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Religion, Growth and Innovation in Contemporary Russia

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1 Introduction

For many decades culture has been considered to have a significant impact on the productivity of people. As nations, on their most basic level, are the sum of their inhabitants and the geographic area they live on, culture also affects the development of nations. To study the impact of culture a number of approaches have been implemented - mostly by sociologists - to argue not only the specifics of culture, but also its impact on different indicators of economic and sociological output.

Applied to empirical economics most recent studies aim at the impact of religious diversity¹ or the degree of individualism of a society². Only a very select number of studies take up ideas introduced in sociological studies by philosophers or sociologists, such as Max Weber³, and try to relate the cultural aspect of religion to economic output or productivity⁴. In this area the study by Helble (2007) focussing on the relation between religion and trade is unique insofar as an econometrical study is conducted and half-way decent results are obtained.

One of the reasons for the scarcity of research in this area lies in the past and the wrong political, sociological and ethical decisions that were based on pseudo-scientific research, particularly research conducted during the 1930s and 1940s in Germany⁵.

Additionally, the scarcity of data on the spread of religions usually either prohibits or at least hinders a comprehensive and conclusive empirical analysis.

This last problem holds especially true for the regions of the Russian Federation where, in general, data on cultural aspects is only partially available. In particular, Russian law prohibits the collection of official statistical data concerning religious affiliations.

Why then should the Russia Federation provide a suitable basis for this kind of study at all? Until the end of the Soviet Union religion as a societal institution officially did not exist⁶.

¹See for example Alesino and La Ferrara (2005).

²See for example Hofstede (1980), Vadi and Vereshagin (2006) or Michailova and Hutchings (2006).

³See Weber (2010), Weber (2011) or Weber (1998).

⁴With his reference to the *Spirit of Capitalism* Weber generates as well a first link between religious adherence and entrepreneurship or innovativeness respectively.

⁵At this point the author wants to stress that this study has a purely positive scientific background and no normative intentions. All conclusions drawn from this study need to be considered from an ethical perspective as well.

⁶It is noted however that in an unofficial context religion has been practised even in times of the Soviet Union.

If under Soviet rule religion, at least officially, did not exist then the religious opening-up during the beginning of the 1990s can be considered a natural experiment⁷. A question thus exists whether, two decades later, religion - a slow changing institution - still does not play an important role in Russian society. The question can be reformulated as to whether the Russian Federation successfully finished its religious transition process.

Further argument to study both aspects in the context of the Russian Federation can be found in the composition of Russian oligarchs or rather Russian billionaires.

The Forbes list gives an annual overview over all billionaires of the Russian Federation. In 2004 the list included 26 Russians. Of those 26 Russians ten (38.5%) were of certain Jewish descent while four are of uncertain descent but with a high probability of being Jewish leading to a share of 53.8% of Jewish born oligarchs. Of the remaining 12 oligarchs the religious affiliation of seven still remains an open question. Considering that in the 2010 Census only 0.11% of all Russians are recorded as being of Jewish origin, a large discrepancy can be found in the distribution of religious affiliations across the oligarchs. If, instead of the number of oligarchs, the share of their cumulative wealth is considered, the share of Jewish oligarchs rises from 53.8% in 2004 to 68.5% in 2013. The importance of Jewish people in the context of Russia's oligarchs has also been discussed by Braguinsky (2009) in his broad study on the background of especially those oligarchs who came to power during the 1990s.

Motivated by those numbers and the preceding arguments, the present study aims at taking a look at the relation between religious affiliation and economic output indicators like the GRP and the GRP per capita. As oligarchs might be considered to be more business oriented than the average inhabitant, the relation between religious affiliation and innovativeness - measured through the amount of patents is considered as well.

Patent data is taken from Rospatent referring to patents granted by Rospatent. The data on religious affiliation is taken from the ARENA study⁸.

In the second section the data set on religious affiliations is presented in more detail and discussed as to its regional dimension. The third section dis-

⁷See Roland (2004).

⁸The ARENA study has been published by SREDA (2012) and is a comprehensive source for the distribution of different religious affiliations across most regions of the Russian Federation in the year 2012. The data has been collected via a survey - based on 56,900 interviews - and is available for 79 of the 83 regions of the Russian Federation. In this study however only 77 regions are considered and the results for Khantia-Mansia and Yamalia are considered as a part of the Tyumen oblast. The study can be considered representative as it encompasses approximately 0.4% of the total Russian population.

cusses theoretical aspects of the relation between religion, economic output and innovativeness. It is based mostly on existing studies and their results concerning characteristics of religions like thriftiness, trust or risk aversity. Following this summary of religious characteristics, the main study is conducted in a second sub-section by using different econometrical approaches to quantify the impacts. Preliminary conclusions are drawn in the fourth section.

2 Religious Diversity in the Russian Federation

Table 1 reports in the last column the share of the religious beliefs that have been considered in the ARENA study. In the second column, the respective absolute numbers have been calculated using the shares and the official population data for 2012.

Religious Belief	Population	Percentage of Total Population
Russian Orthodox	58,808,314	41.14
Believe in God	35,965,415	25.16
Atheist	18,611,673	13.02
Other Muslims	6,661,321	4.66
Other Christians	5,803,640	4.06
Sunni Muslims	2,372,917	1.66
Other Orthodox	2,144,202	1.50
Pagan Believers	1,743,951	1.22
Other Believers	871,975	0.61
Buddhists	657,555	0.46
Old Believers	457,430	0.32
Protestants	300,188	0.21
Shiite Muslims	300,188	0.21
Catholics	185,831	0.13
Jews	100,063	0.07
Hindus	85,768	0.06
Pentacostalists	85,768	0.06

Table 1: Share of Selected Religious Groups - Absolute and as a Percentage of the Russian Population

As a caveat it needs to be mentioned that while the ARENA study spans a considerably large part of the population it still only covers approximately 0.4% of the whole population. The presented results are therefore only a rough snapshot of the real situation. However, due to the high quality of the data collected by ARENA it is still one of the best estimates that exist for religious affiliations across most regions of the Russian Federation.

