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DISCUSSION PAPER SERIES

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ABSTRACT

Religion, Ideology and Fertility

In this paper, we investigate how attachment to religion is connected to conservative gender role beliefs and to what extent they, in turn, materialize into fertility decisions. We also test the hypothesis that exposure to gender-progressive political regimes and ideology can weaken this chain of effects, by eroding either the way religion shapes gender roles or the impact of gender beliefs on fertility. Our empirical analysis is based on World Value Survey (WVS) data for five Muslim ex-Soviet Republics vis-à-vis seven other Muslim countries in the neighbouring regions. Results highlight that higher attachment to religion is in both groups associated with more traditional gender roles; however, the link is significantly weaker for the individuals of former communist countries who spent their formative age under Soviet rule. More conservative gender beliefs, in turn, do not translate into higher fertility in Muslim ex-USSR Republics, while the opposite holds for other Muslim countries.

JEL Classification: J13, J16, Z12, P20

Keywords: religion, gender norms, fertility, ex-Ussr

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1. Introduction

Despite the increasing pervasiveness of secularisation processes, religion still plays an influential role in many societies around the globe, shaping individuals' choices related to private and public life. Our focus here is on the impact of religiosity on fertility, a topic that has attracted extensive research in recent sociological and demographic research (see Hubert, 2015). While most contributions agree on the existence of a positive relationship between attachment to religion and fertility (e.g., Adserà, 2006; Peri-Rotem, 2016), the link does not seem to be universal and its magnitude varies considerably across countries (Philipov and Berghammer, 2012; Guetto et al., 2015). This suggests that country-level cultural or institutional factors may moderate the relationship. Our research contributes to the stream of literature that emphasises how gender regimes shape the existence and magnitude of the individual-level linkage between religion and fertility (Bein et al., 2021a; Goldscheider, 2006). One underlying assumption in this literature, not always considered and/or modelled explicitly in existing empirical studies, is that one important channel through which religion affects fertility is related to the way religion shapes individual beliefs about gender roles, childbearing, and family values related to parenthood. Only once this first link is established it is possible to assess whether, and to what extent, such a set of religion-driven beliefs reverberates on fertility. We contend that disentangling this two-stage process is a crucial preliminary task to understand where the moderating effect of gender regimes materializes. This can indeed happen either in the first stage (a progressive gender regime prevents religion to shape conservative gender/family norms), in the second stage (by dampening the effects of conservative gender norms on fertility), or in both the first and the second stages.

This paper aims to shed light on this complex tangle of mechanisms both conceptually and empirically. On the first side, we start by discussing how attachment to religion can be conducive to conservative gender role beliefs and how they, in turn, can materialize into fertility decisions. Then, we illustrate how exposure to gender-progressive political regimes and ideology can weaken this chain of effects by eroding either the way religion shapes gender roles or the impact of gender beliefs on fertility. Grounded on this literature-based conceptual framework, we derive our research hypotheses. On the empirical side, we propose a model that allows: (i) rendering explicit the channels through which religion affects fertility (a two-stage model), and (ii) identifying the impact of gender regimes (interaction term/split sample analysis). Our empirical analysis is based on the World Value Survey (WVS) data, from which we extract a sample of countries with the same religious majority but that experienced radically different political regimes, also in terms of gender norms. Namely, we compare the outcomes obtained for Muslim-majority countries that were part of the

Soviet Union until its collapse in 1990, in which gender equality was one of the key ideological tenets, with the evidence emerging for other Muslim-dominated countries in the same (or neighbouring) region. The first group includes four Republics of Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan) and one country of the South Caucasian region (Azerbaijan). The second group includes two oil-rich countries (Kuwait and Qatar) and five low-income countries of the same broad geographical area (Iran, Iraq, Jordan, Lebanon, and Pakistan). The choice of limiting the sample to Muslim-dominated societies serves the purpose of increasing the cultural homogeneity of the contexts (as driven by the common prevailing religious background) and, this way, limiting the role of confounding factors in the identification of the relationships of interest (e.g., different religions' stances on birth control, abortion, etc.).

Our results indicate that: (i) a stronger attachment to religion in the Muslim countries of our sample is related to more conservative beliefs on gender equality, and (ii) more conservative gender role beliefs are associated with a larger number of children. The split sample analysis highlights that heterogeneity exists between Muslim countries that were exposed to the Soviet regime/ideology and those that were not. First, even though attachment to religion is associated with more conservative gender roles in ex-USSR too, if we restrict the sample to the individuals who spent their formative age under the Soviet Union, this effect disappears. Second, the pro-fertility effect of more conservative gender beliefs is driven by the Muslim-majority countries that were not part of the Soviet Union, as the effect is insignificant for the former USSR Muslim countries. We interpret this evidence as corroborative to the idea that the ideological and institutional architecture implemented by the Soviet regime to promote the social, political, and economic empowerment of women managed to prevent conservative religious beliefs to translate into fertility decisions that would limit an active role of women into the socio-economic sphere.

The paper speaks to different literature backgrounds, which include: (i) the relationship between religion and gender role beliefs and stereotypes; (ii) how gender beliefs shape the role of women in society and within the household, including household responsibilities and childrearing; (iii) the capacity of gender-progressive political and institutional regimes to affect *de facto* the role of religion in society, temporarily or permanently. Our original contribution to this body of literature is threefold. First, we develop a literature-based conceptual framework that links sequentially attachment to religion, gender roles, and fertility decisions. Such aspects have indeed been modelled and discussed before, but separately. Second, to test our predictions we use an empirical micro-level approach able to model the sequence of effects just described and, at the same time, to account for the complex interactions between the variables of interest and to

address identification issues credibly. There are indeed critical endogeneity issues related to omitted variables and reverse causality that can materialize into fatal estimation biases, that need to be addressed properly. As explained later, this is done by estimating a recursive system of simultaneous equations. Third, we implement our empirical analysis on a set of countries for which the aspects of interest here have been under-researched, despite providing a suitable ground to test our hypotheses. While being dominated by the same religious majority, only some of them have been for many decades ruled by a regime with a clear ideological commitment and policy/institutional architecture in favour of a more active role of women in social, political, and economic life.

The following of the paper is structured as follows. In the next section, we provide a bird eye view of the historical, political, and institutional context in post-Soviet Union Muslim countries, with specific reference to its implications for religion, the role of women in the public sphere, and gender equality. In section 3 we describe our literature-based conceptual framework and sketch out our research hypotheses. Section 4 illustrates the dataset used in the empirical analysis, some descriptive evidence on the countries considered, and the key characteristics of our sample. In section 5 we present the empirical model and the econometric strategy adopted to address the key identification challenges of our analysis. The following section (6) illustrates and discusses our results. Section 7 concludes.

2. The historical, political, and institutional context in Ex-USSR Muslim countries

2.1 Muslim religion during the Soviet Union and after the independence

After winning the civil war following the Russian October Revolution, the Soviet government proceeded to eliminate all Islamic traditions in their social and cultural aspects (Marshall, 1971). This pressure on religion by the Soviet regime was, needless to say, not exclusively directed against Islam. Rather Christianity was the main target of its repression, as did the destruction of churches, their conversion to other purposes (known as "atheist museums", etc.), and the confiscation of church property, etc.; equally, there was a systematic abolition of mosques, madrassas, etc. (Meerson, 1980) in Islamic spheres. Religious freedom was not completely absent in the USSR and congregations did exist, but religious 'propaganda' was illegal, i.e., proselytising was not allowed; in the 1930s alone more than tens of thousands of people were convicted in religious cases.

This situation changed to a certain extent during the Second World War, when the all-out warfare required the mobilisation of various strata of society, and the repression of religion softened (Fomin, 2003).

This was the case for various religions, including Christianity, but in the case of Islam, the establishment of the Central Asia Kazakhstan Muslim Sect in 1943 was emblematic. The establishment of an official, regime-recognized Islam was a major shift.

Later, at the end of the 1980s, at the end of perestroika, the Soviet regime, namely then General Secretary Gorbachev, announced a rapprochement with religious organisations, which was a milestone and is understood to have led to the subsequent Islamic revival (Pravda, 1988; Boone, 1992). For those who saw the collapse of the Soviet political and economic system, Islam would have been seen as a new ethical and social guide. Mosques and madrassas were rebuilt, and an expansion of schools for the study of the Koran also occurred.

It was inevitable that after the collapse of the Soviet regime, which was fundamentally negative towards religion, Islam would have regained a central cultural and political in Central Asia (Olimova and Tolipov, 2011). The complex combination of nationalism and Islam developed in tandem and, depending on the specific contexts, took different forms. In Central Asian countries where authoritarian political regimes have been established, the growth of a docile Islam has been encouraged in a way that has been incorporated into these regimes (Jones, 2017). On the other hand, specific countries have implemented a strong and clear suppression of so-called Islamic 'fundamentalism', in an attempt to limit the growing pervasiveness of the Islamic revival. For example, despite the important role played by religion in social life, it is rare to see women in Uzbekistan wearing the hijab worn by Muslim women, and it is legally prohibited in Tajikistan (Radio Free Europe, December 18, 2019).

