefs on fertility and showed that the effects are similar for men and women. Adserà (2006a) made use of self-assessed religiosity (whether respondents considered themselves practising Catholics or not) and found evidence that the role of religiosity as a determinant of fertility has even gotten stronger over time.

Some studies also looked at earlier stages of the fertility decision making process. This decision-making process is often modelled as a path that starts with fertility desires or ideals. Based on those, people form fertility intentions, which describe actual plans of having children. These fertility intentions eventually result in childbirth if they are realized. Considering that fertility ideals and desires stand at the beginning of the decision-making process and can therefore be expected to be affected most directly by family norms propagated by religions (Philipov and Berghammer, 2007), most studies on other stages of this decision making process have looked at the impact of religiosity on fertility ideals. Overall, the same pattern of a positive impact of religiosity on fertility has also been for fertility ideals or norms (Adserà, 2006b). Also for fertility intentions, there is evidence of a positive relationship with religiosity (Hayford and Morgan, 2008).

The study of Adserà (2006b) and further studies that took a cross-national approach revealed that the relationship differs in strength between countries (Hubert, 2015), and furthermore, could not be observed in all countries (Burkimsher, 2019). Those varying results across countries were found for all stages of the fertility decision making process (Philipov and Berghammer, 2007). Guetto *et al.* (2015) analysed these cross-national differences and

concluded that in more traditional and Catholic countries, the effect of religiosity on fertility is more notable.

This short literature review has shown that it is possible to analyse the relationship between religiosity and fertility from many different angles, and that the field can be imagined as a big puzzle of different aspects. The literature review has also shown some promising research pathways and gaps that could be filled by further research. First, there is the angle of cross-national differences. Many studies with a cross-national approach aimed at describing the existing differences in the relationship between religiosity and fertility. Only a few had the goal of explaining and analysing them in more detail, for example the aforementioned study by Guetto *et al.* (2015). Second, there is the angle of the fertility decision making process. The focus of most previous studies was either on analysing fertility behaviour, while another large group focused on fertility ideals and norms. The question of how religiosity affects fertility intentions, which link ideals and behaviour, has only been investigated by a few studies. The third and last major research gap concerns the actual mechanisms of how religiosity translates into higher fertility. While these pathways have been described in many theoretically aimed studies, empirical studies have rarely tested them. It is still not yet clear which other variables might be intertwined with religiosity, affecting its impact on fertility decisions.

Research questions

With the characterization of the research field as a big puzzle in mind, the following section describes in detail the four puzzle pieces this thesis aims at adding to the field. The first two papers take a cross-national approach and incorporate the gender dimension, as it may help to solve the religiosity-fertility puzzle. While the first one examines whether cross-country differences in the strength of the association between religiosity and fertility intentions could be explained by the ruling gender regime in the different countries, the second one examines interrelations between religiosity and gender equality on the individual level in different countries. The other two research papers look further into the role of religiosity in the fertility decision-making process. The third paper, using Poland as an example, is about how religiosity and perceived consequences of parenthood, expressed in costs and benefits, affect fertility intentions. In the fourth and last paper of this thesis, set in the German context, I deal with how religiosity affects the stability of fertility intentions.

Cross-country differences in the effect of religiosity on fertility intentions (Paper 1)

As described in the theoretical section of the introduction, previous research on the relationship between religiosity and fertility revealed considerable cross-country differences in this relationship (Philipov and Berghammer, 2007; Guetto *et al.*, 2015). While the reasons for these differences are not yet clear, several explanations have been put forward in the literature. Adserà (2006b) pointed out that the religious context in a country may play a role in that matter. Philipov and Berghammer (2007) on the other hand suggested that religiosity might interact with other social systems. This approach has been more specified by Guetto *et al.* (2015), who found that the effect of religiosity on fertility is influenced by the cultural setting.

The first paper builds on and develops this approach, acknowledging that the cultural setting constitutes an important variable for understanding those cross-national differences. In order to approximate and quantify the cultural and institutional context in each country, the prevailing gender regime is being used. The gender regime in general describes models and norms regarding gender equality that are in place in a country. That way, the distinction that is usually made in the literature between traditional and more egalitarian countries can be captured. The gender regime might also be able to explain cross-national differences because religions themselves are gendered institutions and support traditional gender norms in their doctrines (Neitz, 2014; Klingorová and Havlicek, 2015). The influence of the gender regime could work out depending on how individual preferences regarding gender equality, which are decisively shaped by individual religiosity, align with the gender regime on the macro level. If more religious people are in a traditional gender regime where their own preferences are represented as the dominant idea in society itself, they receive institutional and social support for their preferences and might therefore be more likely to have fertility intentions than in other contexts.

On the macro level, this "boost" for fertility intentions of the highly religious implies a stronger individual-level association of fertility intentions with religiosity in those more traditional contexts. In more gender egalitarian regimes on the other hand, the highly religious lack that societal support and hence will have lower fertility intentions, implying a smaller difference of fertility intentions between the highly and the less religious. **This leads to the main hypothesis**

of this paper: The effect of religiosity on fertility intentions is stronger in traditional gender regimes than in egalitarian gender regimes.

Religiosity, gender equality and their impact on fertility (Paper 2)

The second paper connects to the first one as it also examines possible connections between gender equality and religiosity, but here, the focus is on the individual level for both dimensions. As described in the theoretical section, religions encourage their followers to have children by promoting traditional gender roles and the specialization of mothers to be caregivers for the children. Previous research on the impact of gender arrangements and attitudes concluded however, that traditional gender roles are typically associated with low fertility (McDonald, 2000; Mills *et al.*, 2008; Neyer *et al.*, 2013). It has been suggested that the main reason for this is that traditional gender roles in European societies, where female employment is widespread, create a double burden where it is expected of women to care for the household and children while pursuing a career at the same time. More egalitarian arrangements on the other hand shift some of that burden away, which may ease the decision to have another child.

Putting these findings together, a contradiction emerges: While religiosity has been shown to be associated with traditional gender roles and high fertility, traditional gender roles on their own are associated with lower fertility according to recent research. These seemingly contradictive findings are the starting point of this paper. **The aim is thus to solve this seeming inconsistency with a thorough analysis on the joint and separate effects of religiosity, gender attitudes and gender behaviour on fertility intentions.** Furthermore, the realization of fertility intentions is also investigated as an additional feature of this paper since the question of how these factors affect the realization of childbearing plans has only rarely been investigated so far.

Perceived consequences of parenthood, religiosity, and their role in fertility intentions (Paper 3)

For the third research question, the attention is shifted to other possible mechanisms in which religiosity may impact reproductive decision-making. In particular, this research focuses on how religious people might perceive consequences of parenthood differently than the less

religious and whether they also might act differently upon them. Many economical or psychological theoretical models on the fertility decision making process assume that the decision to have a child is based on an assessment of perceived costs and benefits of having children (Becker, 1960; Schultz, 1973; Miller, 1994; Nauck, 2014). High perceived benefits and low perceived costs make the decision to have a child more likely.

Religiosity might encourage decisions to have a child by interacting with those perceived consequences in two different ways (Arránz Becker and Lois, 2017). First, it is possible that those perceived consequences might act as a mediator of the effect of religiosity on fertility. In other words, religiosity increases perceived benefits, for example by highlighting the positive sides of having children in religious doctrines (Brose, 2006). Religiosity could also decrease perceived costs, for example by providing childcare, promoting the specialization of women to care for children and by discouraging thinking about children in materialistic terms. Those higher perceived costs and lower benefits then translate into a higher likelihood for planning children. A second possible mechanism is that a high religiosity changes how people react on costs and benefits of children, or in other words, religiosity acts as a moderator for the relationship between perceived consequences of having children and fertility decisions (Arránz Becker and Lois, 2017). Due to pronatalist religious doctrines, highly religious people for example could favour having children regardless of the costs they may carry for them.

Based on these findings, two hypotheses are being tested in this paper. **The first hypothesis is that the highly religious have higher fertility intentions because they see higher benefits and lower costs of having children. The second hypothesis is that perceived costs play a less prominent role in determining fertility intentions among the highly religious in comparison to the less religious.** Considering that the only previous studies on the topic were conducted in Germany (Brose, 2006; Arránz Becker and Lois, 2017), a further contribution of this study is that it examines these relationships in the highly religious context of Poland, adding to the understanding of this mechanism in different country contexts.

Religiosity and stability of fertility intentions (Paper 4)

The last research question deals with the impact of religiosity on the stability of fertility intentions. Over the life course, fertility intentions are not stable but constantly re-evaluated and adjusted, based on changing circumstances and life situations (Heiland *et al.*, 2008;

Hayford, 2009; Liefbroer, 2009; Iacovou and Tavares, 2011). In most cases, these adjustments are downwards, but in some cases, upward trajectories can be found as well (Hayford, 2009). However, it has still gotten little attention how religiosity could affect the stability of fertility intentions.

The first part of the theoretical reasoning of this paper builds upon the reasoning of the third research question on religiosity and perceived consequences of parenthood. When more religious people generally either perceive lower costs of childbearing or do not base their childbearing decisions on the extent of the perceived costs, it could be expected that religious people have more stable fertility intentions, as changes in perceived childbearing costs are an important reason for changing fertility intentions. The second part builds upon the assumption that the decision to have a child is not always a rational decision rooted in an assessment of perceived costs and benefits, but could also be an automatic and/or spontaneous decision based on internalized norms (Esser and Kroneberg, 2015). Previous research on religiosity and perceived consequences of parenthood already mentioned the possibility that the religious may base their childbearing decisions more on internalized norms, for example religious pronatalist norms. These decisions based on norms can be assumed to be more stable over time, in comparison to rational decisions based on an evaluation of benefits and costs, as benefits and costs could change more easily.

Considering that the highly religious may be less likely to change childbearing plans when conditions of life change, and that their childbearing plans are already in the beginning more impacted by norms instead of a more "rational" decision based on an evaluation of costs and benefits of having children, **it can be expected that the highly religious have more stable fertility intentions across time in comparison to the less religious. This is the main hypothesis of this paper.**

Data sources and methodological considerations

Data sources

For the first three papers, data from the first two waves of the Generations and Gender Survey (GGS) was used. The GGS is a large-scale social survey with a focus on families, individual life course trajectories and gender relationships. The survey questionnaires have been designed

and developed by demographers, sociologists, and economists, thus making the GGS a survey with a wide scope of topics covered.

So far, data of the first edition of the survey is available for 17 European and 2 non-European countries. Table 1.2 shows the 12 countries of which data was used in this thesis. Within each country, the sample has been designed to be nationally representative, and the sample size amounts to 10,000 respondents on average, involving persons aged 18-79. Furthermore, the GGS has been designed as a panel study. The first wave has been conducted between 2002 and 2013. Table 2 also shows response rates to the first wave as calculated by Fokkema *et al.* (2016). They ranged from values of over 75% in Bulgaria, Georgia and Romania to a low of 35.6% in Lithuania and 41.8% in Belgium. The overall (unweighted) average response rate across countries for the first wave amounted to around 60%, a similar value as in other bigger European surveys. Based on the response rate and other criteria, the data quality of the GGS can be rated as good (Fokkema *et al.*, 2016).

Table 1.2: Overview of the 12 countries covered by the Generations and Gender Survey and included in the thesis; the years of data collection, and the response rate in the first wave

	Wave 1		Wave 2
Country	Year	Response rate (%)	Year
Austria	2008-2009	64.6	2012-2013
Bulgaria	2004	78.1	2007
Czech Republic	2005	49.1	2008-2009
France	2005	66.8	2008
Georgia	2006	78.2	2009
Germany	2005	55.4	2008-2009
Lithuania	2006	35.6	2009
Norway	2007-2008	60.2	
Poland	2010-2011	-	2014-2015
Romania	2005	83.9	
Russia	2004	49.7	2007
Sweden	2012-2013	54.7	

Source for the response rates : $RR_{4\text{-}6}$ as calculated by Fokkema *et al.* (2016)

The second wave was typically conducted around three years after the first wave in each country, starting in 2006. For this second wave, data of 14 countries is available, compared to 19 countries for the first wave. These features make the GGS a suitable dataset for the first two papers that take a cross-national approach.

For the third paper, which is set in the Polish context, data from the second wave of the Polish GGS was used. Poland in this wave is the only country where elements of perceived costs and benefits of children were introduced into the questionnaire (Kotowska *et al.*, 2019), allowing the use of this dataset for the third research question.

The fourth paper makes use of the German Family Panel (pairfam, Brüderl *et al.*, 2019). While the pairfam, similar to the GGS, focuses on family, partnership and fertility decisions (Huinink *et al.*, 2011), its geographic scope lies on Germany instead of a multitude of countries. The survey started in 2008/2009 and has been repeated every year on the same set of respondents since the onset. So far, 10 waves have been released. Another important aspect of the pairfam survey is its sampling, which differs from most other sociological survey in that it focuses on three different cohorts (born in 1971-1973, 1981-1983 and 1991-1993) instead of a sample within a large age range. The survey started off with a large sample of 12,402 respondents belonging to these three cohorts (anchor respondents). Additionally, partners, children and parents of these anchor persons were surveyed. In the fourth paper, only the data of the anchor persons are used though. The annual panel design and the focus on people in the fertile age range make the pairfam a suitable data source for a study on the stability of fertility intentions.

The geographical focus of both datasets is Europe. Therefore, the focus of this thesis will be on the Christian religion, as among all religions, it is by far the most widespread and important religion in Europe. This does not imply that studying other religions is less useful, but that considering other, smaller religions would have gone beyond the scope of this thesis. Moreover, the sample size for these other religions is too small to allow for such detailed analyses.

Methodological considerations

In the four papers, different indicators for individual religiosity are used. Paper 1,2 and 4 make use of the frequency of attending religious services as an indicator for religiosity. Attendance frequency is considered as an indicator that can be compared well across countries and different Christian denominations and contexts (Brenner, 2016). Furthermore, it is an objective measure which has the advantage of being more likely to be understood similarly by different individuals. In Paper 3 on the other hand, religiosity is represented by another indicator, namely self-assessed religiosity. While it may be more suitable at first thought to use the same religiosity indicator in the whole thesis, this was not possible due to limitations of the dataset.

In the analytical models of the four papers, there are two further methodological issues that must be considered. The first methodological issue occurs in all studies since logistic regression models in various forms are used. In many studies, the results of these regression models are expressed either in odds ratios or log-odds ratios (logits). It has been argued however, that these

measures cannot be interpreted as effect measures as such and be compared across models (Mood, 2009) since they are affected by unobserved heterogeneity that changes between models and samples. One solution to this problem proposed by Mood (2009) is to use average marginal effects to compare effect sizes across models, an approach that is used in all instances of logistic regression models in this thesis.

The second issue concerns the first study, which includes a cross-country comparison. For these kinds of clustered data, multilevel regression models are usually applied. Bryan and Jenkins (2016) argued that for multilevel logistic regression models, at least 30 clusters are necessary to arrive with unbiased results. Since the cross-country analysis in this study involves only 12 countries, an alternative approach suggested by Bryan and Jenkins (2016) is used. This alternative approach involves running separate models for each country and then using the found country-level effects in a meta-regression. This approach does not only yield unbiased results, but also provides a graphical representation of country-level effects of the variables of interest.

Overall contributions of this thesis

The overall goal of this thesis is to expand the religiosity-fertility "puzzle" by covering the topic from different angles to improve our understanding of how religiosity actually translates into higher fertility in the empirical sense. In this thesis, one can speak of four different angles from which the topic is addressed. In some papers, a cross-national approach is applied, the papers take different stages of the fertility decision making process into account, they address the gender dimension, and they go deeper into the mechanisms of how religiosity actually translates into higher fertility.

The first overall contribution of this thesis lies in pursuing a cross-national approach in the first two papers. Such a cross-national approach has only been applied seldomly in previous research on religiosity and fertility, but it has important advantages. First, it gives a useful overview on whether and how much the effect of religiosity on fertility varies between countries. And second, it improves our understanding on how that effect is dependent on various aspects of the national context.

The second key contribution concerns the fertility decision making process and consists of the use of fertility intentions in all four papers, which stands in contrast to most earlier studies which either focused on fertility ideals or fertility behaviour. Fertility intentions have some unique characteristics, as they lie in the middle of the fertility decision making process. In contrast to fertility behaviour for example, intentions are not affected as much from obstacles that could appear randomly and affect the timely realization of childbearing plans. However, compared to fertility ideals and norms, fertility intentions are closer to reality since they do take some structural obstacles for childbearing into account. This distinction is important when going deeper into the actual mechanisms of how religiosity translates into childbearing within the childbearing decision-making process.

The use of fertility intentions has a further advantage over other fertility indicators. In many studies that analysed the relationship between completed fertility and religiosity, fertility represents a retrospective variable, as the associated births have already happened a long time ago when the interview was made. Religiosity on the other hand was measured right at the point of interview. In order to evaluate a causal relationship between religiosity and fertility, it is however necessary to evaluate religiosity before the decision to have a child is made (Marcum, 1988). Even though a panel study conducted in the Dutch context found little evidence for a reverse causality of fertility affecting religiosity (Berghammer, 2012), it has been argued that it might still appear in European countries (Peri-Rotem, 2016). For these reasons, all studies in this thesis make use of different variants of fertility intentions (and their realization in one study), which have the advantage that they are evaluated at the same time as religiosity, while still being rather close to eventual fertility behaviour (Dommermuth *et al.*, 2015).

A third contribution of this thesis is that it takes the gender dimension into account, and in two different ways. First, in all papers, a distinction is made in the models between men and women. In previous research, no clear finding on whether the effect of religiosity on fertility is stronger for men or for women was found (Zhang, 2008). Nevertheless, distinguishing between men and women is particularly important in the first two papers, as they incorporate gender equality, which may have different effects for men and women. For the other two papers, there may be no theoretical reasons to make this distinction, but for consistency with the first two papers, and for taking the possibility of significant differences between men and women into account, it is kept. Second, gender equality constitutes an important further variable in the first two research papers, due to its possible interrelations with religiosity (Goldscheider, 2006). In the

first paper, the role of gender equality as a contextual variable is examined. In the second paper, possible interrelations between gender and religiosity on the individual level are analysed.

The fourth main contribution is going deeper into the mechanisms of how religiosity translates into higher fertility. Examining interrelations between religiosity and the gender dimension can reveal for example whether religiosity leads to higher fertility by emphasizing traditional gender roles. The third paper takes a different part of the mechanisms and links religiosity with perceived consequences of parenthood. The fourth paper, unlike the other three papers, does not incorporate another factor, but expands on fertility intentions by analysing their stability. That way, the last two papers are shedding light on the question whether the highly religious have higher fertility because they may make fertility plans and decisions in a different way in comparison to the less religious.

Outline of the thesis

The structure of the remaining part of this thesis follows the order of how the four individual research questions were presented. Each of the Chapters 2-5 has been published or submitted to peer-reviewed journals as research papers. Consequently, as each chapter constitutes a stand-alone paper, some overlaps between them are inevitable.

In Chapter 2, cross-national differences in the relationship of religiosity and fertility intentions are approached by the gender regime (Paper 1). Chapter 3 examines relationships between religiosity, gender equality and fertility intentions as well as their realization on the individual level (Paper 2). Chapter 4 combines the religiosity-fertility relationship with the assessment of perceived consequences of parenthood (Paper 3). In Chapter 5, it is analysed whether the more religious have more stable fertility intentions (Paper 4).

Chapter 6 is the last chapter of this thesis and summarizes the results of the four papers. It also includes a discussion of these results and shows possible future pathways of research.

Chapter 2

Religiosity and fertility intentions – Can the gender regime explain cross-country differences?

Christoph Bein, Anne H. Gauthier, Monika Mynarska

A revised version of this chapter is currently under review by an international peer-reviewed journal.

Abstract

Research on the relationship between religiosity and fertility intentions revealed substantial cross-national differences. In some countries, a strong and positive effect of religiosity on fertility intentions was found, while in others, the effect was weaker or not significant, and the reasons underlying these cross-national differences are still unclear. The aim of this article is to explain these macro-level differences from the perspective of the prevailing gender regime. We argue that in countries with more traditional regimes, a stronger effect of religiosity on fertility intentions could be expected than in countries with a more egalitarian view. We make use of the first wave of the Generations and Gender Survey (GGS) and incorporate data from a total of 12 European countries in our analysis. We examine the influence of gender regime according to various macro-level indicators on gender attitudes and gender equality using meta-regression analyses. We also conduct robustness checks using other indicators such as the Gender Development Index. Our results reveal that the gender regime is only able to explain these differences in certain situations, specifically those relating to the long-term fertility intentions of men.

Introduction

Research on the impact of religiosity on fertility is a re-emerging field in demography, and coincides with a general renewed interest in religion in the public discourse (Hubert, 2015). In the past, the focus was mainly on the examination of differences in fertility behaviour among different religious denominations, such as Catholics, Protestants and Jews (Westoff and Jones, 1979; van Poppel, 1985). Since then, there has been a trend in favour of studies on the influence of individual religiosity on fertility. This is partly related to the increasing secularization which has led to a greater heterogeneity of religious practices among people within each denomination (Kaufmann, 2010). Results from such studies show that religiosity tends to be a better predictor of fertility than simple denominational affiliation alone (Adserà, 2006a). In general, more religious respondents tend to have more children and have a higher ideal number of children than less religious respondents (Adserà, 2006a; Adserà, 2006b).

The positive relationship between religiosity and fertility behaviour was confirmed using various indicators for religiosity and in a range of geographical settings across Christian-dominated Western countries (Frejka and Westoff, 2007; Berghammer, 2012; Hubert, 2015; Peri-Rotem, 2016). Furthermore, some studies found similar results for the relationship between religiosity and predecessors of fertility behaviour, such as fertility ideals or intentions (Philipov and Berghammer, 2007; Hayford and Morgan, 2008; Dilmaghani, 2019). But this relationship cannot be said to be universal across Western countries. Philipov and Berghammer (2007) revealed considerable differences across countries in terms of the impact of religiosity on fertility ideals, intentions and behaviours. In many countries the frequency of attending religious services is positively associated with the intention to have a child, but in some countries this is not the case.

The reasons for such cross-national differences remain somewhat unclear. While Philipov and Berghammer (2007) suggested that religiosity might interact with other social systems relevant to fertility, such as education, work or culture, they did not actually test this hypothesis. In another cross-national study, but restricted to fertility behaviour, Guetto *et al*. (2015) concluded that religiosity exerts a stronger effect on the number of children of women in more traditional countries as compared to more secular and liberal contexts. In this paper, we build on the argument that the cultural or institutional setting of a country may be interacting with the individual-level relationship between religiosity and fertility intentions. We do so by focusing on the gender regime. As discussed later, this allows us to link the gendered nature of religions,

and their views on gender roles (at the macro-level), with religiosity (at the micro-level). It also allows us to operationalise differences between more traditional and liberal contexts along both attitudinal or normative, and institutional dimensions. In other words, our argument is that the countries' gender regime is modifying the individual-level relationship between religiosity and fertility intentions, and is consequently key to understanding cross-national differences in this individual-level relationship.

In this paper, we examine the macro-level moderating impact of gender regimes on the relationship between religiosity and fertility intentions by using data from 12 European countries from the Generations and Gender Survey (GGS). Because of the small number of countries, we apply logistic meta-regression. Models are constructed separately according to gender and categorized into short-term (over the next three years) and long-term (over an indefinite time span) intentions. Our results show that in some countries there is no significant impact of religiosity on fertility intentions, while in other countries there is a strong positive impact. The gender regime explains only part of these differences, however, as we find evidence for the influence of the attitudinal dimension of gender regime on the effect of religiosity on fertility intentions for men only.

Theoretical background and hypotheses

In the literature, childbearing is often modelled as an outcome of a holistic decision-making process from ideals/desires, through intentions, to behaviour (Miller, 1994; Johnson-Hanks *et al.*, 2011; Miller, 2011a; Ajzen and Klobas, 2013; Bachrach and Morgan, 2013; Mencarini *et al.*, 2015; Mynarska and Rytel, 2018). Fertility ideals and desires stand at the beginning of this process and describe the most basic wishes related to childbearing. While both terms are often used interchangeably (Hin *et al.*, 2011), it has been argued that "desires" may be understood by respondents in terms of personal wishes, while "ideals" may also refer to societal ideas or norms (Knodel and Prachuabmoh, 1973; Philipov and Bernardi, 2011). Those ideals and desires form the base for fertility intentions, which are the focus of our study. They refer to a concrete plan to have a child or not within a set timeframe. Compared to ideals and desires, intentions take into account restrains that could stand in the way of realizing wishes, such as the opinion of significant others, employment/unemployment, partnership status or the

financial status (Miller, 1994; Iacovou and Tavares, 2011). Intentions are therefore usually a good predictor of actual behaviour (e.g. Régnier-Loilier and Vignoli, 2011).

Religiosity—the second concept central for our study—is similarly complex. In general, it refers to the strength of commitment to a religion or religious beliefs, together with the degree of participation in religious activities (Lehrer, 2004). Various ways of capturing religiosity have been used in research on the relationship between religiosity and fertility, such as the importance of God or religion in one's life (Zhang, 2008), or by self-assessment of religiosity (Philipov and Berghammer, 2007). Furthermore, many researchers used the frequency of attendance at religious services (Berghammer, 2012; Hubert, 2015; Peri-Rotem, 2016; Dilmaghani, 2019), believing that it is a more objective indicator of religiosity. From a theoretical point of view, frequency of attendance also expresses the extent of exposure to other religious people and religious doctrines.

Individual-level impact of religiosity on fertility intentions

Religiosity can influence the childbearing decision-making process in various ways. In particular, pronatalist religious doctrines are central to an understanding of this impact. Goldscheider (1971) summarized the influence of direct religious doctrines under the term "particularized theology" and stressed that many religions explicitly encourage their followers to have large numbers of children. Furthermore, religions often emphasize associated family values, such as the importance of marriage and the role of women as mothers and carers (McQuillan, 2004). The Catholic Church, for example, has developed a set of defined pronatalist rules and values concerning marriage and family (Catechism 2366-2379). A high level of religiosity also leads to more contact and stronger relationships with other highly religious people, who may harbour similar opinions on family and children (Krause *et al.*, 2001; Philipov and Berghammer, 2007; Peri-Rotem, 2016). In other words, one way religiosity can influence the childbearing decision making process is through fertility ideals, that is, the promotion of a larger family size.

Another path of influence concerns the influence of religiosity on actual fertility behaviour. This manifests itself for example in the stance of religions on the use of contraception. While Protestant and Orthodox denominations are less critical of the use of contraception (Hubert, 2015), the Catholic church has very strict rules regarding its use (Srikanthan and Reid, 2008),

which could also influence the reproductive choices of its followers. Furthermore, religious doctrines may also have a negative influence on fertility behaviour, by inhibiting extramarital births, for example among teenagers (Lyons and Smith, 2014) or delaying the entrance into sexual activity (Manlove *et al.*, 2008).

When it however comes to fertility intentions, additional mechanisms may be at work. In particular, and as noted by Philipov (2011), religious people could form fertility intentions differently due to their belief in a higher power that would support them in raising children and save them from the normal worries and concerns of parenthood. Arránz Becker and Lois (2017) demonstrated in a study on Germany, that for the more religious, perceived costs regarding childbearing matter less in their childbearing decisions compared to the less religious. This could imply that the more religious may formulate fertility intentions more frequently than the less religious, as constraints that inhibit the translation of fertility ideals into intentions play a less prominent role among them. Notably, attitudes towards marriage or contraceptives, shaped by religion, might also have impact on childbearing intentions.

Overall, the exposure to religious doctrines and contacts with highly religious groups may have a direct or an indirect impact on all stages of the reproductive decision-making process: from ideals to actual behaviours. In our study, we focus on the impact of religiosity on intentions, constituting the middle part of the decision-making process. We examine the role of religiosity for both short- and long-term childbearing intentions. Short-term fertility intentions describe whether a respondent plans to have a child, or another child, within a fixed (short) period (in our case, over the next three years). Long-term intentions refer to a plan to have a child, or another child, at any point in the future. Short-term intentions thus capture both the timing and quantum of fertility, while long-term intentions capture the quantum only. Therefore, long-term intentions are closer to concepts such as "total intended (or expected) family size" and also closer to fertility ideals (Philipov and Bernardi, 2011). These indicators relating to the quantum of fertility have been proven to be decisively affected by religiosity (Philipov and Berghammer, 2007; Hayford and Morgan, 2008). Evidence for religious influence on the timing element, which constitutes an important part of the short-term intentions, is less clear (Hayford and Morgan, 2008). These considerations at the micro-level lead to the following two hypotheses:

H1a: *Religiosity is expected to be positively related to fertility intentions (i.e., the more religious a respondent, the more likely he/she is to intend to have a child, or another child).*

H1b: *Religiosity is expected to have a stronger effect on long-term than short-term fertility intentions.*

Macro-level moderating impact of the gender regime on the association between religiosity and fertility intentions

Previous research found considerable variation in the relationship between religiosity and various indicators of fertility across countries, including a rather strong and clear impact of religiosity on fertility ideals, intentions and behaviour in some countries, and no effect at all in others (Adserà, 2006b; Philipov and Berghammer, 2007; Hubert, 2015; Peri-Rotem, 2016). Some researchers, like Adserà (2006b) suggested that the religious context in each country plays a role in determining to what extent fertility ideals differ between the more and the less religious. Okun (2017) also stressed the role of religious context and noted that for Jews in Israel, religious community and the role of religion as an institutional power can explain individual differences in the relationship between religiosity and fertility. Other authors in contrast argued that the micro-level relationship between religiosity and fertility might be influenced by other contextual variables. For instance, Guetto *et al.* (2015) considered the overall role of culture and noted that religiosity has a stronger impact on fertility in more traditional and Catholic countries. And Philipov and Berghammer (2007) assumed that individual-level religiosity might interact with other social systems in shaping fertility. Overall, any interdependencies in people's life course are strongly dependent on different cultural and institutional contexts in which they occur (Bernardi *et al.*, 2019). These contexts need to be considered when analysing relationship between childbearing intentions and religiosity.

In our study, we refer to gender regimes to capture the cultural (normative, attitudinal) and institutional context in which childbearing takes place. The concept of gender regime was initially developed as an alternative to Esping-Andersen's welfare state classification (Betzelt, 2007). Consequently, the first gender-regime typologies focus mainly on the institutional part of gender equality and examined the extent to which women are enabled by institutions and policies to have access to the labour market and to lead a household independently (e.g. Lewis, 1992; Sainsbury, 1999; Walby, 2004). These typologies were usually conceived as a spectrum of regimes, ranging from those supporting the male breadwinner (traditional) model all the way to those supporting the individual-adult or egalitarian model. Later, the definition of gender

regime was widened to take account of the cultural-normative dimension of gender equality (MacRae, 2006; Betzelt, 2007). That way, the gender regime can capture the contrast that has often been made in demographic studies between the familialist and traditional cultures of Southern Europe and the individualistic Northern European countries where gender equality is emphasized (e.g. Dalla Zuanna, 2001; Livi-Bacci, 2001).

The mechanism by which the gender regime may influence the individual-level relationship between religiosity and fertility intentions is centred around the fact that religions themselves are gendered institutions (Neitz, 2014). Many religions propagate traditional gender roles and have different rules in place for men and women. In the Catholic Church or the Russian Orthodox Church for example, only men are allowed to become priests (Haskins, 2003; Chernyak, 2016). Most religions have also created mechanisms regarding gender relationships in the private sphere, emphasizing the ideal of the woman as a caring mother and a good wife. Men, on the other hand, are expected to be good husbands and providers. Many religions are critical of gender equality or the emancipation of women (Klingorová and Havlicek, 2015). Goldscheider (2006) argued that the promotion of these traditional gender roles plays a role in the influence of religiosity on fertility, even though the direct pronatalist teaching may also be influential (Bein *et al.*, 2017).

The actual mechanism thus involves the extent to which the gender roles supported by the gender regimes (at the macro level) are in line with those expressed at the individual level. For example, traditional gender regimes generally emphasize male-breadwinner family models, just as most religions do. In such a country context, the preferred gender arrangement of more religious individuals is mostly in line with the ruling gender regime in society, meaning that religious people experience institutional and societal support for the choices they make. This compatibility between the macro and micro sphere is consequently expected to modify the individual-level relationship between religiosity and fertility. Specifically, we therefore expect the strength of the relationship to be larger in traditional gender regimes. Concretely, what this means is that the relationship between religiosity and fertility intentions would be expected to be stronger in a country such as Poland where a support for more traditional gender roles still prevails, and weaker in a country such as Sweden where a support for more gender equal roles is in place. Our second hypothesis thus is as following:

H2: *The effect of religiosity on fertility intentions is stronger in countries with a more traditional gender regime.*

In this study, we consider men and women separately. This is especially crucial in our case, as gender regimes may impact men's and women's lives differently. Additionally, most studies on the relationship between religiosity and fertility focused exclusively on the situation of women. Of those studies that considered both men and women, Zhang (2008) did not find any differences in that relationship between men and women. In contrast, Hubert (2015) concluded the opposite – that religiosity is a stronger determinant of male fertility.

Data and methods

Dataset and sample selection

Our data source is Wave 1 of the Generations and Gender Survey (GGS). For the purpose of this study, we selected those twelve countries for which the GGS provide data on frequency of attendance at religious services and both long- and short-term fertility intentions [1]: Of these, 4 countries are dominated by Orthodox Christianity (Bulgaria, Russia, Georgia, and Romania), 4 are majority Catholic (France, Austria, Lithuania and Poland), 2 are majority Protestant (Norway and Sweden), Czechia is majority unaffiliated and Germany is mixed Catholic and Protestant. The data were collected between 2004 and 2013. Our sample was restricted to men (18-49 years) and women (18-44 years) of childbearing age (N = 72,071). We further restricted our sample by omitting cases for which the survey questions on fertility intentions were not deemed applicable, such as for those indicating infertility, of themselves or their partners (Beaujouan, 2013), or declared themselves pregnant, resulting in 66,074 respondents. Missing values on fertility intentions and religiosity further reduced the sample to N = 54,429 respondents, of which there were 25,832 men and 28,597 women.

Measurement of religiosity

Following many previous studies (Berghammer, 2012; Hubert, 2015; Peri-Rotem, 2016; Dilmaghani, 2019), the paper uses attendance frequency of religious services as a marker for religiosity. In the GGS, attendance frequency was asked as: "How often, if at all, do you attend

[1] The following countries were excluded for the following reasons: For Australia, Belgium, Estonia, Hungary, and Japan no data on religiosity were available. Data on Belarus have not yet been published. For Italy and the Netherlands, the variables necessary for the construction of the Gender Attitudes Index were not available.

religious services (apart from weddings, funerals, baptisms, and the like)?" In most countries, respondents were able to give numerical responses, such as "10 times a year" or "2 times a week". In others, religiosity was assessed via a varying set of categories, such as "more than once per month" or "once per year". In order to harmonize the variable across countries, we recoded attendance frequency into three classes: "never" (also called "low religiosity" in our models), "less than monthly" (medium religiosity) and "monthly or more often" (high religiosity).

Other micro-level variables

The dependent variable is a measure of fertility intentions, in other words, whether the respondent intends to have a(nother) child. In the GGS, fertility intentions were assessed using two questions. The first concerns fertility intentions over the next three years (short-term) and was asked as follows: "Do you intend to have a(nother) child over the next three years?". Respondents who answered that they did not intend to have a(nother) child during that time were asked an additional question on their intentions beyond that time frame: "Supposing you do not have a/another child during the next three years, do you intend to have any (more) children at all?" For both questions, respondents were able to answer on a four-point scale ranging from "definitely yes" to "definitely no" in most countries. In Norway, however, only a binary answer was possible (yes or no). For this reason, we recoded all answers into a binary form (1: intends to have a child, 0: does not intend to have a child).

In order to create a variable that captures fertility intentions irrespective of the time frame (which we now refer to using "long-term intentions"), we combined the answers to the two questions in the following way. Those respondents who answered yes either for the short-term or for their intentions beyond three years were coded as "yes", while those respondents who answered no to both questions were coded as "no".

By measuring religiosity in terms of frequency of attendance as described above, its meaning could vary depending on the religion concerned. We therefore included religious affiliation as a control variable. Unfortunately, for Germany, detailed information on different Christian denominations was missing. Additionally, there are too few cases to permit separate categories to be used for non-Christian religions such as Islam or Judaism. With these limitations in mind, we divided religious affiliation into three groups (Christian, other religion, unaffiliated). We

also included the following additional control variables: age of respondent, number of biological children, whether the respondent had a child younger than 10 years old, partnership status, education level (based on ISCED categories: low denotes levels 0-2, medium 3-4 and high 5-6), and employment status.