One possible way to evaluate the quality of the ARENA data is by comparing the number of people of the Jewish faith with the numbers reported in the All-Russian Census of 2010. In contrast to the ARENA study the All-Russian Census of 2010 covers all households and while some arguments have been raised as to the quality of data collection it can still be considered

a very reliable source of information. The advantage of the Census is that it also collected information on ethnicity. Adherence to the Jewish faith has been considered as belonging to the Jewish ethnic group in the Census, thus the numbers of both data sets should be roughly comparable.

The shares read as 0.11% in the 2010 Census and 0.07% in the ARENA study. Besides inconsistencies in the ARENA data due to the small share of people of Jewish faith in general, it has been shown that the level of education and the quality of jobs is usually better for Jewish people than for members of other religious groups. The numbers of people of the Jewish faith in the Russian Federation therefore might have decreased due to migration to other countries with higher income potential. Summarizing, these arguments can alleviate at least part of the difference even if not all of it. Nevertheless, a difference of only 0.04 percentage points⁹ is small enough to not outright question the reliability of the ARENA study in general.

Considering the choice of religious groups of the ARENA study, atheism - however prevalent it might be - strictly speaking is no religious belief. The same applies to people who report to believe in a godly power, but do not adhere to any official faith.

Furthermore, the share of pentacostalists is only listed separately in the table as the original data also differentiates between protestants in general and pentacostalists in specific.

As a side-note to the table, a large share of the Sunni Muslims are Wahhabi Muslims that are living in the republics of the Northern Caucasus. Considering the prevalent belief of Sufism in Dagestan, it is not stated in detail whether the authors of the ARENA study count this as part of the Sunni Muslims or as Other Muslims.

Finally, concerning the group listed as Pagan Believers, this heading refers mostly to Animism, Tengrism and Shamanism instead of modern neo-paganistic groups.

The table shows that, at least officially, the largest grouping, 41% of Russians, see themselves as members of the Russian Orthodox church. Nevertheless, almost the same amount (38%) adhere to no faith at all or at best have only a basic understanding of the existence of some supernatural being. This significant number can be seen as a remnant of Russia's Soviet heritage when religions were officially banned from everyday life.

Interestingly enough only about 7.5% of the Russian population are Muslims of any kind. This number might come as a surprise if one considers that President Vladimir Putin once stressed the Muslim character of Russian society and that Russia is a member - even if it only holds an observer status

⁹Comparable to approximately 36,387 people.

- of the Organisation of Islamic Countries (OIC)¹⁰.

Table 1 however, only gives an overview of the entire Russian Federation; in more detail Figure 2 reports the two most prevalent religious beliefs in a region. The background color of a region marks the most prevalent religion while stripes mark the second most important religion¹¹.

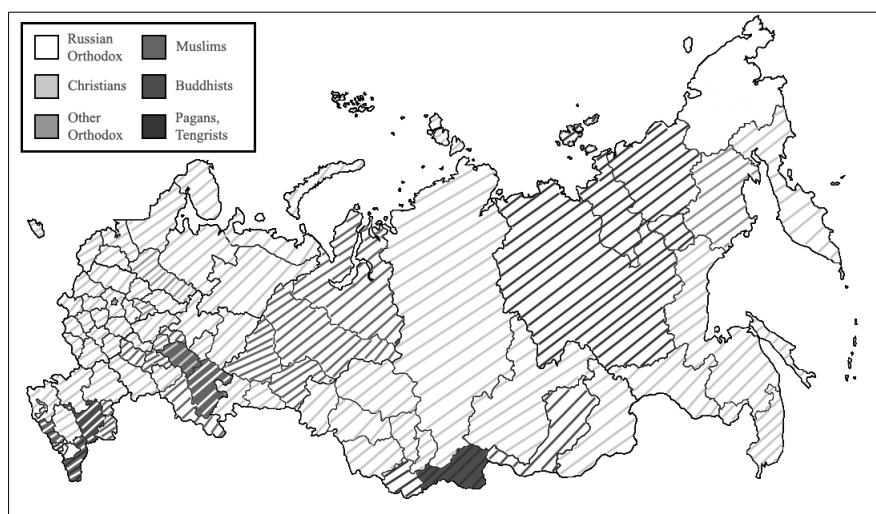


Figure 1: Religious Beliefs in the Russian Federation

In almost all regions, with the exception of some republics in the Northern Caucasus, the two ethnic republics of Tatarstan and Bashkortostan as well as the Republic of Tuva in the southern part of the Siberian district, the majority of the population is Russian Orthodox¹². Here, the Republic of Tuva, in contrast to the other republics with a majority of Muslim believers, reports a majority of Buddhists. Tuva, after the Altai Republic and the Sakha Republic, also reports the largest share of pagan believers, which indicates why animism and shamanism are the most widespread pagan beliefs in Russia.

Interesting to note is that in most parts of Western Russia the second most prevalent religious group are Christians, however in most cases it is neither Catholics nor Protestants, nor other Orthodox believers, but what

¹⁰This stresses the rather political and historical dimension of this comment which, however, in no way is backed up by statistics.

¹¹Note that Atheism and Believe in God are, in this context, not considered to be a distinct religious group.

¹²Note that for the Chukotka Autonomous Okrug Chechnya and Ingushetia no data has been available and the regions have consequently been left blank.

the ARENA study lists as Other Christians which supposedly encompasses non-canonical protestants or old religions like the Armenian Christians.

3 On the Links between Ethnicity, Religion, Growth and Innovation

3.1 Theoretical and Empirical Evidence from the Literature

Reading into the literature on the economics of religion it is obvious that the link between economics, or economic behavior, and religion is usually established via the set of values a religion is based on¹³. These values can be found in texts seen as fundamental by the religious groups, like the Bible or the Qur'an, or in rules that are applied in everyday life but that are not fixed in writing; like the attitude towards thriftiness.

Due to its nature, the economics of religion, is more of a sociological than an economical science. Thus a discussion needs to start with sociological aspects.