2.2 Gender ideology, policies, and fertility policies during the Soviet Union and after the independence

At the beginning of the revolution, the ideological 'emancipation of women' was proclaimed, and abortion was legalised in 1920, leading to a rapid increase in the number of abortions. In 1944, the Family Law established the so-called 'Mother Hero' award for women who gave birth to a large number of children and also improved and increased childcare allowances (Selezneva, 2017). Another background is that the Soviet Union experienced the largest population loss of all the participating countries in the Second World War. Before and after the Second World War, it is estimated that more than 20 million people were lost throughout the Soviet Union. Although many civilians were included, most soldiers were, needless to say, men of reproductive age. Because of this situation, the USSR faced a shortage of workers immediately after

the war. In general, therefore, it can be said that the USSR continued to adopt measures to encourage childbearing.

The Soviet regime's attitude towards women was ambivalent. Men and women were equally expected to participate in socialist construction as workers, and women always accounted for most of all industrial workers, not only during the war but also after 1970 (TsSU SSSR, various years). At the same time, however, not only childbirth but also childcare was clearly stated in government documents as the responsibility of women¹. During the Perestroika period, a reactionary view came to be discussed. Some argued that women were over-represented in labour, or that the Soviet-style emancipation of women, which demanded their participation in productive activities, was rather a form of forced labour, and that it was necessary for women to obtain the right not to work (Zaslavskaya, 1990).

In Central Asia, after the collapse of the Soviet Union, the women's liberation movement is sometimes seen as a negative legacy of the Soviet era, with a negative attitude towards women's rights in the name of traditional norms. In Uzbekistan and Tajikistan, it is also noted that manifestations of domestic violence are common (Human Rights Watch, 2001). Empirical analyses showed that in the former Soviet Central Asian countries, younger women have a lower probability of being employed full-time, the social values are, as can be expected, very conservative and this trend is common among ex-Soviet Central Asian states (Karabchuk et al., 2021). In line with this, the fertility rates in the Central Asian countries are relatively high and the population growth rates remain high (WDI, various years)².

3. Literature-based conceptual framework and research hypotheses

Religion can affect fertility through several intertwined channels. The first, direct, one is the stance of religion on sexual and reproductive behaviours, i.e., on the use of contraceptives, on the attitude towards extramarital births, and the age of entrance into sexual activity (Manlove et al. 2008; Eltigani, 2005). While there is agreement on the fact that all major religious traditions place a strong emphasis on family and this normally has pronatalist implications, the magnitude of the impact is uncertain as remarkable differences exist across confessions regarding birth control and family planning. Protestant and Orthodox denominations are for example more permissive on the use of contraception (Hubert, 2015) compared to

¹ *Sobranie zakonov i rasporiazhenii raboche-krest'ianskogo pravitel'stva SSSR, No.34, 1936, item 309. (in Russian)*

² The exception is Kazakhstan, where the exodus of ethnic Russians caused a major population decline immediately after the collapse of the Soviet Union; however, even in this country, the population has been growing steadily since 2001.

the Catholic Church (Srikanthan and Reid, 2008). In the Islamic tradition, less hierarchical and more pluralist, the most appropriate generalization is that birth control is permissible but not typically or explicitly promoted (Roudi-Fahimi, 2004; Westoff and Frejka, 2007). As in our empirical analysis we focus on Islam-majority countries in which a very large share of the individuals sampled is Muslim (see section 4), factors related to cross-religion differences in family planning can be considered of limited importance for our aims³.

Additional mechanisms reported by the literature refer to the fact that more religious individuals tend to have higher fertility due to their belief in a higher power that will help them in raising children, lifting them from the economic and non-economic worries of parenthood (Philipov, 2011; Bein et al., 2021b).

Another way religion affects fertility, which is more relevant for our aims, is through the promotion of specific family models and ideals, that directly or indirectly imply a stance on the role of women within the family and in the social, political, and economic life. We focus on these aspects in the following of this section.

3.1 Religion and gender role beliefs

Religion is important in shaping the culture and values of a society, by prescribing a wide range of norms for social behaviour. It seems therefore plausible that religious attitudes affect, among other things, traditional gender roles on the division of labour within households. The link between religious practices and ideologies and gender role attitudes has been the object of extensive literature (e.g., Morgan, 1987; Voicu, 2009; Voicu et al., 2009; Sherkat and Ellison, 1999; Ammons and Edgell, 2007). A substantial agreement exists on the fact that, despite the secularization processes of the last decades and the mitigating role of individual factors, more religious individuals are more likely to support traditional family models and gender roles (Houseknecht and Pankhurst, 2000). Differences across traditions have been documented, but most religions explicitly promote traditional family models strongly based on parenthood, the importance of marriage, and the crucial role of women as mothers and caregivers (McQuillan, 2004). In Christianity, men have been considered traditionally better suited to leadership roles than women both in home affairs and in church organisation (Pulley, 1993). However, it has been highlighted that such norms are significantly affected by differences in educational attainment, life experience, and age (e.g., Baker and Terpstra, 1986;

³ This does not mean that the information on the non-Muslim religious affiliation of some individuals should be ignored or neglected. As explained in Section 4, we include as a control variable for both gender beliefs and fertility a dummy variable that identifies whether the individual is a Muslim or belongs to another religion.

Glick et al., 2002). Within Christianity, however, differences exist: The Orthodox tradition is the most conservative concerning gender roles, while the Protestant one is the most liberal. The Catholic heritage is situated in between the two (Kalmijn, 2003; Inglehart and Welzel, 2005; Wilcox et al., 2004).

As regards the Islamic tradition, differences in gender norms across countries with a Muslim majority have been documented (Gouda and Potrafke, 2016) and, as in the case of Christianity, quantitative studies have shown that higher levels of education and progressive social environments can mitigate conservative attitudes (Igarasih and Kumo, 2021). Feminist movements, also increasingly advocate greater gender equality and social justice, citing religious teachings and principles to support their claims (Bouga and Gairin, 2017; Khan, 2008). However, other interpretations describe Islam as inimical to women's rights (e.g., An- Na'im, 2008; Syed et al., 2009). Gender inequality is taken for granted, a priori, as a principle in classical Islamic jurisprudence texts (Mir- Hosseini, 2003) and, in the Islamic divine plan, the woman's primary role and the main contribution to society are to bear and rear children (Sharabi, 1988) As a matter of facts, there is extensive evidence of wide gender asymmetries in both the private and the public sphere, that materialize into commonly accepted discrimination practices against women *de jure* and *de facto* (Gutmann and Voigt, 2015). This materializes in a marked gender asymmetry in household duties and participation in social, economic, and political life (e.g., Nabwani, 2022).

3.2 Gender role beliefs and fertility

Explanations of the heterogeneity in fertility levels and patterns across countries have increasingly emphasized the role of cross-cultural variation in the extent of gender equality and gender norms (Anderson and Kohler, 2015; Arpiño et al., 2015; Esping-Andersen and Biliari, 2015). The improvement in the status of women in society, as represented for example by the advancement of educational attainment level or labour participation ratio, has been associated with lower levels of fertility, as a result of the evolution of gender asymmetries in market and non-market workloads. Enhanced participation of women in the paid labour market has indeed greatly increased the opportunity cost of marriage and childbearing and led to a decline in fertility (Becker, 1981; Tsuya, 2019). Only to a limited extent, this effect has been dampened by a parallel improvement in gender equality in household duties, which progressed at a much slower pace (McDonald, 2000 and 2006). The institutional context has also been documented as playing a crucial role: countries like Scandinavia, the UK, France, and North America have succeeded in reducing the opportunity

costs of marriage, childbirth, and child-rearing by socialized childcare and improved gender equality infrastructures, despite the increase in women's labour participation (Rindfuss et al., 2003).

In societies where the tradition of gender complementarity is still pervasive, fertility rates tend to be higher (Brinton and Lee, 2016). In context with more pronounced family orientation, traditional norms around marriage and family are more pervasive than in individualist societies and the gender system is less flexible; as a consequence, women are more likely to be expected to fulfil their traditional roles as wives and mothers, their labour market participation remains low and fertility rates tend to be higher. Closely related to the aims of this paper, this seems to be the case in a societal context where religious beliefs nurture more conservative gender attitudes, as in certain Muslim contexts (Lassassi and Tansel, 2020), despite some recent studies pointing out that better access to information, education, and employment opportunities are conducive to lower marriage and fertility rates (Amongin et al., 2020; Viollaz and Winkler, 2022; Samari, 2017). Despite such interesting novel insights, quantitative research on the countries of the Middle East remains extremely limited; on the other hand, and closely related to the present paper, more empirical research has been conducted on the Central Asian countries that once constituted the former Soviet Union, especially in recent years.

Among them, although concerned with the fertility trends after the demise of the Soviet regime only, Kozlov (2019) showed that in the regions of the Russian North Caucasus, where Muslims were the majority of the population, the religiosity of respondents was related to higher fertility, regardless of family policy issues. This seems to suggest that an Islamic revival within a given society can support fertility. Kazenin and Kozlov (2021a), again in the Russian Caucasus, observed that the religious attitude of the respondent and the power of elder people in the household affect fertility positively, but higher education attainment decreases the probability of giving birth. Kazenin and Kozlov (2021b) described the stability of age patterns of women's fertility in Kyrgyzstan, with its peak remaining below 25 years old.

