Determinants of Private Savings in the Arab Countries, Iran and Turkey

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1. Introduction[1]

Traditional growth and saving analysis focuses on the effect of higher savings on the long-run growth and the impact of an increase in domestic savings on investment. The neoclassical model suggests that during the transition between steady states, an increase in saving ratios generate higher growth only in the short run (Solow 1956). In the long run, equilibrium rate of growth can be explained by structural and demographic variables. Endogenous growth theories developed by Romer (1986) and Lucas (1988) suggest that permanent increases in growth rates can be determined by increased capital accumulation and achieved higher savings. If there is very limited international capital mobility, higher domestic saving results in higher investment and economic growth. However, this is valid only if investment and domestic savings are highly correlated. There are vast amount of empirical literature examining the correlation between domestic savings and aggregate investment. In addition, investigation of the saving behavior has gained significance in the empirical studies, although the lack of detailed and reliable data (see Schmidt-Hebbel et al. (1996) for an excellent survey) was the main bottleneck for a fuller development in this line of work.

Among several other empirical studies, Edwards (1996) investigates the process of determination of saving rates, and in contrast with the earlier works, makes a distinction between private and government savings in the world economy. Edwards (1996) discusses why savings ratios in Latin America have traditionally been so low and compares them with some of the most successful countries in the world. Edwards (1996) also incorporates some policy-related, demographic, structural and political variables to determine the saving ratios. Per capita income growth seemed to be the most important determinant of private and public savings; public savings are lower in countries with higher political instability; public savings crowd out private savings, but less than proportionately.

Dayal-Ghulati and Thimann (1997) examine empirical determinants of private savings for a sample of economies in Southeast Asia and Latin America over the period 1975-1995. They use panel estimations to examine relationship between private saving rates and policy and non-policy variables. Their results indicate that fiscal policy, particularly social security arrangements influence private saving, macroeconomic stability and financial deepening also appear as important variables determining saving behavior in the two regions.

Loayza, Schmidt-Hebbel and Serven (1999) investigate factors behind the broad saving disparities using a large cross-country time-series data constructed for the World Bank Saving Project (WBSP). Their paper contributes to the literature by using the largest data set on aggregate saving measures assembled to date. They use the panel instrumental variable technique that allows correcting for endogeneity and heterogeneity through internal instruments.

This paper also examines empirical determinants of private saving for a sample of economies in the Middle East and North Africa (MENA) over the period 1981-1994. It argues that the mean saving ratio for the selected MENA countries is over the mean world saving ratio (0.26 vs. 0.16, respectively).[2] However, the force behind the savings in MENA countries can be delineated, to a large extent, by the growth rate of income. Public savings seem to be quite important for the determination of private savings. This paper then tests if the public savings crowd out the private savings. Additionally, statistical significance tests on the effects of policy and non-policy related variables are performed. Panel estimation is employed to investigate the relationship between private saving rates and several macroeconomic policy and non-policy variables which, in some ways are similar to the study he done by Loayza, Schmidt-Hebbel and Serven (1999). A cross-country time-series data set constructed for the World Bank Saving Project is employed.

2. Trends in Private Saving

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[2] The mean saving rate for MENA countries drops to .24 when the rate for Arab Emirates is excluded. Excluding three high saving countries (Kuwait, Bahrain and Arab Emirates), the mean saving rate becomes .22. The median value is .25. If only seven MENA countries (Egypt, Iran, Jordan, Morocco, Syria, Tunisia and Turkey) are considered the mean saving rate drops to a low of .17 which is almost equal to the world saving rate.

Descriptive statistics of all variables in the data set, covering t1981-1994 period, are given in Table 1 and Figure 1-3 that present private saving rates (private saving/gross private disposable income), which has an overall mean rate of