Macro-level variables

To account for the multidimensionality of gender regimes, we used two macro level indicators to capture normative/attitudinal and institutional aspects. These are our key explanatory variables for analysing cross-country differences in terms of the effect of religiosity on fertility. First, we constructed a Gender Attitudes Index from four items included in the GGS regarding attitudes towards gender roles and relationships, based on the approach used by Aassve *et al.* (2015). For each of the following four items, respondents were asked about the extent to which they agreed or disagreed with the following statements (on a 5-point scale from "strongly agree" to "strongly disagree"):

- In a couple it is better for the man to be older than the woman
- If a woman earns more than her partner, it is not good for the relationship
- On the whole, men make better political leaders than women do
- When jobs are scarce, men should have more right to a job than women

We recoded the answers to each question in a scale from 1 (least traditional gender attitude) to 5 (most traditional gender attitude). The average score for each respondent was then calculated. These data were then used to calculate the country average. Different from our individual-level variables, we used all respondents in the dataset (i.e., aged 18 and over[2]) to calculate country averages. This was necessary because we are interested in the gender-attitude environment, which is rooted in norms, attitudes and cultural habits, all of which can be formed and upheld by people of all ages. Factor analysis confirms that all four items belong to one factor. Across the whole sample, Cronbach's alpha amounted to 0.70, deemed an acceptably high value, with some variation between countries (it ranged from 0.82 in Sweden to 0.46 in Russia).

[2] In Austria, the GGS sample only consisted of respondents aged 18-45, while in all other countries in our study, the age range is 18-80. Therefore, the Gender Attitudes Index for Austria might be slightly biased.

In order to incorporate the institutional aspect of the gender regime, it would have been appropriate to construct an index that represents, for example, institutional support for the dual-earner model. Unfortunately, indices of that kind providing data on all countries of interest were not available. Most such indices are only available for EU countries (e.g. Billingsley and Ferrarini, 2014; Matysiak and Weziak-Bialowolska, 2016). For this reason, we used the Economic Participation and Opportunity sub-index (EPO-Index) as an alternative, which is part of the Gender Gap Index developed by the World Economic Forum (2008). This sub-index measures the extent to which women are able to participate in the economy and ranges from 0 (least possible participation and opportunities) to 1 (highest possible participation and opportunities).

We acknowledge that the Gender Attitudes Index and the EPO-Index might not be a perfect means of representing the gender regime. Therefore, we also conducted robustness checks using a wide array of other indicators related to gender regime. These are described in detail in the "Robustness check" section.

Methods

For modelling the micro-macro linkages in our paper, we followed the two-step approach described by Bryan and Jenkins (2016) involving meta-analysis and meta-regression. This approach has some advantages compared to other approaches like multilevel modelling, which have been often used for similar research questions. Bryan and Jenkins (2016) argued that for multilevel logistic regression, at least 30 clusters are necessary to allow for reliable estimates to be made. For 15 clusters, country-level variance is already biased downwards by 10% and may be even more biased in our case of 12 countries. The two-step approach does not only show unbiased estimates, but also provides a graphical representation of country-level variations which give further clues about them.

In the first step of this approach, we ran logistic models for each country separately using the individual-level variables. The coefficients and standard errors expressed in terms of odds ratio or logit coefficients of the variable of interest as required in the meta-regression cannot be used to compare strength of effect across different countries (Mood, 2009). We therefore used average marginal effects, measured in percentage points. These show the average difference in

the probability that the event in question takes place for each possible value of the categorical variable, in comparison to the reference category.

These results were used to perform a meta-analysis using the 'metan' command in Stata (Harris *et al.*, 2008). Because religiosity in our study is a categorical variable with three possible values, there are two kinds of sizes of effect in each model: the first describes the effect of attending religious services less than monthly compared to never, and the second describes the effect of attending monthly or more compared to never. Meta-analysis provides, among other things, estimates of heterogeneity (in other words, the variation between studies, in this case countries, rather than within-study variance), and the I^2 statistic showing the variation in size of effect attributable to heterogeneity across countries (Higgins and Thompson, 2002).

In the second step, we performed the actual meta-regression at the macro level, using the 'metareg' command (Harbord and Higgins, 2008). Theoretically, a simple linear regression would be possible using our gender regime indices as the independent variable, and the strengths of effect from the meta-analysis as the dependent variable. Meta-regression nevertheless has the advantage that it accounts for the standard errors of the effects of religiosity, as well as the number of observations in each country.

Our macro-level hypotheses were framed as directional hypotheses, i.e., we hypothesized that each effect has a defined direction. In the analyses, we therefore applied one-sided t-tests.

The procedure described above was repeated for both genders (male and female), both time horizons (short- and long-term intentions), and both macro-level variables (Gender Attitudes Index and EPO-Index), leading to a total of 8 models with two meta-regressions per model: one for the effect of medium religiosity and the other for the effect of high religiosity, compared to our reference category of low religiosity.

Results

Descriptive results

The distributions of our variables according to country are shown in the Appendix Table 2.1 for men and Appendix Table 2.2 for women. The percentage of respondents intending to have a(nother) child over the next three years varies between countries. Georgia is the country with

the highest short-term intentions (men: 43% and women: 34%), whereas German respondents show the lowest short-term intentions (around 21% for both women and men). For long-term intentions, the pattern is slightly different, with Austrian men (63%) and Swedish women (62%) showing the highest intentions to have a(nother) child at any time. Norwegian men and Romanian women have the lowest intentions (39% in both cases). Overall, it is also important to note that among men, cross-country differences are more pronounced than among women.

In terms of religious practices and denominations, men and women differ much less than in their fertility intentions. Overall, women attend religious services slightly more frequently than men. Respondents from France and Czechia are the least frequent attenders of religious services, with a vast majority stating that they never attend them. In France, however, most respondents still consider themselves Christian, while Czechia is the only country in our sample where the majority of respondents do not belong to any religion. Polish, Romanian, and Georgian respondents, on the other hand, are the most likely to attend services monthly or more. They are also the least likely to belong to no religion at all.

The Gender Attitudes Index and the EPO-Index are macro indicators, and therefore the same for both genders. Expressed in the Gender Attitudes Index, Sweden and Norway can be considered the least traditional, while Georgia, followed by Russia, occupies the other end of the spectrum. In terms of economic participation and opportunity, there are some marked differences. Again, Sweden and Norway show the highest levels of opportunity and participation; Austria and Poland show the lowest levels. Russia and Latvia are examples of countries that offer many opportunities for participation, despite having a population with more traditional gender attitudes.

Meta-analysis of the models

In the meta-analysis, we systematically analysed the strength of the effect of religiosity on the likelihood of the intention to have a(nother) child, as well as the extent to which these effects vary by country. The forest plots (Appendix Figures 2.1 and 2.2) depict the average marginal effect on the probability of intending to have a(nother) child for each country separately and at the bottom an overall average value for all countries. The values are expressed in percentage terms, and show how much more likely a respondent of medium or high religiosity is to intend to have children compared to the reference category (low religiosity). They also show the

confidence interval associated with each value. The dotted vertical line shows the overall effect among all countries combined with the confidence interval, indicated by the diamond at the bottom of each diagram.

The overall effects are positive in all cases, meaning that the probability of respondents intending to have a(nother) child both in the short- and long-term is highest for those who attend religious services at least once a month. Those attending less than monthly are less likely to plan to have a child than the highly religious, but are more likely to do so in comparison to those who never attend. The overall effect varies only very slightly according to the timeframe of the intentions. For men, the effects are slightly stronger than for women.

However, significant positive effects of religiosity on fertility intentions are not seen in all countries. The number of countries with a positive effect also varies by timeframe, religiosity, and gender. Highly religious men are significantly more likely to intend to have a child in the long-term than less religious men in six countries (Bulgaria, Russia, France, Romania, Poland, and Czechia); this is the case for women in seven countries (Bulgaria, Russia, Germany, Norway, Austria, Poland, and Czechia). In contrast, there are only three countries with significant positive effects for medium religious respondents and short-term intentions (Bulgaria and Russia for both men and women, Georgia for men, Norway for women). For men, Bulgaria and Russia show positive effects in all models, while in Germany, Austria, Norway and Sweden, there are no significant effects in any of the models. In the case of women, only Russia and Norway show significantly positive effects in all models, while there are no significant effects in any of the models in Georgia, France, Romania, Lithuania, and Sweden.

Table 2.1: Results of the meta-analysis of the effect of religiosity on short-term and long-term fertility intentions in 12 countries. Shown here are those countries with significant positive effects of religiosity on fertility intentions.

		Medium vs. low religiosity	High vs. low religiosity
Men	Short-term	BG, GE, RU	BG, CZ, FR, GE, NO, RU
	Long-term	BG, GE, LT, RU	BG, CZ, FR, PL, RO, RU
Women	Short-term	BG, NO, RU	AT, BG, NO, RU
	Long-term	CZ, DE, NO, RU	AT, BG, CZ, DE, NO, PL, RU

Generally, the country differences in the effects of religiosity on fertility intentions as revealed by the meta-analysis are small. The I-squared values are generally higher for high vs. medium religiosity and for long-term vs. short-term intentions, indicating greater cross-country variation in the effects in those situations. For both men and women, the most pronounced

differences occur for the model for high religiosity coupled with long-term intentions (I-squared over 50%).

Meta-regression models

Figures 2.1 and 2.2 show the results of the meta-regressions in graphical terms, using marginal effects as the dependent variable and the Gender Attitudes Index as the independent variable. Appendix Table 2.7 shows the corresponding coefficients and p-values for all meta-regressions. For men, the regression line has a positive gradient, suggesting that in more traditional countries, religiosity has a stronger effect on fertility intentions than in more egalitarian countries. However, only in the case of long-term intentions and medium religiosity is this effect significant. The effect on short-term intentions and medium religiosity is also significant. In the case of women, the gradients of the regression line are positive in all cases except for high religiosity and short-term intentions. None of these effects are statistically significant, however.

In Figure 2.3 and 2.4, we show the same analyses repeated for the EPO-Index (on economic opportunities and participation for women). The index on the x-axis is shown from high to low values from left to right, such that the more traditional countries lie on the right-hand side in each graph. Compared to the results using the Gender Attitudes Index, the pattern is less clear. While in some cases the line shows a higher strength of effect of religiosity on fertility intentions in more traditional countries, none of these results are statistically significant.

Figure 2.1: Meta-regression results of the association of the Gender Attitudes Index with the effect strength of religiosity on fertility intentions for short-term and long-term fertility intentions, country-specific effects expressed as average marginal effects in percentage points, men.

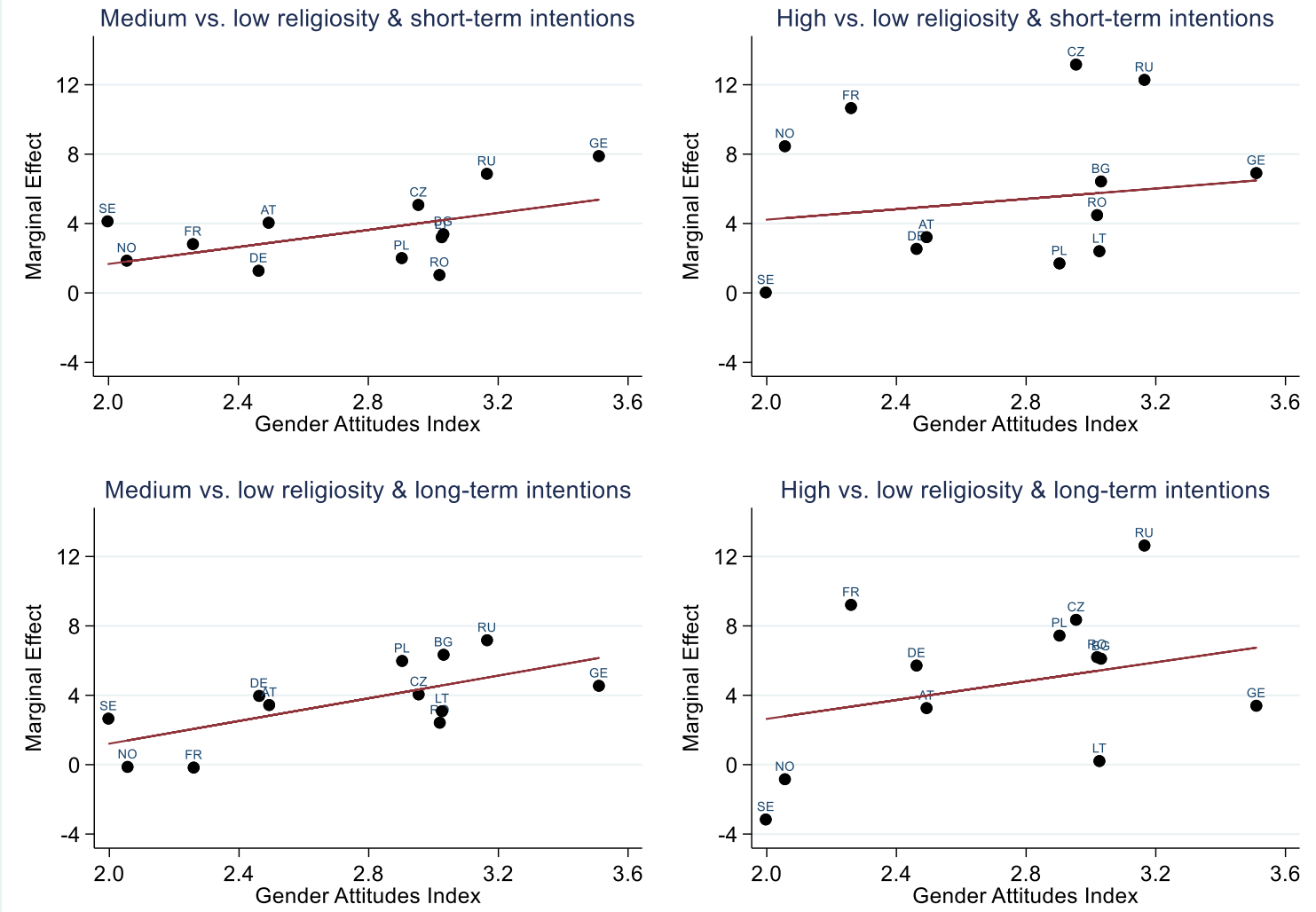


Figure 2.2: Meta-regression results of the association of the Gender Attitudes Index with the effect strength of religiosity on fertility intentions for short-term and long-term fertility intentions, country-specific effects expressed as average marginal effects in percentage points, women.

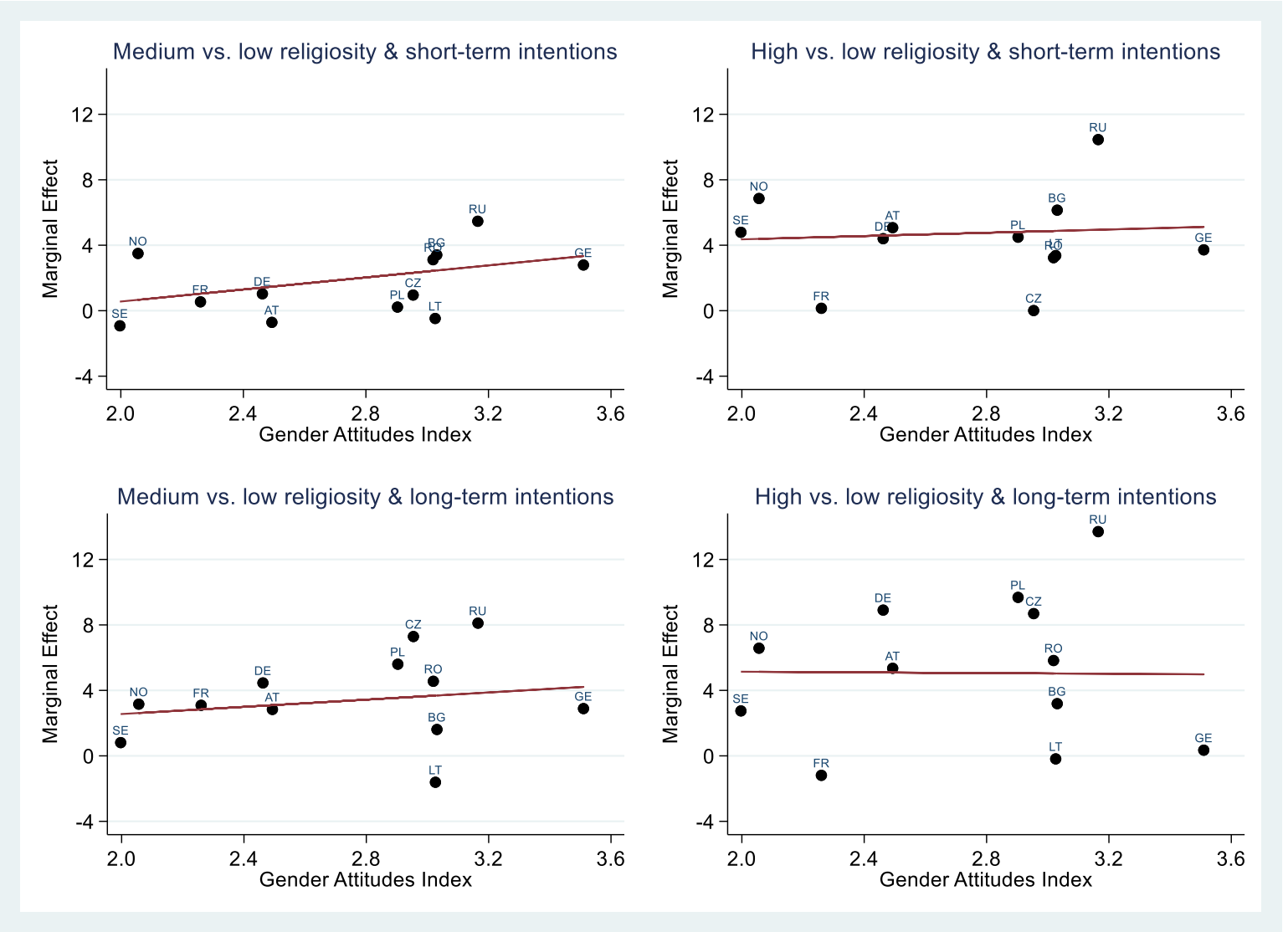


Figure 2.3: Meta-regression results of the association of the EPO-Index with the effect strength of religiosity on fertility intentions for short-term and long-term fertility intentions, country-specific effects expressed as average marginal effects in percentage points, men.

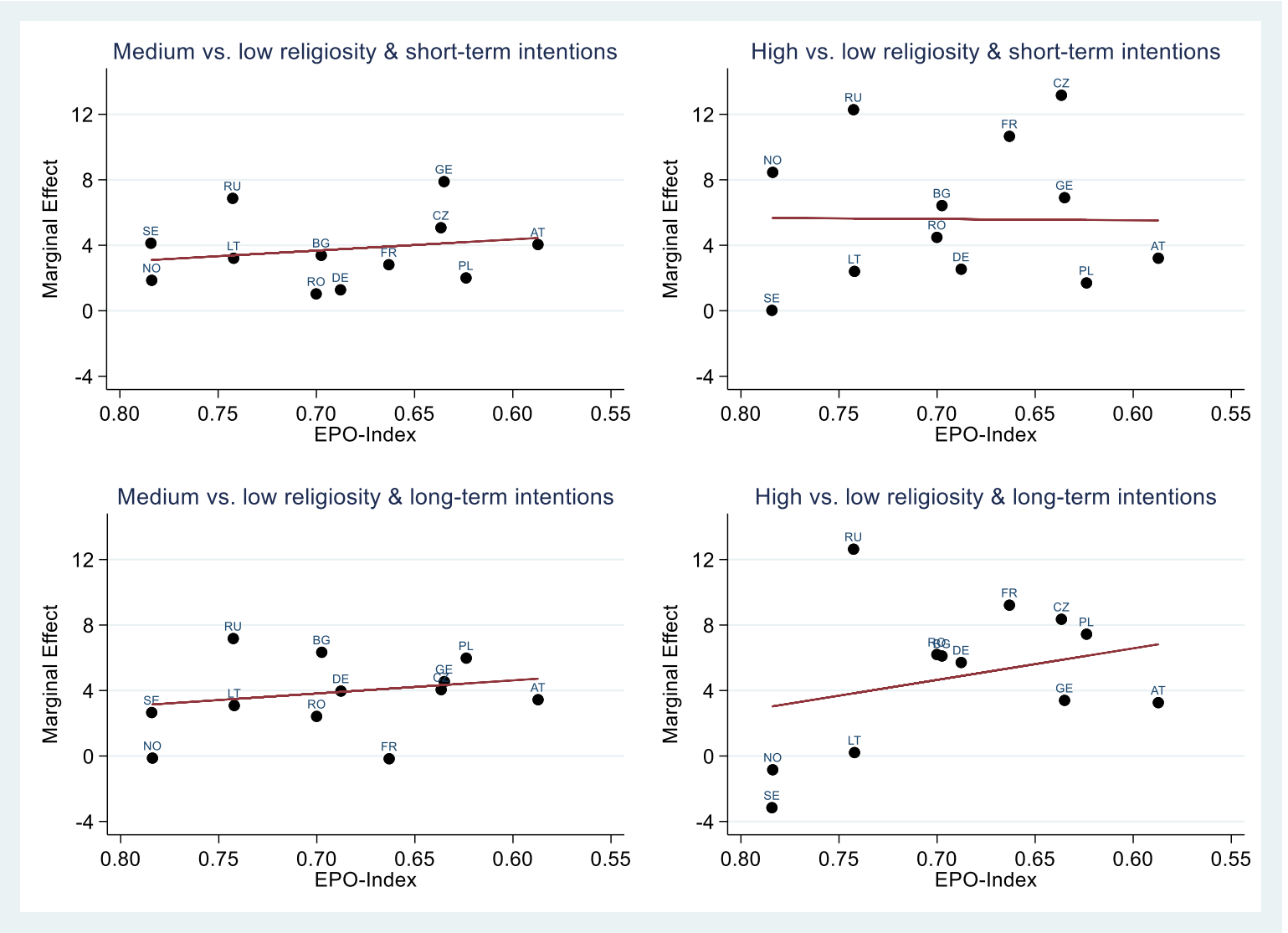
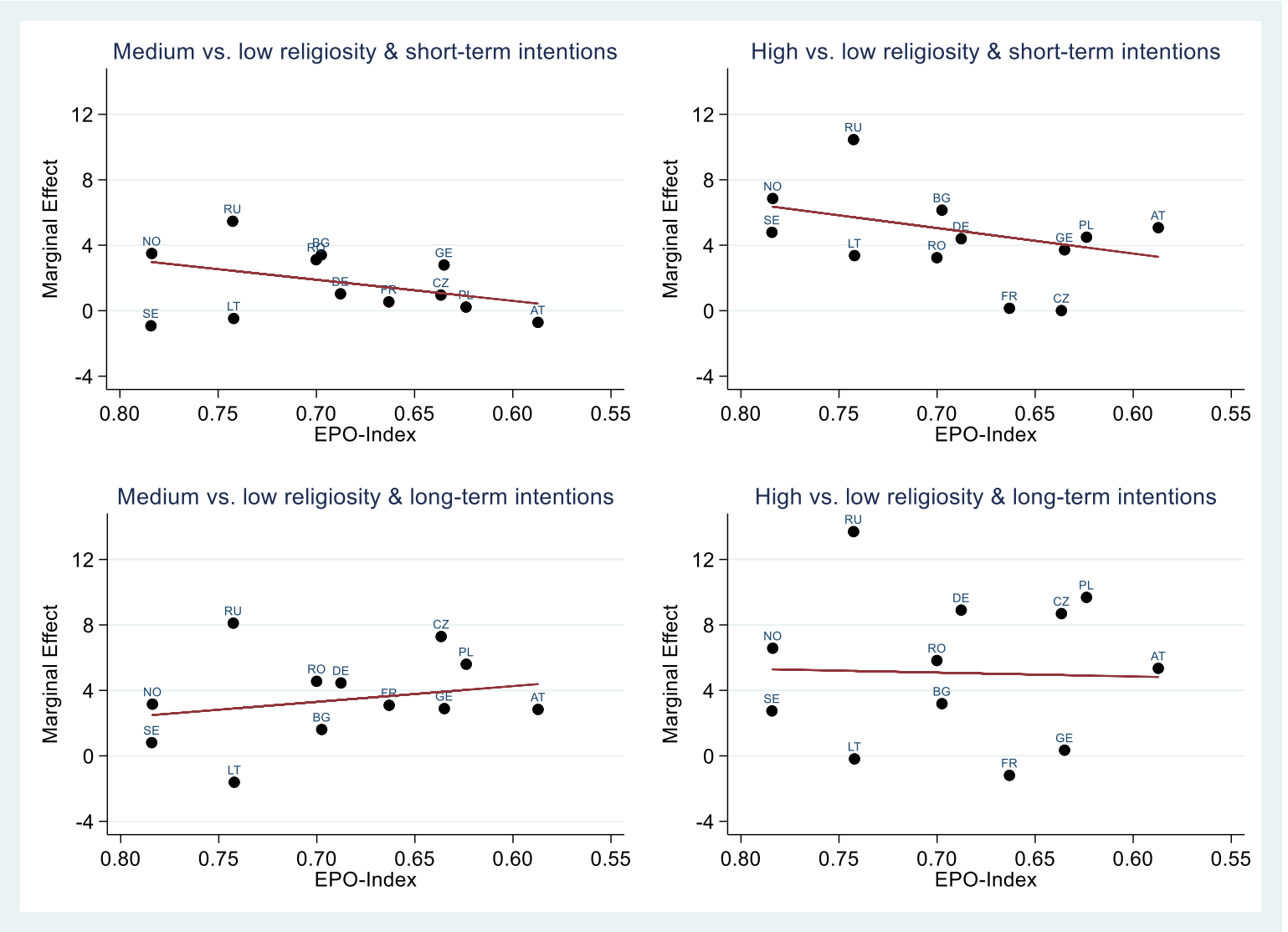


Figure 2.4: Meta-regression results of the association of the EPO-Index with the effect strength of religiosity on fertility intentions for short-term and long-term fertility intentions, country-specific effects expressed as average marginal effects in percentage points, women.



Robustness checks

To account for possible limitations of the macro-level indicators of gender regime used in our study, we decided to conduct robustness checks using different indicators on gender equality. Similar to the Gender Attitudes Index in our models, we constructed an index using 8 items on gender equality from the 4th wave of the European Values Study. Additionally, we tested the influence of other indices on gender equality: the Gender Development Index and Gender Empowerment Measure (United Nations, 2007), the Gender Inequality Index (United Nations, 2010), The Gender Equity Index (Social Watch, 2008), the Gender Gap Index (World Economic Forum, 2008), and the Index of conditions for work and family reconciliation (ICWFR) developed by Matysiak and Weziak-Bialowolska (2016). In order to make the indices more comparable, standardized scores were used and some indices were reversed in order to ensure that for all indices, higher values are associated with a more traditional gender regime.

In Table 2.2, each coefficient and its p-value represent a meta-regression. A positive coefficient means that the more traditional a country is on the respective gender index, the stronger the effect of religiosity. The p-values show whether that coefficient is statistically significant or not. These alternative indicators do not add a great deal to the overall picture, however. Almost all coefficients are insignificant, and the few significant coefficients do not show a consistent pattern. The gender indices are mostly relevant in determining the strength of effect of religiosity on fertility intentions in the case of the long-term intentions of men.

Table 2.2: Overview of the results of separate meta-regressions of the association of various gender-related indices with the effect strength of religiosity on fertility intentions (robustness checks). Shown here are standardized meta-regression coefficients and their p-values.

		Number of countries	Short-term				Long-term			
			Medium vs. low relig.		High vs. low relig.		Medium vs. low relig.		High vs. low relig.	
			S Coef.	*p*	S Coef.	*p*	S Coef.	*p*	S Coef.	*p*
Men	Gender Attitudes Index	12	1.17	0.066	0.71	0.284	1.55	0.021	1.29	0.172
	EPO-Index	12	0.44	0.282	-0.05	0.515	0.51	0.265	1.23	0.183
	EVS-Index	12	0.66	0.178	-0.89	0.749	0.10	0.095	0.91	0.260
	Gender Development Index 2008	11	0.51	0.241	0.58	0.340	0.17	0.011	2.01	0.077
	Gender Empowerment Measure 2008	12	1.14	0.067	1.17	0.152	1.34	0.036	1.89	0.072
	Gender Equity Index 2008	12	0.99	0.108	1.12	0.183	0.84	0.148	1.73	0.110
	Gender Gap Index 2008	12	0.85	0.134	0.80	0.285	1.34	0.042	2.37	0.047
	Gender Inequality Index 2008	12	1.20	0.059	0.78	0.231	1.09	0.076	0.77	0.271
	ICWFR, Matysiak 2016	10	-0.12	0.557	-0.69	0.670	0.86	0.180	2.26	0.081
Women	Gender Attitudes Index	12	0.87	0.125	0.24	0.399	0.52	0.279	-0.05	0.514
	EPO-Index	12	-0.82	0.877	-1.00	0.853	0.61	0.244	-0.15	0.542
	EVS-Index	12	-0.13	0.566	-0.28	0.611	0.29	0.371	0.17	0.452
	Gender Development Index 2008	11	1.27	0.042	1.05	0.139	0.68	0.245	1.11	0.229
	Gender Empowerment Measure 2008	12	1.06	0.078	0.12	0.446	0.86	0.165	-0.05	0.514
	Gender Equity Index 2008	12	0.21	0.397	-0.95	0.823	0.77	0.195	-0.69	0.679
	Gender Gap Index 2008	12	0.29	0.354	-0.52	0.692	0.88	0.156	0.17	0.455
	Gender Inequality Index 2008	12	1.18	0.072	0.21	0.405	0.43	0.322	-0.62	0.671
	ICWFR, Matysiak 2016	10	-0.40	0.690	-0.99	0.777	0.85	0.169	1.14	0.211

Discussion and conclusions

The aim of our study was to add evidence to the ongoing discussion on the relationship between religiosity and fertility. Specifically, we attempted to explain cross-country differences in the influence of religiosity on fertility intentions, as found in a previous study (Philipov and Berghammer, 2007). Based on our theoretical considerations and on previous research that suggested that relationship between religiosity and fertility differs in more and less traditional countries (Guetto *et al.*, 2015), we posited that the gender regime might help to explain these differences.

Our first aim was to confirm an overall association between childbearing plans and religiosity. We hypothesized (hypothesis H1a) that frequent attendance at religious services is positively associated with these plans. We found this to be the case, as far as the overall effect across countries is concerned. Regardless of gender, and for both short- and long-term fertility intentions, compared to the non-religious, people of medium religiosity are more likely to intend to have a(nother) child, and highly religious people are even more likely to have these intentions. These findings were only partially confirmed when considering the effects for each country separately, however. The overall positive effect is not mirrored in all the countries included in our study, corroborating the findings of previous research (Philipov and Berghammer, 2007).

In our analyses we included both short- and long-term fertility intentions and hypothesized that religiosity has more of a bearing for the latter (H1b). The meta-analysis provided no support for this hypothesis: there are no notable differences between the average sizes of the effect of attendance at religious services on short-term and long-term intentions. There is some support for H1b, when considering the number of countries in which we found statistically significant positive effects, in that this number is slightly higher in the case of long-term than short-term intentions.

Because our findings confirm a large variation in the degree to which religiosity influences childbearing intentions across countries, we made use of meta-regression to evaluate whether this effect is stronger in countries with more traditional gender regimes (hypothesis H2). We tested our hypothesis using two different indices: The Gender Attitudes Index, representing societal norms and ideals in terms of gender roles, and the EPO-Index, representing the

institutional dimension of the gender regime. Moreover, we conducted robustness checks using an array of other indicators representing various aspects of the gender regime.

Our analyses revealed that for the long-term childbearing intentions of men, the effect of religiosity is indeed stronger in more traditional countries, but the effect was only found when men who never attend religious services were compared with those with medium levels of attendance, and only when the Gender Attitudes Index was considered. No significant effect was found for the EPO-Index. The robustness checks largely confirmed this conclusion: several indices are able to explain differences only in the strength of effect of religiosity for the long-term intentions of men.

Our finding that in more traditional gender regimes, the effect of religiosity on fertility intentions is stronger for men but not for women calls for some explanation. With the second phase of the Gender Revolution on the way (Goldscheider *et al.*, 2015), some religious institutions have adjusted their doctrines and have increasingly begun to promote gender equality and the involvement of men in the household and private sphere. This has become evident in the Church of Sweden (Church of Sweden, 2012; Goldscheider *et al.*, 2014) and the Evangelical Church of Germany (Rat der Evangelischen Kirche in Deutschland, 2013). Consequently, in more progressive countries, religious men may have scaled down their fertility intentions, because a higher level of gender equality places more responsibilities on them in the household and childrearing spheres. This effect is not visible in more traditional settings.

Additionally, it should be considered that parenthood may carry different meanings for men and women. Women are generally more inclined to intend to have children, while men are more likely to intend to stay childless (Miettinen and Szalma, 2014). With parenthood being a more universal ideal for women than for men, there might be more variance in men's fertility intentions, which can be explained by, among other things, religiosity. Contrary to the effect of the adoption of gender equality by religions as described above, this effect largely applies in more traditional countries.

Furthermore, the differences in the extent to which welfare states support families might be important. In traditional, familialist countries such as Poland, such support is generally rather limited and families are expected to care for themselves (Javornik, 2014). Men in these countries are expected to provide the financial means to support their families. In case of unemployment or other economic hardship for example, non-religious men might scale back

their fertility intentions significantly, because they are no longer able to support further children. More religious men in that situation, on the other hand, might maintain their intention to have a child, because their faith could give them support in coping with economic hardship (Philipov, 2011). Overall, this may lead to a bigger difference in fertility intentions between more and less religious men in more traditional countries.

More egalitarian gender regimes, on the other hand, often have extensive welfare states that provide support during times of economic hardship. Additionally, men are not expected to be the sole breadwinners, and they might therefore be less likely to give up their fertility intentions in these situations. Here, the gap between more and less religious men is probably much smaller.

In summary, our research showed that the gender regime is able to explain only a small fraction of the variation in the effect of religiosity on fertility intentions, and only as far as men's intentions are concerned. This study can therefore be considered a starting point, and could be expanded along several lines of possible enquiry.

One point concerns the measurement of religiosity, in our case the frequency of attending religious services. One criticism that has often been made regarding this indicator is that the meaning of attending religious services can vary between religious denominations. Catholicism for example puts a higher priority on churchgoing than other Christian denominations (Voas and Doebler, 2011). A high frequency of attending religious services may indicate a very high level of religiosity in a context of a low attendance frequency, but in a context of high attendance, it may not be able to discriminate well enough between the highly religious and those that mostly attend in order to follow local traditions. While there were good reasons for choosing this indicator of religiosity (it is less likely to be interpreted differently by respondents and carries a similar meaning across Christian denominations (Brenner, 2016)), other measures of religiosity could be tested in future studies to corroborate our findings.

Similarly, future research could examine other stages of the fertility decision making process besides fertility intentions, such as fertility ideals or behaviour. Due to the persistence of the two-child 'ideal' in Europe, parity-specific effects might also be expected (Sobotka and Beaujouan, 2014), meaning that the relationship between religiosity and fertility and the influence of the gender regime could be parity-specific. It might also be possible that other characteristics interact with gender regime, such as education or partnership status. In our analyses, we controlled for these individual-level variables but their moderating effect was not tested.

Our study includes 12 European countries, and focuses mostly on the impact of Christian religiosity on fertility intentions, and even for these (mostly) Christian countries, the study could be further developed. In our paper, the traditional side of the Gender regime is mostly represented by post-communist countries in Central and Eastern Europe, and their history means that their behaviour in our models may therefore be different from otherwise similarly traditional countries in Southern Europe, such as Italy, Greece or Spain. For a better understanding of the influence of different gender regimes, it would be beneficial to add these countries in future studies. Furthermore, highly religious adherents of other religions might react differently to the gender regime from Christians, meaning that one future avenue of research would be to examine the universality of our findings.

Technically, a sample of 12 countries is sufficiently large to allow meta-regression analyses (Valentine *et al.*, 2010), but using a greater number of countries could also improve the reliability of the coefficients. Similarly, meta-regression is sensitive to the confidence intervals of the sizes of effects within each country, which are still rather high in our case of fertility intentions.

Finally, this research could also be expanded by taking another approach to measuring the gender regime. Despite making use of many different indices, we relied on one-dimensional measures, while more compound measures could be more appropriate to capture the complexity of gender regime. Beyond using a different approach on gender regime, it might also be possible that other dimensions of macro-level context influence the relationship between religiosity and fertility across countries.