3.3 Research hypotheses

In the previous subsections (3.1 and 3.2) we have reviewed the main research contributions on the relationship between religious norms and gender ideology, particularly in Muslim-majority societies, and on the impact of gender norms on fertility. We have also highlighted that the drivers of fertility are multifaceted; in particular, higher levels of education and women's participation in the workforce reduce the probability of childbearing and the number of live births, not only in developed countries but also in Muslim countries.

However, once those factors are accounted for, the extensive body of existing knowledge suggests that a stronger attachment to religious norms is likely to nurture more conservative gender inequality beliefs and that the latter, in turn, are associated with higher fertility. Our first contention supports the idea that the two effects (religion on gender norms; gender norms on fertility) might be sequentially linked, i.e., that religion affects fertility *through* its impact on gender roles. More specifically, our first research hypothesis (H1) is that, once other observable personal characteristics are controlled for, *a stronger attachment to religion is associated with more conservative gender roles, which in turn favour higher levels of fertility.*

In Section 2 we have summarized the literature and evidence on the Soviet Union's religious and gender policies, as well as the trend towards a return to Islam and gender norms observed in Central Asia after its collapse. Our second research interest is on the role that exposure to specific ideological and institutional regimes, which take a clear stance on the role of religion in societal life and on gender equality norms, exerts on the chain of effects described in H1. In particular, the Soviet Union imposed on one hand extremely anti-religious education and policies; on the other hand, it promoted gender progressive policies that triggered active participation of women in economic, political, and social life. Our second research hypothesis (H2) is *that the impact of religion on fertility through gender role beliefs is weaker in Muslim countries that were part of the Soviet Union*, compared to other contexts with a similar religious background. In principle, this weaker role of religion can materialize on either one or both of the following links: (i) on the first stage, as religious attachment is less viable to affect gender roles due to the Soviet policies aimed to reduce the influence of religion on political and social life and to promote a culture of gender equality; (ii) on the second stage, as gender role beliefs are less able to shape fertility decisions due to the persistence of Soviet cultural and institutional infrastructures, that promote active involvement and participation of women in the labour market and the socio-political life.

4. Data and descriptive evidence

For our analysis, we use version V3.0 of the World Values Survey (WVS) time-series dataset. The dataset covers the WVS surveys completed across the period 1981-2022 and, given the availability of the information of interest for the aims of our research, we use waves 5 (2005-2008), 6 (2010-2014), and 7 (2017-2022). The WVS is a worldwide network of researchers studying values and their impact on social and political life. The network mainly collects data on people's values via extensive surveys among representative samples of nearly 90 per cent of the world's population. For each country/wave the representative sample is composed

of around 1,200 individuals for whom information is collected in a broad range of domains that include: social values, attitudes and stereotypes, happiness and well-being, social capital, trust and organizational membership, economic values, corruption, migration, security, postmaterialist attitudes, science and technology, religious values, ethical values and norms, political interest and political participation, political culture and political regimes, and demographics. The sample is not longitudinal, but the version we use here (WVS Time Series or Longitudinal Multiple Wave dataset) includes a relatively large number of harmonized variables in an integrated country/year pooled sample (Inglehart et al., 2022).

In view of the availability of information/variables needed for our study, we have assembled a dataset that covers 12 Muslim countries, that we classify into three groups. The first one (*Ex_Ussr*) includes the following Muslim countries that were part of the Soviet Union: Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan. The second group is composed of countries from the Gulf area (Kuwait and Qatar), that we label as *Oil_Rich* countries, to acknowledge and control for the specificities of a development pattern dominantly driven by the presence of natural resources (see Ross, 2008, and Luong and Weintal, 2010). The third group (*Other*) includes other countries of the middle east/south Asia region in a development stage similar to the *Ex_Ussr* group: Iran, Iraq, Jordan, Lebanon, and Pakistan⁴. The total sample is composed of 29,038 individuals, of which 8,967 belong to *Ex_Ussr* countries and 20,071 to the remaining groups (2,143 and 17,928 individuals in the *Oil_rich* and the *Other* subsamples, respectively). Our sample includes both men and women aged 15 years or more because, consistent with our conceptual framework, we are interested in analysing the pervasiveness of the impact of religion on the fertility behaviours of all members of society. This is also functional to keep the number of observations to a size that enables the replication of the econometric analysis for subsamples of individuals (see section 6). To test the robustness of our results, however, we run the baseline models restricting the sample to women of reproductive age (15-45 and 15-49 years old) (see section 6).

The core variables for the aims of our analysis are, besides the number of children (nchild - variable X011), attachment to religion (religbelief), and the attitude towards gender inequality (genineq).

The adoption of the number of children as a metric of fertility, driven by data availability, means that we refer to fertility's actual behaviour, rather than looking at 'ideals/desires' (i.e., wishes related to

⁴ Unfortunately, not all countries are available for all waves used in the analysis, except for Iraq and Jordan. The coverage for the remaining country is the following: Iran (waves 5 and 7), Kazakhstan, Kyrgyzstan, Lebanon, and Pakistan (waves 6 and 7), Azerbaijan, Uzbekistan, Kuwait and Qatar (wave 6), Tajikistan (wave 7).

childbearing) or ‘intentions’ (i.e., the plan to have a child or not in a given timeframe) (see Mynarska and Rytel, 2018; Mencarini et al., 2015). The metric of attachment to religion (*regbelief*) is constructed by reverting the scale of the Welzel ‘*disbelief*’ index (variable Y012), which is a 3-item index measuring the individual culture’s distance to “sacred” sources of authority in the domain of religious authority (faith, commitment, practice) (see Welzel, 2013)⁵. Our index of attachment to religion (*regbelief*) ranges from 0 to 1 and increases the more religion matters to the respondent. The metric, by construction, encompasses and combines the dimensions of religiosity identified by the literature as important and complementary (see Leher, 2004), i.e.: the importance of God/religion in own’s life (Zhang, 2008); a self-assessment of religiosity (Philipov and Berghammer, 2007); and the frequency of attendance of religious services (Berghammer, 2012).

The measure of an individual’s attitude towards gender inequality (*genineq*) is constructed, in a way similar to *regbelief*, by reverting the scale of the Welzel ‘*equality*’ index (variable Y022), a 3-item index measuring individual culture’s emphasis on universal freedoms in the domain of gender equality (support of women’s equal access to education, jobs, and power)⁶. Our gender inequality index (*genineq*) ranges from 0 to 1 and increases with the more conservative (i.e., against gender equality) orientation of the respondent.

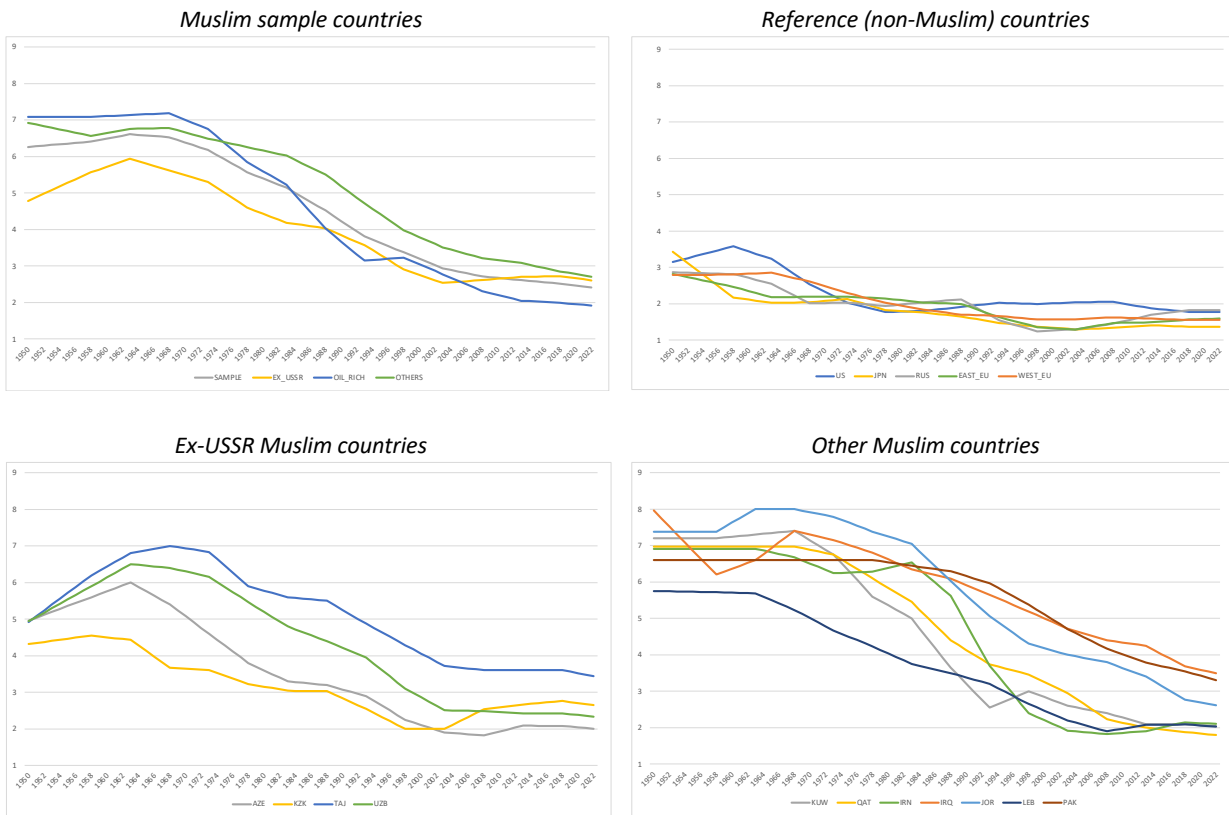
Other control variables included in our empirical model are the household income decile of the respondent (*incdecile* - variable X047_WVS), her/his education level (*educ* – variable X025R – coded into three classes: lower, middle, upper), age (variable X003), gender (female =1, variable X001), marital status (married or cohabitant =1, 0 otherwise, variable X007), religious affiliation (Muslim =1, 0 otherwise – variable F025), employment status (employed=1, 0 otherwise, variable X028) and place of residence (rural area or small village =1, 0 otherwise – variable X049).

