Two Sides of a Medal: The Changing Relationship between Religious Diversity and Religiosity

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September 2013

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Abstract

Religious Market Theory assigns basic market principles to the market for religion. The derived supply side model proposes that religiosity is higher on a competitive market, characterized by high religious diversity. Churches will provide higher quality goods compared to monopolistic churches. The demand side model, originating from the Secularization Hypothesis, suggests that the establishment of new churches casts doubt on the existing religion, which reduces overall religiosity. I find a negative linear relationship between religious diversity and religiosity which supports the demand side model. However, high levels of income, education, and democracy mitigate this effect. The relationship becomes positive in the most developed countries. The demand side model seems to dominate in less developed countries, while the supply side model better describes the market for religion after Secularization has occurred.

JEL-classification: D4, O1, Z12

Keywords: Supply side, Demand side, interaction, attenuating effects

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1 Introduction

Religion is a good which is produced and supplied on markets. People in many of nowadays' societies are free to choose if they want to engage in religiosity and if so, in which faith they want to believe. However, we can also observe that this freedom of choice is restricted in other countries or that adherence to specific denominations is forbidden. At the same time, levels of religiosity appear to differ across the world. Especially, the importance of religiosity seems to be lower in the Western and more developed countries. The question arises whether there is a relationship between religious diversity and the level of religiosity.

This question, or rather the possible answers to it, splits the scholars in this field of study in two camps. On the one hand there is the Religious Market Theory, which is based on an influential article by Iannaccone (1991). The market for religion is regarded similarly to any other market from a microeconomic perspective. It follows that monopolistic churches want to increase profits which they achieve by reducing effort. The quality of the produced good decreases, which leads to lower demand for this inferior good. Competition between churches is promoted when religious diversity is high, that is, many different churches operate in one country. These are forced to produce religion goods of high quality to attract more consumers to their respective faith. The religious needs of the consumers are satisfied which raises their overall involvement with religion. Consequently, this model implies that a large supply of religions goes along with higher levels of religiosity.

On the other hand, the demand side model predicts a negative relationship between religious diversity and religiosity. The argumentation is based on the Secularization Hypothesis which is prominent in the social sciences, compare e.g. Martin (1978). Higher religious diversity induces believers to doubt the correctness of their own faith, which weakens the ties with their respective denomination. Bar-El et al. (2013) call this phenomenon disaffiliation and present a model of cultural transmission to investigate the factors which influence the process of secularization. Instead of switching faiths, people reduce their overall involvement with religion.

The aim of this analysis is to evaluate empirically the relationship between religious diversity and religiosity without prior judgment of the underlying hypotheses. I want to derive conclusions on whether the demand side or the supply side model of religion is better able to describe the market for religion. It might appear to be a microeconomic problem as it would be interesting to see the effect of changing religious diversity on one person's religiosity. A similar approach is taken by Hanson and Xiang (2011) who present a model to determine the market power of each religion. But unfortunately, religious diversity and religiosity are rather slow moving variables. Consequently, I focus my analysis on the societal level

which means that I will compare different countries at different stages of economic development and with different levels of religious diversity.

A main contribution of this analysis is that I extend the empirical estimations to investigate the factors which mediate the role of religious diversity. I include interaction terms between the different explanatory variables to measure if religious diversity might have different influences on religiosity, depending on the stage of development. The results of this extension help to shed new light on the functioning of the market for religion.

Furthermore, religiosity is measured differently and more comprehensively than in earlier studies. Most studies use church attendance rates as a proxy variable for religious participation. This is obviously a rather rough measure for actual religiosity as there might be many different reasons to go to church which might not necessarily reflect actual religiosity. I will use a comprehensive measure of religiosity which is proposed by Paldam and Gundlach (2012). They generate a measure of religiosity which is based on 14 different characteristics and people's attitudes towards the church and faith itself. Interestingly, McCleary and Barro (2006) only find a positive effect of religious diversity on religiosity when they use church attendance rates as a proxy for religiosity. Using other measures related to religiosity, contained in Paldam and Gundlach's (2012) religiosity score, delivers inconclusive results. Glock and Stark (1965) also argue against using church attendance rates as a measure for religiosity, stating that "[i]t is evident that to equate the two [churchgoers] on the grounds of their actual participation in worship services is to obscure a major difference in their involvement in ritualistic activity. This illustrates the inherent weakness of relying on a single indicator to distinguish individuals on this, as well as other dimensions of religiosity."(p.29).

