CAUSALITY BETWEEN FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH: A CASE STUDY ON SELECTED MIDDLE EASTERN COUNTRIES

A Thesis

by

MASSA W. ALRAYES

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

May 2005

Major Subject: Economics

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Approved as to style and content by:

Dennis Jansen (Chair of Committee)	Genevieve Verdier (Member)
Kishore Gawande (Member)	Leonardo Auernheimer (Head of Department)

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ABSTRACT

Causality between Financial Development and
Economic Growth: A Case Study on Selected
Middle Eastern Countries. (May 2005)
Massa W. Alrayes, B.B.A, The American University of Beirut
Chair of Advisory Committee: Dr. Dennis W. Jansen

This study empirically investigates the hypothesis of causality between financial development and economic growth in seven Middle East and North African countries from a time series perspective. I use ordinary least squares and vector auto regression estimations to infer Granger Causality, after controlling for a set of non-financial variables. Results show evidence of unidirectional and bidirectional causality between financial development and economic growth in four cases, no causality in two cases, and no significant relation between financial development and economic growth in one case. The significance of the relations varies on case-specific basis. I also control for three indices of civil liberties, economic and political freedom, and find significant evidence of an impact on GDP in three out of seven countries.

DEDICATION

To the people of my nation: Arabs of the Middle East

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ACKNOWLEDGMENTS

For his willingness, considerable time, dedication, and supervision, special thanks to Dr. Dennis Jansen. This study would not have gone through without his motivation.

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CHAPTER I

INTRODUCTION

The link between financial development and cross-country economic growth rates has been widely discussed in the empirical and theoretical academic literature. Developed countries have well functioning financial markets, high GDP per capita, and moderate growth rates of GDP per capita. The less developed countries have little in the way of modern financial markets, low GDP per capita, and often low growth rates. Sizeable research finds that financial development boosts overall economic growth, which suggests evidence of causation running from financial development to economic growth.

Past work in the field asserts that the level of financial development is a good indicator of economic growth (Levine 1998; Rousseau and Wachtel 1998). Calderón and Liu (2003) find that financial development generally leads to economic growth and that short run bidirectional causality exists as well. King and Levine (1993) conclude that "finance seems to lead economic growth". Amaral and Quintin (2004) quantify the importance of finance for economic development based on a dynamic general equilibrium model, and find that finance matters only when the elasticity of substitution between capital and labor is low. On the other hand, Arestis and Demetriades (1997) note in an empirical cross-country time series analysis that "financial development can not lead to economic growth". Edison, Levine, Ricci, and Slok (2002) do not find sufficient evidence to reject the hypothesis that international financial integration does not improve economic growth even after accounting for economic, financial, institutional, and policy characters in 57 countries. One of the controversial questions is whether this correlation between financial development and growth indicates causation, and in which direction? Other issues that might be considered are long run bidirectional causation, nonlinearities, and threshold effects between financial development and economic growth. Shan, Morris and Sun (2001) study nine OECD countries and China

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This thesis conforms in style and format to *Economic Inquiry*.

in a VAR context, and find evidence of bidirectional causality in five of the countries and reverse causality in three others. Hansen and Rand (2004) analyze Granger-causality between foreign direct investment and GDP in a sample of 31 developing countries. Using estimators for heterogeneous panel data they find evidence of bi-directional causality between the ratio of foreign direct investment (FDI) to GDP and the level of GDP, and support of the hypothesis that FDI causes growth. Rioja and Valev (2004) find that finance has a strong positive influence on productivity growth in more developed economies, while in less developed ones the effect on output growth occurs primarily through capital accumulation rather than productivity acceleration. Shachmurove (2004) argued that improvements in the social living standard in the Middle East that may stir economic prosperity for the region will only be attained through fiscal and political reforms. Levine (2001) pointed out the special importance of settling the issue of causality in developing countries as the answers would help policy makes determine areas of most urgent reform.

One line of argument suggests that the abundance and variety of financial instruments and institutions reduces transaction costs for economic agents, which stirs a country's climate for trading and investment, subsequently generating economic growth. As economic development differs among countries, special concerns build up when attempting to study less developed ones. This study looks at the general issue of financial development and economic growth within seven Middle Eastern countries. The importance of the Arab region comes from the connection between countries in the form of cultural, social and demographic characteristics. In addition, economies have been historically dependent on agriculture and the export of natural resources. Nevertheless, with the trend of globalization dominating economies some countries managed to have flourishing growth through encouraging private investments and providing access to larger markets. On the other hand, other economies are still facing the challenge of liberalizing their financial systems. Barro and Sala-i-Martin (2003) finds that private investment in the region has been held back by political instability, excessive government intervention, protection and regulation, and inadequate human capital.

CHAPTER II

METHODOLOGY

This study compliments the existing empirical work on causality, and addresses the question of causality proposed by Al-Tamimi, Al-Awad, and Charif (2002) between financial development and economic growth for selected Arab countries. I use the same the same set of countries they study except Kuwait, due to the absence of statistics between 1990 -1991 because of the Gulf War. Their study addresses the long and short run causality question between financial development and real GDP growth. They suggest a strong long run relation between the two variables based on failing to reject a multivariate co-integration test at the 5% level of significance in five out of six cases. Short run causality appears weak based on the rejection of bidirectional Granger Causality test results at the 5% level of significance in seven out of ten cases. My approach varies in the sense that I do not attempt to address long-run causality and therefore, do not use co-integration techniques. However, I attempt to assess the short run causality matter in a deeper manner through: (1) carefully defining three different proxies for financial development rather than one, (2) controlling for five exogenous non financial variables after characterizing each variable in detail (3) investigating the effect of civil liberties, political, and economic freedom indices (4) estimating the relation in an OLS setting to determine the level of correlation, then examining VAR and causality (5) using the Kwiatkowski-Phillips-Schmidt-Shin test for stationary instead on the Augmented Dickey-Fuller non-stationary test.

The time period used to analyze each country varies depending on the availability of data. Countries and years of the study are the following: Algeria (1970-2003), Egypt (1960 – 2003), Bahrain (1975 – 2003), Jordan (1977– 2003), Morocco (1959 – 2003), Saudi Arabia (1972 – 2003), and Syria (1964 – 2002). The statistics for Bahrain have been collected for years preceding the period used for this study, however, GDP, Exports and Imports were collected for the first time on 1975. Observations are

collected one period before the beginning of each time span since some variables are defined as averages from previous years.

Perhaps the biggest problem of this study and the literature on finance and growth in general, is the lack of a complete database on the economic statistics of developing countries. Poor quality or even completely missing data makes it difficult to study developing countries. According to Levine 2003 "the biggest data problem involves the lack of accurate empirical proxies of 'financial development', because it is difficult to construct consistent, accurate measures of financial development for a broad cross-section of countries". Moreover, since the term "Financial Development" does not have an agreed upon definition in literature, different proxies have been used to capture it effect. Levine (2004) discusses an extensive list of answers to what financial development means. Among which are producing information and allocating capital, monitoring firms, easing exchange, and pooling savings. Levine (2002) constructs a dataset on the size, activity and efficiency of various components of the financial system. In this study, different measures of financial markets, functioning of banking systems, or measures of economic well being in a country are assumed to be equally acceptable proxies for "Financial Development", since no extensive database had been complied for detailed financial measures in the set of countries I attempt to study. I construct financial development variables for the set of countries studied following the methodology specified by Demirguc-kunt and Levine 2001.

Sources of statistics utilized for this study are mainly the International Financial Statistics online database since it proposes the most up to date, comprehensive database across time and countries, and the Energy Information Administration's official website. While the lack of comprehensive statistics creates a major obstacle for researchers in the field of finance and growth in general, studying developing regions like the Middle East further impedes efforts in that direction. One problem is that countries considered for this study have joined the IMF less than sixty years ago, so studying the region in a time series context becomes a challenge because of the low number of observations available. Another is that IMF had been constantly improving the quality of data by either

narrowing down or widening specific categories of statistics. This is why certain categories may have stopped being reported or some series may contain sudden jumps due to changes in the compiling procedures. A third problem is the Middle East had hosted several wars and major political events that reflected on the economic performance of different countries with varying effect. This makes it hard to collect consistent measures of cross country variables. Therefore, an attempt to address the question of causality between development and growth in the Middle East is very likely to produce results that can not generalize to other countries. At the same time it is not clear that results for other countries apply to the Middle East. I further expect my conclusions to be challenged by additional research in the field as improved databases come into use.

The general purpose of this paper is to assess the effect of different economic measures on real per capita GDP, a proxy for the level of economic development, and measures of financial development. I base the analysis on three sets of explanatory variables, namely six control variables, three financial development measures, and three indices that measure freedom. Control variable are inflation, government expenditure as a share of GDP, openness to trade, oil prices, and capital per capita to proxy productivity per individual (See the Appendix A for detailed descriptions).

Financial development variables are: the ratio of liquid liabilities to GDP, the ratio of private credit to GDP, and the share of deposit money bank assets from total assets. Liquid Liabilities to GDP (LIQUIDITY) is used as a broad indicator of financial intermediation. Private Credit (PRIVATE) is used as a proxy for measuring the *activity* of financial intermediaries. The relevance of this variable comes from the fact that it focuses on indicators of private sector activity in an economy as opposed to the both private and public sector when measuring the *size* of financial intermediation. DEPOSIT is defined as a measure of the *relative size* of financial intermediation. Levine and Demirguc-kunt 2001, chapter two, propose DEPOSIT as the ratio of indicators of financial sector assets to GDP, where financial sector indicators are central bank, deposit money banks, and other financial institution assets. However, due to lack of

simultaneous availability of data on all the three financial sectors, an alternative indicator was used for measuring the relative size of financial development as developed by King and Levine (1993) and Levine, Loayza, and Beck (2000). They measure the relative importance of deposit money banks assets relative to central bank assets. I modify this measure by taking the ratio of deposit money bank assets, to total, as opposed to only central bank assets, due to lake of consistent time series statistics on central bank assets. My attempt is to capture a measure of the size of bank deposits in an economy and assess its effect on a country's economic growth performance.

Countries in the Middle East vary in terms of economic advancements depending on diverse institutional characteristics (strength and flexibility of financial, level of corruption, legal, and political systems). According to Gwarthney, Holcombe and Lawson (2004) changes in institutional quality exert a positive impact on growth and countries with higher quality institutions, as measured by the Economic Freedom of the World (EFW) Index, achieve more growth per unit of investment. Consequently, I will attempt to assess the effect of a country's economic freedom, civil liberties, and political freedom on growth potential through utilizing the indices that measure those characteristics. The three indices are the Economic Freedom of the World (EFW), Political Freedom (PL), and Civil Liberties (CL) Index, because of their availability across time for this specific set of countries. EFW (by the Frazer Insitute 2005) is measure indicators of a country's economic environment through researching the following areas: 1) size of government expenditures, taxes, and enterprises, 2) legal structure property rights, 3) access to money and international trade, and 4) regulation of credit, labor, and business. Both indices are measured based on a checklist of questions derived in large measure from the Universal Declaration of Human Rights. Political freedom measures the right to vote, compete for public office, and to elect representatives who have a decisive vote on public policies. Civil liberties include the freedom to develop opinions, institutions, and personal autonomy without interference from the state (Freedom House 2003). Thus, I shall test whether controlling for those

indices produces significant OLS coefficients, and if so whether it they produce significant VAR results.

The remaining of this paper is structured as follows: First I describe the time series being investigated for each country and present graphical presentation and some preliminary statistics of variables. I provide a brief explanation of some obvious patterns in the series by indicating changes in data gathering procedures or intuitive explanations related to historical events that had affected a country's economic performance. Then, I perform the Kwiatkowski-Phillips-Schmidt-Shin unit root test to determine whether variables are stationary. Next, I attempt to find the most significant relation between economic growth and financial development through estimating three sets of Ordinary Least Squares regressions. After that, I use the model containing the most significant explanatory variables to estimate a VAR. Finally, after controlling for exogenous variables, I obtain the impulse response functions and Granger causality for the VAR and conclude my findings accordingly.

CHAPTER III

EMPIRICAL APPROACH

The general methodology I follow in evaluating the direction of causality between economic growth and financial development consists of the following steps:

1- I perform the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test to infer whether a series is stationary (See Enders 2004 for Unit Root Tests). KPSS has the null hypothesis that the variable is stationary. I do not use the Augmented-Dickey Fuller (ADF) test for stationary because it has low power due to the small number of observations on hand. However, I do take into consideration the cases where the ADF test rejects a unit root, because a rejection implies a strong conclusion with the low number of observations on hand. A unit root test is not performed for the variables: DEPOSIT and TRADE, since they are ratios and are expected to be in the range between zero and one, and thus are unlikely to have unit root. I begin by evaluating the LM statistics on a series with an intercept at the 5% significance level. If the test fails to reject that a series is stationary, I conclude that the variable does not have a unit root and is therefore stationary. In case the test with an intercept reject that a series is stationary, I perform a test with an intercept and trend. If the test rejects that a series is stationary at the 5% significance level, I conclude that the variable has a unit root and thereafter needs to be differenced.

2- I evaluate an OLS regression using two lags of all the stationary variables on the series of RGDP or the differenced series of DRGDP depending on which is stationary based on the KPSS test results (See Wooldridge 2003 for regression estimations). I include a trend in the regression in case at least one variable is stationary when testing with a constant and a trend in the KPSS test. The trend is only dropped in cases where it is highly insignificant or in case including the trend produces econometrically inconsistent results such as

a regression coefficient that is larger than one, (example Saudi Arabia). When estimating an OLS regression, I first begin by regressing RGDP, the proxy for economic development, on a set of control variables. Then, I sequentially drop the most insignificant variables until I obtain a model of a complete set of significant explanatory variables. Second, I use the last model and estimate it after adding a set of financial development variables. Then, I also sequentially drop the most insignificant variables until I obtain a model of a complete set of significant explanatory control and financial development variables. Third, I use the final model and estimate it with a set of indices. The last model in the system is that obtained at this stage, where all variables are significant after accounting for the effects of financial development variables and indices.

3- I estimate a vector auto-regression using the last model obtained in the previous step. In cases where the trend, oil prices or any of the indices are significant, I control for the effect exogenously. Then I obtain impulse response functions and granger causality from the VAR estimates and thereafter conclude the relationship between financial development and economic growth accordingly (See Kennedy 2003 for more technical information).

SAUDI ARABIA

Data for Saudi Arabia economy covers the period 1976 – 2003. I attempt to associate variations in the series to major economic and political event in that country. After the 1973 embargo, prices of oil continue rising until the early 1980's, expanding the Kingdom's GDP, exports, and capital stock. The graph of inflation show a significant drop after 1976, as the Kingdom suffered high inflation after assisting in the 1973 Arab-Israeli War through imposing the embargo. The Kingdom witnesses its first serious rebellion in 1979 when strict Islamists protest what they see as the corrupting influence of Western culture. This might explain the sudden drop in government

spending between 1978 and 1981(Encyclopedia Britannica 2005) After 1981 the government supports Iraq in its war against Iran, and takes initiative establishing modern state-of-the-art industrial cities during the peak oil revenue phase. This explains the sudden rise in the series of government spending and financial development indicators. Then petroleum prices drop, ending with the oil crash of 1986. This explains the drop in GDP near that time.

I choose the time span starting in 1976 because of an improvement in the IMF collection process thereafter. The change in data collection procedures creates an unrealistic discrepancy in figures before and after 1976, which is why I restrict the sample to post 1975 (IFS Country Notes). Within the time frame of 1976 - 2003, descriptive statistics illustrate that deposits compose an average 42% of total assets, while liquid liabilities and private credit compose an average proportion of 0.99, and 0.79 from GDP, respectively. Skewness statistics indicate that the observations on LIQUIDITY (+ 0.25) and DEPOSITS (+0.26) are skewed left, with a long positive right tail, and PRIVATE (-0.32) is skewed right. The distributions are flat for all three financial development variables. When conducting the Kwiatkowski-Phillips-Schmidt-Shin test with a constant, five out of six variables reject a unit root at the 5% significance level, except LIQUIDITY which requires a trend to confirm stationary. The trend required for LIQUIDITY seems visually obvious in the graphical representation of the variables. Moreover, I choose to difference LIQUIDITY, because the Impulse Response Function for the non-differenced variable appears explosive. INFLATION also proves to be integrated of degree zero according to the Augmented-Dickey Fuller unit root test with intercept, with a t-statistics -6.258 significantly larger than 5% significance value of -3.653. Although the variable LNOIL proves stationary on the period 1959 – 2003, the longest time period used for this study, it appears to have a unit root when tested for the restricted 28 year time period used for Saudi Arabia. I, therefore, difference the variable before using it for estimating OLS and VAR.

First, I estimate an OLS regression of RGDP on two lags of all six control variables without a trend variable*. After filtering out the non-significant control variables, the relation trims down to the following equation of significant variables.

$$\begin{aligned} RGDP = {} & 3.371 + 1.06RGDP(-1) - 0.85RGDP(-2) + 0.33CAPOP(-1) \\ & + 0.31GOVGDP(-1) - 1.23GOVGDP(-2) + e \end{aligned} \qquad [1.\ A]$$

This implies an overall negative relation between two lags of government expenditure and GDP with a cumulative coefficient of -0.92 - obtained by combining the values of coefficients on both lags –. A positive relation exists between RGDP and its two lags with a cumulative coefficient of +0.21. A positive relation also exists between the first lag of capital per capita and RGDP with a coefficient of +0.33. The signs on coefficients indicate a relation that goes in tandem with economic theory, in the sense that higher capital , and arguably lower government spending ought to enhance a country's overall productivity.

Second, I add two lags of the level of the two financial development variables and the difference of LIQUIDITY to the former OLS estimation and obtain the following reduced form equation of significant variables:

$$\begin{aligned} RGDP = {} & 4.16 + 1.27RGDP(-1) - 0.95RGDP(-2) \\ & + 0.32PRIVATE(-1) - 0.67PRIVATE(-2) + e \end{aligned} \qquad [1.B]$$

PRIVATE appears significant in the former regression. However, cumulative signs of coefficients do not seem to accord well with economic theory. Since we expect proxies for financial development to have a positive influence on RGDP, the OLS results, thus far, are disappointing. Finally, I estimate a model with both control and financial development variables after adding the two indices on political freedom and civil liberties (The Economic Freedom of the Word index had not been estimated for Saudi

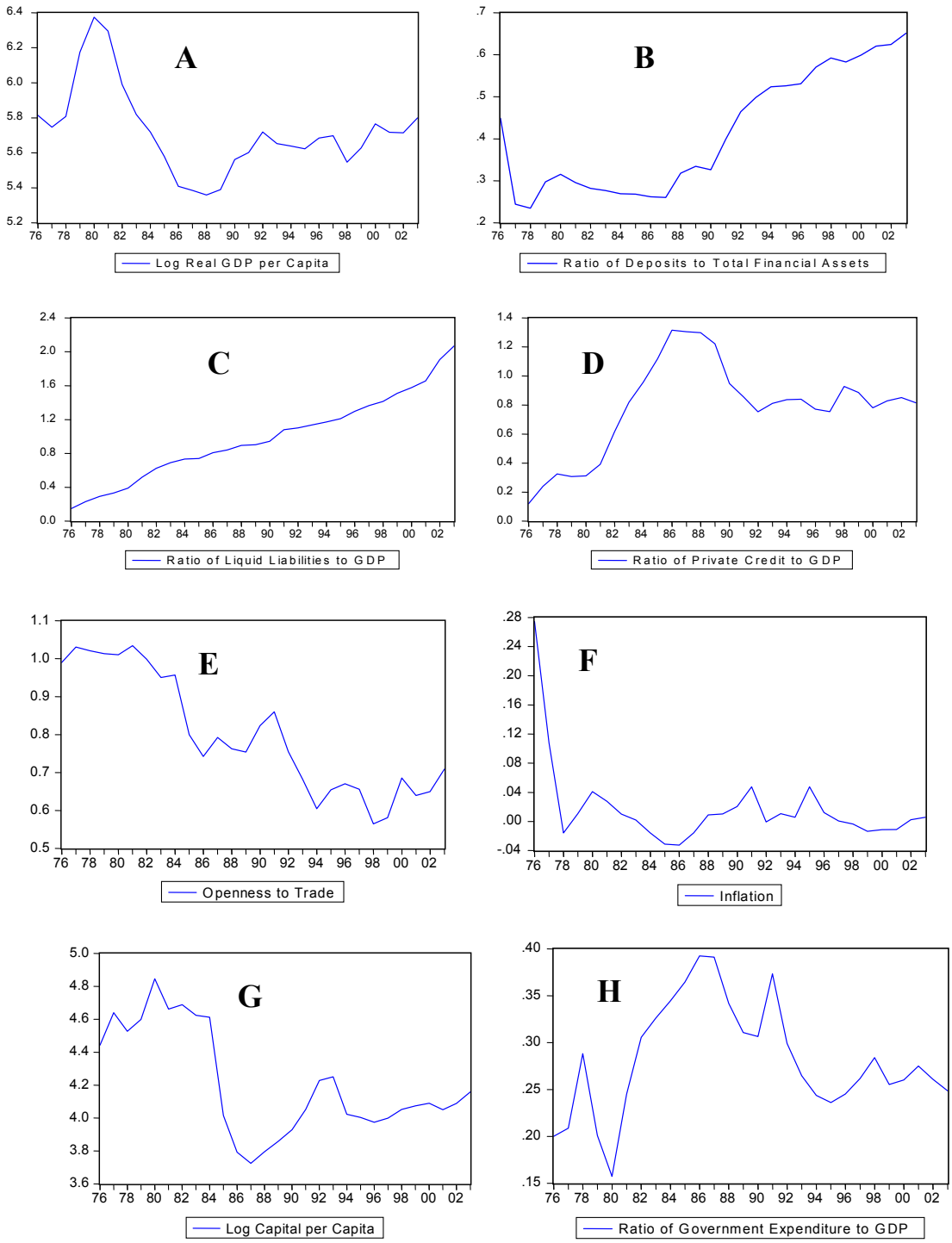
* I first estimated an OLS regression with a trend variable, and after filtering out the non-significant control and financial development variables, I obtain a relationship between RGDP and the following variables: trend, the first lag of the variables TRADE, INFLATION and RGDP, and the first and second lag of differenced LNOIL. It becomes clear that the model can not be econometrically plausible, because the coefficient on the first lag of RGDP is larger than one. It also appears that the coefficient on the trend is insignificant; therefore, I follow a different approach by dropping the trend variable.

