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Oil Consumption and Microeconomic Policies: Evidence of Asymmetry in Developing Countries

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Macroeconomic Policies, Cyclicality and Planned Consumption: Evidence from the Middle East

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Abstract

The paper examines asymmetry in the cyclical behavior of private consumption. The empirical model includes three policy variables: government spending, the money supply, and the exchange rate. Anticipated movements in these variables are likely to vary with agents' forecasts of macroeconomic fundamentals and, therefore, determine planned consumption. Unanticipated policy changes, in contrast, determine cyclical consumption. Using data for a sample of nine developing countries in the Middle East, fluctuations in private consumption are mostly cyclical. The stabilizing function of policy shocks varies across countries and appears to be asymmetric within countries. The evidence of asymmetry necessitates that the policy stance be carefully designed to maximize its desired effects on private consumption, the largest growing component of aggregate demand in many developing countries.

I. INTRODUCTION

Consumption spending is a major component of aggregate demand. [1] To what extent does private consumption vary with policy variables in developing countries? A positive cyclical response of private consumption to real growth is desirable. It indicates a reduction in private consumption in response to a decline in real growth. This positive correlation reduces pressure on price inflation given constraints on the supply side. Further, this positive response points to the need for policy intervention to stimulate economic conditions during periods of a slowdown. It is, therefore, necessary to evaluate developments in private consumption with major policy tools: fiscal policy, monetary policy, and exchange rate policy. Nonetheless, researchers have not analyzed thoroughly determinants of consumption spending in many developing countries. Financial markets and credit availability are at different stages in developed and developing countries, necessitating different treatments in modeling and analyzing private consumption. In addition, data availability is very limited for developing countries. Our research aims at bridging the gap in the empirical literature by analyzing determinants of consumption in developing countries.

Using a rational expectation model, we decompose determinants of consumption into anticipated and unanticipated components. This decomposition aims at separating fluctuations in planned consumption in the face of anticipated forecasts from cyclical consumption that varies in the face of unanticipated shifts. The anticipated component varies with agents' forecasts of macroeconomic fundamentals. The cyclical component of consumption varies with random uncertainty impinging on the economic system.

We will study how consumption spending varies with stabilization policies, including both fiscal and monetary policies, in a sample of Middle Eastern countries. [2] Given the dependency of many Middle Eastern countries on imports, we add the exchange rate to the empirical model to study the effects of fluctuations in the exchange rate on consumption. Currency appreciation would make imports cheaper and divert private consumption away from non-tradables towards tradable goods. [3]

Anticipated changes in policy variables are likely to determine the steady state income. We will investigate if consumption moves with anticipated changes in the money supply, government spending, and the exchange rate. In addition, one expects that transitory shocks in policy variables will determine cyclical consumption. Moreover, policy shocks are decomposed into expansionary and contractionary shocks. Using this decomposition, we study asymmetry in the cyclical behavior of consumption in the face of policy shocks.

Countries included in the study are Algeria, Egypt, Iran, Jordan, Libya, Oman, Pakistan, Syria, and Tunisia. The sample period of investigation varies based on data availability. The investigation will evaluate the final findings from a regional standpoint to shed light on the cross regional similarities and the role of policy makers in determining and stabilizing consumption in a sample of developing Countries.

The remainder of the paper is organized as follows. Section II outlines the empirical models. Section III presents empirical results. The summary and conclusion are presented in Section IV.

II. Empirical Models

The empirical investigation analyzes annual time-series data of private consumption in nine countries in the Middle East: Algeria, Egypt, Iran, Jordan, Libya, Oman, Pakistan, Syria, and Tunisia. Data for most countries range from 1963-2002. For Algeria and Tunisia, the sample period extends through 2003. For Oman, the sample period is 1967-2002. For data definition and sources, see Appendix B.

We estimate a reduced-form equation that replicates the solution of private consumption in the model. Private consumption varies with government spending, the money supply, and the exchange rate. Each policy variable is decomposed into anticipated and unanticipated components. The response of private consumption to anticipated policy shifts will indicate the degree by which anticipated policy shifts gauge planned consumption decision in the steady state. The response of private consumption to unanticipated policy shocks will indicate the cyclical nature of consumption spending and the success of stabilization policies in countering this cyclicality. Of particular interest is to study asymmetry in consumption fluctuations in the face of policy shocks. To that end, policy shocks are decomposed into positive and negative components. The sign and significance of parameters measuring the response of private consumption to positive and negative shocks will be studied to evaluate the degree of asymmetry.