The results gained in this paper show that there is a negative relationship between religious diversity and religiosity as proposed by the demand side model. The relationship between income and religiosity is found to be negative as well which further supports the underlying Secularization Hypothesis. However, the results on the interaction terms reveal that high levels of income, education, and democracy can mitigate the negative influence of religious diversity on religiosity. The relationship even turns to positive for the most developed countries. Apparently, the supply side model, derived from the Religious Market Theory is a suitable description of the market for religion in the most developed societies.

The paper is organized as follows. The next Section will give an overview of the underlying Religious Market Theory and the Secularization Hypothesis. Section 3 describes data and methodology. The results are presented in Section 4 before they are discussed with regards to the underlying theories in Section 5. Section 6 briefly concludes.

2 Theoretical Background

Iannaccone (1991) develops the Religious Market Theory by assigning basic microeconomic principles to the market for religion. Monopolistic churches and their employees, similar to regular enterprises, try to maximize their profits. However, the employees are civil servants and they are paid a fixed income by the government. Hence their only possibility to increase profits is to reduce effort. The good which they produce will be of minor quality, so that the demand for this inferior good declines. In contrast, churches which operate in a competitive market cannot afford to produce goods of minor quality. They would loose market shares and profits would decrease. This induces employees of churches in competitive markets to exert optimal effort and raise the quality of their product. It follows that the demand for religion is higher if different churches compete for the favor of the believers. In other words, higher religious diversity leads to higher demand for religion goods which should be measurable as an increase in religiosity.

Iannaccone (1991) presents another argument in favor of a positive relationship between religious diversity and religiosity. He states that monopolistic churches can only serve a fraction of people's beliefs. "[A single church] cannot be monotheistic and polytheistic; it cannot proclaim both that Jesus is the Christ and that the messiah is yet to come"(p.163). On a monopolistic market for religion people can only choose between accepting the existing faith and dropping out. If several religions coexist side by side, i.e. if religious diversity is high, there is a higher probability that everyone in the society can find a faith which fits his own preferences. This leads to higher religiosity in societies with more different religious denominations. In his empirical validation of the theory Iannaccone (1991) finds that his theory fits particularly for predominantly Protestant countries.

Franck and Iannaccone (2009) compare this supply side model of religion to the demand side model of the Secularization Hypothesis using church attendance rates in ten Western economies from the 1920's to the 1990's. They find that income, education, or urbanization do not affect the level of religiosity. They argue that the formation of welfare states reduces church participation rates. People do not have to rely on churches any longer because social benefits are granted by the government. This effect is stronger in countries with a monopolistic church because on a competitive market churches offer social benefits of higher quality which can compete with government welfare and attract more people.

Finke and Stark (1988) analyze the impact of urbanization and religious pluralism on religious mobilization using the US Census of Religious Bodies from 1906. They find that religious adherence is higher in cities compared to rural areas and argue that religious diversity explains why religiosity is higher in urban areas. Gruber (2005) also finds that religious participation increases with market density. Barro and McCleary (2002) investigate the correlation between religion and economic development in both directions

of causation. In their comprehensive study they find, amongst other things, that religious pluralism has a positive effect on religious inputs, such as church attendance, and religious outcomes, such as belief in heaven and hell.

However, in a follow-up study McCleary and Barro (2006) do not find a significant impact of religious diversity on religiosity, but show that income affects religiosity negatively. They conclude that "this finding supports the secularization view...[although] the proponents of secularization have been in retreat over the last couple of decades." The Secularization Hypothesis refers originally to the relationship between religiosity and human development. Proponents of the Secularization Hypothesis argue that the importance of, and also the interest in, religion decreases as countries develop economically. In early times life on earth was lived in a manner to maximize the probability of being allowed to live an afterlife in heaven. However, since the late Middle Ages humans seem to focus on worldly matters, such as higher income and wealth (compare Inglehart and Baker, 2000). Today we also see that religion plays a more prominent role in less developed countries than in the industrialized world (Paldam and Gundlach, 2012). Paldam and Gundlach (2012) present causality tests which show that in the long run higher income causes the decline of religiosity. Although the way of causation is less clear over shorter periods of time, it appears to be a fact that higher levels of economic development correlate with lower levels of religiosity.

The Secularization Hypothesis also allows to draw conclusions regarding the relationship between religious diversity and religiosity. The proponents of this demand side model argue that higher levels of religious diversity reduce religiosity. The main argument is that the establishment of new churches casts doubt on the correctness of one's own belief. As long as there is only the monopoly religion, believers will accept the validity of the preachings. But if they become aware of the existence of different faiths, trust in the correctness of their belief might vanish. When many different churches compete for believers, which means religious diversity is high, people do not know in which religion they should actually believe. Instead of switching denominations, as the Religious Market Theory would suggest, they reduce their overall religious involvement and drop out of religion altogether. This would result in a measurable reduction of religiosity.