Arabia). As the index on political freedom does not appear statistically significant, the final model explains economic growth in Saudi Arabia as a function of an index of civil liberties CL-KSA, the first and second lags of RGDP and PRIVATE.

$$\begin{aligned} RGDP = {} & 4.49 + 1.22RGDP(-1) - 0.85RGDP(-2) + 0.43PRIVATE(-1) \\ & - 0.7PRIVATE(-2) - 0.09CL\_ksa \end{aligned} \qquad [1.C]$$

The final model has a relatively strong explanatory power (R-squared of 91%) in comparison to [1] where R-squared is 88%. Using the significant variables obtained from the final OLS model, I begin the second step of the methodology by estimating a VAR (See Appendix B for VAR details). The cumulative sign on the coefficient of the explanatory variables along with the impulse response functions indicate a significantly positive effect of RGDP on its lags. According to the impulse responses the relation of RGDP to its lags appears highly significant in the first three years and declines then becomes insignificantly negative for three periods then dies out in the long run. The impulse responses show that PRIVATE appears to have a significant and increasing effect for the first two years. Four years into the shock its effect on RGDP begins to steadily decline and produces a big negative effect with confidence bands falling in the negative region. Effects neutralize in the long run and the impulse response has almost no long run effect on RGDP which insures that the series is stationary. As a final step I performed Granger Causality test. It indicates a significant bi-directional causality between RGDP and PRIVATE. Granger causality suggests that PRIVATE, as a proxy for financial development, has a significant unidirectional inverse causal relation with economic growth also referred to as “demand-following” causality. And RGDP, as a proxy for economic growth, suggests a “supply- leading” phenomenon. Table 1.C reportS P-values and Chi-squared statistics which expresses the significance of causality for each variable. The folloing pages present tables for summary statistics of variables (table1.A), and results of the KPSS test (table 1.B). Additionally, a graphical representation of all series is presented in (figure 1.A), and the impulse resposes of the VAR estimation (figure 1.B).

FIGURE 1.A -VARIABLES – SAUDI ARABIA (1976 – 2003)



A:Log real GDP per capita **B:**Deposits to total assets **C:**Liquid Liabilities to GDP **D:**Private credit to GDP
E: Openness to trade **F:** Inflation **G:** Log GDP per capita **H:** Government expenditure to GDP

TABLE 1.A– SUMMARY STATISTICS - SAUDI ARABIA

(28 observations)

	RGDP	DEPOSITS	LIQ	DLIQ	PRIV	TRAD	INF	CAPOP	GOVGDP	LNOIL
Mean	5.72	0.42	0.99	0.07	0.79	0.80	0.02	4.21	0.28	3.36
Median	5.71	0.37	0.92	0.06	0.82	0.76	0.01	4.08	0.27	3.20
Maximum	6.37	0.65	2.07	0.25	1.32	1.03	0.27	4.85	0.39	4.28
Minimum	5.36	0.24	0.15	0.01	0.12	0.56	-0.03	3.73	0.16	2.60
Std. Dev.	0.25	0.14	0.50	0.05	0.32	0.16	0.06	0.32	0.06	0.46
Skewness	1.04	0.26	0.25	1.79	-0.32	0.26	3.41	0.47	0.16	0.59
Kurtosis	4.06	1.45	2.41	6.89	2.58	1.63	15.47	1.93	2.52	2.31

TABLE 1.B – UNIT ROOT TESTS - SAUDI ARABIA

Kwiatkowski-Phillips-Schmidt-Shin test

	Intercept		Trend and Intercept	
	LM-statistics		LM-statistics	
	1%	0.739	1%	0.216
	5%	0.463	5%	0.146
	10%	0.347	10%	0.119
Saudi Arabia (28 Obs.)				
RGDP	0.215922		* 0.120883	**I(0) at 5% intercept**
INFL	* 0.371956		** 0.149449	**I(0) at 5% ADF intercept**
CAPOP	* 0.357535			**I(0) at 5% intercept**
LIQ	** 0.683745		* 0.125033	**I(0) at 5% trend**[†]
LNOIL	** 0.499705		*** 0.104302	**I(1) difference**
PRIVATE	0.248551		* 0.141854	**I(0) at 5% intercept**

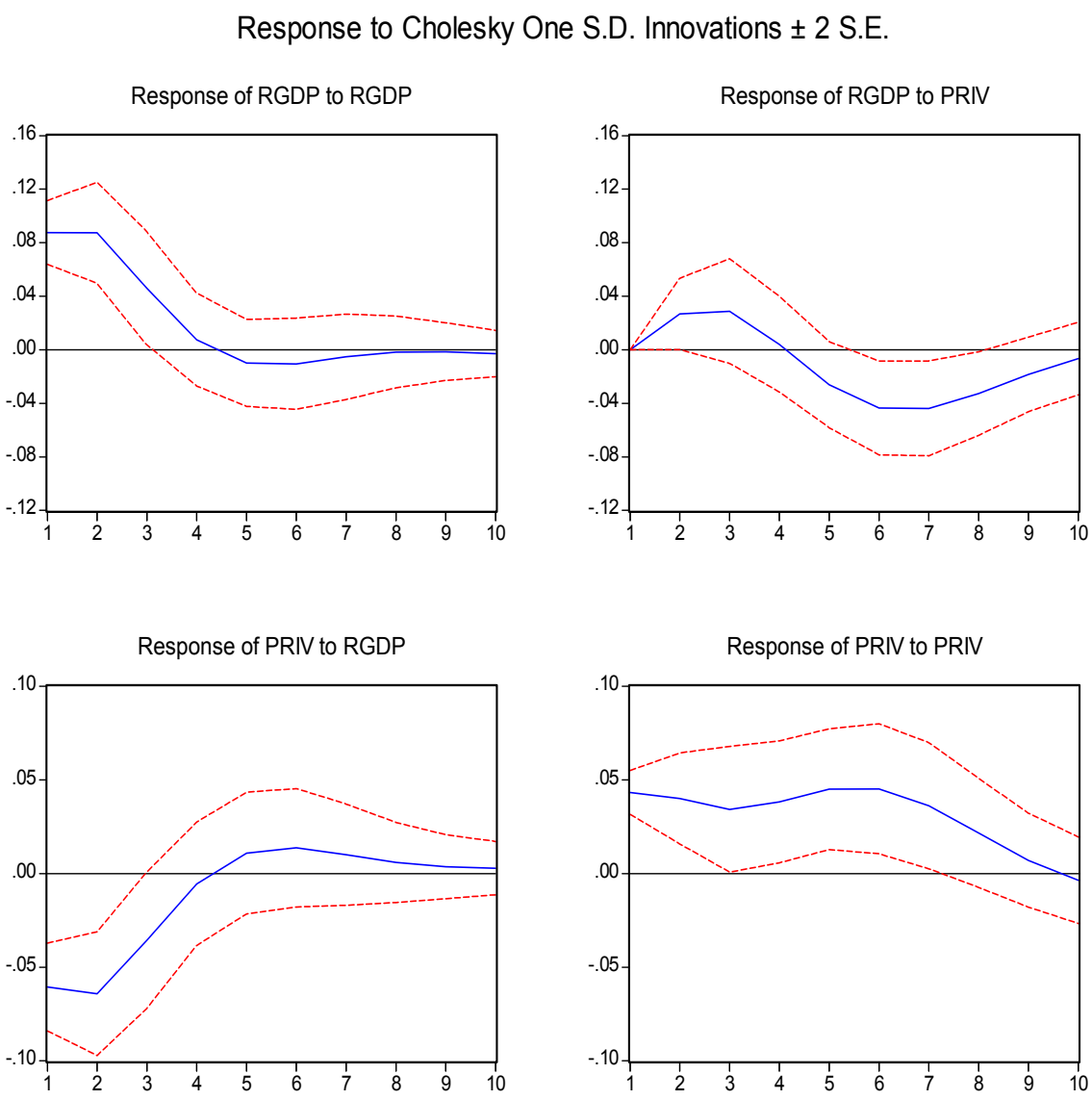
Signifcance level at the 1% leel (***), 5% level (**), 10% level (*)

TABLE1.C - GRANGER CAUSALITY - SAUDI ARABIA

Hypothesis	**Chi-Squared**	**Probability**	**Nature of Causality** (Bidirectional causality)
PRIVATE does not cause RGDP	11.74	0.003	Reject Hypothesis (Supply-leading causality)
RGDP does not cause PRIVATE	7.02	0.030	Reject Hypothesis (Demand-following causality)

[†] I difference LIQUIDITY because the impulse response function of the non differenced variable is explosive. *,**, *** indicate significance at 10%,5%, and 1% respectively.

FIGURE 1.B – IMPULSE RESPONSE FUNCTIONS – SAUDI ARABIA



SYRIA

Oil had a major impact on the Syrian economy since 1968. Revenue flows from exporting oil substantially enhanced the economy's production. Graphically this shows up as a rise in most series between 1970 and 1981. For 1978 and the early 1980s, oil-export earnings increased by over a billion dollars, as did Arab aid (Plaut - 1999). When world oil prices began to slide in 1981, aid from Arab states was reduced and workers' remittances fell. After a positive balance of payments (the current account) in 1979 and 1980, eight consecutive years of deficits followed[*]. In the mid-1980s, Damascus defaulted on its external debt. The authorities reacted by imposing ever greater restrictions on imports; the market reacted with a major growth in smuggling[**]. Inflation in prices meanwhile became an issue with reported food prices rising by a factor of about three between 1987 and 1994.

Descriptive statistics for financial development variables indicate that deposits comprise an average 40% of total assets, while liquid liabilities and private credit compose a proportion of 46% and 13% of GDP, respectively. DEPOSITS ratio fell to its lowest value of 23% in 1985, during the period of import restrictions. Skewness statistics indicate that the observations on LIQUIDITY (+ 0.15) and PRIVATE (+1.78) are skewed left, with a long right tail. The distributions are peaked for PRIVATE, approximately normal for DEPOSITS, and flat for LIQUIDITY (Table 1.A). According to the KPSS test with intercept, all variables except LIQUIDITY prove to reject the presence of a unit root at the 5% significance level of 0.463. LIQUIDITY fails to reject a unit root when performing a test with a constant; however, repeating the test with a trend makes the series stationary. This conclusion may also be confirmed by examining the series visually, and gives a reason for including a trend in the forthcoming estimations . After I regress RGDP on trend and a set of control variables with two lags, then

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[*] Unless otherwise stated, the data are from the Central Bank of Syria, Quarterly Bulletin (various issues); and the International Monetary Fund, International Financial Statistics (various issues).

[**] The Economist, Nov. 7, 1987, p. 66

sequentially eliminating the least significant, my initial OLS estimation provides the following results:

$$\begin{aligned} RGDP = &-0.55 + 0.44TREND + 1.16RGDP(-1) + 0.66INFLATION(-1) + 0.14LNOIL(-1) \\ &- 0.18LNOIL(-2) + 1.91GOVGDP(-1) - 3.9GOVGDP(-2) + e \end{aligned} \qquad [2.A]$$

The former equation shows a positive relation between RGDP and INFLATION, TREND, and the first lag of RGDP. The sign on the variable INFLATION appears unexpected, as the behaviors of consumer's prices are likely to relate negatively to that of productivity. However, government expenditure has a cumulative negative coefficient of -2, indicating that less government intervention is more desirable for enhancing the economy's productivity. This conclusion appear particularly true considering the communist ideology of the ruling Syrian Baa'th Party. LNOIL shows a cumulative negative coefficient of -0.04 which may seem troubling for an economy that generates the bulk of its national income from oil revenues. However, since Syria is considered a secondary oil exporting country ,when compared to major OPEC members, we may argue that as higher oil prices the dominate consumers are more inclined to purchase oil from countries that afford lower costs of extraction, and therefore, lower prices.This translates into a negative relation as indicate by the former equation. After adding financial development variables and filtering out non significant ones, the following equation is obtained:

$$\begin{aligned} RGDP = &-0.5 + 0.004TREND + 1.07RGDP(-1) + 0.5INFLATION(-1) + 0.069LNOIL(-1) \\ &- 0.2LNOIL(-2) + 2.73GOVGDP(-1) - 2.66GOVGDP(-2) + 0.77DEPOSITS(-1) + e \end{aligned} \qquad [2.B]$$

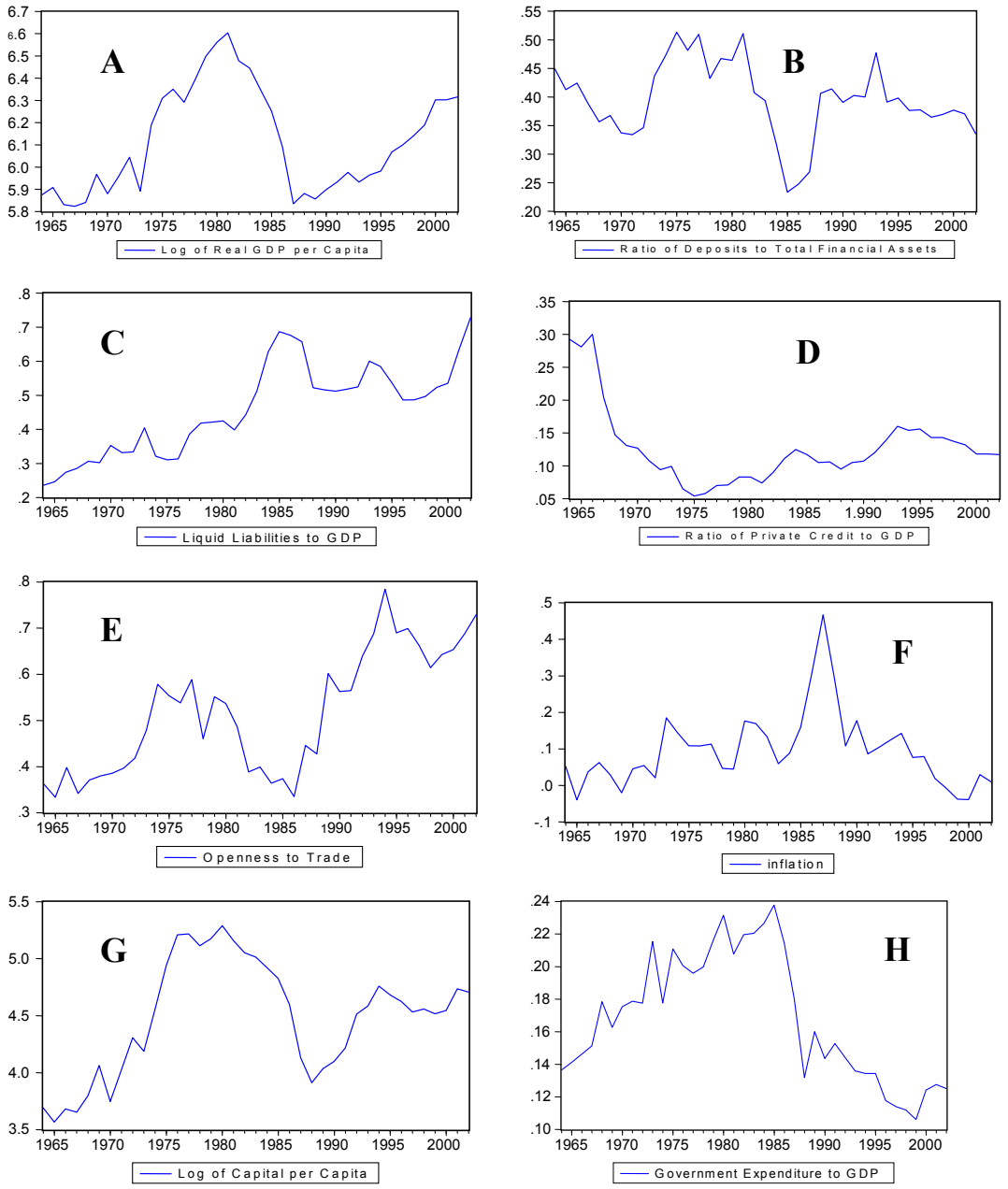
Equation [2.B] expresses the same signs of the effects obtained earlier through equation [2.A], except that the sign on government spending seem to have altered to reflect a positive coefficient of +0.07. DEPOSITS is the only financial development variable that shows a significant effect on real GDP with a positive coefficient. Finally, I estimate the former model after adding estimated indices of the country's civil liberties, political, and economic freedom. Both political and economic freedom indices prove insignificant, and the resulting model is:

$$\begin{aligned} RGDP = &1.65 + 0.004TREND + 0.823RGDP(-1) + 0.07LNOIL(-1) - 0.15LNOIL(-2) \\ &+ 1.35GOVGDP(-1) - 1.76GOVGDP(-2) + 0.62DEPOSITS - 0.086PF\_SYR + e \end{aligned} \qquad [2.C]$$

The variable government shows a negative cumulative coefficient of -0.41.The altering sign on the variable government from negative in [2.A] and [2.C] to positive in [2.B], indicates its ambiguous effect although a negative coefficient seems to have a more significant P-value 0.07 at the 10% level. A negative sign also gives a better understanding of the country's circumstances. LNOIL seems to maintain its negative effect on RGDP, and well as the political freedom index. When higher numbers on the PF_SYR index represent less freedom, we expect to have a negative coefficient on the index. Political freedom, therefore, enters the regression with a negative coefficient that is significant at the 5% level. Equations [2.B] and [2.C] have an equal explanatory power, R-squared 94%, while [2.A] has a slightly lower explanatory power with an R-squared of 92%, but all three seem to represent a fairly decent fit for data.