Having tested for non-stationarity, the empirical model is specified in first-difference form as follows: [4] Accordingly, the following empirical model is estimated:

$$\begin{aligned} Dc_t = {} & B_0 + B_1 E_{t-1} Dg_t + B_2 \left(Dg_t - E_{t-1} Dg_t \right) + B_3 E_{t-1} Dm_t + B_4 \left(Dm_t - E_{t-1} Dm_t \right) \\ & + A_5 E_{t-1} Drer_t + A_6 \left(Drer_t - E_{t-1} Drer_t \right) + A_7 EC_{t-1} + v_{ct} \end{aligned} \qquad (1)$$

Here, c_t is the log value of real private consumption, where $D(.)$ is the first-difference operator. Real consumption varies with real government spending, real money supply and the real exchange rate. The log values of real government spending, the real money supply, and the real exchange rate are denoted by g_t, m_t, and rer_t. The change in each of these variables is decomposed into anticipated and unanticipated components, where $\$ E_{t-1}$ denotes expectations at time t_1. [5]

Since the model is estimated in first-difference form, we should test if the non-stationary dependent variable is jointly cointegrated with all non-stationary right-hand side variables. Given evidence of cointegration (see Table A2), the error correction term is included in the empirical model. [6] The unexplained residual of the model is denoted by v_{ct}.

To establish robustness and draw further insights, we estimate another version of the empirical model allowing for variation in data measures. Nominal consumption varies with nominal government spending, nominal money, and the nominal exchange rate.

To study asymmetry, each of the shocks in the empirical models is decomposed into positive and negative components as follows:

$$Dc_t = B_0 + B_1 E_{t-1} Dg_t = B_{2p} posg_t + B_{2n} negg_t + B_3 E_{t-1} Dm_t + B_{4p} posm_t + B_{4n} negm_t + A_5 E_{t-1} Drer_t + A_{6p} posr_t + A_{6n} negr_t + A_7 EC_{t-1} + v_{ct} \quad (2)$$

Shocks to government spending are decomposed into positive and negative components, *posg* and *negg*. Expansionary and contractionary shocks to the money supply are denoted by *posm* and *negm*. A positive shock to the exchange rate, *posr*, indicates currency appreciation while a negative shock, *negr*, indicates currency depreciation.

III. Empirical Results

Table 1 presents shares of private consumption to GDP for a group of Middle Eastern and North African countries. Table 2 presents the evidence of estimating real consumption as a function of real government spending, real money and real exchange rate.

Planned real consumption does not vary significantly with anticipated real money growth in any country. In contrast, a positive shock to monetary growth stimulates real consumption in Syria. [7] In contrast, an expansionary shock to monetary growth decreases real consumption growth in Oman. [8] Private consumption also decreases in the face of contractionary shocks to real monetary growth in Oman. [9] Clearly, monetary shocks appear to be asymmetric in determining real consumption spending in Oman. The interest rate channel dominates in the face of expansionary shocks while the liquidity channel dominates in the face of contractionary shocks.

Planned consumption does not vary significantly with anticipated real government spending in any country. Consistent with the dominant role of the government in providing employment in Syria, expansionary shocks to government spending stimulate private consumption. Contractionary shocks to government spending decrease private consumption significantly in Egypt and Pakistan.[10] In contrast, a reduction in government spending stimulates an increase in private consumption in Jordan and Syria.[11]

Both anticipated and unanticipated currency appreciation has a significant positive effect on private consumption in Egypt. [12] Similarly, currency depreciation decreases real consumption spending significantly in Iran, Jordan, and Oman.

Overall, fluctuations in consumption are mostly transitory in the face of unanticipated policy shocks. The contractionary effect of policy shocks appears more pervasive compared to the expansionary effects on private consumption. The evidence provides limited support to the asymmetric (varying) effects of positive and negative policy shocks.

