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Institutions and Economic Growth: Empirical Evidence from a Cross-National Analysis

Maya Vijayaraghavan* and William A.Ward**
Clemson University

Center for International Trade
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Abstract: The relationship between institutional infrastructure and economic growth rates across 43 nations between the years 1975-90 is examined. Within the framework of the neoclassical growth model, this study integrates a broad set of institutional variables which together proxy for the overall institutional infrastructure of an economy. Security of property rights, governance, political freedom and size of government are the indicators used in the study, facilitating identification of the most important institutions that account for the observed variations in economic growth rates among nations. Results indicate that security of property rights and size of government are the most significant institutions that explain the variations in economic growth rates.

* Department of Agricultural and Applied Economics, 247 Barre Hall, Clemson SC 29634-0355. Email: mvijaya@clemson.edu. Tel: 864.656.7822
** Director, Center for International Trade, 325 Sirrine Hall, Clemson SC 29634-1394

Introduction

The discovery in neo-classical economics that relative prices mattered led to an excessive focus on them in the context of development policy. Price reforms, along with macroeconomic stability and privatization were the reformers' rallying cries in the 1980s. The encounter between neo-classical economics and developing societies served to reveal the institutional underpinnings of market economies, when it became clear that incentives would not work or generate perverse results in the absence of adequate institutions. Some of the implications of this were recognized in discussions on rent seeking in the trade policy context, where corruption was the main issue, and in discussions on common-property resources, where the focus was on property rights. However, the broader point that markets needed support from non-market institutions took a while to gain recognition. One of the ways in which institutional capacity can affect economic performance is through the allocation of resources. Providing public services, providing quasi-public goods or public goods, and intervening to improve the functioning of markets are all directly concerned with resource allocation. The simplest mechanism by which a lack of institutional capacity might result in resource misallocation is through inefficient investment choices by the public sector. The lack of good institutions may also lead to inefficient investment choices by the private sector.

The process of integrating institutions into economic theory is of comparatively recent vintage. Over a decade ago, institutional measures were first introduced into cross-country growth equations, and there has been a recent renaissance in this literature. Differences in institutions across countries have proven empirically to be among the most important determinants of differences in rates of economic growth. However, the question of which aspects of institutions matter more for long-run economic growth has

proven to be more controversial than the proposition that institutions are important overall. Diverse measures have been used, encompassing property rights, political freedom, political instability, governance, and measures of the quality of institutions for economic exchange. The collective classification of these measures has tended to obscure the different channels through which institutions operate. In this study, four measures of institutional infrastructure – security of property rights, governance, political freedom and government consumption are used as proxies for the overall institutional environment, and an attempt is made to identify the institutions that appear to be the most significant source of the differences in growth rates. The results from this study will therefore contribute to the debate in the growth and institutions literature.

The second section of this paper summarizes select literature on economic growth and institutions. The third section details the empirical model, variables used in the study, their likely impacts, sources of data and model estimation techniques. The results of the regression are discussed in the fourth section, and the final section concludes the paper.

Literature

The majority of studies investigating the economic growth-institutions nexus use a version of the neoclassical growth model (Solow, 1956), augmented to include measures of human capital (from Mankiw, Romer and Weil (MRW), 1992) and institutions. Previous studies examine the relationship between one aspect of institutions and economic growth, without controlling for the presence of other institutions that could alter the significance of the relationships. Among the pioneers in the growth and institutions literature, Kormendi and Meguire (1985) explored the link between the Gastil indices of political freedom (civil liberties and political rights) and economic growth and

found a marginal effect of civil liberties on growth. Results from Scully's (1988) analysis using the same indices provide similar support for the growth-political freedom nexus. Helliwell's (1992) study however does not find a significant net effect of democracy on growth. Barro (1996) finds the overall effect of democracy on growth to be weakly negative, and some indication of a nonlinear relation in which more democracy enhances growth at low levels of political freedom but depresses growth when a moderate level of political freedom has already been attained. The more general conclusion of this study is that the advanced western countries would contribute more to the welfare of poor nations by exporting their economic systems, notably property rights and free markets, rather than their political systems, which typically developed after reasonable standards of living have been attained.