I then estimate a system of equations in a VAR context after controlling exogenously for the trend, prices of oil and the political freedom index (Appendix contains VAR details). Impulse response functions show a significant negative effect of GOVGDP on RGDP which carries out six periods into the future with large negative confidence bands (figure 2.B). In the long run, it continues to have a negative effect with partly positive confidence interval which approach zero toward the end. On the other hand, impulse response functions seem to show an insignificant positive effect of DEPOSITS on RGDP, which appears to become negative and insignificant in the long run with wide confidence intervals. Granger causality (table 2.C) implies no causality between the proxy for financial development and economic growth. However, a significant bidirectional causality seems to exist between government expenditure as a share of GDP and RGDP as a proxy for economic growth. The folloing pages present tables for summary statistics of variables (tables 2.A), and results of the KPSS test (table 2.B). A graphical representation of all series is presented in (figure 2.A).

FIGURE 2.A - VARIABLES♦ - SYRIA (1964 – 2002)



A: Log real GDP per capita **B:** Deposits to total assets **C:** Liquid Liabilities to GDP
D:Private credit to GDP **E:** Openness to trade **F:** Inflation
G: Log GDP per capita **H:** Government expenditure to GDP

♦ CPI rose from 16.7 in 1985 to 24.3 in 1986 in response to an inflationary period, which explains some of the soars and drops in the graphs.

TABLE 2.A – SUMMARY STATISTICS - SYRIA

(39 observations)

	RGDP	DEPOSIT	LIQ	PRIVATE	TRAD	INFL	CAPOP	GOVGDP	LNOIL
Mean	6.12	0.40	0.46	0.13	0.52	0.10	4.49	0.17	3.08
Median	6.07	0.39	0.49	0.12	0.54	0.08	4.56	0.16	3.08
Maximum	6.60	0.51	0.73	0.30	0.78	0.47	5.29	0.24	4.28
Minimum	5.82	0.23	0.24	0.05	0.33	-0.04	3.57	0.11	2.05
Std. Dev.	0.23	0.07	0.13	0.06	0.13	0.10	0.50	0.04	0.64
Skewness	0.46	-0.33	0.15	1.73	0.23	1.54	-0.20	0.18	0.04
Kurtosis	1.92	3.15	2.06	5.92	1.77	6.40	1.95	1.72	2.06

TABLE 2.B – UNIT ROOT TEST - SYRIA

Kwiatkowski-Phillips-Schmidt-Shin test

Intercept		**Trend and Intercept**	
LM-statistics		LM-statistics	
1%	0.739	1%	0.216
5%	0.463	5%	0.146
10%	0.347	10%	0.119

Syria (31 Obs.)			
RGDP	0.120886		**I(0) at 5% intercept**
INFL	0.177878		**I(0) at 5% intercept**
CAPOP	0.204576		**I(0) at 5% intercept**
LNOIL	0.21245		**I(0) at 5% intercept**
LIQ	** 0.652835	0.11494	**I(0) at 5% trend**
PRIVATE	0.20223		**I(0) at 5% intercept**

Significant at the 5% level (**)

TABLE 2.C – GRANGER CAUSALITY - SYRIA

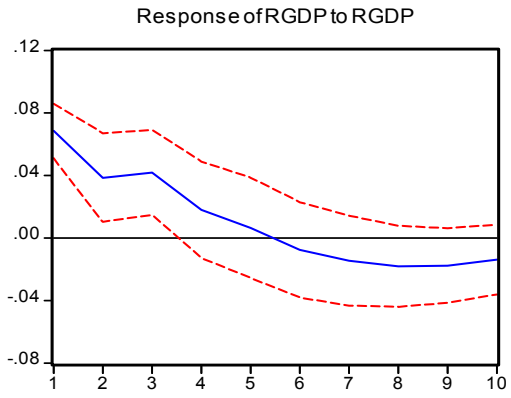
Granger Causality for Financial Development Variables

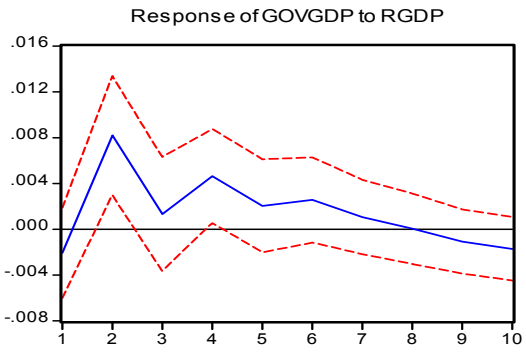
Hypothesis	**Chi-Squared**	**Probability**	**Nature of Causality** (No causality)
DEPOSIT does not cause RGDP	0.164435	0.9211	Fail to reject the hypothesis
RGDP does not cause DEPOSIT	2.363146	0.3068	Fail to reject the hypothesis

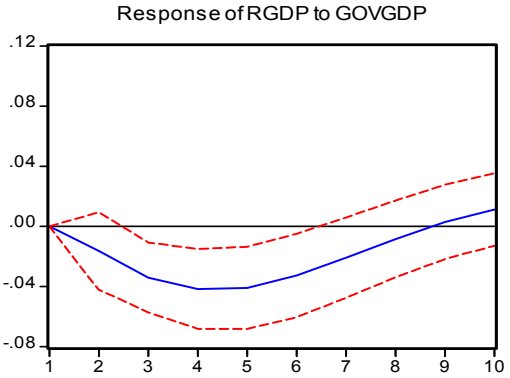
Granger Causality for Non Financial Development Variables

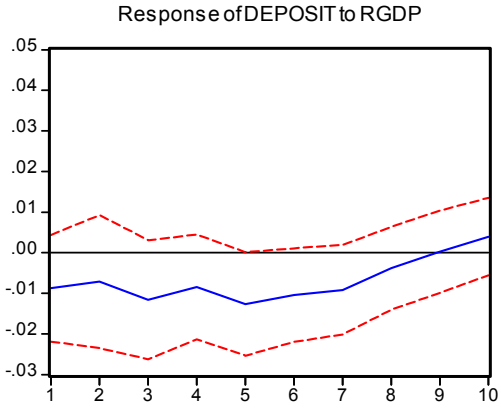
Hypothesis	**Chi- Squared**	**Probability**	**Nature of Causality** (Bidirectional Causality)
GOVGDP does not cause RGDP	17.27903	0.0002	Reject the hypothesis
RGDP does not cause GOVGDP	14.29087	0.0008	Reject the hypothesis

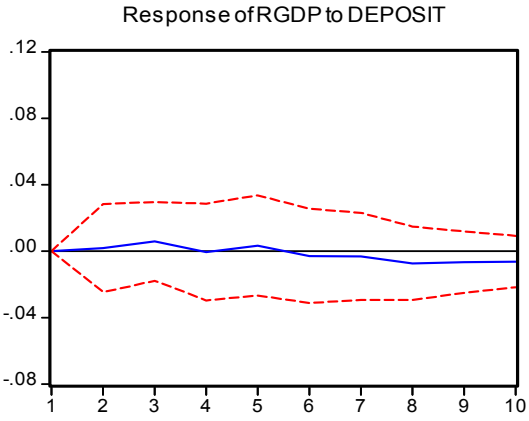
FIGURE 2.B – IMPULSE RESPONSE FUNCTIONS – SYRIA











MOROCCO

We notice a single jump in government expenditures as a share of GDP and inflation series in 1975, which is explained by the Spanish withdrawal from Western Sahara, leaving Morocco and Mauritania in dispute during that year. Also successful economic reform in the early 1980's implemented a chain of efficient resource allocation shifts, like privatization, that result in an expansion in GDP at an annual average rate of 4% during the 1980s. Exports rose from 18% of GDP in 1965 to 25 % in 1990.

Descriptive statistics show that deposits compose an average of 71% of total assets; liquid liabilities comprise an average proportion of 0.27 of GDP . The variable PRIVATE is not constructed for Morocco due to lack of sufficient data. The distance between the maximum and minimum value is larger for LIQUIDITY than that of DEPOSITS, and the respective standard deviations are 0.14 and 0.27. LNOIL varies most for Morocco with a standard deviation of 0.64, explained by large changes in oil prices. The Kurtosis statistics are less than 3 for all variables except INFLATION (3.24). This indicates a flat distribution for all variables, and a slightly peaked one for inflation. The KPSS unit root test has an LM–statistics on INFLATION and LNOIL of 0.177 and 0.306, respectively. All values fall below the 5% statistical significance level of 0.463 and are statistically insignificant. Thus, the series prove to be stationary when modeled with an intercept. I do not include a trend in the OLS estimation because variables proved to reject a unit root with out having to model them with a trend. LM-statistics on RGDP, CAPOP, and LIQ are statistically significant and should therefore be differenced in order to be stationary.

Similar to the prior analysis I continue the exercise of estimating an initial OLS regression of the growth in real GDP per capita DRGDP on the six control variables. Equation [3.A] shows the estimates of this regression, where the coefficient on inflation enters with a negative sign confirming the predicted theoretical relation between the two variables. The P-value on inflation is significant at the 5% level (0.04). The coefficient on TRADE has an overall negative sign, showing a relation that contradicts with economic theory. However, after adding financial development variables the coefficient

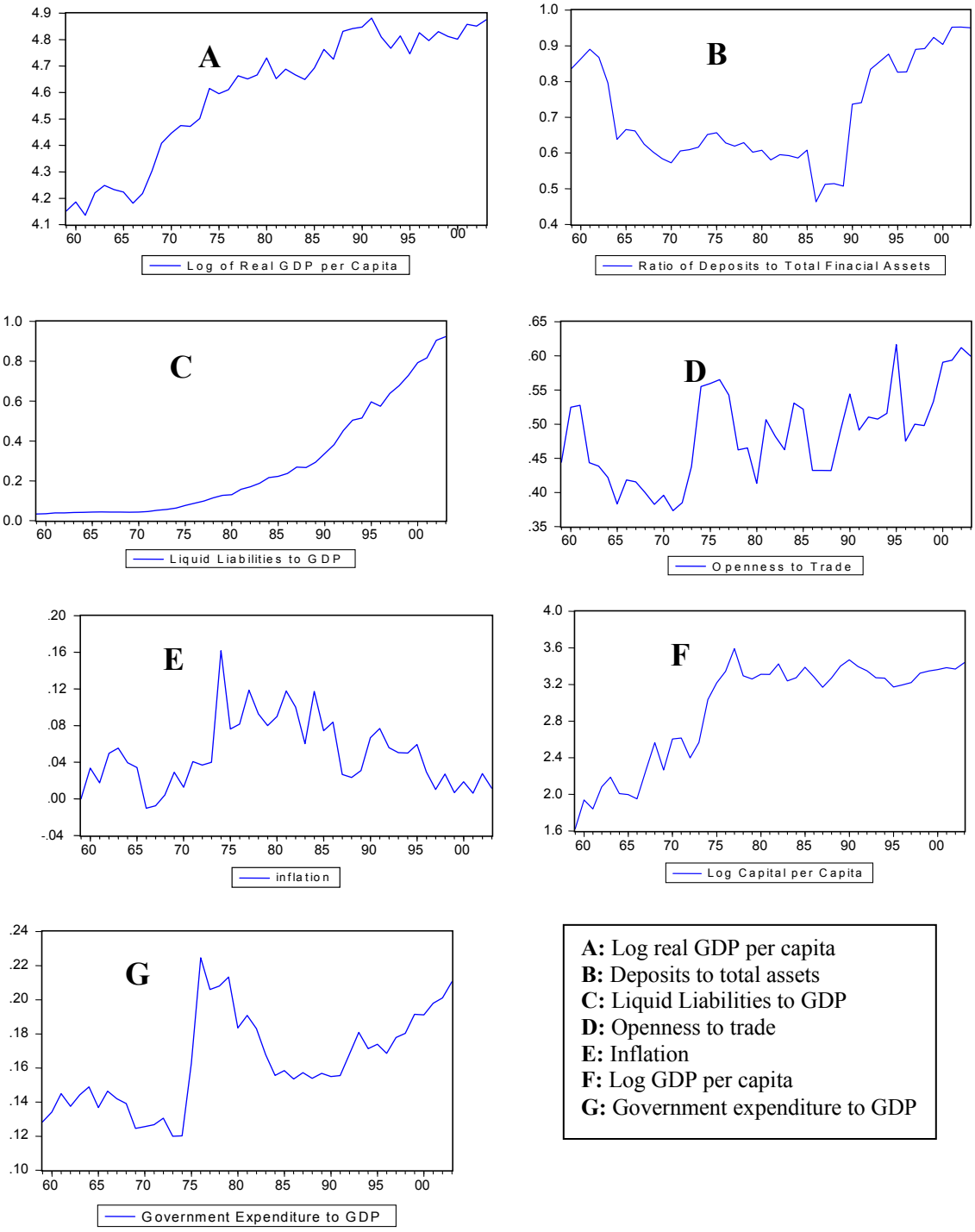
on the second lag of TRADE drops out as insignificant, while the first lag on DEPOSITS enters with a significant negative coefficient. Equation [3.B] shows that trade has a significant positive relation with the growth of RGDP, P-value (0.01). But DEPOSITS enters with an negative sign, although the number of observations used for Morocco (42) is relatively bigger than that used for other countries. All three indices of institutional quality drop out in the third OLS estimation as insignificant (see Excel file for OLS results). R-Squared on all three estimations has a relatively low value of 23%. This confirms our doubts about the direction of the relation between DEPOSITS and DRGDP suggested by the coefficients of the OLS estimation.

$$\mathrm{DRGDP} = 0.058 + 0.33\mathrm{TRADE}(-1) - 0.4\mathrm{TRADE}(-2) - 0.4\mathrm{INFLATION}(-1) + \mathrm{e} \quad [3.A]$$

$$\mathrm{DRGDP} = 0.02 + 0.38\mathrm{TRADE}(-1) - 0.76\mathrm{INFLATION}(-1) - 0.204\mathrm{DEPOSITS}(-1) + \mathrm{e} \quad [3.B]$$

VAR estimation of the former remaining set of independent variables on DRGDP produces the impulse responses in figure 3.B. Both TRADE and INFLATION have a significant negative effect on DRGDP during the first four periods, which becomes neutral in the long run. INFLATION has a significant predictable effect, with narrow confidence bands through out the ten period impulse responses. Confidence intervals for INFLATION spread in the negative region during the first two years of the shock, then distribute evenly around for the remaining periods. DEPOSITS have a negative effect with confidence intervals spreading around the central axis. TRADE has an initial positive effect with large confidence bans for the first two periods. Then the effect becomes slightly negative with smaller confidence bands and continues until the effect dies out in the long run. Finally, Granger Causality (table 3.C) indicates no significant causal relationship between DEPOSITS and DRGDP. The P-values of the relation in both directions are greater than 0.05. However, a significant supply leading relation runs from INFLATION to DRGDP with a significant P-value of 0.009, and from TRADE to DGRDP with a significant P-value of 0.03. The folloing pages present tables for summary statistics of variables (table 3.A), and results of the KPSS test (table 3.B). A graphical representation of all series is presented in (figure 3.A).

FIGURE 3.A - VARIABLES - MOROCCO (1959 – 2003)



A: Log real GDP per capita
B: Deposits to total assets
C: Liquid Liabilities to GDP
D: Openness to trade
E: Inflation
F: Log GDP per capita
G: Government expenditure to GDP

TABLE 3.A – SUMMARY STATISTICS – MOROCCO

(45 observations)

	RGDP	DEPOSIT	LIQ	TRADE	INF	CAPOP	GOVGDP	OIL
Mean	4.60	0.71	0.27	0.49	0.05	2.94	0.16	3.01
Median	4.67	0.65	0.15	0.49	0.04	3.26	0.16	3.01
Maximum	4.88	0.95	0.92	0.62	0.16	3.59	0.22	4.28
Minimum	4.14	0.46	0.03	0.37	-0.01	1.62	0.12	2.05
Std. Dev.	0.24	0.14	0.27	0.07	0.04	0.57	0.03	0.64
Skewness	-0.69	0.30	1.04	0.18	0.75	-0.92	0.33	0.23
Kurtosis	2.05	1.68	2.77	2.08	3.24	2.29	2.17	2.00

* PRIV is not defined for Morocco due to lack of data.

TABLE 3.B – UNIT ROOT TESTS - MOROCCO

Kwiatkowski-Phillips-Schmidt-Shin test

Intercept		**Trend and Intercept**	
LM-statistics		LM-statistics	
1%	0.739	1%	0.216
5%	0.463	5%	0.146
10%	0.347	10%	0.119

Morocco (42 Obs.)			**Whether Unit Root process**
RGDP	** 0.783395	** 0.193047	**I(1) - difference**
INFL	** 0.177179	** 0.177212	**I(0) at 5% intercept**
CAPOP	** 0.683241	** 0.202593	**I(1) - difference**
LNOIL	0.305876	** 0.159404	**I(0) at 5% intercept**
LIQ	0.765441	** 0.223839	**I(1) - difference**

Significance level at the 5% level (**)

TABLE 3.C – GRANGER CAUSALITY – MOROCCO

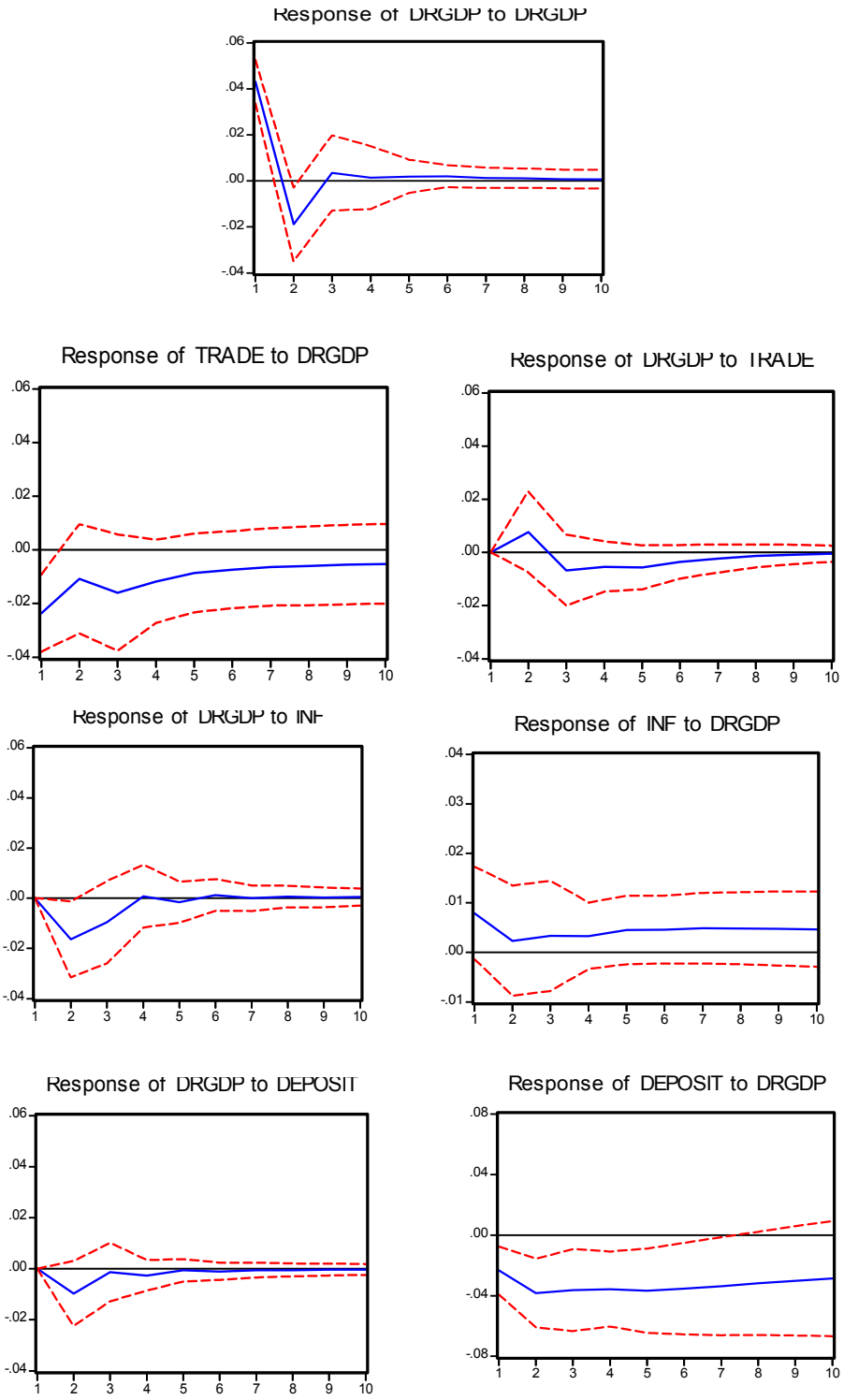
Granger Causality for Financial Development Variables

Hypothesis	**Chi- Squared**	**Probability**	**Nature of Causality** (No Causality)
DEPOSIT Causes DRGDP	5.38	0.07	Fail to reject hypothesis
DRGDP Does not Cause DEPOSIT	4.47	0.11	Fail to reject hypothesis

Granger Causality for Non Financial Development Variables

Hypothesis	**Chi- Squared**	**Probability**	**Nature of Causality**
INFLATION causes DRGDP	9.347845	0.0093	Reject hypothesis
DRGDP does not cause INFLATION	0.634419	0.7282	Fail to reject hypothesis
TRADE causes DRGDP	6.585733	0.0371	Reject hypothesis
DRGDP does not cause TRADE	3.123868	0.2097	Fail to reject hypothesis

FIGURE 3.B – IMPULSE RESPONSE FUNCTIONS - MOROCCO



EGYPT

A large proportion of Egyptian resources were devoted to preparing the country for warfare with Israel on 1967 and 1973 and later to rebuilding after the destruction incurred in the Arab-Israeli wars. This explains the rise in GDP and government expenditures series during that period. Egypt suffered inflation and heavy losses from supporting the republican government in Yemen between 1962 and 1967. A process of privatization that began in the mid-1990s and moved substantial public sector assets into private sector hands has slowed since the year 2000. The Egyptian economy relies heavily on tourism, oil and gas, and Suez Canal revenues, all of which are vulnerable to surrounding regional events (The U.S. Department of State, 2005).