While the usual first step is a reference to the works of Max Weber; not only to the work-ethics of protestants but to his further works on the Islamic, Hindu, Jewish and Buddhist belief systems as well¹⁴. In a broader sense however, it is more fitting to start with the works by Gay (1991) and Kuran (1993) who essentially argue that for almost every religion there are a number of arguments in favor of or against their economic disposition. Before any discussions on different religious affiliations and their views on economics, it should thus be noted that for every comment given here a theologian might be able to find an additional comment that could be used to counter. The arguments given herein are therefore rather guidelines and basic principles than absolutes.

Returning to Max Weber, his works are seen by a number of researchers as a basis to the economics of religions. However, with Tawney (1926), Anderson and Tollison (1992), Samuelson (1993), Delacroix (1995) or Iannaccone (1998), there is a broad front of research who argue not only against the argumentative structure of Weber but against the basic facts underlying his analyses¹⁵.

Here we would like to extend the idea of the work-ethic of Weber using the

¹³See Guiso, L.; Sapienza and Zingales (2003) or Guiso, L.; Sapienza and Zingales (2005)

¹⁴See for an overview and a discussion Weber (2006).

¹⁵See Arrunada (2004).

more tangible concepts of trust, thriftiness, risk-aversity, disposition towards interest and the general attitude towards economic well-being.

Sticking to these concepts might not generate a direct link between economic output and religious affiliation, but it will show the basic trends a religion follows in regard to different economic aspects. Furthermore, comparable studies on the subject use similar approaches to establish a relationship¹⁶.

In the following paragraphs we will discuss different religious groups according to their attitudes towards the above introduced concepts.

Christianity

At best it is possible to differentiate between Orthodox Christians, Catholics and Protestants, where the term protestants usually refers to Lutheran or Calvinist Protestants. While the term might per se include other protestant groups, the following argumentation refers in some parts to the arguments given by Weber (2010) and therefore Lutheran and Calvinist protestants are its focus.

In contrast to Christians in general, for Orthodox Christians, and more specifically for Russian Orthodox Christians, only very limited characteristics to distinguish them from other Christian groups are available, especially concerning existent studies on their economic disposition. Nevertheless, it can be said that the Russian Orthodox Church in its theological disposition is much more similar to the Catholic Church than the Protestants. Additionally, institutions of the Church, like the sacrament of the shrift, and the closer relations to the Church as an institution itself, place Orthodox churches in general but the Russian Orthodox Church in particular, more in line with the Catholic Church.

Following Iannaccone (1998) it needs to be recalled that beliefs inside a religious group are lower if the church is the dominant one in a country and especially - as is the case with the Russian Orthodox Church - if it is supported by the state. Furthermore, the Russian Orthodox Church had been officially banned during Soviet times and many of its current members did not join for faith alone but for the chance to adhere to a faith at all. This trend might have increased in recent years as links between the government of the Russian Federation and the Russian Orthodox Church have strengthened.

Therefore, comments for the Catholic Church might in most cases apply to the Russian Orthodox Church as well, however it can be assumed that

¹⁶See Guiso, L.; Sapienza and Zingales (2003) or Guiso, L.; Sapienza and Zingales (2005) or in the context of international trade Guo (2004), Helble (2007) or Guiso, L.; Sapienza and Zingales (2009).

they will be not as pronounced as they are in the Catholic Church.

While Blume and Fromm (2000) and Sala-I-Martin (1997) quote results that state a consistently negative correlation between the spread of the Catholic faith in a country and its economic situation. These results do not argue about the reasons behind this relation. Taking a look at the distribution of the Catholic and the Protestant faiths it can easily be seen that in developing countries, especially in Africa or Southern America, the Catholic faith is much more present than any Protestant faith. Therefore, the negative correlation might be by design and not through any specifics of the belief system.

Weber (2010) whose comments can be interpreted to imply a positive relationship between the share of Protestants and the economic well being of a country are in a similar way attacked. Besides arguing that the selection of regions by Weber is, by itself, a bias of his study's foundations, Iannaccone (1998) furthermore argues, for example with reference to for example Tawney (1926), that the regions observed by Weber were not always the economic paragons Weber paints them to be. Arrunada (2004) additionally argues that at the same time a number of wealthy regions existed with a Catholic majority as well¹⁷.

Returning to the basics of the belief systems, both faiths are inherently against the taking of interest¹⁸. Also both groups are in favor of encouraging thriftiness¹⁹. Similar to the Jewish faith both groups also are considering to be more in favor of a liberal economic system - a market economy - and against re-distribution than for example Muslims²⁰.

Catholics and Protestants are therefore more or less on par. Considering the arguments by Arrunada (2004) that Protestants are more inclined against redistribution of wealth and therefore more market oriented than Catholics, as well as the comment by Wilson (1997) that Martin Luther argued that worthiness to faith comes rather through work than through prayer and faith alone, would imply that a large share of Protestants is more beneficial for economic growth than a large share of Catholics.

In contrast, the Catholic faith, through the institution of the sacrament of confession, generates a generally higher degree of trust than the Protestant faiths. Trust, while not an economic variable per se, does play an important

¹⁷Additional critique can be found for example in Delacroix (1995), Anderson and Tolison (1992) or Samuelson (1993).

¹⁸While Thomas Aquinas argues against the taking of interest, the bible - the Apostle Luke in specific says that the taking of interest per se is no sin. See Wilson (1997).

¹⁹See Guiso, L.; Sapienza and Zingales (2005).

²⁰See Guiso, L.; Sapienza and Zingales (2003) and Guiso, L.; Sapienza and Zingales (2005).

role in business deals, especially in countries where the rule of law is relatively weak and deals or contracts are not always formalized. In this context it plays an important role especially when considering trade deals. Therefore, in studies dealing with economic trade trust is always listed directly or indirectly as a significant impact factor²¹.

Summarizing, the arguments indicate a positive impact of the Catholic faith, as well as of the Protestant faiths, however through different channels. While the arguments focussing on trust might especially hold true for the Russian Federation, the Catholic faith is only a minority religion there and therefore cannot fully exercise its effects. Instead the Russian Orthodox Church might just take this role. In this light it can be assumed that the share of Protestants has a positive impact on economic growth. The share of Catholics might have a positive impact as well - following Guiso, L.; Sapienza and Zingales (2003) or at least a stronger impact than any Muslim faith - however, much weaker than the share of Protestants.

