

Investigating the Determining Role of Interest Rates: Comparing Selected Muslim and Non-Muslim Developing Countries

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Abstract: This paper investigates if demand for money and investment is determined by interest rates in Muslim societies. For this, two groups of Muslim and non-Muslim countries with comparable economic conditions were selected. By using panel data for 1990-2000, demand function for investment and for money was estimated. The results show that people in selected Muslim countries are totally inelastic to the interest rates, while interest rates play an essential role in investment and demand for money in non-Muslim countries. The results also imply that both transactional and speculation motives are important in non-Muslim countries, but in Muslim countries, the transactional motive is dominant and income plays the main role.

I. Introduction

In macroeconomics, interest rate is considered and accounted as a basic variable in the money and goods markets and directly affects investment. From Keynes' viewpoint, demand for money originates from three motives, transactional, precautionary and speculative. The speculation motive has a particular importance in determining demand for money. Namely, demand for money (liquidity preference) is a reverse function of interest

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rates. Demand for investment on this theory depends upon the anticipated interest rates or marginal costs which are in full, direct relationship with interest rates. As the interest rate increases, demand for investment decreases (Dornbusch and Fisher, 1988: 131). On the other hand, it is known that in the Islamic perspective, usury or receiving a predetermined amount additional to the principal amount is forbidden (*Qur'ān*, 2: 275-281). The question posed by this study is what is the effect of interest rates on demand for money and demand for investment in Muslim countries?

In this paper, Muslim country refers to one in which the Muslim population is the majority. In almost all Muslim countries so defined, interest is a reliable variable in the money and goods market. Given that interest is forbidden, it should be expected that Islamic principal to be manifest in Muslim economic behavior so that the demand function of money and investment for Muslims is unaffected by the interest rates. At the same time given that interest rates function as an important economic variable in the economic theories that govern economies of Muslim countries, we should expect that interest rates have a fundamental role in determining preference for liquidity and investment decisions. To study the effect of such a dilemma on Muslim behaviour, it is useful to study the role of interest in the demand function for money and for investment in Muslim societies. However, in assessing the results it is necessary to take account of the likelihood that those results are shaped by the relative backwardness or underdevelopment of the money and capital market structures rather than by the efficiency of the monetary policies in the Muslim countries.

To be sure that the role of interest rates in the economies of Muslim countries is affected by Muslim beliefs and behaviours rather than by the underdevelopment of their money and capital markets, it is necessary to compare the results with those similar non-Muslim countries; similar in terms of development and economic structure. This paper studies the role of interest rates in the money and goods markets using econometric methods, and the demand functions for money and investment are estimated as functions of interest rates.

It should be noted that there are a number of studies in the literature examining the impact of Islamic norms and behaviours on their economic attitude and the development of their economies. However, these studies remain mostly on theoretical framework rather than investigating such impacts through empirical work. Among others, such studies include works of Khan and Mirakhor (1988), Wilson (1990), Chapra (1992), Siddiqi (1993),

Khan and Mirakhor (1994) and Zahier and Hassan (2001). Only few attempts have been made to study the impact of interest rates in Muslim societies, such as Jeffrey et al. (1991). To the best knowledge of these researchers, the only existing study on the role and importance of interest rates in the demand functions for money and investment in Muslim countries through Islamic perspective was conducted by Metwally (1990).

In the research for this paper, conducted using time series data and estimation of a single equation, a number of Muslim countries were compared with a number of non-Muslim countries similar in terms of economic development. The results of the research show that both the demand function for money and the demand function for investments in the Muslim countries, unlike the similar non-Muslim countries, are inelastic to interest rates.

In the second section of this paper, there is a review of the role of interest rates and usury in Islam. The third and fourth sections study the role of interest rates in money and goods markets in the Muslim and non-Muslim countries. The fifth section evaluates and interprets the results yielded by econometric modeling in this study. The concluding section presents an overview of the research results and the policy recommendations that follow from them.

