

**Demographic development of Post-Soviet Muslim regions. The evidence from
North Caucasian republics (draft)**

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The paper deals with fertility in some republics of North Caucasus (Dagestan and Karachay-Cherkessia), as one of the post-Soviet regions which have undergone a serious intensification of religiosity and at the same time weakening of family traditionalism in the recent decades. The goal of the paper is to figure out if these trends affect fertility patterns, especially fertility whose decrease is apparently stalling in North Caucasus during the last decade and birth calendar (the decline of the mean age of birth for 1st and even 2nd parities is observed also in some of the Republics. One reason why it is important is that North Caucasus is supposed to be a part of Russia where pronatalist social policy of the state has affected fertility (both tempo and cohort) in an especially significant way. However the question concerning the strength of the religiosity revitalization among younger generation as a trigger for demographic changes is still opened. And it is not an easy task to distinguish cultural, religious and economic parts of the abovementioned effect.

The results were based on the organized by the authors in Dagestan and Karachay Cherkessia on 2015-2016 pilot field survey and partly on the final survey organized on 2018. The pilot data has shown that the local religiosity environment is related to higher fertility independently of family policy issues. Also the relation between religiosity and higher fertility arguably is independent upon observance of traditional family norms which impose gender and generation hierarchies. This suggests that Islamic revival in a society can support fertility even when it goes parallel to weakening of family traditionalism. The additional multilevel analysis at the communities' level also demonstrates the mixed results, showing the major role of individual religiosity with marginally significant effects for some questions on the villages' levels.

The results of the main survey are expected to be analyzed in the near future to confirm the pilot results and take into account the effect of economic welfare of the family. However the preliminary results are available and it demonstrates the impact of cultural patters to fertility

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differences. Also the effect of the role of culture in fertility changes was shown on the examples of different fertility patterns of population in modern Central Asian republics (mainly Kyrgyzstan and Kazakhstan with the available statistics), where the close situation was observed.

1. Introduction. North Caucasus and its fertility: a general overview

Russian North Caucasus includes six republics which are subjects of the Russian Federation. Their overall population amount is about 7 mln. In terms of ethnic and religious composition, North Caucasus is very clearly divided into two parts: North-East Caucasus, comprising the republics of Chechnya, Dagestan and Ingushetia, and North-West Caucasus, consisting of North Ossetia, Kabardino-Balkaria and Karachay-Cherkessia.

North-East Caucasus is an area with very low (less than 5%) presence of non-indigenous peoples (mainly Russians). Local population of North-East Caucasus is almost totally Sunni Muslim. The area has the level of rural population rather high for today's Russia (above 50%). The region is remarkable for relatively strong role of traditional family norms which have survived the Soviet epoch and which give much value to extended families and to mutual support between relatives and between fellow-villages, often being at work even among migrants to large cities (Kisriev, Ware 2000). Considerable gender and intergenerational asymmetries are also observed in North-East Caucasus, with young women highly dependent upon their elder relatives (Molodikova, Watt 2014). In the last several decades, however, this traditional social setting has experienced considerable shocks. For Chechnya and Ingushetia, this was due to the military conflict between local combatant groups and Russian Federal armed forces which started in 1994 and ended by the middle of the 2000s. In Dagestan, the traditional set-up of rural life started changing rapidly in late 1980s – early 1990s with collapse of agricultural enterprises earlier supported by state. This has caused massive rural-urban migration (often under registered). After the dissolution of the Soviet Union, North-East Caucasus has also experienced extensive re-islamization, which extended not just to revival of religious cult, but to emergence of informal regulation of conflicts within families, villages etc. on the basis of Islamic law (Kazenin 2015).

North-West Caucasus contrasts its eastern neighbor in many ways and appears to be much closer to other regions of Russia in its social organization. The proportion of Russian population is considerably higher there (a little below 25%), as is also the diversity of religious affiliations because the percent of Christians in North-West Caucasus is much higher than in North-East Caucasus. The role of traditional family and village community organization seems to be much more modest, as is also the social role of Islam even in the areas where Muslims strongly prevail in number. This may be due to extensive urbanization which took place in North-West Caucasus as early as in the 1960s – 1970s (Belozerov 2005).

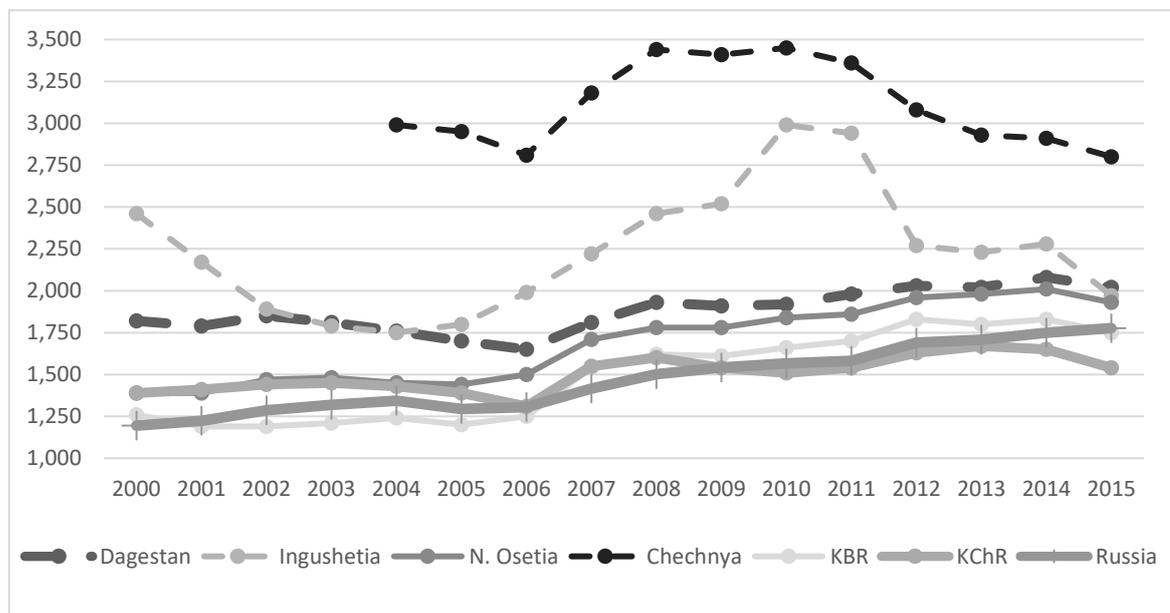
Despite the very different positions of Islam in the two parts of North Caucasus, recent developments in their Muslim communities have something in common. Both North-East and

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North-West Caucasus have experienced deep doctrinal divisions within their Muslim communities in the last three decades, which resulted in a schism between followers of local Islamic traditions established in the 19th – early 20th centuries and adherents of abandoning those traditions in favor of ‘pure’ Islam (Salafism). Almost every region of North Caucasus has its own story of this conflict, but one of its common outcomes was that Islam ceased to be perceived as the religion totally rooted in ‘traditions of grandfathers’. The emergence of Islamic trends, alternative to traditions of earlier generations, has to some extent separated religious observance from loyalty to local family and community norms, making Islamic faith possible for young people as an individual choice, independent of family and village elders etc. (see section 5 for references and discussion).

The two parts of North Caucasus also differ in fertility. Picture 1 shows Total Fertility Rates (TFRs) for all the six republics of the North Caucasus compared with the country TFR for Russia in 2000-2015. Actually to the end of the current period of time we can see that fertility indicators in the republics are very close to Russian ones.