⁵ The index is computed as the average of three original WVS variables: (i) importance of religion in the individual’s life (variable A006); (ii) self-definition of the respondent as either a religious person, a non-religious person or an atheist (F034); and (iii) how often the respondent attends religious services (F028). The Welzel ‘*disbelief*’ index ranges from 0 (when the least secular position is taken on all 3 items) to a maximum of 1 (when the most secular position is taken). See the Online Appendix to Welzel (2013) at www.cambridge.org/welzel (pp. 15-27) for further details.

⁶ The index is computed as the average of three original WVS variables: (i) whether men should have a priority over women in employment when jobs are scarce (variable C001); (ii) whether men make better political leaders than women do (D059); and (iii) whether attending university is more important for a boy than for a girl (D060). The Welzel ‘*equality*’ index ranges from 0 (when the least emancipative position is taken on all 3 items) to a maximum of 1 (when the most emancipative position is taken on all 3 items). See the Online Appendix to Welzel (2013) (www.cambridge.org/welzel, pp. 15-27) for further details.

To provide a first snapshot of the trends in fertility in the countries of interest, we compare in Figure 1 the evolution in total fertility rates (births per woman, UN-World Population Prospects data) in the Muslim countries considered and in other reference economies (US, Japan, Russia Western Europe and Eastern Europe). The top two panels highlight that the Muslim sample countries have virtually reached only in recent years the fertility rates that reference countries already exhibited in the first decade observed (the 1950s).

Figure 1. Fertility rates (births per woman) in Muslim sample countries and reference countries (1950-2022)



Source: Our elaborations on United Nations - World Population Prospects data

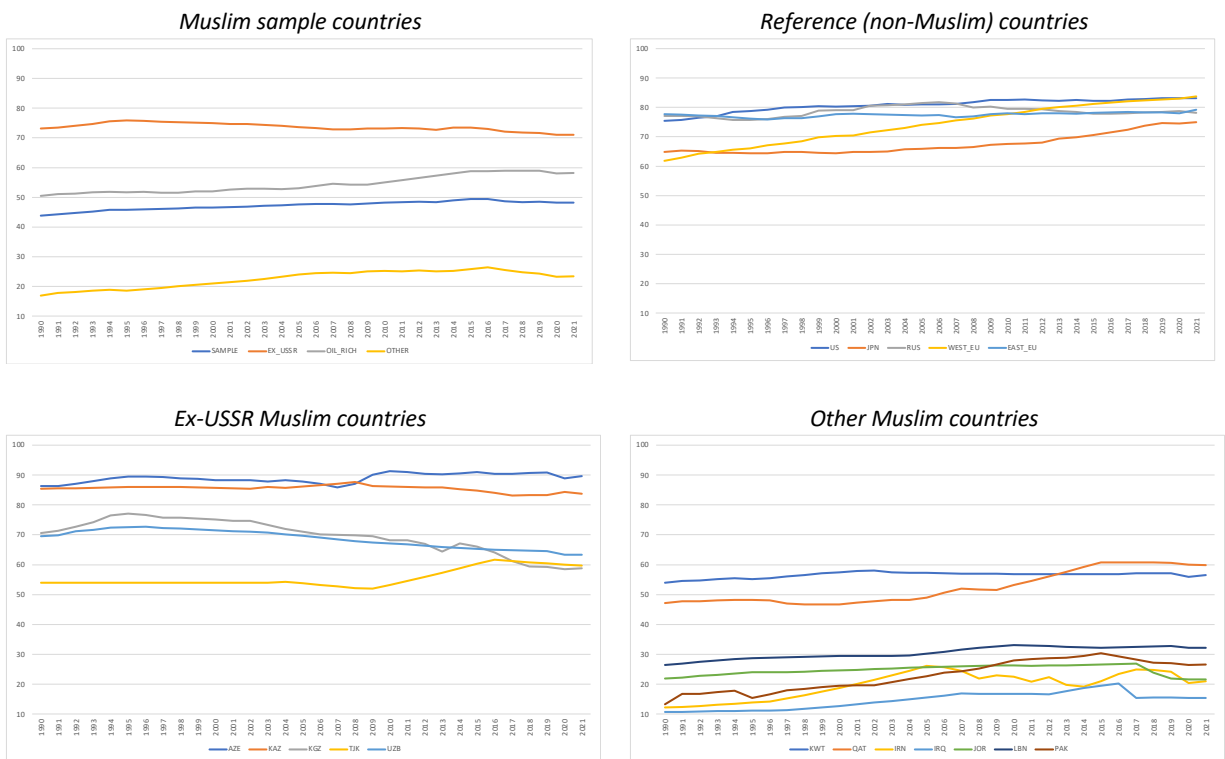
Notes: The *Ex_USSR* aggregate does not include Kyrgyzstan due to data unavailability. The *EAST_EU* aggregate includes Bulgaria, Romania, Poland, Estonia, Lithuania, Latvia, Croatia, and Slovenia. The *WEST_EU* aggregate includes Austria, Belgium, France, Germany, Denmark, Finland, Ireland, Sweden, Spain, Portugal, Italy, Greece, Cyprus, and Malta.

However, within the Muslim countries considered, a significant heterogeneity emerges between those that were part of the Soviet Union and the remaining ones. From the top-left panel we notice that, on average, the fertility rates of the former were significantly lower throughout the whole period. The bottom panels of Figure 1 highlight that in the *Ex-USSR* Muslim countries, fertility increased in the first decade and started to decline already during the 1960s. On the contrary (bottom-right panel), except for Lebanon, fertility persisted around 7 for a longer period: until the end of the 1970s for the ‘oil-rich’ countries and Iran;

until the beginning of the 80s for the remaining ones. In addition, it is apparent how, compared to the second subsample, the trend within the former USSR Muslim countries is relatively homogeneous; this can be seen as evidence corroborative of the idea that exposure to the same institutional and ideological framework produced a specific fertility pattern.

In Figure 2 we plot the gender gap in labour market participation (1990-2021, World Development Indicators data) of our countries of interest vis-à-vis other reference economies. The difference between the former Soviet Union and the remaining Muslim countries is even more striking than that in fertility rates. At the outset of the transition towards a market economy regime, their gender asymmetry in labour market participation was on average aligned to the reference (non-Muslim) countries (top-right panel in Figure 2); for the first two decades, the relative labour force participation of women was even higher than in Japan and Western Europe.

Figure 2. Gender labour force participation gap in Muslim sample countries and reference countries, 1990-2021



Source: Our elaborations on World Bank – World Development Indicators data

Notes: The Ex_USSR aggregate does not include Kyrgyzstan due to data unavailability. The EAST_EU aggregate includes Bulgaria, Romania, Poland, Estonia, Lithuania, Latvia, Croatia, and Slovenia. The WEST_EU aggregate includes Austria, Belgium, France, Germany, Denmark, Finland, Ireland, Sweden, Spain, Portugal, Italy, Greece, Cyprus, and Malta.

In the meanwhile, the other Muslim countries of the sample were instead still experiencing almost double levels of gender asymmetry (three times higher for the low-income Muslim countries of Central Asia). In such contexts, at the beginning of the 2020s, labour market participation for women is still one-fifth the level for men. The bottom panels of Figure 2 confirm this evidence for the single countries of our sample: the only economies approaching the gender gap in participation rates of the (more unequal) Ex-USSR countries are the high-income countries from the Gulf region (Kuwait and Qatar). The remaining ones are stuck at much lower levels. On the contrary, Azerbaijan and Kazakhstan are (and already were in the early 1990s) close to substantial gender parity in labour participation rates.

Table 1 provides a descriptive overview of the sample characteristics (pooling all WVS waves available, 2005-2022), contrasted with the reference countries in the same period.