Olson (1999) supports this idea and additionally proposes another channel for the negative relationship. To signal conformance it can be socially optimal to reduce one's own revealed religiosity once the rest of the society starts to decrease their religious involvement. Hence, the channels via development and diversity might be self-enforcing processes. If parts of the population start to decrease their religious involvement because they doubt the correctness of their faith, others might feel inclined to do so as well.

Using survival models Sherkat (1991) shows that a higher supply of religious goods tends to decrease

the ties to one's own religion. Breault (1989) and Blau et al. (1993) also support the demand side model of the Secularization Hypothesis, while Bruce (2000) shows that religious participation in the Nordic states declined continuously although the level of religious diversification has remained stable. He argues that ethnicity and national identity are more important in explaining religiosity than the structure of the market for religious goods. Bar-El et al. (2013) find that the relationship between religious diversity and religiosity follows an inverted U. When religious diversity is low, increasing it leads to rising religiosity. At some point the relationship is reversed and further increases in religious diversity reduce religiosity. In a summary of the literature, Chaves and Gorski (2001) find support for the positive, as well as, for the negative relationship.

3 Data and Methodology

In earlier studies church attendance rates have often been used as a proxy variable for religiosity. However, it appears feasible to assume that religiosity is a multi-dimensional phenomenon rather than the desire to just visit a church. Religiosity reflects religious practices, such as praying and people's beliefs in God and the church. For this reason Paldam and Gundlach (2012) construct a comprehensive measure of religiosity. They analyze answers to 14 different questions concerning religion from the World Values Survey, which ask, for example, about subjective attitudes towards religion, such as if the individual believes in God or thinks that religion is important in life, and about revealed religious behavior, such as how often the individual goes to church or if he adheres to a specific denomination. Paldam and Gundlach (2012) calculate a religiosity score, which ranges from 0 to 100, for 93 countries by using factor analysis. Their index can be interpreted as a measure for the importance of religion in people's lives, similar to what other authors have termed "neo-secularization" (Yamane (1997), Tschannen (1994), Casanova (1994), Chaves (1994)). However, I will stick to the term religiosity throughout this analysis.

The explanatory variables of main interest are religious diversity and income. Commonly, religious diversity is measured by a concentration index, called the Herfindahl-Index, which is gained by $H = \sum_{i=1}^{n} s_i^2$ where s is the share of adherents to each religious denomination i and n is the number of denominations. This is transformed to the index of religious diversity by $1 - H$. It measures the probability that two randomly drawn persons belong to different denominations. It equals 0 if every person in a country adheres to the same faith and would equal 1 if everyone belonged to a different denomination.

Alesina et al. (2003) offer data on this variable. However, their data is unfortunately available for only one point in time. I rely on data from the World Christian Encyclopedia (Barrett, Kurian, Johnson, 2002) to calculate the index of religious diversity. Data is available for the years 1990, 1995, and 2000 which

coincides with the second, third, and fourth wave of the World Values Survey. Those countries which participate in the World Values Survey only in the last wave and for which the religiosity score would be available are consequently left out of the analysis. The index of religious diversity I calculate is very similar to the values of Alesina et al. (2003), the correlation between the two measures is 0.86. I will test the robustness of the empirical results by including religious diversity from Alesina et al. (2003).

Voas et al. (2002) show that an improperly estimated index of religious diversity can cause biased results. They present evidence that this mathematical fallacy can be resolved if, and only if, every person in a country belongs to a religious denomination. Hence, I also include atheists and non-religious people as separate denominations in the calculation of this index. In most cases it should be a free decision not to belong to a specific church so that there is no reason to exclude these groups. Furthermore, the World Christian Encyclopedia distinguishes many Christian denominations, such as Roman Catholic, Protestant, Anglican, Baptist etc. It also includes Islam, Judaism, Buddhism, Hinduism, Taoism, Shintoism, and indigenous religions. When there is a considerable Shiite population I separate Islam into Sunni and Shiite Islam. In this sample this applies to Iran, Iraq, Pakistan, Saudi Arabia, and Turkey. Table A1 in the appendix presents the calculated index of religious diversity for those countries included in the empirical analysis.

