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## Abstract

Using data for a sample of developing countries, we analyze the effects of external flows, namely migrants' remittances and FDI flows, on real output growth, price inflation, and components of aggregate demand. The historical evidence indicates unstable patterns of FDI inflows to a sample of nine MENA countries. In contrast, remittances flows appear to be more stable over time in recipient countries. Except in Jordan, real GDP growth does not vary significantly with FDI inflows. Tunisia provides the only significant evidence of an increase in price inflation in response to FDI, which is coupled with a significant increase in private investment. FDI flows stimulate a higher increase in imports in Egypt. Remittances inflows appear, in general, a more important determinant of macroeconomic performance. Remittances inflows stimulate real output growth in Jordan and decrease price inflation in Egypt and Tunisia. The increase in growth in Jordan is coupled with an increase in private consumption, private investment, real exports and imports with respect to remittances inflows. Moreover, remittances increase export growth in Tunisia



## ملخص

اعتماداً على بياناتٍ من عينةٍ من الدول النامية, نقوم بتحليل تأثيرات التدفقات الخارجية وبالتحديد تحويلات المقيمين بالخارج وتدفقات الإستثمارات الأجنبية المباشرة على النمو الفعلي للإنتاج وتضخم الأسعار ومكونات إجمالي الطلب. وثمة دليلٍ تاريخي يشير إلى أنماطٍ غير مستقرةٍ لتدفقات الإستثمارات الأجنبية المباشرة في عينةٍ من تسع دولٍ من دول منطقة الشرق الأوسط وشمال إفريقيا.

وبالعكس فإن تدفقات التحويلات القادمة من الخارج تزدادا استقراراً – على ما يبدو – بمضي الوقت في الدول المستقبلة لها.

وباستثناء الأردن, فإن إجمالي الناتج المحلي لا يتفاوت بشكلٍ ذي بالٍ مع تدفقات الإستثمارات الأجنبية المباشرة بينما لا نجد غير تونس دليلاً ذا بالٍ على حدوث زيادةٍ في تضخم الأسعار كرد فعلٍ للإستثمارات الأجنبية المباشرة مصحوبةً بزيادةٍ ذات بالٍ في الإستثمارات الخاصة.

وتحفز تدفقات الإستثمارات الأجنبية المباشرة زيادةً كبيرةً في الواردات في مصر في الوقت الذي تبدو فيه تدفقات تحويلات المقيمين بالخارج مؤشراً أكثر أهميةً لأداء الإقتصاد الكلي بوجهٍ عامٍ. وتحفز تدفقات تحويلات المقيمين بالخارج نمواً حقيقياً بالإنتاج في الأردن كما تؤدي إلى خفض تضخم الأسعار في كلٍ من مصر وتونس وتصاحب الزيادة في الإنتاج في الأردن زيادة في الإستهلاك الخاص والإستثمارات الخاصة والصادرات والواردات الفعلية فيما يتعلق بتدفقات التحويلات. اضف إلي ذلك أن تدفقات التحويلات تزيد من نمو الصادرات في تونس.

## I. Introduction

Many developing countries are resource-constrained, meaning that they are running a current account deficit. The deficit in the current account indicates that aggregate demand exceeds aggregate supply. Alternatively, domestic investment cannot be financed using national savings, necessitating continued reliance on foreign resources to fill in the resource gap.

Given the resource deficit, many countries have taken a closer look into ways to revive the current account balance and supplement domestic resources. There are two policy tracks. First, domestic policies may aim at constraining aggregate demand, particularly domestic consumption, to provide more domestic resources to finance domestic investment. Under this agenda, constraining the budget deficit usually takes top priority. The second priority is to pursue reforms to expand productive capacity and increase aggregate supply. The former track (demand management) maybe difficult to implement given priorities for fiscal spending and in light of constraints on government revenues. The second track (supply management) is even more difficult given resource constraints and the time necessary to stimulate output supply and implement structural reforms.

In addition to domestic policies, countries may pursue an exchange rate management policy in order to stimulate exports and constrain imports. Nonetheless, exchange rate policy may not yield the desired results. Export competitiveness may not be stimulated, despite exchange rate depreciation, absent measures to revive quality, improve productivity, and guarantee access to new external markets. Moreover, many developing countries have suffered from the J-curve effect whereby depreciation, in the short-run, may increase the value of imports, absent domestic alternatives to substitute for necessary imports.

In light of the limited potential for stabilization policies to address the resource constraint problem, many countries have focused on natural (non-debt) resources that would decrease their dependency on external financing. Two types of inflows have gained increasing attention in this connection.

Countries that have migrants working abroad enjoy a large amount of inflows in the form of migrants' remittances[1]. These remittances are recorded in the current account balance, reducing the deficit in light of a widening trade deficit[2].

Alternatively, countries that have taken steps to liberalize the capital and financial balance may resort to ways to stimulate financial inflows[3]. These flows may take the form of portfolio flows in financial investment. While these flows may provide additional pool of external resources to finance the current account deficit, there is the

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[1] "Remittances flows are quickly surpassing private capital flows and official aid in magnitude and rate of growth, making them the single most important form of income flows into developing and emerging economies," Chami, Cosimano and Gapen (2006). See Taylor (1999) for an extensive review of the literature on remittances.