Picture 1. TFR in the republics of North Caucasus, 2000-2015 (number of children per 1000 women; source: Russian State Statistic Agency) ¹



Nevertheless, it could be seen from Pictures 2 and 3 the republics of North-East Caucasus started the period since 1990s with TFRs considerably higher than the national average for Russia and with a considerable urban-rural variation. Subsequent TFR dynamics of those

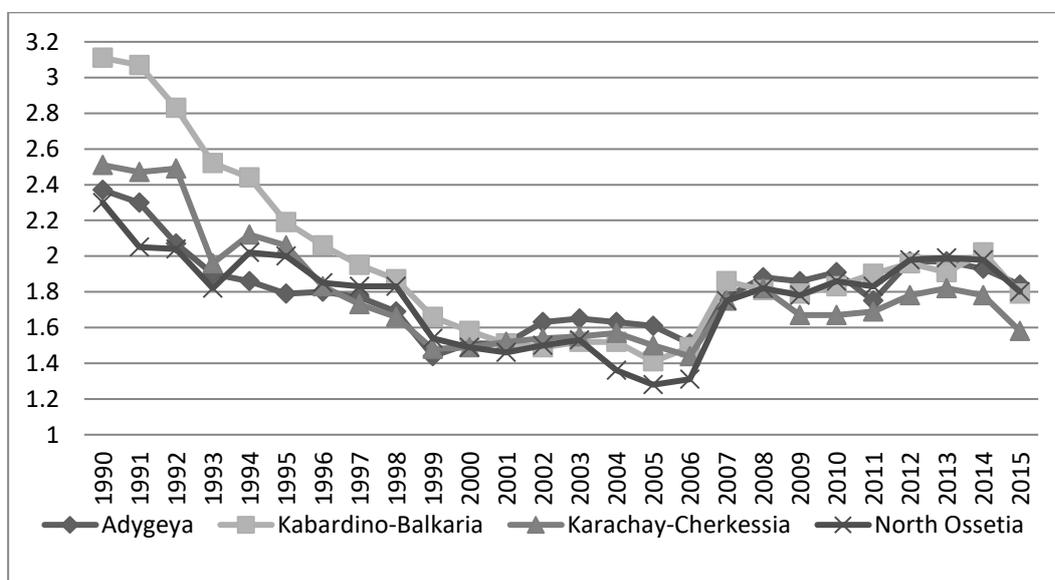
¹Hereinafter official data on the Republics of Chechnya and Ingushetia are absent for some years because of an armed conflict on their territories in 1994-2004.

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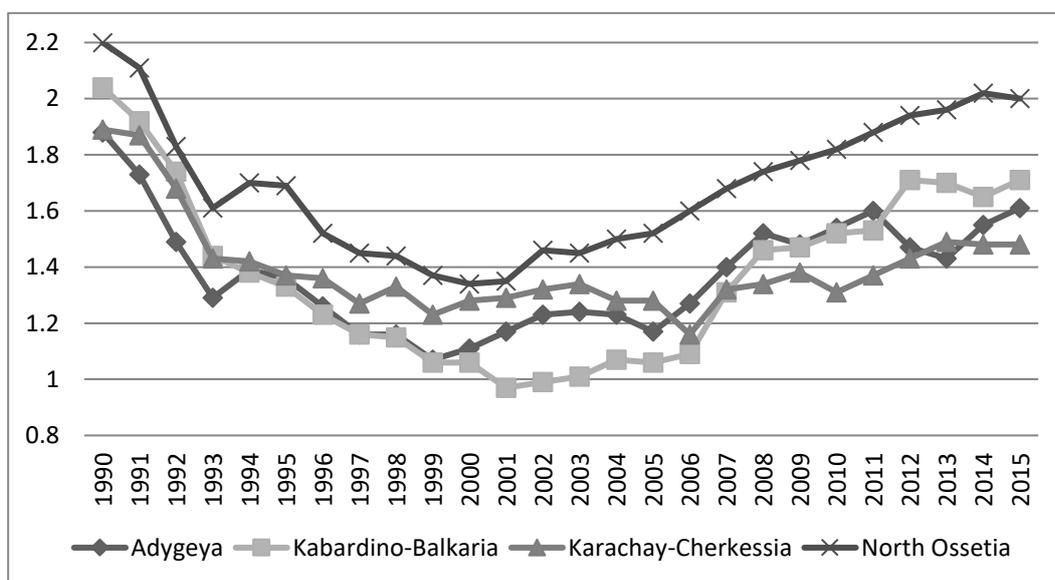
republics show that they reached fertility levels expected at the completion of the First Demographic Transition only at the very end of the 20th century and currently still have fertility above the country level. In North-West Caucasus, by contrast, current fertility is lower than the country level. Its dynamics from 1991 suggests that the First Demographic Transition in North-West Caucasus, as actually in most other regions of Russia (Zakharov 2008), had been completed before that period.

Picture 2. Total fertility rates of the population in the republics of North-West Caucasus, 1990-2015 (source: Russian statistic agency)

A. Rural

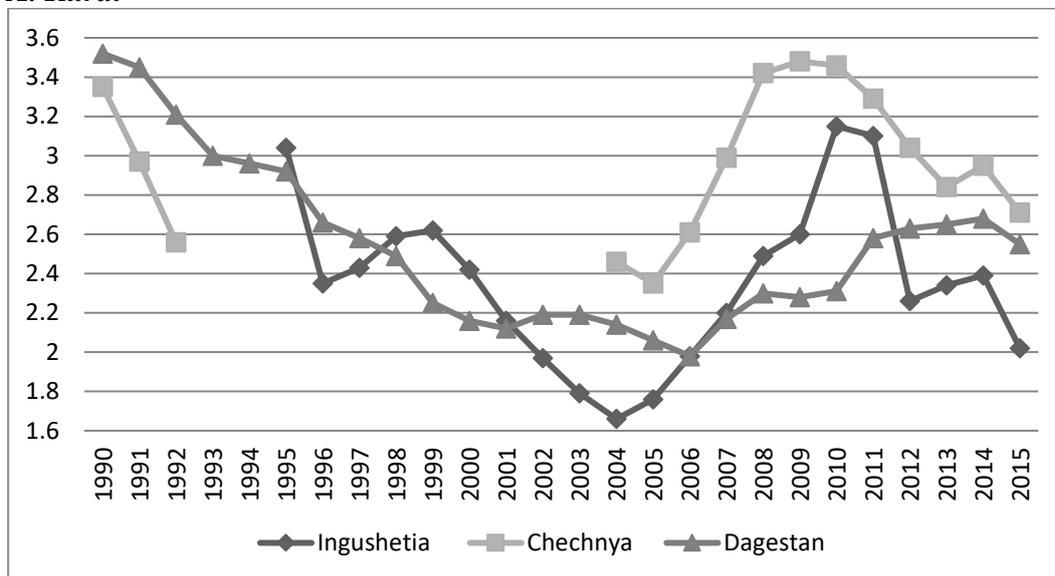


B. Urban

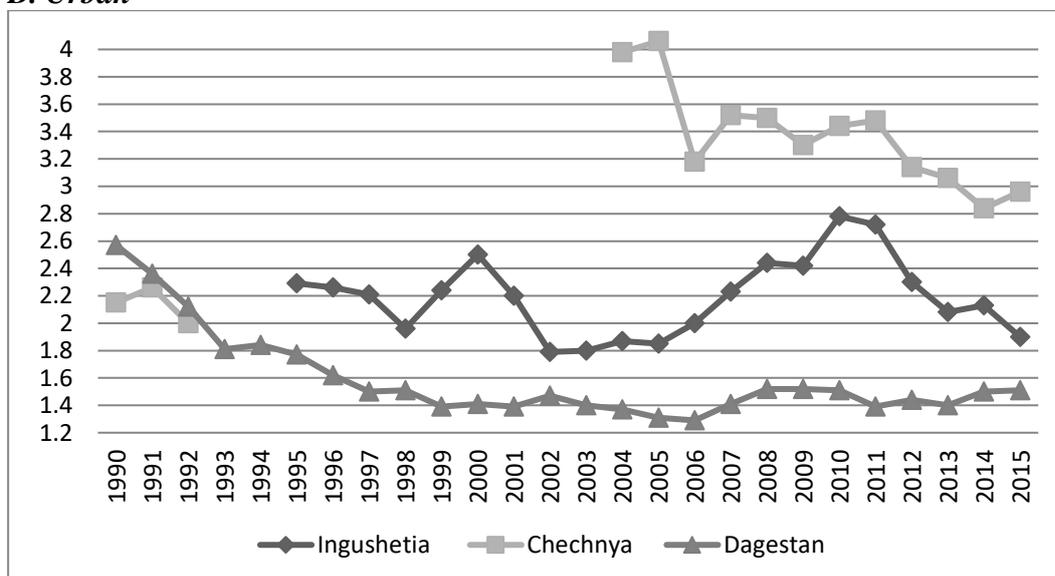


Picture 3. Total fertility rates of the population in the republics of North-East Caucasus, 1990-2015 (source: Russian statistic agency)