To substantiate the evidence, Table 3 contains the results of estimating nominal consumption as a function of nominal government spending, nominal money and the nominal exchange rate. Anticipated nominal monetary growth increases private consumption significantly in Jordan. [13] Expansionary monetary growth stimulates private consumption in Pakistan and Jordan. Consistently, a reduction in monetary growth decreases private consumption significantly in Iran.[14] In contrast, a reduction in monetary growth increases private consumption significantly in Syria.[15]

Anticipated growth in government spending stimulates growth in private consumption in Libya. Unanticipated growth in government spending increases private consumption significantly in Oman.[16] Consistently, a negative shock to government spending decreases private consumption significantly in Pakistan.[17]

Planned consumption does not vary significantly with anticipated exchange rate appreciation. Unanticipated appreciation of the exchange rate increases private consumption significantly in Egypt and Libya. [18] In contrast, unanticipated appreciation decreases private consumption significantly in Pakistan.[19] Unanticipated depreciation increases private consumption significantly in Egypt, Libya, and Syria.[20] In contrast, unanticipated depreciation increases the cost of imports and decreases private consumption significantly in Jordan.

Overall, fluctuations in nominal consumption are mostly cyclical. The expansionary effects of policy shocks appear to be limited on private consumption. Further, the expansionary effects of policy shocks on private consumption are not matched by equal contractionary effects and vice versa.

IV. CONCLUSION

The analysis of this paper has focused on a sample of nine developing countries. Theory has distinguished between cyclical and planned fluctuations in private consumption. Economic agents make planned consumption decisions in response to anticipated changes in macroeconomic fundamentals and forecasts of policy variables. In contrast, random transitory fluctuations impinging on the economic system determine cyclical consumption.

We estimate a reduced-form equation that explains private consumption as a function of policy variables: government spending, the money supply, and the exchange rate. Planned consumption varies with anticipated forecasts of policy variables. Cyclical consumption varies with unanticipated policy shifts. The evidence, in general, indicates that anticipated policy shifts have limited effects on planned consumption.

Cyclical fluctuations in private consumption spending in the face of policy shocks vary across countries. Expansionary monetary policy is significant in stimulating consumption growth in Syria, Pakistan and Tunisia. Monetary expansion increases liquidity and stimulates consumption growth. In Oman, however, expansionary monetary policy decreases private consumption growth. The reduction in the interest rate in the face of monetary growth increases capital outflows, countering the effects of monetary shocks. Contractionary monetary shocks decrease the growth of real private consumption in Oman and the growth of nominal consumption in Iran. The reduction in liquidity appears to be significant in curbing consumption growth. Nonetheless, the growth of nominal consumption appears to be increasing in the face of contractionary monetary shocks in Syria, signaling ineffectiveness of monetary policy.

Consistent with the dominance of government on the economies of developing countries under investigation, expansionary shocks to government spending stimulate private consumption in Syria and Oman. Increased government spending supports higher wages and salaries in the public sector, which provides support for the largest share of employment. Similarly, contractionary shocks to real government spending have a depressing effect on private consumption in Egypt and Pakistan. Nonetheless, the reduction in government spending in Jordan, where a variety of reform measures have been underway, stimulates the growth of private consumption.

Unanticipated currency appreciation stimulates the growth of private consumption in Egypt and Libya. Currency appreciation decreases the cost of imports and raises real income, increasing consumption of tradables and non-tradables. In Pakistan, however, currency appreciation decreases the demand for money and, therefore, the growth of private consumption. Currency depreciation increases the cost of imports and domestic inflation. The reduction in imports results in reduction in private consumption in the face of currency depreciation in Iran, Jordan, and Oman. In contrast, the cost channel increases private consumption in the face of currency depreciation in Egypt, Libya, and Syria.

Overall, the evidence presents a more important role for the stabilizing function of policy shocks compared to anticipated (steady state) policy shifts on private consumption. Nonetheless, the evidence varies across countries and appears to be asymmetric within countries. Exchange rate shocks are relevant to stabilize consumption in Egypt, Iran, Jordan, Libya, Oman, Pakistan, and Syria. Government spending shocks are relevant to stabilize consumption shocks in Egypt, Jordan, Oman, Pakistan, and Syria. The stabilizing effects of monetary shocks on private consumption are evident in Iran, Oman, Pakistan, Syria, and Tunisia. In all of these cases, the stabilizing effects appear to be asymmetric on private consumption. The evidence of asymmetry necessitates that the policy stance be carefully designed to maximize its desired effects on private consumption, the largest growing component of aggregate demand in many developing countries.