Knack and Keefer (1995) pioneered the use of indicators of security of property rights in the growth literature, with the ICRG and BERI indices as proxies for this aspect of institutions. The results from their analysis indicate that institutions that protect property rights are crucial to economic growth. More recently, Mauro (1995) found corruption in countries to be growth retarding.

In the last five years, a number of studies have used the Economic Freedom Index from the Fraser Institute to investigate the link between economic growth and institutions. Ali (1997), and Ali and Crain (1999) find economic freedom to be a more robust determinant of growth than political freedom and civil liberties. Ayal and Karras (1998) find that economic growth enhances growth both via increasing total factor productivity and via enhancing capital accumulation. In a study by Dawson (1998), economic freedom is found to be growth enhancing. Easton and Walker (1997) find that economic freedom is an important explanatory variable for steady-state levels of income.

The addition of a variable for economic freedom is also shown to increase the explanatory power of the neo-classical growth model. Norton's (1998) study compares property rights to indicators of development and determines that the "well-being of the world's poorest inhabitants [is] sensitive to the cross-national specification of property rights." The paper shows that well-specified property rights enhance the well-being of the world's most impoverished.

Results from empirical analyses suggest the existence of the economic growth – institutions nexus, but statistical support is not uniform across all indicators of institutional quality. Depending on the institutional variables chosen, the group of countries in the analysis, and the time period of the study, the results are mixed. This study attempts to integrate all available indicators of institutional capital within the same model to determine the relative importance of each of these in explaining the variations in growth performance across nations.

Data and Methodology

Using the framework of the neoclassical growth model, this study examines the relationship between economic growth and institutions in 43 nations for the period 1975 to 1990. All except nine nations included in the study are "developing economies" as per the World Bank classification of 1990. Table 3 lists the countries included in the study. The basic theoretical framework outlined in Solow (1956) and MRW (1992) is used for the analysis. The model assumes that the economies are characterized by a production function exhibiting the standard characteristics – constant returns to scale and diminishing returns with respect to each of the factors of production. It is also assumed that it is possible to derive the steady-state level of output for the model, and the

dynamics of the path to such a steady-state can be described. Estimating equations are derived similar to Dawson (1998).

The paper utilizes four measures of institutional infrastructure. A measure of governance computed as a simple average of three indicators – corruption, rule of law and bureaucratic quality, measured on a scale of 0-6, with higher values indicating "better" ratings. The measure of security of property rights is computed as a simple average of two indicators: risk of repudiation of contracts and risk of expropriation, measured on a scale of 0-10, with higher values indicating "better" ratings. Political freedom is computed as the simple average of indicators of civil liberties and political rights, measured on a scale of 1-7, with 1 representing "most free". Government consumption as a share of total consumption is measured on a scale of 0-10, with larger values indicating smaller governments. Following previous studies in the literature, the data on growth rate of GDP per worker are derived from the Penn World Tables Mark 5.6 (Summers and Heston, 1991). Initial income and the period average for investment share are also from the same source. The data on human capital (secondary school enrolment, %) are taken from Barro and Lee (2000), and averaged for the years 1975-90. Descriptions of the variables used in the regression analysis are summarized in Table 1.

Expected relationship between economic growth rates and the explanatory variables

Initial level of GDP:

Poorer countries, with low ratios of capital to labor, have high marginal products of capital. Therefore, as an economy prospers, the return on investment declines, and the growth rate tends accordingly to decline. On the other hand, a poor country that has a low steady-state level of per-capita output - because, for example, it has institutions that are inhospitable to investment – need not grow faster than a rich country. Since countries

are likely to be poor or rich precisely because the underlying determinants of their steady states are unfavorable or favorable, the model does not predict any clear pattern of simple correlation between growth rates and initial incomes.

Labor force growth and depreciation:

There is a reduction in the capital stock per worker because of an increase in the number of workers. If there were no new investment and no depreciation, capital per worker would decline because of the increase in the labor force, resulting in a decline in the GDP per worker, and therefore the growth rates.

Investment share:

The economy is closed, so that savings equals investment, and the only use of investment in this economy is to accumulate capital. The consumers then rent this capital to firms for use in production. As the investment share increases, more capital accumulates, and output increases. So, the growth rate also increases.

Human Capital:

There is a greater labor force role of males in most developing countries, therefore male education attainment more important in terms of the direct effects on GDP growth. Increased education of women leads to a sharp fall in fertility, and hence in population growth. Therefore, the overall effect of increased human capital is to increase GDP growth.