Since we have information on the religiosity score and religious diversity for three different points of time, it would obviously be desirable to use panel estimation methods. However, religious diversity is a very slow moving variable. Including country fixed effects will therefore eliminate every possibly significant relationship between religiosity and religious diversity. Hence I will present the results of a random effects estimation in the section on empirical results. However, the main insights will be drawn from OLS regressions of the mean value of religiosity on the mean values of religious diversity, income, and other control variables X_i, so that the estimated regressions are of the form:

$$religiosity_i = \alpha + \beta \cdot diversity_i + \gamma \cdot income_i + \delta \cdot X_i + \varepsilon_i, \tag{1}$$

where ε_i are robust standard errors.

In order to reduce the risk of reverse causality income should be used from a year before the first observation on religiosity, which is 1990. Only the Maddison (2010) online database offers income information on the single former Soviet nations before the dissolution of the USSR. This data is available only for the year 1973. I test the robustness of the results with income data from the Penn World Tables (Heston et al., 2011). When income is used from 1973 the former Soviet and Yugoslav nations are dropped so that I repeat the robustness test with all countries which is possible when income is taken from the year 1993.

Income is transformed into log terms because Paldam and Gundlach (2012) suggest that secularization is a non-linear process.

I control for ethnic and linguistic diversity to take into account other possible cultural dimensions apart from religious diversity. The information is taken from the afore mentioned paper by Alesina et al. (2003) and is calculated equivalently to religious diversity. In addition I control for secondary education. Information is taken from the World Bank Databank, based on the results from Barro and Lee (2010) and measures the percentage of the population which completed secondary education. The Secularization Hypothesis suggests a negative relationship with religiosity. As people become better informed, miraculous explanations of scientific phenomena become insufficient or might be proven to be wrong. I include the Polity IV score to test for possible effects of democratic institutions. Population size enters as another control variable.

It might be argued that religious diversity is not exogenous to the level of religion. Therefore, I run an instrumental variable regression to test the results gained by the OLS estimation. Fincher and Thornhill (2008) propose that the disease environment can explain the distribution of religions across countries. Harttgen and Opfinger (2012) show that these variables might be used as instruments for religious diversity. In order to work as instrument in this analysis the disease environment must explain religious diversity but must not be correlated with the level of religiosity. The first condition holds, as presented in Fincher and Thornhill (2008). The authors argue that people separate themselves from groups with which they do not share the same immunity pattern against contagious diseases. As a consequence separate cultures emerge of which religion is an integral part. The more different immunity patterns existed, the more different religions emerged as an evolutionary reaction which explains why there are different levels of religious diversity today.

Fincher and Thornhill (2008) use the number of diseases and the number of pathogens as variables in their study. The exclusion restriction requires that these variables do not affect religiosity through another channel but religious diversity. It appears not immediately obvious how this should be the case. The number of contagious diseases in a country which has led to an evolutionary emergence of different cultures should not influence people's perception of religiosity today. The questions used to calculate the religiosity score ask about intrinsic involvement with the church and practiced religiosity. These should be independent of the disease variables. One might argue that an increasing number of deaths due to a disease might reduce faith due to disappointment or a feeling on unfairness. But however, this should lead to a drop-out of religion which puts these people in the non-religious category. Or people form another religion when they are disappointed with their old faith. Either way the reaction of religiosity should be

through religious diversity so that the exclusion restriction should hold unviolated.

Table 1: Summary statistics

Variable	Mean	Median	Stan.Dev.	Min	Max
Religiosity score	57.43	56.20	19.66	15.18	89.99
Religious Diversity	0.48	0.51	0.24	0.03	0.86
Log Income 1973	8.49	8.61	0.90	6.21	9.81
Secondary Education	37.53	37.40	18.34	1.40	80.13
Ethnic Diversity	0.34	0.32	0.22	0.00	0.93
Linguistic Diversity	0.30	0.22	0.26	0.00	0.92
Polity Score 1973	-0.64	-7	8.17	-10	10
Population in million	69.39	22.78	184.06	1.46	1200.90

Table 1 gives an overview of the summary statistics used in the empirical analysis. There are 69 countries for which information on all variables exists. The lowest value of religiosity is reported for China, whereas Morocco reveals the highest level of religiosity. Croatia is the median observation and Italy comes closest to the mean value. Morocco has the lowest value of religious diversity. Here, the highest level is calculated for South Korea. The value implies that the probability that two randomly drawn people belong to different denominations is more than 86%. The observations on Morocco propose that low religious diversity is correlated to high religiosity scores. The next section will present the regression results to either support or refuse this suspicion.