Appendix

Appendix Table 2.1: Descriptive analysis of the data by country including (a) Average values of the Gender Attitudes Index and the EPO-Index and (b) the distribution of the male sample by characteristics.

		Austria	Bulgaria	Czechia	France	Georgia	Germany	Lithuania	Norway	Poland	Romania	Russia	Sweden
Gender Attitudes Index		2.493	3.031	2.954	2.260	3.510	2.462	3.026	2.056	2.903	3.019	3.165	1.997
EPO-Index		0.587	0.698	0.637	0.663	0.635	0.688	0.742	0.784	0.624	0.700	0.743	0.784
		%	%	%	%	%	%	%	%	%	%	%	%
Attendance frequency	Never	44.5	40.8	77.6	82.3	36.2	38.1	30.7	57.9	5.1	12.5	59.9	59.0
	Less than monthly	33.2	46.5	15.7	10.5	24.8	47.1	54.3	35.6	26.3	55.0	33.3	34.6
	Monthly and more often	22.3	12.7	6.7	7.2	39.0	14.7	15.1	6.5	68.6	32.4	6.8	6.3
Short-term intentions (yes)		28.6	30.9	28.6	24.6	29.4	42.8	20.6	24.2	24.9	30.1	28.9	27.7
Long-term intentions (yes)		51.5	62.6	51.5	50.1	46.9	57.3	41.6	55.1	38.8	46.0	47.1	56.0
Religion	Christian	74.5	75.1	22.5	69.4	86.1	64.9	89.1	81.0	98.9	99.3	64.5	56.2
	Other Religion	8.1	13.2	2.1	7.3	12.7	6.8	0.9	5.4	0.9	0.4	8.0	5.6
	Unaffiliated	17.4	11.6	75.0	15.8	1.2	27.8	9.5	13.3	0.0	0.2	27.5	35.1
	Missing	0.0	0.1	0.4	7.5	0.0	0.6	0.5	0.3	0.2	0.1	0.0	3.1
Age category	18-24	23.7	22.4	19.9	23.4	25.4	15.9	27.6	10.4	14.0	16.0	25.7	21.7
	25-29	17.2	15.2	17.5	14.1	14.8	12.9	14.9	11.1	15.0	13.2	16.1	13.7
	30-34	16.3	17.2	16.7	15.3	15.4	16.4	16.0	17.2	20.3	17.2	14.4	15.6
	35-39	18.8	17.3	16.1	18.8	15.5	18.9	14.7	24.4	20.7	22.7	14.0	18.1
	40-49	24.0	28.0	29.7	28.4	28.9	35.8	26.7	36.9	29.9	31.0	29.8	31.0
Number of biological children	0	57.9	44.8	49.2	48.0	44.8	47.8	45.5	28.4	29.4	40.1	38.1	54.1
	1	16.2	22.5	17.3	16.8	13.8	22.2	24.5	15.3	26.3	27.9	30.5	14.1
	2	17.9	27.4	26.5	23.4	29.2	22.4	24.2	34.6	30.6	24.4	25.0	24.2
	3 and more	8.0	5.4	7.0	11.8	12.3	7.5	5.8	21.6	13.8	7.5	6.3	7.7
Young child (below 10) (yes)		26.7	29.8	26.7	25.8	38.2	33.2	31.3	28.6	52.6	47.8	30.9	30.8
Partnership status	Coresiding	47.4	56.0	57.7	56.9	55.7	63.0	59.3	83.3	80.6	65.7	64.0	59.5
	Not living with partner	52.5	43.8	42.1	43.1	44.3	36.2	40.7	16.5	19.4	34.3	35.6	40.5
	Missing	0.1	0.3	0.2	0.0	0.0	0.7	0.0	0.2	0.0	0.0	0.3	0.0
Education	Low	11.0	23.5	17.8	20.5	7.3	16.8	14.4	19.7	9.1	21.8	7.3	11.6
	Medium	72.2	62.8	64.4	51.7	64.4	59.5	64.9	48.5	66.5	66.9	55.6	55.0
	High	16.8	13.7	16.1	27.7	28.2	23.7	20.7	30.2	24.2	11.4	30.9	32.9
	Missing	0.0	0.1	1.8	0.0	0.0	0.0	0.0	1.6	0.3	0.0	6.2	0.4
Employment status	In paid work	82.5	65.5	78.8	73.3	60.4	75.4	74.1	88.4	81.9	80.9	74.4	77.1
	Not in paid work	17.5	34.5	21.2	26.7	39.6	24.6	25.9	11.6	18.1	19.1	25.6	22.9
N		1990	2940	2005	2166	2420	1654	2487	1220	2929	2885	2230	906

Appendix Table 2.2: Descriptive analysis of the data by country including (a) Average values of the Gender Attitudes Index and the EPO-Index and (b) the distribution of the female sample by characteristics.

		Austria	Bulgaria	Czechia	France	Georgia	Germany	Lithuania	Norway	Poland	Romania	Russia	Sweden
Gender Attitudes Index		2.493	3.031	2.954	2.260	3.510	2.462	3.026	2.056	2.903	3.019	3.165	1.997
EPO-Index		0.587	0.698	0.637	0.663	0.635	0.688	0.742	0.784	0.624	0.700	0.743	0.784
		%	%	%	%	%	%	%	%	%	%	%	%
Attendance frequency	Never	38.9	24.8	72.8	77.8	27.6	33.2	17.7	57.2	2.2	5.7	41.8	54.1
	Less than monthly	37.5	50.8	18.7	14.1	20.5	50.4	58.5	35.1	22.4	40.5	48.4	39.3
	Monthly and more often	23.6	24.4	8.5	8.0	51.9	16.5	23.8	7.7	75.4	53.9	9.8	6.7
Short-term intentions (yes)		24.0	28.8	24.0	27.3	32.7	34.2	21.3	24.6	26.8	28.4	26.1	21.3
Long-term intentions (yes)		40.8	54.9	40.8	48.1	50.0	48.0	42.0	53.7	51.7	47.3	39.0	44.3
Religion	Christian	78.9	81.0	24.6	72.8	87.7	66.4	93.0	80.6	99.0	99.6	76.7	65.7
	Other Religion	7.3	12.4	1.4	7.1	11.4	7.9	0.5	6.6	0.8	0.3	6.3	5.2
	Unaffiliated	13.6	6.4	73.7	14.5	0.9	25.1	6.1	12.7	0.0	0.1	17.0	26.2
	Missing	0.1	0.2	0.3	5.6	0.0	0.6	0.5	0.1	0.2	0.0	0.0	2.8
Age category	18-24	24.3	21.1	23.5	25.8	24.6	22.4	31.6	26.2	21.0	15.4	18.5	27.8
	25-29	18.3	17.3	20.8	16.0	18.6	16.0	15.8	17.2	19.3	17.7	18.2	18.7
	30-34	17.3	20.2	21.4	17.5	17.5	18.1	19.7	17.8	21.9	22.2	18.7	16.9
	35-39	19.7	20.5	17.8	21.4	19.8	22.3	16.5	22.7	21.8	28.9	17.8	18.5
	40-44	20.3	20.8	16.5	19.2	19.5	21.2	16.4	16.0	16.0	15.9	26.8	18.1
Number of biological children	0	49.4	29.6	36.2	41.9	35.1	40.3	39.5	46.9	30.2	27.0	12.5	52.5
	1	20.5	28.4	22.9	19.5	16.7	24.9	28.0	14.6	27.1	34.6	45.7	13.6
	2	22.3	36.1	32.0	23.9	33.9	24.6	26.7	25.4	30.8	29.6	34.1	24.8
	3 and more	7.8	5.9	8.8	14.7	14.2	10.2	5.8	13.1	11.9	8.8	7.7	9.0
Young child (below 10) (yes)		33.0	33.1	33.0	35.4	43.6	37.7	39.5	34.3	40.1	48.6	39.8	46.8
Partnership status	Coresiding	54.5	66.1	64.1	62.4	59.4	64.3	52.6	58.5	67.2	74.6	72.2	62.8
	Not living with partner	45.5	33.8	35.6	37.6	40.6	35.2	47.4	41.3	32.8	25.4	27.6	37.2
	Missing	0.0	0.1	0.2	0.0	0.0	0.5	0.0	0.2	0.0	0.0	0.2	0.0
Education	Low	14.2	19.6	15.8	15.6	8.7	23.8	11.4	20.7	9.5	27.1	4.7	14.2
	Medium	66.9	53.7	70.1	46.1	61.5	57.4	62.6	36.6	58.9	60.5	45.3	45.9
	High	18.8	26.7	12.7	38.3	29.8	18.8	26.0	39.8	31.1	12.4	44.2	39.5
	Missing	0.0	0.1	1.3	0.0	0.0	0.0	0.0	2.8	0.5	0.0	5.9	0.4
Employment status	In paid work	72.8	59.6	56.6	59.9	32.3	55.3	59.8	67.0	55.1	62.4	63.3	63.6
	Not in paid work	27.2	40.4	43.4	40.1	67.7	44.7	40.2	33.0	44.9	37.6	36.7	36.4
N		2156	3093	1923	2255	2481	1945	2579	2094	4269	2138	2465	1199

Appendix Table 2.3: Results of the regressions on short-term fertility intentions of men, separately by country (Average marginal effects, in percentage points)

		Austria	Bulgaria	Czechia	France	Georgia	Germany	Lithuania	Norway	Poland	Romania	Russia	Sweden
Attendance frequency	Never (ref.)												
	Less than monthly	4.0	3.4*	5.1	2.8	7.9***	1.3	3.2	1.9	2.0	1.0	6.9***	4.1
	Monthly and more often	3.2	6.4**	13.2**	10.7**	6.9***	2.5	2.4	8.5*	1.7	4.5	12.3***	0.0
Religion	Christian (ref.)												
	Other Religion	8.8*	5.7*	-4.6	11.5**	8.4**	5.3	-6.0	-1.6	-7.8	-2.0	15.3***	4.6
	Unaffiliated	-4.7	-2.8	2.9	-2.6	-11.5	-2.8	2.3	-1.7		-10.4	-1.4	-6.4*
	Missing		4.7	-3.5	-5.0		3.0	17.4	5.0	-8.1	30.4		-5.6
Age category	18-24 (ref.)												
	25-29	17.9***	14.1***	15.1***	24.7***	19.2***	10.0**	12.1***	26.3***	13.8***	19.6***	14.4***	11.6**
	30-34	23.5***	16.1***	13.8***	28.1***	22.0***	2.4	10.7***	27.0***	9.7**	18.2***	13.8***	21.7***
	35-39	15.8***	15.1***	1.2	14.0***	22.4***	-3.9	1.0	14.4***	2.8	10.1***	5.0	15.5**
	40-49	10.2**	0.8	-11.7***	4.0	8.6**	-15.3***	-10.7***	0.8	-12.0***	-4.3	-9.9***	-1.2
Number of biological children	0 (ref.)												
	1	-28.5***	-42.8***	-13.2***	-24.5***	-37.4***	-23.6***	-25.8***	-28.1***	-25.8***	-44.7***	-23.6***	-21.9**
	2	-48.4***	-60.8***	-32.6***	-46.2***	-64.0***	-37.2***	-42.1***	-52.1***	-56.0***	-61.4***	-42.1***	-48.7***
	3 and more	-45.5***	-60.9***	-33.3***	-47.4***	-71.1***	-38.9***	-43.2***	-58.9***	-58.0***	-60.5***	-41.7***	-50.8***
Young child (below 10)	Yes (ref.)												
	No	-20.3***	-25.4***	-8.8*	-21.3***	-24.5***	-21.3***	-16.0***	-17.0***	-10.5***	-16.3***	-7.2*	-27.3***
Partnership status	Coresiding (ref.)												
	Not living with partner	-17.6***	-18.6***	-18.2***	-7.3**	-21.0***	-13.0***	-24.6***	-7.9**	-18.9***	-18.5***	-10.7***	-17.5***
	Missing		-21.8	48.0**									
Education	Low (ref.)												
	Medium	-0.4	-3.7*	4.4*	-1.9	3.7	-0.1	5.7**	-4.1	4.1	1.8	-4.0	2.3
	High	3.1	3.0	9.9***	2.8	10.9**	10.1**	10.9***	-2.6	9.3**	1.3	0.2	4.4
	Missing												
Employment status	In paid work (ref.)												
	Not in paid work	-8.6**	-6.4***	-3.7	-5.9**	-8.4***	-6.3**	-9.7***	-5.3	-10.7***	-9.6***	-13.2***	-3.3
N		1784	3181	2151	1948	2427	1449	2347	1306	2166	2808	2235	982

Significance levels (*p*): ***: <0.001 **: <0.01 *: <0.05

Appendix Table 2.4: Results of the regressions on long-term fertility intentions of men, separately by country (Average marginal effects, in percentage points)

		Austria	Bulgaria	Czechia	France	Georgia	Germany	Lithuania	Norway	Poland	Romania	Russia	Sweden
Attendance frequency	Never (ref.)												
	Less than monthly	3.4	6.3***	4.1	-0.2	4.5*	4.0	3.1*	-0.1	6.0	2.4	7.2***	2.7
	Monthly and more often	3.3	6.1***	8.4*	9.2*	3.4	5.7	0.2	-0.8	7.4*	6.2**	12.6***	-3.2
Religion	Christian (ref.)												
	Other Religion	3.1	1.0	-5.3	11.7**	1.6	3.3	-1.1	0.9	-4.8	-0.0	7.1*	7.7
	Unaffiliated	-4.8	-0.2	1.4	-1.4	1.0	2.0	2.3	-3.2		25.7	1.3	-5.1*
	Missing		7.2	-4.4	-8.0*		22.5	4.2	10.3	-13.0	14.8		-15.0*
Age category	18-24 (ref.)												
	25-29	0.6	1.6	-6.3	6.0	11.0***	-6.6	-16.8***	8.5	-11.7**	-2.0	-6.4	-6.2
	30-34	-7.1	-5.4*	-17.6***	-2.9	7.5**	-29.0***	-34.5***	-7.0	-22.6***	-11.4**	-15.7***	-17.0**
	35-39	-15.5***	-11.4***	-43.4***	-18.7***	6.0*	-45.0***	-51.8***	-22.3**	-32.4***	-22.7***	-26.2***	-29.1***
	40-49	-26.4***	-29.5***	-61.7***	-34.5***	-7.0*	-59.5***	-72.0***	-39.0***	-53.1***	-44.9***	-49.2***	-47.3***
Number of biological children	0 (ref.)												
	1	-32.7***	-46.4***	-13.4***	-23.6***	-34.8***	-24.6***	-20.9***	-35.6***	-26.6***	-42.6***	-16.3***	-19.0*
	2	-67.6***	-77.8***	-43.2***	-51.0***	-70.3***	-45.4***	-50.0***	-63.7***	-64.6***	-69.2***	-49.2***	-62.7***
	3 and more	-63.6***	-76.3***	-44.2***	-51.3***	-79.9***	-43.3***	-60.6***	-70.0***	-71.2***	-70.5***	-49.4***	-64.4***
Young child (below 10)	Yes (ref.)												
	No	-12.1***	-12.6***	-2.9	-15.8***	-17.5***	-8.5**	-7.8***	-13.2***	-8.5***	-8.7***	-8.0***	-11.4**
Partnership status	Coresiding (ref.)												
	Not living with partner	-2.1	1.3	-2.7	-0.8	-2.1	-2.5	-3.6*	3.4	-11.0***	-1.4	1.9	-1.7
	Missing		0.5	30.6*			-16.3		-0.3			17.4	
Education	Low (ref.)												
	Medium	5.9	1.2	4.3*	-0.4	2.3	0.6	5.7***	-1.3	4.4	3.1*	2.8	4.0
	High	8.0*	6.0**	9.3***	5.2	8.2**	7.4*	9.8***	-0.2	10.8***	6.6**	5.0	12.2*
	Missing												
Employment status	In paid work (ref.)												
	Not in paid work	4.1	-2.4	0.3	-3.9	-2.4	1.1	-2.3	4.4	-1.3	-2.9	-6.8***	6.7
N		1794	3381	2132	2067	2521	1525	2564	1324	2151	2885	2343	969

Significance levels (*p*): ***: <0.001 **: <0.01 *: <0.05

Appendix Table 2.5: Results of the regressions on short-term fertility intentions of women, separately by country (Average marginal effects, in percentage points)

		Austria	Bulgaria	Czechia	France	Georgia	Germany	Lithuania	Norway	Poland	Romania	Russia	Sweden
Attendance frequency	Never (ref.)												
	Less than monthly	-0.7	3.4*	1.0	0.5	2.8	1.0	-0.5	3.5*	0.2	3.1	5.5**	-0.9
	Monthly and more often	5.1*	6.1***	0.0	0.1	3.7	4.4	3.4	6.9*	4.5	3.2	10.5***	4.8
Religion	Christian (ref.)												
	Other Religion	7.8*	3.3	11.7	16.0***	3.6	2.1	12.2	0.8	10.1	25.1	12.3**	7.1
	Unaffiliated	-5.4*	-2.2	-0.7	-3.5	-4.2	-2.0	-6.3	-2.7		41.1*	8.9***	-2.7
	Missing	-5.4	-2.8	17.9	-1.9		-7.7	-11.3	-3.9	3.0			2.8
Age category	18-24 (ref.)												
	25-29	21.0***	8.1***	10.8***	24.3***	9.2***	9.3**	10.9***	19.1***	11.4***	15.3***	10.7***	23.5***
	30-34	19.2***	3.1	4.5	21.8***	6.9*	5.1	9.2**	17.3***	7.9**	9.9***	3.4	17.3***
	35-39	4.7	-2.3	-8.3*	4.6	-2.9	-10.1**	-7.8*	-0.3	-10.4***	-1.9	-11.8***	-2.7
	40-44	-9.4***	-11.7***	-22.9***	-11.4***	-12.6***	-18.9***	-16.3***	-13.5***	-18.8***	-11.0***	-15.7***	-17.1***
Number of biological children	0 (ref.)												
	1	-18.8***	-46.8***	-17.7***	-18.2***	-39.7***	-16.0***	-28.5***	-14.7**	-21.0***	-48.6***	-21.6***	-14.3
	2	-43.0***	-66.4***	-45.2***	-44.6***	-64.4***	-31.2***	-45.4***	-47.3***	-47.7***	-69.2***	-41.9***	-44.5***
	3 and more	-45.1***	-64.8***	-46.6***	-49.8***	-72.1***	-34.2***	-49.0***	-50.1***	-50.9***	-66.7***	-40.4***	-48.7***
Young child (below 10)	yes (ref.)												
	no	-17.6***	-17.9***	-20.5***	-14.2***	-20.5***	-10.9**	-13.4***	-14.8***	-8.1***	-12.6***	-4.5	-24.1***
Partnership status	Coresiding (ref.)												
	Not living with partner	-12.5***	-16.6***	-13.3***	-13.6***	-25.7***	-12.7***	-19.4***	-21.6***	-18.7***	-17.1***	-8.1***	-20.9***
	Missing												
Education	Low (ref.)												
	Medium	-0.3	-2.7	8.9***	-1.5	4.6	5.2*	8.5***	-0.6	4.8*	1.0	-2.2	7.0
	High	0.2	4.4*	9.8**	0.7	12.5***	11.1***	13.5***	3.6	9.9***	4.5	-0.7	10.1*
	Missing		4.8	12.9					1.4	2.8		-3.5	45.9*
Employment status	In paid work (ref.)												
	Not in paid work	-2.5	-2.5	-7.8***	-8.2***	-4.6*	-1.0	-6.3**	-3.2	-6.1***	-5.0**	-6.2***	-4.6
N		2534	3823	1850	2244	2262	1939	1964	1997	3470	2084	2215	1211

Significance levels (*p*): ***: <0.001 **: <0.01 *: <0.05

Appendix Table 2.6: Results of the regressions on long-term fertility intentions of women, separately by country (Average marginal effects, in percentage points)

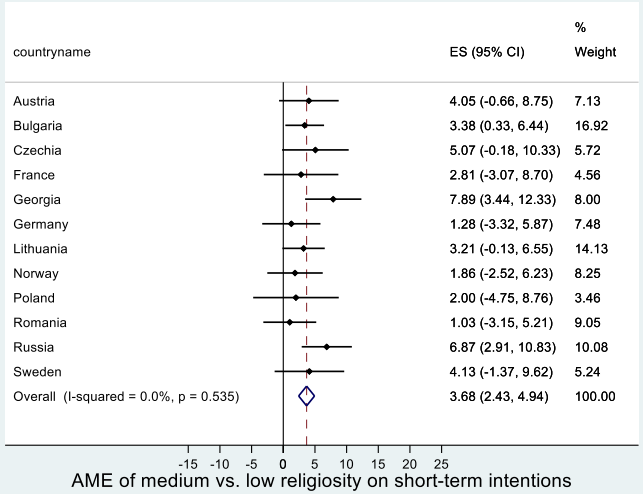
		Austria	Bulgaria	Czechia	France	Georgia	Germany	Lithuania	Norway	Poland	Romania	Russia	Sweden
Attendance frequency	Never (ref.)												
	Less than monthly	2.8	1.6	7.3**	3.1	2.9	4.5*	-1.6	3.2*	5.6	4.6	8.1***	0.8
	Monthly and more often	5.4**	3.2*	8.7**	-1.2	0.3	8.9**	-0.2	6.6**	9.7**	5.8	13.7***	2.7
Religion	Christian (ref.)												
	Other Religion	0.9	-2.7	0.8	12.9***	0.3	-0.8	8.5	3.7	26.8***	13.3	5.3	2.4
	Unaffiliated	-6.8**	-7.8***	3.8	-2.3	-7.0	-0.2	-3.5	-1.6		32.6*	10.2***	-2.2
	Missing	-2.9	22.6*	12.7	-4.4		2.7	-14.7		6.7			6.2
Age category	18-24 (ref.)												
	25-29	-1.7	-9.1***	-8.2*	6.8*	1.9	-9.6*	-11.8**	-2.0	-9.9***	-5.0	-5.1	-1.5
	30-34	-12.4***	-18.2***	-21.2***	-3.0	-5.8*	-24.4***	-26.8***	-12.5**	-21.0***	-11.7**	-21.0***	-17.8***
	35-39	-31.5***	-26.4***	-40.6***	-23.4***	-16.0***	-46.4***	-47.4***	-39.2***	-42.5***	-29.2***	-41.8***	-44.3***
	40-44	-48.7***	-38.9***	-62.9***	-40.6***	-31.4***	-60.9***	-64.5***	-58.8***	-57.2***	-40.0***	-49.0***	-65.2***
Number of biological children	0 (ref.)												
	1	-22.0***	-48.4***	-19.9***	-20.7***	-39.2***	-21.5***	-34.0***	-16.3**	-22.9***	-50.3***	-31.3***	-12.0
	2	-52.3***	-79.4***	-57.8***	-51.9***	-72.6***	-45.4***	-58.4***	-61.8***	-61.2***	-80.5***	-56.8***	-48.6***
	3 and more	-58.1***	-78.5***	-62.5***	-58.7***	-82.8***	-45.5***	-66.9***	-66.0***	-68.5***	-76.8***	-61.8***	-52.8***
Young child (below 10)	yes (ref.)												
	no	-8.1***	-9.3***	-9.1***	-7.9**	-13.8***	-6.6*	-4.3*	-7.8**	-5.0**	-6.7***	-3.9	-8.1*
Partnership status	Coresiding (ref.)												
	Not living with partner	1.6	-3.4**	-1.7	-6.4***	-14.6***	-2.8	-4.0**	-5.5***	-7.7***	-4.4*	-1.9	-2.6
	Missing		5.3				-13.3		3.9			-27.9**	
Education	Low (ref.)												
	Medium	0.9	0.9	5.2*	0.0	6.8*	1.6	5.6**	-3.8	1.2	1.9	4.8	-0.0
	High	5.1	5.5**	5.0	3.1	12.0***	9.7***	10.4***	-2.0	6.6**	3.7	6.7	3.7
	Missing		13.9	8.4					-5.7	-0.4		6.5	
Employment status	In paid work (ref.)												
	Not in paid work	2.9	0.4	1.8	-0.3	-4.7**	3.9*	1.6	0.8	-1.1	0.6	-1.8	0.6
N		2546	4049	1826	2377	2330	2014	2086	2055	3437	2138	2302	1199

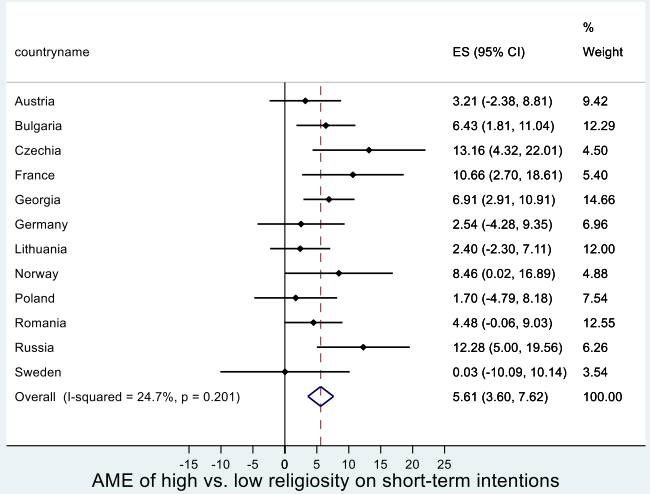
Significance levels (*p*): ***: <0.001 **: <0.01 *: <0.05

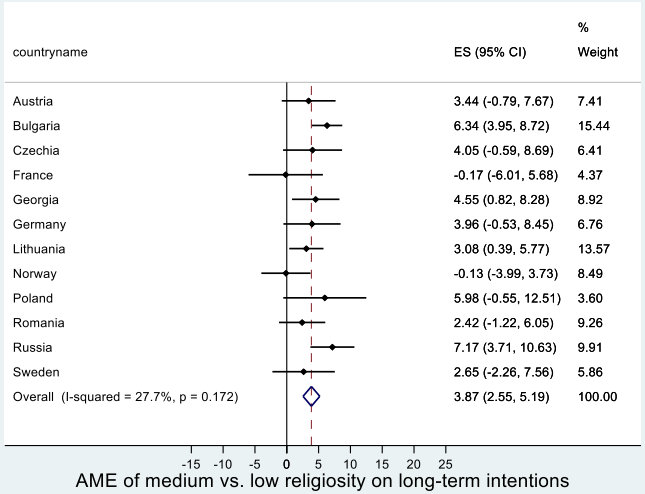
Appendix Table 2.7: Coefficients and P-values of the meta-regressions

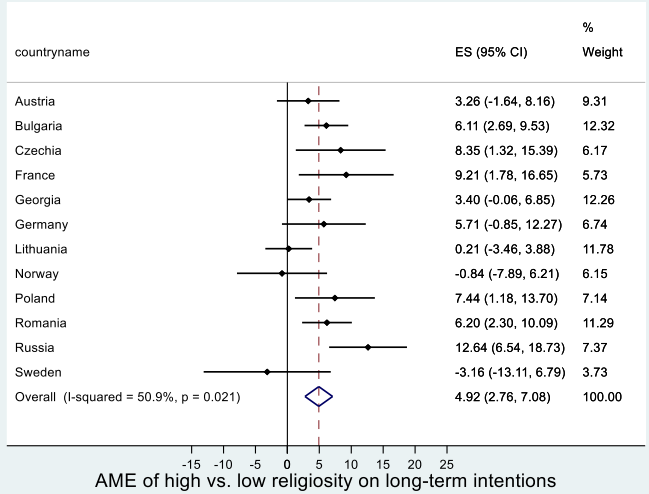
		Men				Women			
		Short-term		Long-term		Short-term		Long-term	
		Medium vs. low relig.	High vs. low relig.	Medium vs. low relig.	High vs. low relig.	Medium vs. low relig.	High vs. low relig.	Medium vs. low relig.	High vs. low relig.
Gender Attitudes Index	Coef.	2.45	1.50	3.27	2.72	1.84	0.50	1.10	1.10
	p	0.066	0.284	0.021	0.172	0.125	0.399	0.279	0.279
	Intercept	-3.24	1.23	-5.33	-2.80	-3.12	3.36	0.36	0.36
	p	0.768	0.436	0.894	0.636	0.767	0.275	0.472	0.472
EPO-Index	Coef.	-6.84	0.76	-8.01	-19.28	12.90	15.57	-9.60	-0.11
	p	0.718	0.485	0.736	0.818	0.124	0.147	0.244	0.514
	Intercept	8.46	5.07	9.43	18.14	-7.14	-5.85	10.02	5.36
	p	0.159	0.357	0.149	0.112	0.823	0.722	0.154	0.267

Appendix Figure 2.1: Country-specific effects and the overall effect of high and medium vs. low religiosity on short- and long-term fertility intentions, men (meta-analysis). The effect strengths are expressed as average marginal effects (AME) in percentage points.

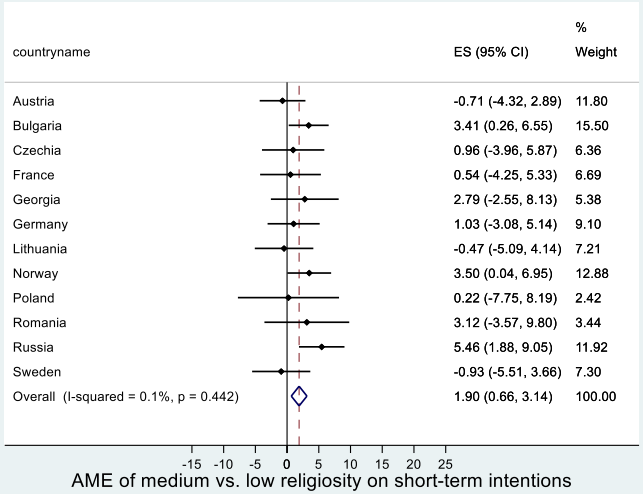


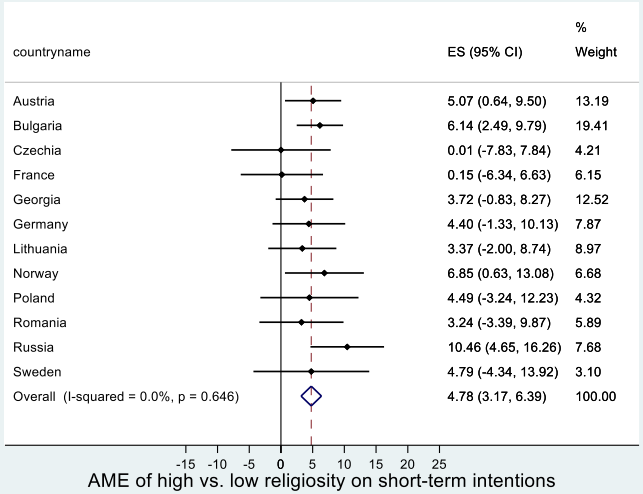


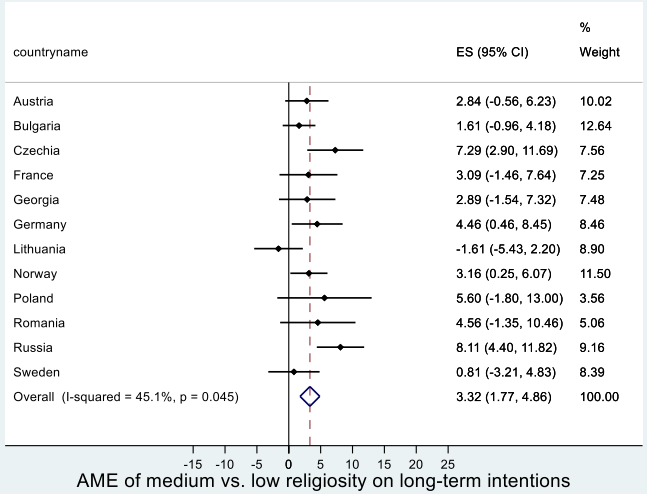


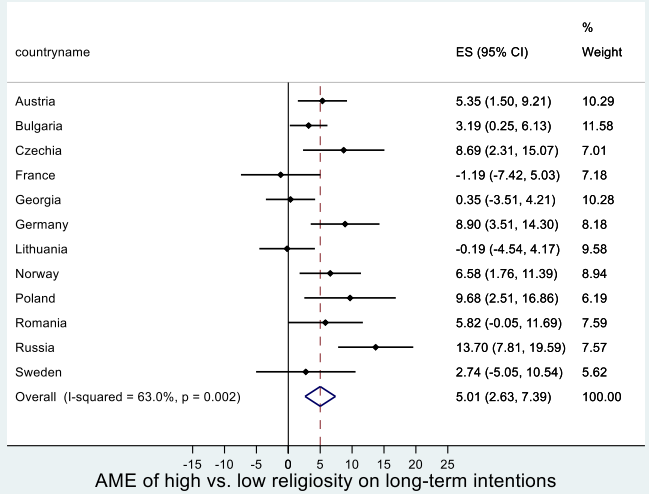


Appendix Figure 2.2: Country-specific effects and the overall effect of high and medium vs. low religiosity on short- and long-term fertility intentions, women (meta-analysis). The effect strengths are expressed as average marginal effects (AME) in percentage points.









Chapter 3

A cross-national study of the impact of religiosity and gender equality on fertility intention and its realization

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Abstract

The role of religiosity and gender in shaping fertility decisions have been the subject of many studies in recent years. This literature has highlighted an interesting conundrum, however. While religiosity has a positive effect on fertility, partly through the promotion of traditional gender roles, gender equality has been found to have a positive – rather than negative – impact on fertility. We address this ambiguity in the effect of religiosity and gender roles in this paper by examining their specific effects on fertility intention and realization. We do so by using data from the first and second wave of the Generations and Gender Survey (GGS) and apply logistic regression models to a sample from five European countries (Austria, Bulgaria, France, Georgia and Russia). We construct models on the influence of religiosity, gender attitudes and the gender distribution of household tasks on the intention to have a(nother) child as well as the realization of positive (plan to have a child) and negative fertility (plan to *not* have a child) intentions. Our findings suggest that, regardless of the country context, religiosity and gender roles appear to have an independent impact on fertility intentions and their realization.

Introduction

In the context of increasing migration and increasing ethnic diversity, the role of religiosity, as a determinant of fertility, has gained a lot of attention in the past decades (Kaufmann, 2010; Hubert, 2015). Specifically, more religious people have been found to be more likely to intend – and to have – more children than less religious ones. This relationship has been observed in numerous studies and on the basis of different measures of religiosity and religious affiliation (for Europe: Berghammer (2012); Hubert (2015); Peri-Rotem (2016); for the US: Frejka and Westoff (2007); Hayford and Morgan (2008)).

The main mechanisms linking religiosity and childbearing reside in the pronatalist teaching inherent in several religions and in the valorisation of traditional gender roles, including the role of women as mothers (Inglehart and Norris, 2003; McQuillan, 2004). Highly religious people, it follows, are more likely to adhere to the teaching of their religion than their less religious counterparts, and are consequently more likely to support traditional gender roles and the importance of having a larger number of children. From this perspective, religiosity, and thus adhering to traditional gender roles, should be associated with having larger families. However, recent studies have concluded the exact opposite regarding gender roles. Gender egalitarian attitudes and gender equity in the household have been found to be positively correlated with fertility intentions (Neyer *et al.*, 2013) and fertility behaviour (Aassve *et al.*, 2015).

The key question that this ambiguity consequently raises is whether religiosity and gender roles (at the individual level) operate independently or whether gender roles instead explain a link between religiosity and people's childbearing choices. Disentangling the effects of these two variables is important in order to better understand how religiosity matters for human reproduction in modern societies. But it will also give us micro-level insights into how gender roles are linked with other normative variables in the midst of the gender revolution.

To investigate the role of religiosity and gender roles on people's reproductive choices, we use longitudinal data from the first and second waves of the Generations and Gender Survey (GGS) from five European countries (Austria, Bulgaria, France, Georgia and Russia). For our analyses we focus on men and women of childbearing years (men aged 18 to 50 and women aged 18 to 45) and examine both their intention to have children (at Wave 1) and the realization of these intentions (at Wave 2). Our main independent variables are religiosity, measured by the

frequency of attending religious services, and gender equality, measured in terms of both individual attitudes and behaviours. To disentangle their respective effects, we use a stepwise approach and show the effects of gender equality and religiosity first separately and then in combination. Our findings suggest that religiosity and the gender variables act in a rather independent way.