Institutional variables:

Size of government:

The state has a role in providing a minimum level of certain services. However, if the government is too large, it might be taking away resources that could otherwise yield a higher rate of return. If there were a greater volume of nonproductive government

consumption, it would reduce the growth rate for a given starting value of GDP. In this sense, big government is bad for growth. Therefore, a certain "optimum" size of government might be indicated. Growth rates tend to increase as size of government approaches this "optimum" and then decrease beyond this point.

Governance:

This is a composite measure that reflects the quality of the bureaucracy, maintenance of rule of law and level of corruption in government. The quality of the bureaucracy measures mechanisms for recruitment and training, autonomy from political pressure, and strength and expertise to govern without drastic changes in policy or interruptions in government services when governments change. If rules that are in place are not "good", and these are enforced with enthusiasm and rigor, the effect could be counterproductive. In the presence of good rules, growth could be higher. Maintenance of rule of law reflects the degree to which the citizens of a country are willing to accept the established institutions to make and implement laws and adjudicate disputes. Sound political institutions and a strong judicial system are conducive to growth. In some circumstances, corruption maybe preferable to honest enforcement of bad rules. Outcomes maybe worse if rules and regulations that prohibit some useful economic activity are thoroughly enforced rather than circumvented through bribes. On the other hand, the economy maybe hampered if few legitimate activities can be undertaken without bribes. Thus, the overall impact of corruption maybe ambiguous. The impact of the governance variable on economic growth is therefore uncertain.

Security of property rights:

This measure is constructed from two institutional variables – risk of repudiation of contracts by government and risk of expropriation of private investment. The risk of

repudiation of contracts indicator addresses the possibility that businesses, contractors, and consultants face the risk of a modification in a contract taking the form of a repudiation, postponement, or scaling down" due to "an income drop, budget cutbacks, indigenization pressure, a change in government, or a change in government economic and social priorities." The risk of expropriation indicator evaluates the risk of "outright confiscation and forced nationalization" of property. Lower ratings "are given to countries where expropriation of private investment is a likely event." Security of property rights is therefore conducive to economic growth.

Political freedom:

This measure is composed of indicators of political rights and civil liberties. The political rights indicators are based on the degree to which individuals in a state have control over those who govern. The civil liberties indicator purports to measure the rights of the individual, including freedom of expression, assembly, association, and religion. Political freedom provides a check on governmental power and thereby limits the potential of public officials to amass personal wealth and to carry out unpopular policies. Since at least some policies that stimulate growth will also be politically popular, more political rights tend to be growth enhancing on this count. However, the growth retarding features of greater political freedom need to be taken into account – these include the enhanced role of interest groups in systems with representative governments. Thus, the net effect of political freedom on growth is theoretically inconclusive.

Oil exporting economies:

Exports of oil account for a significant portion of the GDP of the oil exporting economies, a factor that cannot be explained by differences in the other explanatory

variables. Increases in oil exports will therefore lead to an increase in growth rates for these economies. The sign on this dummy variable is expected to be positive.

The MRW (1992) human-capital augmented version of the Solow model is first estimated for the sample of 43 countries listed in Table 3. The model is of the form:

$$Growth = \beta_0 + \beta_1 InitialIncome + \beta_2 Laborforcegrowth + \beta_3 Investmentshare + \beta_4 Humancapital$$

The model is estimated following standard procedures for ordinary least squares (OLS). The sign and significance of the variables in the model are similar to those in MRW. However, an analysis of the residuals (Figure 1) reveals that the oil exporting economies of Syria (SYR) and Tunisia (TUN) are among the outliers, and their growth rates are underpredicted by the model. These economies experience high growth merely because of one natural resource, a fact that is not accounted for by any of the variables included in the model. Consequently, a dummy variable is created to account for this discrepancy.

The revised version of the model attempts to identify the most important components of the institutional infrastructure that account for the differences in growth rates.

The revised model is of the form:

$$Growth = \beta_0 + \beta_1 InitialIncome + \beta_2 Laborforcegrowth + \beta_3 Investmentshare + \beta_4 Humancapital + \beta_{5i} Institution_j + \beta_6 OIL$$

where i=1..4 and j=governance, security of property rights, political freedom and government consumption.