Finally, it can be mentioned that according to Stark (1972) more conservative religious groups especially fundamentalists draw primarily from the poorer groups of a society. Therefore, Pentecostals which in the study by SREDA (2012) are considered as a special religious group should, by selection, represent a poorer society.

Considering innovativeness, it seems hard to directly relate any of the arguments given above to a general inclination for either Catholics or Protestants. However, it can be considered that due to their stronger focus on personal economic well-being the Protestants are more open towards the involved risk taking. This is strengthened as they are not as bound by traditions as the Catholics are and, therefore, in general more open to change and the introduction of new innovation. Catholics on the other hand might be more open to risk taking as the community they are living in can be considered to be more tightly linked than that of Protestants, therefore they can rely on this security when undertaking risky endeavors. In total however, it is assumed that Protestants will be more innovative than Catholics.

Islam

In the previous paragraphs some comments on the Muslim faith in general have already been given. It needs however to be considered that the Muslim faith can primarily be divided into Sunni and Shiite Muslims as well as a number of smaller groups. As both of these sub-groups are also reported separately by SREDA (2012) it seems only prudent to take a look at them separately.

²¹See Mehanna (2003), Helble (2007) or Guiso, L.; Sapienza and Zingales (2009).

First, a few general comments on the Muslim faith as a whole can be given. On a positive side Wilson (1997) shows that the Qu'ran sees trade as a worthy occupation and traders as positive sources of knowledge. Furthermore, it is argued that capital accumulation and consumption per se are good while extensive saving and hoarding of goods and money is not. Guiso, L.; Sapienza and Zingales (2003) argue that the Qu'ran encourages economic effort as such.

On the other hand both Muslim groups have an inherent aversion to taking interest. Guiso, L.; Sapienza and Zingales (2003) argue that Muslims, compared to Christians, are less market oriented and more in favor of redistribution of wealth. Additionally, most studies on religion and trade like Mehanna (2003) or Helble (2007) find that Muslims in general trade less - on the one hand with each other but especially with people from other religious groups. The lower level of trade might be considered a result of a lower level of common trust - mostly towards members of other religious groups - with the negative aspects already discussed above. Finally, Wilson (1997) argues that Muslims are more risk averse than other religious groups and therefore less open for change in an economic context, specifically concerning innovations and entrepreneurship. The pre-selection bias mentioned and discussed by Stark (1972) has already been recalled for Pentacostals and this applies as well for some Muslims in the Russian Federation, especially those from the Northern Caucasus.

Differentiating between Sunni and Shiite Muslims Guiso, L.; Sapienza and Zingales (2003) state that the Sunnah prohibits contracts based on chance. Economically speaking, this dictum is a relatively harsh limitation on economic activities. Therefore, while both groups might have a rather conservative approach towards economic activities, it is even more pronounced for Sunni Muslims than for Shiite Muslims. The impact of the share of Sunni Muslims is therefore to have a distinct negative impact on the economic situation but even more so on innovative and entrepreneurial activities. The impact of Shiite Muslims is assumed to be negative, however not as pronounced as the impact of Sunni Muslims.

Judaism

Besides Christianity and Islam, the Jewish faith is the third major Abrahamic religion. While in the Jewish faith minor sub-groups might exist, the majority can be seen as a rather homogenous group especially considering their religious beliefs. Furthermore, since the data set by Sreda does not include any data on sub-groups of the Jewish faith, we consider in this study the Jewish faith as a single belief system.

The major difference between the Christian and Muslim religion on the

one hand, and the Jewish religion on the other, is usually seen in the openness towards the taking of interest. This perception however is flawed. In the Jewish belief system there is a strict separation between economic deals with other Jewish people and those with people of other faiths. While the taking of interest from fellow Jews is prohibited it is allowed to take interest from people belonging to other faiths. As the Jewish people as a religious group is usually a minority, this distinction is not obvious at first sight.

Wilson (1997) states that in the holy scripture, the Torah, material goods are seen as a blessing and wealth as a gift from heaven. However, this gift does not come without restrictions and everyone needs to take active part to become worthy of receiving this gift²². In the context of welfare and redistribution of wealth, Wilson argues that while the Jewish belief does not exclude redistribution of income per se, poor people should be obliged to work for their welfare.

Considering the history of the Jewish people, a distinct level of trust has been built between people of the Jewish religion and a potential distrust towards members of all other religious groups exists. This distrust might have a negative impact on business deals with people from non-Jewish faiths or concerning cross-religious trade relations. As has been mentioned by Helble (2007), measuring the effect on economic trade is rather problematic as Israel is the only country where the Jewish religion is the majority religion. However a positive impact can be reported nonetheless.

Considering the higher trust between members of the Jewish religion, this might be an indicator for the large share of Jewish oligarchs as has been shown in the introduction of the study.

Regarding the innovative potential of the Jewish faith, it can be assumed from the large share of Jewish Nobel prize winners - approximately 15% of all Nobel prize winners - and the Jewish business culture as reported by Chiswick (1995) that Jewish people are, even if not due to any religious dogmas but through societal upbringing, more prone to be highly innovative.

Buddhism

Similar to the Christian or the Muslim faiths, there is no single Buddhist belief system. As such it is rather problematic to establish a Buddhist business ethic and to deduce specific characteristics of Buddhist thought on economic activities and the respective effects on economic development. Similar to the Christian or the Muslim faiths, there is no single Buddhist belief system. However, in the course of this study, and due to the available data and

²²In this context Chiswick (1995) reports that American Jews in particular strive towards a better education and in the end towards better income jobs.

the available literature on the topic, Buddhism is treated as a single belief system and characteristics are discussed on a rather general level.

Two approaches - Weber (1998) and Brodbeck (2002) - already tried to deduce some kind of Buddhist business ethic and can, therefore, be used as a basis for the present study. The arguments most conducive to this study can be taken from Brodbeck (2002). Results from studies on international trade can only partially be referred to as there are only so many countries in the world where Buddhism is the majority religion and therefore results in this context might be rather unstable. Nevertheless, Helble (2007) in particular finds a positive impact of Buddhism on international trade.