A. Rural



B. Urban



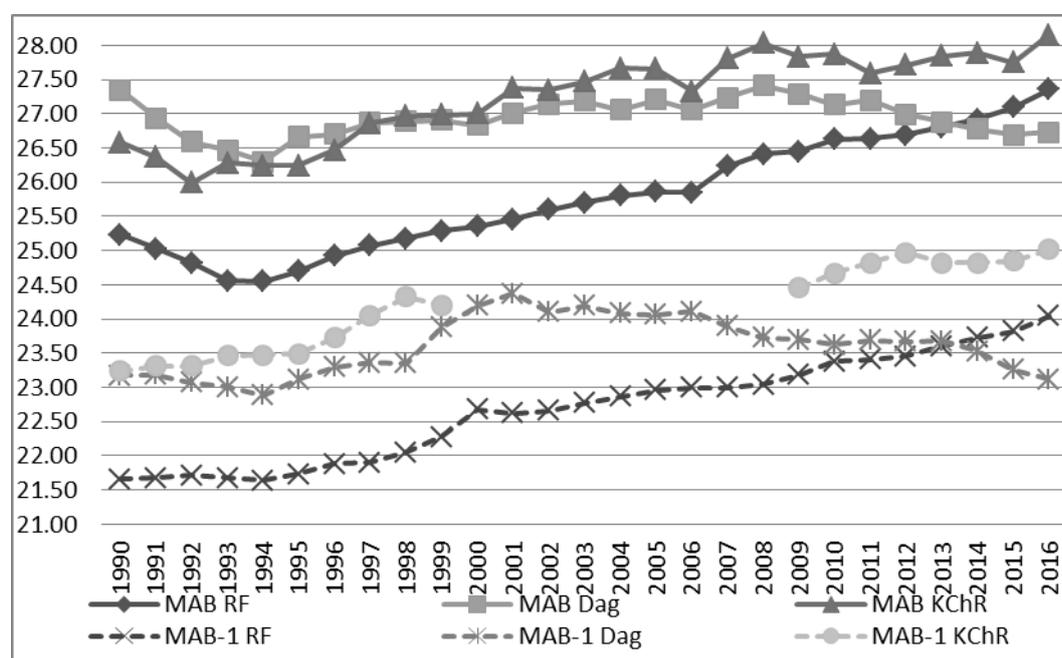
However, the observed statistics can be distorted by the inaccurate calculations of the population especially for the Eastern part of the region. The estimations based on the alternative sources of information (like the lists of voters) and the other demographic events calculations (for example parity rates) show that the TFR should be in Ingushetia at the level of Chechnya and in Dagestan at the level above 2 for urban areas and about 2.5 for rural ones. Thus the need

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for the field research in the region to estimate the fertility patterns and their determinants more accurately is actual.

The picture of the constant modernization also does not match to the situation with the mean age of childbearing/birth in North-East Caucasus. The age of mothers e.g. in Dagestan (see Picture 4) has been falling since 2000s, that goes in contrast with the Theory of the Second demographic transition and the situation in Russia as a whole. The motivation of the whole research was first based on the analysis of the reasons (economic, social, cultural) for the trend towards earlier childbearing patterns.

Picture 4. Mean age of birth for all parities (MAB) and for the 1st child (MAB – 1) for Russia, Daghestan (Dag) and Karachay-Cherkessia (KChR)



We used these regions in the graph as the present study is restricted to one republic of North-East Caucasus, Daghestan, and one republic of North-West Caucasus, Karachay-Cherkessia. Daghestan is a republic between Caucasian mountains and the shore of the Caspian Lake, with almost 3 million population of many different ethnic origins (up to 30 local peoples are viewed among indigenous local population, ethnic divisions being somewhat disputable; no people amounts to 30% or more of the total population of the republic). Among the rural population of Daghestan (which comprised almost 55% of its total population in 2016 according to the Russian Federal Statistic Agency), about a half resides in mountain areas. Despite the still high level of rural and mountainous population, post-Soviet Daghestan experienced extensive migration from the mountains to the valley and from villages to cities and towns (Eldarov et al., 2007). The slow weakening of ‘patriarchal’ family norms in Daghestan during the last decades can be illustrated by the growth of the percent of women with tertiary education (graduated

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from a University or an institute) from very low 15% among those born in the 1950s to beyond 30% among those born in the middle of the 1980s (Picture 2 of the Annex). Due to the considerable diversity of fertility in the three republics of North-East Caucasus (Picture 1) and certain differences in their social settings, Daghestan hardly can be treated as a representative for North-East Caucasus as a whole. Nevertheless, it gives a valid example of a region with a high level of Islamic observance and a considerable, though somewhat weakening, adherence of local population to traditional family and community norms.

Karachay-Cherkessia is the most western republic of North Caucasus, with population of 467 797 people in 2016 according to Russian Federal Statistic Agency (Bulletin Russian Population by age and sex to 01.01.2016). Russians constituted almost one third of its population (31,6%) according to Russian Population Census of 2010. Major indigenous peoples are Karachays (41% in 2010), Circassians (11,9%) and Abazins (7,8%). Although the republic has large mountainous areas, most of its population is concentrated in the valley part since 1960s (Belozerov 2005). The regular fertility gap between rural parts of Daghestan and Karachay-Cherkessia observed in the last decades is shown in Picture 1 of the Annex. Compared to Daghestan, Karachay-Cherkessia had a higher proportion of women with tertiary education already among those born in the 1950s and has its even more rapid growth of tertiary in the subsequent cohorts (Picture 2 of the Annex). This can be treated as evidence of weaker family traditionalism in Karachay-Cherkessia compared to Daghestan. For North-West Caucasus, where differences between regions in fertility and issues of social organization are relatively small, the choice of Karachay-Cherkessia for the survey may be considered random.

2. Islam and fertility

The relation between Islam and fertility remains a controversial issue. Although fertility in most Islamic countries is well known to be decreasing during the recent decades, Total Fertility Rates in many of them were still considerably higher than the reproduction level at least around year 2000 (Fargues 2003, Jones 2006). Also, some Muslim communities, either migrant or not, still demonstrate higher fertility than their neighbors in the same country (see e.g. Dharmalingam, Morgan 2004, Westoff, Frejka 2007, Stonawski et al. 2016). Still more complex than the dynamics of fertility in Islamic world is the issue of possible ways in which Islam affects fertility in today's societies. An authoritative view once put forward by Caldwell (1986) assigned higher fertility of Muslim societies to traditional family organization yielding gender inequality: "The traditionally low status of woman is assumed to be uniform throughout the Islamic world and to constitute the crucial causal link between religious doctrine and the

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observed levels of fertility.” Under this approach, higher fertility in Muslim societies must be supported by family norms which presumably treat child-bearing as the most important role for a woman and restrict her involvement in any activities outside the family, including education and work. This account of higher fertility of Muslims agrees well with some recent studies of impact of traditional or patriarchal family norms upon fertility. Some of those studies were undertaken for totally Muslim societies, and some for societies with different religious composition (see e.g. Malhotra et al. 1995 for India, Lerch 2013 for Albania, among others). Evidence has been adduced that components of traditional family set up, such as unequal gender relations and power of senior relatives within a family, are related to higher fertility at least in some countries.

However, some further research has questioned Caldwell’s account. E.g., Morgan et al. (2002) suggest a comparison between 50 Muslim and non-Muslim communities in four Asian countries. They concentrate on woman’s dependence upon her husband or relatives as an important component of traditionalism. Although actual and desired Muslims’ fertility tended to be higher than that of other religious groups, no regular contrast in woman’s autonomy between Muslim and non-Muslim groups was detected. This undermines the assumption that higher fertility of Muslims is always due to more traditional organization of Muslim families.

Among alternative explanations of higher fertility of Muslims, two have become most influential. One can be called ‘structural’ as it relates higher fertility to some demographic or socio-economic characteristics of Muslim societies. Probably, the most recent study developing this approach is Stonawski et al. (2016), where it is argued that observed fertility differences between Muslims and non-Muslims in several countries of Europe decrease considerably when economic activity status and education are controlled. Among earlier studies, see e.g. Johnson-Hanks (2006) arguing that fertility differences between Muslim and non-Muslim communities in West Africa shrink considerably under control for socio-economic parameters.