Literature review on religion, gender and fertility

Micro-level links between religiosity, gender equality and fertility

There are various ways in which people's fertility choices may be influenced by their religion and religiosity. First of all, religious teachings actively encourage their members to have large families (McQuillan, 2004). Some of these teachings can be found directly in religious texts (e.g. the Bible: "be fruitful and multiply") or in official documents of religious organizations (e.g. in the Catechism of the Catholic Church). Many religions also discourage the use of contraceptives in order to encourage births, especially so the Catholic church, while the stance of Orthodox Christianity and Protestant churches in Europe is more permissive (Srikanthan and Reid, 2008).

In today's secularized European countries, the level of attachment to the religion has been argued to be playing an increasing role for the determination of fertility behaviour (Adserà, 2006a; Adserà, 2006b). By being more exposed to pronatalist teachings, more religious people are therefore assumed to be more likely to follow such teachings. This direct influence of church's teachings is often summarized under the "particularized theology hypothesis" (Goldscheider, 1971). According to this hypothesis, specific religious doctrines related to reproduction (e.g., to contraception or regarding the family size) translate directly into the followers' attitudes and behaviours (Knodel *et al.*, 1999). Indeed, numerous studies have found that religious people show a higher level of fertility than less religious people in a multitude of countries (Frejka and Westoff, 2007; Hubert, 2015; Peri-Rotem, 2016). This is valid for both fertility intentions and behaviour (Philipov and Berghammer, 2007).

But the observed impact of religiosity on fertility is not solely driven by pronatalist teachings. As argued by Goldscheider (2006), the indirect influence of religiosity – through the promotion of traditional gender and family roles – also matters. In general, most religions uphold

traditional norms on the division of gender roles at home, in the workforce and in the public sphere (Inglehart and Norris, 2003). Similarly, according to Seguino (2011), religiosity is associated with more traditional attitudes on gender roles as well as more traditional gender behaviour. Noteworthy examples for religious gender values include the Catholic Church only allowing males to become priests (Haskins, 2003) or religions in general speaking of a fatherly God and emphasizing the motherly role of women. Emancipation of women and total equality between men and women is discouraged by most religions (Klingorová and Havlicek, 2015). From a theoretical perspective, it therefore follows that the promotion of traditional gender roles can be a key pathway linking religiosity and fertility.

The gender literature of the past decades has however concluded the exact opposite: in modern societies, traditional gender attitudes and gender inequity in the family appear to have a negative – rather than a positive – effect on childbearing. In these societies, women have increasingly entered the labour market, while men have not engaged in household duties to the same extent. If women are expected to run the household and care for children on their own on top of their work-related responsibilities, this creates a double burden on them which inhibits family formation and expansion. In a study on the Netherlands and Italy, Mills *et al.* (2008) found that women facing long hours in both employment and in the household are less likely to intend to have another child. In more gender egalitarian couples, in contrast, part of the household burden is shifted away from females to their partners. Due to the reduced burden, women are more likely, in this context, to intend to have another child (Neyer *et al.*, 2013).

The juxtaposition of these two bodies of literature leads to a contradiction: while on the one hand, religiosity encourages traditional gender roles and fosters childbearing, on the other hand, holding and acting upon traditional gender roles, on their own, are associated with lower individual fertility in modern societies. Despite this puzzle, studies on the simultaneous effect of religiosity and gender equality on fertility, at the micro-level, are rare. We are aware of only two studies considering religiosity and gender equality simultaneously. First, Guetto *et al.* (2015) took a comparative approach and demonstrated that in countries with a more religious and traditional gender role environment, individual level religiosity and gender equality play a stronger role in determining fertility among women than in countries with a more egalitarian and secular environment. Second, the thesis of Jeppsen (2015) based on the World Values Study tested whether a mediation effect of religion on the relationship between gender equality and fertility exists. The findings provided however no evidence of such mediating effect.

Macro-level context: five countries

When considering the relationship between gender equality, religiosity and childbearing, it is important to take the macro level context in which childbearing decisions are made into account. Alongside socioeconomic development, a key role of the context is played by the gender regime (Anderson and Kohler, 2015). In fact, it is argued that the incomplete "gender revolution" is an important factor behind the observed fertility decline (Esping-Andersen and Billari, 2015; Goldscheider *et al.*, 2015): as women become increasingly present at the labour market and in the public sphere, they experience a growing tension between their family-related and work-related obligations. These tensions can be eased by policy measures that improve the work/life balance, but it is argued that they will be removed only when men become more engaged in the household work and child-care (the second phase of the gender revolution (Esping-Andersen and Billari, 2015)). In Europe, most of the countries have not completed the gender revolution yet. These ongoing changes in gender regimes, coupled with more general value changes and secularization (Lesthaeghe, 2010), constitute an interesting context for our study. In this context, links at the individual level between gender attitudes and religiosity call for a better understanding.

In this study, we included data from five countries: two western European countries (Austria and France) and three Eastern European ones (Bulgaria, Georgia and Russia). All these five countries differ highly in terms of their institutional context. Austria and France are usually classified in the welfare state literature as belonging to the conservative model of high spending on families but limited support for dual-earner families, despite signs that they are partly moving towards a model based more on gender-equality (Thévenon, 2011). Bulgaria, Georgia and Russia on the other hand belong to the group of post-communist countries with a more ambivalent family policy (Fenger, 2007). During the communist period, these countries encouraged female full-time employment, but still stressed the role of women in the household. After the transition, some of these family policies, such as child-care provisions, were limited, discontinued or lost their relevance due to the high inflation of the 1990s (Deacon, 2016). Coupled with the difficult situation on the labour market, this led to women pursuing a more traditional role in the family again.

In Table 3.1, some macro indicators for the five countries of our sample are shown. In terms of economic development, there are huge disparities between these countries. Bulgaria, Russia and especially Georgia lag behind Austria and France in terms of socioeconomic development. These differences become apparent when comparing their GDP/capita and Human Development Indices. Noticeable differences also exist in the sphere of gender inequality, represented by the multidimensional Gender Inequality Index developed by the UN. Georgia shows the highest gender inequality, followed by Russia, Bulgaria, Austria and France. Remarkably and despite these differences in socioeconomic development and gender equality, women are present at the labour market to a similar extent in all five countries, judging by the gap between male and female employment rates. In terms of the gender revolution, these five countries therefore cannot be considered traditional anymore and are in the midst of the gender revolution.

Table 3.1: Macro-level indicators on the five countries

Indicators	Sources	Bulgaria	Russia	Georgia	France	Austria
Male employment rate 2008	1	58.5	65.8	61.7	57.9	64.5
Female employment rate 2008	1	46.0	53.3	45.7	46.9	50.4
Male/Female Gap 2008	1	12.5	12.5	16.0	11.0	14.1
GDP/capita (PPP) 2008 (US$)	2	15,517	23,054	6125	37,313	42,763
Human Development Index 2010	3	0.743	0.719	0.698	0.872	0.851
Rank for the Human Development Index	3	58	65	74	14	25
Gender Inequality Index	3	0.399	0.442	0.597	0.260	0.300
Religious denomination		%	%	%	%	%
Catholic	4	0.9	0.8	0.7	64.7	68.6
Protestant	4	0.6	1.5	1.4	2.0	6.4
Orthodox	4	80.9	72.0	77.1	1.2	1.1
Muslim	4	12.9	11.6	9.9	7.9	5.1
Other Religion	4	0.0	0.1	2.1	4.9	2.2
No Religion	4	4.7	14.0	8.8	19.3	16.5

Sources:
1 - International Labour Organization (2018)
2 - International Monetary Fund (2018)
3 - United Nations (2010)
4 – World Religion Data (v1.1), Maoz and Henderson (2013).

Other important variables in our study are religion and religiosity. While Bulgaria, Russia and Georgia are dominated by Orthodox Christians, France and Austria are predominantly Catholic countries. The number of Christians from other than the dominating denomination is small in every country. All countries have sizeable Muslim minorities. There are also numerous people who are not affiliated with any religion in all these countries.

Contributions

Our aim in this paper is to disentangle the impact of religiosity and gender roles on childbearing choices in a diverse set of countries. We ask how religiosity, gender role attitudes and gender division of housework shape fertility intentions and their realization. In doing so, we expand previous findings in four key ways.

First, we distinguish between gender attitudes and gender behaviour in order to capture the complex nature of gender equality and its relation to fertility that cannot be expressed in a single variable (Aassve *et al.*, 2015). Gender attitudes describe individual opinions on the role of women and men in society and the private sphere, while gender behaviour instead refers to the actual work distribution of different household tasks, such as cleaning, dishwashing or grocery shopping between the genders.

Second, we look at both fertility intentions and their realization. This has the advantage of following the decision-making process that leads to a birth more comprehensively and closely than it is done in studies where only intentions or only behaviours are analysed. That way, we are able to determine where exactly religiosity, gender attitudes and gender behaviour influence the childbearing choices. It is possible that some variables are only important for the formation of intentions, while having no effect on whether they get realized or not. This becomes evident for example when it comes to religiosity (Philipov, 2011). A recent study found that religiosity tends to operate mainly via fertility intentions and has little effect on the realization of these intentions (Berghammer and Buber-Ennser, 2015). Moreover, we go one step further and analyse separately the realization of positive (the plan to have a child) and negative (the plan to *not* have a child) intentions. The critical stance of some religions on contraception, e.g. of the Catholic Church (Srikanthan and Reid, 2008), means that religiosity could have a decisive negative impact on couples to realize their plan to *not* have a child in a set timeframe. As the

adherents are discouraged to use modern methods of contraception as well as to terminate an unplanned pregnancy, they might become parents even if they did not plan to.

Third, we analyse men's and women's choices separately. Previous research has shown that the relationship between gender equality and fertility intentions and their realization is less clear for men than for women (Neyer *et al.*, 2013). The effects for men are usually weaker and it is still debated in what direction the influence is. While Puur *et al.* (2008) found men with more egalitarian gender attitudes to desire and have more children than men with traditional attitudes, Westoff and Higgins (2009) found the opposite. Similarly, the gender division of housework may also affect men's and women's fertility differently. A more traditional distribution of housework, for example, by putting less burden on men may encourage them to intend to have more children, while having the exact opposite effect on women.

Finally, we perform our analyses for five different countries. As discussed earlier in the sub-section on the macro level, it is highly likely that the relationships between gender equality, religiosity and fertility are affected by different economic, cultural, or traditional contexts across countries. For example, other studies have already shown that the effect of religiosity on fertility decisions varies across countries (Philipov and Berghammer, 2007). As a result, it was important to perform our analyses for each of the five countries separately.

Data and methods

Dataset and sub-sample

Our data consist of Waves 1 and 2 of the Generations and Gender Survey (GGS). Specifically, we matched the respondents' fertility intention at wave 1 (framed in terms of intention to have a child within the next three years) with its actual realization or not three years later – at Wave 2. Such longitudinal data for our key variables of interest is available for five countries (Austria, Bulgaria, France, Georgia and Russia)[3]. The first wave was collected during the period 2004 to 2009. The second wave was collected approximately three years later. We limited the sample

[3] GGS Waves 1 and 2 are also available from the following countries, but were not included here for three reasons: (1) in the case of Italy and the Netherlands the variables on gender attitudes and gender distribution of housework were not included while in the case of Australia and Hungary, religiosity was not included; (2) in the case of Czechia, Germany and Lithuania, the attrition rate at Wave 2 was large and leaving us with a too small sample for our analyses; and (3) in the case of Poland, the data from Wave 2 was released only after this paper was written.

to women aged 18-45 years and men aged 18-50 at the first wave, who were fecund, and lived together with a partner. We further restricted the sample to those respondents who answered the fertility intentions question (N = 15,266) and to those who participated in Wave 2 (N = 11,573) corresponding to panel attrition of 24.2%, ranging from 15% in Georgia to 29% in Russia (see below and Table 3.2 for more information on this). The sample was further reduced to 11,224 when accounting for missing values.

Table 3.2: Attrition rates and Cronbach's Alpha

	Bulgaria	Russia	Georgia	France	Austria	Total
Attrition rate (between Waves 1 and 2)	26.3	28.8	14.9	29.7	19.6	24.2
Cronbach's Alpha – Gender Attitudes Index	0.533	0.510	0.513	0.540	0.639	0.684
Cronbach's Alpha – Household Involvement Index	0.788	0.713	0.764	0.614	0.744	0.729

Main variables

We considered fertility intentions over the next three years in our study. As they refer to a concrete plan to have a child or not in a set timeframe, they are frequently found to be a good predictor of actual behaviour (Régnier-Loilier and Vignoli, 2011). This applies especially to fertility intentions formulated over a short time frame (Dommermuth *et al.*, 2015). Intentions were asked in the GGS as following: "Do you intend to have a(nother) child over the next three years". The answer was given on a four-point scale ranging from "definitely yes" to "definitely no". We dichotomized the data into a simple yes/no outcome, in order to analyse the realization of positive (to have a child) and negative (not to have a child) intentions.

The realization of these fertility intentions was computed using retrospective data from Wave 2, in which we checked whether a birth happened between waves or the respondent or his partner got pregnant. Based on this data, we were able to determine whether positive or negative fertility intentions were realized or not. For example, when at Wave 1 a respondent stated that he/she did not intend to have a child in the next three years, and indeed did not get a child between Waves 1 and 2, this means that his/her negative intention was realized.

As for our explanatory variables we considered gender attitudes, gender behaviour and religiosity. Gender attitudes are represented by an index which was constructed based on four statements on attitudes towards gender relations. A similar approach was taken by Aassve *et*

al. (2015). Respondents were asked to state their opinion on each item, using a five-point Likert scale (from "strongly agree" to "strongly disagree").

- In a couple it is better for the man to be older than the woman
- If a woman earns more than her partner, it is not good for the relationship
- On the whole, men make better political leaders than women do
- When jobs are scarce, men should have more right to a job than women

We then calculated the average score across all four items for each respondent, resulting in a gender attitudes index which ranges from 1 (least traditional gender attitude) to 5 (most traditional gender attitude). The internal consistency of these items can be seen as acceptable with an overall Cronbach's alpha of 0.68). Within the countries, Cronbach's alpha ranges from 0.51 in Russia to 0.64 in France.

For the gender division of housework, we used a similar approach as Neyer *et al.* (2013) and constructed an index capturing the involvement of men in household tasks. We considered the distribution of cooking, grocery shopping, doing the dishes and vacuum cleaning within the couple. For each of these tasks, respondents in the surveys were asked whether it was performed by them or their partner. Possible answers included "always respondent", "usually respondent", "respondent and partner equally", "usually partner", "always partner", "always/usually other persons in the household" or "always/usually other persons not living in the household". For men, we gave a score of 3 when the partner does the task all the time, 2 when the partner does it most of the time and 1 when the share is equal, the respondent does it more often or someone else does it. For women a score of 3 was given when she does it all the time, 2 when she does it most of the time and 1 when the task is shared equally, done by someone else or mostly/always done by the partner. Following Neyer *et al.* (2013), we combined the rare cases where men do more housework than women with the cases where housework is shared equally. The scores were averaged for each respondent, leading to a household involvement index ranging from 1 (least traditional distribution) to 3 (most traditional distribution). Cronbach's alpha in this case amounted to 0.73, ranging from 0.79 in Bulgaria to 0.61 in France.

Our third main explanatory variable is religiosity and is approximated by the frequency of attending religious services and was asked in most countries by allowing respondents to state

how often they attend per year, month or week. We categorized these answers across countries by recoding them into: “never”, “less than monthly” and “monthly and more often”.

In order to account for different meanings that attendance may carry in various religions, we included religious affiliation into our model as a control variable. We distinguish between Christians, non-Christians and unaffiliated persons[4]. Moreover, our models also include the following control variables: the age of respondent, the number of biological children, whether the respondent had a child younger than 10 years old, marital status, education level (based on ISCED categories: low denotes levels 0-2, medium 3-4 and high 5-6) and employment status. The data on the control variables were all collected at Wave 1.

Methods

Due to the dichotomous nature of our dependent variables (fertility intentions and their realization) we used logistic regression models to examine the effects of religiosity as well as gender attitudes and behaviour. We first modelled the determinants of fertility intentions, and subsequently the realization of these intentions by distinguishing the realization of positive and negative intentions. To examine the effects of our gender variables and religiosity thoroughly, we followed a stepwise approach. In the first step, we only modelled the effect of the gender indices, in the second step only the effect of religiosity and in the third step we include both variables. Furthermore, we have also considered the possibility that gender variables and religiosity act through interaction effects. In a last step, we therefore included interaction effects between the gender variables and religiosity.

Due to unobserved heterogeneity and its variance across models of different variables or samples, it is not possible to compare odds ratios or logit coefficients (Mood, 2009). Therefore, instead of logit coefficients or odds ratios, we report the average marginal effects of our models. Average marginal effects are one of Mood’s ways of enabling comparisons of effect sizes and p-values of logistic regression models. In our tables, such average marginal effects are expressed in terms of percentage points and show the average change of the probability of the event for each value of a variable in comparison to the reference category (in the case of categorical variables) or for each increase by one point of a continuous variable.

[4] The number of cases in each country was too small to allow a more detailed breakdown by denomination.

As already mentioned, the attrition in our panel ranges from 15% in Georgia to 29% in Russia. There are two studies on the consequences of panel attrition and their impact on the reliability of the GGS data. For Austria, Buber-Ennser (2014) found no impact of attrition on data reliability, while Régnier-Loilier and Guisse (2012) found for France that there were significant effects of age, gender, education and nationality on the likelihood of dropping out of the sample. Therefore, it was necessary to conduct a robustness check in order to make sure that these cases do not distort the results. We did so by running two models of fertility intentions: one where we restricted the sample to those who were present at both waves, and one where we dropped the requirement to be present at Wave 2 (results of the additional model are available upon requests). The differences between these two models turned out to be negligible in each country and the exclusion of these respondents made no significant impact on the results.

Results

Descriptive results

Table 3.3 shows the distribution of our samples according to fertility intentions and their realization. As declared at wave one, 20% to 33% of men and 17% to 33% of women intended to have a or another child over the next three years. In Bulgaria and Russia, fewer respondents intended to have a(nother) child than in the other three countries. Of respondents who planned to have a child, between 21% and 57% of men and between 25% and 62% of women actually had a child between the two waves. The share of realized positive intentions is particularly low in the post-communist countries, which stands in a strong contrast to the situation of Austria and France, where realization rates are much higher. Of those respondents who stated a negative intention, more than 90% of respondents in each country fulfilled their plan of not having a child.

Table 3.3: Descriptive statistics by gender and country

		Men					Women				
		Bulgaria	Russia	Georgia	France	Austria	Bulgaria	Russia	Georgia	France	Austria
Variables	Categories	%	%	%	%	%	%	%	%	%	%
Intentions	Yes	20.1	24.7	32.5	30.1	32.0	16.7	17.3	26.6	33.2	27.9
	No	79.9	75.3	67.5	69.9	68.0	83.3	82.7	73.4	66.8	72.1
Realization of positive intentions	Yes	33.4	20.9	38.7	56.8	50.8	30.1	25.4	39.6	62.4	55.5
	No	66.6	79.1	61.3	43.2	49.2	69.9	74.6	60.4	37.6	44.5
Realization of negative intentions	Yes	94.1	94.2	91.2	91.6	90.5	94.2	96.6	90.5	96.2	94.5
	No	5.9	5.8	8.8	8.4	9.5	5.8	3.4	9.5	3.8	5.5
Gender Attitudes Index (range 1-5)	Mean	3.18	3.28	3.68	2.01	2.64	2.85	3.01	3.41	2.04	2.43
	SD	0.67	0.60	0.61	0.78	0.72	0.65	0.64	0.68	0.78	0.67
Household Involvement Index (range 1-3)	Mean	1.88	1.71	2.19	1.77	1.67	2.06	1.95	2.24	1.96	1.93
	SD	0.56	0.52	0.58	0.55	0.52	0.60	0.58	0.59	0.58	0.61
Attendance frequency	Never	37.0	61.7	39.6	82.9	39.5	25.7	43.0	32.8	76.4	31.8
	Less than monthly	49.2	33.4	28.5	10.8	32.7	52.2	49.1	22.4	15.4	38.5
	Monthly and more often	13.8	4.9	31.9	6.2	27.8	22.1	7.9	44.8	8.2	29.6
Religion	Christian	71.6	65.7	83.8	81.6	73.6	79.5	77.7	85.4	81.9	82.2
	Other religion	17.8	10.0	14.9	6.0	8.9	15.1	5.7	13.9	5.3	7.2
	No religion	10.7	24.3	1.3	12.4	17.6	5.4	16.7	0.7	12.7	10.6
Age	18-24	4.3	7.2	4.8	4.5	4.4	7.1	9.0	10.8	8.8	6.7
	25-29	11.2	15.4	10.6	13.2	12.6	16.6	17.1	18.8	15.6	17.1
	30-34	19.7	17.9	17.7	17.7	20.0	23.5	19.5	21.4	22.7	21.3
	35-39	24.1	18.8	20.9	25.0	26.7	24.9	20.6	24.1	26.1	25.3
	Men: 40-50 Women: 40-45	40.8	40.7	46.0	39.7	36.3	27.8	33.8	24.8	26.7	29.7
Number of children	0	6.8	11.0	4.8	16.8	21.6	4.5	2.2	3.3	18.9	22.2
	1	33.4	39.3	21.4	21.3	25.4	33.3	41.8	20.8	23.8	26.1
	2	50.8	39.4	52.4	43.5	36.7	53.4	44.3	53.2	37.1	38.4
	3 and more	9.1	10.2	21.5	18.4	16.3	8.8	11.7	22.8	20.2	13.3
Child below 10	Yes	47.2	44.7	57.8	62.4	58.7	44.8	48.4	58.7	61.1	51.4
	No	52.8	55.3	42.2	37.6	41.3	55.2	51.6	41.3	38.9	48.6
Marital status	Married	86.1	85.2	75.8	66.4	73.8	88.3	86.3	80.4	65.5	71.7
	Cohabiting	13.9	14.8	24.2	33.6	26.2	11.7	13.7	19.6	34.5	28.3
Education	Low	25.0	6.6	5.6	17.2	7.5	21.0	4.6	8.8	14.1	12.5
	Medium	61.6	60.8	65.6	51.7	71.6	52.6	49.8	62.4	42.7	67.6
	High	13.3	32.6	28.8	31.1	20.9	26.4	45.6	28.7	43.2	19.9
Employment status	In paid work	73.6	84.5	76.3	89.4	95.4	64.5	69.2	32.7	71.0	76.7
	Not in paid work	26.4	15.5	23.7	10.6	4.6	35.5	30.8	67.3	29.0	23.3
Total (*N*)		1163	926	1107	840	794	1567	1388	1384	1025	1030

As to our gender variables, both men and women show more traditional gender attitudes in the post-communist countries, with the most traditional views expressed in Georgia. In terms of the gender division of housework, the contrast lies more between Georgia, having on average the most traditional arrangements, and the remaining countries. As to the frequency of attending religious services, women are slightly more religious then men. France appears to be the least religious country, while in Georgia, respondents attend religious services the most frequently. As for religious denomination, we see that the distribution in the analytic sample reflects the distribution described above in the section on the macro-level context.

We also calculated correlations between the gender indices as well as rank correlation coefficients between religiosity and the two gender indices for each country separately. These correlations turned out to be low, indicating that all three variables are largely independent in each country[5].

Determinants of fertility intentions

The effects of gender attitudes, gender division of housework and religiosity on the likelihood of intending to have a(nother) child over the next three years can be seen in Table 3.4 for men. In the first model, only the gender equality variables were included. In Georgia and France, men with more traditional gender attitudes are more likely to intend to have a(nother) child. In Bulgaria on the other hand, more traditional gender attitudes are associated with a lower likelihood of having a fertility intention. In all five countries, the gender distribution of housework, represented by the "Household involvement index" has no significant effect on men's fertility intentions. Model 2 deals with the effect of religiosity and leaves the effects of the two gender variables out. In all three post-communist countries, men attending religious services more frequently are more likely to intend to have a(nother) child. In France and Austria on the other hand, this is not the case.

[5] The lowest correlation coefficient that we found amounts to -0.121 among Russian men between religiosity and the gender division of housework. The strongest correlation was also found between these two variables and amounts to 0.168 among Austrian men.

Table 3.4: Models of fertility intentions for men, by country[1]

		Bulgaria			Russia			Georgia		
	Model:	1	2	3	1	2	3	1	2	3
Gender Attitudes Index[2]	Index (1-5)	-2.9*		-2.9*	3.1		3.0	3.9*		3.8*
Household Involvement Index [3]	Index (1-3)	0.2		0.5	-0.5		0.5	-3.9		-3.5
Attendance frequency	Never (ref.)									
	Less than monthly		4.6*	4.8*		5.3	5.5		5.8*	5.4
	Monthly and more often		5.7*	5.5*		19.1**	19.2**		7.2**	6.8*
Religion	Christianity (ref.)									
	Other religion	-0.7	-0.9	-0.9	20.3**	18.8**	17.3**	5.3	9.2*	7.5
	No religion	-6.6**	-4.7	-4.1	-2.6	-0.3	0.3	-9.7	-3.8	-6.2
N		1271	1271	1271	901	901	901	1108	1108	1108

		France			Austria		
	Model:	1	2	3	1	2	3
Gender Attitudes Index[2]	Index (1-5)	5.3*		5.1*	-0.9		-1.0
Household Involvement Index [3]	Index (1-3)	1.0		0.9	-2.0		-2.1
Attendance frequency	Never (ref.)						
	Less than monthly		2.0	1.4		5.8	5.8
	Monthly and more often		7.2	5.2		4.4	4.7
Religion	Christianity (ref.)						
	Other religion	10.4	11.2	8.7	6.7	6.3	7.1
	No religion	-4.2	-5.4	-4.0	-4.1	-1.2	-1.5
N		760	760	760	790	790	790

(Results are represented by average marginal effects, expressed in percentage points)
Significance levels (*p*): **: <0.01 *: <0.05

Notes:
1-All models also control for age, number of children, children less than 10 years old (yes/no), marital status (married or cohabiting), education level and employment status
2- Gender Attitudes: A higher value indicates more traditional gender attitudes
3- Household Involvement: A higher value indicates more traditional gender division of housework

Table 3.5: Models of fertility intentions for women, by country[1]

		Bulgaria			Russia			Georgia		
	Model:	1	2	3	1	2	3	1	2	3
Gender Attitudes Index[2]	Index (1-5)	0.8		0.8	-1.7		-1.8	-0.5		-0.4
Household Involvement Index [3]	Index (1-3)	-1.5		-1.5	-7.1**		-7.0**	0.6		0.7
Attendance frequency	Never (ref.)									
	Less than monthly		0.3	0.3		5.8*	5.8*		4.8	4.8
	Monthly and more often		-0.2	-0.1		6.6	5.9		2.4	2.4
Religion	Christianity (ref.)									
	Other religion	-1.7	-1.6	-1.6	6.8	9.2	10.5	1.6	3.6	3.7
	No religion	0.1	0.2	0.2	3.9	7.6*	7.6*	-13.2	-11.5	-11.4
N		1271	1903	1903	1903	1115	1115	1115	1200	1200

		France			Austria		
	Model:	1	2	3	1	2	3
Gender Attitudes Index[2]	Index (1-5)	2.1		1.9	1.7		1.7
Household Involvement Index [3]	Index (1-3)	3.1		2.9	-2.4		-2.5
Attendance frequency	Never (ref.)						
	Less than monthly		8.1*	7.6*		-0.4	-0.5
	Monthly and more often		-3.0	-3.3		4.9	4.9
Religion	Christianity (ref.)						
	Other religion	10.7*	12.9*	11.8*	4.8	5.3	4.5
	No religion	-6.2	-4.9	-5.3	-10.3**	-9.1**	-9.3**
N		920	920	920	1256	1256	1256

(Results are represented by average marginal effects, expressed in percentage points)
Significance levels (*p*): **: <0.01 *: <0.05

Notes:
1-All models also control for age, number of children, children less than 10 years old (yes/no), marital status (married or cohabiting), education level and employment status
2- Gender Attitudes: A higher value indicates more traditional gender attitudes
3- Household Involvement: A higher value indicates more traditional gender division of housework

The third model incorporates all variables in order to determine the joint effect of religiosity and our gender equality variables. By comparing the effect sizes and significance levels of this model with those of the previous two models, we can tell whether the gender variables take up the influence of religiosity or they behave more independently from each other. Compared to Model 1 and 2, the significant coefficients stay virtually the same in Model 3, indicating that religiosity and gender equality operate in a rather independent way.

Table 3.5 shows the effects for women. In contrast to the results for men, gender attitudes show no significant effects for fertility intentions of women in any country. In Russia, there is a negative effect of the household involvement index, indicating that with a more traditional distribution of housework between men and women, women are less likely to intend to have a(nother) child. Apart from some significant effects for women attending religious services less than monthly in Russia and France, there is not a systematic positive effect of religiosity on fertility intentions. More importantly, the same observation regarding the changes of the coefficients in Model 3 compared to Models 1 and 2 can be made for women. This suggests that religiosity and gender attitudes operate independently from each other in determining women's as well as men's fertility intentions.

Determinants of the realization of positive and negative fertility intentions

Table 3.6 shows the models on the realization of positive fertility intentions for men. Only those respondents who indicated at Wave 1 that they planned to have a(nother) child were included in the model. No significant effects of either gender equity variable exist in this case. Only in the case of French men, attendance frequency is a significant determinant of childbearing behaviour. French men who attend religious services less than monthly are more likely to realize the intention to have a child in the following three years than men who never attend.

The effects for women are shown in Table 3.7. The only significant effect of the gender variables in this case can be seen in Russia. Here, a more traditional gender distribution of household tasks encourages the realization of fertility intentions. Furthermore, highly religious women in Bulgaria and France are much more likely to realize positive intentions than women who never attend religious services. In France, a denominational effect can be seen as well,

with women affiliated with non-Christian religions being more likely to realize positive fertility intentions than Christian women.

As to Model 3 for both men and women, the same situation emerges as on fertility intentions. The coefficients in Model 3 are barely different from those in Models 1 and 2 again, indicating that gender equality and religiosity work independently from each other not only for fertility intentions, but also for their realization.

In Table 3.8 and 3.9, the results of the models on the realization of negative intentions are presented. In this case, a positive effect means that there is a higher likelihood of not having a child between the waves. Only respondents who indicated that they did not want a child over the next three years were included here. Results of these models should be taken with more caution, as the overwhelming majority of respondents in our sample realized their negative fertility intentions and few unintended births happened. Highly religious men are less likely than men never attending religious services to realize negative intentions only in France. In Russia, men not affiliated with a religion are more likely to realize negative intentions. In the case of women, traditional gender attitudes are associated with a lower likelihood to realize negative intentions in Russia. In Georgia, non-Christian women are less likely than Christian women to realize negative intentions. Also for negative fertility intentions, there are little differences in the coefficients between Model 3 and the other two models, meaning that religiosity and gender equality are operating independently also in this case.

Table 3.6: Models of the realization of positive fertility intentions for men, by country[1]

		Bulgaria			Russia			Georgia		
	Model:	1	2	3	1	2	3	1	2	3
Gender Attitudes Index[2]	Index (1-5)	7.0		7.3	2.2		2.5	-0.0		0.5
Household Involvement Index [3]	Index (1-3)	-8.0		-8.5	2.5		2.8	2.3		2.0
Attendance frequency	Never (ref.)									
	Less than monthly		-7.0	-9.0		4.4	5.1		-11.3	-11.2
	Monthly and more often		-14.1	-15.0		-1.4	-1.0		-11.3	-11.2
Religion	Christianity (ref.)									
	Other religion	-1.6	-0.4	-0.7	-3.2	-0.3	-2.2	5.5	0.9	0.6
	No religion	9.1	4.7	2.9	-0.3	1.0	1.6	22.9	14.2	14.7
N		264	264	264	225	225	225	350	350	350

		France			Austria		
	Model:	1	2	3	1	2	3
Gender Attitudes Index[2]	Index (1-5)	1.1		-0.0	6.0		5.8
Household Involvement Index [3]	Index (1-3)	-10.4		-9.2	2.4		1.3
Attendance frequency	Never (ref.)						
	Less than monthly		25.6**	25.0*		5.3	4.4
	Monthly and more often		17.1	16.9		11.5	10.8
Religion	Christianity (ref.)						
	Other religion	6.2	0.8	2.6	-22.0	-20.3	-22.7
	No religion	2.7	4.7	4.8	7.7	11.4	11.2
N		200	200	200	275	275	275

(Results are represented by average marginal effects, expressed in percentage points)
Significance levels (*p*): **: <0.01 *: <0.05

Notes:
1-All models also control for age, number of children, children less than 10 years old (yes/no), marital status (married or cohabiting), education level and employment status
2- Gender Attitudes: A higher value indicates more traditional gender attitudes
3- Household Involvement: A higher value indicates more traditional gender division of housework

Table 3.7: Models of the realization of positive fertility intentions for women, by country[1]

		Bulgaria			Russia			Georgia		
	Model:	1	2	3	1	2	3	1	2	3
Gender Attitudes Index[2]	Index (1-5)	-4.9		-4.1	6.3		5.8	7.0		6.9
Household Involvement Index [3]	Index (1-3)	-2.6		-2.4	11.8*		13.0**	-0.1		0.0
Attendance frequency	Never (ref.)									
	Less than monthly		11.0	10.3		3.5	2.2		2.2	1.0
	Monthly and more often		19.3*	18.6*		16.5	20.4		3.7	2.4
Religion	Christianity (ref.)									
	Other religion	4.2	10.3	10.9	2.9	6.9	3.7	6.8	9.9	8.1
	No religion	-3.3	7.9	5.7	1.7	5.3	4.1	(empty)	(empty)	(empty)
N		326	326	326	197	197	197	306	306	306

		France			Austria		
	Model:	1	2	3	1	2	3
Gender Attitudes Index[2]	Index (1-5)	0.5		0.4	-2.4		-2.4
Household Involvement Index [3]	Index (1-3)	7.7		7.1	6.4		6.5
Attendance frequency	Never (ref.)						
	Less than monthly		7.2	6.1		8.2	8.9
	Monthly and more often		19.2*	19.0*		12.4	12.0
Religion	Christianity (ref.)						
	Other religion	26.0**	27.3**	27.1**	-3.1	-2.1	-1.3
	No religion	2.7	5.7	4.7	2.3	8.1	8.0
N		271	271	271	348	348	348

(Results are represented by average marginal effects, expressed in percentage points)
Significance levels (*p*): **: <0.01 *: <0.05

Notes:
1-All models also control for age, number of children, children less than 10 years old (yes/no), marital status (married or cohabiting), education level and employment status
2- Gender Attitudes: A higher value indicates more traditional gender attitudes
3- Household Involvement: A higher value indicates more traditional gender division of housework

Table 3.8: Models of the realization of negative fertility intentions for men, by country[1]

		Bulgaria			Russia			Georgia		
	Model:	1	2	3	1	2	3	1	2	3
Gender Attitudes Index[2]	Index (1-5)	1.1		1.1	-2.6*		-2.4	-0.6		-0.6
Household Involvement Index [3]	Index (1-3)	-0.3		-0.3	-1.7		-1.6	-1.2		-1.3
Attendance frequency	Never (ref.)									
	Less than monthly		0.0	-0.1		3.3	3.1		-2.1	-2.2
	Monthly and more often		0.2	0.2		(empty)	(empty)		-2.8	-2.8
Religion	Christianity (ref.)									
	Other religion	0.6	0.7	0.6	-0.6	-2.5	-1.0	-6.5	-7.5	-7.5
	No religion	-1.7	-1.6	-1.7	3.7*	5.1**	4.7**	-3.0	-4.4	-5.0
N		1007	1007	1007	676	654	654	756	756	756

		France			Austria		
	Model:	1	2	3	1	2	3
Gender Attitudes Index[2]	Index (1-5)	0.4		0.4	-1.6		-1.4
Household Involvement Index [3]	Index (1-3)	-1.0		-0.6	-2.5		-2.5
Attendance frequency	Never (ref.)						
	Less than monthly		-1.3	-1.3		2.5	2.4
	Monthly and more often		-14.8*	-14.6*		-1.9	-1.7
Religion	Christianity (ref.)						
	Other religion	-2.1	1.0	0.6	-4.7	-5.2	-3.7
	No religion	-4.7	-5.7	-5.7	-4.3	-3.1	-4.0
N		560	560	560	515	515	515

(Results are represented by average marginal effects, expressed in percentage points)
Significance levels (*p*): **: <0.01 *: <0.05

Notes:
1-All models also control for age, number of children, children less than 10 years old (yes/no), marital status (married or cohabiting), education level and employment status
2- Gender Attitudes: A higher value indicates more traditional gender attitudes
3- Household Involvement: A higher value indicates more traditional gender division of housework

Table 3.9: Models of the realization of negative fertility intentions for women, by country[1]

		Bulgaria			Russia			Georgia		
	Model:	1	2	3	1	2	3	1	2	3
Gender Attitudes Index[2]	Index (1-5)	0.4		0.4	-2.2*		-2.2*	0.1		0.1
Household Involvement Index [3]	Index (1-3)	-1.5		-1.5	1.6		1.6	-3.6		-3.6
Attendance frequency	Never (ref.)									
	Less than monthly		-0.8	-1.0		0.8	1.0		-0.7	-0.4
	Monthly and more often		0.6	0.5		0.2	0.6		-2.6	-2.5
Religion	Christianity (ref.)									
	Other religion	1.0	1.0	0.8	0.7	0.8	1.1	-12.8**	-14.5**	-14.5**
	No religion	-0.5	-0.9	-0.8	-1.3	-0.7	-0.6	-21.4	-22.9	-24.1
N		1567	1567	1567	911	911	911	882	882	882

		France			Austria		
	Model:	1	2	3	1	2	3
Gender Attitudes Index[2]	Index (1-5)	1.2		1.4	-1.4		-1.3
Household Involvement Index [3]	Index (1-3)	-0.5		-0.0	0.4		0.4
Attendance frequency	Never (ref.)						
	Less than monthly		0.0	0.1		-1.9	-1.9
	Monthly and more often		-5.5	-6.2		-2.8	-2.7
Religion	Christianity (ref.)						
	Other religion	-8.7	-7.1	-8.1	-1.8	-2.9	-2.2
	No religion	-2.4	-3.1	-2.7	1.6	0.3	0.5
N		636	636	636	908	908	908

(Results are represented by average marginal effects, expressed in percentage points)
Significance levels (*p*): **: <0.01 *: <0.05

Notes:
1-All models also control for age, number of children, children less than 10 years old (yes/no), marital status (married or cohabiting), education level and employment status
2- Gender Attitudes: A higher value indicates more traditional gender attitudes
3- Household Involvement: A higher value indicates more traditional gender division of housework

Interaction effects between gender equality and religiosity

Despite the indications that our gender variables and religiosity operate independently, the possibility remains that they might still interact with each other. For example, it could be that the effect of religiosity on say fertility intention is much higher for individuals holding very traditional gender attitudes. In such cases, the mechanism at stake would involve a moderating effect. To test for this, we therefore re-run our models by adding a series of interaction effects between our three variables. Table 3.10 shows the countries and models in which significant interaction effects were found and their direction (positive or negative). The detailed results of all calculated interaction effects are available on request. The results suggest that our gender variables and religiosity do interact, but only for some countries and only for some of our models. The lack of systematic pattern in these results makes them consequently very difficult to interpret, but suggest that overall, the interaction effects do not play an important role.