Starting with the fundamental idea of Buddhism that suffering is universal and that everyone is suffering, every action - economical or otherwise - as long as it reduces suffering is good. Therefore, economic activities are encouraged per se as long as the result reduces suffering or, in other words, as long as it leads to a win-win or a zero-win situation. A win-lose situation, even if beneficial from a social perspective, would not be encouraged as it would encourage the generation of additional suffering for a second party.

Following this line of argumentation, the Buddhist faith might be beneficial to economic development, however its effects will not be as pronounced as for the Christian or the Jewish faith where generally the idea of win-lose situations is not shunned and, therefore, more potential for economic activities, that in the end enlarge the overall wealth, exists.

Concerning innovativeness, similar arguments can be used. As long as innovations aim at lessening the level of suffering in a country they are encouraged. In the Russian Federation where most of the innovations are introduced in the arms or the mining and quarrying industry it is however questionable to assume any link between any Buddhist business ethic and a region's innovativeness.

Hinduism

As a polytheistic religion Hinduism can per definition not be considered as representing a homogenous religious group. Similar to the case with Buddhism, Weber (1998), and additionally Uppal (1986), can be used as a source for determining characteristics of the Hindu faith and their effects on economic development. It needs to be mentioned in advance that the Hindus make up a very small minority in the regions of the Russian Federation. Therefore, it is questionable from the beginning whether the share of Hindus in the total population will have any effect at all.

Following Uppal (1986), economic well-being, and therefore economic activity, is generally viewed as a positive aspect. He denotes it in details

as *wealth giving vigor, confidence and power* and argues that Hindus view poverty as a curse.

Aside from both aforementioned studies, the concepts of Karma and re-birth are essential parts of Hindu philosophy and therefore reflect into economic activities. The concept of Karma would implicate an orientation towards economic activities comparable to the situation for Buddhists except that win-lose situations might also be acceptable. Therefore, Karma, from an economical perspective, would be more or less a self-fulfilling prophecy as doing good in business is therefore generating good Karma - if it has been a *good* business deal - which in turn would lead to a good standing depending on the interpretation either in this life or the next.

The problem however exists that both aspects lead to a more or less deterministic perspective on life since the current life is determined by the Karma collected in a previous life and therefore only a limited motivation to try to change the current situation might exist²³.

Summarizing these arguments, in this study the impact of the share of Hindus will only be very minor and supposedly inconclusive, especially since they Hindu population makes up only a very limited percentage of the population in general.

Atheism

While they are not a religious group by definition some final words can be said about atheists.

Guiso, L.; Sapienza and Zingales (2003) report for atheists overall lower levels of trust than for other religious groups. They furthermore argue that this it not due to any communist influence. The reason for this might be found rather in the fact that in contrast to distinct religious groups atheists lack a common denominator with others and therefore exhibit towards all other people the level of trust that members of religious groups only exhibit towards outsiders.

This argument is strengthened insofar as members of minority religions in particular usually develop strong ties and networks which in turn help them foster economic returns. These developments have been linked in particular with Jewish people, who in most cases can be considered a minority religion, but are also exhibited by Christians - especially Armenians - as well as Muslims or Hindus.

This underdeveloped level of trust implies the same negative effects that have already been mentioned especially for Russia as a country with a weak

²³These arguments might hold for Buddhists as well as the belief systems are similar in this regard.

rule of law. Consequently, it can be assumed that the share of atheists has a rather negative impact on the economic development of a region.

3.2 Empirical Evidence for the Russian Federation

The analysis of the effects of religious groups on economic output and innovativeness has been implemented in three steps for each of the dependent variables. The GRP and the GRP per capita have been used to account for the economic situation - the wealth - of each region as well as the wealth of an average inhabitant. The GRP reflects effects on a societal basis while the GRP per capita reflects effects on an individual basis of wealth.

Innovativeness has been operationalized using the number of patents issued by Rospatent. While the critique of different authors concerning the usability of patents as an indicator of innovative output of a region is noted²⁴, reference can be made to Verspagen and Schoenmakers (2004) who argue that patents are noisy, though suitable, measure for the stock of knowledge and therefore the innovativeness of a region. Smith (2006) additionally argues the advantages of patents as an indicator of innovations.

In a first step, the influence of each variable has been estimated individually using a maximum likelihood estimator already controlling for spatial autocorrelation effects. As a qualitative indicator, the variance ratio - an indicator comparable to the R^2 -statistic - is reported.

In the second step, a model with all religious groups is estimated. Here the share of Russian Orthodox believers is omitted for three reasons.

The variable itself is highly correlated with other input variables whose impact is of more interest in the course of this study. Secondly, if all variables were to be included in the model the share would add up to unity - disregarding non-responders - which might bias the regression results. Finally, following the arguments of Iannaccone (1998) that belief in and therefore adherence to religious values is stronger in minority religions it seems only prudent to exclude the Russian Orthodox religion as their status as majority religion, and a more or less state subsidized religion, might bias all of the results. Additionally, it has been shown by surveys from Russian institutes that a number of official Russian Orthodox adherents do not follow the faith out of pure belief²⁵.

²⁴See for this discussion Griliches (1979), Griliches and Lichtenberg (1984) Jaffe (1986), Griliches (1990), Acs et al. (1991), Jaffe et al. (1993), Fritsch (2000), Jaffe and Trajtenberg (2002) or Fritsch (2003).

²⁵A number of these people might have been part of the *Atheist* and the *Believe in God* variable.

The third step controls whether or not the results gained in the first two remain consistent in the presence of significant control variables. Here, the knowledge production function setup and the growth accounting approach implemented in Perret (2013) are used to rely on a more or less proven model setup under which the impacts can be tested. The growth accounting approach is also applied to the GRP per capita as the arguments for the use of respective variables, as given by Perret (2013), basically remain the same for per capita values.