Table 1. Sample characteristics: demographics, family, and employment

		Sample	Ex_Ussr	Oil_rich	Other	US	JAP	RUS	East_EU	West_EU
N. of children	mean	2.113	2.032	2.208	2.136	1.755	1.626	1.375	1.557	1.481
	<i>cv</i>	<i>0.869</i>	<i>0.783</i>	<i>0.899</i>	<i>0.896</i>	<i>0.882</i>	<i>0.725</i>	<i>0.761</i>	<i>0.770</i>	<i>0.893</i>
Age	mean	37.398	39.389	35.216	36.810	45.283	47.604	44.465	46.050	46.613
	<i>cv</i>	<i>0.379</i>	<i>0.377</i>	<i>0.339</i>	<i>0.382</i>	<i>0.390</i>	<i>0.351</i>	<i>0.379</i>	<i>0.373</i>	<i>0.378</i>
Female	mean	0.507	0.551	0.460	0.494	0.510	0.531	0.567	0.540	0.502
	<i>cv</i>	<i>0.986</i>	<i>0.903</i>	<i>1.084</i>	<i>1.012</i>	<i>0.981</i>	<i>0.941</i>	<i>0.875</i>	<i>0.923</i>	<i>0.997</i>
rural_village	mean	0.267	0.448	0.050	0.216	0.086	0.001	0.223	0.397	0.198
	<i>cv</i>	<i>1.657</i>	<i>1.109</i>	<i>4.351</i>	<i>1.904</i>	<i>3.256</i>	<i>39.829</i>	<i>1.867</i>	<i>1.233</i>	<i>2.012</i>
Married_Cohab.	mean	0.673	0.678	0.626	0.678	0.608	0.726	0.596	0.658	0.634
	<i>cv</i>	<i>0.697</i>	<i>0.689</i>	<i>0.774</i>	<i>0.690</i>	<i>0.803</i>	<i>0.615</i>	<i>0.824</i>	<i>0.721</i>	<i>0.760</i>
Muslim	mean	0.723	0.829	0.988	0.638	0.003	0.000	0.052	0.011	0.056
	<i>cv</i>	<i>0.619</i>	<i>0.454</i>	<i>0.109</i>	<i>0.753</i>	<i>17.149</i>	.	<i>4.286</i>	<i>9.431</i>	<i>4.108</i>
Employed	mean	0.487	0.579	0.594	0.428	0.615	0.649	0.613	0.529	0.534
	<i>cv</i>	<i>1.026</i>	<i>0.852</i>	<i>0.826</i>	<i>1.156</i>	<i>0.791</i>	<i>0.735</i>	<i>0.794</i>	<i>0.944</i>	<i>0.935</i>
Employed_male	mean	0.689	0.668	0.776	0.684	0.676	0.775	0.694	0.597	0.598
	<i>cv</i>	<i>0.672</i>	<i>0.705</i>	<i>0.538</i>	<i>0.679</i>	<i>0.692</i>	<i>0.539</i>	<i>0.665</i>	<i>0.822</i>	<i>0.820</i>
Employed_female	mean	0.291	0.507	0.384	0.164	0.556	0.538	0.552	0.471	0.472
	<i>cv</i>	<i>1.560</i>	<i>0.986</i>	<i>1.267</i>	<i>2.257</i>	<i>0.893</i>	<i>0.927</i>	<i>0.901</i>	<i>1.060</i>	<i>1.057</i>

Source: Our elaborations on WVS data, waves 5, 6, and 7 (pooled)

Notes: 'Sample' includes all Muslim countries belonging to subsamples 'Ex-Ussr', 'Oil-rich', and 'Other'. *Ex_Ussr*: Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan; *Oil_Rich*: Kuwait and Qatar; *Other*: Iran, Iraq, Jordan, Lebanon, and Pakistan; *East_EU*: Bulgaria, Romania, Hungary, Czech Republic, Slovak Republic, Poland, Slovenia, Estonia, Lithuania, and Latvia; *West_EU*: France, Germany, Finland, Sweden, Spain, Netherlands, Italy, Greece, and Cyprus.

The number of children per individual (both men and women) indicates a clear divide between the Muslim countries and lower levels of the reference economies. However, within the first group, *‘Ex-Ussr’* Muslim economies exhibit lower fertility compared to other countries of the sample. The labour market status also highlights a divide between former Soviet Union countries and the remaining ones: their gender gap in employment is much lower (67% for men and 51% for women) and substantially aligned to the reference countries. The corresponding figures for the *‘Oil-rich’* countries are 78% and 38%, respectively; for the *‘Other’* Muslim countries, they amount to 68% and 16%.

Regarding the demographic characteristics, the average age of the individuals sampled is 37 years and there is a substantial balance in the gender distribution. About 67% of the individuals are either married or cohabitants and still a significant share of the sample resides in rural areas or small villages (27%); the percentage increases to 45% in the sample of the *‘Ex-Ussr’* Muslim countries. Over 72% of the sample belongs to the Muslim religion, but the share increases to 83% and 99% in the Ex-Ussr and Oil-rich subsamples, respectively.

Table 2 illustrates the education profile of the sample and its distribution in terms of income deciles (bottom, middle and top 20%).

Table 2. Sample characteristics: education and incomes

		Sample	Ex_Ussr	Oil_rich	Other	US	JAP	RUS	East_EU	West_EU
lower_educ	mean	0.270	0.045	0.110	0.394	0.060	0.096	0.078	0.204	0.288
	cv	1.643	4.616	2.844	1.239	3.973	3.069	3.428	1.973	1.574
middle_educ	mean	0.381	0.554	0.350	0.308	0.466	0.475	0.565	0.589	0.431
	cv	1.275	0.898	1.363	1.500	1.071	1.051	0.878	0.835	1.149
upper_educ	mean	0.349	0.401	0.540	0.298	0.475	0.429	0.357	0.206	0.281
	cv	1.367	1.221	0.923	1.535	1.052	1.155	1.343	1.961	1.599
bottom_20p	mean	0.133	0.094	0.084	0.158	0.094	0.246	0.130	0.174	0.140
	cv	2.549	3.109	3.301	2.308	3.102	1.750	2.583	2.180	2.476
middle_20p	mean	0.354	0.427	0.300	0.329	0.281	0.167	0.285	0.254	0.264
	cv	1.351	1.158	1.528	1.429	1.599	2.230	1.584	1.714	1.670
top_20p	mean	0.043	0.040	0.136	0.032	0.157	0.135	0.060	0.059	0.046
	cv	4.700	4.931	2.518	5.457	2.321	2.536	3.963	4.006	4.568

Source: Our elaborations on WVS data, waves 5, 6, and 7 (pooled)

Notes: ‘Sample’ includes all Muslim countries belonging to subsamples *‘Ex-Ussr’*, *‘Oil-rich’*, and *‘Other’*. Ex_Ussr: Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan; Oil_Rich: Kuwait and Qatar; Other: Iran, Iraq, Jordan, Lebanon, and Pakistan; East_EU: Bulgaria, Romania, Hungary, Czech Republic, Slovak Republic, Poland, Slovenia, Estonia, Lithuania, and Latvia; West_EU: France, Germany, Finland, Sweden, Spain, Netherlands, Italy, Greece, and Cyprus.

About 35% of the individuals have completed a tertiary level of education, but the share increases to 40% and 54% in the subsamples of *'Ex-Ussr'* and *'Oil-rich'* countries; 13% of the individuals sampled report a household income in the bottom quintile of the country income distribution, but with a significant heterogeneity within the Muslim countries (9% in the *'Ex-Ussr'*, 8% in the *'Oil-rich'* and 16% in the remaining economies, respectively). Former Soviet Union countries also exhibit a remarkably high share of individuals placed in the middle of the distribution (43%); as expected, the top of the distribution is instead more densely populated in the *'Oil-rich'* economies.

To conclude this section, Table 3 provides a snapshot of the average attitudes of the sampled individuals towards religion and gender inequality. Differences with the sample of the Muslim countries are striking and reveal a clear divide between countries that belonged to the Soviet Union and the remaining ones. This applies to both religion (attachment, importance, and practice) and gender beliefs in the various domains of individuals' life, with the only exception of gender asymmetry in terms of access to higher levels of education.