Discussion and conclusion

The aim of this paper was to disentangle the effect of religiosity and gender attitudes on fertility intentions and their realization. Our main question was whether the impact of religiosity on fertility runs mainly through the influence of religiosity on gender equality, which in turn influences fertility, or whether religiosity and gender attitudes and behaviour have independent effects. We used a stepwise approach of first introducing only the gender variables, followed by a second step only encompassing religiosity and a third step in order to examine the combined effects. Three concluding remarks can be made.

Table 3.10: Summary of the models with interaction terms for fertility intentions and realization showing only the countries with significant interaction (p<0.05)

	Intentions		Positive realization		Negative realization	
	Men	Women	Men	Women	Men	Women
Gender Attitudes Index × Medium religiosity	-	Austria (-)	-	-	-	Georgia (+), Austria (-)
Gender Attitudes Index × High religiosity	France (-)	Georgia (-)	-	-	France (-)	Georgia (+)
Household Involvement Index × Medium religiosity	-	Bulgaria (-)	-	-	Georgia (+)	-
Household Involvement Index × High religiosity	-	Bulgaria (-)	-	Austria (-)	Austria (-)	-

Notes:
Religiosity: Frequency of attending religious services

First, if we look at the variables related to gender equity, there were only a few significant relationships. As for gender attitudes, our finding of French and Georgian men with more traditional gender attitudes being more likely to intend to have a(nother) child support the findings of Westoff and Higgins (2009), but the opposite result for Bulgarian men's intentions seem to be more in line with what Puur *et al.* (2008). As for the effects of the household division of labour on the formation and realization of fertility intentions, we found no significant effects apart from one exception. In our models, only in the case of Russian women, the fertility intentions were negatively impacted by a traditional gender division of housework, which would be in line of what other studies suggest for other countries (Mills *et al.*, 2008; Neyer *et al.*, 2013). That negative impact on intentions however was counterbalanced by the positive impact of traditional household arrangements on their realization. For men, gender division of housework was not statistically significant in any case. One reason for that might be related to the low number of men who do more housework than their female partner in all countries of our sample. Consequently, only few men are in the situation where housework becomes particular burdensome that it inhibits plans for additional children. Men however often overstate their own share in doing housework, which could have impacted the comparability of our results between men and women (Baxter, 1997). The role of gender equity in the household could be tackled more in depth in future studies, for instance by incorporating additional variables, such as the satisfaction with the distribution of housework (Neyer *et al.*, 2013).

Second, when considering the effects of religiosity on people's childbearing intentions, they were mostly visible in the post-communist countries and for men only: those attending church more often were more likely to plan to become fathers in the next three years.. As for the realization of intentions, few significant relationships were noticed with religiosity having a positive effect on realization of positive intentions in Bulgaria (only for women) and in France. Moreover, our expectation that more religious people are less likely to realize negative fertility intentions due to the critical stance of some religions on contraception and abortion (Srikanthan and Reid, 2008) was only confirmed for French men (where the highly religious were less likely to realize their negative intentions) and Russian men (where the unaffiliated were more likely). It needs to be noted, however, that the rate of realization of negative fertility intentions is high and there are only few cases where negative intentions are not realized.

Summarizing our findings on the specific effects of gender attitudes and behaviour as well as of religiosity, few significant results can be noticed and overall, the results show no clear

pattern across countries. Interestingly, even though our descriptive findings revealed marked differences in the rates of realization of fertility intentions between post-communist and western European countries (in line with previous studies, e.g. Spéder and Kapitány (2014)), these differences were not echoed in how religiosity and gender matters for this process. Similarly, we did not find any systematic differences between men and women. Nevertheless, separate analyses for men and women are still appropriate from a theoretical point of view, as traditional or egalitarian gender attitudes and behaviour have different consequences for men and women.

Third, there was one consistent finding that was repeated across all our models in our study and stemming from our step-wise approach: there were no substantial differences in the coefficients of religiosity and our gender equality variables between the combined model (Step 3) and the models where the explanatory variables were introduced separately. Moreover, the interaction effects between religiosity and the gender variables showed no systematic pattern. This result constitutes the most important conclusion we draw from our analyses and indicates that religiosity and gender equality operate in a rather independent way. Gender attitudes, gender behaviour and religiosity appear to exert additive effects in the process of reproductive decision-making. This does not bring support to Goldscheider (2006)'s suggestion that the positive effect of religiosity on fertility runs mostly indirectly by promoting traditional gender roles.

There are several possible explanations of this finding. Due to the rising tide of gender equality, religions themselves could have adopted their stances and teachings on gender roles to reflect this new reality. This becomes evident in the case of the Catholic Church of Austria for example, which demands better policies regarding the reconciliation between work and family (Katholischer Familienverband Österreichs, 2017). However a different mechanism may operate in other, mostly post-communist countries where the Church still promotes traditional gender roles (e.g. in Russia: Chernyak (2016)). A general revival of traditional gender roles happened in post-communist countries (Schmitt and Trappe, 2010), accompanied by the loss of jobs and the downsizing of childcare provisions by the state, which drove women to assume a more traditional role in the family (ibid.). Religious attendance after the fall of communism has only picked up in a few countries however (Brenner, 2016). Thus, the revival of traditional gender roles has not been accompanied or driven by a revival in religiosity on a similar scale, which weakened the association between religiosity and traditional gender roles.

The independent effects in our models indicated that the "particularized theology" assumption, which assumes that the explicit pronatalist teachings of many religions are encouraging the decision to have many children, may be more important than previously thought. If religions further adjust to and adapt gender equality in their teachings, the direct teachings to have many children might become even more relevant for fertility decisions of more religious people. In the light of decreasing attendance frequencies of religious services for mainstream religions, more religious people however are already a highly selected group of people and are destined to become even more so (Kaufmann, 2010).

With our findings, we provide a new perspective on the interplay between religiosity and gender equality in fertility decision making. Contrary to our assumption stemming from the literature, religiosity does *not* exert its pronatalist influence through the promotion of traditional gender roles (Goldscheider, 2006). In the context of the gender revolution, in which the association between gender equality and fertility turned from negative to positive, and the situation where some religions are themselves starting to promote gender equality, the question arises whether this is also the case in societies with dominating traditional gender roles. As none of the countries we considered in our sample can be classified as being "truly" traditional, one avenue of future research is to extend the analysis to countries, where traditional gender roles are dominant and few women are in the labour market and the female revolution has not started yet. Judging by the female/male labour force participation gap, this is for example the case in many Muslim countries and in India (International Labour Organization, 2018). An alternative is to look at the situation of Western countries at earlier points in time where they were in an earlier phase of the female revolution.

Finally, it is important to note that our results are based on all men and women, as opposed to results based by parity, i.e. on the intention and realization to have a first, second or third child, due to the low sample sizes. Previous studies however suggest that there are different parity-specific effects when it comes to gender equality (especially, considering the decision for a first and a second child separately (Bernardi *et al.*, 2013; Mynarska and Styrc, 2014) and religiosity (Philipov and Berghammer, 2007). In future studies, it would therefore be crucial to take these differences into account.

Chapter 4

Do costs and benefits of children matter for religious people? - Perceived consequences of parenthood and fertility intentions in Poland

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Abstract

The aim of this paper is to examine the positive relationship between religiosity and fertility from the perspective of perceived consequences of parenthood. Previous studies on Germany found that highly religious people ascribe higher benefits and lower costs to having children. Furthermore, the impact of costs and benefits on fertility is less pronounced among the highly religious. This study tests these mechanisms for fertility intentions and in the context of Poland, a country with a low fertility rate and high religiosity in comparison to other European countries. A sample of 4892 men and women of childbearing age from the second wave of the Polish version of the Generations and Gender Survey is used. First, it is analysed to what extent perceived costs and benefits mediate the impact of religiosity on fertility intentions. Second, it is examined whether religiosity moderates the impact of perceived costs and benefits on fertility intentions. The results show that part of the positive effect of religiosity on fertility intentions can be explained by more religious people seeing higher benefits of having children. Furthermore, but only in the case of women, religiosity moderates the impact of perceived costs on fertility intentions, suggesting that the effect of perceived costs decreases with increasing religiosity.

Introduction

Despite the ongoing trend of secularization and a decline of the relevance of religion in public life, religiosity continues to be one of the key determinants of fertility. More religious people have been found to be more likely to have children in comparison to the less religious in many different county settings (Adserà, 2006b; Hubert, 2015; Peri-Rotem, 2016; Okun, 2017; Dilmaghani, 2019). Explanations for the positive association of religiosity and fertility are manifold. It has been argued that religions encourage their followers to have children by providing social support and networks for families (Krause *et al.*, 2001; Okun, 2017), by promoting traditional gender roles and family values (Sherkat, 2000; Goldscheider, 2006; Klingorová and Havlicek, 2015), or by direct teachings such as the Biblical command "be fruitful and multiply".

Another mechanism of how religiosity may facilitate childbearing relates to how religious people perceive, and how strongly they react to, various costs and benefits of having children. Religions encourage their followers to have children by accentuating and communicating the benefits of parenthood. The support that religious faith gives in different life situations may also lead to lower perceived costs of having children. Furthermore, it may lead to the belief that a deep faith can shield religious people from high costs of having children (Philipov, 2011). It follows that even those religious people who perceive high costs of having children may still want to have them. Previous research using German data confirmed a positive relationship between religiosity and higher perceived benefits of having children (Brose, 2006), and showed that this is one of the reasons why the more religious are more likely to start a family (Arránz Becker and Lois, 2017). What is however not clear from this literature is whether these results hold for other countries, too. The exact mechanism of how the perceived costs and benefits of children intertwine with religiosity is also yet to be established.

The goal of this study was to contribute to the literature by examining the interrelations between religiosity and perceived costs and benefits of having children in the context of Poland, and in regards to fertility intentions. Poland, as a majority-Catholic country with a low fertility rate constitutes an interesting case study due to its marked contrast to the German context of earlier studies. Moreover, and in contrast to previous studies, this one focuses on fertility intentions. If the whole fertility decision making process is considered (Miller, 1994; Miller, 2011b), fertility intentions are the link between the perceived costs and benefits on one side and behaviour on

the other. By focusing on intentions, this study was able to go deeper into the role of religiosity in the fertility decision making process.

The study used the second wave of the Polish version of the Generations and Gender Survey. Of the countries that participated in the survey, Poland was the only one to include a series of items tapping into perceived benefits and costs of having children, which allowed for a thorough analysis of their relationship with religiosity and fertility. The study aimed to examine the extent to which the costs and benefits of having children act as mediators for the effect of religiosity on fertility intentions and to assess whether religiosity acts as a moderator on the relationship between perceived costs and benefits and fertility intentions.

Theoretical background

Religiosity and perceived costs/benefits of having children

Perceived costs and benefits of children are a key component of numerous theoretical models of fertility decisions. These models assume that high perceived costs and low perceived benefits have a negative effect on the decision to have a child. This assumption is part of many economic models (e.g. Becker, 1960; Schultz, 1973) as well as models formulated in psychology or sociology (Hoffman and Hoffman, 1973; Miller, 1994; Nauck, 2014). In the economic theories, direct monetary costs and indirect costs related to the allocation of time to housework and foregone wages are most frequently considered (Becker, 1965; Schultz, 1973; Becker, 1981). Costs cover also other possible negative aspects of having children, such as stress, worries over children, discomforts of pregnancy or limited time for leisure (Miller, 1995; Guedes *et al.*, 2015). Similarly, benefits of children encompass numerous motivations or reasons for which people have children. They include emotional aspects such as affiliation, a sense of accomplishment, novelty (children bring new experiences), but also instrumental aspects such as economic utility or fulfilling norms regarding morality and religion (Hoffman and Hoffman, 1973; Miller, 1995; Guedes *et al.*, 2015).

The role of costs and benefits of children for fertility choices has already been tested in a wide range of studies (e.g. Bulatao, 1981; Shah and Nathanson, 2004). These have shown that, for the first child, emotional and psychological benefits are the most relevant, while for higher parities, economic and instrumental values grow in importance (Bulatao, 1981). They also

indicated that emotional values of children became central in modern societies, while the importance of instrumental values diminished (Nauck, 2007; Mayer and Trommsdorff, 2010; Nauck, 2014). In terms of costs, it has been highlighted that due to rising employment of women, opportunity costs of having children have risen considerably (Moss, 1988) and represent an important part of the overall costs of childbearing (Duggan, 2003).

Despite the recognized importance of perceived costs and benefits of children in fertility decisions, one missing link is the possible role of religiosity. Theoretically, Goldscheider (1971) and McQuillan (2004) do identify the perceived costs and benefits as one possible link between religiosity and fertility. This link seemed apparent in traditional societies, where instrumental values of children related to fulfilment of norms regarding morality and religion also had a large influence on the decision to have children (Westoff and Jones, 1979; van Poppel, 1985; Lesthaeghe and Meekers, 1987). The Second Demographic Transition theory suggests that those norms have however become less relevant over time in Western countries, as secularization spread and welfare systems expanded (Lesthaeghe, 2010). Yet, a large number of studies have found that religiosity still matters in individual childbearing decisions (Philipov and Berghammer, 2007; Buber-Ennser and Skirbekk, 2016; Peri-Rotem, 2016; Bein *et al.*, 2017; Dilmaghani, 2019), and some findings even suggested that its importance has grown over time (Adserà, 2006a; Adserà, 2006b). In light of the continuing relevance of individual religiosity for childbearing decisions despite the general context of a decline in the influence of religions, the question emerges how religiosity relates to, and might influence, other perceived costs and benefits of having children. The current study considered two possible mechanisms: the mediating mechanism and the moderating mechanism.

The mediating mechanism

Considering the role of religiosity for fertility choices, it is postulated that more-religious people might perceive more benefits of having children overall. This becomes apparent by looking at the ways in which religions encourage their followers to have children. One aspect is the influence of direct religious teachings or commands (McQuillan, 2004). The Catholic Church, which is the most influential religious institution in Poland, where the current study is located, has a particularly explicit pronatalist stance in its teachings. In the Social Doctrine of the Catholic Church, children are seen as a gift from God to parents, family and the whole society

(Pontifical Council for Justice and Peace, 2004). The prime goal of marriage, one of the sacraments of the church, is seen in procreation. The Catholic Catechism states that large families are to be seen as a sign of God's blessing (Catechism 2366-2379). Beyond pronatalist stances, many religions also put an emphasis on family values and traditional gender roles (Lehrer, 2004; McQuillan, 2004). These examples show that many religious doctrines emphasize the positive sides and benefits of having children. Brose (2006) showed in a study using German data, that religious people indeed attach more positive values to children than less religious people and suggested that they might therefore be more likely to have them. Moreover, among the more religious, a stronger association between the number of children and happiness has been reported (Cranney, 2017).

Religiosity may also impact childbearing decisions by reducing the perceived costs of having children. For instance, a part of the perceived costs of childbearing that are mentioned in the literature consists of difficulties in combining family and career. The opportunity costs that stem from this conflict are particularly high for women and play an important role in childbearing decisions (McDonald, 2000; Thévenon and Gauthier, 2011; Goldscheider *et al.*, 2015; Baizan *et al.*, 2016). As many religions promote traditional gender roles and view childrearing and housework as areas of women's specialization (Sherkat, 2000; Goldscheider, 2006; Seguino, 2011; Klingorová and Havlicek, 2015), these costs may be perceived as less relevant by the religious people. Moreover, some religious institutions help reducing the costs of childbearing by providing activities and childcare for families (Blume, 2014). Another reason is related to differences in the interest in material gains. Previous research found indications that more religious people might be less materialistic than the less religious (Jensen and Jensen, 1993; Veer and Shankar, 2011; Rakrachakarn *et al.*, 2015). It might therefore be possible that the religious perceive lower costs of children because they think less in terms of economic benefits and costs in their decisions. In other words, there can be a mediating effect at work through which religiosity leads to higher fertility by influencing perceived costs and benefits of having children. This mediating effect has already been found for perceived benefits in a German study by Arránz Becker and Lois (2017) on the likelihood of having a first child. Therefore, the first hypothesis is:

H1: *The effect of religiosity on fertility intentions can be explained by more-religious people perceiving higher benefits and lower costs of having children than less-religious people*

The moderating mechanism

It is also possible that religiosity controls, or moderates, how much costs and benefits actually influence the decision to have a child, which is another mechanism considered in the current study. Highly religious people are frequently in contact with other highly religious people due to their involvement in Church activities, gaining valuable sources of social support in coping with problems and stressful situations that may arise in larger families (Krause *et al.*, 2001). Religious faith can also give further spiritual support in stressful situations (Maton, 1989), and more religious people might rely on their faith to be shielded from high costs of children (Philipov, 2011). Consequently, the second hypothesis refers to a moderating role of religiosity:

H2: *The negative effect of perceived costs of having children on fertility intentions is less pronounced for more religious people*

On the one hand, there is no reason to expect that emotional values have different effects on childbearing intentions among religious and non-religious individuals. On the other hand, as benefits of parenthood include instrumental ones as well as benefits related to traditional values, it could be expected that they have a stronger effect for religious individuals. In contrast with this assumption, the already mentioned study of Arránz Becker and Lois (2017) found that the effect of both perceived costs and benefits on fertility is weaker among the highly religious. That study argued that religious individuals are generally less inclined to consider childbearing in terms of costs and benefits. Yet, only emotional benefits were included in that study.

Consequently, no explicit hypothesis on how religiosity moderates the impact of perceived benefits of childbearing on fertility intentions was formulated. Nonetheless, to gain a full picture of all possible channels of influence, this effect was tested as well.

The Polish context

Poland is religiously homogenous and can be characterized as highly religious as compared to most other European countries. A recent Pew survey on religion in Europe found that a vast majority of the population in Poland (87%) is affiliated with the Catholic Church. Around 61% of the population indicated that they attend religious services at least monthly (the highest value of all countries surveyed in Europe), compared to 24% in Germany, 11% in the Czech Republic or 17% in Russia. Only 7% indicated that they do not identify with a faith, which is lower than

in neighbouring countries like Russia (15%), the Czech Republic (72%) or Germany (24%) (Pew Research Center, 2018). Among younger adults, who are on average less religious than the general population, Poland still stands out as comparably religious. According to findings from the European Social Survey (2014-16), young people in Poland are the most likely to identify with a faith and attend religious services and pray at least weekly among all European countries surveyed (Bullivant, 2018). The comparably high religiosity of the population is also reflected in the influence of the Catholic Church on society and government (Zuba, 2010; Szwed and Zielińska, 2017). Part of that influence is rooted in the fact that during the communist period, the Church was one of the leading opposition forces and played an important role in overcoming the previous regime and introducing democracy. Consequently, after the collapse of communism, the Church gained a strong position in society (Szwed and Zielińska, 2017). That position for example enabled the Church to successfully lobby for stricter abortion laws, turning them into one of the most restrictive rules within Europe (Szelewa, 2016).

At the same time, the fertility rate in Poland is very low. The total fertility rate declined from around 2.1 children per woman in 1990 to the lowest-low level of 1.2 in 2003, which was related most of all to the economic shock that the country experienced after the end of communism. Changes in the labour market, high unemployment and less stable employment, as well as the reduced state support for families increased the vulnerability of families and resulted in profound changes in family formation (Kotowska *et al.*, 2008). In the following years and especially after the accession to the EU in 2004, Poland has been on a sustained growth path and even posted economic growth during the crisis in 2009 (Duszczyk, 2014). At the time of data collection for the current study (2014 and 2015), Poland continued its strong growth and had a declining unemployment rate of around 8% (Eurostat, 2019). Nevertheless, the fertility rate recovered only slightly to 1.3 children per woman (Eurostat, 2019). This has been partly explained by the weak governmental support for families (Matysiak and Weziak-Bialowolska, 2016) and the difficulties for women to combine career and family. These economic and institutional changes have been argued to be one of the reasons why the comparably high religiosity of Poland has not been able to shield Poland from fertility decline (Matysiak and Vignoli, 2013). Neither has the high religiosity prevented the widespread use of contraceptives (Mynarska, 2016). Only for the most religious people, religiosity matters in their decision on contraceptive use (Mishtal and Dannefer, 2010). Nevertheless, the more religious in Poland express more positive attitudes towards marriage and are more inclined to choose marriage over

cohabitation (Baranowska-Rataj *et al.*, 2014). The religious also express larger desired family sizes (Mishtal, 2009).

Overall, there is a pronounced contrast between Poland and Germany, the focus of the previous studies of Arránz Becker and Lois (2017), and Brose (2006). Even though Germany is also characterised by low fertility, its institutional and cultural setting differs. Compared to Poland, gender attitudes in Germany are less traditional (Matysiak and Weziak-Bialowolska, 2016) and childlessness is more tolerated (Merz and Liefbroer, 2012). Germany is also characterized by a more mixed and more secularized religious landscape (Pew Research Center, 2018). Therefore, testing those mechanisms in the Polish context may add to a further understanding of how religiosity shapes childbearing decisions in different contexts.

Methods

Dataset

The dataset used in this study was the second wave of the Polish version of the Generations and Gender Survey (Kotowska *et al.*, 2019). The Generations and Gender Survey (GGS) is a survey with nationally representative samples having a target population of all 18-79-year-old non-institutionalized residents. So far, it has been conducted in 19 countries. Its questionnaire encompasses a wide range of items on causes and consequences of family change. In the second wave of the Polish version of the survey, a wide range of statements regarding perceived costs and benefits of children were introduced and asked to be evaluated in terms of their relevance for having children by each respondent.

In the first wave of the Polish GGS, which was conducted in 2010 and 2011, 19,987 people were interviewed. The initial sample of the second wave, conducted in 2014 and 2015, consisted of 12,294 respondents, bringing the attrition to 38.4%. The sample in the second wave was expanded by a number of respondents aged 18-22, who were not interviewed in Wave 1, bringing the total number to 13,480 respondents at Wave 2. Despite this sizeable attrition, patterns of fertility intentions were the same when comparing respondents present at both waves and respondents who dropped out of the sample after Wave 1 (Brzozowska and Mynarska, 2019). This indicates that any attrition biases that might have occurred due to the exclusive use of the second wave of the survey can be considered negligible in studying fertility intentions.

For this study, the sample was restricted to those of childbearing age (N = 5459), i.e. men aged 18–49 and women aged 18–44. Furthermore, cases in which the female respondent or the partner of the male respondent was pregnant, as well as cases in which the respondents declared themselves or their partner infecund were removed, further reducing the sample to 5176 respondents. Cases in which information was missing on fertility intentions (47 cases), religiosity (226 cases), the importance of perceived costs and benefits of having children (9 cases) and on the control variables (2 cases) were dropped as well. The final analytical sample consisted of 4892 respondents.

Variables

In the models, the dependent variable "fertility intentions" was constructed based on the question: "Do you intend to have a/another child during the next three years?". Respondents were given the following four response categories: "definitely not", "probably not", "probably yes" and "definitely yes". For the purpose of this study, the variable was dichotomized by grouping the responses "definitely not" and "probably not" into "no" and the responses "probably yes" and "definitely yes" into "yes".

The main explanatory variables were religiosity and perceived costs and benefits of children. There are many ways in which religiosity could be conceptualized and measured, such as the frequency of attending religious services or the importance of religion in one's life. In this paper, the latter was used, as this more subjective way of measuring religiosity aligns with the subjectivity of perceived costs and benefits. It was asked in the survey on a 5-point scale ranging from "completely unimportant" to "very important".

The Polish GGS included 19 items on perceived costs and benefits of having children. Respondents were presented with each of these items and then asked to evaluate their importance for them at the moment. Table 4.1 shows all of the benefits and costs of having a child included in the survey. Answers were given on a 5-point scale. They were recoded so that the highest value corresponds to "very important" and the lowest to "completely unimportant". On the basis of these items, two scales were then computed: one encompassing the perceived benefits and another one the perceived costs. They were calculated as the average scores of importance across benefits and costs for each individual. However, for the perceived benefits scale, the item related to religiosity ("*Parenthood means fulfilling religious feeling about family*

life") was removed, because of its collinearity with religiosity itself. Cronbach's alpha for the scale of perceived costs amounted to 0.88 for men and 0.88 for women. For the scale of perceived benefits, the corresponding values were 0.86 for men and 0.83 for women.

Table 4.1: List of items used to measure perceived costs and benefits of having children

Benefits of children	Costs of children
• Children are necessary for the future of Polish economy (people to work) • Children will support their elderly parents • Children will inherit parents' properties • Children prevent parents from feeling lonely in older age • Children take over parents' personal characteristics and values • We experience a special love and closeness through parenthood • We want to watch children grow and develop • Parenthood makes a union stronger and more committed • A parent feels more complete as a woman / a man • Parenthood means fulfilling religious feeling about family life (dropped)	• Raising children makes it more difficult for parents to engage in paid employment and to have a professional career • Partners have less time for each other when children are born • Raising children limits parents' leisure time • Raising children is difficult financially • Raising children brings many worries and concerns • For women, it is difficult to combine work and childbearing • Raising children brings too much responsibility • Pregnancy and delivery are strenuous for women • A fear that a child will be born ill

Individual religiosity in part also depends on personal characteristics, such as education (Aleksynska and Chiswick, 2015). Within the models, this was taken into account by adding additional variables to control for age, age squared (to take the non-linear relationship between age and fertility intentions into account), partnership status (married or cohabiting vs. single or not living with a partner) and education level (recoded into: low – up to basic vocational training, medium – up to post-secondary education, and high – academic education).

Analysis

The analytical strategy of this study consisted of two parts, in which the two different mechanisms of how religiosity may matter for shaping fertility intentions were considered. In the first part, the goal was to verify whether, and to what extent, religiosity affects fertility intentions through perceived costs or benefits of parenthood, i.e. whether and to what extent its effect is mediated by them. Therefore, the total effect of religiosity on fertility intentions needed to be disentangled into the direct and indirect effect. The direct effect describes the effect of religiosity on intentions independently of the perceived costs and benefits. The indirect effect,

on the other hand, describes that part of the total effect that emerges because more and less religious respondents perceive costs and benefits to a different degree and therefore differ in their fertility intentions.

In the analysis, the part of the indirect effect that goes through perceived costs and the other part that goes through perceived benefits were distinguished. To capture both, the khb-package developed by Kohler *et al.* (2011) for Stata was used. In the case of linear models, the decomposition of the total effect into the direct and the indirect effect would be straightforward, as the coefficients of the model with and without the mediator could be compared and the difference between them captures the indirect (mediated) effect. Since the models in this study were logistic models, confounding as well as the rescaling of the model, that can take place when additional variables are introduced, needed to be considered. The khb-package does not only take these issues into account but also provides the necessary tools to decompose the effects of multiple mediator variables.

In the second step, possible moderation effects of religiosity on the effects of perceived benefits and costs of having children on intentions were examined. The primary goal of this step was to determine whether the effect strength of perceived costs on fertility intentions declines with increasing religiosity. In order to present a complete picture, interaction effects between perceived benefits and religiosity were included as well, even though there were no specific hypotheses regarding this moderation in this study. For these analyses, four logistic regression models on fertility intentions were run. All models included religiosity as an explanatory variable. Models 1 and 2 included perceived benefits and Models 3 and 4 included perceived costs. The moderation effect was assessed by the interaction effect between religiosity and perceived benefits or costs in Model 2 and 4, respectively.

For both the mediation and moderation analysis, all models were constructed separately for men and women.

Results

Descriptive results

In Table 4.2, descriptive statistics are shown separately for women and men for all variables used in the models. Women were on average ascribing a higher importance to religion in their

daily lives than men did. Overall, both men and women scored higher on the index on perceived benefits of having children than on the index of perceived costs. Furthermore, there were only slight differences between men and women in their average index scores on benefits and costs and virtually no difference in their intentions. Around 22% of women and 21% of men intended to have a(nother) child over the next three years. In terms of the number of children respondents already had, there were some notable differences between men and women. More than a half of the men in the sample reported being childless, compared to around 40% of women. In turn, almost 40% of women had 2 or more children, compared to around 32% of men. Differences appeared in the level of education and partnership status as well: women were better educated and were more likely to live with a partner and less likely to be single than men.

Table 4.2: Descriptive statistics of the analytical sample used in the models (means and standard deviations for continuous variables, percentage distribution for categorical variables)

		Men		Women	
		M	SD	M	SD
Religiosity	Index (1-5)[1]	3.54	1.06	3.81	0.94
Benefits of children	Index (1-5)[2]	3.89	0.60	3.97	0.60
Costs of children	Index (1-5)[2]	3.18	0.74	3.15	0.78
Age		31.82	9.93	30.90	8.38
		N	%	N	%
Fertility intentions	No	1837	79.1	2012	78.3
	Yes	486	20.9	557	21.7
Number of children	0	1233	53.1	1041	40.5
	1	350	15.1	509	19.8
	2 or more	740	31.9	1019	39.7
Partnership status	Partnered	1152	49.6	1490	58.0
	No partner	1171	50.4	1079	42.0
Education level	Low	1039	44.7	756	29.4
	Medium	819	35.3	1009	39.3
	High	465	20.0	804	31.3
Total *N*		2323		2569	

[1] Higher index values indicate higher religiosity
[2] Higher index values indicate higher benefits or costs of having children

Perceived benefits and costs as a mediator for the effect of religiosity on fertility intentions

The results of all mediation analyses were summarized in Table 4.3 and 4.4. In the upper part of Table 4.3, the results of the mediation analysis were summarized and the total effect of religiosity was split up into the direct effect and the indirect effect (the part that was mediated by perceived costs and benefits). The lower part of that table shows the share of the total effect

that was mediated by each mediator separately and by both combined. Table 4.4 shows the associations between religiosity and the two mediator variables of perceived costs and benefits.

Table 4.3: Separation of the total effect of religiosity on short-term fertility intentions (over the next three years) into the direct effect and the effect mediated through perceived benefits/costs (mediation analysis)

		Men		Women	
Determinants of fertility intentions		Logit	*p*	Logit	*p*
Benefits of children	Index (1-5)	0.589	<0.001	0.620	<0.001
Costs of children	Index (1-5)	-0.214	0.008	-0.275	<0.001
Religiosity	Total effect	0.215	<0.001	0.267	<0.001
	Direct effect	0.140	0.016	0.173	0.008
	Indirect effect	0.076	<0.001	0.094	<0.001
N		2323		2569	
		%		%	
Proportion mediated through p. benefits		31.2		29.9	
Proportion mediated through p. costs		3.9		5.4	
Proportion mediated in total		35.1		35.3	

All models controlled for: age, age squared, parity (number of children), partnership status, education level

Table 4.4: Linear regression of the relationship between religiosity and the two mediator variables (perceived costs and perceived benefits)

		Men		Women	
Determinants of perceived benefits		Beta	*p*	Beta	*p*
Religiosity	Index (1-5)	0.201	<0.001	0.203	<0.001
Determinants of perceived costs		Beta	*p*	Beta	*p*
Religiosity	Index (1-5)	-0.056	0.008	-0.064	0.001

All models controlled for: age, age squared, parity (number of children), partnership status, education level

Table 4.3 shows a significant positive total effect of religiosity on men's fertility intentions. Around 65% of that total effect was not mediated by perceived benefits and costs of having children. The remaining 35.1% of the total effect could be explained by the mediation effect of the perceived costs and benefits. Most of this mediation was carried by perceived benefits of having children: more religious men perceived higher benefits to having children, which can be seen in Table 4.4. These perceived benefits themselves were associated with higher fertility intentions, as shown in Table 4.3. This pathway explained 31.2% of the total effect of religiosity on intentions and constituted a large part of the mediation effect. The other mediation pathway went through perceived costs and explained the remaining 3.9% of the total effect and therefore only a small part of the mediation. Even though the effect was much weaker, more religious men showed higher fertility intentions also because they perceived less costs of having children

(Table 4.4) and higher perceived costs themselves were associated with lower fertility intentions (Table 4.3).

As to women, their results resembled those of men. Overall, women's fertility intentions were also higher among the more religious. Again, this total positive effect of religiosity was split up into the direct effect, which accounted for 65% of the total effect, and the indirect (mediated) effect, which was responsible for the remaining 35%. There were some slight differences in the distribution of the mediation effect in comparison to men: around 30% of the effect of religiosity on fertility intentions was mediated by the fact that more religious women saw higher benefits in having children, which then were associated with higher fertility intentions. Compared to men, the share of the total effect mediated by the perceived costs, again associated with lower fertility intentions, was higher for women and stood at 5.4%.

All in all, the results showed that a part, but not all, of the positive effect of religiosity on fertility intentions could be explained by more religious people perceiving children as more beneficial. Notably, the proportion that was mediated was almost identical between men and women. Furthermore, only a very small part of that overall effect could be explained by religious people perceiving lower costs of having children. Among women, perceived costs explained a slightly larger part of the total effect than among men.

The moderating impact of religiosity

Tables 4.5 and 4.6 show the result of the models on the moderating impact of religiosity on the effect of perceived benefits and costs on fertility intentions for men and women, respectively. These tables are accompanied by Figure 4.1, showing the predicted probabilities of fertility intentions for all calculated interaction effects in the models.

The results of the first model mirrored those found in the mediation analysis and demonstrated that men who perceived higher benefits of having children and more religious men were significantly more likely to intend to have a(nother) child over the next three years than men who perceived lower benefits and less religious men, respectively. In Model 2, an interaction term between religiosity and perceived benefits was introduced. This interaction term was not significant however, and Figure 4.1 shows that fertility intentions increased with higher perceived benefits irrespectively of the level of religiosity.