	GRP	GRP per Capita	Patents
Believe in God	-0.846 (-0.06)	5.077** (2.04)	-6.977 (-0.91)
Var. Ratio	0.010	0.087	0.015
Atheists	8.867 (0.71)	1.415 (0.42)	3.517 (0.48)
Var. Ratio	0.010	0.045	0.009
Russian Orthodox	4.788 (0.51)	-0.066 (-0.05)	6.628 (1.12)
Var. Ratio	0.013	0.042	0.023
Old Believers	415.563 (0.61)	32.038 (0.46)	361.498 (0.80)
Var. Ratio	0.018	0.044	0.026
Other Orthodox	184.291 (1.48)	42.610 (1.24)	25.458 (1.38)
Var. Ratio	0.054	0.137	0.011
Catholics	-565.945 (-0.83)	134.518 (1.29)	-550.017 (-1.22)
Var. Ratio	0.015	0.055	0.022
Protestants	86.603 (0.19)	126.262 (0.92)	-171.116** (-2.22)
Var. Ratio	0.010	0.069	0.013
Other Christians	-28.431 (-0.62)	-2.806 (-0.36)	-29.712 (-1.02)
Var. Ratio	0.012	0.043	0.015
Sunni Muslims	-0.664 (-0.09)	-4.092*** (-3.73)	-1.842 (-0.45)
Var. Ratio	0.010	0.052	0.010
Shiit Muslims	444.577 (1.04)	-16.788 (-0.20)	81.452 (0.53)
Var. Ratio	0.019	0.043	0.010
Other Muslims	-4.086 (-0.47)	-2.906* (-1.80)	-3.779 (-0.88)
Var. Ratio	0.011	0.056	0.011
Jews	1,979.224 (1.15)	-123.636 (-0.44)	1,561.346 (1.52)
Var. Ratio	0.024	0.043	0.033
Buddhists	-12.444*** (-3.08)	-4.535*** (-4.19)	-4.189* (-1.82)
Var. Ratio	0.015	0.067	0.011
Hindus	-89.191 (-0.18)	31.606 (0.22)	-310.450 (-1.41)
Var. Ratio	0.010	0.043	0.015
Pagan Believers	-27.649** (-2.44)	-6.115* (-1.67)	-11.680* (-1.73)
Var. Ratio	0.016	0.052	0.012
Pentacostalists	-965.111 (-1.09)	188.210 (0.73)	-599.575 (-1.11)
Var. Ratio	0.017	0.054	0.017
Other Believers	531.563 (1.47)	103.168* (1.84)	217.693 (1.06)
Var. Ratio	0.043	0.092	0.023

Table 2: Influence of Single Variables - Religion

In addition, Table 2 reports the results for the impact of different religious groups. In general the results are rather inconclusive as many of the variables report only insignificant coefficients.

Only Buddhists and Pagan believers report consistently significant signs. In both cases the impacts are negative for both GRP variables as well as for the amount of patents granted.

Aside from this, at least two assumptions from the theoretical discussion could be proven right. On one hand a large share of Protestants implies a larger share of patents being granted. On the other hand the impact of Sunni Muslims on GRP per capita is consistently negative.

The low significance levels can in part be explained as a bias through reverse causality is also in line with other studies where religious groups have been implemented in a country or region specific context as in the study by Helble (2007).

At this point we therefore disregard the significance levels and the variance ratio which are also very low and observe the size and signs of the coefficients alone.

While both Catholics and Protestants have comparably high coefficients for the GRP per capita, the coefficient for GRP is negative for the Catholics but positive for the Protestants. For patents, they both have a negative coefficient, however the one for Catholics is larger - the one for Protestants however is significant. This shows that for economic output the theoretically discussed results seems to hold for the Russian Federation, while patents seemingly are not determined in the same way. However, as growth in the Russian Federation is not so much driven by innovations as by the exploitation of natural resources these results are only marginally surprising.

In contrast to the assumptions voiced above, the results for the Russian Orthodox do not mirror the results for Catholics which in some part might be due to the different penetration both groups have in the population and the rank of the Russian Orthodox religion as a major - state - religion.

For Muslims the characteristics presented in the previous section also hold, for the most part. Considering the GRP, Shiite Muslims report a positive impact while Sunni Muslims report a negative impact. In contrast, for the GRP per capita both report a negative impact but the coefficients for the Sunni Muslims is even smaller than the coefficient for Shiite Muslims. However the coefficient for Sunnis is highly significant while the one for Shiites is insignificant.

The results for Buddhists, who report negative coefficients for all three indicators, are, in light of the theoretical considerations, rather surprising as Buddhists should be more open to economic deals. With regards to a deterministic approach towards life, as discussed in the context of the Hindu faith, Buddhists might also have a negative impact on economic output. Additionally, in contrast for example to Protestantism it is no major aspect of the Buddhist system of beliefs to be economically successful. Finally

the environment of the regions with a Buddhist majority inside the Russian Federation, especially the Republic of Kalmykia and the Republic of Tuva, might explain the negative coefficients.

More surprising is the fact that the variable of the Jewish faith reported on the one hand only insignificant results and on the other that the coefficient for the GRP per capita is negative which might only be explainable through the low percentage that the Jewish faith has in the total population.

To test the validity of these results, additional models are estimated by implementing all variables at once. For the religious groups the Russian Orthodox Church has been left out for reasons discussed above. For all of the four (ethnic groups) or three (religious groups) cases both a spatial error and a spatial lag model have been estimated.