A criticism of (some versions of) the ‘structural’ approach is proposed in Heaton (2011), studying data from DHSs of 22 developing countries with both Christian and Muslim populations. Heaton demonstrates that higher national level of Human Development Index (HDI) and higher level of education in a country are, contrary to expectation, related to larger differences between Christian and Muslim fertility within that country. That is, modernization development affecting a country does not necessarily result in vanishing higher fertility among Muslims of that country. There are also several studies which show, contrary to proponents of the ‘structural’ approach, that certain individual fertility characteristics in countries outside Europe where both Muslim and non-Muslim populations are present are related to religion even

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in models controlling for basic socio-economic parameters (see e.g. Bumpass & Rindfuss, 1980) studying mother's mean age at birth of different parities in Malaysia).

The other alternative to the traditionalism account view Islamic doctrine as the key reason producing higher fertility in Muslim communities. There is the common view that higher fertility of Muslims comes from ban on contraception substantial for Muslim theology. However, this approach has been put to serious doubt in some studies. As Obermeyer (1992) shows, based on religious dogma, it would be difficult to substantiate the opinion that Muslims are more pronatalist or less approving of contraception than are other groups. As argued in that paper, the Quran, although generally perceived to be pronatalist, does not contain straightforward injunctions against the use of contraceptives. Some studies, however, demonstrate that in a number of Muslim societies people lacking Islamic education tend to give religious reasons for not using contraception (Casterline, Sinding 2000, Knodel et al. 1999), so the contraceptive issue remains to some extent unclear. However, even if one does not concentrate narrowly on contraception but views Islamic doctrine as the basis for general adherence to family values, some explanatory shortcomings also occur. Importance of family values in Islamic doctrine has been questioned by some studies as a sufficient explanation of higher fertility among Muslims. Thus Frejka, Westoff (2007), exploring data on adherents of different religions in Europe in World Value Survey (rounds 1981-2001), show that family values and religiousness both are associated with higher fertility among Muslim women in Europe (family values including high value of having many children, having a son, considering family as an important institution, etc.). The impact of the two covariates, however, can be statistically disentangled because both religiousness index and values index are significant within one binominal logit model of fertility elaborated in that study (by contrast, for other religions present in Europe, family values indices but not religiousness indices appear significant for fertility in models of the same type suggested in that paper). If the impact of religion upon fertility among Muslims was confined to theological support of family values, the independent significance of religion for fertility of Muslims would not be expected in such models.²

In the present paper, we do attempt to evaluate all the existing accounts of the possible relations between Islam and fertility, and also concentrate on the issue of the adherence to traditional family norms as a putative 'proxy' which provides for this relation, in accordance

²Kaufmann (2008) argues for 'islamism', viz. adherence to Islamic ideology, to be a factor related to higher fertility instead of general adherence to religion. Again, this account does not agree with the assumption that Islam influences fertility through traditional family setting associated with that religion.

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with Caldwell's account (by traditional family norms we mainly mean gender inequality and power of elder relatives; see section 3 for some discussion and measurement issues).

3. Pilot survey. Hypothesis and Description

One of our initial goals when the pilot survey was organized was to check whether the mentioned position is always valid for explaining higher fertility among Muslims, or some alternative accounts are called for. Given the diversity of accounts of Muslim fertility, we do not confine ourselves to comparison of the traditionalism account with any other particular rivaling account, but rather contrast it with the most general approach under which identifying oneself as a Muslim and obeying the key commandments of Islamic faith (prayer 5 times a day, fasting, etc.) is considered to be directly related to fertility, irrespective of any social, doctrinal or other 'proxies'. Further, we refer to Islamic self-identification and obeying the key Islamic commandments and 'religiosity', which we consider as a personal parameter.

The question of the role of traditional family norms for Muslim fertility is further justified by the following reason. Many Muslim countries and regions currently undergo radical societal changes, at least partly departing from traditional family norms (for dynamics of family traditionalism in some Muslim societies in the recent decades, see e.g. Jejeebhoy, Sathar 2001, Koenig et al. 2003, Fuseini, Kalile-Sabiti 2015). This departure is manifested, among other things, in higher freedom of women in their choice of career, spouse, in their decision to have children, etc. To predict fertility development in societies undergoing such changes, it is important to find out whether Islam can persist to be related to higher fertility when family traditionalism is weakened.

The following two mutually exclusive hypotheses will be evaluated in the present paper:

Hypothesis A. Islamic religiosity can be related to higher fertility only 'through' traditional family set up.

Hypothesis B. Islamic religiosity can be related to higher fertility in a direct way, independent upon family traditionalism.

If Hypothesis A is correct, it is expected that religiosity parameters are not significant for fertility if parameters of family traditionalism are also included in the model. Also Hypothesis A brings in the expectation that parameters of religiosity and traditionalism will correlate with each other. By contrast, under Hypothesis B, religiosity may be significant for fertility whether or not traditionalism parameters are present in the model, and no correlation between the two groups of parameters is predicted.

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We attempt to undertake comparison of the two hypotheses for Muslims of North Caucasus, Russia. The choice of North Caucasus as a region for study looks feasible under the goal stated above. This region has experienced considerable modernization changes in recent decades, mainly due to urbanization and collapse of traditional agricultural settings. At the same time, high adherence to Islam is observed among local population and does not seem to diminish among younger generations, at least in some parts of the region. So North Caucasus gives an opportunity to test the assumption that Islamic religiosity influences fertility only through family traditionalism and becomes less significant under the process of family modernization.

On the basis of a survey of women of reproductive age undertaken by the authors in North Caucasus in 2016, we check how religious observance and traditional family organization are related to fertility. Our analysis leads us to the conclusion that Islamic religiosity is related to higher fertility among women of North Caucasus, as is also obeying traditional norms by their families, but the latter does not correlate with the former and both do not suppress each other's influence on fertility. Thus, religiosity turns out to be a parameter which can be related to fertility directly and independently of the traditional family setting.

Description

The survey in both republics was undertaken in 2016. In Daghestan it covered 950 married women of ages 16-39 in 12 rural settlements, and in Karachay-Cherkessia 605 women in 7 rural settlements. The settlements were chosen randomly within rural municipal districts. The districts were chosen in order to cover all major peoples of the regions and the three geographical zones (mountains, foothills and valley). The number of people living in the villages included in the survey varied between 400 and 5000. The number of women covered by the survey in a village varied between 40 and 120 and dependent mainly upon the village's size. Since only married women were surveyed, it proved to be impossible to provide for equal presence of all age groups of 16-19, 20-24, 25-29, 30-34 and 35-39 years in the survey. The overall percent of the 16-19 age group is about 12% instead of expected 20%, because relatively few women of this age group are married in the regions under study. All the other age groups are represented in almost equal proportions. The data was collected by way of interviewing respondents chosen randomly in each village for each age group.

Special explanation is needed for restricting our survey to rural parts of the two republics. There were several reasons for this. First, it is commonly expected that traditional family organization is better preserved in rural areas, so its impact on fertility, if it at all exists, should be expected there in the first turn. The second reason was rather technical, but substantial for

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our study. Our preliminary field observations showed a considerable ethnic diversity of fertility in North Caucasus (hence ethnicity parameter were included in our models – see below). Complex and rather irregular ethnic composition of urban areas made it rather difficult to control ethnic proportions in the sample. In rural areas, this task was easier because most rural settlements of the region are monoethnic (or inhabited by 2-3 ethnic groups at maximum).

The questionnaire included several groups of questions. First, women were asked about their life history. Those questions concerned woman's age, place of birth and of current residence, education, age at marriage, number of children and age at birth of each child. Also, a question about desired number of children was asked. Table 1 contains means for number of children at ages 25, 30 and 35 and for desired number of children for both regions. It shows that in the sample of Daghestan both actual and desired fertility were somewhat higher than in Karachay-Cherkessia (the gap between the two republics, however, became statistically insignificant by age 35).