Table 4.5: Results of the logistic moderation analysis on the effects on short-term fertility intentions (over the next three years) for men

		Model 1		Model 2		Model 3		Model 4	
		Logit	*p*	Logit	*p*	Logit	*p*	Logit	*p*
Religiosity	Index (1-5)	0.150	0.009	0.452	0.22	0.205	<0.001	0.018	0.938
Benefits of children	Index (1-5)	0.577	<0.001	0.846	0.014				
Costs of children	Index (1-5)					-0.187	0.019	-0.402	0.144
Rel. × Benefits				-0.078	0.406				
Rel. × Costs								0.060	0.414
Age		0.776	<0.001	0.776	<0.001	0.768	<0.001	0.767	<0.001
Age squared		-0.013	<0.001	-0.013	<0.001	-0.013	<0.001	-0.012	<0.001
Number of children	0 (ref.)								
	1	-0.881	<0.001	-0.885	<0.001	-0.818	<0.001	-0.818	<0.001
	2 or more	-3.076	<0.001	-3.075	<0.001	-2.948	<0.001	-2.949	<0.001
Partnership status	No partner (ref.)								
	Partnered	1.325	<0.001	1.331	<0.001	1.363	<0.001	1.363	<0.001
Education level	Low (ref.)								
	Medium	0.076	0.591	0.073	0.604	0.101	0.469	0.101	0.472
	High	0.628	<0.001	0.633	<0.001	0.603	<0.001	0.605	<0.001
Constant		-15.09	<0.001	-16.12	<0.001	-12.33	<0.001	-11.64	<0.001
N		2323		2323		2323		2323	
Pseudo R^2		0.243		0.243		0.232		0.233	

Model 3 assessed the impact of religiosity and perceived costs of having children on fertility intentions. Similarly to the first model, there was a significant positive effect of religiosity. In line with expectations, higher perceived costs of children significantly reduced fertility intentions. The last model again incorporated an interaction term, this time between religiosity and perceived costs. While that interaction effect was positive, which would be in line with the theoretical expectations, it was not significant.

Figure 4.1: Predicted probabilities of intending to have a(nother) child over the next three years according to religiosity and perceived benefits or costs of having children (graphical representation of all interaction effects)

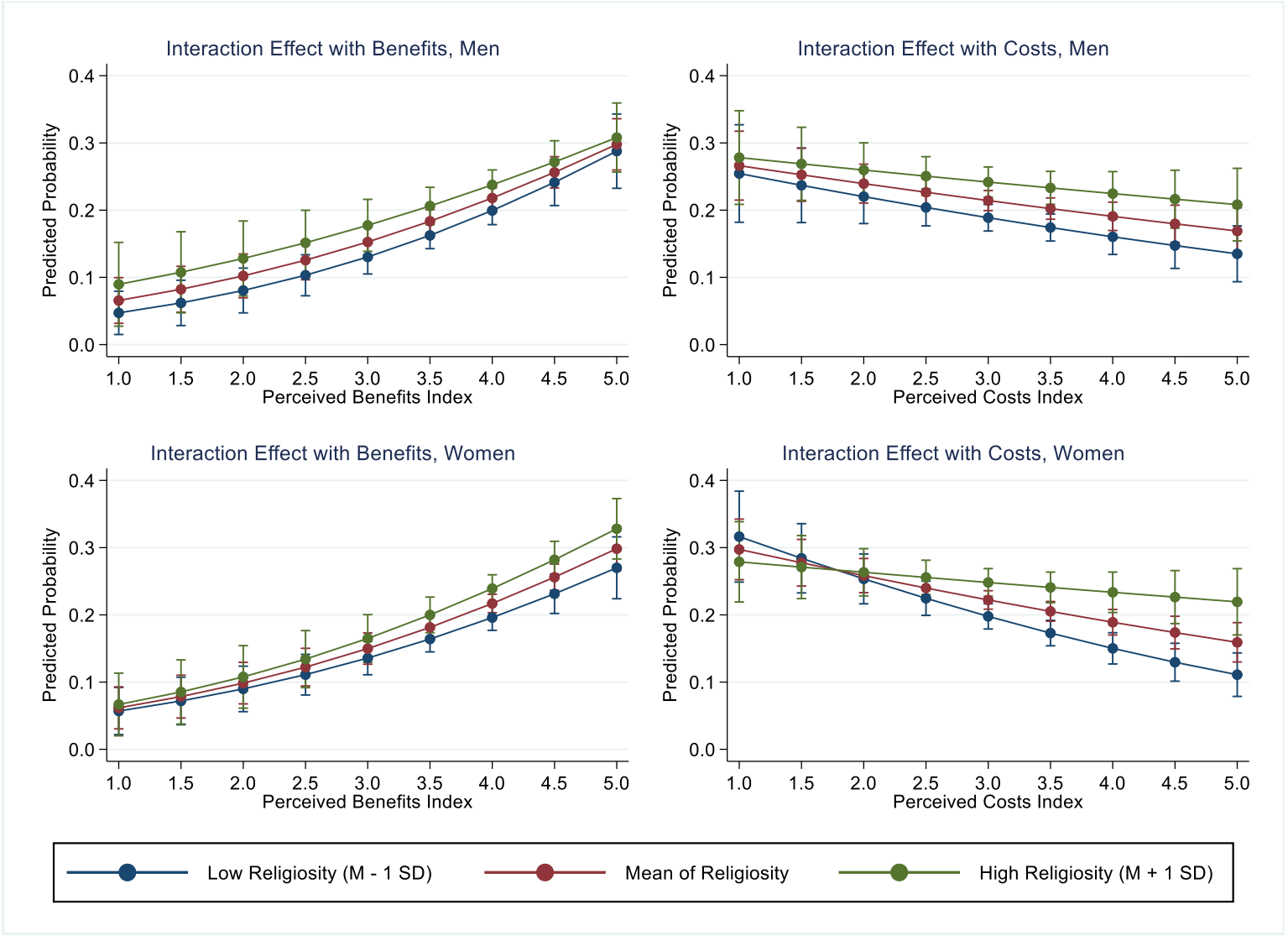

Table 4.6: Results of the logistic moderation analysis on the effects on short-term fertility intentions (over the next three years) for women

		Model 1		Model 2		Model 3		Model 4	
		Logit	*p*	Logit	*p*	Logit	*p*	Logit	*p*
Religiosity	Index (1-5)	0.190	0.003	0.080	0.839	0.245	<0.001	-0.324	0.191
Benefits of children	Index (1-5)	0.625	<0.001	0.520	0.174				
Costs of children	Index (1-5)					-0.278	<0.001	-0.980	0.001
Rel. × Benefits				0.028	0.774				
Rel. × Costs								0.182	0.018
Age		0.767	<0.001	0.767	<0.001	0.778	<0.001	0.780	<0.001
Age squared		-0.014	<0.001	-0.014	<0.001	-0.014	<0.001	-0.014	<0.001
Number of children	0 (ref.)								
	1	-1.185	<0.001	-1.183	<0.001	-1.077	<0.001	-1.081	<0.001
	2 or more	-3.534	<0.001	-3.534	<0.001	-3.372	<0.001	-3.383	<0.001
Partnership status	No partner (ref.)								
	Partnered	1.832	<0.001	1.831	<0.001	1.839	<0.001	1.841	<0.001
Education level	Low (ref.)								
	Medium	0.257	0.114	0.258	0.113	0.250	0.123	0.255	0.116
	High	0.825	<0.001	0.825	<0.001	0.785	<0.001	0.801	<0.001
Constant		-14.49	<0.001	-14.07	<0.001	-11.42	<0.001	-9.27	<0.001
N		2569		2569		2569		2569	
Pseudo R^2		0.296		0.296		0.287		0.290	

In the case of women, the results in the first two models resembled those of men. Again, there was a significant positive effect of religiosity and perceived benefits of having children on fertility intentions. The interaction term was not significant, and Figure 4.1 shows only marginal differences in the relationship between perceived benefits and fertility intentions by the level of religiosity, akin to the situation of men. Model 3 repeated the findings for men as well – a significant negative effect of perceived costs of having children on the likelihood of intending to have a(nother) child over the next three years. In the fourth and last model, the interaction effect between religiosity and perceived costs was introduced. For women, this interaction term was positive and significant. It indicated that the negative effect of perceived costs on fertility intentions was weaker for more religious women than for less religious women. Figure 4.1 shows that for highly religious women, fertility intentions stayed at a relatively high level independently of the amount of costs perceived. For less-religious women on the other hand, fertility intentions dropped considerably as the perceived costs increased.

Summarizing the findings on the moderation analysis, it follows that only in the case of women, higher religiosity lead to a lower impact of perceived costs on fertility intentions. For men, no significant effect was observed. Furthermore, there were no moderation effects of religiosity on the impact of perceived benefits of having children neither for men nor women, indicating that

higher perceived benefits increased the likelihood of intending to have a(nother) child irrespectively of religiosity.

Discussion

The aim of this study was to investigate mechanisms behind the positive influence of religiosity on fertility intentions that has been observed in many countries (Philipov and Berghammer, 2007; Bein *et al.*, 2017). Following theoretical considerations and previous research on this topic (Brose, 2006; Arránz Becker and Lois, 2017), two possible mechanisms linking religiosity, perceived costs and benefits of having children, and fertility intentions were examined. First, it was hypothesized that religions influence how people perceive costs and benefits of having children: religious individuals might perceive higher benefits and lower costs of parenthood and consequently, they might be more likely to intend a(nother) child compared to their less religious counterparts. In other words, it was hypothesized that the effect of religiosity on childbearing intentions is mediated by the perceived costs and benefits of children (H1).

As for the second possible mechanism, it was postulated that religiosity moderates how perceived costs translate into fertility intentions. It was hypothesized that the negative effect of perceived costs on fertility intentions may be weaker among the more religious, meaning that for the more religious, perceptions of cost play only a small role in the formation of their fertility intentions (H2). To get a full picture, the moderation effect of religiosity was tested also in relation to how perceptions of benefits impact fertility intentions.

The results indicated that around one third of the effect of religiosity on fertility intentions was mediated by perceived costs and benefits for both men and women, bringing some support to Hypothesis 1. Two additional findings appeared: Firstly, while both perceived costs and benefits played a role in the mediation effect, perceived benefits mediated a lion's share of the effect. This suggests that religions mostly encourage their followers to have children by emphasizing benefits of parenthood, for example by promoting children as a blessing and stressing their emotional values (Catechism 2366-2379). Those findings were generally in line with the two previous studies on fertility behaviour in Germany (Brose, 2006; Arránz Becker and Lois, 2017).

Secondly, a substantial direct effect of religiosity on fertility intentions remained which was not explained through the perceived benefits and costs of having children. On the one hand, it is

possible that the selection of items on perceived costs and benefits of children used in the Polish survey did not cover all relevant aspects of parenthood. For example, fulfilling expectations of significant others or continuing the family among the benefits, and increased instability of partnership or possible hardships for the partner among the costs were not part of the questionnaire used in this study (Miller, 1995; Guedes *et al.*, 2015). If religious people attach more importance to those missed aspects, part of the mediation effect could have remained hidden in the presented analyses. Another possible explanation is that the remaining direct effect stands for the influence of the particularized theology, which represents direct pronatalist religious teachings eminent in the Catholic Church. Those pronatalist teachings may exert an independent normative pressure on religious individuals, prompting them to have children regardless of their personal beliefs on positive or negative aspects of parenthood. That way, the findings gave support for the notion that particularized theology still plays a non-negligible role in the overall impact of religiosity on fertility.

As for the second examined mechanism, the study brings only limited support to Hypothesis 2. It was found that religiosity moderated the impact of the perceived costs of childbearing on fertility intentions only for women. In line with the expectations, the results revealed that the negative effect of perceived costs on fertility intentions becomes weaker as religiosity increases. Among very religious women, perceived costs of children had only a small effect on fertility intentions, while for the least religious women, perceived costs were a strong negative determinant of intentions. In other words, highly religious women seem to be inclined to have children regardless of any costs children may carry for them. No such effect was found for men. Several possible explanations may be applied here. For instance, it is possible that women either benefit or believe that they can benefit more than men from practical and emotional support in religious communities when a child is born (e.g. by family members, friends, religious groups and institutions). It is also possible that the overall negative impact of perceived costs on intentions is weaker for men, thus leaving fewer possibilities for likely interactions. Some of the items on costs included in the Polish survey are also more important for women (pregnancy is strenuous, difficult to combine work and childbearing for women) and thus, they impact men's fertility intentions indirectly and probably to a lower degree. Furthermore, even the items that apply to men directly (e.g., having less time for leisure or for a spouse) may not impact them as much as they impact women in a country like Poland, where traditional gender roles are still widespread and women are expected to provide most of the care and time for children (Mills, 2010; Szelewa, 2017). In that situation, more religious women may count on help from

their religions and social networks that support them in their decision to have large families regardless of the costs. In a more egalitarian gender context like Germany on the other hand, evidence of a moderating effect was found for both men and women (Arránz Becker and Lois, 2017).

The picture that emerged in this study is that the effect of religiosity on fertility is mostly mediated through perceived benefits of parenthood, while the moderating effect of religiosity relates to the perceived costs. Specifically, religions seem to amplify perceived benefits of having children and at the same time limit the impact of costs related to childbearing. Furthermore, the study demonstrated that these mechanisms are visible for fertility intentions already, pointing to the role of religiosity at the early stage of the fertility decision making process. A future avenue of research may thus be to examine the fertility decision making process in more detail. First, fertility intentions could be analysed together with their realization in order to verify whether high religiosity leads to having more children by helping people to cope with high costs regarding childbearing (the second part of the mechanism). Second, the process could also be examined by parity, since previous research on determinants of fertility intentions suggested some parity-specific effects (Philipov and Berghammer, 2007). Due to limitations in the sample size, it was not possible to carry out the analysis by parity in this study.

In future and more detailed analyses, it would also be crucial to consider different categories of perceived benefits and costs of children. While costs and benefits were modelled here as single dimensions, it is possible that different categories, like direct economic consequences, opportunity costs or non-economic costs and benefits might have varying effects for religious and non-religious people. Making a distinction between different types of costs and benefits of children could allow depicting more refined mechanisms in which religiosity shapes fertility. Importantly, these mechanisms might play out differently in various economic contexts. While the current study took place during a relatively good economic situation in Poland, the monetary and indirect costs of children may be perceived in a different way under more challenging economic conditions.

Overall, future studies need to investigate whether the relationships described here hold true across time and space. Longitudinal studies and cross-country comparisons would also shed light on the question whether the identified mechanisms can be applied across other cultural settings. In very secular countries for instance, where highly religious people are a more

selected group and religion has less influence on society, the nature of these mechanisms may be different than in Poland or Germany.

Chapter 5

Religiosity and stability of fertility intentions – Evidence from a German panel study

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This chapter has been invited to be revised and resubmitted by an international peer-reviewed journal.

Abstract

Background: Much of the literature available on this topic has shown that fertility intentions are broadly predictive of fertility behaviour. However, it has also shown that these intentions are very unstable over a person's life. The heterogeneity in this instability has rarely been the subject of investigation, especially so with regard to religiosity.

Objective: In this paper, we focus on the role of religiosity and its relationship with the stability of fertility intentions over time. Specifically, we examine whether highly religious people have more stable intended family sizes than their less religious counterparts over time in the German context.

Methods: We applied group-based trajectories and logistic regression on a sample of 3089 men and women born in 1991-1993, 1981-1983 and 1971-1973. The sample stems from the first ten waves of the anchor dataset of the German Family Panel (pairfam).

Results: Highly religious people are more likely to have a stable or increasing trajectory of fertility intentions. Meanwhile, less religious people are more likely to have decreasing and low fertility intentions.

Contribution: This study was able to demonstrate that the stability of fertility intentions is an important aspect in the nexus of fertility and religiosity. Furthermore, it demonstrated that religiosity continues to be an important variable in research on fertility intentions.

Introduction

Fertility intentions have become a widely used tool to study the fertility decision-making process (Dommermuth *et al.*, 2015). Over the life course, however, they are not static but are instead constantly changing as individuals adjust their intended family sizes, for example as a response to changing circumstances (Heiland *et al.*, 2008; Hayford, 2009; Liefbroer, 2009; Iacovou and Tavares, 2011; Philipov and Bernardi, 2011). As a result, the trajectories of fertility intentions across the life course of individuals show a considerable degree of heterogeneity (Hayford, 2009). While fertility intentions follow a downward trajectory in most cases (i.e. with people adjusting their intentions downwards), there are also cases in which intentions are kept stable across the life course or even increase (Hayford, 2009). Research on the reasons and drivers of changes in and trajectories of fertility intentions constitutes an emerging field in demography and different determinants have already been found. In this study, we want to address the impact of religiosity on the stability of fertility intentions.

Religiosity has already been singled out in the literature as a major determinant both of fertility intentions and the realisation of these intentions (Philipov and Berghammer, 2007; Bein *et al.*, 2017). However, so far it has received little attention as a potential determinant of the stability of fertility intentions over the life course. In particular, and in view of the literature showing that highly religious people evaluate the costs and benefits of children differently to less religious people (Bein *et al.*, 2020), it could be that they also harbour more stable fertility intentions. Specifically, previous studies have demonstrated that for highly religious people, perceived costs play a less prominent role in the fertility decision-making process than for less religious people (Arránz Becker and Lois, 2017; Bein *et al.*, 2020). This could mean that when the perceived consequences of having children change, highly religious people might be less likely to change their fertility intentions in response to this change since those consequences do not play a central role in the formation of their fertility intentions. Furthermore, some other background factors explaining high fertility intentions among people who are more religious, such as the impact of pronatalist religious teachings (e.g. be fruitful and multiply), are rather stable over time and may also contribute to more stable fertility intentions among them and prevent downward adjustments to the total intended family size.

In order to evaluate the relationship between the stability of fertility intentions and religiosity, we use a sample of men and women from the German Family Panel (Panel Analysis of Intimate Relationships and Family Dynamics; pairfam), whose data was collected between 2008 and

2018 (Brüderl *et al.*, 2019). In our study, fertility intentions are measured by the total intended family size. In order to assess the stability and trajectories of those intended family sizes, group-based trajectory models are calculated. Our results indicate that highly religious people are more likely to be on a trajectory with stable or increasing fertility intentions over time in comparison to less religious people.

Theoretical and empirical background

Fertility intentions and their stability

The focus of our study is fertility intentions. Fertility intentions are related to other concepts often used in research on the fertility decision-making process, such as fertility ideals or desires, but they differ in some important aspects (Miller *et al.*, 2004; Philipov and Bernardi, 2011). While fertility desires or ideals are generally understood as being formulated without the consideration of any inhibiting factors or obstacles (as operationalised in the pairfam question; see: Brüderl *et al.* (2019)), fertility intentions take those obstacles into account as they refer to concrete plans of having children (Miller and Pasta, 1994; Miller and Pasta, 1995). Fertility intentions are often theoretically based as a psychological construct, either using the theory of planned behaviour (Ajzen, 1991; Ajzen and Klobas, 2013) or the Traits-Desires-Intentions-Behaviour framework (Miller, 1994; Miller, 2011b). They are usually distinguished into short-term intentions, which are often formulated over the next two or three years, and long-term intentions, often referring to a "realistic" number of children that is expected over the rest of the life course. However, these long-term intentions involve a number of uncertainties (Philipov and Bernardi, 2011).

The formation of fertility intentions depends on many different aspects. One aspect includes the perceived costs and benefits of having children (Hoffman and Hoffman, 1973; Becker, 1981). It has been posited that the plan to have a child is made if those perceived benefits – such as emotional motives, affiliation, sense of accomplishment or economic benefits – outweigh perceived costs – which include monetary costs, lost career opportunities, stress and worries.

Despite being understood as concrete plans, individual fertility intentions do change over time (Heiland *et al.*, 2008; Hayford, 2009; Liefbroer, 2009; Iacovou and Tavares, 2011). Part of the

reason for these changes is that people are not always certain about their fertility plans (Morgan, 1982; Philipov and Bernardi, 2011), especially when they are young and the plans concern a long timeframe. The pressure of fulfilling societal norms regarding the number of children a woman has and the timing of these children adds to this uncertainty, as those norms held by society may not always be in line with individual desires and turn out to be unrealistic. This is also one of the reasons why changes in fertility intentions over the life course are much more often downward than upward. Another reason is the dyadic adjustment of intentions among women and men in partnerships (Miller *et al.*, 2004), where couple disagreement has negative effects for higher parities (Testa *et al.*, 2014). Other studies on the stability of fertility intentions found that the stability of intentions depends, among other factors, on career and partnership pathways (Liefbroer, 2009), employment uncertainty (Hanappi *et al.*, 2017), the number of children initially intended (Iacovou and Tavares, 2011) or previous births and education levels (Hayford, 2009).

The impact of religiosity on the stability of fertility intentions

Considering that there is a positive correlation between religiosity and fertility outcomes (Adserà, 2006a; Baudin, 2015) and intentions (Philipov and Berghammer, 2007; Bein *et al.*, 2017), the question arises as to whether religiosity also plays a role in the stability of fertility intentions. While there are indications that the stability of fertility intentions differs by religious denomination (Heiland *et al.*, 2008), individual religiosity has not yet been taken into account in previous research. Nevertheless, more stable fertility intentions among people with the highest levels of religiosity could explain part of the mechanism that links high religiosity and high fertility. Key in this regard is how highly religious people form fertility intentions and in which ways they form them differently from those who are less religious.

Overall, religions encourage their followers to have many children by communicating and propagating pronatalist norms (Adserà, 2006b), traditional gender roles and by providing networks of social support that are conducive to larger families (McQuillan, 2004). Furthermore, it has been suggested that religions might also "shield" their followers from negative consequences of parenthood (Philipov, 2011).

One possible way in which religiosity matters for the stability of fertility intentions relates to how highly religious people differ from the less religious in their evaluation of benefits and

costs of having children. Some values of children (VOC) such as morality, which includes statements such as children may make you a better person, less selfish or more settled down are associated with a religious background (Hoffman and Manis, 1979). Religions also propagate the notion of having children as being a moral act (Hoffman and Hoffman, 1973). Due to reasons mentioned above, highly religious people for instance see more benefits and less costs of having children (Brose, 2006; Arránz Becker and Lois, 2017; Bein *et al.*, 2020), and are therefore more likely to decide in favour of having children. Where the costs associated with childbearing (either objective or subjective costs) are perceived to be lower, this can also be expected to have a positive impact on the stability of fertility intentions, since changes in costs or opportunity costs are a major determinant of changes in fertility intentions (Hanappi *et al.*, 2017).

The assumption that the plan to have a child is a rational choice, based on costs and benefits for example, is questioned in sociological and psychological approaches on fertility (Miller, 1983). Some theoretical models on actions suggest that the amount of rationality on which a plan or decision is based can vary on a spectrum, between a completely rational choice on the one hand, and an automatic and spontaneous choice on the other (Esser and Kroneberg, 2015). In previous research on religiosity and fertility, it has been claimed that highly religious people may be more likely to base their fertility planning on a more automatic and spontaneous assessment than people who are less religious (Arránz Becker and Lois, 2017). One reason is that pronatalist norms such as "be fruitful and multiply" (Genesis 1:28), that are inherent in many religions, are more internalised by highly religious people. As a result, the answers they give to questions on fertility intentions are more likely to be in line with the teachings of their particular religion. People who are less religious, and who are less likely to have these pronatalist norms internalised in their fertility decision-making, are assumed to give more weight to a rational choice. These differences have consequences for the stability of fertility intentions as well. Fertility plans that are mostly based on religious norms are less likely to be adjusted over time than fertility plans based on aspects of a rational choice. Based on these considerations, we have formulated the hypothesis that *highly religious people are more likely to have a stable or increasing trajectory of intended family size over time.*

The context of Germany

Fertility levels in Germany have been comparably low for a long time. Between German reunification in 1990 and 2015, the total fertility rate was between 1.2 and 1.4 children per woman. For western Germany, this low level has been explained mostly by the difficulties experienced by women in reconciling and combining a career with having children (Dorbritz, 2008). More recently, the total fertility rate has experienced a marginal rise to just under 1.6 children per woman in 2018 (Statistisches Bundesamt, 2019). This recent rise can be attributed to several factors, namely policies aimed at improving the reconciliation between family and career, an improved situation on the labour market and immigration of women from high-fertility countries (Pötzsch, 2018). Despite this rise, Germany's fertility rate is still rather low. Furthermore, Germany is also characterised by a high level of childlessness in comparison with the rest of Europe (Kreyenfeld and Konietzka, 2017).

In terms of religion, the most distinct feature of Germany is the heterogeneity of its religious landscape. In 2018, around 28% of people were affiliated with the Catholic Church and 25% with the Evangelical Church of Germany. A further 3% belonged to other Christian denominations, while 38% were not affiliated with any faith and a minority of 6% followed non-Christian religions, mostly Islam (fowid, 2019b). The share of denominations varies considerably at the regional level. There is also a link between particular denominations and fertility levels – a high proportion of Catholics is associated with higher cohort fertility at district level (Bujard and Scheller, 2017). In recent times, the share of people not affiliated with any faith has grown markedly, following the trend towards secularisation across the Western world (Norris and Inglehart, 2004). Due to migratory movements, the share of non-Christians has grown as well. Despite the fact that the majority of the German population adheres to a faith, Germany is one of the more secularised countries in Europe when it comes to religious practice. According to a Pew survey from 2018, around 24% indicated that they attend religious services at least once per month, while 11% say that religion is very important in their life (Pew Research Center, 2018), figures that are lower than most southern and eastern European countries and more in line with France or the United Kingdom. Countries that are more secularised than Germany within Europe include most Nordic and Baltic countries.

Data and methods

Dataset

For this study, we use data from the first ten waves of the German Family Panel (pairfam, release 10.0 (Brüderl *et al.*, 2019)). pairfam is a nationally representative, longitudinal survey and collects data on partnerships and family dynamics in Germany annually from respondents of three cohorts: 1971-1973, 1981-1983, and 1991-1993 (Huinink *et al.*, 2011). The first wave was collected in 2008-2009, while the 10th wave, which is the most recent wave available, was collected in 2017-2018.

In our analyses, we make use of the anchor dataset and exclude those respondents who were added later from the DemoDiff sample after Wave 3. The initial sample at Wave 1 includes 12,402 men and women. By the 10th wave, 4102 respondents remain in the sample. Cases in which information on fertility intentions was only available in less than five waves were removed, bringing the sample to 3934 respondents. Furthermore, cases with missing information on religiosity, or cases that were not present in all waves were excluded. Our final sample consists of 3089 respondents and 28,191 total observations.

The panel attrition across the observation period amounts to 67%. This can be considered a high rate of attrition and may skew our analyses. Research on the determinants of leaving the pairfam panel between Waves 1 to 6 found no distinctive patterns of attrition according to various socioeconomic variables and concluded that the structure of the sample remains the same across the waves (Müller and Castiglioni, 2015). Although Müller and Castiglioni (2015) did not test the impact of religiosity on panel attrition, their conclusions suggest that there may not be major differences in that regard.

Variables

We quantify fertility intentions by the total intended number of children. This variable consists of the sum of two parts: first, the total number of biological children that a respondent already has (including pregnancies of the respondent or the respondent's partner); and second, the number of additional children that the respondent intends to have.

In Wave 1 and 2, the question asked in order to ascertain the number of additional intended children was as follows: "When you think realistically about having (additional) children, how many (more) children do you think you will have?" Since some respondents misinterpreted this question and answered it by giving the total number of children they had, we followed the suggestion of Buhr and Huinink (2014) and applied the more conservative version of their method to adjust the responses for this variable in those cases where it was likely that the respondent had indeed misinterpreted the question. In order to identify these cases, Buhr and Huinink (2014) used other variables like short-term fertility intentions, fertility ideals, expected age at next birth and information on pregnancies, and compared them with the stated intended number of additional children to find inconsistencies. Around 7.2% of all values in Wave 1 and 5.3% of all values in Wave 2 were adjusted accordingly.

After Wave 3, the question asked in the survey in order to establish fertility intentions was changed due to those issues. Childless respondents were presented with the question "When you think realistically about having children, how many biological or adoptive children do you think you will have?" Respondents who already had children were asked two questions: first, about whether they actually want additional children ("When you think realistically about having additional children, do you think that you will have more biological or adoptive children in addition to your current children or stepchildren and the child you are currently expecting?"); and second, if yes, how many ("How many more biological or adoptive children do you think you will have in addition to your current children or stepchildren and the child you are currently expecting?").

Our key independent variable is religiosity. It is represented by the frequency of attending religious services, which was asked in Wave 1, 5 and 9. As individuals may have changed in their religious behaviour across the panel, we created a variable on religiosity that captures both level and change. We consider three levels of religiosity: "low", representing respondents that never attend religious services; "medium", representing respondents attending religious services less than once a month; and "high", representing respondents attending at least once a month. Based on these categories of religiosity at Wave 1 and Wave 9, we created seven categories: "stable low", "stable medium", "stable high", "increase to medium", "increase to high", "decrease from medium" and "decrease from high". Respondents who indicated a different level of religiosity at Wave 5 in comparison with Wave 1, but then reverted to the earlier level at Wave 1 in Wave 9 were categorised in the respective low, medium or high stable category.

Furthermore, we include a range of control variables, including the cohort (1991-1993, 1981-1983 and 1971-1973), religious affiliation (recoded into “Evangelical Church”, “Catholic Church”, “Other Christian denomination”, “Other religion” and “None”), whether the respondent lives in eastern or western Germany, and level of education (recoded into “in education”, “low”, “vocational” and “academic”). With the exception of cohort, all of these variables can change from wave to wave for each respondent. Our models on group membership, which are described below, accept only one value for each respondent however. Following the suggestion by Nagin and Odgers (2010), we used the values for each respondent at Wave 1 for religious affiliation and eastern/western Germany. For education, however, we used the values at Wave 10, as we are interested in the highest degree attained instead of the level of education at the beginning of the panel.

Methods

In order to evaluate trends and levels of fertility intention across time, we make use of group-based trajectory models (GBTM) (Nagin, 2005). Contrary to other statistical methods used for modelling trends of an outcome, which usually focus on individual variability around a mean trend of the population and/or analyse groups that are based on measurable individual characteristics such as gender or socioeconomic status, GBTMs are designed to identify groups with similar trajectories (Nagin, 2014). Groups are identified by maximum likelihood estimation. GBTM do not necessarily assume that the population is composed of several distinct subpopulations with their own trajectories, but instead try to represent an unknown continuous distribution of trajectories with a finite number of groups (Nagin, 2005), a concept that fits our research question on trajectories of fertility intention.

In this study, we use the “traj” package, developed by Jones and Nagin (2013) for Stata. This package permits the calculation of group-based trajectories for different model types, such as logit, censored normal distributed outcomes or zero-inflated Poisson models. The first step involves choosing the appropriate model. The outcome variable in our case, fertility intentions, is a count variable. While this would suggest using a Poisson model, the “traj”, package only allows for a zero-inflated Poisson model, something which does not fit our data (i.e. the distribution of the values of the total intended family size does not include an inflated number of zeros). Instead, our choice is the censored normal distribution. The second step consists of

the model selection in terms of the number of groups and the mathematical shape of the trajectories (constant, linear, quadratic or cubic). Indicators for determining the right choice include the Akaike information criterion (AIC) and the Bayesian information criteria (BIC), but also the average posterior probability (APP) and the odds of correct classification (OCC) that can be calculated after the model estimation. For the calculation of some of these indicators, we use a Stata function written by Wheeler (2016). Beyond those statistical indicators, the literature also highlights the importance of assessing the model selected in accordance with subjective criteria that are relevant to the research question. In our case, those objective criteria indicate a better fit for models with cubic trajectories and an improvement in the fit with every increase in the number of groups until at least 9 groups. Subjectively, however, there are reasons why we decided to choose a model with fewer groups. Those models with a large number of groups are comprised of many groups with a very small number of individuals. Moreover, the substantive interpretation of the model with numerous trajectories was not clear. In contrast, the three group trajectories provided the most clearly interpretable solution, as it allows a mainstream "central" path to be shown, as well as upward and downward deviations. In a similar analysis of the trajectories of fertility expectations in the American context, Hayford (2009) opted for a four-group solution. As the German context is characterised by lower fertility intentions in general (as compared with the USA), and our observation period was shorter, a simpler solution was deemed to be better.

In the final step, each individual is assigned to one of the three group-based trajectories by the model routine. Group membership can then be used as a dependent variable in logistic regression models. For three trajectory groups, a multinomial logistic regression model would be appropriate and has already been used in research on fertility intentions (Hayford, 2009). However, the literature has also advised against using odds ratios to compare models with a different sample, for example comparing the results between men and women (Mood, 2009). Instead, it has been suggested that average marginal effects be used instead of odds ratios or logits (Mood, 2009). For this reason, these average marginal effects are reported on in the results section.

In our analysis, we also run the results separately for men and women.

Results

Descriptive results

Table 5.1: Descriptive statistics of the sample, by sex

		Male		Female	
		N	%	*N*	%
Characteristics of respondents:					
Religiosity path	Stable low	430	31.1	453	26.6
	Stable medium	407	29.4	548	32.1
	Stable high	81	5.9	123	7.2
	Increase to medium	148	10.7	214	12.6
	Increase to high	57	4.1	67	3.9
	Decrease from medium	156	11.3	188	11.0
	Decrease from high	105	7.6	112	6.6
Religion	Evangelical Church	503	36.3	572	33.5
	Catholic Church	399	28.8	562	33.0
	Other Christian	36	2.6	44	2.6
	Other	59	4.3	70	4.1
	None	387	28.0	457	26.8
Education	In education	151	10.9	128	7.5
	Low	69	5.0	103	6.0
	Vocational	782	56.5	982	57.6
	Academic	375	27.1	487	28.6
	Missing	7	0.5	5	0.3
Part of country	West	1105	79.8	1362	79.9
	East	279	20.2	343	20.1
Cohort	1991-1993	508	36.7	506	29.7
	1981-1983	394	28.5	511	30.0
	1971-1973	482	34.8	688	40.4
Respondents		1384		1705	
Observations		12,389		15,802	

Table 5.1 shows descriptive statistics on our sample for all variables used in the models, separately for men and women. Overall, the majority of respondents have shown stable religiosity between Wave 1 and 9, while around one third of both men and women have changed the frequency with which they attend religious services. Of those who show a stable religiosity, the majority rarely (medium religiosity) or never attend religious services (low religiosity). Women are slightly more likely to attend religious services monthly, and also more often than men. Among those who changed their religious behaviour, changes to less frequent attendance are more numerous than changes to a higher frequency of attending religious services, mirroring the general trend in Germany towards secularisation. Around one third of the sample is affiliated with the Evangelical Church and another third with the Catholic Church. The majority of people not affiliated with either of the two big Christian churches are not

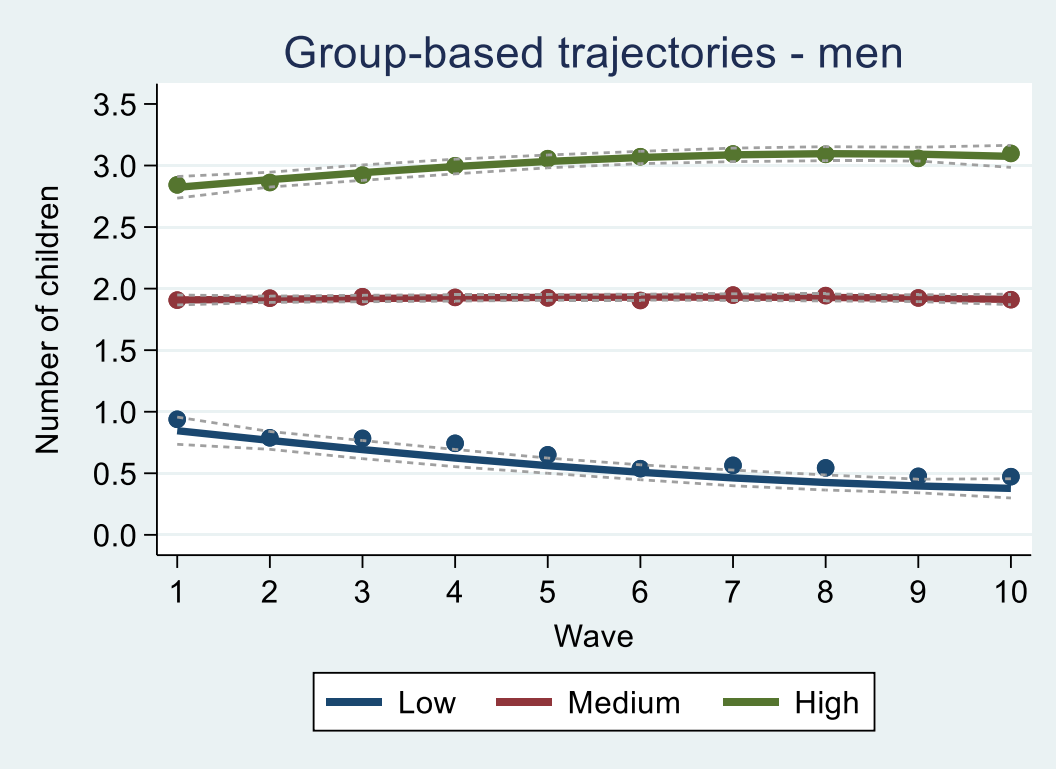
affiliated with any faith. A minority belong to other Christian denominations or non-Christian religions.