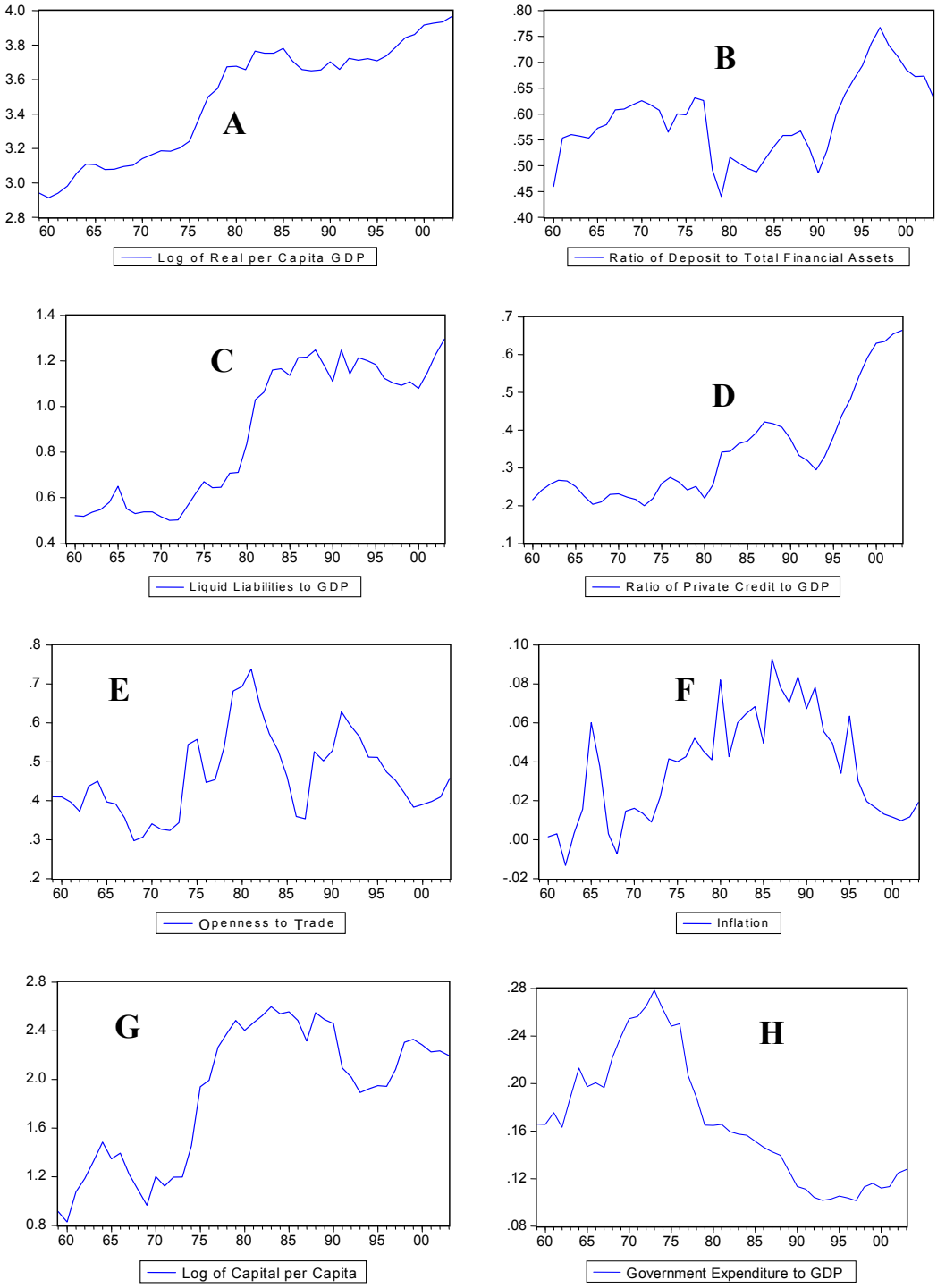
Descriptive statistics cover the time frame of 1960 – 2003. Median Statistics show that deposits constitute 59% of total assets, while liquid liabilities and private credit compose a median proportion of 2.1 and 0.29 of GDP. Skewness statistics indicate that RGDP (-0.34), LIQUIDITY (-0.13), and CAPOP (-0.42) are skewed right with a large left tail indicate by the low Kurtosis values. All other variables are skewed left, with a long positive right tail. LIQUIDITY is the only variables with a high standard deviation of 0.89, relative other variable's standard deviations. The KPSS test results with a trend indicate that the LM-statistics on PRIVATE (0.143) and LIQUIDITY (0.110) fail to reject the null hypothesis that the variable is stationary at the 5% significance level of 0.146. LM-statistics on INFLATION (0.27) and LNOIL (0.3) also fail to reject the null hypothesis at the 5% significance level of 0.463 when modeled with a constant. CAPOP and RGDP reject stationarity when modeled with an intercept and trend, and are, thereafter, differenced. I exclude the trend component from the regression because I difference two variables.

$$\begin{aligned}\mathrm{DRGDP} = {} & -0.017 + 0.12\mathrm{TRADE}(-1) - 0.59\mathrm{INFLATION}(-1) \\ & + 0.04\mathrm{DCAPOP}(-1) + 0.13\mathrm{DCAPOP}(-2) + \mathrm{e}\end{aligned} \qquad [4.A]$$

$$\begin{aligned}DRGDP = {} & -0.145 - 0.164TRADE(-1) + 0.03DCAPOP(-1) + 0.12DCAPOP(-2) \\ & - 0.049LIQUIDITY + 0.22DEPOSITS + e\end{aligned} \qquad [4.B]$$

The coefficient on the difference in capital per capita in the first OLS estimation equation [4.A] is +0.04 and significant, and so is the first lag on TRADE +0.12, indicating a positive and significant effect on the growth in RGDP. In the same equation INFLATION has a negative and significant coefficient with a P-value of 0.03. After adding financial development variables, INFLATION drops out as insignificant, while DEPOSITS and LIQUIDITY enter with significant P-values of 0.06 and 0.02 in equation [4.B]. None of the institutional quality indices provide evidence of significance. Therefore, equation [4.B] provides evidence of the most significant variables that are worth estimating in a VAR system. Impulse response functions indicate that all three variables: TRADE, DCAPOP, and DEPOSITS have a significant positive effect on the growth of RGDP. The effect of DEPOSITS and TRADE rise gradually during the first four years with wide confidence bands in the positive significance region. The effect of DEPOSITS shrinks moderately on the fifth year then approaches zero but remains positive and significant until the last graphed period. The effect of TRADE approaches zero in the long run. Growth in capital per capita has a large initial positive effect on the growth of RGDP during the first four years, with broad confidence bands, and then declines steadily until it becomes negative in the long run (figure 4.B). LIQUIDITY, however, has an initial positive and insignificant which becomes negative and more significant in the long run. Granger Causality (table 4.C) suggests that financial institutions contribute to economic development through a "supply-leading" causal relation between DEPOSITS and the growth of RGDP, and "bidirectional" causality between LIQUIDITY and RGDP. Inverse causality does prove statistically significant for DEPOSITS because Chi-Squared values are not large enough. The folloing pages present tables for summary statistics of variables (table 4.A), and results of the KPSS test (table 4.B). A graphical representation of all series is presented in (figure 4.A).

FIGURE 4.A - VARIABLES - EGYPT (1960 – 2003)



A: Log real GDP per capita **B:** Deposits to total assets **C:** Liquid Liabilities to GDP
D: Private credit to GDP **E:** Openness to trade **F:** Inflation
G: Log GDP per capita **H:** Government expenditure to GDP

TABLE 4.A – SUMMARY STATISTICS – EGYPT

(45 observations)

	RGDP	DEPOSIT	LIQ	PRIVATE	TRADE	INF	CAPOP	GOVGDP	LNOIL
Mean	3.49	0.59	1.52	0.34	0.46	0.04	1.89	0.17	3.01
Median	3.66	0.59	2.10	0.29	0.45	0.04	2.02	0.16	3.01
Maximum	3.97	0.77	2.64	0.66	0.74	0.09	2.60	0.28	4.28
Minimum	2.91	0.44	0.50	0.20	0.30	-0.01	0.83	0.10	2.05
Std. Dev.	0.33	0.08	0.89	0.13	0.11	0.03	0.57	0.05	0.64
Skewness	-0.34	0.28	-0.13	1.14	0.64	0.20	-0.42	0.51	0.23
Kurtosis	1.56	2.56	1.10	3.25	2.75	1.96	1.67	2.11	2.00

TABLE 4.B – UNIT ROOT TESTS - EGYPT

Kwiatkowski-Phillips-Schmidt-Shin test

Intercept		**Trend and Intercept**	
LM-statistics		LM-statistics	
1%	0.739	1%	0.216
5%	0.463	5%	0.146
10%	0.347	10%	0.119

Egypt (42 Obs.)			**Whether Unit Root process**
RGDP	*** 0.79916	* 0.130025	**I(1) - difference**
INFL	0.278357		**I(0) at 5% Intercept**
			I(1) at 5%, I(0) @1%
CAPOP	** 0.571294	** 0.155374	**- Difference -**
LNOIL	0.305876	** 0.159404	**I(0) at 5% Intercept**
LIQ	*** 0.749586	0.110384	**I(0) at 5% trend**
PRIVATE	** 0.694023	* 0.143304	**I(0) at 5% trend**

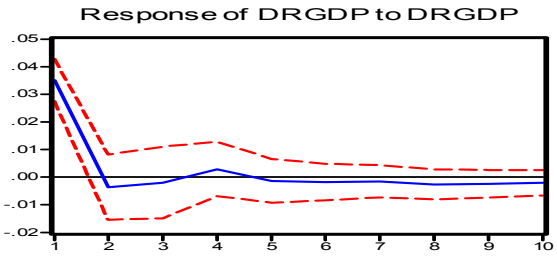
Significant at the 1% level (***), at the 10% level (**) , at the 5% (*)

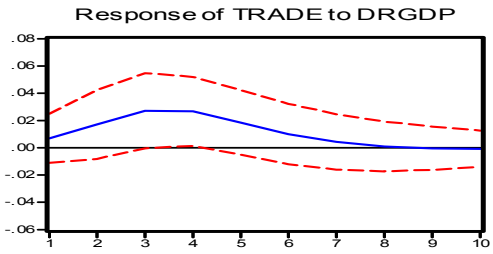
TABLE 4.C – GRANGER CAUSALITY – EGYPT

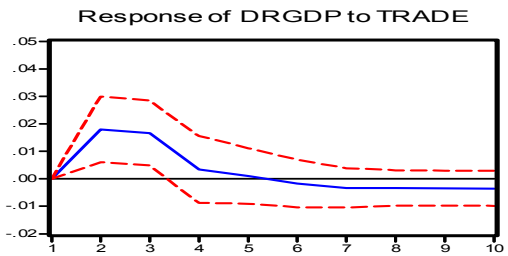
Granger Causality for Financial Development Variables

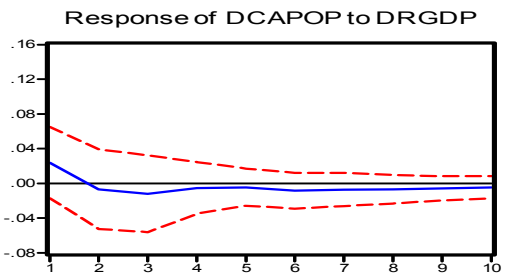
Hypothesis	**Chi-Squared**	**Probability**	**Nature of Causality** (Supply-leading and Bidirectional causality)
DEPOSIT does not cause DRGDP	9.898	0.007	Reject hypothesis (Supply-leading causality)
DRGDP does not cause DEPOSITS	3.663	0.160	Fail to reject hypothesis
LIQUIDITY does not cause DRGDP	7.599	0.022	Reject hypothesis (Bidirectional causality)
DRGDP does not cause LIQUIDITY	9.211	0.010	Reject hypothesis (Bidirectional causality)
Granger Causality for Non Financial Development Variables			
DCAPOP does not cause DRGDP	9.737	0.008	Reject hypothesis
DRGDP does not cause DCAPOP	3.389	0.184	Fail to reject hypothesis
TRADE does not cause DRGDP	6.869	0.032	Reject hypothesis
DRGDP does not cause TRADE	1.826	0.401	Fail to reject hypothesis

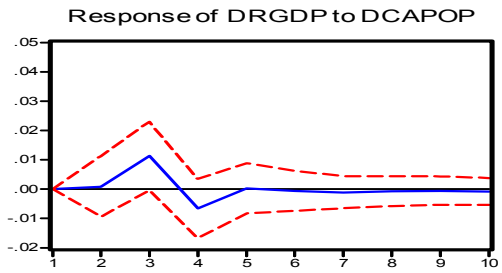
FIGURE 4.B – IMPULSE RESPONSE FUNCTIONS - EGYPT

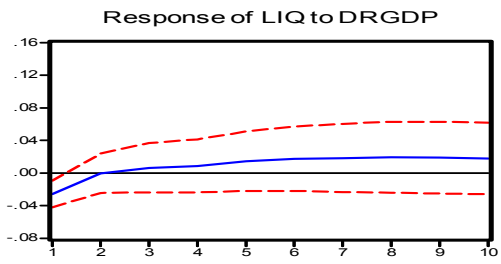


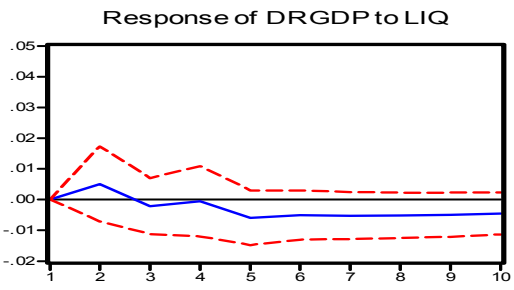


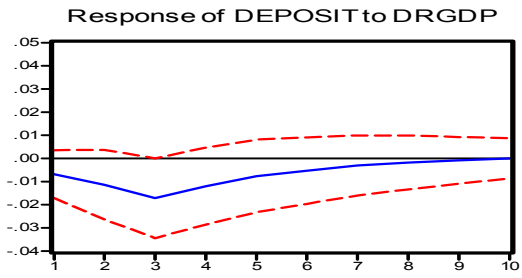


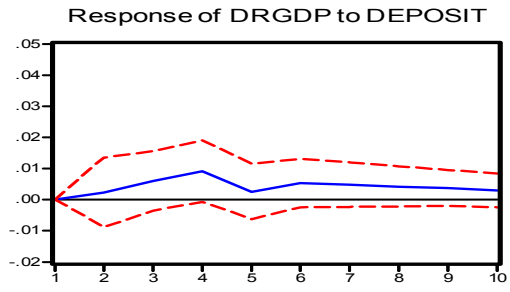












ALGERIA

Graphs for Algeria show inflation and a major slowdown in the country's economic activities between 1990 and 1999 in response to a civil war during that period. The fall in oil and natural gas prices also seems to reflect a dip in the openness to trade graph as natural gas composes a substantial portion of Algerian exports. We also realize this feature when looking at the TRADE series of Saudi Arabia. The country is studied in the time frame of 1970-2003. Summary statistics indicate that deposits compose a median of 82% of total assets. Liquid liabilities and private credit correspondingly comprise a median proportion of 0.89 and 0.57 to RGDP. All variables except PRIVATE and INFLATION are skewed right as indicate by the negative Skewness values. Distributions are flat for all three financial development variables as indicate by the low Kurtosis statistics. LNOIL has the highest standard deviation among all variables reflected by the embargo during 1970's and oil price during 1980's. All variables fail to reject stationarity because LM-statistic is less than the 5% significance level of 0.463 when modeled with an intercept and 0.146 when modeled with a trend.

$$\mathrm{RGDP} = 6 + 0.03\mathrm{TREND} - 0.16\mathrm{RGDP}(-1) - 0.38\mathrm{RGDP}(-2) + 0.16\mathrm{LNOIL} + 0.58\mathrm{CAPOP}(-1) + \mathrm{e} \quad [5.\mathrm{A}]$$

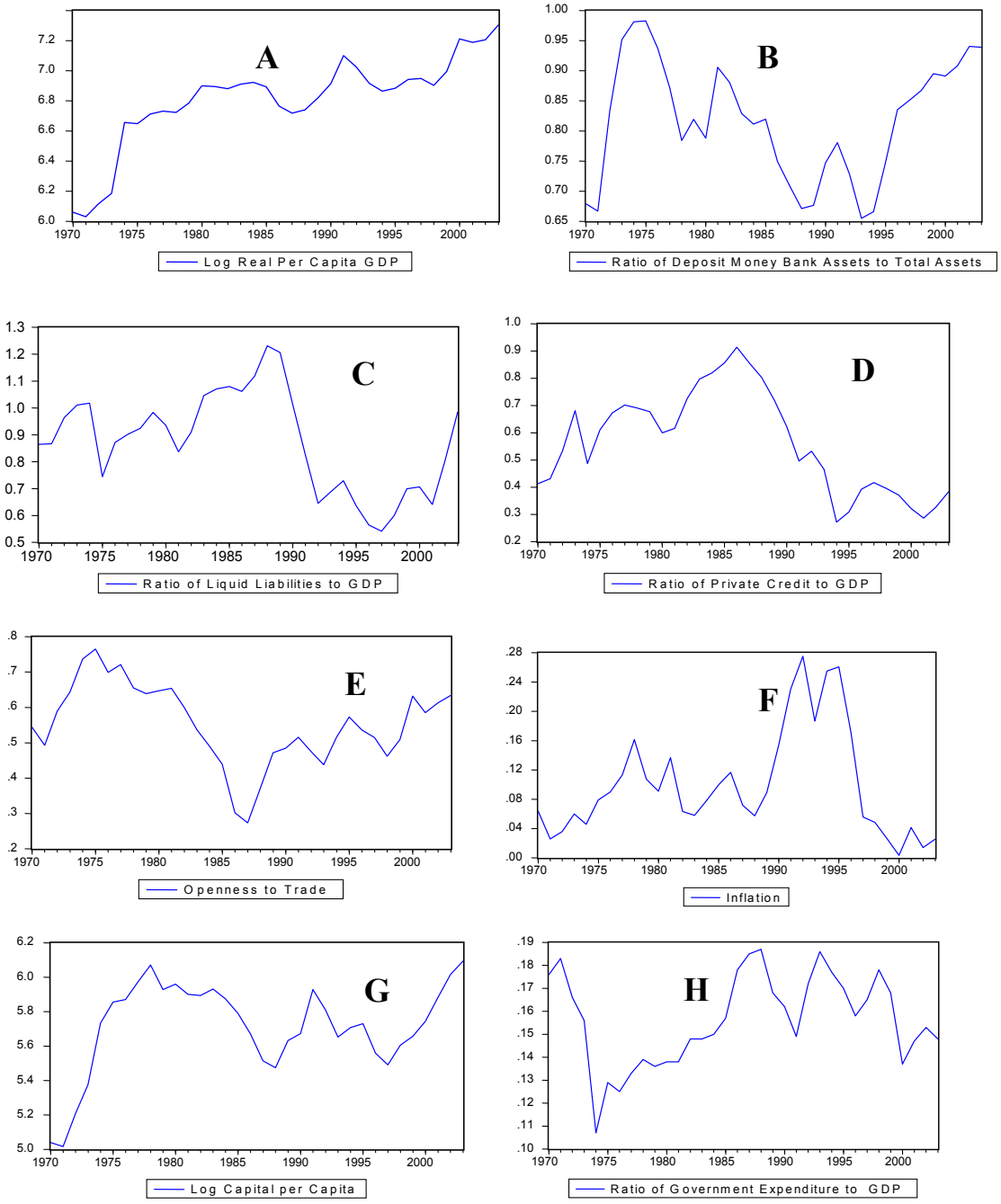
$$\mathrm{RGDP} = 4.9 + 0.03\mathrm{TREND} - 0.29\mathrm{RGDP}(-1) + 0.12\mathrm{LNOIL} + 0.41\mathrm{CAPOP}(-1) + 0.21\mathrm{LIQUIDITY}(-1) + 0.54\mathrm{DEPOSITS}(-1) + \mathrm{e} \quad [5.\mathrm{B}]$$

$$\mathrm{RGDP} = 2.9 + 0.03\mathrm{TREND} + 0.42\mathrm{CAPOP}(-1) + 0.3\mathrm{LIQUIDITY}(-1) + 0.72\mathrm{DEPOSITS}(-1) + 0.027\mathrm{CL\_Alger} + \mathrm{e} \quad [5.\mathrm{C}]$$

Similar to the preceding analysis I continue the exercise of estimating an initial OLS regression of the RGDP on the six control variables. I reduce the estimation to a system of the most significant variables (equation 5.A), add financial development variables (equation 5.B), then including institutional indices. Equation 5.C states that the first lag on DEPOSTIS, LIQUIDITY, capital per capita, and the index of civil liberties have a significant positive effect on RGDP, with significant P-values at the 5% level. The positive sign on civil liberties index indicates that lower freedom of civilians has a significant positive effect on RGDP, because higher numbers on the index denote less freedom. R-squared has a fairly high explanatory power of 93%.