II. Interest and Usury

In the Islamic economy, usury, as a forbidden act, takes place if an additional amount is paid to the principal amount of debt (or assets in general). The prohibition of usury has a long history, dating back to 4000 BC (Durant, 1957: 151).

Usury was the subject of reproach in Babylon (Durant, 1957: 271), Egypt and Greece (Aristotle, 1992) and ancient Rome (Visser and McIntosh, 1998), as well as different religions including Judaism (Old Testament, Chapter 22: 15) and Christianity (Luke, Chapter 6: 34). From Islam's viewpoint, paying any interest on any types of debt, including personal, commercial, agricultural and industrial debts is forbidden. Some of the verses and explanations have explicitly forbidden usury (see *Qur'ān*, 3: 130; 2: 275; 2: 276; 2: 278; 30: 39).

Forbidding usury is a tool in Islamic economic policy geared to establishing a society based on economic justice. Zero interest rate is one of the characteristics of an Islamic economy. Taking interest out of the economy does not lead to economic disorder and depression, but to a

moral economic order that contains disparity of income and wealth and so provides for the economic well-being of the society as a whole.

It would normally be expected, as a consequence of the *Qur'ānic* injunction mentioned above forbidding *ribā*, interest rate should not have a fundamental role in demand for money and demand for investment in Muslim countries.

III. Role of Interest in Demand for Money and Investment in Muslim countries

One can say with certainty that the economy in none of the contemporary Muslim countries could be called an Islamic economy. Nevertheless, Islamic principles and values should manifest in the economic behaviour of Muslims to some extent, and shape their economic transactions. For that reason, we may assume that many Muslims refrain from usurious transactions even if usury is not forbidden by law in their countries. It should, however, be stated that due to high secularization in some Muslim countries, this may not necessarily be the attitude.

In this section, we study and clarify the econometric models to be used in estimating the role of interest in the contemporary Islamic societies. According to modern macroeconomic theories, establishing balance between demand and supply of money is one of the basic roles of interest rates. Accordingly, studying the money demand function is a useful tool.

According to Keynes' theory, the demand for money (with precautionary and transactional motive) is a function of income, while demand for money speculation is a function of interest rate. Therefore, the function of liquidity preference could be defined as follows:

$$M^d = M^d(r, y) \quad (1)$$

To study the above-mentioned function, we use the following econometric model:

$$\ln M^d = a_0 + a_1 \ln Y + a_2 \ln r + u \quad (2)$$

where M^d indicates demand for money (M_2), Y is the actual national income, r is the interest rate and u is the error term.

Since in equation (2), the variables of both parts of the function are logarithmic, the variables coefficients show the elasticity of money demand. a_1 and a_2 are short elasticity trends of demand for money subject,

respectively, to actual income and interest rate, and show the effect of 1% variation in income and interest rate on demand for money, with the assumption that all other conditions are constant.

$$\alpha_1 = \frac{\partial \ln\left(\frac{M^d}{P}\right)}{\partial \ln(Y)} \quad (3)$$

$$\alpha_2 = \frac{\partial \ln\left(\frac{M^d}{P}\right)}{\partial \ln(r)} \quad (4)$$

where P represents the general level of price.

The assumption is that there is always balance in money markets and the amount of demanded money should be equal to the amount of supplied money. It is expected that based on the above-mentioned relations, $a_1 > 0$ and $a_2 < 0$. In this study, the statistical analysis was carried out for some selected Muslim and non-Muslim countries.

Demand for investment is another function that indicates the importance of interest in Muslim countries compared to non-Muslim countries. On modern theories of macroeconomics, the interest rate affects the goods market through demand for investment. Investors compare the market interest rate with the anticipated rate of return before making investment decisions. Since investment is an important determining factor in the level of income and employment, variation in interest rates plays a great role in determining the values of these variables.