Table 1. Mean number of children at 25, 30 and 35 years and desired fertility, Daghestan and Karachay-Cherkessia

	Daghestan			Karachay-Cherkessia		
	Mean number of children	N	S.E.	Mean number of children	N	S.E.
25 years	1,32	493	0,038	1,08	428	0,047
30 years	2,32	299	0,05	1,94	294	0,061
35 years	2,66	178	0,077	2,64	137	0,082
Desired fertility	3,51	841	0,047	3,13	523	0,044

Another group of questions dealt with family norms affecting the woman's life. Elaborating these questions, we profited from the extensive research on measuring traditionalism of family setting. For most part, the measures which have been proposed concern woman's autonomy from her husband and her elder relatives (see Morgan et al. 2002, Mason 1986, Malhotra et al. 1995, Szoltysek et al. 2016, Therborn 2004, among many others). What all the proposed measures (or indices) have in common is that the idea of inequality is essential for them. All of them consider gender discrimination, some of them also further investigates discrimination by age (seniority). Our preliminary observations on North Caucasus suggested

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that both types of discrimination are imposed by its traditional family organization, which requires considerable dependency of women on their husbands and of younger people on their elder relatives. However, certain measures of discrimination proposed in different studies obviously were inapplicable to North Caucasus. E.g. measuring distance on which a woman can travel unattended by her relatives hardly is relevant for the republics of North Caucasus under study, where independent travelling of women at least within the region borders has been normal at least during the last half-century.

The gender inequality measures which we have chosen concerned woman's possibility for education and labor outside her family.

Questions aimed at discovering age discrimination concerned ability of a woman to take key life decisions independently of her elder relatives. We concentrated on the issue of marriage as an event which all the women surveyed had experienced. Each woman was asked whether she got acquainted with her future husband on her own or with the help of her relatives and whether marriage was her own decision or she was advised by her parents to marry that particular man. As Table 2 of the Annex shows, Daghestan and Karachay-Cherkessia differed on the distribution of answers to these questions, and again Daghestan showed a higher level of discrimination because arranged marriages appeared to be more common in it. In both republics, however, woman's freedom to choose her spouse is growing from the elder generation to the younger ones, as Pictures 6-7 of the Annex indicate. This shows that, at least in this aspect, younger generations of women are faced with lower level of family traditionalism in both republics.

Another group of questions were concerned with religiosity— understood as intensity of religious beliefs and participation. Some recent studies have suggested attending religious worship as the key parameter measuring religiosity (Zhang 2008). In the case of North Caucasus, however, this measure is hardly applicable as in most of its areas, attending Friday mosque worship —the key public religious event —is generally not prescribed for women. In our survey therefore, women were asked whether they performed daily prayer (*namaz*), whether they observed Islamic fasting (*uraza*), whether they considered religious upbringing of children important and whether they found their family religious. Note that the first two variables concern performance of the key activities required from Muslims (though not publicly), whereas the other two rather deal with subjective perception of Islamic norms. Table 2 of the Annex shows that the respondents in Daghestan generally were found more observant. Differences between the regions are especially clear in observing religious rites, viz. fasting and daily prayer.

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To conclude, the survey has shown that the two regions differ not only in fertility behavior, but also in some parameters related to women's autonomy and to religion. Women in Daghestan generally appeared to be more religious than in Karachay-Cherkessia. At the same time women's autonomy in Daghestan, both in their possibility to study and work and in their freedom in marriage solutions, is lower than in Karachay-Cherkessia. Changes in the proportions between generations also are not the same in the two regions, but here more similarities were observed. While Islamic observance is decreasing among the younger generations in Karachay-Cherkessia, but not in Daghestan, both regions demonstrate a decrease of women dependent upon their relatives in marriage. Also, the data on Karachay-Cherkessia clearly points to growth of education level from older generations of women to the younger ones. In Daghestan, that tendency is not very clear, but still observable between some age groups and with better clarity in some villages included in the survey. These developments without parallel lowering of the proportion of Muslims adherents give some credit to the hypothesis that obeying traditional family norms and religious observance are not obligatorily interdependent.

4. Pilot survey. Models

We have elaborated models for two dependent variables:

- 1) the number of children born by a woman;
- 2) the desire of a woman to have an additional child (binary variable).

In the former models we use the Poisson regression and for the latter the binary logistic regression model.

We produced the indices for Non-traditionalism (or Modernization) and Religiosity combining the abovementioned parameters without weights. The Indexes were produced as average means of the four religiosity parameters (the Religiosity index) and 6 non-traditional (the Non-traditionalism index). For each parameter, the meaning which fits the religiosity or non-traditionalism pattern is coded "1", and the opposite meaning is coded "0" for the indices calculation (see Table 2).

Table 2. Parameters involved in our calculation of the Non-traditionalism and Religiosity indices

Non-traditionalism	Religiosity
1. Studying after secondary school (0- no, 1 – yes)	1. Performs daily prayer (0 – no, 1 – yes)

2. Studying after getting married (0 – no, 1 – yes)	2. Observed Islamic fasting (0 – no, 1 – yes)
3. Working after getting married (0 - no, 1 – yes)	3. Considers her family religious (0 – no, 1 – yes)
4. Planning to work in future (0 – no, 1 – yes)	4. Finds important the religious upbringing of children (0 – no, 1 – yes)
5. Got acquainted with her future husband on her own (0 – no [was acquainted with him by her relatives], 1 – yes)	
6. Took the decision to marry on her own (0 – no [was advised by her parents], 1 – yes)	

The descriptive statistics for the variables can be found in the Table 3. To check consistency of the items included in our indices, we calculated the Alpha-Cronbach coefficients for 4 religiosity and 6 non-traditionalism variables³. Assessing the reliability for importance of Islam (the Religiosity index), we received Alpha-Cronbach 0.762 (0.86 for Dagestan and 0.53 for Karachay-Cherkessia), while for Non-traditionalism (*Non-Trad*) only 0.667 (0.63 and 0.47 respectively). Given this, we only included the religiosity index for input in our models. The Non-traditionalism will be used for the robustness checks.

Table 3. Descriptive statistics for explanatory variables. Proportion of women with characteristics studied in the survey

Daghestan			
Variable	N	Proportion	Std. Dev.
Considers her family religious	847	0,848878	0,358379
Performs daily prayer	891	0,762065	0,426058
Observes Muslim fasting	889	0,848144	0,359083

³The reliability coefficient of 0.70 or higher normally is considered “acceptable” in social science research.

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Considers religious upbringing of children important	896	0,666295	0,471799
Studied after marriage	898	0,273942	0,446228
Worked after marriage	896	0,430804	0,495465
Was introduced to her future husband by her relatives	816	0,599265	0,490348
Was advised to get married by her parents	863	0,484357	0,500045
Studied after secondary school	900	0,475556	0,49968
Karachay-Cherkessia			
Considers her family religious	518	0,777992	0,415998
Performs daily prayer	557	0,235189	0,424498
Observes Muslim fasting	554	0,626354	0,484209
Considers religious upbringing of children important	566	0,572438	0,495163
Studied after marriage	568	0,420775	0,494119
Worked after marriage	566	0,671378	0,470128
Was introduced to her future husband by her relatives	558	0,360215	0,480493
Was advised to get married by her parents	534	0,121723	0,327272
Studied after school	567	0,844797	0,362418

We used cascade models including the religiosity and traditionalism indicators one by one as well as the Index of religiosity and the following control parameters (control parameters are not shown in the models below):

- *Age of the respondent.* We consider this parameter important both for actual fertility measurement, as fertility is expected to vary across age groups (even if that fertility is

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measured for married women only), and for the desired fertility, which also can be age-sensitive;

- *Nationality*. As shown in section 2, considerable fertility variation across nationalities is observed in the regions under study, so control on nationality of the respondents is crucial and can be a substitute for the control for Region;
- *Current number of children*. It used as a control parameter only in the model with desired fertility, which is expected to depend upon the actual number of children a woman has.

The resulting models for actual number of children are shown the Table 1 Annex.

Table 1 . See below in the Annex.⁴

Being separately included in the models, all the religiosity indicators increase the rate ratio of the next childbearing (Models 2-5 in Table 1). The strongest effect is observed for the variable of considering religious upbringing important, which keeps the significance for all the procedures with the additional control variables inclusion (Models 1, 5, 7 in Table 1). The Religiosity index also demonstrates positive relation to the number of children (Model 6 in Table 1), showing the importance of religion when the effects of all religiosity variables are merged together and there is no risk of multicollinearity.

As far as the variables showing traditionalism of family set up are concerned, three of them, woman's studying after secondary school, work after becoming married and planning to work in future show a significant relation with number of children (cf. Models 8, 12 and 13 in Table 1). As expected, higher level of education and work after marriage affect number of children negatively. The desire to work in future has a negative effect on the number of children, but here reverse causality is possible.

When both religiosity and traditionalism parameters are included in the model (Model 7 in Table 1), some parameters of each group remain significant. This shows that the two groups of parameters affect number of children independently.