By Wave 10, a majority of respondents had completed a vocational degree. More than a quarter of both men and women had attained an academic degree. Furthermore, 80% of the people that make up the sample live in western Germany and 20% in eastern Germany. The three cohorts are of roughly equal size.

Group-based trajectories

Figures 5.1 and 5.2 show the group-based trajectories for the total intended number of children. Results are shown for men and women respectively. As described in the methods, we calculated three trajectories for men and women separately.

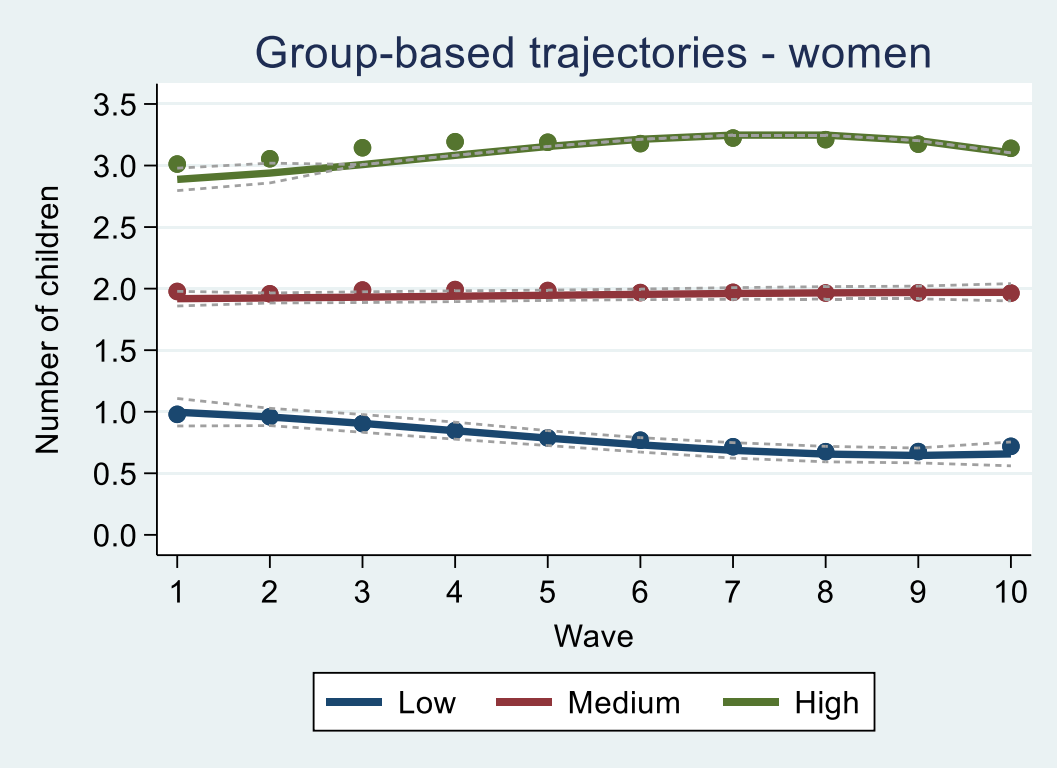
Figure 5.1: Group-based trajectories of men



Among the men, the three trajectories can be characterised as follows: The highest trajectory ("high") starts below an intended number of children of three and increases slightly over time. Around 14% of all men belong to this group. The second trajectory ("middle") starts below two children and remains constant over time. This trajectory is followed by two thirds of men in our sample and is therefore the largest group. The last trajectory ("low") is characterised by

fertility intentions that start below one child and quickly decline to a very low level. Around one fifth of all men in our sample belong to this group.

Figure 5.2: Group-based trajectories of women



The three trajectories of fertility intentions over time among women are similar to those of men, albeit with some notable differences. The "high" trajectory for women describes slightly higher fertility intentions compared with the "high" trajectory for men, while its shape is roughly the same. At 18%, women are also more likely to belong to the "high" trajectory than men. The "middle" trajectory for women is even closer to two children than that of men. While this group is also the biggest group among women, the share is slightly lower than that of men. The "low" trajectory again is slightly higher than the "low" trajectory of men and is also characterised by a less steep decline. The share of women belonging to this group (25%) is higher than that of men, however.

Overall, the trajectories for men and women reveal that a majority of people in this sample have rather stable fertility intentions of two children, while less than 40% in both cases tend to follow a trajectory that diverges from the societal norm of two children. In the following analyses, the focus will therefore be on contrasting the middle trajectory and its followers from the low and high trajectories and their followers.

Characteristics of groups

Table 5.2 shows descriptive statistics on the composition of the three groups for men and women separately. Depicted is the distribution of all respondents assigned to a group according to our independent variables. For each variable and group, the percentages add up to 100%, so by comparing the percentages between the groups, it can be seen whether some values for the independent variables are overrepresented or underrepresented. That way, some notable differences in the composition of each group become apparent.

Table 5.2: Composition of trajectory groups according to all independent variables (percentage share)

		Male			Female		
	Trajectory group:	Low	Medium	High	Low	Medium	High
Characteristics of respondents:							
Religiosity path	Stable low	47.0	29.7	15.7	34.4	25.6	19.0
	Stable medium	19.0	33.1	26.4	25.2	36.2	28.7
	Stable high	5.2	4.0	15.2	4.0	5.3	17.4
	Increase to medium	11.6	10.4	10.7	15.4	12.1	10.0
	Increase to high	1.9	2.9	12.7	3.6	3.2	6.8
	Decrease from medium	9.0	12.3	9.6	13.1	11.0	8.4
	Decrease from high	6.3	7.5	9.6	4.3	6.6	9.7
Religion	Evangelical Church	32.1	38.2	33.5	30.9	32.9	39.4
	Catholic Church	23.1	29.7	32.5	29.7	35.8	28.4
	Other Christian	1.1	2.1	7.1	2.1	2.1	4.8
	Other	2.6	3.6	9.6	1.9	3.5	9.0
	None	41.0	26.4	17.3	35.4	25.8	18.4
Education	In education	3.4	13.6	8.6	4.8	8.9	6.8
	Low	7.5	4.0	6.1	7.4	5.2	6.8
	Vocational	63.8	56.0	48.7	62.5	57.0	52.9
	Academic	23.5	26.2	36.0	25.4	28.5	32.9
	Missing	1.9	0.1	0.5	0.0	0.3	0.6
Part of country	West	77.2	79.4	85.3	78.4	79.1	84.5
	East	22.8	20.6	14.7	21.6	20.9	15.5
Cohort	1991-1993	14.6	45.5	25.9	15.2	38.7	21.0
	1981-1983	29.5	28.2	28.4	23.3	31.8	33.2
	1971-1973	56.0	26.3	45.7	61.5	29.5	45.8
N (Respondents)		268	919	197	421	974	310

Among men, the share of respondents with a stable and low religiosity is much higher among the low trajectory group (one child in the beginning and declining), than among the high trajectory (close to three intended children and increasing slightly over time). For men with stable and high religiosity, the opposite is true. Men who increased their religiosity over time are even more overrepresented among the high trajectory group. Most other categories of religiosity are represented to a similar degree in each group. In terms of religious affiliation,

men who were assigned to the high trajectory group are more likely to be Catholic, other Christian or affiliated with a non-Christian religion than those men assigned to the medium or low trajectory group. Men in the low trajectory group on the other hand are much more likely to have no religious affiliation. These differences in the makeup of the three trajectory groups already give some initial indications that highly religious people have more stable fertility intentions across time. As to the control variables, men in the high trajectory group have a higher level of education overall, are from western Germany rather than eastern Germany and belong to the oldest of the three pairfam cohorts.

The characteristics of the three trajectory groups for women differ slightly. As in the case of men, highly religious women are overrepresented in the high trajectory group, while less religious women are overrepresented in the low trajectory group. For women with stable and high religiosity, the differences between the three trajectory groups are a bit more pronounced than among men. In most other categories of religiosity, however, those differences are less marked. In terms of religious affiliation, the high trajectory group of women is characterised by an overrepresentation of other Christians and non-Christians, while those who are unaffiliated are underrepresented. In contrast to men, however, the high trajectory group is characterised by an overrepresentation of Evangelicals instead of Catholics. The group characteristics based on our control variables are again similar to those of men.

Determinants of group membership

Tables 5.3 and 5.4 show the results of multinomial logistic regression models on the determinants of group membership. The results are reported as average marginal effects expressed in percentage points. These average marginal effects express the difference in the predicted probability of belonging to a group trajectory between a category and the reference category of an independent variable[6].

[6] As explained earlier, these average marginal effects (as opposed to odds ratios or logits) can be compared across subgroups. However, one limitation is that they do not allow us to test whether the results across subgroups are statistically significant. To do this, we first report the logit coefficients of the models that compare the likelihood of group membership in comparison with the medium group. We also ran additional separate logistic regression models: one comparing group membership of the low trajectory group versus the medium trajectory group, and the other comparing membership of the high trajectory group with medium trajectory group membership. The results are included in the Appendix.

Table 5.3: Results of the multinomial logistic regression models on the likelihood of belonging to different trajectory groups, expressed in AME percentage points - Men

Trajectory group:		Low		Medium		High	
		AME	*p*	AME	*p*	AME	*p*
Characteristics of respondents:							
Religiosity path	Stable low (ref.)						
	Stable medium	-14.0	<0.001	9.4	0.017	4.6	0.085
	Stable high	-7.8	0.156	-12.8	0.057	20.6	<0.001
	Increase to medium	-8.2	0.021	1.5	0.734	6.7	0.039
	Increase to high	-19.6	<0.001	-8.7	0.228	28.3	<0.001
	Decrease from medium	-4.7	0.334	-0.4	0.936	5.1	0.150
	Decrease from high	-5.1	0.343	-4.1	0.489	9.2	0.034
Religion	Evangelical Church (ref.)						
	Catholic Church	-2.2	0.408	1.5	0.617	0.7	0.762
	Other Christian	-12.0	0.013	-1.2	0.877	13.2	0.057
	Other	-8.6	0.056	-1.8	0.779	10.4	0.056
	None	1.3	0.714	-0.5	0.908	-0.8	0.808
Education	In education	-5.6	0.235	2.9	0.564	2.6	0.491
	Low	9.0	0.100	-13.3	0.026	4.3	0.357
	Vocational (ref.)						
	Academic	-5.6	0.010	2.4	0.388	3.3	0.124
	Missing	53.7	0.001	-52.0	<0.001	-1.8	0.878
Part of country	West (ref.)						
	East	-4.2	0.087	5.2	0.117	-0.9	0.728
Cohort	1991-1993 (ref.)						
	1981-1983	11.6	<0.001	-16.3	<0.001	4.7	0.059
	1971-1973	24.5	<0.001	-30.9	<0.001	6.4	0.009

Table 5.3 shows that among those men who reported a stable level of religiosity throughout our observation period, those with a medium level of religiosity are less likely to belong to the low trajectory group and more likely to belong to the medium trajectory group than the reference category of men with a stable and low level of religiosity. Men with a stable and high level of religiosity on the other hand are more likely to belong to the high trajectory group. For men with an increase in their religiosity, the results are similar. The most notable difference, however, is that men who reported an increase in their religiosity to a high level are even more likely to belong to the high trajectory and less likely to belong to the low trajectory than those men who reported a stable high level of religiosity. Among men with a decrease in their religiosity, those who decreased from a high level of religiosity are more likely to belong to the high trajectory.

As far as the effects of religious denomination are concerned, men who belong to another Christian denomination are less likely to belong to the low trajectory group than men affiliated with the Evangelical Church. Among the other control variables, there is a strong cohort effect

– older cohorts are more likely to belong to either the low or high trajectory group, which means that they can be seen as being more polarised than the younger cohorts.

Table 5.4: Results of the multinomial logistic regression models on the likelihood of belonging to different trajectory groups, expressed in AME percentage points – Women

Trajectory group:		Low		Medium		High	
		AME	*p*	AME	*p*	AME	*p*
Characteristics of respondents:							
Religiosity path	Stable low (ref.)						
	Stable medium	-12.2	0.001	10.8	0.006	1.5	0.615
	Stable high	-20.2	<0.001	-7.8	0.175	28.1	<0.001
	Increase to medium	-4.8	0.175	4.3	0.276	0.5	0.854
	Increase to high	-14.0	0.006	0.2	0.976	13.8	0.017
	Decrease from medium	0.9	0.846	0.3	0.955	-1.2	0.721
	Decrease from high	-13.9	0.005	0.4	0.942	13.5	0.009
Religion	Evangelical Church (ref.)						
	Catholic Church	1.3	0.623	7.0	0.015	-8.2	<0.001
	Other Christian	3.5	0.644	-0.2	0.984	-3.3	0.533
	Other	-10.0	0.037	-7.6	0.229	17.5	0.005
	None	2.1	0.564	3.7	0.391	-5.8	0.097
Education	In education	5.3	0.336	-7.8	0.130	2.4	0.575
	Low	3.5	0.422	-5.3	0.275	1.8	0.632
	Vocational (ref.)						
	Academic	-3.4	0.128	0.7	0.789	2.7	0.200
	Missing	-25.2	<0.001	16.4	0.330	8.8	0.601
Part of country	West (ref.)						
	East	-2.7	0.323	5.0	0.131	-2.3	0.389
Cohort	1991-1993 (ref.)						
	1981-1983	7.4	0.002	-15.7	<0.001	8.4	0.001
	1971-1973	26.7	<0.001	-34.6	<0.001	7.9	0.001

In Table 5.4, the results of the regression of group membership likelihoods, expressed in average marginal effects, are shown for women. While they are similar to the results for men, there are some differences to be noted. For women with a stable level of religiosity, the patterns are slightly more pronounced, with highly religious women being even more likely to belong to the high trajectory group in comparison with those women with a stable low level of religiosity. Highly religious women are also less likely to belong to the low trajectory. Women who experienced an increase in their religiosity to a high level show a similar pattern to stable highly religious women, but with weaker effects. The same is true for women who experienced a decrease in their level of religiosity from a high level. In contrast to the position for men, where no differences between Evangelicals and Catholics were found, Catholic women are less likely to belong to the high trajectory and more likely to belong to the medium trajectory. Women of a non-Christian faith again show a higher likelihood of belonging to the high

trajectory than the low one. No effects of education level or residing in western or eastern Germany were found. The polarisation of older cohorts in comparison with younger cohorts is also evident among women, although it is not as pronounced.

Overall, higher levels of religiosity are associated with a higher likelihood of belonging to the high trajectory group and a lower likelihood of belonging to the low trajectory group. These effects were also seen for respondents reporting a change in their religiosity. Apart from the very small group of people who reported an increase in their religiosity, those patterns are more pronounced for women.

Discussion

In this article, we investigated the relationship between religiosity and the stability of fertility intentions over the life course. Based on our theoretical examinations, we hypothesized that highly religious people have more stable fertility intentions over time. We tested this hypothesis using a sample of men and women born between 1971 and 1993, drawn from the first 10 waves of the German family panel pairfam. In order to examine the stability of fertility intentions, we calculated group-based trajectories of the intended number of children. We modelled three different trajectories for men and women separately. Religiosity was then used as a determinant of trajectory group membership in multinomial logistic regression models.

The results of these regression models indicated that highly religious individuals are more likely to belong to high and stable trajectories of fertility intentions and less likely to belong to the low and declining trajectory group, thus supporting our hypothesis. Those effects were also evident in the case of respondents who initially reported high religiosity at Wave 1, but then reported a lower level of religiosity at a later wave, indicating that religious experience in the past can still have an influence on fertility plans. The patterns we found did not differ consistently between men and women, corroborating previous research on the differences between men and women as regards the relationship of fertility and religiosity (Zhang, 2008).

Previous research on the topic of religiosity and fertility has mostly focused on fertility outcomes (Adserà, 2006a; Berghammer, 2009; Baudin, 2015; Peri-Rotem, 2016). A few additional studies took fertility intentions into account (Philipov and Berghammer, 2007; Bein *et al.*, 2017) but questions about the stability of fertility intentions have played a very minor

role to date. The results of this study show that highly religious people are "better" at maintaining high fertility intentions over time and in that way defy the normative pressure of society towards lower fertility intentions. This suggests that this research strand can benefit by also analysing stability and change in fertility intentions.

This study also contributes to the expanding field of research on fertility intentions in general. Only a small number of studies on fertility intentions considered the stability over time using numerous waves of panel data. While the topic of fertility intentions has already been analysed from many different angles – such as the psychological process (Miller and Pasta, 1994; Miller and Pasta, 1995), the variance of cohorts and between countries (Testa, 2012), family policies (Billingsley and Ferrarini, 2014), uncertainties (Morgan, 1982), education levels (Hayford, 2009) or economic uncertainty (Hanappi *et al.*, 2017) – religiosity has often been left out in most studies. Our study was able to demonstrate that even in a rather secularised country like Germany, religiosity is still an important variable in the fertility decision-making process. For this reason, future studies on fertility intentions may benefit from looking at the stability of fertility intentions over the life course and including aspects on religion and religiosity.

Germany is not so much an outlier in terms of the religiosity of its population and the trend of secularisation in comparison with other western European countries. However, as a country it is rather distinct in its religious composition due to its mixed religious heritage. While we did find some differences in group trajectory membership between Evangelicals and Catholics among women, the difference is the opposite to what earlier studies have found on fertility differences between Protestants and Catholics (Heiland *et al.*, 2008; Bujard and Scheller, 2017). This may indicate that the classical fertility divide between them is less relevant today. However, because of the small number of cases from a non-Christian denomination, this study was unable to shed much light on this group and test whether or not their faith also translates into more stable fertility intentions. Therefore, a future path of research may be to investigate trajectories of fertility intentions in those other contexts.

The length of our study period is just one of the further avenues of future research. While we have already been able to find some patterns, a study period that is longer than 10 years might lead to more improved results. Another potential approach in terms of methodology would be to model the stability of fertility intentions in a different way. One way of doing so involves focussing on events of change instead of trajectories. Starting from the initial number of children intended, it could be analysed how religiosity involves the likelihood of whether there

are events of an increase or decrease of fertility intentions. A second possible way would be to dissect the trajectories into its components: value, trend and the variation of the trend and analyse in what way religiosity affects each of these three components. These future avenues of research show that this part of the fertility-religiosity nexus has only begun to be the subject of thorough investigation, and that this study may represent a first step in this direction.

Appendix

Appendix Table 5.1: Results of the separate logistic regression models on the determinants of group trajectory membership – Men

	Trajectory group:	Low vs. Medium		High vs. Medium	
		AME	*p*	AME	*p*
Characteristics of respondents:					
Religiosity path	Stable low (ref.)				
	Stable medium	-14.4	<0.001	2.7	0.420
	Stable high	-3.5	0.598	23.3	0.001
	Increase to medium	-7.1	0.070	7.1	0.082
	Increase to high	-17.3	0.002	26.0	<0.001
	Decrease from medium	-3.3	0.528	5.4	0.235
	Decrease from high	-2.7	0.654	10.6	0.051
Religion	Evangelical Church (ref.)				
	Catholic Church	-3.0	0.315	1.2	0.662
	Other Christian	-12.4	0.045	12.7	0.093
	Other	-8.4	0.132	9.0	0.132
	None	1.2	0.749	-0.9	0.824
Education	In education	-5.7	0.283	2.1	0.620
	Low	11.8	0.054	7.9	0.197
	Vocational (ref.)				
	Academic	-5.4	0.030	2.3	0.350
	Missing	60.0	<0.001	15.3	0.657
Part of country	West (ref.)				
	East	-5.3	0.058	-2.2	0.490
Cohort	1991-1993 (ref.)				
	1981-1983	14.0	<0.001	7.4	0.012
	1971-1973	30.2	<0.001	12.8	<0.001
N (Respondents)		1187		1116	

Appendix Table 5.2: Results of the separate logistic regression models on the determinants of group trajectory membership – Women

	Trajectory group:	Low vs. Medium		High vs. Medium	
		AME	*p*	AME	*p*
Characteristics of respondents:					
Religiosity path	Stable low (ref.)				
	Stable medium	-13.6	0.001	-1.7	0.659
	Stable high	-15.5	0.008	26.1	<0.001
	Increase to medium	-4.8	0.229	-0.9	0.824
	Increase to high	-12.0	0.063	12.4	0.078
	Decrease from medium	0.9	0.870	-1.2	0.810
	Decrease from high	-13.5	0.022	12.6	0.042
Religion	Evangelical Church (ref.)				
	Catholic Church	-1.6	0.581	-10.4	<0.001
	Other Christian	0.1	0.991	-1.6	0.830
	Other	-10.2	0.127	17.0	0.012
	None	-0.1	0.987	-6.4	0.154
Education	In education	7.7	0.200	4.9	0.366
	Low	4.3	0.389	3.5	0.498
	Vocational (ref.)				
	Academic	-3.5	0.175	2.6	0.309
	Missing			2.0	0.903
Part of country	West (ref.)				
	East	-3.7	0.244	-4.5	0.172
Cohort	1991-1993 (ref.)				
	1981-1983	10.7	<0.001	11.5	<0.001
	1971-1973	34.9	<0.001	18.2	<0.001
N (Respondents)		1392		1284	

Appendix Table 5.3: Results of the multinomial logistic regression model on the determinants of group trajectory membership, expressed in logit coefficients, with the medium group as the reference group – Men

	Trajectory group:	Low vs. Medium		High vs. Medium	
		Logit	*p*	Logit	*p*
Characteristics of respondents:					
Religiosity path	Stable low (ref.)				
	Stable medium	-0.98	<0.001	0.29	0.346
	Stable high	-0.13	0.749	1.52	<0.001
	Increase to medium	-0.43	0.081	0.58	0.063
	Increase to high	-1.26	0.019	1.67	<0.001
	Decrease from medium	-0.21	0.503	0.50	0.180
	Decrease from high	-0.16	0.651	0.84	0.028
Religion	Evangelical Church (ref.)				
	Catholic Church	-0.16	0.434	0.03	0.905
	Other Christian	-0.95	0.151	0.75	0.069
	Other	-0.58	0.221	0.65	0.068
	None	0.08	0.750	-0.06	0.861
Education	In education	-0.40	0.314	0.15	0.639
	Low	0.67	0.037	0.57	0.136
	Vocational (ref.)				
	Academic	-0.39	0.027	0.21	0.273
	Missing	3.26	0.005	1.51	0.336
Part of country	West (ref.)				
	East	-0.36	0.083	-0.16	0.529
Cohort	1991-1993 (ref.)				
	1981-1983	1.19	<0.001	0.61	0.012
	1971-1973	1.99	<0.001	0.97	<0.001
Intercept		-1.85	<0.001	-2.74	<0.001

Appendix Table 5.4: Results of the multinomial logistic regression model on the determinants of group trajectory membership, expressed in logit coefficients, with the medium group as the reference group – Women

	Trajectory group:	Low vs. Medium		High vs. Medium	
		Logit	*p*	Logit	*p*
Characteristics of respondents:					
Religiosity path	Stable low (ref.)				
	Stable medium	-0.73	0.001	-0.12	0.640
	Stable high	-0.87	0.012	1.28	<0.001
	Increase to medium	-0.27	0.182	-0.05	0.841
	Increase to high	-0.62	0.089	0.68	0.051
	Decrease from medium	0.03	0.919	-0.10	0.759
	Decrease from high	-0.62	0.065	0.67	0.036
Religion	Evangelical Church (ref.)				
	Catholic Church	-0.08	0.604	-0.63	<0.001
	Other Christian	0.15	0.732	-0.17	0.668
	Other	-0.41	0.338	0.79	0.009
	None	0.02	0.936	-0.40	0.132
Education	In education	0.38	0.205	0.31	0.308
	Low	0.26	0.314	0.22	0.447
	Vocational (ref.)				
	Academic	-0.17	0.235	0.14	0.356
	Missing	-13.10	0.981	0.16	0.872
Part of country	West (ref.)				
	East	-0.22	0.214	-0.24	0.263
Cohort	1991-1993 (ref.)				
	1981-1983	0.72	<0.001	0.78	<0.001
	1971-1973	1.83	<0.001	1.13	<0.001
Intercept		-1.44	<0.001	-1.79	<0.001

Chapter 6

Discussion and conclusion

Introduction

Contemporary Europe is characterized by low fertility and has experienced a marked trend towards secularization and a retreat of religion in the past decades. Yet, religiosity has remained a powerful individual determinant of fertility (Adserà, 2006b; Philipov and Berghammer, 2007; Hubert, 2015; Peri-Rotem, 2016). The goal of this thesis was to further examine what role religiosity plays as a determinant of fertility in secularized Europe and to shed more light on the mechanisms linking religiosity and fertility.

Using the Generations and Gender Survey (GGS) and the pairfam survey, this thesis dealt with four research "puzzle pieces", written as research papers from the broader field of religion and fertility analysis. The first paper was about cross-national differences in the effect of religiosity on fertility intentions. The second paper dealt with possible cross relations of religiosity and gender equality, which constitutes another particularly important determinant of fertility in the European context. In the third paper, it was investigated how religiosity and perceived consequences of parenthood influence childbearing plans. The last paper then analysed whether religiosity also affects the stability of fertility intentions.

This chapter is structured in the following way. The following section summarizes the findings of each paper and the interpretation of the results. This is followed by a section that synthesizes the findings of all four papers and places the findings in the European societal context. In the last section, some future avenues of research are presented.

Summary of the findings

Cross-country differences in the effect of religiosity on fertility intentions (Chapter 2, Paper 1)

The aim of the first study of this dissertation was to examine cross-national differences in the effect of religiosity on fertility intentions that were already observed in some earlier research (Philipov and Berghammer, 2007; Guetto *et al.*, 2015). It was hypothesized that this effect might be stronger in countries with more traditional gender regimes, as in these contexts, the ideals of more religious people regarding family and gender relationships are more in line with

the societal ideals. Therefore, religiosity might be a stronger predictor of fertility intentions in these traditional countries in comparison to countries with more egalitarian gender regimes.

To start with, the study first examined the relationship between religiosity and fertility intentions in 12 countries to establish the extent to which the same relationship between religiosity and fertility intentions was found. The postulated positive effect of religiosity on fertility intentions was not found in all the 12 countries. This mirrors findings of earlier studies, which also demonstrated that not in all countries, a positive effect of religiosity on fertility was observed (Philipov and Berghammer, 2007). However, the number of countries with positive effects was greater in the case of long-term intentions (over the rest of the life), while only in a few countries, effects were found for short-term intentions (over the next three years).

The second step was then to try to explain why cross-national differences in the relationship between religiosity and fertility intentions exist. To do so, the effect coefficients of religiosity on fertility intentions for all the countries, that were obtained in the previous models, were used as the dependent variable in meta-regression models with gender regime as the independent variable. In other words, the aim was to assess whether the gender regime influences the strength of the effects (i.e. the country-specific effect of religiosity on fertility). The results of these meta-regression models suggest that only in the case of men, and for long-term intentions, the strength of the effect of religiosity is significantly affected by one of the two indices used to represent the gender regime, namely the Gender Attitudes Index. No significant effects were found for the EPO-Index (Economic Participation and Opportunity index) which represents the economic side of the gender regime. Robustness checks with several alternative indicators for the gender regime did not change this picture.

Several explanations can be put forward for this result. For one, the clearer picture among men could be due to a changed and more gender egalitarian stance of religious institutions in more egalitarian countries, for example in Sweden (Church of Sweden, 2012; Goldscheider *et al.*, 2014). This means that in egalitarian countries, more religious men could follow these religiously propagated egalitarian stances. Accordingly, they might see themselves more burdened with housework and childcare and thus be less likely to intend to have more children. This means that in egalitarian contexts, fertility intentions of the highly religious men may not differ that much from those of less religious men. Hence, in egalitarian contexts, the effect of religiosity on men's fertility intentions could be very small and indeed much smaller than among women. Second, it can be assumed that there is generally more variation in men's

fertility intentions, due to parenthood being a more universal ideal among women than among men (Miettinen and Szalma, 2014). That higher variation in fertility intentions among men leaves more variation to be explained by religiosity and the gender regime. And finally, the gender regime might be more relevant in determining the role of religiosity for fertility intentions among men due to differences between egalitarian and traditional gender regimes in regard to the priorities of welfare states and societal expectations of men regarding their role in a family. In more traditional gender regimes, where men are expected to be earners and providers for the family, welfare states are often less generous than in egalitarian regimes. Therefore, in traditional gender regimes, especially less religious men – who are not exposed to pronatalist religious doctrines - may decrease their fertility intentions in times of economic hardship.

An additional explanation can be raised to address the result that for women, the gender regime does not affect the individual-level effect strength of religiosity on fertility intentions. This seemingly counterintuitive result implies that in traditional and egalitarian gender regimes, the effect of religiosity on fertility intentions is similar. While a notable effect of religiosity on fertility intentions in traditional gender regimes was expected from the theoretical reasonings, finding a similar effect in egalitarian gender regimes was not expected. It could be that for highly religious and less religious women, egalitarian gender regimes make the decision for a child easier than traditional gender regimes by the same amount, as highly religious women might also be able to profit from family policies associated with more egalitarian gender regimes. Therefore, the positive effect of religiosity on fertility intentions remains similar regardless of the gender regime in the case of women.

Religiosity, gender equality and their impact on fertility (Chapter 3, Paper 2)

The evidence of the first study led to another research question: how religiosity and gender equality are related at the micro level and how that affects fertility decisions. One way in which religions encourage their followers to have children lies in the promotion of traditional gender roles in religious doctrines (Goldscheider, 2006). Traditional gender arrangements and policies on the other hand have been shown to be associated with lower fertility and a lower likelihood of fertility intentions due to the double burden of housework and career that is put onto women in that case. The goal of this study was to shed light on this seeming contradiction. The study

considered 5 countries from different parts of Europe (Austria, Bulgaria, France, Georgia and Russia) to get a broad picture of these relationships.

In a nutshell, this study examined the impact of individual religiosity and gender equality on fertility decisions. To get a more refined picture and to represent the multidimensional nature of gender equality, the impact of gender attitudes (opinions on the roles of men and women) and gender behaviour (how household tasks are split in the household) were considered. Furthermore, this study analysed both fertility intentions and their realization to get a broad picture of the fertility decision making process.

While the results of all regression models were rather mixed and did not show a clear pattern, one important finding was repeated in all models. Whenever a new variable (religiosity, gender attitudes or gender behaviour) was introduced into the model, the other key independent variables experienced little change in their values. This suggests that religiosity has a rather independent effect from gender attitudes or behaviour on fertility decisions.

The finding that religiosity seems to exert an effect on fertility decisions that is independent from gender represents the key finding of this study. Two explanations can be put forward for this finding. First, there is the possibility that the assumption of religiosity being associated with traditional gender roles might not be valid in every country anymore. As mentioned in the findings for Paper 1, some religious denominations changed their stance towards gender roles and are promoting more egalitarian gender roles. In the post-communist countries, a revival of traditional gender roles was observed after the end of communism that was not always accompanied by a corresponding rise in religiosity. Both trends may have contributed to a disentanglement of religiosity and traditional gender roles. A second possible explanation for the rather independent effect of religiosity is that the particularized theology, represented by outright pronatalist religious doctrines, is more important than previously thought and the direct religious teachings related to childbearing play the central role.

Perceived consequences of parenthood, religiosity, and their role in fertility intentions (Chapter 4, Paper 3)

The two previous studies examined the interplay between religiosity and gender relationship. This third study had the aim of looking for other mechanisms in which religiosity shapes

reproductive decisions. It was examined how religiosity interplays with perceived costs and benefits of parenthood, putting more light on the rational choice side of the fertility decision making process. In the geographical sense, this study focuses on Poland. Poland is a country with a comparably highly religious population and low fertility rate and constituted an interesting contrast in comparison to earlier studies on the German context (Brose, 2006; Arránz Becker and Lois, 2017).

Two different mechanisms were examined in that study. The first one describes a possible role of the perceived consequences of parenthood acting as a *mediator* for the effect of religiosity on fertility intentions. In other words, it was proposed that the more religious are more likely to have higher fertility intentions, because they perceive higher benefits and lower costs of parenthood. This assumption, that has already been examined in some previous studies (Brose, 2006; Arránz Becker and Lois, 2017), is rooted in the fact that religions emphasize the benefits of having children in their pronatalist doctrines and discourage thinking and making decisions in materialistic terms. The second mechanism is about how those perceived costs and benefits translate into fertility intentions and to what extent religiosity may *moderate* this pathway. For example, by providing support and aid to families, religions could also decrease the relevance of costs in childbearing decisions.

The results regarding the mediating effect of the perceived consequences of parenthood indicate that the role of perceived benefits is larger than the role of perceived costs. In particular, around 31% of the total effect of religiosity on fertility intentions is mediated by perceived benefits of having children, i.e. 31% of the total effect can be explained by the highly religious perceiving higher benefits of having children, for example due to aforementioned pronatalist doctrines. As for the costs, for men around 4%, and for women 5.4% of the total effect of religiosity on fertility intentions was mediated by the perceived negative consequences of having children. Taken together, this means that most of the effect of religiosity is not mediated by perceived consequences of parenthood, but instead constitutes an independent, direct effect. This direct effect can be explained in two ways. First, it is possible that the scales on perceived benefits and costs did not capture all possible different costs and benefits. Thus, part of that residual direct effect could represent those missed costs and benefits. Second, the direct effect could be explained by a strong influence of direct pronatalist teachings that are independent of costs and benefits.

The second mechanism examined in this paper is the moderating effect of religiosity on the relationship between perceived consequences of parenthood and fertility intentions. The moderation analysis showed that religiosity indeed moderates the impact of costs on fertility intentions, but in this study, that effect was only found for women. While for less religious women, perceived costs of childbearing have a strong negative effect on fertility intentions, for the highly religious, perceived costs have little or no influence on fertility intentions. One reason for the fact that no such effects were found for men could be that the selection of the items for perceived costs often concern women more than they do men (e.g. costs regarding pregnancy). This leaves a larger general effect of perceived costs on fertility intentions that could then be moderated, for example by religiosity.

Religiosity and stability of fertility intentions (Chapter 5, Paper 4)

The last study of this thesis dealt with the question whether the highly religious have more stable fertility intentions over time in comparison to the less religious. Fertility intentions are usually not stable but are constantly adjusted over the life course according to changes in life circumstances (Heiland *et al.*, 2008; Hayford, 2009; Liefbroer, 2009; Iacovou and Tavares, 2011). Changes in life circumstances might also affect costs of childbearing. As demonstrated in the third study and in previous research, costs of childbearing are not as relevant in childbearing decisions for the highly religious. Furthermore, it has also been argued that the religious might be less likely in general to make childbearing plans in terms of a decision based on costs and benefits. Instead, they are more likely to consider prevalent norms while making childbearing plans, for example religious norms regarding families. For these reasons, it was hypothesized in this study that the religious generally harbour more stable fertility intentions over time.

Like the previous study in this thesis, this study provided an in-depth analysis of a single country instead of a cross-country approach, this time for Germany. Within Europe, Germany is a rather secularized country with a religiously mixed landscape and a moderately low fertility rate.

Using group-based trajectory modelling, three different trajectories were modelled for both men and women separately - one high and increasing trajectory, one medium and stable trajectory, and one low and declining trajectory. The results of the analysis of group

membership likelihood confirmed that the highly religious are more likely to belong to the high and increasing trajectory group, while the less religious are in turn more likely to belong to the low and decreasing trajectory group. The results were similar for men and women. Importantly, no notable differences between Catholics and Evangelicals were found, indicating that also in Germany, religiosity rather than religious affiliation is making an impact on fertility decision making. All these results underline that research on religiosity and fertility could benefit from incorporating stability and changes of fertility plans, and research on the stability could benefit from taking religiosity into account.

Discussion of findings

Contributions of this thesis

The results of the four papers of this thesis contributed to the research in several ways. The four key contributions consist of the cross-national approach, examining different stages of the fertility decision making process, analysing the gender dimension, and finally going deeper into the mechanisms of how religiosity translates into higher fertility.

First, the results confirmed the cross-national differences in the relationship between religiosity and fertility that were found in previous studies (Adserà, 2006b; Philipov and Berghammer, 2007; Guetto *et al.*, 2015). The differences are only explainable by the gender regime in very specific situations, namely for the long-term fertility intentions of men. Furthermore, the cross-country differences do not show any other recognizable pattern though. Neither do they seem to depend on the overall religiosity in the country, as patterns of a positive impact of religiosity on fertility intentions were found for both a rather religious country like Poland in the third study of this paper, and a rather secular country like Germany in the fourth study. The first study however gave a clue that the extent of cross-national differences may depend on the fertility indicator used, or more specific, the time horizon of fertility intentions. For long-term fertility intentions, a larger number of countries showed significant results in terms of the effect of religiosity as opposed to short-term intentions. Coupled with the interpretations of previous research on those cross-national differences, it can be concluded that these differences are not random and could be investigated further.