A. Econometric Methodology

The surprise terms that enter models (11) and (12) are unobservable, necessitating the construction of empirical proxies before estimation takes place. Thus, the empirical models include equations describing agents' forecast of the change in the log values of the exchange rate, the money supply and government spending. All variables are first-differenced to render the series stationary, as described in Table A1.

To decide on variables in the forecast equations, a formal causality test is followed. Each variable is regressed on two of its lags as well as two lags of all variables that enter the model: the change in the log value of income, the interest rate or price, government spending, the money supply, and the exchange rate. The joint significance of the lags is tested for each variable (see Table A3). Accordingly, the forecast equations account for the lags of variables proven to be statistically significant.

Subtracting the above forecasts from the actual change in the variable results in surprises that enter the empirical model. To obtain efficient estimates and ensure correct inferences(i.e., to obtain consistent variance estimates), the empirical models are estimated jointly with a forecast equation for each anticipated regressor, following the suggestions of Pagan(1984 and 1986)

To account for endogenous variables, instrumental variables are used in the estimation of the empirical models. The instrument list includes four lags of all variables in the model: price, the interest rate, income, money, government spending and the exchange rate. In a few cases, the number of lags has been modified until the estimation did converge. The paper's evidence remains robust with respect to modifications that alter variables or the lag length in the forecast equations and/or the instruments list.

Following the suggestions of Engle (1982), the results of the test for serial correlation in simultaneous equation models are consistent with the presence of first-order autoregressive errors. To maintain comparability, it is assumed in all models that the error term follows an AR(1) process. The estimated models are transformed, therefore, to eliminate any possibility of serial correlation. The estimated residuals from the transformed models have zero means and are serially independent.

B. Data Sources

The sample period for investigation varies based on data availability as follows: Algeria (1963-2003), Egypt (1963-2002), Iran (1963-2002), Jordan (1966-2000), Libya (1963-2002), Oman (1967-2002), Pakistan (1963-2002), Syria (1964-2000), and Tunisia (1963-2003). Variables used in investigation are as follows:

1. Interest Rate: Discount rate, IFS, 60..ZF.
2. Private Consumption: Household consumption expenditure, IFS,96F..ZF.
3. Broad Money: WEO, WFMB.
4. General Government Expenditure and Net Lending: WEO. WGCENL.
5. Exchange Rate: National currency per US dollar, WEO, WENDA.
6. Real Exchange Rate: Nominal exchange rate multiplied by the U.S. CPI and divided by the developing countries CPI. The inverse measures the real value of national currency in terms of dollar. An increase indicates appreciation.
7. GDP Deflator: WEO, WNGDP.
8. Nominal GDP: Gross domestic product current prices, WNGDP.
9. Consumer Price Index: WEO, WPCPI.

All nominal variables have been deflated by the GDP deflator to measure real terms. All country variables are from the IMF, International Financial Statistics (IFS), or World Economic Outlook (WEO), except for USCPI, which is taken from the Federal Reserve Bank of St. Louis.

Notes

[1] Table 1 presents the shares of private consumption to GDP for three distinct years over time.

[2] For related references, see Heller and Starr (1979), Reinhart and Vegh (1995), Sarno and Taylor (1998), Hussein and de Mello (1999), and Yin and Wan (2002).

[3] This channel focuses on the relative prices of tradables and non-tradables. Private consumption may not be affected if consumers substitute imported goods for consumption of domestically produced goods. Other researchers have focused, however, on the contractionary effect of currency depreciation on real income and, therefore, private consumption. According to Diaz-Alejandro (1963), devaluation transfers real income from workers to producers of exports and non-tradables. The latter group has a smaller marginal propensity to consume. Along the same lines, Krugman and Taylor (1978) and Barbone and Rivera-Batiz (1987) have formalized several channels of the contractionary effects of devaluation on private consumption.

[4] For details, see Kwiatkowski e. al. (1992). To select lags for the KPSS test, we follow the suggestions of Newey and West (1994). Non-stationarity indicates that the series follows a random walk process. Upon first-differencing, the resulting series is stationary. Table A1 in the appendix summarizes the results of non-stationarity.

[5] We test for the endogeneity of the explanatory variables in the model (see Table A3). Given evidence of endogeneity, the forecast equations account for lagged values of variables proven to be statistically significant.