Table 3. Sample characteristics: religious and gender inequality beliefs

		Sample	Ex_Ussr	Oil_rich	Other	US	JAP	RUS	East_EU	West_EU
Religious_belief	mean	0.725	0.587	0.826	0.775	0.649	0.297	0.463	0.548	0.433
	cv	0.338	0.447	0.255	0.276	0.483	0.791	0.627	0.587	0.758
Religious person	mean	0.780	0.693	0.785	0.820	0.741	0.242	0.668	0.671	0.521
	cv	0.531	0.666	0.524	0.468	0.591	1.768	0.705	0.700	0.959
Religion importance	mean	0.868	0.691	0.967	0.933	0.695	0.292	0.454	0.548	0.456
	cv	0.278	0.426	0.128	0.191	0.491	1.013	0.728	0.657	0.783
Religion practice	mean	0.501	0.381	0.509	0.559	0.529	0.363	0.269	0.440	0.325
	cv	0.726	0.856	0.661	0.658	0.690	0.607	1.002	0.711	0.975
Gender ineq belief	mean	0.624	0.580	0.672	0.638	0.275	0.467	0.495	0.416	0.251
	cv	0.405	0.450	0.354	0.390	0.720	0.444	0.473	0.610	0.905
Gender ineq belief job	mean	0.739	0.654	0.758	0.775	0.293	0.553	0.481	0.425	0.253
	cv	0.519	0.612	0.497	0.478	1.088	0.604	0.893	1.026	1.478
Gender ineq belief pol	mean	0.688	0.638	0.761	0.700	0.344	0.469	0.590	0.521	0.298
	cv	0.465	0.491	0.396	0.460	0.746	0.523	0.486	0.601	0.920
Gender ineq belief edu	mean	0.450	0.449	0.502	0.442	0.248	0.376	0.402	0.324	0.211
	cv	0.789	0.753	0.732	0.813	0.929	0.632	0.702	0.914	1.161

Source: Our elaborations on WVS data, waves 5, 6, and 7 (pooled)

Notes: 'Sample' includes all Muslim countries belonging to subsamples *'Ex-Ussr'*, *'Oil-rich'*, and *'Other'*. Ex_Ussr: Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan; Oil_Rich: Kuwait and Qatar; Other: Iran, Iraq, Jordan, Lebanon, and Pakistan; East_EU: Bulgaria, Romania, Hungary, Czech Republic, Slovak Republic, Poland, Slovenia, Estonia, Lithuania, and Latvia; West_EU: France, Germany, Finland, Sweden, Spain, Netherlands, Italy, Greece, and Cyprus.

5. Empirical model and econometric methods

The investigation of the chain of effects hypothesised in section 3 (attachment to religion – gender beliefs – fertility) poses several challenges due to the complexity of the relations between the key variables. Consistent with our conceptual background and the aims of the analysis, we need to identify the impact of gender beliefs on fertility triggered by religion. This implies that our empirical approach must be able to model, in the first place, the impact of religion on the variable (gender inequality beliefs) assumed to affect fertility; at the same time, we are interested in estimating the impact of religion-driven gender beliefs on fertility. In such a context, two potential identification challenges due to endogeneity/reverse causality issues are of particular concern. The first regards the potential endogeneity of beliefs on gender inequality to fertility, as some omitted variables may be simultaneously correlated with more conservative/progressive gender roles and higher/lower fertility. Examples of such variables can be the socio-cultural family background (e.g., the level of education or the occupation of the individual's parents) (Kulik, 2002; Marks et al., 2009) or the individual's exposure to diverse cultural environments (e.g., linked to experiences of migration and propensity to mobility) (Cooke, 2008; Tinnerman et al., 2018). A *reverse causality-based* endogeneity is also possible. For example, in contexts where fertility is higher, gender traditional gender roles might tend to gain strength as, in the presence of gender asymmetries in the division of labour in household tasks (particularly childrearing), mothers tend to bear higher costs in terms of participation to the labour market (Lebediski et al., 2023; Kleven et al., 2019), education (Diebolt et al., 2021) and participation to political life (Sommer, 2018). This is likely to reinforce stereotypes of gender roles and, consequently, individuals' attitudes toward gender inequality.

One possible approach to deal with such identification issues is to implement instrumental variables (IV) methods, by first modelling the effect of religion on gender beliefs (first stage) and then the effect of (fitted) gender beliefs on fertility (second stage). An alternative approach is to estimate the two relationships jointly, using a system of simultaneous equations (see Zellner and Theil, 1962) in which the two dependent variables (gender beliefs and the number of children) are explicitly considered endogenous and treated as being correlated with disturbances in the system's equations. The inclusion of specific drivers (excluded instruments) for gender beliefs (attachment to religion) and fertility (marital and employment status) allows us to build a set of recursive equations as in two-stage least squares (2SLS) (Roodman, 2011). All other (control) variables in the system are treated as exogenous, and as such are included as instruments for the endogenous variables. The advantage of a simultaneous equation system over a standard IV approach lies in

the estimation of the system equations employing maximum likelihood (ML) methods. Specifically, we use an ML-SUR model grounded in a simultaneous and recursive equation system where endogenous variables can feature in another system's equation and allow for substantial simultaneity between the two dependent variables (see Roodman, 2011).

Formally, we define the recursive system of equations for the two endogenous variables as:

$$nchild_{igct} = \alpha_1 incdecile_{igct} + \alpha_2 educ_{igct} + \alpha_3 age_{igct} + \alpha_4 female_{igct} + \alpha_5 muslim_{igct} + \alpha_6 married_{igct} + \alpha_7 empl_{igct} + \alpha_8 rur_vil_{igct} + \alpha_9 genineq_{igct} + \rho_g + \mu_c + \nu_t + \varepsilon_{igct}^1 \quad (1.1)$$

$$genineq_{igct} = \beta_1 incdecile_{igct} + \beta_2 educ_{igct} + \beta_3 age_{igct} + \beta_4 female_{igct} + \beta_5 muslim_{igct} + \beta_6 rur_vil_{igct} + \beta_7 religbelief_{igct} + \rho_g + \mu_c + \nu_t + \varepsilon_{igct}^2 \quad (1.2)$$

where, starting from the equation identifying our key relationships (1.1), $nchild_{igct}$ is the number of children of individual i , in country group g , country c , and year t . The right-hand side variables are those described in section 4 and include the key variable $genineq_{igct}$, i.e., the measure of the individual's attitude towards gender inequality. ρ_g , μ_c and ν_t are the country group ($g = 'Ex_Ussr', 'Oil-rich', 'Other'$), country and year fixed effects, aimed at controlling for the unobserved group-, country-, and time-specific common shocks. We include as drivers specific for the number of children (and not for gender beliefs): (i) the marital status (married or cohabitant = 1, 0 otherwise) as the presence of children is normally high in formalized relationships (Guzzo and Hayford, 2014; Sweeney, 2010); and (ii) the dummy for employment status (employed = 1, = otherwise) as the labour market status is one key variable associated to fertility decisions (Behrman and Gonalons-Pons, 2020; Matysiak and Vignoli, 2008).

The key explanatory variable in equation 1.1 ($genineq_{igct}$) also appears as the dependent variable in equation 1.2. This second regression includes, besides the set of exogenous drivers and the country group, country and year dummies common to equation 1.1, the measure of attachment to religion ($religbelief_{igct}$). To address possible correlations of errors between individuals in the same country group and survey wave, standard errors are clustered in all estimations at the country/WVS wave level.

The analysis of the heterogeneity of the relationships of interest in the countries that were part of the Soviet Union and the remaining ones is carried out by simply augmenting equations 1.1 and 1.2 with an

interaction term between the key variables ($genineq_{igct}$ and $religbelief_{igct}$) and the dummy variable that identifies individuals sampled in one the former USSR countries ($\rho_g = \rho_{Ex-USSR}$):

$$nchild_{igct} = \alpha_1 incdecile_{igct} + \alpha_2 educ_{igct} + \alpha_3 age_{igct} + \alpha_4 female_{igct} + \alpha_5 muslim_{igct} + \alpha_6 married_{igct} + \alpha_7 empl_{igct} + \alpha_8 rur_vil_{igct} + \alpha_9 genineq_{igct} + \alpha_{10} (genineq_{igct} \cdot \rho_{ExUSSR}) + \rho_g + \mu_c + \nu_t + \varepsilon_{igct}^1 \quad (2.1)$$

$$genineq_{igct} = \beta_1 incdecile_{igct} + \beta_2 educ_{igct} + \beta_3 age_{igct} + \beta_4 female_{igct} + \beta_5 muslim_{igct} + \beta_6 rur_vil_{igct} + \beta_7 religbelief_{igct} + \beta_8 (religbelief_{igct} \cdot \rho_{ExUSSR}) + \rho_g + \mu_c + \nu_t + \varepsilon_{igct}^2 \quad (2.2)$$

Conceptually, the interaction term models describe a situation in which the institutional environment (having been part of the Soviet Union) only moderates the relationships of our interests. On the econometric side, the interaction model allows testing the statistical significance of the key moderating effect (i.e., the coefficient of the cross term). However, it cannot be excluded that the past Soviet history also affects other relationships in our empirical model, as the communist ideology and institutions permeated for a prolonged period all fields of economy, society, and culture. Consistent with this possibility, as a robustness check for the results obtained in equations 2.1 and 2.2, we implement a split sample analysis replicating the baseline model (system equations 1.1 and 1.2) for the subsample of ‘Ex-Ussr’ Muslim economies and the remaining Muslim countries (‘Other’ plus ‘Oil-rich’ countries together, due to the limited number of observations available for the latter group).

6. Results

Columns (i) and (ii) in Table 4 report the results of the baseline model illustrated by equations 1.1 and 1.2. The direction of the relationships emerging from our results largely meets the *ex-ante* expectations. More conservative gender role beliefs – column (i) – are associated with lower levels of education and residence in peripheral areas (rural settings or small villages). Women seem to be more conservative than men, and affiliation to the Muslim religion is also positively related to pro-gender inequality attitudes, compared to belonging to other (minoritarian) religious groups. Household income of the individual, expected to be positively associated with more progressive gender balance beliefs, is not statistically significant. This is probably because household economic conditions are already accounted for by other variables in the model (education and place of residence). Surprisingly, older generations emerge as more pro-gender equality; as we will see in the following of the section, this outcome deserves further

investigation. Consistent with our expectations and the descriptive evidence presented in section 4, surveyed individuals from Muslim countries of the former Soviet Republic express, on average more progressive views on gender equality compared to those from other Muslim countries of the sample. The key variable for the aims of the analysis (religbelief) turns out positive and significant, consistent with the expectation that a stronger attachment to religion is associated with more conservative views on women's participation in education, the labour market, and political life.