Table 1a   Descriptive statistics

	S	M	C	YD	OD	U	T	GS	INF	Y	DY
Mean	0.260338	0.673625	0.492791	0.377819	0.043997	0.621961	1,219,138	0.073389	0.108302	8,704,361	0.008727
Median	0.250994	0.610756	0.472345	0.386896	0.035613	0.576807	1,117,578	0.038094	0.055339	7,795,953	0.017889
Maximum	0.743568	1,558,595	1,290,991	0.488721	0.107739	1,025,371	5,722,671	1,705,705	1,577,276	1,424,028	0.285108
Minimum	-0.11728	0.194578	0.061232	0.228357	0.01276	0.079005	0.113267	-0.82013	-0.28482	5,958,415	-0.32191
Std. Dev.	0.135022	0.306752	0.261232	0.074772	0.028501	0.221229	0.533943	0.215992	0.215319	2,248,878	0.094992
Skewness	0.674984	0.754507	0.49424	-0.40384	1,218,403	-0.45399	3,839,883	3,351,051	3,229,760	1,160,542	-0.56049
Kurtosis	5,339,939	2,941,882	2,691,404	2,097,086	3,027,587	2,911,889	2,952,838	2,483,950	1,876,169	3,319,596	4,592,404
Jarque-Bera	6,142,256	1,919,419	9,025,383	1,235,221	4,998,479	7,004,111	6,419,674	4,392,505	2,442,148	4,620,391	3,191,889
Probability	0	0.000068	0.010969	0.002079	0	0.030135	0	0	0	0	0
Observations	202	202	202	202	202	202	202	202	202	202	202

Table 1b   Cross section correlations

	S	Y	DY	GS	INF	M	YD	OD	U	T	C
S	1										
Y	0.433265	1									
DY	-0.19346	-0.07716	1								
GS	-0.34558	0.018716	0.066461	1							
INF	0.408691	0.32999	0.128215	-0.45285	1						
M	-0.01716	-0.05025	-0.13042	-0.15888	-0.12974	1					
YD	-0.4926	-0.02026	0.228408	-0.15197	0.023091	0.079088	1				
OD	-0.18497	-0.48563	-0.02071	0.421321	-0.23925	-0.21696	-0.671	1			
U	0.350943	-0.08233	-0.35414	-0.09784	0.152853	0.121766	-0.4581	0.125536	1		
T	-0.22942	0.054403	0.228274	0.214081	-0.41126	-0.16626	0.273082	-0.20473	0.056061	1	
C	-0.25746	-0.17754	0.296912	0.264565	-0.15427	-0.07454	-0.18157	0.323465	0.038131	-0.0611	1

Table 1c   correlations (full sample)

	S	M	C	YD	OD	U	T	GS	INF	Y	DY
S	1										
M	-0.12493	1									
C	-0.009	-0.06016	1								
YD	-0.37595	-0.18641	0.008915	1							
OD	-0.10114	0.264148	-0.18082	-0.69891	1						
U	0.094133	0.16383	0.03139	0.009366	-0.06451	1					
T	-0.22074	-0.03449	0.050271	0.092982	-0.07136	-0.14645	1				
GS	-0.1952	-0.04013	-0.01665	0.081564	-0.05848	-0.00697	0.689105	1			
INF	0.055669	0.132705	-0.01677	-0.06885	0.152933	-0.00702	-0.08386	-0.00983	1		
Y	-0.30453	0.00054	0.08488	0.076049	0.135692	0.038822	0.138863	0.096996	-0.04762	1	
DY	0.00598	-0.02865	-0.01189	0.072808	-0.03272	-0.00498	0.002981	-0.00697	-0.00702	-0.11278	1

0.26 for all countries with a standard deviation of .135. Syria has the lowest mean saving rate (.104) while Arab Emirates the highest (.624). Due to the considerable range in the mean saving rates, it is better to divide the countries into three groups. First group consists of those countries which have lower mean saving rates than .20 which are Syria, Egypt, Saudi Arabia and Jordan. Second group countries have mean saving rates between .20 and .30 which are Morocco, Tunisia, Turkey, Cyprus, Malta, Iran, Oman and Israel. The third group, whose mean saving rate is higher than .30 includes Kuwait, Bahrain and Arab Emirates (Appendix A Table 1)

Syria indicates a very different picture from the rest of the countries in the data set. In addition to having the lowest mean saving rate (0.104), Syria had also a high standard deviation (0.107), which is indicative of serious ups and downs in the saving rates. The falling saving rate since 1980 seems to recover in 1985. Starting from 1985, Syria experienced fast drops in her savings, which reached below zero level in 1988. Although Syria's saving rate increased to 0.05 levels in 1990, it inclined downward again until it reached to minus saving rate in 1992. Rates for Egypt (0.16) seem to have fluctuated somewhat, which fell below the overall mean between 1984 and 1988 and recovered in the following two years but tended to fall again in 1993. Saudi Arabia (.186) has the highest standard deviation in saving rates which indicates unstable saving behavior in this period. The country experienced a downward trend between 1980 and 1984. Despite small fluctuations in some years, savings had an upward trend until 1991. Since then, savings decreased gradually to .31 level in 1994. Jordan (.189) is a country with considerable fluctuation in her savings, which was lowest (0.07) in 1985 and recovered gradually, reaching its second highest in 1989 (0.25). Savings in Jordan have been coming down since 1985. Morocco (.207) had quite stable saving rates over the period, which tended to decrease gradually after 1990. Morocco entered an upward trend in her savings after 1993.