[6] As long as there exists at least one co-integrating vector, it is necessary to control for this long-run relationship in the empirical model using stationary data. The error correction term captures deviation around the long-run trend, i.e., the lagged value of the residual from regressing the non-stationary dependent variable on the non-stationary variables in the model.

[7] In Syria, monetization is pursued to finance government spending, which provides support for a good share of wages and salaries in the economy.

[8] Expansionary monetary growth decreases the interest rate and stimulates capital outflows.

[9] The reduction in liquidity decreases available credit.

[10] This is consistent with the contractionary effect of a reduction in government spending on income.

[11] The reduction in government spending increases available credit for private activity.

[12] Currency appreciation decreases the cost of imports and increases real income, raising consumption of both tradables and non-tradables.

[13] This evidence captures the effect of monetary growth on price inflation of consumption goods.

[14] Monetary growth increases liquidity and, therefore, consumption spending.

[15] A reduction in monetary growth coincides with a reduction in government spending and inflation, which has a positive effect on private consumption.

[16] In oil-producing countries, government has a dominant role on economic activity and employment.

[17] Government spending provides employment and supports wages and salaries.

[18] Appreciation increases imported consumption and real income. The latter channel stimulates an increase in consumption of non-tradables.

[19] Agents capitalize on currency depreciation by decreasing money demand and consumption of non-tradables.

[20] Agents switch demand to non-tradables following depreciation. Further, depreciation increases the domestic price of non-tradables and, hence, the nominal value of private consumption.

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Table 1: Shares of private consumption to GDP

	1990	1995	2000	Average 1966-2000
Algeria	56.6	55.6	41.8	47.1
Egypt	71.7	74.2	76.1	68.1
Iran	59.9	47.1	47.7	52.3
Jordan	74.1	64.6	79.5	72.8
Libya	48.4	58.8	45.4	40.1
Pakistan	65.1	67.8	71.3	67.7
Syria	68.7	66.2	64.1	70
Tunisia	63.6	62.9	60.6	61.8
Oman	50.3	47.6	41.4	32.9

Table 2: Nonlinear 3SLS Parameter Estimates,

Model 1: Real Consumption as a function of Real Government Spending, Real Money, and Real Exchange Rate

	A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	RH0
Algeria												
	-0.05	0.68	0.02	0.05	0.51	0.02	-0.12	-0.55	0.90	0.44	-0.23	0.03
	(-0.60)	(1.01)	(0.06)	(0.08)	(0.24)	(0.02)	(-0.14)	(-0.51)	(1.60)	(1.12)	(-0.90)	(0.06)
R-square: 0.08												
Egypt												
	0.07*	-0.22	0.12	0.23	-0.12	-0.03	0.26**	0.34**	0.40*	-0.13		-0.40*
	(1.88)	(-0.55)	(0.50)	(1.08)	(-0.87)	(-0.34)	(2.37)	(2.05)	(1.77)	(-1.58)		(-1.73)
R-square: 0.48												
Iran												
	-0.02	1.58	-0.04	0.15	0.59	0.08	0.16	-0.10	0.56	0.34**	0.07	-0.39
	(-0.35)	(0.80)	(-0.06)	(0.34)	(0.89)	(0.28)	(0.82)	(-0.43)	(1.49)	(2.32)	(0.81)	(-1.60)
R-square: 0.22												
Jordan												
	-0.12	2.79	0.59	0.67	0.38	-0.23	-0.35*	-0.10	-0.85	1.65**	-1.10**	0.84**
	(-0.56)	(1.19)	(1.04)	(0.68)	(1.11)	(-0.86)	(-1.82)	(-0.24)	(-1.49)	(2.42)	(-3.93)	(4.66)
R-square: 0.58												
Libya												
	0.08	-0.57	0.27	0.59	1.38	0.02	-0.04	-0.04	0.13	-0.12	-0.72	-0.002
	(0.76)	(-0.51)	(0.53)	(0.98)	(0.55)	(0.05)	(-0.08)	(-0.10)	(0.16)	(-0.24)	(-0.10)	(-1.00)
R-square: 0.57												
Oman												
	0.54	-1.17	-0.65*	1.81**	0.76	0.81	0.18	2.61	-0.16	2.06*	-0.93**	1.03**
	(0.58)	(-1.08)	(-1.83)	(5.24)	(0.68)	(1.56)	(0.61)	(0.85)	(-0.15)	(1.91)	(-5.94)	(6.74)
R-square: 0.82												
Pakistan												
	0.12	0.36	0.33	-0.08	-0.66	-0.26	0.36*	1.36	0.20	0.11	-0.04	-0.26
	(1.29)	(0.62)	(0.75)	(-0.14)	(-0.59)	(-0.86)	(1.89)	(0.72)	(0.65)	(0.61)	(-0.28)	(-0.96)
R-square: 0.31												
Syria												
	0.23	-4.26	1.07*	0.19	0.61	0.64**	-1.07*	0.48	-0.39	-0.15	-0.22	-0.66**
	(1.10)	(-1.50)	(1.85)	(0.35)	(0.72)	(2.20)	(-1.77)	(1.48)	(-0.96)	(-0.57)	(-1.02)	(-2.92)
R-square: 0.64												
Tunisia												
	0.08	-0.62	0.77	0.45	0.46	0.17	-1.10	1.39	0.06	0.02	-0.59	-0.003
	(0.97)	(-0.82)	(1.61)	(1.12)	(1.15)	(0.37)	(-0.24)	(0.47)	(0.35)	(0.15)	(-1.03)	(-0.00)
R-square: 0.62												