	GRP		GRP per Capita		Patents	
	SL	SE	SL	SE	SL	SE
Believe in God	-26.111 (-1.20)	-30.159 (-1.24)	1.764 (0.56)	0.987 (0.36)	-16.047 (-1.13)	-18.084 (-1.13)
Atheists	32.743 (1.37)	24.276 (1.17)	-2.838 (-0.47)	-3.805 (-0.50)	16.289 (1.23)	15.910 (1.19)
Old Believers	665.706 (0.82)	621.533 (0.80)	-23.277 (-0.26)	-35.163 (-0.38)	548.947 (1.01)	525.735 (1.02)
Other Orthodox	211.335** (2.04)	207.791** (1.97)	39.426 (1.36)	38.888 (1.32)	48.354 (1.58)	48.107 (1.58)
Catholics	-211.117 (-0.34)	-264.545 (-0.41)	91.683 (0.65)	81.579 (0.58)	-404.907 (-1.15)	-427.977 (-1.16)
Protestants	258.667 (0.61)	240.358 (0.59)	189.923* (1.81)	189.522* (1.82)	-134.860 (-0.78)	-131.761 (-0.75)
Other Christians	-62.946 (-1.09)	-68.202 (-1.12)	-22.983** (-2.00)	-24.349** (-2.12)	-39.576 (-1.18)	-42.995 (-1.18)
Sunni Muslims	-47.973 (-1.55)	-49.554 (-1.57)	-3.466 (-0.61)	-3.428 (-0.62)	-19.624 (-1.20)	-19.353 (-1.22)
Shiit Muslims	1,837.701* (1.69)	1,783.835* (1.66)	89.551 (0.48)	76.340 (0.40)	673.548 (1.09)	652.999 (1.08)
Other Muslims	-32.608 (-1.31)	()	-3.949 (-1.48)	-4.395* (-1.67)	-17.332 (-1.08)	-18.454 (-1.08)
Jews	2,630.089 (1.50)	2,455.708 (1.40)	62.554 (0.24)	44.316 (0.16)	1,814.902 (1.59)	1,837.422 (1.55)
Buddhists	-10.271 (-1.15)	-12.794 (-1.33)	-6.387** (-2.42)	-6.855** (-2.44)	-5.048 (-0.86)	-6.488 (-1.00)
Hindus	141.908 (0.31)	175.312 (0.40)	10.262 (0.10)	17.912 (0.17)	-211.357 (-1.00)	-199.959 (-1.00)
Pagan Believers	-16.346 (-1.00)	-23.597 (-1.39)	-3.345 (-0.72)	-4.378 (-0.83)	0.660 (0.07)	-1.007 (-0.11)
Pentacostalists	-1,533.041 (-1.25)	-1,536.504 (-1.34)	40.761 (0.12)	58.914 (0.19)	-608.602 (-0.82)	-509.074 (-0.80)
Other Believers	677.961* (1.73)	621.533* (1.88)	91.207 (0.90)	88.162* (1.80)	306.357 (1.25)	305.144 (1.24)
Constant	594.796 (1.20)	44.9153 (1.22)	86.876 (0.90)	289.192* (1.89)	407.308 (1.46)	319.056 (1.26)
ρ/λ	-0.706 (-1.54)	0.192 (-1.41)	0.493 (1.19)	0.548* (1.69)	-0.729 (-1.35)	-0.624 (-1.37)
Var. Ratio	0.201	0.192	0.303	0.252	0.143	0.139
Corr. ²	0.211	0.182	0.313	0.255	0.155	0.128

Table 3: Impact of Religions - Part I

The results for the model encompassing all religious groups are summarized in Table 3, while Table 4 summarizes the results for the models including the size of the labor and research force respectively.

Table 3 shows that while there have not been many religious groups that reported significant coefficients to begin with, including all of them in a comprehensive model reduces this number even further.

Comparing to the previous results, the Protestants still report a significantly positive impact on the GRP per capita. While the Sunni Muslims' impact is slightly insignificant but still negative the impact of Shiite Muslims is significantly positive. Finally the impact of Buddhists on the GRP per capita remains significantly negative.

Disregarding the significance levels, a number of variables retain the impact they already showed when being considered individually. As such the Protestants have a positive impact on GRP and negative impact on patents.

The impact of the Jewish faith on the GRP and patenting remains positive while the impact on the GRP per capita turns positive as well. Finally, the impact of atheists on the GRP per capita turns negative as had been expected from the theoretical discussion.

Considering the patents, the results are rather disillusioning as no faith has any significant impact on the innovativeness. The only variables that report only slightly insignificant signs are the Jewish faith and the Other Orthodox faiths. This shows that it is much harder to relate culture and innovativeness and it is mostly the Jewish people that report that any impact in this area at all.

If the share of the religious groups are implemented in the context of a growth model, or a knowledge production function, again the results for Buddhists, Sunni and Shiite muslims only change in size²⁶.

It is interesting that atheists report a consistently significant and negative coefficient for the two economic variables thereby aligning the results with theory.

In contrast to theory, the impact of the Jewish faith turns highly insignificant and negative. This, however, does not present a significant problem as a large share of the Jewish faith usually implies a region with a number of large firms, that is innovative and doing well economically.

Considering patenting, it is interesting to note that only the Hindu, Buddhist and Jewish faiths exhibit any significant impact at all - negative in all three cases.

In this light it is an even more interesting question whether or not the distribution of religious groups is an important addition to the estimation itself. Comparing the variance ratio and squared correlation with a compar-

²⁶Note that only the stock of labor has been implemented in the model. It has been chosen over the capital stock for two reasons. First, data on the capital stock has not been available yet for the year 2012 canceling the possibility to test the impact of religious groups. Secondly, in Perret (2013) it has been argued that there is a significant correlation between the stock of capital and the stock of labor and it is prudent for Russia to estimate a production function solely based on the labor input. The bias generated by using the stock of labor when estimating the GRP per capita is noted.