The standard assumptions and estimation procedures for OLS apply to this revised version of the model.

Regression Results

Results of the models explaining the differences in growth rates across countries are given in Table 2. Model 1 reproduces MRW's (1992) human-capital augmented version of the Solow model for the 43 countries under consideration in this study. The sign and significance of all of the variables are qualitatively similar to the results obtained by MRW, although the proxy for human capital is not significant. The measure of human capital is highly correlated with initial income in this sample of 43 countries (Table 6), which could be one reason for the lack of significance of this variable in Model 1. Model 2 is an extended version of Model 1, with a dummy variable included for the oil exporters, to account for higher growth rates merely because of the presence of one natural resource, exports of which account for a significant fraction of GDP in these economies. As expected, the dummy variable for oil exporters is positive and significant, indicating that other things being equal, oil exporters would be expected to have higher economic growth rates. A plot of the residuals from this model (Figure 2) reveals a good prediction of the growth rates for the oil exporters. The sign and significance of the other variables in Model 2 is as expected.

Model 3 includes all of the institutional variables for the 43 countries included in the study. All four institutional variables affect economic growth rates positively. The negative sign on the political freedom variable is merely a reflection of the "reverse scale" – i.e. a country with a value of 1 is politically the "most free". However, government consumption is the only institutional variable that is statistically significant in Model 3, indicating that smaller governments are "better". Over the last century, the size and scope of government have expanded enormously, particularly in the industrial economies. The post-World War-II confidence in the government bred demands for it to

do more. Industrial economies expanded the welfare state, and much of the developing world embraced state-dominated development strategies. The result was a tremendous expansion in the size and scope of government worldwide. State spending now constitutes almost half of total income in the established industrial countries, and around a quarter in the developing economies (World Development Report, 1997). The positive effect of government consumption on economic growth rates in this sample of countries is a reflection of this shift in government consumption.

In an attempt to determine the relative significance of the four component measures of institutional capital, a step-wise regression is employed, where we start with a model containing all of the component institutional indices (Model 3) and then individually drop those that are statistically insignificant. This approach results in governance and political freedom dropping out of the model, leaving us with Model 4, in which the security of property rights and size of government are the institutional variables that explain to a significant extent the differential growth performance across nations. A plot of the residuals from this model (Figure 3) reveals no outliers, and the model explains upto 50% of the variability in growth rates. More secure property rights lead to a high level of GDP per capita through their effect on allocative efficiency. When property rights are not well defined, resources maybe directed towards unproductive activities. Transaction costs also tend to be high, and may prevent mutually beneficial transactions. With well-defined property rights, growth will occur either through an increase in the quantity of factors of production or through a more efficient use of available factors of production. The first direct effect of security of property rights on growth arises through a more efficient use of capital. Capital devoted to productive activities will enhance the productive capacity of the economy. The structure of property

rights is also expected to affect the allocation of capital. The presence of a secure system of property rights promotes innovation, since rewards can be reaped from new products or processes. In the absence of property rights, human capital may be used for rent-seeking and other redistributive activities. Other things being equal, growth rates are higher with a more secure system of property rights. For the sample of countries included in this study, the high growth rates of the East Asian countries and the poor growth performance of Sub-Saharan Africa is consistent with differences in their security of property rights. However, the lack of statistical significance for the institutions of governance in the cross-country regression should not be construed to imply that this institution is unimportant for the process of economic growth. Rather, the high correlation (0.73, from Table 6) between governance structures and property rights is one possible reason why the results of the regression are as obtained. In the context of New Institutional Economics, Williamson (2000) distinguishes four levels of social analysis. The top level is the social embeddedness. This is where the norms, customs, mores, traditions etc. are located. Religion plays a role at this level. Although an analysis of this level is undertaken by some economic historians, it is taken as given by most institutional economists. The New Institutional Economics has been concerned principally with levels 2 and 3. The second level is referred to as the institutional environment. Much of the economics of property rights are of a Level 2 kind. The third level is where the institutions of governance are located. Within this theoretical framework, there is a virtuous cycle of feedback between the governance structures and security of property rights. The high degree of correlation between these two institutions possibly captures this phenomenon, with the Level 2 variable dominating the effect of the Level 3 variable. Model 5, an extension of Model 4, tests for non-linearity of government consumption.