Let us now turn to the logistic models with desire to have one more child as the dependent parameter. Being separately included in a model, all religiosity indicators increase the odds ratio of the desire for the next child (Models 2-5 in Table 2). The strongest effect is detected with observing fasting, which keeps the significance for all robustness checks here. The Religiosity index also demonstrates positive influence on the odds ratio (Model 6 of Table 2). Among

⁴ Hereinafter please see all the Tables with model results in the special Annexes

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traditionalism parameters, only the fact of non-independent acquaintance with the future husband demonstrates significance for desire to have the next child (Model 10 of Table 2)⁵. When both religiosity and traditionalism parameters are included in the model, none of the latter is significant at the 95% significance level (Model 7 of Table 2).

Table 2 . See below in the Annex.

To conclude the models in Table 1 and Table 2 show a significant relation between fertility behavior and Islamic observance, which is related to higher number of children and to higher propensity for desire to have more children. The relation of the variables showing traditionalism of family setting to actual and desired fertility is vaguer, as few of those parameters appeared to be significant, with the list of significant parameters changing respective to the dependent parameter of the model. When the religiosity parameters and the traditionalism parameters are included in the model altogether, either both are significant, or both are not (respective to the dependent parameter).

Turning back to the hypotheses outlined in the introduction, we can see that the data from North Caucasus suggest that traditional family norms are not obliged to be a ‘proxy’ for the relation between Islam and fertility. The religiosity parameters are highly significant both for actual number of children and for the desire to have one more child, and weakly correlate with the traditionalism parameters. Possible consequences of this result are discussed in the next section.

Robustness checks

For additional robustness checks⁶, we built models controlling on region instead of nationality. Due to the considerable fertility contrasts between the republics, we expect that some part of variation between them will not be related to differences in the social variables included in our models or to ethnic composition. Therefore, we used a control dummy variable which has the meaning “1” if the respondent lives in Daghestan and “0” if she lives in Karachay-Cherkessia. The impact of the ‘regional’ dummy for the models with the desire to have an extra child was considerably higher than on the number of children. However, with both dependent parameters the significance of most of the religiosity and traditionalism parameters persisted after inclusion the ‘regional’ dummy.

⁵Interestingly, independent acquaintance, signaling non-arranged marriage, is related to higher risk of the desire to have one more child. An opposite relation could be expected given that arranged marriage is a part of the traditional family set up. We do not take up this question here, admitting that the uniqueness of the traditionalism parameter which has turned out to be significant here hardly allows coming up with any hypothesis about the way the traditional family set up could affect desired fertility.

⁶ The robustness check tables are available upon request.

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Also, we built separate models for each of the republics, for Daghestan we controlled for nationality due to its high ethnic diversity. In the models built separately for Daghestan, the effect of the religiosity parameters on the number of children was a bit higher, and their effect on the desire to have an extra child was tremendously higher than in Karachay-Cherkessia. Generally speaking, the higher effect of religiosity in Daghestan agrees with the higher proportions of religiously observant women in that region detected by our survey. Note, however, that the significance of the religiosity parameters in models for both regions with the regional dummy does not allow us to neglect the effect of religiosity in Karachay-Cherkessia as well.

Finally, we have built models taking respondents only below 30. No remarkable change of significance of the religiosity and traditionalism parameters was attested in the models, pointing to relatively homogeneous impact of those parameters for all age groups included in our study.

The results can be still timing driven, even controlling for the current age of the respondent cannot solve this problem properly, but when we use the variables of interest like the cumulative number of children to the age of 30, we still have the similar results.

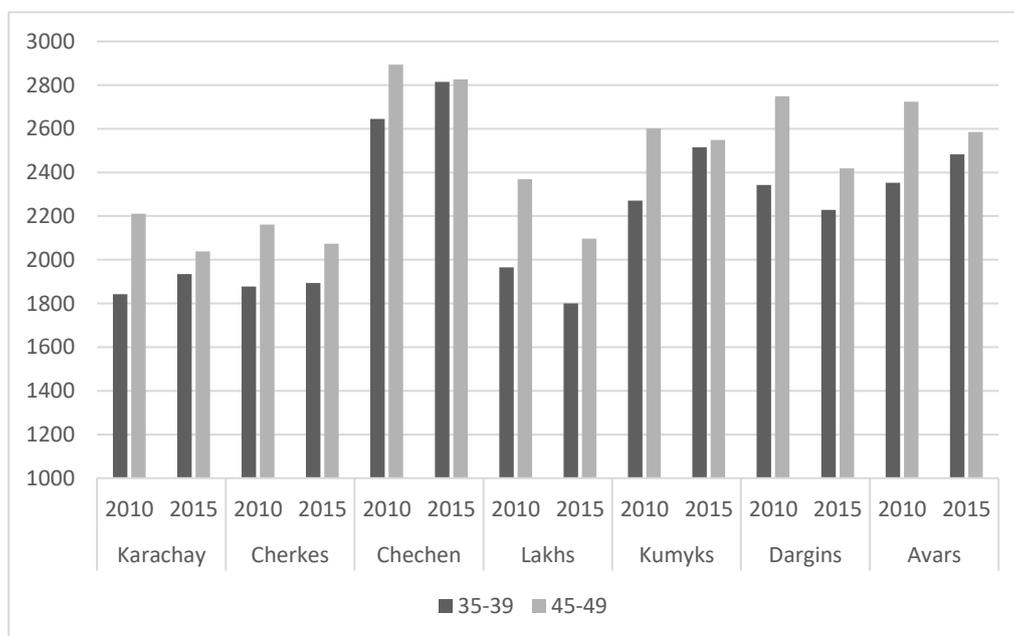
5. Pilot study. Discussion and conclusion

We have seen that statistic models show that the impact of Islamic religiosity on fertility behavior in North Caucasus is clearly distinct from that of the traditional family set up, and that the two groups of parameters weakly correlate with each other. Seeking for an explanation to these observations, rather unexpected under an influential approach to the relation between Islam and fertility, it could be worth to turn first to look at recent religious trends in both regions. As already mentioned, starting from the 1990es North Caucasus has become an area of permanent disputes and conflicts within local Islam, where so called ‘young Muslims’ regularly constituted one of the sides. As shown by Kisriev, Ware (2000), these were Islamic groups often headed by preachers who had studied abroad, were opposed to local Islamic traditions in many ways and were backed mainly by young people. Given that the ‘youth Islam’ was openly schismatic from the local religious tradition going back to elder generations, it does not come as a surprise that Islamic values could be perceived by its adherents quite separately from family traditions. As such, the ‘youth Islam’ was in many aspects related to the global trends of Islamic religious modernization and neo-fundamentalism discussed in much detail by Roy (2004). Under these circumstances, religious observance can be perceived as having no relation to observing traditional family norms, based on reverence to elders, restricting social role of

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women, etc. The observed weakness of correlation between religiosity and family traditionalism would be expected in this case, as well as their mutual independence in affecting fertility. Note that even the eldest age groups included in our study (35-39 years old) went through their adolescent years when the ‘youth Islam’ was already present as a religious trend (in the 1990s), so they could have a value system before them which clearly separated religious adherence from family traditionalism. However we still can do only projections and even speculations regarding the effect that the earlier childbearing among more religious youth can give to the cohort fertility. The previous observations give us the evidence of the really huge diversity of the cohort fertility among the nations, especially in Dagestan (see Picture 5). The cohort fertility demonstrates the increase in cumulative indicator for the real generations to the age 35-39.

Picture 5. The number of children born to woman of different ethnic groups of Daghestan and Karachay-Cherkessia to age periods 35-39 and 45-49 based on Census 2010 and Microcensus 2015 results



However the results can be explained not only by higher share of religious persons, but by the economic factors (including the utilization of the Russian family policy issues or the period of economic growth), or decline in 1990s for real generations, or the problems with the sample for the Microcensus 2015 (selectivity towards less modernized persons, who e.g. migrate with lower probability and can be found by the organizers of the large survey).