The saving rates of Tunisia (.216) were quite stable over the period. Despite some small fluctuations between 1982 and 1987 it tended to stay in the range of .20 and .25. Turkey (.251) had the median saving rate for the period. Relatively stable rates reached their highest in 1988. They followed first a downward trend and then an upward trend between 1988 and 1993. Savings decreased somewhat after 1993.

Cyprus (.258) is one of the stable countries in terms of saving rates. Throughout the period, the rate of savings stayed between .20 and .30. Malta (.261) has a similar saving behavior to Cyprus. Savings came down under .20 level only once in 1986 after which remained quite stable till the end of the period. Iran (.272) experienced a drastic drop in her savings between 1980 and 1984. Following the recovery in 1985, savings remained less fluctuated and tended to increase after 1993. Oman (.289) presents a unique case of constantly dropping savings. If the upward trend between 1990 and 1992 is disregarded, the country had falling savings in the whole period. The relatively higher mean saving rate is obviously due to the higher initial savings between 1980 and 1983. As of 1993 the country had nearly zero saving. Israel (.289) is among the countries that exhibited a stable saving behavior in this period. The country experienced a serious downward trend between 1984 and 1988 .An upward trend seems stabilized around .25 level.

Among the high saving countries, Kuwait (.324) followed in general, an upward trend in the period. Savings which were around .10 level in 1980 increased to .40 level in 1994. Two serious drops were experienced in 1983 and 1986. Bahrain (.397) is the country which had the second highest initial saving rate (.50) in 1980. Savings followed a gradual downward trend until 1986, reaching as low as .25 level. This trend was reversed in 1987 after which fluctuated somewhat until 1992. The country experienced a drastic increase in savings after 1993 and reached .52 level in 1994. Arab Emirates (.624) is the country with the highest saving ratio in the region. This is due to the highest initial saving ratio (almost.80) which came down to .52 in 1991, following a straight downward trend until 1987. Since then, relatively low savings in 1988 seem to increase until 1991 which is the last year for the available saving data.

Some trends are obvious from these descriptions: 1) Countries with high saving ratios in the period had similarly high saving rates before the period. It seems that their higher saving ratios is, to some extent, due to spillover, 2) There are vast differences among the countries in terms of the mean saving ratios. This heterogeneity may have serious implications for the analysis of determinants of saving in the region at large and 3) None of the countries had a perfectly consistent trend (increasing, decreasing or stable) throughout the period.

Although it is quite difficult to explain these trends for each country and region as a whole, one can attempt to pinpoint certain tendencies for the countries and the region. All of the countries had experienced either domestic or international conflicts in this period or they shared borders with those countries that had domestic and international political conflicts. Egypt-Israel war, Iraq aggression to Kuwait, Iran-Iraq war, PKK problem in Turkey and Iraq, fundamentalist religious movements in North African Countries are good examples. It is politically one of the unsettled regions of the world.

All the countries can be characterized as countries with a high proportion of young population. MENA also continues to show the highest population growth rate among developing regions. This reflects to a large extent social and cultural norms that are difficult to change, but that are gradually changing to varying degrees among countries of the region.

Child rearing traditions, which are observed strictly, foresee children living with parents until they complete their education and marry. Raising a number of children, (the number is usually higher than the ideal or wanted), is an expensive process and uses much of the household's sources. This tradition, coupled with the tradition of not letting children and youngsters work for money until they finish their education, increases the burden of the adults, and lessens their chance to save. Just the opposite of what is alluded in the literature, older people may start saving money after they educate and marry their children. Their income may be lower but their expenses will be much lower than what it used to be when raising their children, the majority of whom remain unproductive until the age of 22.