To show the above-mentioned relations, the following econometric model is estimated:

$$\ln I = b_0 + b_1 \ln Y + b_2 \ln r + \varepsilon \quad (5)$$

where I indicates investment and ε is the error term.

It is expected that an increase in real income would increase demand for investment; that is, $b_1 > 0$. In addition, as demand for investment is ordinarily done through loans, a higher interest rate would lower demand for loans as well as the output of investment and therefore lower demand for investment. On this basis, it is expected that the elasticity of demand for investment in response to interest rate would be negative, that is, $b_2 < 0$.

$$b_1 = \frac{\partial \ln I}{\partial \ln \bar{Y}} > 0 \quad (6)$$

$$b_2 = \frac{\partial \ln I}{\partial \ln r} > 0 \quad (7)$$

IV. Description of Data and Procedure

As noted in the previous section, in order to study the importance and role of interest rates in Muslim countries, compared to non-Muslim ones, two basic functions, i.e. demand for money and demand for investment, are estimated and interpreted. The variables, which have been used in this research, are: volume of money, general level of prices, interest rates, national income and amount of investments. This data has been extracted from the reports of the World Bank (World Development Report) for the period 1990-2000. The variables are all based on the U.S. dollar in 1995. By volume of money in this research, is meant M_2 , that is, the sum of current deposits, coins, bills, saving deposits and long term deposits.

The procedure is that first, a number of economically comparable Muslim and non-Muslim countries were selected. This number includes 54 countries with medium and lower income (based on World Bank classification). Then particular indexes were collected to select final samples. These indexes include per capita income, added value in industrial sections, agriculture and service sectors as elements of production and gross investment, goods exports, services, consumption of services and government sectors as demand elements. For more useful comparison of the selected countries, some other development factors such as Gini coefficient, illiteracy rate, life expectancy and unemployment rate indexes were used. The data of these variables was collected for 54 countries for the period subject of study (1990-2000) and based on the mean sampling distribution and variance of these variables from the mean. The countries were ranked on basis of the above-mentioned indexes and the sample countries were chosen out of them. These countries included the six Muslim countries: Jordan, Algeria, Morocco, Egypt, Iran and Guinea as well as the six non-Muslim countries: Peru, Bolivia, Guatemala, Colombia, Philippines and Ecuador. The selected sample countries and related indexes are shown in Table 1.

In table, 1 IPC is the average per capita income; VAI is the average value added in industry sector in terms of percentage of total gross domestic product; VAA is the average value added in the agriculture sector as a ratio of total gross national product; VAS is the average value added of the service sector as a ratio of total gross national product; EPS is the average percent of export of products and services from total gross national product; GCO is the average percent of government's consumption from total gross national product; GIV is the average gross investment sector in terms of percentage of total gross national product; GEC is the ratio of government's expenditures to gross national product; GCE is the average Gini coefficient; LTR is the average illiteracy rate; UNR is the average unemployment rate, and lastly LEX is the average index of life expectancy.

Although estimation of the demand for money and the demand for investment is possible for these countries individually, using panel data method is preferred, as it increases the sample size of the data and improves the integration nature of the model.

Prior to estimation, the stationary and cointegration nature of the data set of the variables should be tested as part of the time-series properties with the objective of overcoming spurious regressions. The Im *et al.* (2003) panel unit root test (IPS), which is based on the null hypothesis of non-stationary against the alternative of stationary is applied, which is based on the standard t – bar statistics as follows:

$$\Gamma_t = \frac{\sqrt{N} \left[\bar{t}_{NT} - M \right]}{\sqrt{\nu}} \approx N(0, 1) \quad (8)$$

where \bar{t}_{NT} represents the average of the N cross-section ADF t statistics, M the mean and ν the variance of the ADF statistic under the null hypothesis calculated by Im *et al.* (2003).