4 Empirical Results

This section will present the results of the empirical estimations. A positive coefficient on religious diversity will support the supply side model of the Religious Market Theory, whereas negative coefficients on religious diversity and income will back up the propositions from the demand side model and the Secularization Hypothesis. Table 2 presents the results of different regressions. Column 1 shows the results of an OLS regression using country means. The t-statistics, produced by using robust standard errors are shown next to the coefficients. In column 2 I present the results of a 2SLS regression, column 3 reveals the results of a random effects model when we use all available data. Remember that religious diversity is very slow moving so that a fixed effects model would not be appropriate to estimate the relationship between religious diversity and religiosity. *,**, and *** denote statistical significance at the 10, 5, and 1 percent levels, respectively.

It becomes apparent at first sight that religious diversity enters negatively and significantly in all three estimations. It is significant at the one percent level in columns 1 and 3. It is significant only at the ten

percent level in the instrumental variable regression. This is probably due to the fact that the instrument is not overtly strong, the first stage F-statistic is only 4.78. However, the Cragg-Donald Wald test implies that the instrument is not too weak. The coefficient itself is of a similar size compared to columns 1 and 3. Since the Wu-Hausman and Durbin-Wu-Hausman tests both indicate that religious diversity does not suffer from endogeneity we regard column 1 for the interpretation of the coefficients.

Table 2: Regression Results, dependent variable: religiosity

	(1)		(2)		(3)	
Estimation method:	OLS		2 SLS (IV)		Panel, RE	
	coef.	t-stat.	coef.	t-stat.	coef.	t-stat.
Religious Diversity	-26.683	-3.46***	-27.451	-1.91*	-28.402	-3.65***
Log Income 1973	-8.862	-2.96***	-8.867	-3.32***	-	-
Log Income	-	-	-	-	-5.011	-2.60***
Secondary Education	-0.146	-1.10	-0.143	-1.16	-0.199	-1.99**
Ethnic Diversity	25.276	2.07**	25.209	2.50**	23.653	2.16**
Linguistic Diversity	7.540	0.81	7.812	0.79	6.182	0.64
Polity Score 1973	0.097	0.41	0.098	0.45	-	-
Polity Score	-	-	-	-	0.107	0.40
Population in million	-0.028	-2.60**	-0.028	-2.91***	-0.014	-1.48
Const.	141.9	5.54***	142.2	6.48***	111.1	6.28***
Observations	69		69		140	
R^2	0.57		0.57		0.50	
First-stage F-statistic	-		4.78		-	
Cragg-Donald Wald F-statistic	-		9.83		-	
Wu-Hausman F-test (P-value)	-		0.95		-	
Durbin-Wu-Hausman chi-sq test (P-value)	-		0.95		-	
Wave fixed effects	-		-		yes	

The religiosity score would be lower by 2.67 points if religious diversity was higher by 0.1 index points, i.e. the probability that two persons belong to different denominations was higher by 10 percentage points, all else held equal. The difference in religious diversity between the most homogeneous and most diverse countries amounts to 0.83 index points which is equivalent to a difference of 22 points of the religiosity score. Religious diversity which is higher by one standard deviation is correlated with 6.4 index points, or approximately one third of a standard deviation, lower religiosity

The log of income is also negatively correlated with the religiosity score. Increasing income by one logarithmic point would imply that religiosity is lower by almost 9 points of the religiosity score, all else equal. Income which is higher by one standard deviation correlates to religiosity scores which are lower by almost 8 points, or 40 percent of a standard deviation. The impact of income on religiosity is slightly larger than that of religious diversity, but both effects are meaningful. In column 3 I use the income level of the respective year instead of relying on information from 1973. In this estimation the coefficient is reduced to

5. But it still remains significant at the one percent level. The findings on religious diversity and income both appear to favor the demand side model over the supply side model of the Religious Market Theory. Table A2 in the appendix shows that the results hold when I use religious diversity from Alesina et al. (2003) and income from the Penn World Tables (Heston et al., 2011).

The Secularization Hypothesis proposes that higher levels of education should lead to lower levels of religiosity. In all three estimations the coefficient on secondary education is negative. However, this finding is only statistically significant in the random effects estimation in column 3. Ethnic diversity enters positively in the estimations. The size of the coefficient is similar to that of religious diversity but in the opposite direction. That is not to mean that religious diversity is only significant because ethnic diversity is included. Eliminating ethnic diversity from the list of control variables leaves the coefficient and the significance level of religious diversity more or less unchanged[1].

Population size enters negatively and significantly in the first two columns. However, the effect is fairly small. Population which is larger by 1 million inhabitants is correlated to only 0.03 points lower religiosity scores. Linguistic diversity and the Polity Score do not come close to statistical significance at conventional levels.

I take the analysis one step further by investigating possible interaction effects between the explanatory variables. I repeat the regression of column 1 from Table 2 and include one interaction term after another in the estimation. The results of this procedure are presented in Table 3. Here, the t-statistics, gained by using robust standard errors are shown in parentheses underneath each coefficient.