Impulse response functions (figure 5.B) show an initial significant positive effect of DEPOSITS on RGDP with wide positive confidence bands, it dies out to zero, and becomes slightly negative in the long run. LIQUIDITY also has an initial positive effect, but its confidence bands are narrower than those for DEPOSITS. The effect dies out in the fifth period and becomes insignificantly negative in the long run. CAPOP has a highly significant initial positive effect, it declines when approaching the fifth period, turns into a negative effect with wide confidence intervals between the fifth and seventh period, and finally becomes insignificantly positive in the log run. Granger causality (table 5.C) suggests that financial development and economic growth have significant bidirectional causality in Algeria, if LIQUIDITY is used to proxy financial development. When DEPOSITS is used to proxy financial development causality goes in one direction, indicating that financial development exist after real growth had fully takes place "demand – following" phenomenon . The folloing pages present tables for summary statistics of variables (table 5.A), and results of the KPSS test (table 5.B). A graphical representation of all series of Algeria is presented in (figure 5.A).

FIGURE 5.A - VARIABLES - ALGERIA (1970-2003)



A: Log real GDP per capita **B:** Deposits to total assets **C:** Liquid Liabilities to GDP
D: Private credit to GD **E:** Openness to trade **F:** Inflation
G: Log GDP per capita **H:** Government expenditure to GDP

TABLE 5.A – SUMMARY STATISTICS - ALGERIA

(34 observations)

	RGDP	DEPOSIT	LIQ	PRIVATE	TRAD	INFL	CAPOP	GOVGDP	LNOIL
Mean	6.81	0.82	0.87	0.56	0.55	0.10	5.71	0.16	2.63
Median	6.89	0.82	0.89	0.57	0.54	0.08	5.74	0.16	2.82
Maximum	7.30	0.98	1.23	0.91	0.77	0.28	6.09	0.19	3.53
Minimum	6.03	0.65	0.54	0.27	0.27	0.00	5.02	0.11	0.30
Std. Dev.	0.31	0.10	0.18	0.19	0.11	0.07	0.27	0.02	0.85
Skewness	-1.18	-0.11	-0.06	0.13	-0.37	1.03	-1.04	-0.31	-1.61
Kurtosis	4.20	1.90	2.10	1.83	2.97	3.14	3.74	2.49	4.79

TABLE 5.B – UNIT ROOT TESTS - ALGERIA

Kwiatkowski-Phillips-Schmidt-Shin test

	Intercept		**Trend and Intercept**	
	LM-statistics		LM-statistics	
	1%	0.739	1%	0.216
	5%	0.463	5%	0.146
	10%	0.347	10%	0.119
Algeria (32 Obs.)				
RGDP		** 0.6412	* 0.1254	**I(0) at 5% trend**
INFL		0.126	0.108894	**I(0) at 5% Intercept**
CAPOP		0.169781	0.108123	**I(0) at 5% Intercept**
LNOIL		0.163037	**0.142791	**I(0) at 5% Intercept**
LIQ		0.292531	0.113345	**I(0) at 5% Intercept**
PRIVATE		0.343878	** 0.170716	**I(0) at 5% Intercept**

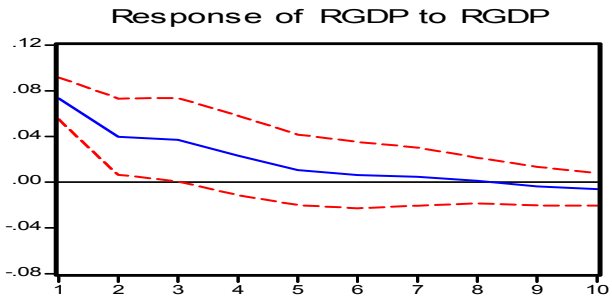
Significant at the 5% level (**), at the 10% level (*)

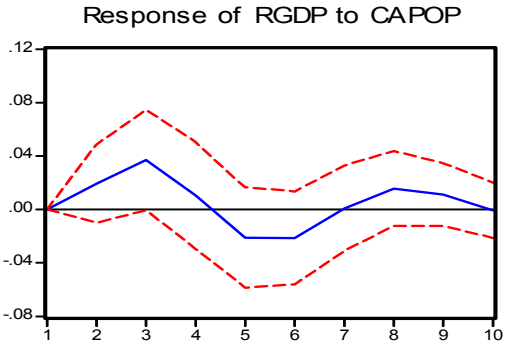
TABLE 5.C – GRANGER CAUSALITY – ALGERIA

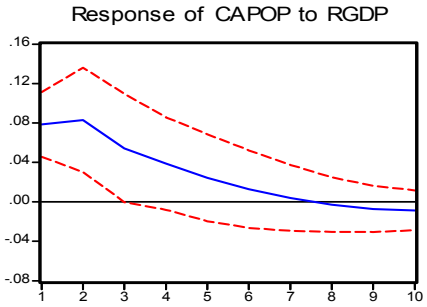
Granger Causality for Financial Development Variables

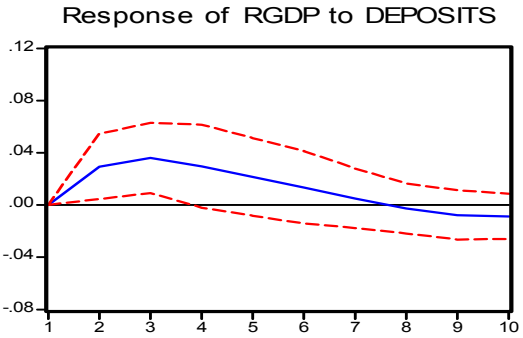
Hypothesis	**Chi-Squared**	**Probability**	**Nature of Causality** (Bi-directional & Unidirectional)
DEPOSIT does not cause RGDP	12.478	0.002	Reject hypothesis (demand following causality)
LIQUIDITY does not cause RGDP	10.784	0.005	Reject hypothesis
RGDP does not cause DEPOSIT	0.435	0.804	Fail to reject hypothesis
RGDP does not cause LIQUIDITY	57.434	0.000	Reject hypothesis (Bidirectional causality)
Granger Causality for Non Financial Development Variables			
CAPOP cause RGDP	10.677	0.005	Reject hypothesis
RGDP does not cause CAPOP	0.080	0.961	Fail to reject hypothesis

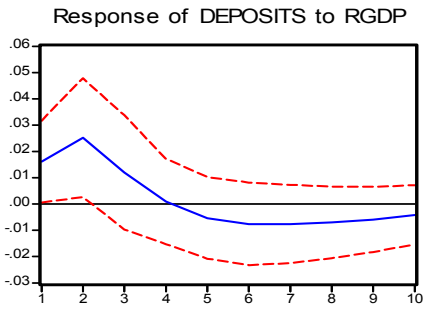
FIGURE 5.B – IMPULSE RESPONSE FUNCTIONS – ALGERIA

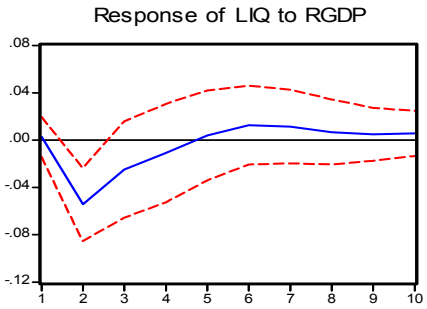


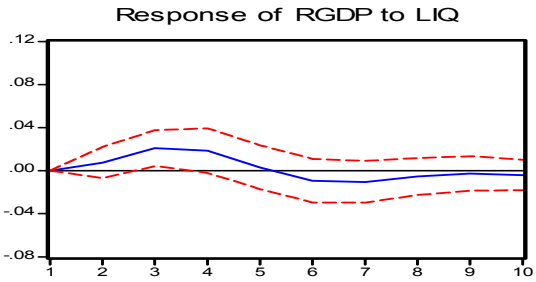












JORDAN

The Jordanian economy shows stable growth from the years 1977 till 1988. As Jordan supported Iraq during its war with Iran it reaped sizable economic benefits from its standpoint. In addition, the economic sector witnessed significant progress during the late 1970's and early 1980's as Arab funding supports and transfer by immigrates increased substantially during the period of high oil prices. However, the country experienced a large devaluation in its currency in the late 1980's leading it to a serious economic crisis that was worsened by the 1990 gulf war. After signing the 1994 peace treaty with Israel, the Kingdom initiated steady measures of reform which explain lower volatility in the graphs as they approach 2003. I analyze the time frame of 1977-2003. Summary statistics indicate that deposits compose a median of 76% of total assets. Liquid liabilities and private credit, respectively, comprise a median proportion of 1.89 and 0.99 to RGDP. Skewness statistics indicate that the observations on LIQUIDITY (+ 0.1) and DEPOSITS (+0.03) are skewed left with a long positive right tail and flat distributions. PRIVATE (-1.07) is skewed right, with a peaked distribution indicate by a 3.13 kurtosis.

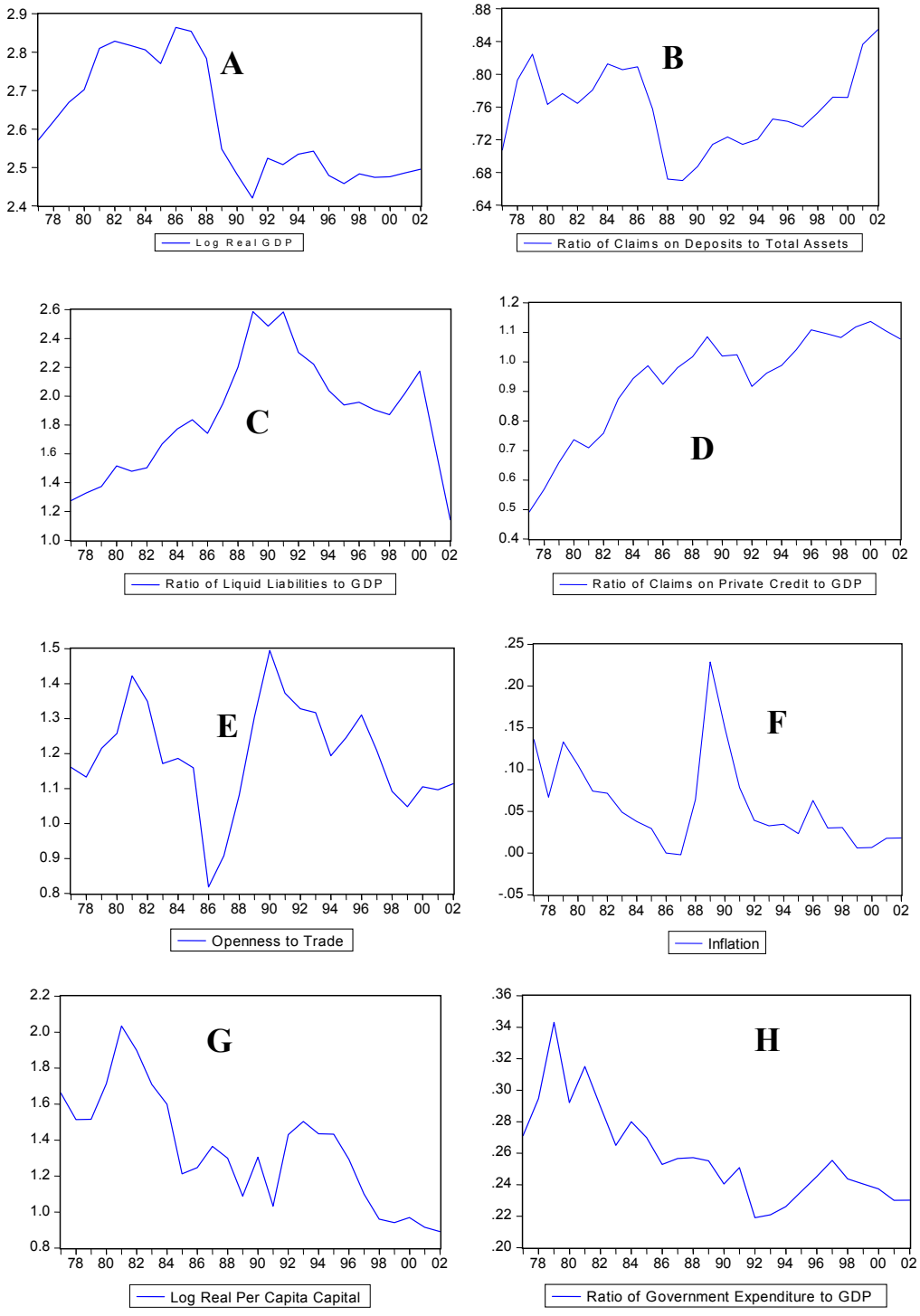
All variables fail to reject stationarity because LM-statistic is less than the 5% significance level of 0.463 when modeled with an intercept and 0.146 when modeled with a trend. PRIVATE strongly rejects a unit root when modeled with an intercept using the Augmented-Dickey Fuller test. t-statistics is -3.147 larger than the 5% significance value of -2.96. I continue the exercise of estimating an initial OLS regression of the RGDP on the six control variables then reduce the estimation to a system of the most significant variables (equation 6.A), add financial development variables. Equation 6.B represents the final OLS model since none of the institutional indices prove significant. It states that the first lag on RGDP, TRADE, and DEPOSOTS have a significant positive effect in explaining RGDP, with cumulative coefficients of 0.49, 1.33, and 0.16 respectively. R-squared has a fairly high explanatory power of 95%.

$$RGDP = 0.71 - 0.0004TREND - 0.4TRADE(-1) + 0.317TRADE(-2) + 0.149LNOIL + e \qquad [6.A]$$

$$\begin{aligned}\text{RGDP} = {} & 0.23 - 0.007\text{TREND} - 0.09\text{TRADE}(-1) + 0.25\text{TRADE}(-2) \\ & + 0.49\text{RGDP}(-1) + 0.37\text{DEPOSITS}(-1) + 0.96\text{DEPOSITS}(-2) + \text{e}\end{aligned} \qquad [6.B]$$

Impulse response functions (figure 6.B) show an initial significant positive effect of DEPOSITS on RGDP with narrow positive confidence bands at first. The effect becomes larger with wider confidence intervals from the second to the ninth period, and then becomes insignificantly negative with wide confidence bands in the long run. TRADE has a slightly negative effect during the fist two periods; it becomes positive and significant with wide confidence bands for seven periods and dies out towards then of the last graphed period. Granger causality (table 6.C) suggests that DEPOSITS, as a proxy for financial development, has a significant unidirectional causal relation with economic growth in a "supply-leading" form. TRADE also proves to have a high value for the Chi-squared statistics, indicating that it causes RGDP. The folloing pages present tables for summary statistics of variables (table 6.A), and results of the KPSS test (table 6.B). A graphical representation of all series is presented in (figure 6.A).