Another important issue concerning the ‘youth Islam’ in the North Caucasus is that for its adherents, religion becomes a crucial component of self-identification. As such, religious self-identification is opposed to ethnic self-identification, the latter being perceived as a value related to tradition of elder generations (see Starodubrovskaya, Kazenin 2016). This allows us

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to hypothesize about possible mechanism of the relation between Islam on fertility. McQuillan (2004) argues for several conditions under which religion can have direct relation to fertility, one of them is its being an essential part of a group's identity. If our reasoning is correct, North Caucasus gives an example of this 'path' for religion/fertility relation. Note that elsewhere direct relation of religiosity to fertility has been argued for those Muslim groups for whom religious identity is important as distinguishing them from their political opponents, cf. Atrash, Schellekens 2012 for Israeli Arabs.

The conclusion about mutual independence of religiosity and family traditionalism in affecting fertility agrees with some recent studies which argue that religious affiliation and/or personal religious adherence can be of independent significance for fertility in non-Muslim societies (cf. Zhang 2008 for some Christian denominations of USA, Philipov & Berghammer 2007 and Peri-Rotem 2016 for Christians of some countries of Western Europe). It is possible that the evidence coming from North Caucasus could bridge the gap between Islam and other religions, giving evidence that Islam also can have direct effect on fertility and is not restricted to influencing it via some social setting.

To sum up the final study we should say that there is of some relevance for understanding dynamics of fertility among Muslim population of the world. It suggests that dissolution or weakening of traditional family norms which is observed currently among some part of the world's Muslim population does not necessarily lead to a loss of all socio-cultural characteristics related to higher fertility in Muslim societies.

However the results could be also driven by the underestimation of the education and labour market factors and also bias in the sample formation. When we tried to distinguish the personal and community effects by 2-level models (using MCMC approach to avoid the problem of the small number of villages) we found the evidence of the community bias possibility, as well as the strongest effect of the education. So our next step is based on the analysis of the new sample organized as a random one and taking into consideration the possible economic and education issues.

6. Final survey. Description

The new survey was organized based on the main technics the samplings. It was carried out at the middle of 2018 (April-July) also in Daghestan and Karachay-Cherkessia. By now we have reliable results included into the database for Daghestan, only, while for the other republic we still in the procedure of validation and technical issues, mainly because for Karachay-Cherkessia we launched the process later. The technics of sampling in Daghestan was random

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choice of the municipal districts (30 from about 60 existing in the republic) and the number of respondents was taken proportionally to the number of population by administrative records. Inside the municipal districts the communities (there were more than 30 of them) were chosen. By this sampling we made a sort of the underestimation of the certain ethnic groups leaving with a high density at the certain territories and communities (as well as the possible overestimation of the others).

Regarding the number of age groups, we did not follow the existing population pyramid waves and took the approach of the equal distribution by 5-year groups of the respondents at the age 15-39 and also took into account some 40+. However the sorting of the results and the cleaning the sample from the unreliable respondent lead to the final distribution. For Daghestan the number of reliable respondents is almost equal to 1000, their age distribution is following: 15-19 – 16%, 20-24 – 20%, 25-29 -20%, 30-34 – 22%, 35-39 – 19%, 40+ - 3%. The respondents were women (regardless the number of children and marital status – but 66% of them were married, and more than 76% had previous marriage or partnership experience, about 56% had at least one child) at the age from 15 to 39, with some 40+ outliers for the sample balance. The survey was organized in 37 different communities of the Republic, including rural and urban ones and the capital. There was a double control of the respondents by the telephone calls, and the suspicious ones, as well as the suspicious territories were excluded from the sample.

7. Current survey. Model and preliminary results

!! The part is still in process, the results are preliminary!!

The variables of interest (*dependent*) for the models will be close to those in the pilot study:

- The number of children born to the date of the survey (the observed characteristic)
- The desired number of children (the subjective characteristic) – it is used instead of the less clear desire to have an additional child

As we can see in the first case the sample of the respondents will be smaller, as there are no there childless women, the test for omitted variables to avoid this possible error will be organized for the whole sample later. As the modelling methods we use both linear regressions where the coefficients are based on the OLS approach with robust standard errors and Poisson regressions. The distribution of the actual number of children is close to Poisson, while the desired number of children looks like a normal distribution (the normality test is close to 5% significance level). Therefore the reported results for the models will be based on the Poisson regression for the actual number and linear OLS regression for the desired number.

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Additionally, we made a comparative analysis for the effects in case of different methods for the same models usage⁷.

The number of *independent* variables in this survey is higher in comparison with the previous pilot study based on the statements and comments about the possible unobserved characteristics concerning husband's characteristics, education, economic status and labour market participation, while we have slightly reduced the religiosity battery. Several clusters from these independent variables are made for better perception of the information, mainly they are dummies if the other information is not specified additionally (coded like 0 – no, 1 – yes).

Cluster 1. Husband's characteristics

Can be close to traditionality, but detached separately, as it cannot be used for unmarried women.

husb_bro – husband is respondent's cousin or second cousin

husb_nat – husband has different nationality from the respondent

husb_birth – husband is from the same place

Cluster 2. Religiosity

value_rel – finds important the religious up-bringing of children

religion_nam – performs daily prayer

religion_ur – observes Islamic fasting

Cluster 3. Traditionality⁸

value_trad - finds important the knowledge about traditions in up-bringing of children

And the answers of the respondents on the questions about the need to get an approval from the parents and/or the older relatives for the certain actions (see the list below):

appr_buy – approval for a purchase that costs sensitive amount for the family budget

appr_move – approval for moving to the new house within the same town/village the respondent lives

appr_reg - approval for moving to the other region

appr_work - approval for finding a new job

appr_div - approval for matrimonial behavior - marriage and/or divorce

appr_chil - approval for reproductive behavior – birth

And finally the personal question to the respondent:

appr_ch_mar – if the respondent could approve the marriage of her children with the spouse from the different ethnic group or nationality

⁷ In this draft we don't show the tables of the results, that are available upon request.

⁸ The questions from the previous pilot study could be too confusing for the respondents and may be are not totally associated with the traditions. So that we decided to change the 'traditionalist' part of the questionnaire.

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Cluster 4. Education

education – The referent group is primary education, and afterwards we can find the following groups, ranged from lower to higher stages: uncompleted secondary, secondary, vocational secondary, uncompleted tertiary, higher, with degree

Cluster 5. Wellbeing

As it was seen in the previous field researches the questions about wellbeing and poverty could be one of the most sensitive and the response rates were relatively low. In our research we stopped at the subjective wellbeing and labour market participation

wealth – subjective wellbeing, as the answer on the question “ How do you estimate your material welfare at the current moment?” . The referent category for all the respondents was good, and than in descending order: relatively good, relatively bad, bad.

-

job - the participation of the respondent in the labour market (state property organization, private organization, self-employed, no job)

no_job - the special indicator to see if the respondent does not have job at all (included separately with the variable ‘job’).

To check the hypothesis about the role of different factors on fertility and the role of religion on fertility in Islam society we can include the explanatory variables in the models by the following clusters under the same order with all the independent variables:

- Husband’s characteristics
- Husband’s characteristics + Religiosity
- Husband’s characteristics + Religiosity +Education
- Husband’s characteristics + Religiosity +Wellbeing
- Husband’s characteristics + Traditionality
- Husband’s characteristics + Traditionality + Education
- Husband’s characteristics + Traditionality + Wellbeing
- Religiosity + Education
- Religiosity + Wellbeing
- Traditionality + Education
- Traditionality + Wellbeing
- Religiosity + Traditionality + Education
- Religiosity + Traditionality + Wellbeing

The variation of the dummy independent variable responsible for the characteristics of the husband, religiosity and traditionality the is visible in Table 4.

Table 4. Descriptive statistics for explanatory variables. Proportion of women with the positive answers on the questions (for dummy variables)

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Variable	Observation	Frequencies (shares), %
husb_bro	565	0.2123894
husb_nat	582	0.161512
husb_birth	637	0.4882261
value_rel	992	0.5897177
religion_nam	937	0.642476
religion_ur	926	0.7451404
value_trad	992	0.3830645
appr_buy	940	0.6851064
appr_move	924	0.7229437
appr_reg	935	0.7914439
appr_work	953	0.5498426
appr_div	931	0.810956
appr_chil	894	0.1420582
appr_ch_mar	786	0.759542

It is important to mention that for all the models as the universal *control* variables we include the age of the respondents (**age1**), as it could be as a timing characteristic the main predictor for the child-bearing (the technic is the same as in pilot study approach), also for the models working with the desired number of children as an explanatory variable we should include the current number of children (**child_number**), and it is as well repeats the approach from the pilot study. Likewise if we do not include the characteristics of husband in the model we will include the marriage status as a control variable (**mar_st**).