States in these countries are the biggest employers. A large portion of the active population work for the state, performing various public services. Public sector has notoriously lower returns compared to the private sector. The majority of the public sector employees barely make their livelihood. Lower salaries of the public sector employees leave little room for saving. On the other hand, lower public pay may translate, depending on the size of public sector, into lower government expenditure, so it may have little net effect on national saving.

3. Determinants of Private Saving Rates in the Previous Work

The challenging task of understanding determinants of private savings and its relation with growth has received equal attention in both industrial and developing countries. Previous empirical literature on determinants of private saving and growth cover both industrial and developing countries (see Masson, Bayoumi and Samiei 1995, Edwards 1996, Bailliu and Reisen 1998, and Loayza, Schmidt-Hebbel and Serven 1999). On industrial-country samples, refer to Haque, Peseran and Sharma 1999), and for developing countries see (Corbo and Schmidt-Hebbel 1991and Dayal-Ghulati and Thimann (1997). The following section presents the expected size and the sign of the coefficients of determinants of private saving model.

3.1 Policy Variables:

Fiscal policy variables: Fiscal policy affects saving behavior through revenue and expenditure policy and the degree of government saving. Empirical results reveal that government saving has crowded out private saving only partially. Therefore, raising government savings helps rise national saving (Dayal-Gulati and Thimann (1997)).

Financial market deepening: It is difficult to find a good proxy to represent the financial market development. The most available data is a set of narrow and broad monetary aggregates. Almost all studies have used the degree of monetisation of the economy measured by the broad money (M2) to the GDP to measure the financial market development. A parameter of interest is expected to be positive and statistically significant. This shows that the financial market development has a positive net effect on saving (see Edwards 1996, Dayal-Gulati and Thimann 1997, Johansson 1996, Loayza, Schmidt-Hebbel and Serven 1999).

Real interest rates: The effect of increases in real interest rates on savings was a topic for a large number of empirical country studies. The existing evidence suggests that there is only a weak interest elasticity of aggregate domestic savings for both developed and developing countries (Boskin 1978, Giovannini 1983). McKinnon

(1991) reports that aggregate savings defined as the percentage of GNP accounts does not respond strongly to higher real interest rates.

Demographic variables:

According to the life-cycle model of Modigliani (1970), economic agents will have negative savings when they are young and have very low income, positive savings during their productive years and negative savings when they are old and retired. Therefore, aggregate private savings will be affected by the age distribution of the population. When the share of the working population relative to that of retired persons increases, saving is likely to increase (see Lahiri 1989, Bos Loayza, Schmidt-Hebbel and Serven 1999, Higgins and Williamson 1996, Edwards 1996, Dayal-Gulati and Thimann 1997, Loayza, Schmidt-Hebbel and Serven 1999). Demographic variables are long-run variables and explain the long- term trends in saving ratios. However, they provide no information about the short-term changes in saving behavior.

Income level and Economic growth:

In the life-cycle hypothesis framework, income growth can be considered having an important positive effect on private savings since saving and growth have been highly correlated in the long run. Growth increases saving since it increases the income of young people relative to that of the old. On the other hand, permanent income hypothesis suggests a negative relationship between growth and saving since forward looking agents believe that their permanent income will increase in the future and then they will dissave against future receipts.

Other determinants of savings:

For an open economy model, terms of trade is a critical variable particularly for the oil exporters (Ostry and Reinhart 1992, Dayal-Gulati and Thimann 1997, Loayza, Schmidt-Hebbel and Serven 1999). Open economy models should also include

domestic interest rates that are related to foreign interest rates. However, obtaining the interest rate spread from the available sources is generally not very easy.

4. Empirical Analysis

This section introduces an empirical private savings model which will be followed by the description the World Bank saving data. Since the definition of private and public sector is particularly important as in the case the oil-exporting economies where oil wealth is held by the public sector and as in the case of economies with a large public enterprise sector, definitions will also be dealt with in this section. Finally, the results of the panel estimations will be reported.