A0 Intercept
A1 Anticipated Real Money
A2 Positive Shock to Real Money
A3 Negative Shock to Real Money
A4 Anticipated Real Government Spending
A5 Positive Shock to Real Government Spending
A6 Negative Shock to Real Government Spending
A7 Anticipated Real Exchange Rate
A8 Positive Shock to Real Exchange Rate
A9 Negative Shock to Real Exchange Rate
A10 Error Correction
RH0 Serial correlation
** Significant at 5%.
* Significant at 10%. t-ratios are in parenthesis

Table 3: Nonlinear 3SLS Parameter Estimates,

Model 2: Nominal Consumption as a function of Nominal Government Spending, Nominal Money, and Nominal Exchange Rate

	B0	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	RH0	
Algeria													
		-0.03	-0.13	0.14	-0.86	0.96	0.16	-0.34	-0.10	-0.36	-0.21	-0.34	0.65*
		(-0.10)	(-0.10)	(0.39)	(-1.38)	(0.59)	(0.51)	(-0.80)	(-0.07)	(-0.64)	(-0.75)	(-0.84)	(1.73)
	R-square: 0.49												
Egypt													
		0.34	0.04	0.29	0.01	-0.99	-0.07	0.19	1.62	0.67*	-0.24**	-0.16	0.78**
		(1.30)	(0.16)	(0.92)	(0.02)	(-0.93)	(-0.50)	(1.20)	(0.89)	(1.91)	(-2.10)	(-0.78)	(3.39)
	R-square: 0.80												
Iran													
		-0.32	3.06	-0.27	0.77*	0.82	0.13	-0.17	1.65	0.07	0.16		0.10
		(-0.47)	(0.60)	(-0.59)	(1.72)	(0.87)	(1.45)	(-0.65)	(0.54)	(0.29)	(1.60)		(0.42)
	R-square: 0.61												
Jordan													
		-0.06	1.18**	0.12	-0.14	0.11	-0.05	-0.21	-0.32	-0.59	0.69*	-0.06	-0.01
		(-0.75)	(2.41)	(0.08)	(-0.15)	(0.37)	(-0.10)	(-0.88)	(-0.56)	(-0.86)	(1.91)	(-0.75)	(-0.03)
	R-square: 0.69												
Libya													
		-0.03	0.23	0.12	-0.15	1.32**	-0.33	0.33	0.49	1.56*	-0.65*	-0.11	-0.42*
		(-0.38)	(0.45)	(0.22)	(-0.31)	(2.73)	(-0.58)	(0.63)	(1.25)	(1.80)	(-1.87)	(-0.57)	(-1.73)
	R-square: 0.68												
Oman													
		0.01	-1.36	-0.40	-0.59	0.88	1.48**	-0.03	-2.26	-2.26	-0.75	-1.08**	0.91**
		(0.02)	(-1.41)	(-0.68)	(-0.56)	(1.35)	(3.29)	(-0.08)	(-0.47)	(-0.45)	(-0.35)	(-3.94)	(4.94)
	R-square: 0.70												
Pakistan													
		0.18	0.44	1.37**	0.12	-0.08	0.29	0.35*	1.16	-1.26**	0.16	-0.83**	0.78**
		(1.25)	(0.93)	(2.57)	(0.23)	(-0.15)	(1.30)	(1.78)	(1.15)	(-2.62)	(0.94)	(-2.97)	(3.42)
	R-square: 0.56												
Syria													
		-0.09	0.26	0.95	-2.57*	0.68	-0.04	0.72	0.04	0.21	-0.65**	-0.67	0.08
		(-0.38)	(0.16)	(0.65)	(-1.89)	(0.81)	(-0.06)	(0.85)	(0.10)	(0.15)	(-3.16)	(-1.29)	(0.12)
	R-square: 0.50												
Tunisia													
		0.10	-0.42	0.83*	0.75	0.61	0.33	0.12	0.29	-0.22	-0.05	-0.48	-0.02
		(1.58)	(-0.77)	(1.77)	(1.47)	(1.59)	(1.11)	(0.41)	(0.64)	(-0.93)	(-0.26)	(-1.41)	(-0.06)
	R-square: 0.36												