Although the results seem to indicate decreasing returns when governments are too large, they should be interpreted with caution, since our sample consists predominantly of developing countries, where the average size of government is small. All of these countries with smaller governments lie in the increasing portion of the growth-government consumption curve. Further analysis with a larger sample of countries is expected to yield more robust results.

Conclusion

This paper attempts to identify the most important institutional determinants of differences in economic growth rates among countries. It provides an analysis of which institutions prove to be growth-enhancing in a sample of forty three countries. The results from the analysis are significant, and provide support for the historical evidence presented by North and Thomas (1973), Rosenberg and Birdzell (1986) and North (1990). They show that the security of property rights provides incentives for economic growth in the world. Secure property rights also lead to an efficient allocation of investment and to an efficient use of capital.

The results seem to indicate that smaller governments are "better". However, government consumption merely reflects its size, and says nothing about the "quality", i.e. its effectiveness. Dramatic changes in the global economy have fundamentally changed the environment in which states operate, and the state is no longer seen merely as a provider, but as facilitator and regulator. Since there is also a predominance of "developing" countries in the sample, which lie in the "increasing" portion of the curve, results for the size of government variable should be interpreted with caution.

This cross-country analysis does not account for inter-temporal changes in the variables that could explain some of the variations in the growth rates. For future

research, when additional data for the institutional indicators are available, the model could be extended to include the temporal dimension and estimated as a panel. The measures of institutional capital used in the study are far from perfect, and do not capture all of the dimensions of institutions. Differences in Level 1 (Williamson, 2000) institutions are also not captured in this study, a factor that could be a significant source of variation in growth rates. A theoretical discussion of cultural differences and long-run economic performance is provided by Lal (1998), which could be used as the building block for empirical testing of this factor endowment as an important source of growth differences.

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Table 1: Description of variables and their expected sign in the estimated model

Variable	Source	Description	Expected Sign
Growth rate of real GDP per worker	Penn World Tables, Mark 5.6	Dependent Variable	Not applicable
Initial Income	Penn World Tables, Mark 5.6	1985 International Prices	Uncertain
Labor Force Growth and Depreciation	Easterly and Levine, 1999	Computed from number of workers	Negative
Investment Share	Penn World Tables, Mark 5.6	Real Investment share of GDP [%] 1985 International Prices	Positive
Human Capital	Barro and Lee, 2000	Secondary School Enrollment [%]	Positive
Government Consumption	The Fraser Institute	Scale of 0-10, with higher values indicating smaller governments	Uncertain Nonlinear?
Governance	IRIS Center, University of Maryland	Scale of 0-6, with higher values indicating better ratings	Uncertain
Security of property rights	IRIS Center, University of Maryland	0-10, with higher values indicating better ratings	Positive
Political Freedom	Gastil Index from "Freedom in the World"	Scale of 1-7, with 1 representing most free	Uncertain Nonlinear?
Dummy for Oil Exporters (OIL)	World Bank classification	1=OIL 0=Other	Positive

Table 2: Factors affecting economic growth
Dependent Variable: Growth Rate of GDP per worker, 1975-1990

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	-0.041	-0.053	-0.301***	-0.306***	0.248
	(0.473)	(0.312)	(0.004)	(0.002)	(0.319)
Initial Income	-0.012**	-0.015***	-0.013**	-0.011**	-0.010**
	(0.032)	(0.007)	(0.029)	(0.027)	(0.035)
Labor Force Growth	-0.033	-0.046**	-0.082***	-0.079***	-0.078**
and Depreciation	(0.138)	(0.038)	(0.001)	(0.000)	(0.000)
Investment Share	0.019***	0.020***	0.023***	0.022***	0.025***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Human Capital	0.006	0.008	-0.003	0.003	0.001
	(0.312)	(0.200)	(0.585)	(0.562)	(0.833)
Oil Exporters	-	0.029**	0.043***	0.041***	0.046***
		(0.027)	(0.002)	(0.001)	(0.000)
Security of Property	-	-	0.015	0.021**	0.024***
Rights			(0.268)	(0.041)	(0.011)
Governance	-	-	0.005	-	-
			(0.566)		
Political Freedom	-	-	-0.003	-	-
			(0.638)		
Government	-	-	0.055**	0.049**	-0.538**
Consumption			(0.018)	(0.019)	(0.0341)
Government	-	-	-	-	0.150**
Consumption squared					(0.021)
R^2	0.34	0.42	0.59	0.58	0.64
Adjusted R^2	0.27	0.34	0.47	0.50	0.56
Root MSE	0.018	0.017	0.015	0.010	0.013
Sample size	43	43	43	43	43

All variables in logs. Parantheses contain p-values.
*, ** and *** denote significance at the 10%, 5% and 1% level.