4. 1. Empirical Private savings Model

Based on the discussion in Section 3, the empirical private saving equation can be specified as:

$$S_{tk}= \text{ß}_0\ S_{(t-1)k}+ \text{ß}_1 GS_{tk}+ \text{ß}_2 ?LP_{tk}+ \text{ß}_3 YD_{tk}+ \text{ß}_4 OD_{tk}+ \text{ß}_5 UR_{tk} + \text{ß}_6 T_{tk}+ \text{ß}_7 C_{tk}+ \text{ß}_8 M_{tk}+$$
$$\text{ß}_9 RR_{tk} + \text{ß}_9\ LY_{tk}+ \text{ß}_{10} ?LY_{tk} + \text{ß}_{11}\ WI_{tk}\ +U_{tk} \qquad (1)$$

Where tk denotes country k in time period t and L denotes the log of the variables of our interests. ? is a difference operator and ?L defines the growth rate of the particular variable. S is the private savings as a percentage of gross private disposable income (GPDI) and $S_{(t-1)k}$ is one period lag of S_{tk}. GS is the saving of public sector as a percentage of gross private disposable income (GP DI) and can be considered as one of the fiscal policy related variables. M is the money plus quasi money (M2) as a percentage of GNP and P is the GDP deflator and therefore ?LP is the rate of inflation. These two variables (M and ?LP) can be treated as macroeconomic stability variables. YD, OD, UR, Y and ?Y represent life-cycle variables, including the young dependency ratio (YD), old dependency ratio (OD), the urbanization ratio (UR), log of real per capita GPDI (LY), and its growth rate (?LY). To capture the characteristics of the financial sector credit to the private sector (end

of period) as a percentage of GPDI and real interest rates (RR) are used. WI denotes the Iran and Iraq war and Gulf war respectively.

4.2 World saving data base

The data set is obtained from the saving database recently constructed at the World Bank, and described in Loayza, Lopez, Schmidt-Hebbel and Serven (1998a). The World Saving Database (WSD) consists of the following modules:

Module 1 National saving and other national accounts aggregates,

Module 2 Saving of the private and public sectors which is defined as central government only specified as unadjusted saving and adjusted saving (corrected for inflation and exchange depreciation),

Module 3 Saving of the private and public sectors which is defined as the general government or the non-financial public sector specified as unadjusted saving and adjusted saving (corrected for inflation and exchange depreciation),

Module 4 Selected savings determinants such as family and demographic structure variables, financial development variables, poverty and inequality variables, social security and external variables.

The database includes 150 countries and covers the period between 1960-1995. However, not all variables are available for every country every year. Hence, the effective time coverage of the data files varies substantially across modules and, within a given module, across countries and variables. In this study, the period covers 1982-1993 for the selected MENA countries.

As in many analyses, measurement of the variables stands as a formidable task. There is considerable dispute about the definitions of the private and public saving, which is the main source of the measurement problem. Definition of the public saving, for instance, is particularly important for the oil-exporting economies of this study where oil wealth is held by the public sector, as well as for economies with a large public enterprise sector such as Turkey.

This study adopts the same definition used in the WSD which deserves a careful attention. Following Loayza, Lopez, Schmidt-Hebbel and Serven (1998b), the basic

income measure is taken as gross national disposable income (GNDI) that is equal to GNP plus all net unrequited transfers from abroad. Gross national saving is then defined as GNDI minus consumption expenditure, both measured at current prices. Gross private saving has been computed as the difference between gross national saving (from Module 1) and public sector saving[3]. For the public sector, four alternative saving measures are available as mentioned above (Module 2 and 3). Module 2, where the public sector is uniformly defined, is selected for saving of the private and public sectors which is delineated as the central government only and unadjusted for inflation and exchange rate depreciation. This is the most available saving definition regarding the selected MENA countries. However, Turkey has data on saving of the consolidated non-financial public sector, inclusive of public enterprises. Tunisia has data on saving of the central government plus state-owned enterprises and Egypt has data on general government as defined in Module 3. Having different saving definitions, which is also the case here, requires particular attention when modelling the saving behaviour in country specific studies.

Although, all demographic variables, financial deepening and fiscal policy variables are available in the WSD, it is unfortunate that the spread between average deposit and lending rates, deposit rate, treasury bill rate or money market rates are absent. These variables are only available for a few MENA countries. Instead, discount rates were used for their availability for the majority of the countries in the data set. Terms of trade was only available for the period of 1982-1993, therefore the sample period shrank significantly.

4.3 Estimation Results

This section reports estimation results of private savings equations for a 15-country data set (Bahrain, Cyprus, Egypt Arab Republic,, Iran Islamic Republic of, Israel, Jordan, Kuwait, Malta, Morocco, Oman, Saudi Arabia, Syrian Arab Rep., Tunisia, Turkey, United Arab Emirates). The estimation was performed on panel data, which were available for a 14-year period from 1981 to 1994 (Syria 1981-1991, Malta 1981-1993, United Arab Emirates 1980-1994). The results obtained from these equations

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[3] Consolidated central government savings in terms of units of domestic currency in module 2.