The other robustness checks include the stepwise control for the area and nationality when the survey was organized, that is very important in this contest as Daghestan is one of the most diversified regions in Russia by nationality, culture and development.

We start with the control for urban or rural (**area**) characteristics, as in contrast with the pilot survey now we used the urban areas, afterwards we control for **nationality** (9 main ones, and others plus mixed – 11 categories altogether). The next step for the robustness checks is the control for the community levels. However the results do not change in most of the cases significantly after all the controls for community and nationality, otherwise we mention it in the description.

The results

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In case of the *actual number of children* the sustainable significant effect was observed only for

- the indicators of traditionalism that are significant even after controlling and all robustness checks, for linear and Poisson regression. After the inclusion of the cluster husband's characteristics the significant positive effect is observed for the approval for movement to the other region, and approval for the matrimonial behavior. Without the husband's characteristics control the following indicators play role additionally to abovementioned - the approval for work, and reproductive behavior.

- in the linear regression model the negative effect of education is obviously observed, while for Poisson the number of children is only significantly higher among women with primary education in comparison with the other stages, but the other stages demonstrate the different directions of the effect

For the *desired number of children* we can observe

- the significantly positive effect of the religiosity Cluster: mainly the components like importance the religious up-bringing of children and the situation when the respondent observes Islamic fasting (however the effect becomes insignificant after the inclusion of all control variables and husband's characteristics). The instability of the religious variables can be explained by the high correlation of them with the choice of the husband (higher correlation to have the husband who is a relative or was born at the same place and has the same nationality for more religious respondents, or the respondents from more religious communities, but the robustness checks do not show the difference)

- the significantly positive effect for the poorer households, but after community control the effect disappears. So than in this case the higher desired fertility is likely observed in poorer communities, but not among population with generally lower welfare.

As it was mentioned above the main motivation of this research was the observation of the reasons for the earlier childbearing practices in Daghestan and generally it should be mentioned here. For the dependent variables in this case we could concentrate at the **age of the first childbearing**, with the mentioned and used in previous models battery of the explanatory variables and control variable as the current age of the respondents only (to control for the possible cohort effect)

As in our sample not only married women and women with the children are observed we see here the truncated number of respondents like in case of actual childbearing. We use as a method OLS with robust standard errors.

The results for the mean age of 1st birth are following.

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- The education demonstrates the positive effect on the mean age of birth, but this effect is not linear, the function can be described as the relatively low age for the women without education in comparison with the other stages. The difference between other stages is insignificant and unclear, even the higher education does not associate negatively with the age of the first childbearing (may be it is associated with a formality of the high education – so-called faked higher education in Russian provinces, the phenomenon that was widespread in 2000s). This effect was also observed for the actual number of children.
- The lack of job is positively associated with the age of the 1st childbearing. So it is possible that the mothers who start the reproductive history earlier have lower opportunity to participate in the labour market (the causality in this relationship can be different)
- If husband is a cousin of the respondent we see the negative effect on the age of childbearing, it becomes weaker, but still significant with the other control variables
- Among the traditionality the need for working opportunity is negatively associated after all the controls with the age of childbearing, but the religiosity does not demonstrate any effect

8. Discussion for the final survey

Among the general findings we should mark that if the respondent is married to her relative (cousin or double cousin) the probability for the higher number of children and earlier childbearing is higher after controlling and robustness procedures.

Traditionality has a stronger impact on the actual number of children, while religiosity influences only on the desired number of children and weaker. Traditionality and the husband's characteristics are strongly correlated. Nevertheless we still cannot maintain that for the desired number of children the results are not based on the selectivity, as the sample for the model is lower in comparison with the other models where all the women are included. Very low level of education influences positively the number of children and negatively the age of first childbearing, but further the effect is unclear.

The situation observed in Daghestan is not unique at least at the Post-Soviet place. The whole trend with fertility patterns: the increase in timing TFR and the decrease for mean age of first childbearing especially in the rural areas and timing is close to the Central Asian countries. The changes in the complete cohort fertility contradictory to the demographic transition patterns was already observed in the territories of Central Asia within Soviet period (that is visible by Soviet Census results) and with lower confidence we can talk about Daghestan. However that time it could be clearly explained by improvement in maternal mortality prevention and

growing reproductive health associated with the lower levels of secondary sterility. Nowadays the explanation for the phenomenon in both territories can be close to the change of the cultural patterns, where re-Islamization still plays an important role.

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ANNEX. Tables with the results of modelling

Table 1. The effects of religiosity on the number of children, incidence rate ratios (IRR) control for Age and Nationalities⁹

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15
REL_FAM	1.076* (0.0406)	1.175*** (0.0347)					1.078* (0.0437)								
URAZA	1.016 (0.0342)		1.118*** (0.0302)				1.005 (0.0363)								
NAMAZ	1.028 (0.0314)			1.119*** (0.0304)			0.985 (0.0314)								
VALUE_REL	1.140*** (0.0317)				1.167*** (0.0274)		1.141*** (0.0343)								
RELIG						1.301*** (0.0497)									1.239*** (0.0508)
WORKMAR							0.945* (0.0289)	0.867*** (0.0213)						0.929** (0.0270)	0.942* (0.0289)
STAFTER MAR							1.036 (0.0275)		0.993 (0.0231)					1.051** (0.0264)	1.037 (0.0278)
SELFAQU							0.980 (0.0265)			1.007 (0.0238)				0.983 (0.0253)	0.982 (0.0266)
SELF_DEC							0.985 (0.0292)				0.988 (0.0254)			0.988 (0.0281)	0.984 (0.0292)
STAFTER SCHOOL							0.929** (0.0278)					0.880*** (0.0217)		0.923*** (0.0266)	0.926** (0.0280)

⁹ The meaning of parameters: REL_FAM – considers her family religious (1 – yes, 0 – no), URAZA – observes Islamic fasting (1 – yes, 0 – no), NAMAZ – performs daily prayer (1 – yes, 0 – no), VALUE_REL – considers religious upbringing of children important; RELIG – index of religiosity; WORKMAR – worked after getting married (0 – no, 1 – yes), STAFTERMAR – studied after getting married (0 – no, 1 – yes), SELFAQU – got acquainted with her future husband herself (0 – yes, 1 – no), SELF_DEC – took the decision to marry herself (0 – yes, 1 – no), STAFTERSCHOOL – studied after secondary school (0 – no, 1 – yes), WORKFUT – plans to work in the future (0 – no, 1 – yes).

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WORKFUT							0.909**						0.847***	0.889***	0.909**
							(0.0347)						(0.0255)	(0.0316)	(0.0349)
Controls:															
Age															
Nationality															
N	1,329	1,360	1,439	1,442	1,456	1,329	1,108	1,456	1,460	1,368	1,392	1,461	1,357	1,217	1,108

Here and after robustness in parentheses;

*** p<0.01, ** p<0.05, * p<0.1

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Table 2. The effects of religiosity on the desire to have an additional child, odd ratios (OR)control for Age, Number of children and Nationalities

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15
REL_FAM	0.817	1.359*					0.849								
	(0.193)	(0.243)					(0.225)								
URAZA	2.582***		2.168***				2.822***								
	(0.546)		(0.352)				(0.645)								
NAMAZ	0.971			1.338*			1.214								
	(0.190)			(0.217)			(0.263)								
VALUE_REL	1.098				1.332**		0.964								
	(0.195)				(0.184)		(0.192)								
RELIG						2.312***									2.836***
						(0.511)									(0.721)
WORKMAR							0.997	0.882						0.995	1.040
							(0.182)	(0.128)						(0.169)	(0.188)
STAFTER MAR							0.778		0.915					0.862	0.792
							(0.133)		(0.126)					(0.136)	(0.135)
SELFAQU							1.339*			1.401**				1.267	1.308
							(0.220)			(0.190)				(0.195)	(0.215)
SELF_DEC							0.857				0.911			0.876	0.854
							(0.149)				(0.130)			(0.142)	(0.149)
STAFTER SCHOOL							0.927					0.876		0.953	0.931
							(0.178)					(0.130)		(0.177)	(0.180)
WORKFUT							1.228						0.875	1.017	1.235
							(0.260)						(0.157)	(0.210)	(0.265)
Controls:															
Age															
Nationality															

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