FIGURE 6.A - VARIABLES – JORDAN (1977– 2003)



A: Log real GDP per capita
B: Deposits to total assets
C: Liquid Liabilities to GDP
D: Private credit to GDP
E: Openness to trade
F: Inflation
G: Log GDP per capita
H: Government expenditure to GDP

TABLE 6.A – SUMMARY STATISTICS - JORDAN

(26 observations)

	RGDP	DEPOSIT	LIQ	PRIVATE	TRAD	INF	CAPOP	GOVGDP	LNOIL
Mean	2.62	0.76	1.87	0.94	1.20	0.06	1.35	0.26	2.96
Median	2.55	0.76	1.89	0.99	1.19	0.04	1.33	0.25	2.89
Maximum	2.86	0.85	2.59	1.14	1.49	0.23	2.03	0.34	3.53
Minimum	2.42	0.67	1.14	0.49	0.82	0.00	0.89	0.22	2.31
Std. Dev.	0.15	0.05	0.40	0.18	0.15	0.05	0.31	0.03	0.35
Skewness	0.46	0.03	0.10	-1.07	-0.38	1.45	0.30	1.06	0.08
Kurtosis	1.58	2.32	2.28	3.13	3.38	4.93	2.36	3.84	1.94

TABLE 6.B – UNIT ROOT TESTS - JORDAN

Kwiatkowski-Phillips-Schmidt-Shin test

Intercept		**Trend and Intercept**	
LM-statistics		LM-statistics	
1%	0.739	1%	0.216
5%	0.463	5%	0.146
10%	0.347	10%	0.119

Jordan (24 Obs.)			
RGDP	** 0.468481	0.100176	**I(0) at 5% trend**
INFL	0.315225	0.062185	**I(0) at 5% intercept**
CAPOP	** 0.555253	0.059828	**I(0) at 5% trend**
LNOIL	** 0.602848	0.106874	**I(0) at 5% trend**
LIQ	0.289706	0.185005	**I(0) at 5% intercept**
PRIVATE	** 0.648444	0.166513	**I(0) at 5% ADF test**

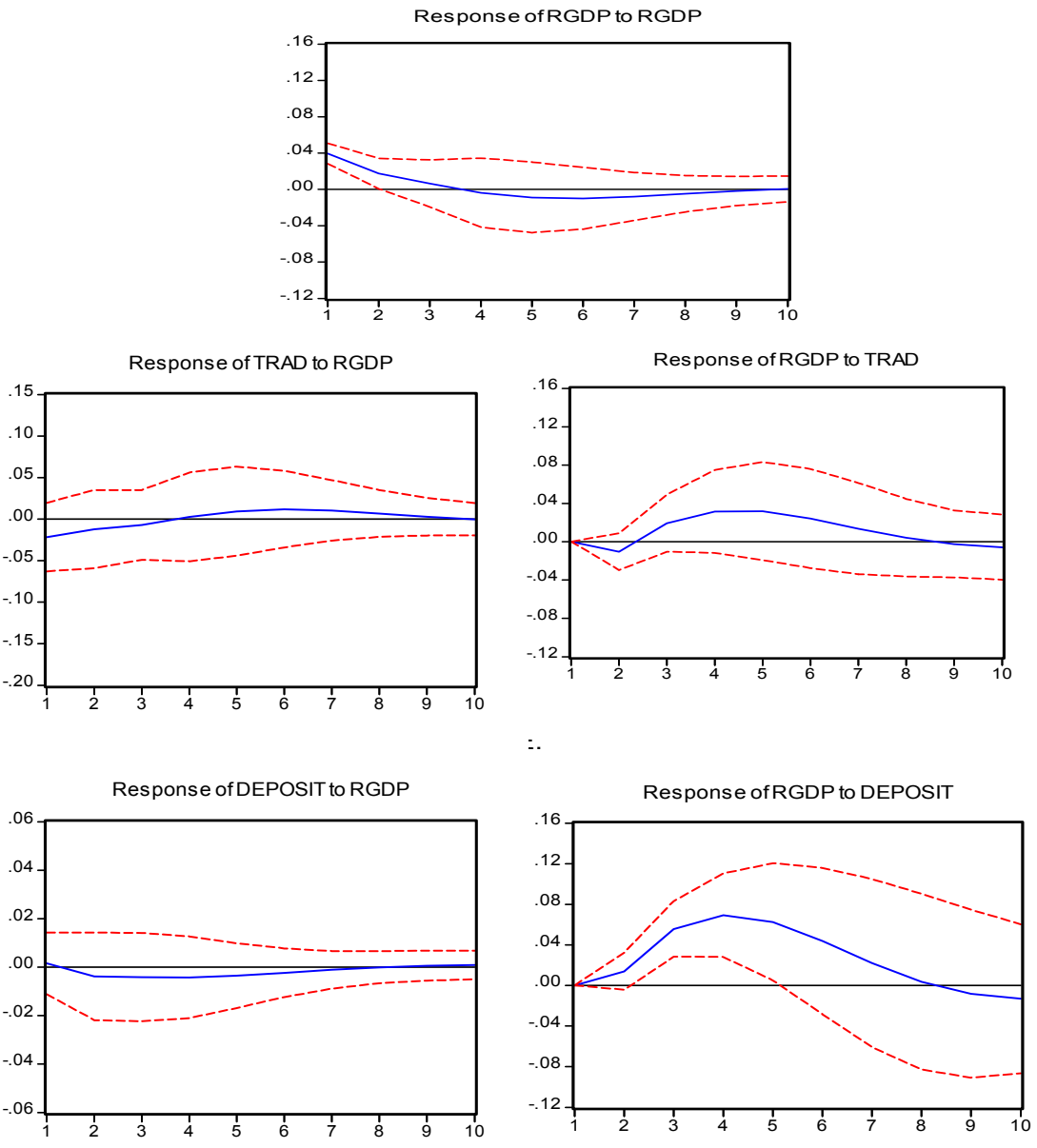
Significant at the 5% level (**)

TABLE 6.C – GRANGER CAUSALITY - JORDAN

Granger Causality for Financial Development Variables

Hypothesis	**Chi-Squared**	**Probability**	**Nature of Causality** (Unidirectional)
DEPOSIT does not cause RGDP	21.051	0.000	Reject hypothesis (supply leading causality)
RGDP does not cause DEPOSIT	0.760	0.392	Fail to reject hypothesis
Granger Causality for Non Financial Development Variables			
TRADE does not cause RGDP	12.860	0.0016	Reject hypothesis
RGDP does not cause TRADE	1.719	0.423	Fail to reject hypothesis

FIGURE 6.B – IMPULSE RESPONSE FUNCTIONS - JORDAN



BAHRAIN

The graphs on real GDP, government expenditure, and capital per capita of Bahrain show a sharp jump on 1986. This can be explained by the three month Qatari occupation of a piece of Bahraini territory causing a short upheaval that was later conciliated by Saudi Arabia. Bahrain is dependent on Saudi Arabia for oil since a large share of its exports consists of petroleum products made from refining imported crude. Therefore, we note an inflationary phase during the late 1970's, similar to that of Saudi Arabia, after assisting in Arab oil embargo. We notice a rise in GDP along with a drop in liquid liability's share of GDP in 1990. This might be explained by Bahrain's participation in the coalition "Operation Desert Storm" against Iraq (the Gulf War).

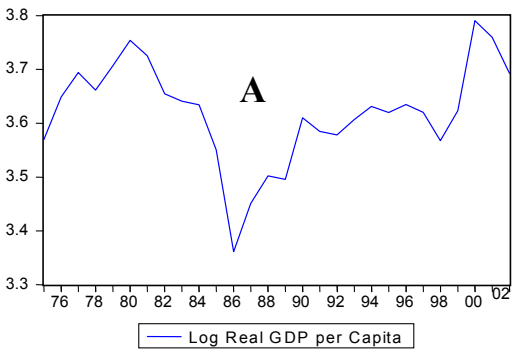
The country is studied in the time frame of 1975-2003. The variables DEPOSITS is not constructed due to lack of sufficient data. Summary statistics indicate that liquid liabilities and private credit, respectively, comprise a median proportion of 0.61 and 0.46 to RGDP. Skewness statistics indicate that all variables but LIQUIDITY and GOVGDP are skewed left with a long positive right tail. All variables have flat distributions (low Kurtosis values) except RGDP and INFLATION. All variables fail to reject stationarity because the LM-statistic is less than the 5% significance level of 0.463 when modeled with an intercept and 0.146 when modeled with a trend. Moreover, PRIVATE strongly rejects a unit root when modeled with an intercept and trend using the Augmented-Dickey Fuller test. It has a t-statistics of 3.79 larger than the 5% significance value of -3.56. INFLATION also rejects a unit root when modeled with an intercept using the Augmented-Dickey Fuller test. It has a t-statistics of -3.453 larger than the 5% significance value of -2.96.

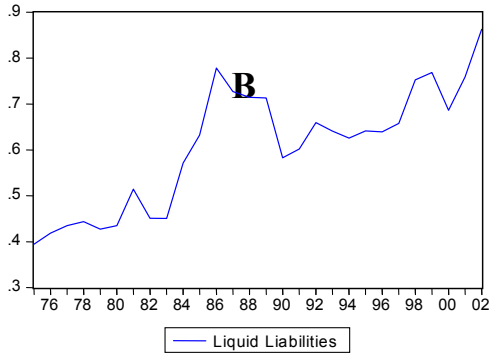
$$RGDP = 3.98 + 0.006TREND - 2.23GOVGDP(-1) + e \qquad [7.A]$$

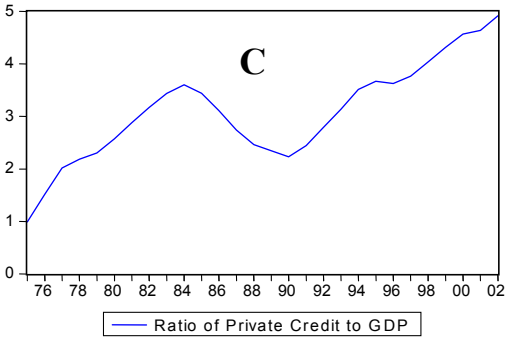
I estimate an initial OLS regression (for OLS results see Excel file) of the RGDP on the six control variables, reduce the estimation to a system of the most significant variables, add two financial development variables, and finally add institutional indices. Equation 7.A represents the final OLS model since neither financial development

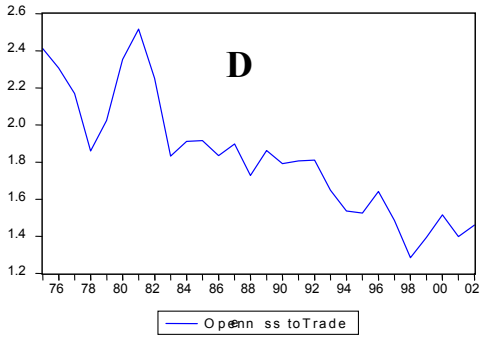
variables nor the institutional indices proved significant. Equation 7.A states that the first lag on the share of government spending from GDP has a significant negative effect in explaining RGDP, with a P-value of 0.0041. R-squared has an explanatory power of 63%. Impulse responses show a significant negative and persistent effect of GOVGDP on RGDP with wide confidence bands falling mostly in the negative region. Granger Causality (table 7.C) indicates a significant causal relation running from GOVGDP to RGDP with a Chi-Squared of 6.14. The folloing pages present tables for summary statistics of variables (table 7.A), and results of the KPSS test (table 7.B). A graphical representation of all series for Bahrain is presented in (figure 7.A), and the impulse resposes of a VAR estimation (figure 7.B) shows the effect of RGDP and GOVGDP to a shock of each.

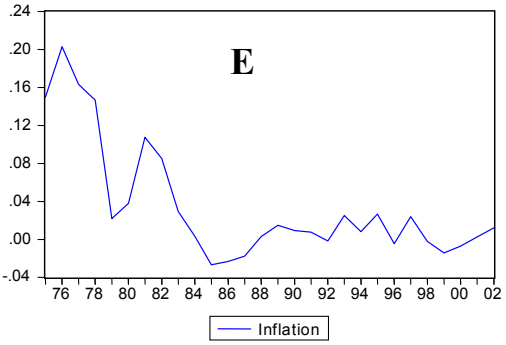
FIGURE 7.A - VARIABLES - BAHRAIN (1975 – 2003)

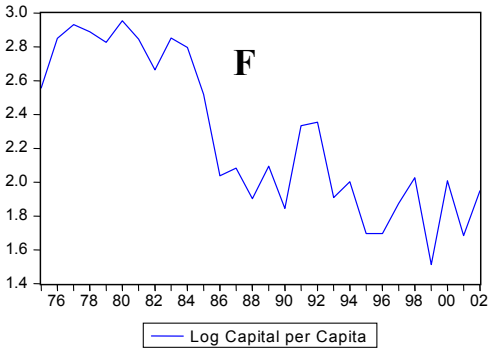


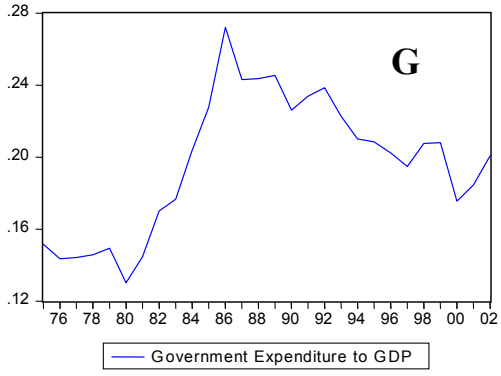












A: Log real GDP per capita
B: Liquid Liabilities to GDP
C: Private credit to GDP
D: Openness to trade
E: Inflation
F: Log GDP per capita
G: Government expenditure to GDP

TABLE 7.A – SUMMARY STATISTICS - BAHRAIN

(28 observations)

	RGDP	LIQ	PRIV	TRAD	INF	CAPOP	GOVGDP	LNOIL
Mean	3.62	0.61	0.46	1.83	0.04	2.27	0.20	3.37
Median	3.63	0.64	0.42	1.82	0.01	2.09	0.20	3.20
Maximum	3.79	0.86	0.62	2.52	0.20	2.95	0.27	4.28
Minimum	3.36	0.39	0.28	1.28	-0.03	1.51	0.13	2.60
Std. Dev.	0.09	0.13	0.11	0.33	0.06	0.46	0.04	0.46
Skewness	-0.63	-0.11	0.17	0.42	1.45	0.16	-0.09	0.52
Kurtosis	3.72	1.90	1.48	2.36	3.89	1.57	1.99	2.23

*DEPOSITS is not defined for Bahrain due to lack of data.

TABLE 7.B – UNIT ROOT TESTS - BAHRAIN

Kwiatkowski-Phillips-Schmidt-Shin test

Intercept		**Trend and Intercept**	
LM-statistics		LM-statistics	
1%	0.739	1%	0.216
5%	0.463	5%	0.146
10%	0.347	10%	0.119

Bahrain (26 Obs.)			
RGDP	0.14313	* 0.142439	**I(0) at 5% intercept**
INFL	** 0.463417	** 0.176468	**I(0) at 1% ADF intercept**
CAPOP	** 0.575909	0.100306	**I(0) at 5% trend**
LNOIL	** 0.516933	0.08461	**I(0) at 5% trend**
LIQ	** 0.563684	0.098958	**I(0) at 5% trend**
PRIVATE	** 0.558536	** 0.146096	**I(0) at 1% ADF trend**

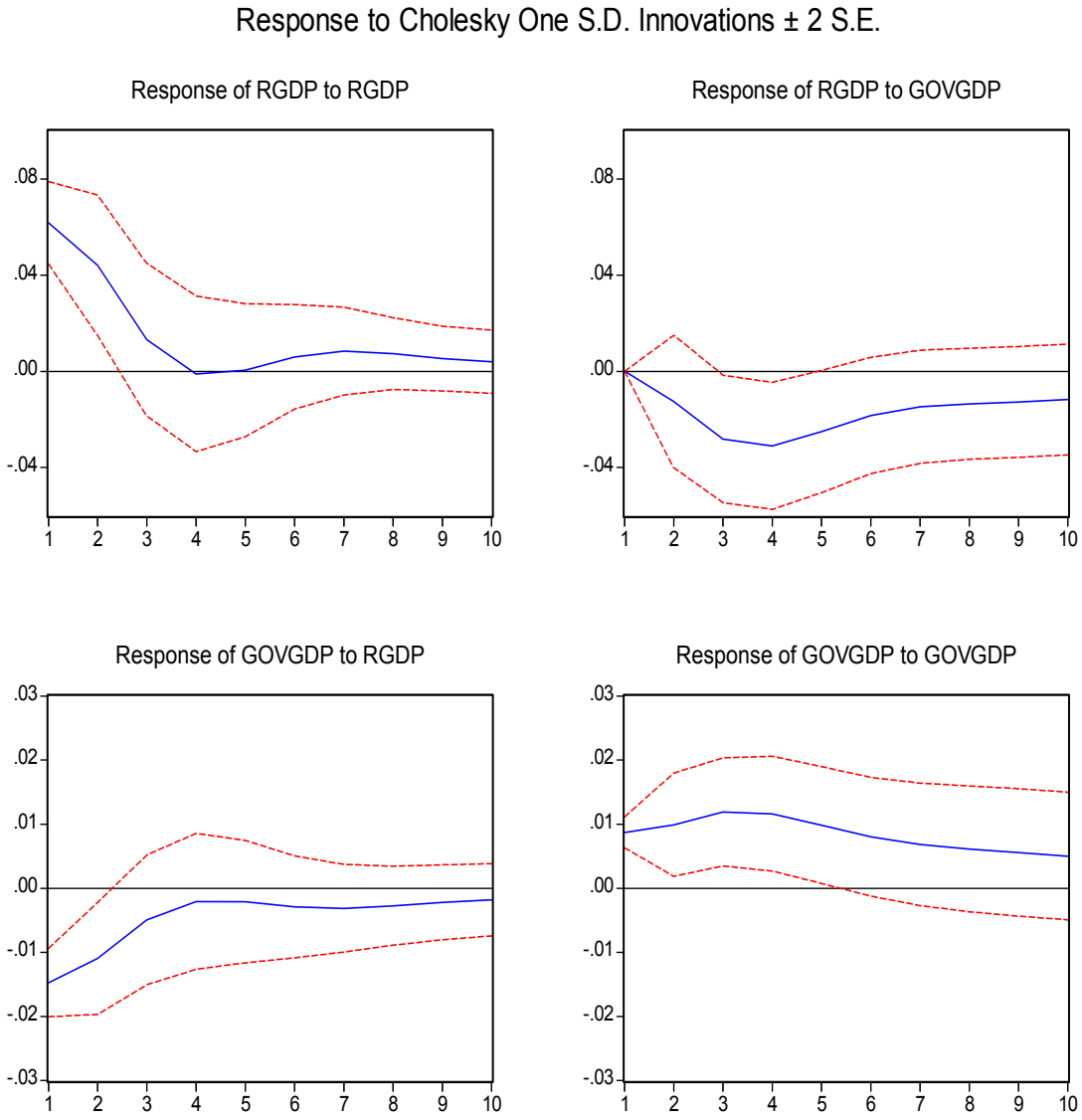
Significant at the 10% level (*) , at the 5% level (**)

TABLE 7.C – GRANGER CAUSALITY - BAHRAIN

Granger Causality for Non Financial Development Variables

Hypothesis	**Chi- Squared**	**Probability**	**Nature of Causality**
GOVGDP causes RGDP	6.145	0.0463	Reject hypothesis
RGDP does not causes GOVGDP	3.612	0.164	Fail to reject hypothesis

FIGURE 7.B – IMPULSE RESPONSE FUNCTIONS – BAHRAIN



CHAPTER IV

CONCLUSIONS

Subject to the caveat that proxies may or may not detect the impact of financial development on economic growth, I assume that the three proxies used for financial development are positively correlated with financial development, and real GDP per capita is positively correlated with economic growth. Granger Causality results indicate a causal relationship between proxies for financial development and economic growth in four countries out of seven, namely Saudi Arabia, Egypt, Jordan, and Algeria. In the cases of Egypt, Algeria, Morocco, Algeria and Syria DEPOSITS appears as the significant proxy for financial development from the third Ordinary Least Squared estimation. Evidence indicates unidirectional causality, specifically "Supply – Leading causality", running from financial development to economic growth in both Egypt and Jordan. Note that real GDP per capita is used as a proxy for economic growth for all countries except Egypt and Morocco, where the variable is differenced and interpreted as the growth in real GDP per capita. In the cases of Syria and Morocco no causal relationship comes into view. Algeria shows evidence of unidirectional causality, specifically "Demand – Following causality", running from economic growth to financial development for the proxy DEPOSITS. Bidirectional Causality running in both directions comes into view in three countries, namely Algeria, Egypt, and Saudi Arabia. Both Algeria and Egypt reveal bidirectional causality through the variable LIQUIDITY, while Saudi Arabia does so through the variable PRIVATE. Although Egypt and Algeria show evidence of bidirectional causality through LIQUIDITY, unidirectional causality runs in opposite directions for each country. Egypt reveal evidence of "Supply- Leading Causality" running from the variable DEPOSITS to growth of real GDP per capita, While Algeria reveals evidence of "Demand-Following Causality" running from LIQUIDITY to real GDP per capita. Ordinary Least Squared results confirm the significance of civil liberties index in both Saudi Arabia and Algeria. The index of political freedom proves significant only in the case of Syria. Bahrain shows no

significant effect of any of the financial development proxy variables on economic development. However, the share of government expenditure from GDP shows a significant negative cause of economic growth in the case of Bahrain, running in one direction, and the case of Syria, running in two directions. Openness to trade shows a significant positive causal effect on growth of real GDP per capita indicating "Supply-Leading causality" for both Egypt and Morocco. Capital per capita shows evidence of a unidirectional Demand-Following causal effect on real GDP per capita in Algeria. The growth of Capital per Capita appears to have significant causal effect on the growth of real GDP per capita in Egypt. Table 8 presents a summary of concluding results.