A0 Intercept
B1 Anticipated Nominal Money
B2 Positive Shock to Nominal Money
B3 Negative Shock to Nominal Money
B4 Anticipated Nominal Government Spending
B5 Positive Shock to Nominal Government Spending
B6 Negative Shock to Nominal Government Spending
B7 Anticipated Nominal Exchange Rate
B8 Positive Shock to Nominal Exchange Rate
B9 Negative Shock to Nominal Exchange Rate
B10 Error Correction
RH0 Serial correlation

** Significant at 5%.
* Significant at 10%. t-ratios are in parenthesis

Table A1: The KPSS Statistics for Null of Level Stationary.
(The 5% critical value is 0.463)

	LM Statistic (Bandwidth)+
Real Consumption	
Algeria	0.76 (5)
Egypt	0.76 (5)
Iran	0.75 (5)
Jordan	0.64 (5)
Libya	0.69 (5)
Oman	0.67 (5)
Pakistan	0.77 (5)
Syria	0.73 (5)
Tunisia	0.78 (5)
Nominal Consumption	
Algeria	0.78 (5)
Egypt	0.76 (5)
Iran	0.77 (5)
Jordan	0.66 (5)
Libya	0.75 (5)
Oman	0.64 (5)
Pakistan	0.77 (5)
Syria	0.73 (5)
Tunisia	0.78 (5)

Test description:
The KPSS (Kwiatowski, Phillips, Schmidt, and Shin) stationarity test procedure examines the null hypothesis of stationarity of a univariate time series. The KPSS test assumes that a time series variable X_t could be decomposed into the sum of a deterministic trend, a random walk, and a stationary error. Then the random walk term is assumed to have two components: an anticipated component and an error term. The stationarity of the error term is established by testing if the variance of the error is zero.
If the calculated lag truncation variable is greater than 0.463, we reject the null hypothesis of stationarity.

+ Bandwidth is specified using Newey-West using Bartlett Kernel. For detail see Newey-West (1994).

Table A2: Cointegration Test Results

ADF test statistics for the null hypothesis of non-stationary residuals.

Critical value at 10% = -2.61

Model 1: Cointegration regression includes Real Consumption, Real Government Spending, Real Money and Real Exchange Rage

	t-Statistic (# of Lags)+
Algeria	-2.78* (0)
Egypt	-2.45 (0)
Iran	-3.11* (0)
Jordan	-4.28* (0)
Libya	-5.31* (0)
Oman	-4.05* (0)
Pakistan	-2.88* (0)
Syria	-5.71* (0)
Tunisia	-2.99* (0)

Model 2: Cointegration regression includes: Nominal Consumption, Nominal Government Spending, Nominal Money, and Nominal Exchange Rage

	t-Statistic (# of Lags)+
Algeria	-3.01* (0)
Egypt	-3.57* (1)
Iran	-2.21 (2)
Jordan	-4.79* (0)
Libya	-2.92* (0)
Oman	-3.23* (0)
Pakistan	-2.88* (2)
Syria	-4.70* (1)
Tunisia	-3.50* (0)

Test Description:

If we have n endogenous variables, each of which is first-order integrated (that is, each has a unit root or stochastic trend or random walk element), there can be from zero to n-1 linearly independent cointegrating vectors. If there is one cointegrating equation, the regression models of the text include a lag of error correction term.