The most important finding is that the coefficient on religious diversity remains negative and statistically significant in all estimations. The size of the coefficient changes obviously because of the inclusion of the interaction terms. Log of income remains significant as well and the size of the coefficient is similar to column 1 of Table 2, except for column 1 in which income and religious diversity are interacted.

In column 1 I include an interaction term between religious diversity and the log of income. The interaction term enters positively which means, together with the negative coefficient on religious diversity, that at high levels of income the negative relationship between religious diversity and religiosity is somewhat mitigated. The mean value for the log of income in this sample is 8.49. At this level of income the impact of religious diversity on religiosity reduces to -25.4 ($-171.71 + 17.23 \cdot 8.49$) points which is very similar to the value estimated in Table 2. At the highest level of income in this sample the negative relationship between religious diversity and religiosity is reduced to -2.7. This means that higher levels of income can attenuate the negative relationship between religious diversity and religiosity. Considering this finding,

[1] Results available on request.

the support for the demand side model derived from the results from Table 2 appears to fade.

Table 3: Regression Results with interaction terms, dependent variable: religiosity

	(1)	(2)	(3)	(4)	(5)	(6)
Religious Diversity	-171.71	-57.43	-34.92	-31.76	-23.19	-25.32
	(-2.60)**	(-3.41)***	(-2.52)**	(-2.79)***	(-3.03)***	(-3.18)***
Log Income 1973	-16.34	-9.18	-9.12	-8.88	-10.55	-8.79
	(-4.11)***	(-3.21)***	(-3.18)***	(-3.02)***	(-3.45)***	(-2.91)***
Secondary Education	-0.23	-0.63	-0.13	-0.13	-0.15	-0.14
	(-1.90)*	(-2.89)***	(-0.91)	(-1.01)	(-1.23)	(-1.06)
Ethnic Diversity	21.42	22.35	14.69	24.21	24.74	25.93
	(1.98)*	(2.14)**	-1.04	(1.92)*	(2.22)**	(2.13)**
Linguistic Diversity	9.89	11.15	5.89	-0.70	5.58	6.32
	(-1.14)	(-1.31)	(-0.56)	(-0.05)	(-0.59)	(-0.69)
Polity Score 1973	-0.03	0.06	0.10	0.09	-0.95	0.08
	(-0.13)	(-0.25)	(-0.43)	(-0.36)	(-2.55)**	(-0.30)
Population in million	-0.03	-0.03	-0.03	-0.03	-0.03	-0.01
	(-2.90)***	(-3.82)***	(-2.40)**	(-2.34)**	(-3.11)***	(-0.42)
Log Income 1973 x	17.23					
Religious Diversity	(2.17)**					
Secondary Education x		0.84				
Religious Diversity		(1.96)*				
Ethnic Diversity x			23.26			
Religious Diversity			(-0.72)			
Linguistic Diversity x				17.15		
Religious Diversity				(-0.70)		
Polity Score 1973 x					2.38	
Religious Diversity					(2.98)***	
Population in million x						-0.03
Religious Diversity						(-0.52)
Cons.	208.20	161.52	147.48	143.98	155.38	140.33
	(6.78)***	(7.29)***	(6.20)***	(5.79)***	(6.09)***	(5.42)***
Observations	69	69	69	69	69	69
R^2	0.60	0.60	0.58	0.57	0.62	0.57

I include an interaction term between secondary education and religious diversity in column 2 which again enters positively and significantly. At the same time the coefficient on secondary education becomes more negative and significant as well. Taking the mean value for secondary education provides a coefficient value for religious diversity of -25.9. High ratios of completed secondary education decrease the negative influence of religious diversity. In the United States 80.13% of the population have completed secondary education. In this case, the effect of religious diversity on religiosity becomes positive ($-57.43+0.84 \cdot 80.13 = +9.9$). The value for which the relationship between religious diversity and religiosity is just zero is a secondary education completion rate of 68.4%. Once again, the supply side model is gaining ground.

Including interaction terms between religious diversity and ethnic or linguistic diversity does merely not change the results at all. Plugging in the mean values of both variables delivers a coefficient on

religious diversity of -27 and -26.6, respectively. The interaction term between the Polity Score and religious diversity enters positively in column 5. The interpretation is similar to that on income and education. In highly autocratic regimes with negative values of the Polity Score the negative relationship between religious diversity and religiosity even becomes reinforced. In democratic countries the negative relationship between religious diversity and religiosity can be overcome. Using the mean value of the Polity score implies a coefficient on religious diversity of -24.7. For the most autocratic regimes the Polity Score is -10. In this case the negative relationship between religious diversity and religiosity amounts to -47. The Polity Score assigns a value of +10 to full democracies. Here, the relationship between religious diversity and religiosity becomes marginally positive.