Table 1: Development Indicators for Some Muslim and Non-Muslim Developing Countries, 1990~2000

Country		IPC	VAI	VAA	VAS	EPS	GCO	GIV	GEC	GCE	LTR	UNR	LEX
Muslim	Non-Muslim												
Jordan		156088	26059	4095	68045	50014	23097	28010	96049	36040	14021	14040	70017
Algeria		155202	50094	10096	38010	27065	16047	28041	68053	35030	40013	23094	69036
Morocco		133605	31097	16052	51051	27005	17040	22035	82089	39050	56011	18022	65055
Egypt		10606	32024	17030	50046	21057	10039	21004	85069	28090	48083	9063	65017
Guinea		81601	31077	37057	30066	10202	17049	32	82067	40020	12015	1107	63076
Iran		1521039	30088	2152	4706	21093	1208	24048	74035	--	29090	--	66092
	Peru	216201	26066	7086	65048	1306	9034	20087	82033	46020	12023	8006	67064
	Guatemala	146004	19085	24032	55083	18051	5085	15064	91004	55080	35007	--	63040
	Colombia	298207	32038	14096	52066	17042	15030	19020	82017	57010	9084	11025	69079
	Philippines	109903	32036	19095	47068	39074	11047	21099	93007	46020	6008	8073	67055
	Bolivia	901090	18085	21006	60010	20054	16055	17002	90012	44068	17098	5009	60072
	Ecuador	1521039	37005	12023	50072	31023	9082	19023	77016	43070	10026	8057	68009

Source: World Development Reports and authors' calculation based on averages for the period.

The results of testing for the time series features, namely existence of unit roots show that the variables included in the regressions are non-stationary. Table 2 reports the panel unit root tests for all the variables used in the two models.

Table 2: Unit Root Test of Panel Data

Statistics	INTEREST	INCOM	INVEST	MP
t-bar	-1.4	-1.2	-1.1	-1.5
Conclusion	I(1)	I(1)	I(1)	I(1)

Note: Critical value t-bar = -1.8 at 5%

We now turn to panel cointegration tests. Following Kao (1999), we use the ADF test to allow for serial correlation in the errors of equation. The DF tests can be obtained from estimated OLS residuals as:

$$DF_{\gamma} = \frac{\sqrt{NT}(\hat{\gamma} - 1) + 3\sqrt{N}}{\sqrt{10.2}} \quad (9)$$

The DF tests in equations of demand for money and for investment show that the null of cointegration is rejected. This means that there is a long run relationship between level of demand for money and the other independent variables included in the model. Tables 3 and 4 report the panel cointegration tests applied to the OLS residual of the two related equations.

Table 3: DF Test for Cointegration of Demand for Investment

Equations	Test statistics	Critical value	Result
Function of investment for Muslim countries	- 8.9	-3.54 (%1) -2.91 (%5)	Cointegrated
Function of investment for non-Muslim countries	- 4.61	-3.54 (%1) -2.91 (%5)	Cointegrated

All statistics are clearly less than the asymptotic critical level at one percent significance. Table 3 also presents the AEG test of demand for money in both selected Muslims and non-Muslims countries, which suggests that the variables are cointegrated.

Table 4: DF Tests for Cointegration of Demand for Money

Functions	Test statistics	Critical value	Result
Function of demand for money in Muslim countries	-8.44	-3.58 (%1) -2.92 (%5)	cointegrated
Function of demand for money in non- Muslim countries	-7.41	-3.54 (%1) -2.91 (%5)	cointegrated

As shown in the table 3 and 4, all statistics are clearly less than the asymptotic critical values at even 1% significance level, indicating that there is a cointegration relationship.

V. Empirical Results

5.1. Investment function

Since some of the data on actual interest rates is negative, it is not appropriate to use logarithmic models to estimate the function; therefore, non-logarithmic models were applied. The general model for estimation is as follows:

$$INVEST_{it} = a_0 + a_1 INTEREST_{it} + a_2 INCOM_{it} + a_4 INVEST_{it}^{(-1)} + u_{it} \quad (10)$$

where $INCOM_{it}$, $INTEREST_{it}$ and $INVEST_{it}$ are actual national income, interest rates and investment of the country i in year t . The symbol u indicates the error term. The first lag of investment has been put in the model to prevent the autocorrelation, to get information about the process and speed of adjustments in response to the effects of other variables. The value of investment has been realized in the fixed prices of 1995.