To check for cointegration, we apply the ADF unit root test to the residual from the cointegration regression in which the non-stationary level of real and nominal consumption are regressed on the level of variables that enter the model.

* The results reject the null hypothesis of non-stationarity at the 10% level.

+ The numbers in parentheses represent the lag lengths. The lag length is selected based on Schwartz Information Criteria (SCI) out of max lag of 12)

Table A3: The Results of Endogeneity Tests.

Model 1: Cointegration regression includes Real Consumption, Real Government Spending, Real Money, and Real Exchange Rage

	Forecasted Variables		
	Dm	Dg	Drex
Algeria			
Real Money Supply (Dm)	0.30	0.01	
Real Government Spending (Dg)	0.96		0.28
Real Exchange Rate (Drex)	0.13	1.09	
Egypt			
Real Money Supply (Dm)		4.32*	0.98
Real Government Spending (Dg)	1.00		4.57*
Real Exchange Rate (Drex)	0.22	0.16	
Iran			
Real Money Supply (Dm)		1.04	0.93
Real Government Spending (Dg)	1.43		2.03
Real Exchange Rate (Drex)	0.74	0.18	
Jordan			
Real Money Supply (Dm)		0.87	0.56
Real Government Spending (Dg)	1.63		0.34
Real Exchange Rate (Drex)	0.31	2.04	
Libya			
Real Money Supply (Dm)		0.75	0.19
Real Government Spending (Dg)	1.30		0.14
Real Exchange Rate (Drex)	1.50	1.43	
Oman			
Real Money Supply (Dm)	1.96	4.43*	
Real Government Spending (Dg)	0.96		1.40
Real Exchange Rate (Drex)	0.01	0.27	
Pakistan			
Real Money Supply (Dm)		2.08	5.75*
Real Government Spending (Dg)	0.11		0.08
Real Exchange Rate (Drex)	0.79	3.19*	
Syria			
Real Money Supply (Dm)		0.07	0.03
Real Government Spending (Dg)	0.44		0.48
Real Exchange Rate (Drex)	0.33	0.99	
Tunisia			
Real Money Supply (Dm)		0.82	1.82
Real Government Spending (Dg)	0.85		1.29
Real Exchange Rate (Drex)	1.69	0.75	

F-value is greater than the critical value of F at 10%.

Table A3: The Results of Endogeneity Tests. (Continued)

Model 2: Cointegration regression includes: Nominal Consumption, Nominal Government Spending, Nominal Money, and Nominal Exchange Rage

	Forecasted Variables		
	Dm	Dg	Dnex
Algeria			
Nominal Money (Dm)		1.22	0.57
Nominal Government Spending (Dg)	1.03		5.05*
Nominal Exchange Rate (Dnex)	0.16	1.22	
Egypt			
Nominal Money (Dm)		6.03*	1.99
Nominal Government Spending (Dg)	5.81*		1.99
Nominal Exchange Rate (Dnex)	0.12	0.12	
Iran			
Nominal Money (Dm)		2.11	2.44*
Nominal Government Spending (Dg)	0.43		1.20
Nominal Exchange Rate (Dnex)	1.05	0.46	
Jordan			
Nominal Money (Dm)		0.37	1.40
Nominal Government Spending (Dg)	3.38*		0.27
Nominal Exchange Rate (Dnex)	0.04	0.15	
Libya			
Nominal Money (Dm)		0.88	0.73
Nominal Government Spending (Dg)	1.54		2.11
Nominal Exchange Rate (Dnex)	0.80	0.99	
Oman			
Nominal Money (Dm)		0.52	5.00*
Nominal Government Spending (Dg)	0.18		2.07
Nominal Exchange Rate (Dnex)	0.18	0.06	
Pakistan			
Nominal Money (Dm)		2.96*	2.97*
Nominal Government Spending (Dg)	0.16		0.54
Nominal Exchange Rate (Dnex)	0.32	2.42	
Syria			
Nominal Money (Dm)		0.36	0.09
Nominal Government Spending (Dg)	1.09		0.45
Nominal Exchange Rate (Dnex)	0.49	0.03	
Tunisia			
Nominal Money (Dm)		1.24	2.73*
Nominal Government Spending (Dg)	1.85		3.13*
Nominal Exchange Rate (Dnex)	1.07	0.39	

* F-value is greater than the critical value of F at 10%.