	GRP		GRP per Capita		Patents	
	SL	SE	SL	SE	SL	SE
Believe in God	0.0035 (1.60)	0.0036 (1.63)	0.0040* (1.65)	0.0040* (1.65)	0.0073 (0.66)	0.0129 (1.07)
Atheists	-0.0092** (-1.99)	-0.0089* (-1.95)	-0.0089* (-1.71)	-0.0088* (-1.70)	-0.0150 (-0.76)	-0.0230 (-0.92)
Old Believers	0.0125 (0.22)	0.0123 (0.22)	0.0314 (0.52)	0.0313 (0.52)	-0.0062 (-0.03)	0.0446 (0.21)
Other Orthodox	0.0098 (0.68)	0.0102 (0.70)	0.0124 (0.77)	0.0125 (0.77)	-0.0913 (-0.81)	-0.0988 (-0.82)
Catholics	0.2264** (2.40)	0.2221** (2.33)	0.2297** (2.19)	0.2286** (2.17)	-0.4081 (-0.94)	-0.3292 (-0.79)
Protestants	0.1360** (2.24)	0.1377** (2.26)	0.1475** (2.24)	0.1478** (2.24)	0.8843 (1.19)	0.8776 (1.20)
Other Christians	-0.0159* (-1.75)	-0.0160* (-1.76)	-0.0209** (-2.21)	-0.0209** (-2.21)	-0.0748 (-0.96)	-0.0713 (-0.92)
Sunni Muslims	-0.0044 (-1.11)	-0.0044 (-1.11)	-0.0068 (-1.49)	-0.0068 (-1.49)	-0.0117 (-0.62)	-0.0112 (-0.59)
Shiit Muslims	0.0301 (0.28)	0.0293 (0.27)	0.0297 (0.24)	0.0296 (0.24)	-0.3741 (-0.72)	-0.4318 (-0.83)
Other Muslims	-0.0012 (-0.66)	-0.0013 (-0.67)	-0.0030 (-1.40)	-0.0030 (-1.40)	0.0023 (0.18)	0.0062 (0.49)
Jews	-0.1821 (-0.98)	-0.1817 (-0.97)	-0.0936 (-0.49)	-0.0937 (-0.49)	-2.2909 (-1.59)	-2.6899* (-1.74)
Buddhists	-0.0024 (-1.06)	-0.0023 (-1.07)	-0.0047** (-1.98)	-0.0047** (-1.98)	-0.0625* (-1.64)	-0.0580 (-1.52)
Hindus	-0.0070 (-0.10)	-0.0072 (-0.10)	-0.0090 (-0.12)	-0.0090 (-0.12)	-1.2965** (-1.98)	-1.2828** (-2.00)
Pagan Believers	0.0004 (0.09)	0.0004 (0.09)	-0.0000 (-0.00)	0.0000 (0.00)	0.0157 (0.76)	0.0190 (0.80)
Pentacostalists	0.0421 (0.23)	0.0466 (0.26)	0.0327 (0.17)	0.0336 (0.17)	-1.0535 (-0.81)	-1.3071 (-0.86)
Other Believers	0.0284 (0.96)	0.0292 (0.99)	0.0292 (0.90)	0.0294 (0.91)	0.2798 (1.55)	0.2509 (1.48)
LogLabor	1.3332*** (23.31)	1.3314*** (23.33)	0.3557*** (5.39)	0.3553*** (5.39)		
LogResearcher					0.8347*** (4.71)	0.9694*** (5.94)
Constant	1.5717*** (8.56)	1.8381*** (11.48)	4.1425*** (19.54)	4.4559*** (24.30)	0.0183 (0.02)	-0.7506 (-1.15)
ρ/λ	0.0492*** (3.67)	0.1574*** (3.19)	0.0579*** (3.69)	0.0716*** (3.50)	-0.2401 (-1.17)	0.3680 (0.71)
Var. Ratio	0.922	1.054	0.569	0.554	0.486	0.456
Corr. ²	0.922	0.878	0.569	0.294	0.487	0.473
Var. Ratio (without)	0.888	0.984	0.338	0.287	0.271	0.222
Corr. ² (without)	0.888	0.858	0.338	0.130	0.275	0.203

Table 4: Impact of Religions - Part II

ative model without religious variables in all three cases the statistics are significantly larger.

If adjusted R^2 statistics are calculated based on the R^2 statistics reported in the table it is revealed that the distribution of religious groups is in all three cases - for economic output as well as patenting - an important aspect that needs to be considered. In the case of the GRP the statistic increases from 0.8562 to 0.8724, for the GRP per capita from 0.1185 to 0.2843 and for patent grants from 0.1924 to 0.2374.

Considering that religion has only become a public institution again in Russia since the end of the Soviet Union, its impact in the context of economic development as well regional innovativeness is considerable.

Nevertheless, the results cannot be considered to be very stable and it is highly possible that the estimated impacts are only statistical artefacts generated through omitted variables. Therefore, this is still only a first step into unknown territory.

4 Conclusions

The present study used the results of the ARENA Study by Sreda to analyze whether a relation between the spread of religious groups on the one hand, and economic output and regional innovativeness on the other hand, exists.

The results are not completely in line with theoretical considerations, particularly because religion and religious values are very difficult to quantify and their impact on specific economic outcomes is not inherently assured. This holds true even more if the impacts are studied, not on a personal level, but on an aggregated regional level with some religious groups representing only a very small share of the population.

The results presented, especially in the previous section, can, however, be considered rather stable. Results in similarly scaled estimations - like Helble (2007), even though on the topic of economic trade, yield qualitatively comparable results.

As it has been shown that the inclusion of standard growth input factors, like the stock of labor, renders the impact of the share of the Jewish faith insignificant, there might be a relation between the spread of the Jewish faith and large firms with a large number of employees.

Additionally, it can be seen that seemingly in the Russian Federation Max Weber's consideration about the Protestant work ethic holds as Protestants report consistently positive impacts even when considering the *Spirit of Capitalism* which is strongly related to innovativeness.

Considering Muslims, the consideration that Sunni Muslims are not as

growth oriented as Shiite Muslims seem to hold. However, it needs to be considered as well that many of the muslims in the North Caucasus are Sunni Muslims. Therefore, the results might be biased via third variables. Similar reasons might apply to the consistently negative impact that Buddhists report. However, in this context, an alternative explanation can be found in a potentially deterministic view of life.

In particular the third approaches shows that the number of Atheists has a consistently negative impact on economic development.

Finally, it has been proven that considering the religious distribution of a region can be a valuable addition to any growth accounting or knowledge production approach. These insights are even more considerable since they are based on data for the Russian Federation, where until two decades ago religion was officially non-existent.

While this study adds to the economic analysis of the Russian Federation on a regional level, and the regional innovativeness, it still lacks in a number of aspects. Due to the nature of available data only a cross-sectional regression with 80 or 77 observation, respectively, has been possible. Adding more waves to the Arena study or extending the analysis to other studies on the distribution of ethnic groups would allow not only to use panel estimators but also to include a dynamic perspective in the model, eliminating a lot of the wrongly perceived causality.

The study can, however, be seen as an additional motivator on lifting the taboo that surround religion and, in some part, the collecting of broad range data on the spread of different religious beliefs. It has been shown, as in a number of other studies before, that culture and thus religion is an essential part of economic growth and innovativeness and therefore respective data is essential for comprehensive economic analyses.

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