The equation 10 was worked out separately for the six Muslim and non-Muslim countries. The estimation methods are GLS and SUR methods. The results of the estimation are presented in Table 5 (see Appendix) in random-effects, which shows the results obtained from estimation of a general regression covering all selected Muslim countries. As the results show in Table 5, R^2 is strong enough to indicate a good model fit. F statistics shows that the model is also significant at 5% level. The autocorrelation problem in the models has been taken care of by the addition of first lag of the dependent variables.

The results of estimating investment functions for Muslim countries, both in random-effects and fixed-effects show that the income coefficient is positive and statistically significant. Therefore, increase in income level would increase the demand for investment in Muslim countries.

The a_3 adjustment coefficient is also statistically significant indicating that dynamic models are suitable for explaining investment behaviour. The interest rate coefficients in the investment functions for Muslim countries, both in fixed-effects and random-effects are not statistically significant even at 10% level. The highly important result of these regressions is that the dominant interest rates in Muslim societies do not play a basic role in determining investors' decision-making. It could be argued that the weak effect of interest rates on investment decisions in Muslim countries is not attributable to choices inspired by the prohibition behavior of usury, but to the lack of development in their financial markets. The question arises whether the main factor determining the insignificance of interest rate is religious belief or the economic structure (development level)? To answer this question similar econometric models were developed for six non-Muslim countries, which are at a similar development stage and have a similar economic structure. The results of these regressions are given in Table 6 in the Appendix, which depicts that R^2 statistics are high enough, implying that the model explains more than 99% of the variation. Recorded

F statistics indicates the overall regression model is significant. The actual income variable coefficient shows that the income variable has a determining role in the investment decisions of non-Muslim countries and this situation is similar to that of Muslim countries.

However, the effect of interest rates on demand for investment in non-Muslim countries is very different from the similar results in Muslim countries with similar economic situations. The interest rate coefficient in studying demand for investment in non-Muslim countries was statistically significant at 5% level, while in the Muslim countries, the interest rate coefficient was not statistically significant.

Therefore, as a basic conclusion, one can say that in countries with similar economic conditions, the non-economic factors, particularly religious belief in the Muslim countries that usury is prohibited, prevented interest rates from being a significant determinant of demand for investments in Muslim countries, even though usury has not been prohibited by law. Strange as it may seem in general, in the light of the Muslim belief (derived from and conditioned by the severity of the prohibition of usury in the *Qur'ān*) it is not surprising. The coefficient of interest rate in each selected country is given in table 5 and 6 in Appendix. Results obtained from estimation of a general regression covering all selected countries also confirm these findings.

5.2. Estimation of demand function for money

As stated before, interest rate is one of the major determinants in the money market. To study the role of interest rate in demand for money, the function of demand for money was estimated for both Muslim and non-Muslim countries. The general form of the model is as follows:

$$MP_{it} = a_0 + a_1 INTEREST_{it} + a_2 INCOM_{it} + a_3 MP_{it}^{(-1)} + u_{it} \quad (11)$$

where MP , $INTEREST$ and $INCOM$ denote the actual quantity of money, interest rate and national income, respectively. By quantity of money is meant the sum of money (M_1) and quasi-money, which is called M_2 in sum. The price levels are measured with consumer price index (CPI). The results of estimation for Muslim countries are depicted in table 7.

As depicted in Table 7 in Appendix, R^2 and F statistics (as in previous models) are quite satisfactory. Due to a first-order lag of the quantity of money as an explanatory variable, the autocorrelation problem has been taken care of.