Table 2 Savings determinants
Dependent Variable: S
Method: Pooled Least Squares
Sample(adjusted): 1981 1990
Included observations: 10 after adjusting endpoints
Number of cross-sections used: 15
Total panel (balanced) observations: 150
White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
S(-1)	0.458362	0.075274	6.089208	0.0000
M	0.053993	0.081325	0.663917	0.5080
C	-0.277625	0.081993	-3.385947	0.0010
YD	-0.209218	0.462975	-0.451900	0.6521
OD	-2.861100	2.589983	-1.104679	0.2715
UR	-0.114298	0.237345	-0.481568	0.6310
T	0.049072	0.016903	2.903098	0.0044
GS	-0.240835	0.054941	-4.383539	0.0000
ΔLP	0.094108	0.029803	3.157687	0.0020
LY	0.079964	0.042420	1.885025	0.0618
ΔLY	0.153990	0.069031	2.230740	0.0275
WI	-0.045722	0.022341	-2.046583	0.0428
Fixed Effects				
BHR--C	0.017434			
CYP--C	0.017386			
EGY--C	-0.236131			
ISR--C	-0.114579			
JOR--C	-0.089613			
KWT--C	0.095135			
MLT--C	0.031524			
MAR--C	-0.342077			
OMN--C	-0.136159			
SAU--C	-0.343337			
TUN--C	-0.046661			
TUR--C	-0.759248			
SAU--C	-0.343337			
ARE--C	-0.320682			
IRN--C	-0.635360			

R-squared	0.921607	Mean dependent Variable		0.265190
Adjusted R-squared	0.905036	S.D. dependent Variable		0.146695
S.E. of regression	0.045206	Sum squared residuals		0.251360
F-statistic	131.4561	Durbin-Watson stat		2.225314
Prob(F-statistic)	0.000000			

were used to understand the saving behavior of the MENA countries, Iran and Turkey.

During the model estimation, we used several specifications to consider the characteristics of the countries of interest. We observe that the sample period appears to include war years. It may be important to assess the impact of these observations on the entire estimation results. To account for the effects of war years on the respective economies, a war dummy was created. It took the value of one for Iran-Iraq war years (September 1979-July 1988) and for Gulf war years (1990 August-1992 July) and otherwise zero. War dummies are included, but only for those countries involved in the conflicts. We estimated private saving equation both with war dummies (see table 2) and without war dummies (see appendix A table 2).

In addition, following Loayza, Schmidt-Hebbel and Serven (1999), we used dynamic specification in order to allow inertia that is very likely to be present in the annual data. Inertia in saving rates can arise from lagged effects of the explanatory variables on saving. Considering the lagged dependent variable as a possible explanatory variable allows us to use dynamic specification and to discriminate between short-run and long-run effects on saving.

Other econometric problems that one should tackle are the problem of joint endogeneity of explanatory variables with the saving rate, and the problem of having some unobserved country-specific effects correlated with the regressors. To control the presence of heterogeneity and endogeneity of explanatory variables Generalized –Method Moment estimators (GMM estimation method) can be used in the dynamic panel specification. Joint endogeneity can be controlled by using internal instruments, namely, some lagged values of the explanatory variables. The country-specific effects in the context of panel data are usually handled by using first difference equations (Anderson and Hsiao 1982) by relaxing the original assumption of strict exogeneity and introducing the assumption of weak exogeneity of the explanatory variables which are assumed to be uncorrelated with the future realizations of the error term (for further discussion see Loayza, Schmidt-Hebbel and Serven 1999, p.6-9) There are some statistical shortcomings of difference GMM estimation. Moreover, there is also a conceptual problem. By differencing,

determinants of cross-country saving relationship will be eliminated, which creates potential biases. To eliminate these biases, the GMM procedure suggested by Arellano and Bond (1991) and Arellano and Bover (1995) can be used as an alternative estimation method, which generates consistent estimates of the parameters of interest. The consistency of GMM estimators relies on testing whether lagged values of the explanatory variables are valid instruments or not in the saving specification. (For testing procedures, see Arellano and Bond 1991, Arellano and Bover 1995 and Blundell and Bond 1997)