Column (ii) of Table 4 reports the results of the estimation of equation (1.2), i.e., the drivers of fertility. A higher number of children is associated with lower income levels, lower education, having a stable partner, and living in rural areas. As regards the remaining control variables, age has the expected (positive) sign and sampled women have, on average, a higher number of children than sampled men. Affiliation to the Muslim religion and being employed do not turn significant. Again consistent with our expectations and the descriptive evidence, the dummy variable for Ex-Ussr countries is negative and significant. The key explanatory variable of the model (genineq), which is the dependent variable of the jointly estimated equation in column (i), is positive and statistically significant. This empirically supports, for the whole sample, our conjecture that more conservative gender beliefs, driven by stronger attachment to religion, drive higher levels of fertility (H1).

Columns (iii) and (iv) of Table 4 report the estimation outcomes of the model illustrated by equations 2.1 and 2.2; they test the hypothesis that the key relations of our interest (impact of religion on gender beliefs and of the latter on fertility) differ due to the past exposure to institutional, ideological and political regimes that promoted progressive gender equality rules (H2). While the inclusion of the interaction terms (between the key variables and the Ex-Ussr dummy variable) does not alter in any significant way the coefficient of the variables included in the two equations, the sign and significance of their coefficients offer interesting insights. Results in column (iii) indicate that having been part or not of the Soviet Union until 1990 does not make any significant difference on how attachment to religion shapes pro-gender inequality beliefs (the coefficient of the interaction terms is negative, but not statistically different from zero). However, this is not the case for the interaction term in column (iv): the sign of the coefficient is negative and highly statistically significant. This means that the pro-fertility effect of conservative gender beliefs driven by religion is significantly more powerful for those individuals residing in countries that were not part of the Soviet Union. Hence our second conjecture (H2) is supported by the results presented so far but limited to the second stage of the chain of effects hypothesised (gender role

beliefs less able to shape fertility decisions in the former Soviet Union). This suggests that prolonged exposure to Soviet rule has shaped institutional settings that are still capable of preventing more conservative gender role beliefs to materialize into higher fertility.

Table 4. Attachment to religion, gender inequality, and fertility: baseline and interaction term model. Pooled sample of all Muslim countries

	<i>Baseline</i>		<i>Interaction term</i>	
	genderineq (i)	nchild (ii)	genderineq (iii)	nchild (iv)
incdecile	-0.002 (0.002)	-0.013*** (0.005)	-0.002 (0.002)	-0.013*** (0.005)
educ	-0.039*** (0.003)	-0.161*** (0.031)	-0.039*** (0.003)	-0.161*** (0.031)
age	-0.000*** (0.000)	0.056*** (0.001)	-0.000*** (0.000)	0.056*** (0.001)
female	-0.088*** (0.006)	0.313*** (0.019)	-0.088*** (0.006)	0.312*** (0.018)
rural_village	0.013* (0.007)	0.134*** (0.041)	0.013* (0.007)	0.134*** (0.042)
muslim	0.041*** (0.008)	0.282 (0.180)	0.042*** (0.008)	0.283 (0.180)
married_cohab		1.523*** (0.172)		1.523*** (0.172)
empl		-0.039 (0.052)		-0.040 (0.051)
religbelief	0.097*** (0.007)		0.102*** (0.014)	
ex_ussr * religbelief			-0.012 (0.013)	
genineq		1.138*** (0.059)		1.161*** (0.090)
ex_uss * genineq				-0.092*** (0.030)
ex_ussr	-0.023*** (0.001)	-0.512*** (0.028)	-0.016* (0.009)	-0.543*** (0.035)
oil_rich	-0.007 (0.010)	0.808*** (0.172)	-0.008 (0.011)	0.811*** (0.176)
Constant	-0.284*** (0.008)	-0.664*** (0.141)	-0.288*** (0.016)	-0.659*** (0.133)
Observations	29,038	29,038	29,038	29,038

Notes: Robust standard errors, clustered at country group/wave level, are reported in parentheses. All equations include country and year of the survey fixed effects. ***, ** and * denote significance at the 1%, 5%, and 10% levels, respectively.

To test the robustness of our results, we run the baseline models presented in Table 4 on a restricted sample of women of reproductive age (15-45 or 15-49 years old). Results, available upon request, confirm the evidence just described.

As anticipated in the previous section, the assumption behind the interaction effects model is that the different regime (having been part of the USSR) only moderates the relationship of interest. This is unlikely to be the case in our context, as the Soviet ideology permeated and shaped all fields of economic and social life. As a robustness check for our core results, we replicate the estimation of the system of equations (1.1) and (1.2) for subsamples of individuals from the two groups of *'Ex-Ussr'* and *'Other Muslim'* countries (Table 5). Again, the replication of the estimates for the restricted sample of women of reproductive age provides similar results (available upon request). Our results confirm the conclusions reached with the interaction terms model. In both subsamples higher attachment to religion shapes pro-gender inequality beliefs (columns i and iii); however, the latter do not translate into higher fertility in post-Soviet countries (columns ii and iv).

The comparison of the magnitude of the effects in the two subsamples corroborates the idea that the institutional and ideological past moderates many effects of the drivers of preferences for gender inequality and fertility. Among the many differences (e.g., effects of residing in peripheral areas, education, marital status), the impact of age in shaping gender inequality beliefs deserves some attention. The negative coefficient that emerged in the pooled model (columns (i) and (iii) of Table 4) is indeed completely driven by the subsample of *'Ex-Ussr'* countries. This suggests that while in *'Other Muslim'* countries gender beliefs do not differ significantly across age cohorts, older individuals in Ex-Ussr states, who were directly (or more closely) exposed to the Socialist institutional setting, might have more progressive gender equality views compared to younger ones who grew up during (or after) the transition. This evidence, if confirmed, would be in line with extensive literature that highlights how, for most post-communist countries, the transition towards a market economy has been paralleled by a reversal of the gender equality trends and attitudes of the previous decades (see Vecernik, 2003; Perugini and Vladislavljevic, 2019; Pascall and Manning, 2000).

To provide an empirical test that this might be the case also for the relationships of our interest, we focus on the sample of *'Ex-Ussr'* Muslim countries and try singling out heterogeneities across age groups. To this purpose, we divide the *'Ex-Ussr'* sample into two groups: those individuals who spent at least their teenage (i.e., at least their first 20 years) under the communist regime and those who grew up after the economic reforms started. In so doing we follow the psychological and economics literature indicating that

behavioural traits and preferences are mainly developed during individuals' formative years (Kohlberg and Mayer, 1972; Heckman, 2007; Klimstra, 2013; Giuliano and Spilimbergo, 2014; Alesina and Fuchs-Schündeln, 2007)⁷.

Table 5. Attachment to religion, gender inequality, and fertility (split sample analysis)

	<i>Other Muslim Countries</i>		<i>Ex Ussr Muslim countries</i>	
	genderineq (i)	nchild (ii)	genderineq (iii)	nchild (iv)
incdecile	-0.004* (0.002)	-0.015 (0.011)	0.004 (0.004)	-0.006 (0.010)
educ	-0.038*** (0.008)	-0.159*** (0.037)	-0.040** (0.020)	-0.161*** (0.000)
age	-0.000 (0.000)	0.056*** (0.006)	-0.000*** (0.000)	0.055*** (0.001)
female	-0.091*** (0.004)	0.306*** (0.034)	-0.081*** (0.020)	0.190*** (0.057)
rural_village	0.006 (0.003)	0.092** (0.045)	0.026*** (0.007)	0.245*** (0.050)
muslim	0.049* (0.029)	0.108 (0.114)	0.030* (0.018)	0.561*** (0.039)
married_cohab		1.689*** (0.122)		1.149*** (0.076)
empl		-0.090*** (0.033)		0.051*** (0.009)
religbelief	0.100*** (0.022)		0.092*** (0.014)	
genineq		1.016*** (0.271)		0.434 (0.483)
oil_rich	0.009** (0.004)	0.803*** (0.023)		
Constant	-0.291*** (0.025)	-0.767*** (0.200)	-0.326*** (0.010)	-1.487*** (0.125)
Observations	20,071	20,071	8,967	8,967

Notes: Robust standard errors, clustered at country group/wave level, are reported in parentheses. All equations include country and year of the survey fixed effects. ***, ** and * denote significance at the 1%, 5%, and 10% levels, respectively.

⁷ The choice of the age limit is of course arbitrary, as the reference literature does not identify univocally the formative years. We check the robustness of our results by altering the length of the reference period. Extending the 'formative years' to 25 years (as, for example, in Giuliano and Spilimbergo, 2014, Roth and Wohlfart, 2018 and Krosnick and Alwin, 1989) does not bear any significant change in the results presented here (complete results available upon request).