The results of Table 7 in Appendix show that in contemporary Muslim countries, demand for money is determined mainly through income level. Therefore, it seems that in Muslim countries precautionary and transactional motives of money are more dominant than the speculation motive. The significant $MP_{it}(-1)$ coefficient shows that in Muslim countries, wealth and money accumulation of previous periods are effective for money.

Based on the results presented in Table 7 in the Appendix, it can be said that interest rates in Muslim countries are not determining factors in liquidity demand; since the interest rate coefficient in the function of demand for money is not statistically significant. This finding is a major result and supports the previous finding and indicates two facts. First, the behaviour of Muslims as regards liquidity preference is significantly different from Keynes' model for the regression results show that the interest rate is not a determining factor for money demand. For this reason, Keynes' speculation motive cannot be considered a dominant motive in Muslim countries. Second, removal of the interest rate should not pose any serious problem for efficiency of monetary policy in Muslim countries, as demand for money in these countries is completely inelastic to interest rates.

Again, one might argue that the poor role of interest rates in Muslim countries is mainly due to the relative underdevelopment of their economies and of money and investment markets, and that accordingly, Muslim religious belief about usury has nothing to do with it.

To deal with this doubt, similar econometric models were estimated for the six non-Muslim countries. The results of this estimation are given in Table 8 in the Appendix. Based on these results, R^2 and F statistics are both strong enough and there are no diagnostic problems. The results also show that, first, the income level in non-Muslim countries is counted as a basic factor in demand for money, because income is statistically significant at 5% level. This shows that the transactional and precautionary motives of money play an important role in determining monetary preference. This is similar to the results obtained for Muslim countries.

Second, the coefficient of lagged variable show that wealth is an essential determining factor in demand for money in non-Muslim countries. This result is also similar to the results obtained for Muslim countries.

Third, the results show that in non-Muslim countries, interest rates are an important determining factor in demand for money, as its coefficient

(a_1) is statistically significant at 5% level. This result is contrary to the results obtained for Muslim countries with similar economic condition. In Muslim countries, the interest rate has no significant effect on demand for money. Therefore, our econometric models have shown that interest rates play an important role in determining demand for money in the non-Muslim countries, whereas in the Muslim countries, this factor was statistically insignificant. It should be noted that results obtained from estimation of a general regression covering all selected countries also confirm these findings.

In general, the above-mentioned results imply that Muslims do consider prohibition of usury in Islam in their economic decisions. Therefore, their liquidity preference is not affected by interest rates, even though the opportunity is available to them to exploit usury.

VI. Conclusion

Econometric models using the panel data method were used to determine the importance and role of interest rates in Muslim countries. The basic findings show that the interest rate plays no significant role in determining demand for investment and demand for money, whereas in similar non-Muslim countries the interest rate is a determining factor in demand for investment and demand for money. Therefore, we infer that the economic behaviour of Muslims is affected by their religious values at least in the case of the sampled Muslim countries, as prohibition of usury causes the interest rates in the sampled Muslim countries to have less importance compared to non-Muslim countries.

The results also imply that it would not be very difficult for Muslim countries to abandon interest rates totally and to take steps towards establishing an Islamic economy based on Islamic values. The results also indicate that in the sampled Muslim countries, the transactional and precautionary motives are stronger than the speculation motive and it would seem that the Keynes' theory on demand for investment and for money is not necessarily applicable in the sampled Muslim countries for the period in question according to the modelling in this study.