TABLE 8 - SUMMARY OF RESULTS

	VAR Results			Direction of effect from (IRF‡)			
Country	**Effect of F.D.§ variables**	**Effect on non F.D. variables**	**Type of causality (G.C.**Test)**	**Initial**	**Long run**	**Significance of confidence bands**	**Institutional indices effect (OLS††)**
KSA	Private		Bidirectional	Positive	Negative	Significant	Significant Civil Liberties Index
Syria	Deposits		No causality	Positive	Negative	Insignificant	Significant Political Freedom Index
		GOVGDP	Bidirectional	Negative	No effect	Significant	
Morocco♣	Deposits		No causality	Negative	No effect	Insignificant	
		Inflation	Supply leading	Negative	No effect	Significant	
		Trade	Supply leading	Positive	No effect	Significant	
Egypt ♣	Deposits		Supply leading	Positive	Positive	Significant	
	Liquidity		Bidirectional	Positive	Negative	Significant	
		DCAPOP	Supply leading	Positive	Negative	Significant	
		Trade	Supply leading	Positive	No effect	Significant	
Algeria	Deposits		Demand following	Positive	No effect	Significant	Significant Civil Liberties Index
	Liquidity		Bidirectional	Positive	No effect	Significant	
		CAPOP	Demand following	Positive	Positive	Significant	
Jordan	Deposits		Supply leading	Positive	No effect	Significant	
		Trade	Supply leading	Positive	No effect	Significant	
Bahrain		GOVGDP	Supply leading	Negative	Negative	Significant	

‡ Refers to Impulse Response Functions
§ Refers to Financial Development
** Refers to Granger Causality test
†† Refers to Ordinary Least Squared estimations
♣The dependent variable is the growth of real GDP per capita (DRGDP) rather than RGDP

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APPENDIX A

DATA SOURCES AND DEFINITIONS OF VARIABLES

The following are definitions of how each variable was obtained as suggested in Chapter two of Levine and Demirguc-kunt 2001. Note that the consumer price index (CPI) is used for converting a series to its real value rather than GDP deflator. The CPI includes goods that were actually bought by consumers and not good purchased only by the governments or firms. The CPI also assigns fixed weights while the GDP deflator assigns changing weights. Finally the CPI includes imported goods while the GDP deflator includes only domestic goods.

Control Variables:

1. The log of real GDP per capita (RGDP) is used as a proxy for the lead of economic development. Calculated as annual nominal GDP in local currency as specified by the IFS national accounts (line 99b), deflated by average annual CPI (line 64) and total population (line 99z).
2. Government expenditure (GOVGDP) is calculated, as the ratio of government consumption as specified by the IFS national accounts (line 91f) deflated by annual nominal GDP (line99b).
3. The inflation rate (INFLATION) is calculated using the difference in the log of average annual CPI.
4. Openness to trade (TRADE) is computed by dividing the sum of exports and imports of goods and services, as measures by IFS national accounts (line 90c, 98c), by nominal GDP (line 99b).
5. Data on annual oil prices (OIL) is obtained from the U.S. Energy Information Administration's official website for energy statistics (www.eia.doe.gov), quoted as Saudi Arabian light crude by OPEC from 1950 to 2003.
6. Capital per capita (CAPOP) is measured by the log of the ratio of the capital stock, obtained as the sum of gross fixed capital formation (line 93e) and change in inventory

(line 93i) as specified by IFS national accounts, deflated by annual CPI and population. Note that the series on changes in inventory starts on 1965 for Egypt. Thus, capital is computed as only gross fixed capital formation before 1965, and the summation of both thereafter. For Syria CAPOP is calculated as gross fixed capital formations (line 93) since no other statistics on capital are reported.

Financial Development Variables:

IFS distinguish among three groups of financial institutions: central banks, deposit money banks, and other financial institutions. The first group consists of the central bank and other institutions that perform functions of the monetary authorities. The second group consists of all financial institutions that have liabilities in the form of deposits usable in making payments (IMF 1984, 29). The third group consists of bank-like institutions and non-bank financial institutions that serve as financial intermediaries but do not incur liabilities usable as forms of payments.

7. Private Credit (PRIVATE) is used as a proxy for measuring the *activity* of financial intermediaries. It is calculated as the ratio of deflated private sector credit to real GDP. Private sector credit (denoted F.D. in the formula below) is calculated as the claims of deposit money banks on private sector (line 22d). Deposit money bank claims on other bank-like institutions (lines 22 f), and other banking institutions claims on private sector (line 42d) are added to FD when available.

$$\text{PRIVATE} = \frac{0.5 * \left(\frac{F.D._{\cdot t}}{CPI_{e,t}} + \frac{F.D._{\cdot t-1}}{CPI_{e,t-1}}\right)}{\frac{GDP_t}{CPI_{a,t}}}$$

Here the subscript e indicates the value of CPI measured on the fourth quarter of the previous year, and a indicates the average value of CPI over the current year t. (Beck, Levine, and Loayza 1999).

The variable PRIVATE is not constructed for Morocco because of a break in the series on deposit money banks claims on the private sector. Figures are collected as zero for

the years 1986 till 1989. The series contain two breaks that identify a point at which multiple time series versions were linked on 1982 and 1990 respectively, and a third break on 1997 due to a change in analytical comparability of data (IFS Online). For Saudi Arabia, PRIVATE is calculated as the ratio of the sum of deposit money bank claims on private sector (credit22d), non-financial public enterprises (line22c), and claims on privates sector by other financial institutions (line 42d). For Jordan PRIVATE includes private claims on deposit money banks (line 22d) and other banking institutions (line 42d).

8. Liquid Liabilities to GDP, LIQ, is measured by dividing the two year arithmetic average of M2 series (currency plus demand deposits and interest bearing deposits – line 35l) deflated by end of year CPI by GDP (line 99b) after deflating it by the average CPI for that year. The variable LIQ for Morocco is divided by 100 for scaling purposes. For Saudi Arabia the series of GDP and M2 are divided by 100,000 before being deflated by CPI. The ratio, thereafter, is also divided by 1000 to scale the variable. Data on the CPI for Algeria is available on a quarterly basis from 1979 -2000 and on an annual basis from 1969 till 1976. Also the CPI for Bahrain is available on a quarterly basis from 1966 - 2000 and on an annual basis from 1966 till 2002. As a result, I use a different formula when calculating the series of liquid liabilities depending on the years considered. Calculations are made according to the following formulas:

For the year's 1969 till1976:

$$\frac{0.5*\left(\frac{FD_t}{CPI_{a,t}}+\frac{FD_{t-1}}{CPI_{a,t-1}}\right)}{\frac{GDP_t}{CPI_{a,t}}}$$

For the years 1976 till 2000:

$$\frac{0.5*\left(\frac{FD_t}{CPI_{e,t}}+\frac{FD_{t-1}}{CPI_{e,t-1}}\right)}{\frac{GDP_t}{CPI_{a,t}}}$$

Here the subscript e indicates the value of the CPI measured on the fourth quarter of the previous year, and a indicates the average value of CPI over the current year t.

9. The variable DEPOSIT is calculated by dividing deposit money bank assets by total financial assets. Total financial assets (Columns A+B+C)are measured as the sum of

central bank assets (lines 12 a, d, c, f, and bx), deposit money bank assets (lines 22 a, c, d, and f), and claims of other banking institutions on private sector and The table below illustrates how DEPOSIT was calculated for each country.

	Total Deposit Money Bank Assets (Column A)	Total Central Bank Assets (Column B)	Total Other Banking Institutions Assets (Column C)
Jordan	Lines 22 a + d	Line 12 a	Line 42 d
Egypt	Lines 22 a + d + c + f	Line 12 a + c	Lines 42 a + d
Algeria	Lines 22 a + d + c	Line 12 a	NA
Morocco	Lines 22 a + d + f	Lines 12 a +d + e	NA
Saudi Arabia	Lines 22 a + d + c	NA	Line 42 d
Syria	Lines 22 a + d + bx	Lines 12 a + bx	NA
Bahrain	Variable not constructed due to missing figures on columns B and C from 1975 -1991		

A. Total Deposit Money Bank Assets (line 22) include: claims on private sector (category d), claims on non-profit public enterprises (category c), claims on official entities (category bx), and claims on central Government (category a).

B. Total Central Bank Assets (line 12) include: claims on central government (category a), and claims on deposit money banks (category e), claims on non-financial public enterprises (category c), claims on private sector (category d), and claims on official entities (category bx).

C. Total Other Banking Institutions Assets (line 42) includes: claims on non-financial public enterprises (category c) and claims on private sector (category d).

Notes:

(1) Data had not been collected on column C for Algeria, Syria and Morocco.

(2) Statistics on line 22c for Algeria are missing prior to 1992; thus Column A for the years 1964 - 1992 is (3) calculated by adding lines 22a and d.
(4) Lines 22f and 22d for Morocco contain breaks in the sense that observations are collected as zero for the years 1986 till 1989. Figures for line22a also contain a break on 1990 due to multiple time series versions linked by splicing.
(5) Note that lines 42 for Morocco used to be collected at IFS starting 1997. Therefore, I use line 22f to supplement the construction of total assets for Morocco. However, figures are first reported starting 1982.

Indices:

10. Indices of Political Freedom (PL) and Civil Liberties (CL), collected by Freedom House from 1972 – 2003. Data may be accesses on line through (www.freedomhouse.org). Political rights and civil liberties are measured on a one-to-seven scale, with one representing the highest degree of freedom and seven the lowest. Countries whose combined average ratings for both indices are between 1.0 and 2.5 were considered "free"; between 3.0 and 5.5 “partly free,” and between 5.5 and 7.0 “not free.”

11. Economic Freedom of the World Index (EFW), collected by The Fraser Institute from 1970 to 2000 on a five year bases, and annually thereafter. Data may be accesses online through (www.freetheworld.com). I construct a simple linear regression of EFW on the former two indices in an attempt to forecast observations in between the five years when no surveys were conducted. Note the index had not been constructed for Saudi Arabia, I therefore do not consider its effect for that country. Also only the index of political freedom is used to forecast EFW values for Syria. Since the value of the index on civil liberties happened to remain constant at seven for all the years except 1976 to1979, the regression treats it as a constant because EFW has no values during those four years. The table below shows the equations estimated for that purpose by country.

Dependent Variable	Coefficients on Independent Variables		
EFW	**Constant**	**PL Index**	**CL Index**
Jordan	9.67	1.13	-1.88
Egypt	1.48	-0.05	0.84
Algeria	2.77	0.99	-0.83
Morocco	0.54	1.10	-0.07
Syria	1.99	0.39	
Bahrain	6.23	0.16	-0.04

APPENDIX B

VECTOR AUTOREGRESSION (VAR) ESTIMATES

VAR estimates for Saudi Arabia:

Vector Autoregression Estimates
Included observations: 26 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	RGDP	PRIV
RGDP(-1)	1.425678	-0.09203
	-0.22173	-0.18837
	[6.42984]	[-0.48854]
RGDP(-2)	-0.99068	0.356777
	-0.23665	-0.20105
	[-4.18629]	[1.77457]
PRIV(-1)	0.620577	0.924728
	-0.29583	-0.25133
	[2.09776]	[3.67940]
PRIV(-2)	-0.79165	-0.0076
	-0.27381	-0.23262
	[-2.89122]	[-0.03269]
C	3.906565	-2.01083
	-0.76076	-0.64632
	[5.13507]	[-3.11122]
CL_KSA	-0.08334	0.087434
	-0.0496	-0.04214
	[-1.68018]	[2.07476]
R-squared	0.901159	0.950395
S.E. equation	0.087644	0.07446
Log likelihood	30.81206	35.21383

VAR System Statistics

Determinant resid covariance (dof adj.)	1.44E-05
Log likelihood	80.71012

VAR estimates for Syria:

31 observations
Standard errors in ( ) & t-statistics in [ ]

	RGDP	GOVGDP	DEPOSIT
RGDP(-1)	0.704424	0.087357	0.024267
	-0.17647	-0.03275	-0.11023
	[3.99176]	[2.66745]	[0.22014]
RGDP(-2)	0.14665	-0.033571	-0.13142
	-0.21248	-0.03943	-0.13273
	[0.69017]	[-0.85135]	[-0.99013]
GOVGDP(-1)	-1.054023	0.254016	-0.702501
	-1.22553	-0.22743	-0.76554
	[-0.86005]	[1.11687]	[-0.91765]
GOVGDP(-2)	-2.820725	0.265699	-0.178216
	-0.7964	-0.1478	-0.49748
	[-3.54183]	[1.79774]	[-0.35824]
DEPOSIT(-1)	0.070624	-0.090518	0.441715
	-0.36891	-0.06846	-0.23045
	[0.19144]	[-1.32215]	[1.91679]
DEPOSIT(-2)	-0.132989	0.046052	0.010121
	-0.32832	-0.06093	-0.20509
	[-0.40506]	[0.75582]	[0.04935]
Constant	1.850609	-0.346502	1.271046
	-0.72873	-0.13524	-0.45521
	[2.53950]	[-2.56217]	[2.79223]
TREND	-0.008498	-0.002194	-0.003072
	-0.0043	-0.0008	-0.00268
	[-1.97694]	[-2.75030]	[-1.14401]
LNOIL	0.117453	0.018386	0.025339
	-0.06021	-0.01117	-0.03761
	[1.95079]	[1.64554]	[0.67375]
PF_SYR	-0.06522	0.016095	-0.040044
	-0.04156	-0.00771	-0.02596
	[-1.56917]	[2.08664]	[-1.54238]
R-squared	0.929019	0.931138	0.721053
Sum sq. resids	0.109344	0.003766	0.042666
Log likelihood	43.5452	95.75756	58.1322

VAR System Statistics	
Determinant resid covariance (dof adj.)	1.27E-09
Log likelihood	203.5963
Log likelihood	216.1564

VAR estimates for Morocco:

42 observations

Standard errors in ( ) & t-statistics in [ ]

	DRGDP	TRADE	INF	DEPOSIT
DRGDP(-1)	-0.173947	0.382912	0.108175	-0.510858
	-0.20109	-0.2309	-0.14368	-0.2517
	[-0.86501]	[1.65835]	[0.75287]	[-2.02960]
DRGDP(-2)	-0.12924	-0.074294	-0.019114	0.070559
	-0.15068	-0.17301	-0.10766	-0.1886
	[-0.85772]	[-0.42941]	[-0.17753]	[0.37412]
TRADE(-1)	0.480092	0.858662	0.151266	0.026693
	-0.19372	-0.22243	-0.13842	-0.24248
	[2.47826]	[3.86029]	[1.09283]	[0.11009]
TRADE(-2)	-0.239676	-0.290117	-0.177289	0.557735
	-0.2253	-0.25869	-0.16098	-0.282
	[-1.06380]	[-1.12147]	[-1.10130]	[1.97776]
INF(-1)	-0.632418	-0.241211	0.323723	0.163879
	-0.28037	-0.32192	-0.20033	-0.35093
	[-2.25569]	[-0.74929]	[1.61599]	[0.46699]
INF(-2)	-0.128203	0.432124	0.397691	-1.21187
	-0.33949	-0.38981	-0.24257	-0.42493
	[-0.37763]	[1.10856]	[1.63949]	[-2.85193]
DEPOSIT(-1)	-0.212629	0.22027	0.057287	0.72785
	-0.13733	-0.15768	-0.09812	-0.17189
	[-1.54831]	[1.39691]	[0.58382]	[4.23435]
DEPOSIT(-2)	0.018898	-0.103276	-0.082625	-0.067346
	-0.12576	-0.1444	-0.08986	-0.15741
	[0.15026]	[-0.71519]	[-0.91949]	[-0.42783]
Constant	0.080408	0.112709	0.042448	0.018392
	-0.05841	-0.06707	-0.04174	-0.07312
	[1.37652]	[1.68041]	[1.01702]	[0.25155]
R-squared	0.356637	0.584326	0.478857	0.884811
S.E. equation	0.043146	0.049541	0.030828	0.054005
Log likelihood	77.48204	71.67726	91.60032	68.05383

VAR System Statistics	
Determinant resid covariance (dof adj.)	4.81E-12
Determinant resid covariance	1.83E-12
Log likelihood	329.1291

VAR estimates for Egypt:

42 Observations
Standard errors in ( ) & t-statistics in [ ]

	DRGDP	TRADE	DCAPOP	LIQ	DEPOSIT
DRGDP(-1)	-0.066789	0.264644	0.700841	0.831771	-0.232626
	-0.19043	-0.31751	-0.72676	-0.30659	-0.18358
	[-0.35072]	[0.83351]	[0.96434]	[2.71294]	[-1.26719]
DRGDP(-2)	-0.327585	0.249859	-1.094821	0.22904	-0.190725
	-0.16718	-0.27874	-0.63802	-0.26916	-0.16116
	[-1.95946]	[0.89638]	[-1.71596]	[0.85094]	[-1.18343]
TRADE(-1)	0.250257	1.012519	0.479811	-0.10125	0.158052
	-0.1108	-0.18474	-0.42285	-0.17839	-0.10681
	[2.25865]	[5.48089]	[1.13470]	[-0.56759]	[1.47974]
TRADE(-2)	-0.044373	-0.376595	-0.532645	0.047983	0.007775
	-0.10759	-0.17938	-0.4106	-0.17322	-0.10371
	[-0.41243]	[-2.09940]	[-1.29725]	[0.27701]	[0.07497]
DCAPOP(-1)	0.01653	-0.109748	0.000288	-0.013453	-0.066775
	-0.04386	-0.07312	-0.16737	-0.07061	-0.04228
	[0.37692]	[-1.50090]	[0.00172]	[-0.19052]	[-1.57945]
DCAPOP(-2)	0.13778	0.01641	0.379099	-0.150613	0.012666
	-0.04502	-0.07506	-0.1718	-0.07248	-0.0434
	[3.06058]	[0.21863]	[2.20659]	[-2.07805]	[0.29188]
LIQ(-1)	0.114095	0.020582	0.955185	1.178683	-0.166875
	-0.13751	-0.22927	-0.52479	-0.22139	-0.13256
	[0.82972]	[0.08977]	[1.82014]	[5.32403]	[-1.25888]
LIQ(-2)	-0.185263	0.023751	-1.064622	-0.161594	0.134754
	-0.13228	-0.22055	-0.50484	-0.21297	-0.12752
	[-1.40051]	[0.10769]	[-2.10884]	[-0.75875]	[1.05673]
DEPOSIT(-1)	0.071342	-0.572826	1.471848	-0.24033	1.040354
	-0.17145	-0.28586	-0.65431	-0.27603	-0.16528
	[0.41611]	[-2.00390]	[2.24947]	[-0.87066]	[6.29465]
DEPOSIT(-2)	0.260262	0.357275	-0.800343	-0.005407	-0.061775
	-0.19008	-0.31692	-0.72542	-0.30603	-0.18324
	[1.36922]	[1.12733]	[-1.10329]	[-0.01767]	[-0.33713]
C	-0.202226	0.252795	-0.274443	0.150586	-0.020352
	-0.07663	-0.12776	-0.29243	-0.12337	-0.07387
	[-2.63915]	[1.97871]	[-0.93849]	[1.22065]	[-0.27552]
R-squared	0.534231	0.79058	0.400369	0.971856	0.848814
S.E. equation	0.035114	5.85E-02	0.134007	0.056533	0.03385
Log likelihood	87.44655	65.97595	31.19614	67.44497	88.98663

VAR System Statistics

Determinant resid covariance (dof adj.)	1.09E-13
Log likelihood	360.6652

VAR estimates for Algeria:

32 observations
Standard errors in ( ) & t-statistics in [ ]