Given the potential econometric and conceptual problems, we were unable to implement Arellano and Bond dynamic panel data (DPD, GMM1 and GMM2 estimators) procedure even in a limited sense. The very limited sample size makes it impractical to work with GMM-like estimators, which do not have good finite sample properties—especially in cases like ours where the time dimension nearly equals the cross section dimension. Since we need to allow somehow for heterogeneity and also have to stick to this sample and therefore to an insufficient degrees of freedom and we had to discard those estimators and to focus on the fixed effect dynamic regressions. However, when we focus mainly on the dynamic regressions we realized that OLS regression without fixed effects will lead to an upward bias in the coefficient of lag dependent variable therefore overstating the degree of persistence. In turn, fixed effects in a short sample like this one results in an understatement of persistence.

In the presence of the mentioned problems, we concentrated on OLS in which the constant terms are allowed to vary across countries in order to capture underlying country specific factors. In Table 2, we estimated Equation 1 with the covariance matrix was adjusted to allow for heteroskedasticity within the sample using the White adjustment procedure.

Persistence: The results in Table 2 confirm the persistence in the saving equation. The lagged dependent variable (lagged private saving rate) has a positive and significant coefficient whose size is (0.46) for the fixed effect model which indicates a large degree of persistence. This result on persistence is consistent with the findings of the previous research.

Income: The results of our estimation show that log of real per capita income level has a positive coefficient (0.08) and is statistically significant impact on the private saving rate, indicating that MINA countries tend to save a higher fraction of their GDP. In addition, the real per capita growth rate is found to be statistically significant and positive (.15) implying that a rise in the growth rate of 1 percent would yield 0.15 percent higher savings in the short-run. When the impact of saving on growth (through capital accumulation) is taken into account, it is possible to confirm the hypothesis that there is virtuous circle that goes from faster growth to increased saving to even higher growth (see Edwards 1996 p.33).

Demographic variables: Our analysis reveals that, for MENA countries, none of the demographic variables under consideration (the young dependency ratio, the old dependency ratio and urbanization) turns out statistically significant. However, the signs of the coefficients of these variables were negative, in line with the predictions of the life-cycle and precautionary savings model. The findings also confirm Deaton's (1990) buffer stock approach to private savings.

Fiscal policy: The impact of government savings on private investment is an issue that receives considerable attention, from a policy as well as a theoretical perspective. Our results indicate a negative and statistically significant coefficient (-0.24) for the government savings to GPDI ratio, confirming the fact that government saving will tend to crowd out private savings An important issue, however, especially regarding policy prescriptions is whether this coefficient is statistically different from –1.0 (the case of complete crowding out) or not. Testing this hypothesis yields the conclusion that the coefficient is indeed significantly different from –1, implying that crowding out is only partial. This indicates that the Ricardian equivalence does not hold strictly, and that the government can increase aggregate through increasing public savings (Edwards 1996 p.32).

Financial variables: The financial variables included aim to reflect the degree of development of the financial system, as well as the tightness of the borrowing constraints. The results reveal that the M2/GNP ratio, used to reflect the "financial depth" has a positive and but statistically insignificant coefficient (0.05), as suggested

by Loayza, Schmidt-Hebbel and Serven (1999). Private credit and real interest rates also capture the severity of the borrowing constraints and the degree of financial repression. We found positive and statistically significant coefficients for private credit to GNDI ratio as suggested by Edwards (1996).

Macro Stability: Following many studies in the literature, we have proxied macroeconomic stability by the inflation rate and found a positive and statistically significant coefficient (0.09) However, one should be cautious while interpreting this result, as the indirect and positive effect of reduced inflation on savings (through growth) must be reduced inflation on savings must also be taken into account is likely to prove to be stronger.

Other variables: We came across a (0.049) positive small and statistically significant terms of trade effect on saving rate. However, we could not find any statistically significant real interest rate effect on savings in the fixed effect model given in the Appendix A Table 3. We have also included the presence of war within the studies period only for those countries involved in the conflicts. A war dummy has a negative (-0.046) and statistically significant impact on private saving rate.

4.4 A Comparison Between MENA, LDC, and OECD group

Having analyzed the determinants of private saving rates for MENA countries, we find it insightful to compare our estimation results on MENA countries with those of less developed countries (LDC) and OECD countries given in the study of Loayza, N., Schmidt-Hebbel, K. and Serven, L. (1999).