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APPENDIX

Table 5: Estimation of Investment Demand Function in Muslim countries (Random-Effects)

Dependent Variable: I

Method: GLS (Variance Components)

Total Panel (unbalanced) Observations 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.25E+08	1.76E+08	0.709994	0.4809
R	-6363745	17763638	-0.358246	0.7216
Y	0.022850	0.007554	3.024775	0.0039
I(-1)	0900819	0.035936	25.06748	0.0000
Random Effects				
JORDAN--C	4.37E+08			
ALGERIA --C	-7.37E+08			
EGYPT--C	-8.55E+08			
IRAN--C	1.34E+09			
MOROCCO--C	-1.80E+09			
GUINEA -- C	7.10E+08			
GLS Transformed Regression			Mean dependent var	8.38E+09
R-squared	0.904587		S.D. dependent var	6.17E+09
Adjusted R-squared	0.898975		Sum squared resid	1.96E+20
S.E. of regression	1.96E+09			
Durbin-Watson stat	2.834749			

Unweighted Statistics including Random Effects

Table 6: Estimation of Investment Demand Function in Non-Muslim Countries (Random-Effects)

Dependent Variable: I

Method: GLS (Variance Components)

Total Panel (unbalanced) Observations 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-89063306	36041982	-2.47109	0.0084
R	-59654363	3049595.	-1.95621	0.0512
Y	0.042556	0.019454	2.187513	0.0329
I(-1)	0900819	0.035936	8.777786	0.0000
Random Effects				
PERU--C	-1.99E+09			
BOLIVIA--C	6.63E+08			
GUATEMALA--C	99682193			
COLOMBIA--C	2.03E+09			
PHILIPPINES--C	-1.31E09			
ECUADOR--C	5.10E+08			
GLS Transformed Regression			Mean dependent var	8.70E+09
R-squared	0.905210		S.D. dependent var	6.17E+09
Adjusted R-squared	0.900132		Sum squared resid	1.96E+20
S.E. of regression	2.28E+09			
Durbin-Watson stat	1.897919			

Table 7: Demand for Money in Muslim Countries (Random-Effects)

Dependent Variable: MP
Method: GLS (Variance Components)
Total Panel (unbalanced) observations 51

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.13E+08	6.89E+08	0.889435	0.3783
R	-63.45297	69438929	-0.913795	0.3655
Y	0.255694	0.119228	2.144587	0.0351
MP(-1)	1.020306	0.001640	622.1778	0.0000
Random Effects				
JORDAN--C	1.20E+11			
ALGERIA—C	3.14E+10			
EGYPT—C	3.97E+10			
IRAN—C	-1.39+E08			
MOROCCO--C	-2.39E+10			
GUIANA – C	-1.17E+11			
Gls Transformed Regression				
R-squared	0.995587	Mean dependent var	1.56E+10	
Adjusted R-squared	0.996305	S.D. dependent var	3.15E+11	
S.E. of regression	2.16E+10	sim squared resid	2.19E+22	
Log Likelihood	-1381.625			
Durbin-Watson stat	2.356033			
Unweighted Statistics including Random Effects				
R-squared	0.887657	Mean dependent var	1.57E+11	
Adjusted R-squared	0.880487	S.D. dependent var	3.15E+11	
S.E. of regression	1.09E+11	Sum squared resid	5.58E+22	
Durbin-Watson stat	2.014501			

Table 8: Demand for Money in Non-Muslim Countries (Fixed-effects)

Dependent Variable: MP
Method: Seemingly Unrelated Regression
Total Panel (unbalanced) Observations 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
R	-85200402	7166150.	-8.121572	0.0000
Y	0.168168	0.04204	3.999640	0.0002
MP(-1)	0.905180	0.03117	29.03536	0.0000
Fixed Effects				
PERU--C	-6.1E+09			
BOLIVIA--C	8.88E+08			
GUATEMALA--C	-1.91E+09			
COLOMBIA--C	1.03E+10			
PHILIPPINES--C	-1.07E+10			
ECUADOR--C	1.50E+10			
Weighted Statistics				
Log likelihood	-1342.596			
Unweighted Statistics				
R-squared	0.990006	Mean dependent var	5.00E+10	
Adjusted R-squared	0.988438	S.D. dependent var	7.10E+10	
S.E. of regression	7.64E+09	Sum squared resid	2.97E+21	
Durbin-Watson stat	1.960286			