In the final column of Table 3 an interaction term between religious diversity and population is included. It seems that this does not change the results much. However plugging in very high values for the population size leads to large negative coefficients on religious diversity. A population size of 1.2 billion which is observed for China in this sample implies a value of -61.3 for the relationship between religious diversity and religiosity. It appears that in very large countries the negative relationship becomes stronger. However, this appears to be only relevant for China and India. For the United States, the third largest country in this sample the coefficient amounts to only -33.3 in column 6.

The results presented above deliver a mixed picture concerning the underlying models. The results from Table 2 support the demand side model as religious diversity and religiosity appear to be negatively correlated. However, including interaction terms reveals that income, education, and democracy can mitigate this effect. For the most developed countries the relationship can even turn positive which favors the supply side model. Nevertheless, the results on income appear to support the Secularization Hypothesis.

5 Discussion

This paper is supposed to reassess the relationship between religious diversity and religiosity and thereby finding support for either the demand side or supply side model. Bar-El et al. (2013) propose that both mechanisms might be at work at the same time but that one dominates the other. However, the ranking of mechanisms may change over time.

The results gained above leave room for a similar explanation. The baseline results from Table 2 propose that there is a negative linear relationship between religious diversity and the level of religiosity which supports the demand side model of the Secularization Hypothesis. However, the results on the interaction terms which are presented in Table 3 reveal that this straight-forward solution would be overtly

simple. High levels of income, secondary education, and democracy can turn the coefficient on religious diversity from negative to positive which in turn supports the supply side model of the Religious Market Theory.

It appears that different mechanisms are in force at different stages of economic development. The structure of the market for religion does not seem to play an important role in less developed countries. Religion is more prominent in these societies for everyday decision making. If the trust in the respective belief is shaken due to the uprising of new churches, people will reduce their overall level of religiosity. This reaction looses power if religion itself is not as important as it has been before. This is the case in the more developed nations. As Hirschle (2011) shows, religiosity is substituted for other activities when income rises. Due to higher education religious myths are no longer necessary to explain certain experiences but there are scientific explanations for most of nature's phenomena. Consequently, people may become more liberal towards switching denominations and looking for a faith which fits best their values and beliefs. Another explanation may be that people concentrate more on the maximization of their own utility. This is maximized when they switch to another belief. It follows that the consumers choose the denomination which offers the religious good with the highest quality. According to the Religious Market Theory, the quality increases when more churches compete for believers and therefore we can explain why there might be a positive relationship between religious diversity and religiosity in the most developed countries.

As Bar-El et al. (2013) propose, both mechanisms seem to be present at the same time. But one force always dominates the other. The demand side forces are stronger at low stages of economic development. People who doubt the correctness of their faith reduce their religious involvement. As economic development proceeds the supply side forces become stronger. Believers feel attracted to churches whose preachings fit their own preferences. They become more liberal to switching religions, instead of reducing religious involvement, which is probably due to the fact that religion itself is not as important anymore in the developed countries.

The results on democracy give further interesting insights. Diversity has a negative effect on religiosity in highly autocratic regimes. Put the other way, the finding proposes that religiosity is higher and probably more important if one sticks to the majority faith, which might itself be chosen by the autocratic leader. This together with the oppression of other religions may make it socially advantageous to be highly involved in the chosen religion. On the other hand, people are free to choose their religion in democratic countries. This makes switching denominations easier and more attractive. Once people find the faith which maximizes their utility, they increase their overall religious involvement.

The results on income provide evidence for the existence and validity of the Secularization Hypothesis.

It appears that ongoing economic development decreases the importance of religiosity for people's lives. This might be the reason for why the supply side forces dominate in the most developed societies once Secularization has occurred.

Using the above argument can also explain why Iannaccone (1991) finds strong support for his Religious Market Theory. He explains that he uses data on "17 Western industrialized countries". The supply side effect should have a strong influence on those because Secularization has already happened. In fact, running the regression from Table 2 column 1 with the countries included in Iannaccone's (1991) study reveals a coefficient on religious diversity of only -4, which is statistically not significantly different from zero. Although the supply side model still would not be endorsed in this case, neither would be the demand side model. It appears that the demand side model dominates for the less developed countries before Secularization takes place. In the course of Secularization, whose existence is proven by the results on income, the importance of religiosity decreases. In the secularized, developed societies the supply side forces take over and competition between churches increases the level of religiosity. This hypothesis of supply side factors coming into force after Secularization should be evaluated further in future research.