The addition of the LDC and OECD countries reveal an interesting fact that there are no inconsistencies in the signs of the coefficients of saving determinants across samples, in other words, no impact turns out to be negative for one group and positive for the other. This finding is pleasing when the fact that ambiguities are a frequent phenomenon in theoretical as well as empirical studies of saving is considered. The statistical significance of variables, however, vary across groups(see table 3).

Looking at the estimation results, it is possible to state that the persistence of saving has been uniformly positive and statistically significant across the three group, as is also the case for inflation, terms of trade and per capita income growth rate. The public savings to GPDI ratio also carries a consistently negative and significant but less than (-1) coefficient . The credit/GPDI ratio presents a negative and statistically significant coefficient too, which uniform across the samples.

This uniformity, however, disappears once we consider the M2/GNP ratio . Although its impact is found to be insignificant for MENA and LDC, the coefficient is significant for the OECD sample.

The demographic variables also exhibit difference in significance across samples, although they all have negative coefficients, in line with the life-cycle/precautionary saving hypotheses for all samples. For MENA and OECD groups, all the three demographic variables are insignificant, unlike LDC, for which all are statistically significant. The coefficient of the level of real per capita income, consistently positive across samples, carries an insignificant coefficient for the OECD group.

The differences in the magnitudes of the income and growth rate of income coefficients also deserve attention: The effect of income and growth is higher in LDC and MENA than OECD, a finding which lends support to the subsistence consumption theory that saving rates in low income countries are more responsive to changes in the level and growth rate of income. All the three coefficients for demographic variables are smaller in the OECD sample, unlike LDC where they are greater and statistically significant. This can be explained by the non-linearity of the effects of demographic variables, as well as the greater homogeneity across OECD populations in terms of urbanization and age structure (Loayza, Schmidt-Hebbel, Serven (1999)). The coefficient of the credit/GPDI ratio is also smaller in OECD countries, as the borrowing constraints there are already not much binding. Therefore, a further increase in this ratio would not imply a significant relaxation in the borrowing availability in these countries.

Table 3 Savings determinants

Dependent Variable: S/GPDI

Variable	MENA	LDC	OECD
S/GPDI(-1)	0.458*	0.476*	0.674*
M/GNP	0.0539	0.024	0.028*
C/GPDI	-0.277*	-0.508*	-0.085*
YD	-0.209	-0.279*	-0.068
OD	-2.861	-1.370*	-0.218
U	-0.114	-0.240*	-0.080
T	0.049*	0.044*	0.068*
GS/GPDI	-0.241*	-0.283*	-0.112*
INF	0.094*	0.177*	0.157*
LRPCGPDI	0.079*	0.071*	0.013
DLRPCGPDI	0.153*	0.425*	0.285*
WI	-0.045*		

*Statistically significant coefficients

5. Conclusion and Policy Implications

This paper examines empirical determinants of private saving for a sample of 15-MENA countries. Factors account for saving can be summarized as:

In MENA region private saving rates has strong inertia and they are highly serially correlated. The effects of a change in a given saving determinant are fully realized in longer term than the short-term (less than a year period).

In the region, real per capita income level has positive impact on private saving rate which indicates that ceteris paribus more advanced countries tend to save a higher percentage of their GDP. Real per capita growth rate is positively related to savings, which supports the hypothesis that there is a virtuous circle that goes from faster growth to increased saving to even higher growth. Moreover, while negative

dependency ratios and urbanization rate lends support to the life-cycle hypothesis, however they are statistically insignificant.

The most important findings of this study is that government savings to GPDI ratio has a negative impact on the saving rate, confirming the claim that government savings will tend to crowd out private savings. For the MENA countries, increases in government savings will be offset by reductions in public savings. The findings further indicate that, although higher government savings crowd out private savings, they do it in a less than one-to-one manner and the Ricardian equivalence does not hold strictly.

From a policy point of view, financial depth and development measure of MENA region (M2 to GPDI) suggests that countries with deeper financial systems will tend to have higher private saving rates. Private credit and real interest rates also capture the severity of the borrowing constraints and the degree of financial repression. The precautionary motive for saving is supported by the findings that inflation captures the degree of macroeconomic volatility and has a positive impact on private saving in the area.

The empirical findings presented here indicate a number of variables that affect saving in the selected MENA countries. They clearly indicate the role of policies pursued by each country and the complexity of the relationship between saving and other variables that affect saving.

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