Results of the estimation of our empirical model with the interaction terms between our variables of interest (religimp and genderineq) and the teenage dummy for the ‘Ex-Ussr’ sample are reported in Table 6, columns (i) and (ii). Columns (iii) to (vi) replicate the analysis by subsamples (teenage under USSR or not). The negative and significant coefficient (-0.015) of the interaction term in column (i) indicates that the capacity of religion to affect gender inequality roles is weaker for individuals who spent at least their teenage under the Soviet regime.

Table 6. Teenage under communism: religion, gender inequality and fertility (interaction term model and split sample analysis)

	<i>Interaction term</i>		<i>No teenage under USSR</i>		<i>Teenage under USSR</i>	
	genderineq (i)	nchild (ii)	genderineq (iii)	nchild (iv)	genderineq (v)	nchild (vi)
incdecile	0.004*** (0.000)	-0.006 (0.017)	0.004 (0.003)	-0.012*** (0.003)	0.003 (0.005)	0.030*** (0.004)
educ	-0.040*** (0.001)	-0.158*** (0.039)	-0.038*** (0.009)	-0.136*** (0.025)	-0.040 (0.039)	-0.209*** (0.040)
age	0.000 (0.000)	0.061*** (0.011)	-0.000 (0.001)	0.084*** (0.007)	0.000 (0.000)	0.035*** (0.004)
female	-0.081*** (0.011)	0.192*** (0.062)	-0.090*** (0.028)	0.192*** (0.017)	-0.066*** (0.013)	0.003 (0.140)
rural_village	0.026*** (0.000)	0.248 (0.181)	0.026* (0.016)	0.104* (0.060)	0.026*** (0.007)	0.458*** (0.026)
muslim	0.030*** (0.003)	0.565** (0.261)	0.034 (0.027)	0.333*** (0.096)	0.028*** (0.003)	0.812*** (0.039)
married_cohab		1.139*** (0.194)		1.148*** (0.169)		0.634*** (0.127)
empl		0.053 (0.047)		-0.093** (0.042)		-0.098*** (0.018)
religbelief	0.098*** (0.011)		0.105** (0.047)		0.067* (0.038)	
teen_commun*religbelief	-0.015*** (0.001)					
genineq		0.321 (0.285)		0.381** (0.164)		0.286 (0.798)
teen_commun*genineq		0.460 (0.478)				
Constant	-0.336*** (0.003)	-1.665*** (0.001)	-0.327*** (0.036)	-1.933*** (0.121)	-0.340*** (0.083)	-0.340* (0.177)
Observations	8,967	8,967	5,417	5,417	3,550	3,550

Notes: Robust standard errors, clustered at country group/wave level, are reported in parentheses. All equations include country and year of the survey fixed effects. ***, ** and * denote significance at the 1%, 5%, and 10% levels, respectively.

This is confirmed by the split sample analysis (see columns (iii) and (v)): the effect of religion in shaping more conservative gender roles is significant in both subsamples, but its magnitude is remarkably lower for the individuals who grew up under the Soviet Union (0.067 as opposed to 0.105). Interestingly, in both cases (and in the interaction term model), the coefficient of age (which also functions as the main effect for the age cohort dummy used as the interaction term) loses its significance compared to the baseline model for *Ex-Ussr* countries without interactions (see column (iii) in Table 5).

Another interesting result, that deserves further investigation in future research is the effect of gender beliefs on fertility in the two subsamples. While in the pooled model (column (ii)) its insignificant effect is confirmed, it emerges as positive and significant in the subsamples of individuals who did not spend their formative years under the Soviet Union (column (iii)). Although this evidence is not confirmed by the interaction term (insignificant in column (ii)), this suggests that the transition might have reassigned such a strong influence to religion in shaping gender roles, that it can impact fertility decisions. In other words, the influence of religion might have regained a pervasive role for those individuals who were not directly exposed to the Soviet Union experience.

7. Conclusions

This paper aims to shed light on how fertility is affected by several intertwined factors such as religious beliefs, gender roles, and institutional settings. The policy relevance of the topic is apparent, as fertility contributes to shaping demographic trends that play a crucial role in many domains including labour market imbalances, the sustainability of welfare systems, and gender equality.

Specifically, the focus of our paper is on how religion shapes fertility through its impact on gender role beliefs, once all other observable drivers are controlled for. Additionally, we are interested in investigating whether such impact is affected by policy and ideological settings that, explicitly or not, promote progress in gender equality. Disentangling the complexity of such interactions is challenging on both the conceptual and the empirical side. On the first side, we rely on the complementarity of various literature backgrounds to formulate testable research hypotheses. The first one (H1) predicts that a stronger attachment to religion is associated with more conservative gender roles, which in turn favour a higher level of fertility. The second one (H2) maintains that such a mechanism is weakened in contexts permeated by gender equality progressive ideological and institutional settings. We argue that this could happen either

because religion is lesser able to determine gender role beliefs or because gender role beliefs are not able to translate into fertility decisions under such political circumstances.

On the empirical side, we take advantage of the rich information provided by the World Values Survey (time-series database, waves 5, 6, and 7). Besides a large set of individual and household characteristics that can be used as control variables, the WVS includes detailed information on both attachment and attitude to religion and gender role beliefs needed to test the first research hypothesis. The wide geographical coverage of the survey is crucial to enable the testing of the second research hypothesis, as we can investigate the variability of the mechanism of interest across different ideological/institutional settings. For this aim, we build a sample that includes all individuals residing in countries with a Muslim majority but who were historically exposed to radically different ideological and political regimes. Namely, we distinguish those individuals living in Muslim countries that were part of the Soviet Union until its dissolution and those living in other Muslim countries of the neighbouring areas. The first group includes four Republics of Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan) and one country of the South Caucasian region (Azerbaijan). The second group includes two oil-rich countries (Kuwait and Qatar) and five low-income countries of the same broad geographical area (Iran, Iraq, Jordan, Lebanon, and Pakistan).

In terms of empirical methods, we use a system of simultaneous equations to account for the complexity of relationships to be modelled and to address potential causality/endogeneity issues; the analysis of heterogeneity between Ex-Ussr and other Muslim countries relies on augmenting the baseline empirical model with interaction terms for the key variables and on a split sample approach.

The results of the empirical analysis provide clear support to our first hypothesis: a stronger attachment to religion is associated with more conservative gender roles beliefs that, in turn, go along with a higher number of children. The second hypothesis is also corroborated by our empirical evidence. For the Ex-Ussr sample, higher attachment to religion underpins more conservative gender roles but, different from the other Muslim countries, they do not translate into higher fertility. Our interpretation is that the ideological and institutional architecture implemented by the Soviet regime to promote the social, political, and economic empowerment of women is still able to prevent conservative religious beliefs to translate into fertility decisions that would limit an active role of women in the socio-economic sphere.

A stronger support to our second hypothesis is provided by the analysis replicated splitting the Ex-Ussr individuals into those who spent their formative years under Soviet rule and those who did not. For the first group, not only a pro-gender inequality orientation does not affect fertility, but higher attachment to

religion feeds more conservative gender roles only marginally. On the contrary, for the second subsample (individuals who did not spend the formative years during the Soviet Union), both effects are in place (religion favours conservative gender roles that increase fertility). This suggests that while the USSR's legacy is still playing a role, its impact might be gradually fading out, especially for the generations that were not directly exposed to the regime. For them, the room that was previously occupied by the Soviet ideology seems likely to have been re-appropriated by the influence of religion.

Religiosity is a matter of individual freedom and, as with any other social or communitarian structure, it impacts the individual behaviours of its affiliates. Judging whether and to what extent this is desirable or not, for individuals and society, is beyond the scope of this paper. However, the social environment can be neutral or have the effect of expanding or limiting freedom of choice for individuals. As individual utility is certainly a function of the variety of choices (and of the capability to choose), it is certainly desirable to construct pro-freedom or at least neutral educational, labour markets, and other social structures.

Independent of the social environment and construction, as it emerges from our results too, promoting higher educational attainment in general and for women in particular, seems crucial. Education enables self-determination and the capability to make own life choices; it also provides skills and knowledge that promote economic independence. Although in several countries such as Kuwait, Iran or Saudi Arabia, the rate of women entering higher education is already relatively high (61% [in 2020], 58% [2020], and 71% [2021], respectively, according to World Development Indicators), it is still very low in Qatar, Jordan or Iraq (25% [2021], 34% [2020], 16% [2005], respectively). The enhancement of access to high education, however, should go hand in hand with legal reforms aimed at eliminating legal discrimination against women, giving them a political voice, and encouraging their participation in social life. Our evidence indicates that in contexts where this was the case due the belonging to the USSR political regime, religion plays a marginal role in shaping prominent life choices (such as the number of children), despite a revival of the role of religion in the last decades. Although some progress has been achieved on this side in the countries that were not part of the Soviet Union too (e.g., women's suffrage in Qatar, Kuwait, and Iraq has only been introduced in the 21st century), its pace still appears either insufficient or too slow and further observation is required.

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