Second, this thesis was able to demonstrate that the patterns demonstrated in previous studies for fertility ideals and fertility behaviour also largely hold true for the intermediate stage of the fertility decision making process – fertility intentions. For the whole fertility decision making process, the influence of religiosity can be summarized as following. The high fertility ideals and desires of the highly religious can be seen as a reflection of the pronatalist norms of most religions. These high fertility ideals are however also translated into childbearing plans. Results of the third and fourth paper suggest that the religious differ to the less religious in how they form fertility intentions. The highly religious seem to make their childbearing plans more on a normative-spontaneous decision based on those pronatalist religious doctrines, while the less religious are more likely to base their decision on balancing costs and benefits of children. This at first suggests that fertility intentions of the highly religious are just mirroring their fertility ideals and may be less of an actual plan in comparison to the fertility intentions of the less religious, implying that the intentions of the highly religious are less predictive of later behaviour. The results of the second study of this thesis however indicate that the highly religious are as likely as the less religious in realizing their childbearing plans. This means that despite being more based on a normative-spontaneous decision, highly religious people are as determined to act upon their plans as the less religious. The second study also concluded that there are also no significant differences between the highly and the less religious in their likelihood of realizing negative intentions, i.e. the plan to not have a child. This also implies that the higher fertility of the highly religious is not a result of the highly religious having more unwanted children, for example due to the critical stance of many religions towards contraceptives and abortion, but is mostly wanted and planned.

And third, the thesis added some notable additional results to the interplay between religiosity and gender. The first study for example revealed that in some cases, the gender regime was able to explain cross-national differences in the relationship between religiosity and fertility intentions for men, but not for women. The third study in turn revealed that a high religiosity leads to perceived costs becoming irrelevant in fertility decisions among women, but not among men. This means that there is evidence for gender-specific differences in the mechanisms of *how* religiosity translates into higher fertility. On the other hand, as to the effect of religiosity on fertility itself, no clear pattern between men and women was found, mirroring the mixed evidence of previous studies on gender differences.

The last conclusion of the results of all studies concerns the character of religiosity as a determinant in fertility decision making. The second study concluded that religiosity exerts its

influence on fertility intentions and their realization independently of gender, which constitutes an important factor in fertility as well, and was proposed as one pathway through which religiosity could affect fertility, namely by promoting traditional gender roles. The third study then concluded that only a part of the total effect of religiosity on fertility intentions is mediated by perceived consequences of parenthood. This suggests that religiosity is a rather independent variable in the fertility decision making process and that the proposed interaction of religion with other social systems (Philipov and Berghammer, 2007) and their joint influence on fertility decisions seem to be less relevant than previously thought.

Societal relevance

Religiosity still constitutes a powerful and rather independent determinant of fertility in secularized Europe. Therefore, the question emerges what demographic consequences this has on European societies, and how the relationship between religiosity and fertility might develop in the future. Knowing more about this relationship will give important clues about the future religious composition of a society. This is important because religiosity itself correlates with many different views, values, and ideas about society, for example with voting behaviour and moral traditionalism (De Koster and Van Der Waal, 2007) as well as a tendency towards collectivism (Zarzycka *et al.*, 2016). Therefore, knowing in which direction the religious composition of a society changes may also give some ideas on the direction of a society itself.

Differences in fertility between the highly and the less religious are important drivers of changes of the religious composition of a society. The fact that the highly religious want, and have more children than the less religious has already prompted some researchers to speak of a "re-sacralization" of Europe in the long run (Kaufmann, 2010; Kaufmann *et al.*, 2011). The assumption of a re-emergence of religion relies not only on higher fertility rates among the highly religious, but also on the fact that recent immigrants to Europe are usually more religious than the native population, and on a high likelihood of retention, i.e. that children will keep the religion of their parents. While the nature of future immigration is hard to predict, there is some truth in the assumption that children largely keep the religion and religiosity of their parents (Blume *et al.*, 2006). Based on these assumptions, Kaufmann *et al.* (2011) ran a religious population projection for Austria and Switzerland that suggests that the share of people not affiliated with any religion could peak between 2020 and 2050. Considering that this projection

was made around 10 years ago, how realistic is a possible demographic-driven reversal of the secularization trend in Europe based on the current situation?

The 2010s were characterized by ongoing secularization in Europe. Across Europe, the share of unaffiliated people increased markedly in the 2010s, and in many cases stronger than in the 2000s. In Germany and Austria for example, the number of people leaving the big mainline churches reached new highs and has been well above the average of previous decades (fowid, 2017; fowid, 2019a; ARD, 2020; Katholische Kirche Österreich, 2020). This trend can be seen in polls of the European Values Study for other countries as well (EVS, 2020b; EVS, 2020a): In countries like Denmark, Hungary, Italy, Norway or Spain, the share of the unaffiliated grew much stronger between 2008 and 2017 than between 1999 and 2008. In some post-communist countries that saw a decline in the share of the unaffiliated and some religious revival after the fall of communism, for example in Russia, Estonia or Belarus, the share of the unaffiliated began to rise again between 2008 and 2017. Considering this "speeding up" of the secularization process in Europe in recent times, the scenario of a demographic driven religious revival became less likely.

On the other hand, the declining share of people belonging to a religion means that the remaining religious people are an increasingly selected group. While they are still in the majority in most European countries and therefore part of mainstream society, it is possible that in the future, the religious may see themselves increasingly distant from the mainstream population and more of a special group. The status of being a special group could lead to the situation where the highly religious feel less bound to norms and customs of the majority, including their fertility ideals. This will make it easier for the religious to maintain high fertility ideals and intentions, no matter how perceptions of an "ideal" family may change in mainstream society. In some cases, it is even thinkable that the highly religious, being aware of being a selected group, make their higher fertility a central identity marker alongside religious behaviour and involvement in church activities. The conservative Christian Quiverfull movement in the US is an example for this – their adherents have moved Christian pronatalist doctrines to the centre of their faith, abstain from any form of birth control and aim at having as many children as God intended them to have (van Geuns, 2014). So, it is highly likely that fertility differences between the highly religious and the less religious will persist in light of ongoing secularization. These differences are also likely to persist when countries move further towards more gender egalitarianism, as in most cases, a greater extent of gender

egalitarianism does not reduce the fertility difference between the highly and the less religious, which was demonstrated in Chapter 2.

Considering that it is very likely that the higher fertility of the highly religious in Europe will persist, is it possible that, by increasing their share of the population due to their higher fertility rates, their childbearing behaviour will lead to a general increase of fertility in Europe? As has been noted by earlier researchers, this depends not only on the fact that there is a difference in fertility behaviour between the highly religious and the less religious, but also on the speed of secularization and religious shifting (Kaufmann *et al.*, 2011). With the current high speed of secularization in Europe, this scenario of a general fertility increase in the coming decades driven by the highly religious becomes less likely, however.

Policy implications

The persistent low fertility rates have been identified as a problem by many governments in Europe. Different kinds of policies were established to support families and facilitate family formation and the combination of career and children (Gauthier, 2007). Considering the previous conclusion that low fertility is likely to stay, assessing the probable effects of those policies on the highly religious and the less religious by using the results and their interpretations of the four papers could lead to a better understanding of how policies could influence fertility.

One group of policies is concerned with gender equality. In short, these policies build upon the theory of the "gender revolution", which assumes that countries transition from a traditional to an egalitarian gender regime over time (Goldscheider *et al.*, 2015). During the first part of this transition, women enter the labour market and start to pursue careers, while keeping the responsibilities of household and childrearing. Consequently, fertility rates fall, as this situation creates a double burden for women and forces them choose to have either a career or children. The goal of family policies of this kind is to facilitate the combination of a career and family for women, and to support the second part of the transition, where men increasingly assume household and family responsibilities. This relieves women from that double burden. Under this redistribution, family formation is assumed to be easier again, resulting in an increase of fertility (Esping-Andersen and Billari, 2015). The second paper showed that the effect of religiosity on childbearing is independent of gender equality, despite of the assumption that a

high religiosity and traditional gender roles go hand in hand. This means that family policies aiming at the reconciliation of family and career could be able to increase both the fertility of the highly and the less religious.

A different approach to pronatalist policies concerns cash transfers and other direct subsidies to families. Contrary to policies aimed at gender equality, these policies have a more immediate effect on fertility, but their effect is often limited in time as they often lead to births happening earlier, rather than a sustained increase of fertility (Thévenon and Gauthier, 2011). The results of the third and fourth research paper give some indications that these policies could affect the highly and the less religious differently. The results suggest that for the highly religious, costs of childbearing matter little in their childbearing decisions. Therefore, policies aimed at reducing the costs of childbearing, for example by cash transfers, might have little effect on childbearing plans of the highly religious. On the other hand, these policies could affect childbearing planning of the less religious to a higher extent, as they are more sensitive to direct and indirect costs of childbearing.

Avenues of future research

The above presentation of the societal relevance and policy implications of the positive relationship between religiosity and childbearing have shown that this topic is highly relevant and likely to remain in a centre of demographic research. The first direction of future research would thus simply be to continue observing the trends and updating existing research to analyse how the relationship between religiosity and fertility develops across time.

Based on the results and their interpretations from the four papers, there are several different dimensions where future research on this topic can advance. One dimension, which mostly applies to the cross-national comparisons of this thesis, is to expand the number of countries. A larger number of countries could improve the statistical power of the results, especially so in meta-analyses. Broadening the body of countries will however also be helpful for expanding research presented in all other papers of this thesis, as some of the relationships that were found could be dependent on the country contexts in which they took place.

An important direction of further research is to examine the relationship between religiosity and fertility in non-Christian contexts in a deeper way. Most of the research so far, including

this study, has focused on the situation in the Western and Christian context. Considering that the Western countries are seen as being the most advanced in the demographic transition, research in this context has been very relevant. However, analysing the relationship between religiosity and fertility in non-Christian contexts is important - not only for the sake of having a more complete picture, but also because some research came to the conclusion that the positive relationship between religiosity and fertility does not exist among all religions. For example, Skirbekk *et al.* (2015) concluded that a high level of Buddhist religiosity is not associated with higher fertility in comparison to the non-religious people.

Related to the consideration of non-Christian and other cultural contexts is the question of the indicators used to assess individual levels of religiosity. In these circumstances, other indicators than the frequency of attending religious services or self-assessed religiosity might work better to evaluate individual religiosity levels. Besides that, future studies could compare the effects of an objective indicator such as attendance frequency and a subjective indicator such as self-assessed religiosity, like how Philipov and Berghammer (2007) did using data from the Family and Fertility Survey. The new GGS 2020, where both variables will be included, will allow these analyses in the future.

Another direction of future research is to examine how religiosity interacts with other fertility determinants. While this thesis focused on interrelations between religiosity and gender equality, it is possible that the effect of religiosity on fertility might also be dependent on other variables, such as the level of education, economic circumstances, living environment or any other factor that affects fertility decisions. Especially in the case of education, some evidence has been found that education acts as a moderator on the religiosity-fertility nexus: Among the highly educated, the relationship between religiosity and fertility is much more pronounced than among the less educated (Blume, 2008). This finding is just one example of many possible interrelations between religiosity and other variables that could add more explanations to the mechanisms of how religiosity translates into higher fertility.

Further research could also focus more on the effect of religiosity on different parities, i.e. whether religiosity differs in its influence on the decision to have a first, second, third, etc. child. For various reasons, but mostly related to the number of cases, parity in this thesis was treated as a control variable. It is possible though, that the relationship between religiosity and fertility, as well as the other relationships, may change depending on whether it concerns the first, second, third or further child. In light of the two-child ideal that is getting more

widespread across Europe (Sobotka and Beaujouan, 2014) and in the rest of the world (ICF, 2012), it might be especially interesting to examine how religiosity impacts the decision to have a third child.

All in all, religiosity is still a powerful determinant of reproductive decisions in a secularizing Europe. The relationship between religiosity and fertility is not straightforward, but a complex process that depends on many other variables. This thesis was able to contribute to a better understanding of these complex relationships and hopes to motivate further research on this important demographic topic.

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Nederlandse samenvatting

Inleiding

In de afgelopen decennia heeft Europa twee belangrijke trends meegemaakt: een sterke daling van de vruchtbaarheid, waardoor de vruchtbaarheidscijfers in alle landen ver onder het vervangingsniveau zijn gekomen, en een systematische secularisatie die een afname van religie en religieuze aangelegenheden uit het openbare leven met zich meebracht. Ondanks het feit dat religiositeit een deel van zijn invloed in Europese samenlevingen heeft verloren, zijn deze twee trends nog steeds met elkaar verbonden. Met andere woorden: religiositeit is nog steeds een belangrijke voorspeller van vruchtbaarheid op individueel niveau. Een deel van deze invloed komt voort uit religies die hun volgelingen aanmoedigen om kinderen te krijgen, bijvoorbeeld door pronatalistische doctrines en een kritische houding tegenover anticonceptie. Bovendien promoten veel religies traditionele genderrollen en idealiseren ze de rol van vrouwen als verzorgers van hun kinderen. Talrijke studies toonden al aan dat hogere religiositeit op individueel niveau geassocieerd is met hogere vruchtbaarheid. Sommige studies onderzochten de rol van religiositeit in eerdere stadia van het hele besluitvormingsproces over vruchtbaarheid. Ze toonden aan dat religiositeit ook van invloed is op vruchtbaarheidsidealen, maar slechts een klein aantal studies vond bewijs voor vruchtbaarheidsintenties, die verwijzen naar daadwerkelijke plannen om kinderen te krijgen. Een andere groep studies onderzocht verschillen tussen landen in de relatie tussen vruchtbaarheid en religiositeit. Deze studies lieten zien dat er opmerkelijke verschillen zijn tussen landen en dat niet in alle landen de gepostuleerde positieve relatie tussen vruchtbaarheid en religiositeit kan worden waargenomen. De oorzaak van deze verschillen is echter niet bekend. Bovendien zijn de genderdimensie alsmede de mechanismen van hoe religiositeit verweven kan zijn met andere variabelen en zich vertaalt in hogere vruchtbaarheid tot dusver zelden onderzocht.

Met deze onderzoekshiaten in gedachten zijn de belangrijkste vragen van dit proefschrift: **Welke rol speelt religiositeit als voorspeller van de vruchtbaarheid op individueel niveau in het hedendaagse Europa, en wat zijn de mechanismen achter de invloed van religiositeit op vruchtbaarheid?** Deze onderzoeksvragen worden behandeld in vier onderzoeksstukken, die hieronder worden beschreven.

Empirische studies

Het eerste deel van het onderzoek**, hoofdstuk 2,** beoogt de verschillen tussen landen te verklaren in het effect van religiositeit op vruchtbaarheidsintenties door het heersende gendersysteem. Het gendersysteem, dat beschrijft op welke manieren traditionele of egalitaire gendernormen de overhand hebben in de samenleving, zou in staat kunnen zijn om cross-nationale verschillen te verklaren, omdat religies zelf gendergerelateerde instellingen zijn en traditionele gendernormen ondersteunen in hun leerstellingen. De invloed zou afhankelijk kunnen zijn van hoe individuele voorkeuren met betrekking tot gendergelijkheid - die worden gevormd door individuele religiositeit - aansluiten bij het gendersysteem op macroniveau. Zeer religieuze mensen in een traditioneel gendersysteem, waar hun eigen voorkeuren worden vertegenwoordigd als het dominante idee in de samenleving zelf, krijgen institutionele en sociale steun voor hun voorkeuren en zullen daarom eerder geneigd zijn een kind te krijgen dan in andere contexten. Op macroniveau impliceert deze "boost" voor vruchtbaarheidsintenties van de zeer gelovigen een sterke individuele associatie van vruchtbaarheidsintenties met religiositeit in de meer traditionele contexten. In meer gender-egalitaire regimes daarentegen, ervaren de zeer gelovigen een gebrek aan maatschappelijke steun en zullen daardoor lagere vruchtbaarheidsintenties hebben, wat een klein verschil in vruchtbaarheidsintenties tussen zeer gelovigen en minder gelovigen impliceert. Dit leidt tot de belangrijkste hypothese van dit artikel: het effect van religiositeit op vruchtbaarheidsintenties is sterker in traditionele gendersystemen dan in egalitaire gendersystemen.

Voor dit onderzoeksstuk zijn gegevens van de eerste ronde van de Generations and Gender Survey (GGS) van 12 landen gebruikt. De resultaten toonden aan dat het gendersysteem deze verschillen alleen in bepaalde situaties kan verklaren, met name in situaties die betrekking hebben op de vruchtbaarheidsintenties van mannen op lange termijn. Voor vrouwen daarentegen werden geen effecten van het gendersysteem gevonden. Een verklaring voor het feit dat dergelijke effecten voor mannen werden gevonden, houdt verband met een veranderde en meer gender-egalitaire houding van religieuze instellingen in meer egalitaire landen, bijvoorbeeld in Zweden. Dit betekent dat in egalitaire landen zeer gelovige mannen deze religieus gepropageerde egalitaire standpunten zouden kunnen volgen. Daarom zien ze zichzelf misschien meer belast met huishoudelijk werk en kinderopvang en hebben ze een lagere intentie om meer kinderen te krijgen. Dit betekent dat in egalitaire contexten de vruchtbaarheidsintenties van de zeer gelovige mannen niet zo veel verschillen van die van

minder religieuze mannen. Als gevolg daarvan zou in egalitaire contexten het effect van religiositeit op de vruchtbaarheidsintenties van mannen klein kunnen zijn. Zeer religieuze vrouwen in egalitaire contexten kunnen profiteren van deze egalitaire regelingen en zo hun hoge vruchtbaarheidsintenties behouden. Hieruit volgt dat voor vrouwen het genderregime geen rol speelt in hoe sterk het effect van religiositeit op vruchtbaarheidsintenties is.

Het tweede deel van het onderzoek, **hoofdstuk 3,** sluit aan op het eerste omdat het ook mogelijke verbanden tussen gendergelijkheid en religiositeit onderzoekt, maar hier ligt de focus op het individuele niveau voor beide dimensies. Religies moedigen hun volgelingen aan om kinderen te krijgen door traditionele genderrollen te promoten alsmede de specialisatie van moeders als verzorgers van de kinderen. Eerder onderzoek naar de invloed van genderarrangementen en attitudes concludeerde echter dat traditionele genderrollen doorgaans geassocieerd worden met lage vruchtbaarheid. In de literatuur vindt men dat de belangrijkste reden hiervoor is dat traditionele genderrollen in Europese samenlevingen, waar de werkgelegenheid voor vrouwen wijdverbreid is, een dubbele last vormen, wanneer van vrouwen wordt verwacht dat zij voor het huishouden en kinderen zorgen, terwijl ze tegelijkertijd een carrière nastreven. Bij meer egalitaire regelingen wordt een deel van die last weggenomen, wat de beslissing om nog een kind te krijgen kan vergemakkelijken. Als we deze bevindingen samenvoegen, ontstaat er een tegenstrijdigheid: hoewel is aangetoond dat religiositeit geassocieerd is met traditionele genderrollen en hoge vruchtbaarheid, worden traditionele genderrollen op zichzelf geassocieerd met lagere vruchtbaarheid. Het doel van dit onderzoeksstuk is, om deze schijnbare inconsistentie op te lossen met een analyse van de gezamenlijke en afzonderlijke effecten van religiositeit, genderattitudes en gendergedrag op vruchtbaarheidsintenties en hun verwezenlijking.

Voor deze onderzoek werden gegevens van de eerste en tweede ronde van de GGS van vijf geselecteerde landen (Oostenrijk, Bulgarije, Frankrijk, Georgië en Rusland) gebruikt. Hoewel de resultaten van alle regressiemodellen geen duidelijk patroon vertonen, wordt één belangrijke bevinding in alle modellen herhaald. Telkens wanneer een nieuwe variabele (religiositeit, genderattitudes of gendergedrag) in het model werd geïntroduceerd, veroorzaakte dit weinig veranderingen in de waarden van de andere belangrijke onafhankelijke variabelen. Dit suggereert dat religiositeit, genderattitudes en gendergedrag wat betreft het effect op beslissingen over vruchtbaarheid van elkaar onafhankelijk zijn. Dit zou kunnen betekenen dat religieuze leer met betrekking tot vruchtbaarheid een centrale rol speelt in de relatie tussen

vruchtbaarheid en religiositeit. Bovendien kan het zijn, dat religiositeit op zichzelf niet zo nauw verbonden is met traditionele genderrollen als eerder werd gedacht.

Het derde deel van het onderzoek, **hoofdstuk 4,** richt zich op in welke mate zeer gelovige mensen de gevolgen van ouderschap anders kunnen ervaren dan de minder gelovigen, en of ze er ook anders op zouden kunnen reageren. Veel theoretische modellen gaan ervan uit dat de beslissing om een kind te krijgen gebaseerd is op een beoordeling van de kosten en baten van het krijgen van kinderen. Religiositeit kan besluiten om een kind te krijgen aanmoedigen door de ervaren gevolgen te beïnvloeden. Ten eerste is het mogelijk dat de ervaren gevolgen van het ouderschap als mediatie dienen in het effect van religiositeit op vruchtbaarheid. Religiositeit vergroot de verwachte voordelen van het krijgen van kinderen, bijvoorbeeld door de positieve kanten van het krijgen van kinderen in religieuze doctrines te benadrukken. Religiositeit zou ook de verwachte kosten kunnen verlagen, bijvoorbeeld door de specialisatie van vrouwen te bevorderen om voor kinderen te zorgen, en door het denken over kinderen in materialistische termen te ontmoedigen. Die grotere voordelen en lagere kosten vertalen zich vervolgens in een grotere kans op het plannen van kinderen. Ten tweede is het mogelijk dat een hoge religiositeit invloed heeft op de manier waarop mensen reageren op de kosten en baten van kinderen. Met andere woorden, religiositeit fungeert als een moderator in de relatie tussen waargenomen gevolgen van het krijgen van kinderen en beslissingen over vruchtbaarheid. Vanwege pronatalistische religieuze doctrines zouden zeer gelovige mensen bijvoorbeeld de voorkeur kunnen geven aan het krijgen van kinderen, ongeacht de kosten die dit met zich meebrengt. Op basis van deze redeneringen worden in dit onderzoeksstuk twee hypothesen getoetst. De eerste hypothese is dat zeer gelovigen een hogere vruchtbaarheidsintentie hebben omdat ze hogere voordelen en lagere kosten voor het krijgen van kinderen zien. De tweede hypothese is, dat verwachte kosten een minder prominente rol spelen bij het bepalen van vruchtbaarheidsintenties bij de zeer gelovigen in vergelijking met de minder religieus.

Voor dit deel van het onderzoek zijn gegevens gebruikt uit de tweede ronde van de Poolse GGS. De resultaten met betrekking tot het mediërende effect van de verwachte gevolgen van ouderschap geven aan dat de rol van verwachte baten groter is dan de rol van verwachte kosten. De invloed van religiositeit op vruchtbaarheidsintenties wordt niet zo zeer gemedieerd door ervaren kosten of baten van ouderschap, maar is veel meer een onafhankelijk, direct effect. Dit kan worden verklaard door een sterke invloed van directe pronatalistische leerstellingen die onafhankelijk zijn van kosten en baten. De moderatieanalyse toonde aan dat religiositeit inderdaad de impact van kosten op vruchtbaarheidsintenties matigt, maar in dit onderzoek werd

een dergelijk effect alleen gevonden voor vrouwen. Terwijl voor minder religieuze vrouwen de verwachte kosten van vruchtbare kinderen een sterk negatief effect hebben op de vruchtbaarheidsintenties, hebben voor de zeer religieuze vrouwen, verwachte kosten weinig of geen invloed op de vruchtbaarheidsintenties.

Het laatste deel van het onderzoek**, hoofdstuk 5,** behandelt de invloed van religiositeit op de stabiliteit van vruchtbaarheidsintenties. Vruchtbaarheidsintenties zijn gedurende de levensloop niet stabiel, maar worden voortdurend opnieuw geëvalueerd en aangepast op basis van veranderende omstandigheden, levenssituaties en veranderingen in verwachte kosten van het krijgen van kinderen. Wanneer zeer gelovige mensen over het algemeen lagere kosten van vruchtbaarheid verwachten of hun vruchtbare vruchtbaarheidsbeslissingen niet baseren op de omvang van de verwachte kosten, zoals betoogd in hoofdstuk 4, kan worden verwacht dat gelovige mensen stabielere vruchtbaarheidsintenties hebben. Bovendien is de beslissing om een kind te krijgen niet altijd een rationele beslissing die is geworteld in een beoordeling van de verwachte kosten en baten, maar het kan ook een automatische en / of spontane beslissing zijn op basis van geïnternaliseerde normen, bijvoorbeeld religieuze normen met betrekking tot de vruchtbaarheid. Aangenomen kan worden dat deze beslissingen op basis van normen in de loop van de tijd stabieler zijn dan rationele beslissingen op basis van een evaluatie van baten en kosten, aangezien de kosten en baten zouden kunnen veranderen. Gezien het feit dat zeer gelovigen minder snel vruchtbare plannen zullen veranderen wanneer de levensomstandigheden veranderen, en dat hun vruchtbare plannen al in het begin meer worden beïnvloed door normen en waarden dan door "rationele" beslissingen op basis van een evaluatie van kosten en baten van het krijgen van kinderen, kan worden verwacht dat de zeer gelovigen in de loop van de tijd stabielere vruchtbaarheidsintenties hebben in vergelijking met de minder religieus.

Voor dit onderzoeksstuk werden gegevens van ronden 1-10 van de pairfam van Duitsland gebruikt. Gebruikmakend van ‘group-based trajectory modelling’ werden drie verschillende trajecten voor zowel mannen als vrouwen afzonderlijk gemodelleerd: een hoog en toenemend traject, een middelgroot en stabiel traject en een laag en dalend traject. De resultaten bevestigden dat de zeer gelovigen eerder tot de hoge en toenemende trajectgroep behoren, terwijl de minder gelovigen op hun beurt vaker tot de lage en afnemende trajectgroep behoren. De resultaten zijn vergelijkbaar voor mannen en vrouwen. Belangrijk is dat er geen opmerkelijke verschillen werden gevonden tussen katholieken en lutheranen, wat aangeeft dat ook in Duitsland religiositeit in plaats van religieuze stroming een impact heeft op de

besluitvorming over vruchtbaarheid. Al deze resultaten onderstrepen dat onderzoek naar religiositeit en vruchtbaarheid baat zou kunnen hebben bij het opnemen van stabiliteit en veranderingen in vruchtbaarheidsplannen, en onderzoek naar stabiliteit zou baat kunnen hebben bij het rekening houden met religieusiteit.

Bijdragen en conclusie

De verschillende delen hebben op vier belangrijke manieren bijgedragen aan het onderzoek. Ten eerste werden in hoofdstukken 2 en 3 een landen-vergelijkende aanpak toegepast om verschillen in de impact van religiositeit op de vruchtbaarheid tussen landen verder te onderzoeken en meer licht te werpen op de redenen achter deze verschillen. De resultaten bevestigden de verschillen in de relatie tussen religiositeit en vruchtbaarheid die in eerdere studies werden gevonden. Deze verschillen zijn slechts gedeeltelijk verklaarbaar door het gendersysteem en vertonen geen ander herkenbaar patroon. Uit onderzoek in hoofdstuk 2 blijkt dat de omvang van verschillen tussen landen afhankelijk kan zijn van de gebruikte vruchtbaarheidsindicator, of meer specifiek, de tijdshorizon van vruchtbaarheidsintenties, aangezien een groter aantal landen significante resultaten liet zien wat betreft het effect van religiositeit op langetermijn-vruchtbaarheidsintenties dan bij kortetermijnintenties.

De tweede belangrijke bijdrage betreft het besluitvormingsproces over vruchtbaarheid en bestaat uit het gebruik van vruchtbaarheidsintenties in alle vier de onderzoeksstukken. Patronen voor vruchtbaarheidsidealen en vruchtbaarheidsgedrag die in eerdere studies zijn aangetoond, gelden grotendeels ook voor vruchtbaarheidsintenties. Hoewel de resultaten van hoofdstukken 4 en 5 suggereren dat de zeer gelovigen hun vruchtbaarheidsplannen meer lijken te baseren op normatief-spontane beslissingen in tegenstelling tot de meer op kosten en baten gebaseerde beslissingen van de minder gelovigen, geven de resultaten van hoofdstuk 3 aan dat het net zo waarschijnlijk is voor de zeer gelovigen als voor de minder gelovigen om hun vruchtbaarheidsplannen te realiseren, wat suggereert dat de hogere vruchtbaarheid van de zeer gelovigen gewenst en gepland is.

Een derde bijdrage van dit proefschrift is, dat het op twee verschillende manieren rekening houdt met de genderdimensie. Uit hoofdstuk 2 bleek bijvoorbeeld dat het gendersysteem in sommige gevallen cross-nationale verschillen in de relatie tussen religiositeit en vruchtbaarheidsintenties voor mannen kan verklaren, maar niet voor vrouwen. Hoofdstuk 4

toonde op zijn beurt aan dat een hoge religiositeit ertoe leidt dat ervaren kosten irrelevant worden bij vruchtbaarheidsbeslissingen bij vrouwen, maar niet bij mannen. Dit betekent dat er aanwijzingen zijn voor genderspecifieke verschillen in de mechanismen van hoe religiositeit zich vertaalt in hogere vruchtbaarheid. Aan de andere kant werd er, wat betreft het effect van religiositeit op de vruchtbaarheid zelf, geen duidelijk patroon tussen mannen en vrouwen gevonden, wat het gemengde bewijs van eerdere studies over genderverschillen weerspiegelt.

Onderzoek van onderlinge relaties tussen geslacht en religiositeit maakt ook deel uit van de vierde hoofdbijdrage, namelijk het dieper ingaan op de mechanismen hoe religiositeit zich vertaalt in hogere vruchtbaarheid. Hoofdstuk 3 concludeerde dat religiositeit zijn invloed uitoefent op vruchtbaarheidsintenties en hun realisatie onafhankelijk van gender. Dit staat in contrast met eerder onderzoek waarin gender werd voorgesteld als een van de manieren waarop religiositeit de vruchtbaarheid zou kunnen beïnvloeden, namelijk door traditionele genderrollen te bevorderen. Hoofdstuk 4 concludeerde vervolgens dat slechts een deel van het totale effect van religiositeit op vruchtbaarheidsintenties wordt gemedieerd door ervaren consequenties van ouderschap. Dit resultaat suggereert dat religiositeit een vrij onafhankelijke variabele is in het besluitvormingsproces van vruchtbaarheid. Hoofdstuk 5 concludeerde dat gelovige mensen stabielere vruchtbaarheidsintenties hadden, wat een andere factor zou kunnen zijn van de hogere vruchtbaarheid van de zeer gelovigen.

Religiositeit vormt nog steeds een belangrijke en tamelijk onafhankelijke voorspeller van vruchtbaarheid in geseculariseerd Europa. Dit zal ook demografische gevolgen hebben voor de toekomstige religieuze samenstelling van de bevolking in Europa. Naast bekeringen en mensen die de religie verlaten, zijn verschillen in vruchtbaarheid tussen zeer en minder gelovigen belangrijke drijfveren voor veranderingen in de religieuze samenstelling van een samenleving. Aangezien het aantal mensen dat de religie verlaat het afgelopen decennium sterk is toegenomen, is het minder waarschijnlijk geworden dat de hogere vruchtbaarheidscijfers onder de zeer gelovigen meer gelovigen in Europa zal leiden. Dit betekent echter ook dat de zeer gelovigen in de toekomst een meer afgezonderde groep zullen worden, wat hun perceptie kan veranderen dat zij niet meer tot de reguliere samenleving te behoren. Dit kan ertoe leiden dat de zeer gelovigen zich minder gebonden voelen aan de normen en gebruiken van de meerderheid, inclusief hun vruchtbaarheidsidealen. Daarom kan het voor zeer gelovigen gemakkelijker worden om vast te houden aan grotere gezinnen, wat betekent dat de verschillen in vruchtbaarheid tussen minder en zeer gelovigen waarschijnlijk zullen voortduren.

De resultaten van dit proefschrift geven ook enkele aanwijzingen over de manier waarop zeer gelovigen en minder gelovigen kunnen reageren op verschillende soorten gezinsbeleid dat tot doel heeft de vruchtbaarheidscijfers te verhogen. Eén benadering is een beleid dat erop is gericht de gelijkheid van mannen en vrouwen te vergroten en vrouwen te ontlasten van de dubbele last van huishouden en carrière. Met een dergelijk beleid wordt aangenomen dat gezinsvorming weer gemakkelijker wordt, wat resulteert in een toename van de vruchtbaarheid. Hoofdstuk 3 toonde aan dat het effect van religiositeit op de vruchtbaarheid onafhankelijk is van gendergelijkheid, ondanks de veronderstelling dat een hoge religiositeit en traditionele genderrollen hand in hand gaan. Dit betekent dat gezinsbeleid dat gericht is op het combineren van gezin en carrière zowel de vruchtbaarheid van de zeer als de minder religieuze zou kunnen vergroten. Een andere benadering van pronatalistisch beleid betreft monetaire aspecten, zoals uitkeringen en andere directe subsidies aan gezinnen. De resultaten van hoofdstukken 4 en 5 geven enkele aanwijzingen dat dit beleid de minder gelovigen meer ten goede zou kunnen komen, aangezien zij hun beslissingen over de vruchtbaarheid eerder baseren op de vermeende kosten en baten van het krijgen van kinderen.

De bovenstaande presentatie van de maatschappelijke relevantie en beleidsimplicaties van de positieve relatie tussen religiositeit en vruchtbaarheid heeft aangetoond dat dit onderwerp zeer relevant is en waarschijnlijk in het centrum van demografisch onderzoek zal blijven. Toekomstig onderzoek zou zich dus allereerst simpelweg kunnen richten op het blijven observeren van de trends en bestaand onderzoek bij te werken, om te analyseren hoe de relatie tussen religiositeit en vruchtbaarheid zich in de tijd ontwikkelt. Ten tweede kan hoofdstuk 2 baat hebben bij het opnemen van een groter aantal landen, wat kan leiden tot meer robuuste resultaten met betrekking tot grensoverschrijdende verschillen in de relatie tussen religiositeit en vruchtbaarheid. Een derde belangrijke richting van verder onderzoek is om de relatie tussen religiositeit en vruchtbaarheid in niet-christelijke contexten dieper te onderzoeken, aangezien onderzoek in deze contexten tot nu toe zeldzaam is geweest. Ten vierde zou kunnen worden onderzocht hoe religiositeit wordt beïnvloed door vruchtbaarheidsdeterminanten, aangezien het mogelijk is dat het effect van religiositeit op vruchtbaarheid ook afhankelijk is van het opleidingsniveau, de economische omstandigheden, de leefomgeving of enige andere factor die de vruchtbaarheidsbeslissingen zelf beïnvloedt. En tot slot zou verder onderzoek kunnen analyseren of religieusiteit verschilt in haar invloed op de beslissing om een eerste kind, tweede kind, derde kind, enz. te krijgen, aangezien de relaties die in dit artikel worden geanalyseerd, kunnen verschillen naargelang gezinsgrootte.

Al met al is religieusiteit nog steeds een belangrijke voorspeller van reproductieve beslissingen in een seculariserend Europa. De relatie tussen religiositeit en vruchtbaarheid is niet eenvoudig, maar een complex proces dat van veel andere variabelen afhangt. Dit proefschrift heeft bijgedragen aan een beter begrip van deze complexe relaties en hoopt verder onderzoek naar dit belangrijke demografische onderwerp te motiveren.

About the author

Christoph Bein was born on September 20, 1989 in Bad Soden am Taunus, Germany. He received his Abitur degree from the Main-Taunus-Schule in Hofheim, Germany. In 2013, he completed his Bachelor's degree in Business and Economics at the University of Jena. He subsequently pursued a Master's degree in Demography at the University of Rostock and graduated in 2015. During his studies, he worked as a student assistant at the Max Planck Institute for Demographic Research in Rostock. After graduating, he took part in the European Doctoral School of Demography, set in Rostock and Rome. Starting in September 2016, he worked as a PhD student at the Netherlands Interdisciplinary Demographic Institute (NIDI) in The Hague and was affiliated with the Sociology Department at the University of Groningen. He presented his research at national and international conferences, such as the Dutch Demography Day 2017, GGP User Conference 2017, DGD Annual Meeting (2018 and 2019), European Population Conference 2018 and the PAA Annual Meeting 2019. In 2019, he spent two months as a guest researcher at the Federal Institute of Population Research in Wiesbaden, Germany as part of his PhD project.