Table 3: List of countries

Bangladesh	Mexico
Benin	Nicaragua
Chile	Pakistan
Colombia	Panama
Costa Rica	Papua New Guinea
Denmark*	Peru
Dominican Republic	Philippines
Ecuador	Portugal*
Ghana	Sierra Leone
Greece*	Singapore*
Guatemala	South Africa
Honduras	Switzerland*
Iceland*	Syrian Arab Republic+
Indonesia	Thailand
Ireland	Trinidad and Tobago
Italy*	Tunisia+
Jamaica	Turkey
Kenya	United Kingdom*
Korea, Rep.	Uruguay
Malawi	Venezuela
Malaysia	Zambia
Mali	

* High-income economies
+ Oil exporters

Table 4: Table of Income group by Region*

Region	Income					
	High-Income Non-OECD	High-Income OECD	Low Income	Lower Middle Income	Upper Middle Income	**Total**
East Asia and Pacific	1	..	1	3	2	7
Europe and Central Asia	..	2	..	..	1	3
Latin America and Caribbean	..	..	2	7	6	15
Middle East and North Africa	..	..	..	2	..	2
South Asia	..	..	2	..	..	2
Sub-Saharan Africa	..	..	7	1	..	8
Western Europe	..	6	..	..	..	6
Total	1	8	12	13	9	43

* World Bank Classification, 1990

Table 5: Descriptive Statistics

Variable	Sample Size	Mean	Standard Deviation	Minimum	Maximum
Growth rate of GDP per worker	43	0.010	0.021	-0.030	0.060
Initial Income	43	9581	6845	1085	27173
Labor force growth	43	0.074	0.010	0.054	0.092
Investment Share	43	17.43	7.29	1.28	35.87
Human Capital	43	23.02	12.96	1.95	54.05
Governance	43	2.67	1.01	0.66	5.23
Political Freedom	43	3.66	1.72	1.00	6.64
Security of Property Rights	43	5.37	1.38	2.65	8.65
Size of government	43	7.94	1.21	4.60	10.00

Table 6: Matrix of correlation coefficients

Variable	Growth rate of GDP per worker	Initial Income	Labor force growth	Investment share	Human capital	Governance	Political freedom	Security of property rights	Size of government
Growth rate of GDP per worker	1.00								
Initial Income	0.18 (0.4542)	1.00							
Labor force growth	-0.22 (0.1564)	-0.45 (0.0022)	1.00						
Investment share	0.48 (0.0010)	0.56 (0.0001)	-0.19 (0.2208)	1.00					
Human Capital	0.28 (0.0653)	0.77 (<0.0001)	-0.44 (0.0030)	0.57 (<0.0001)	1.00				
Governance	0.27 (0.0804)	0.25 (0.1022)	-0.01 (0.9608)	0.26 (0.0951)	0.32 (0.0375)	1.00			
Political freedom	-0.05 (0.7718)	-0.68 (<0.0001)	0.52 (0.0003)	-0.43 (0.0041)	-0.53 (0.0002)	-0.13 (0.4006)	1.00		
Security of property rights	0.40 (0.0084)	0.09 (0.5770)	-0.01 (0.9523)	0.29 (0.0554)	0.25 (0.1089)	0.73 (<0.0001)	-0.12 (0.4550)	1.00	
Size of government	-0.04 (0.8164)	-0.54 (0.0002)	0.58 (<0.0001)	-0.44 (0.0030)	-0.41 (0.0059)	-0.01 (0.9710)	0.53 (0.0002)	0.08 (0.6030)	1.00

Parantheses contain p-values for the null hypothesis: Rho=0

Figure 1: MODEL 1 - PLOT OF RESIDUALS

Figure 2: MODEL 2 - PLOT OF RESIDUALS

Figure 3: MODEL 4 - PLOT OF RESIDUALS