	RGDP	CAPOP	DEPOSITS	LIQ
RGDP(-1)	-0.018978	0.069904	0.009672	-0.73374
	-0.23306	-0.3447	-0.14458	-0.15202
	[-0.08143]	[0.20280]	[0.06689]	[-4.82656]
RGDP(-2)	-0.330189	0.063437	-0.094076	0.916974
	-0.23006	-0.34026	-0.14272	-0.15006
	[-1.43524]	[0.18644]	[-0.65915]	[6.11054]
CAPOP(-1)	0.373649	0.873557	0.144505	-0.117401
	-0.16836	-0.249	-0.10444	-0.10982
	[2.21939]	[3.50824]	[1.38357]	[-1.06906]
CAPOP(-2)	0.262139	-0.290476	-0.133629	-0.068513
	-0.1905	-0.28175	-0.11818	-0.12426
	[1.37607]	[-1.03097]	[-1.13073]	[-0.55137]
DEPOSITS(-1)	0.709241	0.532606	0.824373	0.354327
	-0.28694	-0.42439	-0.17801	-0.18717
	[2.47173]	[1.25499]	[4.63107]	[1.89310]
DEPOSITS(-2)	0.041494	-0.020764	-0.332428	0.156556
	-0.31203	-0.4615	-0.19357	-0.20353
	[0.13298]	[-0.04499]	[-1.71732]	[0.76919]
LIQ(-1)	0.158478	0.281083	-0.034111	1.079656
	-0.15268	-0.22581	-0.09472	-0.09959
	[1.03800]	[1.24477]	[-0.36014]	[10.8411]
LIQ(-2)	0.196423	-0.208408	-0.095034	-0.194316
	-0.17231	-0.25484	-0.10689	-0.11239
	[1.13997]	[-0.81780]	[-0.88906]	[-1.72892]
Constant	3.949884	1.0274	1.110318	-0.252499
	-0.95607	-1.41404	-0.59312	-0.62363
	[4.13137]	[0.72657]	[1.87201]	[-0.40489]
CLINDEX	0.023855	0.003454	-0.010199	-0.017873
	-0.0109	-0.01612	-0.00676	-0.00711
	[2.18922]	[0.21432]	[-1.50877]	[-2.51455]
TREND	0.034248	-0.001299	-0.001061	-0.007059
	-0.00769	-0.01138	-0.00477	-0.00502
	[4.45193]	[-0.11415]	[-0.22223]	[-1.40679]
R-squared	0.940272	0.813971	0.845567	0.957558
S.E. equation	0.073209	0.108277	0.045416	0.047753
Log likelihood	44.99547	32.47146	60.2736	58.6682

VAR System Statistics

Determinant resid covariance (dof adj.)	1.12E-10
Log likelihood	2.12E+02

VAR estimates for Jordan:

24 observations
Standard errors in ( ) & t-statistics in [ ]

	RGDP	TRAD	DEPOSIT
RGDP(-1)	0.36345	0.066676	-0.127145
	-0.19409	-0.50359	-0.15338
	[1.87256]	[0.13240]	[-0.82896]
RGDP(-2)	0.127488	-0.363172	0.098888
	-0.15312	-0.39728	-0.121
	[0.83260]	[-0.91415]	[0.81725]
TRAD(-1)	-0.107809	0.594803	0.023463
	-0.09023	-0.23412	-0.07131
	[-1.19478]	[2.54062]	[0.32905]
TRAD(-2)	0.276532	-0.437242	0.056335
	-0.08029	-0.20831	-0.06345
	[3.44424]	[-2.09897]	[0.88791]
DEPOSIT(-1)	0.448313	-1.219898	1.105941
	-0.28859	-0.74877	-0.22806
	[1.55346]	[-1.62921]	[4.84943]
DEPOSIT(-2)	0.998411	-0.541782	-0.092279
	-0.36278	-0.94127	-0.28669
	[2.75208]	[-0.57559]	[-0.32188]
Constant	0.135841	3.252887	-0.041448
	-0.41181	-1.06846	-0.32543
	[0.32986]	[3.04446]	[-0.12737]
TREND	-0.007273	-0.009857	0.000815
	-0.00221	-0.00574	-0.00175
	[-3.29000]	[-1.71855]	[0.46640]
R-squared	0.955865	0.698564	0.724504
S.E. equation	0.03947	0.102408	0.031191
Log likelihood	48.38416	25.50211	54.0342

VAR System Statistics

Determinant resid covariance (dof adj.)	1.51E-08
Log likelihood	128.513

VAR estimates for Bahrain

26 observations
Standard errors in ( ) & t-statistics in [ ]

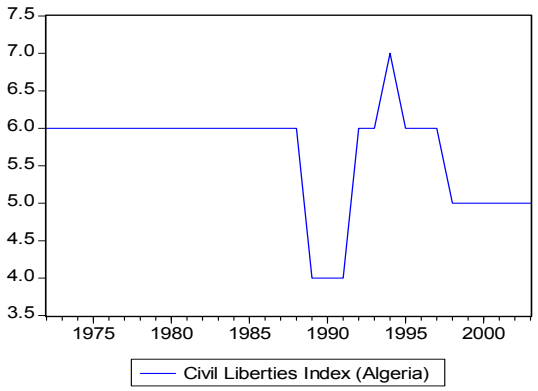
	RGDP	**GOVGDP**
RGDP(-1)	0.369934	0.093627
	-0.41732	-0.11555
	[0.88645]	[0.81028]
RGDP(-2)	-0.559526	0.104307
	-0.40917	-0.11329
	[-1.36747]	[0.92068]
GOVGDP(-1)	-1.442767	1.136238
	-1.56693	-0.43386
	[-0.92076]	[2.61891]
GOVGDP(-2)	-1.058429	0.208532
	-1.58434	-0.43868
	[-0.66806]	[0.47536]
C	4.703772	-0.763417
	-1.51608	-0.41978
	[3.10259]	[-1.81861]
TREND	0.00649	-0.001251
	-0.00297	-0.00082
	[2.18360]	[-1.51975]
R-squared	0.675714	0.831776
S.E. equation	0.061792	0.017109
Log likelihood	38.90173	72.28974

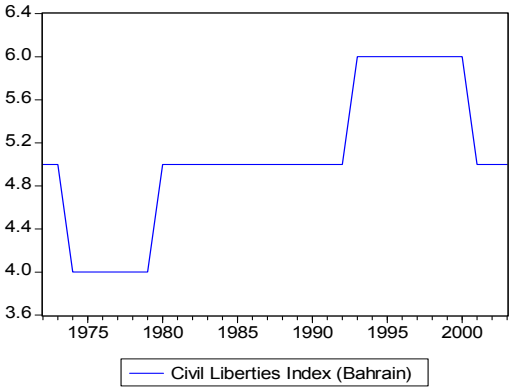
VAR System Statistics

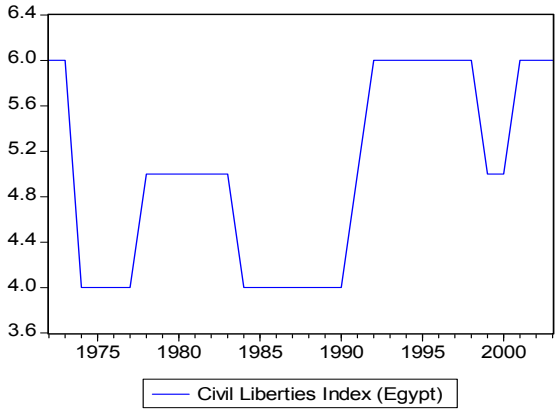
Determinant resid covariance (dof adj.)	2.90E-07
Log likelihood	128.7348

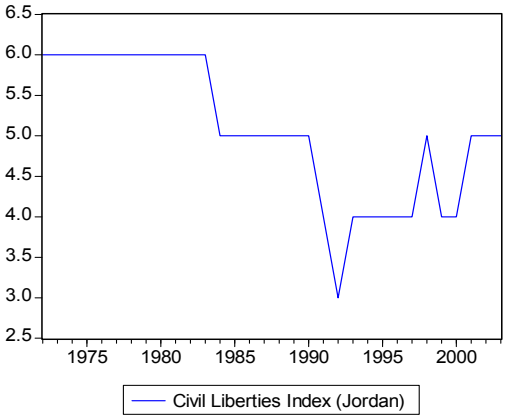
APPENDIX C

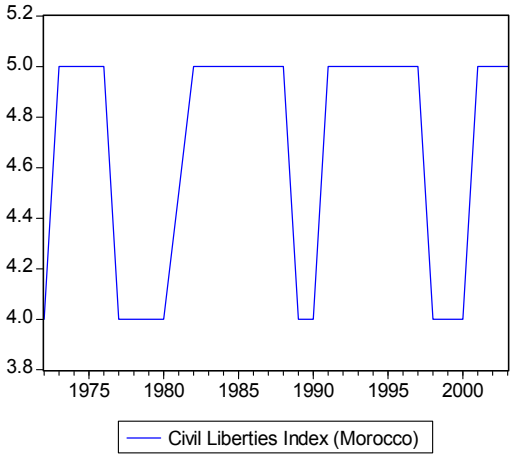
GRAPHS OF THE CIVIL LIBERTIES INDEX‡‡

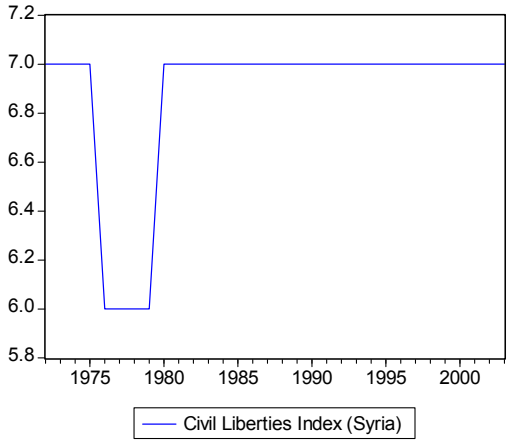






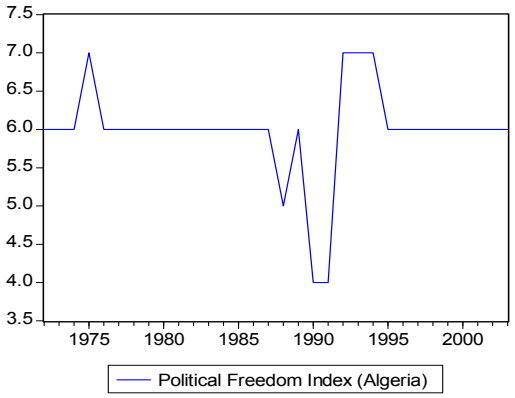


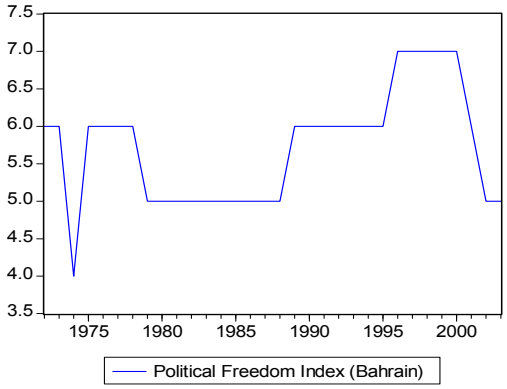


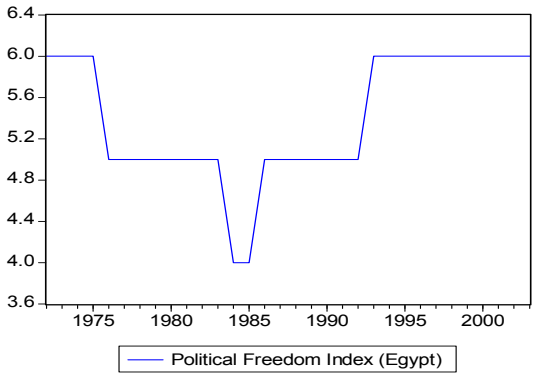


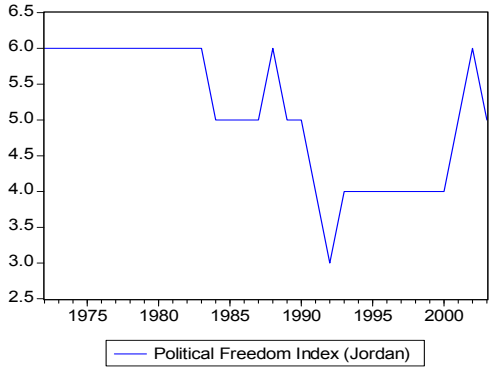
‡‡ The indices are measured such that the number one represent the highest degree of freedom and seven the lowest rating.

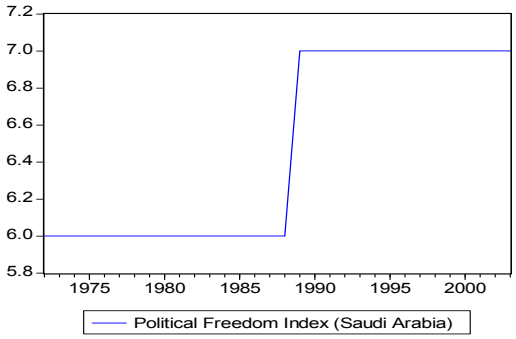
GRAPHS OF THE POLITICAL FREEDOM INDEX

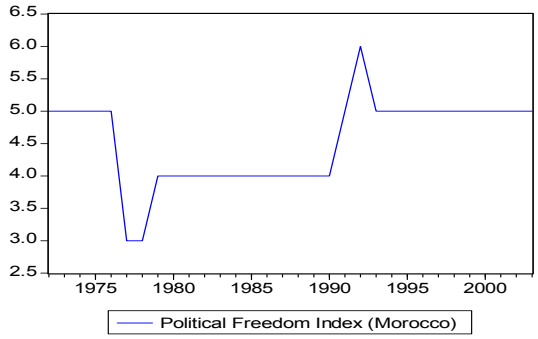


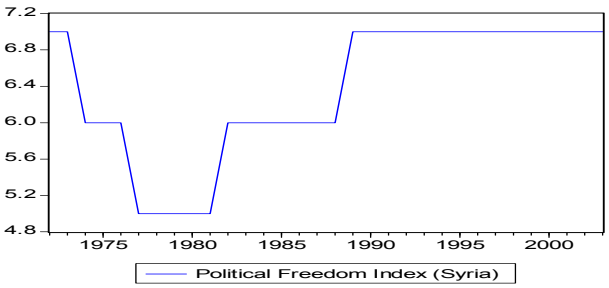




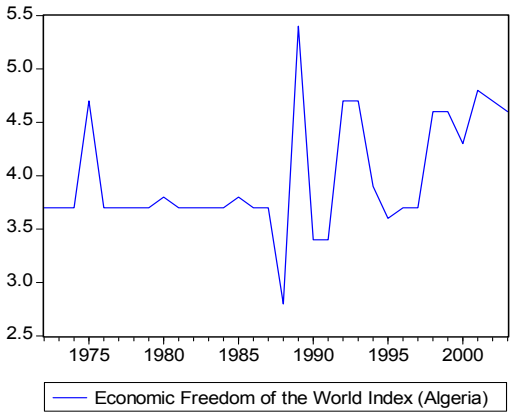


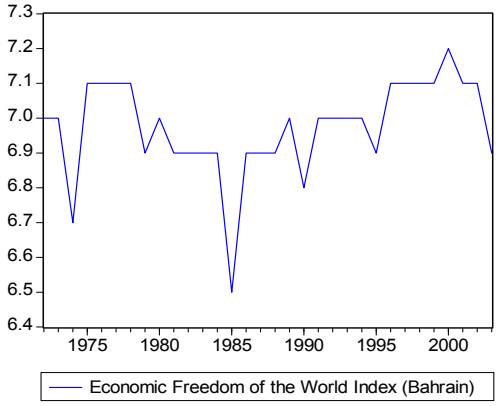


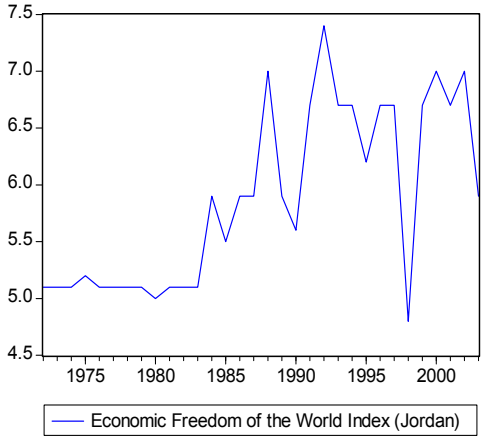


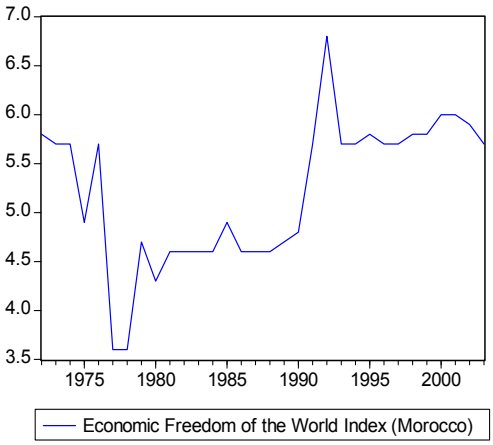


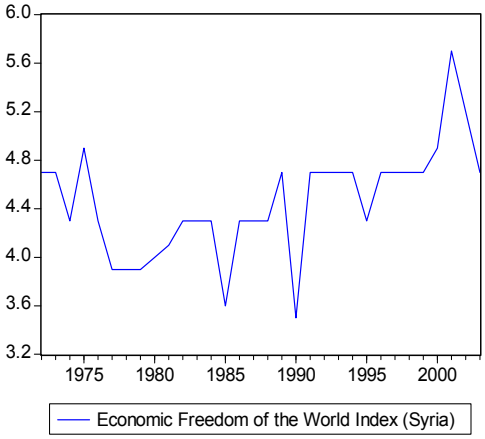
ECONOMIC FREEDOM OF THE WORLD INDEX[§§]







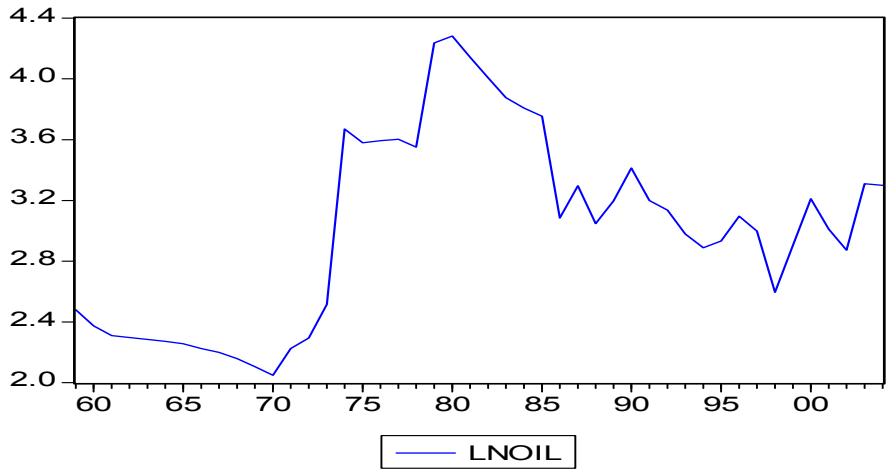




[§§] Low scores are more desirable

APPENDIX D

SAUDI ARABIAN LIGHT CRUDE BY OPEC BETWEEN 1959 AND 2003



UNIT ROOT TEST

Kwiatkowski-Phillips-Schmidt-Shin test

Intercept		**Trend and Intercept**	
LM-statistics		**LM-statistics**	
1%	**0.739**	**1%**	**0.216**
5%	**0.463**	**5%**	**0.146**
10%	**0.347**	**10%**	**0.119**

Log Oil Prices (44 Obs.)

OIL	0.306485	**I(0) at 5% intercept**

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Education
M.S. (Economics), Texas A&M University, College Station, 2005
B.B.A. (Finance), The American University of Beirut, Lebanon, 2003

Professional Experience
Graduate Intern, Institute for School – University Partnerships, Texas A&M University System, Summer 2004
Research Assistant, The Syrian Consulting Bureau for Development & Investment, Damascus, Syria, Fall 2003
Assistant Auditor Intern, Deloitte Touché Tohmatsu, Damascus , Syria, Summer 2002

Languages and Skills
Knowledge of VB programming, WINQSB, STATA, Crystal Ball, E-Views
English and Arabic (fluent) and French (beginner)

Activities and Accomplishments
2004 – 2005 Texas A&M University:
J. Wayne Stark University Galleries, Gallery Guard
Bush School of Government & Public Service, Computer Services Assistant

2002-2003 St. Jude Children Cancer Center in Lebanon, Volunteer
Recipient of Dean's Honor List Scholarship
Member of The American University of Beirut's Syrian Cultural Club, Business Students Society, and Alumni Association

1999-2000 Arts & Sciences Dean's Honor List, The American University of Beirut
Earned 20 %of college expenses through tutoring students in mathematics