6 Conclusion

The Religious Market Theory proposes a supply side model for the market of religion. Basic microeconomic modeling implies that monopoly churches reduce effort in producing the religion good in order to increase profits. However, consumers will demand less of the inferior goods. Churches in competitive markets provide goods of higher quality for which demand is higher. It follows that higher religious diversity should lead to higher levels of religiosity.

In contrast, the demand side model which originates from the Secularization Hypothesis proposes that people reduce the ties to religiosity when they start to doubt the correctness of their faith. Hence, the existence of many different churches, i.e. high religious diversity will lead to low levels of religiosity.

This paper reassesses the relationship between religious diversity and religiosity. For this purpose I rely on a new measure for religiosity from Paldam and Gundlach (2012) which should produce more accurate results than earlier studies which rely on church attendance rates. The results indicate that both models might be in force at the same time, but that one effect dominates the other depending on the level of economic development. At low stages of economic development we find that the demand side model better describes people's behavior, as there is a negative relationship between religious diversity and religiosity. However, high levels of income, education, and democracy can alleviate this effect, so that the relationship turns to positive in the most developed societies. The supply side model seems to dominate

once Secularization has occurred.

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7 Appendix

Table A1: Religious Diversity across countries

Albania	0.765	Greece	0.165	Poland	0.153
Algeria	0.064	Hungary	0.574	Portugal	0.238
Argentina	0.344	India	0.421	Romania	0.537
Armenia	0.440	Indonesia	0.645	Russia	0.669
Australia	0.836	Iran	0.250	Saudi Arabia	0.121
Austria	0.401	Iraq	0.512	Singapore	0.754
Bangladesh	0.248	Ireland	0.268	Slovakia	0.505
Belgium	0.327	Israel	0.388	Slovenia	0.300
Brazil	0.514	Italy	0.333	South Africa	0.763
Bulgaria	0.454	Japan	0.615	South Korea	0.862
Canada	0.784	Jordan	0.125	Spain	0.145
Chile	0.552	Kyrgyzstan	0.573	Sweden	0.536
China	0.719	Latvia	0.795	Switzerland	0.641
Colombia	0.119	Lithuania	0.322	Tanzania	0.792
Croatia	0.232	Mexico	0.239	Turkey	0.296
Czech Rep.	0.705	Moldova	0.732	USA	0.827
Denmark	0.211	Morocco	0.034	Uganda	0.663
Dominican Rep.	0.209	Netherlands	0.761	Ukraine	0.673
Egypt	0.269	New Zealand	0.827	United Kingdom	0.749
Estonia	0.792	Norway	0.179	Uruguay	0.577
Finland	0.261	Pakistan	0.349	Venezuela	0.197
France	0.537	Peru	0.217	Viet Nam	0.707
Germany	0.724	Philippines	0.513	Zimbabwe	0.750

Table A2: robustness tests

	(1)		(2)		(3)		(4)	
Estimation method:	OLS		2 SLS (IV)		OLS		OLS	
	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Religious Diversity (Alesina)	-24.791	-3.05***	-37.030	-1.88*	-	-	-	-
Religious Diversity	-	-	-	-	-24.090	-3.27***	-28.310	-3.65***
Log Income 1973	-8.127	-2.50**	-7.839	-2.78***	-	-	-	-
Log Income 1973 (PWT)	-	-	-	-	-6.518	-2.18**	-	-
Log Income 1993 (PWT)	-	-	-	-	-	-	-5.187	-2.40**
Secondary Education	-0.178	-1.29	-0.144	-1.13	-0.038	-0.24	-0.238	-1.84*
Ethnic Diversity	28.116	2.29**	28.363	2.72***	31.206	2.83***	22.409	1.76*
Linguistic Diversity	4.064	0.45	7.026	0.70	10.786	1.39	8.501	0.90
Polity Score 1973	0.105	0.43	0.131	0.56	-0.165	-0.69	0.026	0.11
Population in million	-0.028	-2.60**	-0.026	-2.48**	-0.029	-2.46**	-0.021	-2.01**
Cons.	134.4	4.78***	134.6	6.01***	118.5	4.32***	118.2	5.35***
Observations	69		69		56		69	
R^2	0.55		0.54		0.60		0.54	
First-stage F-statistic	-		3.00		-		-	
Cragg-Donald Wald F-statistic	-		5.51		-		-	
Wu-Hausman F test (P-value)	-		0.52		-		-	
Durbin-Wu-Hausman chi-sq test (P-value)	-		0.49		-		-	