[2] The World Bank's recent Global Economic Prospects (2006) estimates official remittances received by developing countries to be around $167 billion, up 73% from 2001.

[3] Global foreign direct investment (FDI) grew by 18 percent in 2000, reaching a record of $1.3 trillion (UNCTAD (2001).

risk of sudden reversal and accumulating foreign debt. In contrast, flows in the form of Foreign Direct Investment (FDI) do not involve debt accumulation or a high risk of sudden reversal[4]. FDI flows often involve long-term commitment in productive activity. Accordingly, they are desirable to supplement domestic resources, while contributing to real growth[5].

The purpose of this paper is to study the significance of remittances and FDI flows in a sample of countries in the Middle East[6]. We begin by analyzing the significance of these

flows to GDP in the economies under investigation[7]. We estimate empirical models that explain real output growth, price inflation, and the growth in real components of aggregate demand. The empirical models account for major policy variables: government spending, the money supply, and the exchange rate. In addition, we account for remittances of FDI flows in the empirical models.

The remainder of the investigation is organized as follows. Section II analyzes the shares of FDI and remittances flows to GDP for a sample of countries in the Middle East and North Africa (MENA) region. Section III presents the empirical model and outlines theoretical predictions. Section IV presents the results. Section V concludes.

## II. Background

MENA countries have been striving to increase their shares of FDI flows. To what extent have they succeeded?

Table 1 presents the shares of FDI inflows to GDP in nine MENA countries under investigation in 1990, 1995, 2000, and 2003.

In Egypt, the share of FDI to GDP is very modest, less than one percent, except for 2000 when it reached 1.25 percent of GDP.

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[4] Even though FDI inflows to developing countries have risen, reaching $240 billion in 2000, their share in world FDI flows steadily declined from 39.6 percent in 1996 to 18 percent in 2000 (Yehoue (2005)). Even more striking, the least developed countries (LDCs) remained marginal in terms of allocating FDI, with a mere 0.3 percent of world inflows in 2000.

[5] Many countries liberalized their FDI regimes by reducing barriers toward FDI, strengthening standards of treatment for foreign investors, and giving a greater role to market forces in resource allocation. Virtually all countries have taken steps in this direction at varying degrees, UNCTAD (2004). Hanson (2001) reported that countries at all levels of development have created a policy infrastructure to attract multinational firms.

[6] The papers on the implications of remittances have relied mainly on surveys of households in different countries with divergent results. For example, recently Adams (2004) uses household surveys to look at the role of remittances in alleviating poverty in Guatemala, and Mcenroe (2005) investigates the impact of these flows on Mexican household decision and allocation of resources. See also Lucas and Stark (1985) study on remittances in Botswana, Agarwal and Horowitz (2002) for remittances in Guyana, and GEP (2006) and the references therein.

[7] Chami et al. (2005) show that the characteristics of remittances flows differ from other private capital flows. Using a micro-foundation approach and panel techniques, they show that remittances, unlike other capital flows, are countercyclical and may have unintended consequences for economic growth. The counter- cyclicality result was subsequently found by Gupta (2005), IMF (2005), GEP (2006), among others.

In Iran, the highest share of FDI to GDP is in 2003, 0.09 percent of GDP.

In Jordan, there has been an attempt to increase FDI flows in the nineties. Indeed, the share of FDI flows to GDP increased from 0.20 percent in 1995 to 9.3 percent in 2000 (following a program with the IMF in 1998). Following September 2001, concerns about stability in the region resulted in a significant decline in the share of FDI to GDP in 2003, 3.8 percent.

In Libya, FDI flows were negative, on average, in the nineties, indicating concerns about investment opportunities under the international embargo imposed on the country. More recently, Libya has taken serious steps to open up the economy and abide by the mandate of the international community, resulting in a surge in FDI flows to reach 3 percent of GDP in 2003.

In Oman, the share of FDI to GDP exceeded one percent, 1.22 percent, in 1999. This share declined to 0.08 percent in 2000 and increased more recently in 2003 to reach 0.64 percent.

In Pakistan, there has been an attempt to attract FDI flows. This share, 0.61 percent in 1990, increased to 1.14 percent in 1995 and more recently it reached 1.91 percent in 2003.

Similarly, in Qatar, efforts to attract FDI flows have paid off where its share to GDP has steadily increased over time from 0.07 percent in 1990 to 1.69 percent in 2003.

In Syria, there has been an effort to open up the economy and attract FDI flows. As a result, the share of FDI to GDP increased from 0.58 percent in 1999 to 1.42 percent in 2000. More recently, it reached a share of 0.70 percent of GDP in 2003.

In Tunisia, there has been a significant surge in FDI inflows, which peaked from 0.73 percent of GDP in 1990 to 1.79 percent in 1995 and to 4 percent in 2000. More recently, the share of FDI to GDP decreased to 0.24 percent in 2003.

Clearly, the share of FDI to GDP fluctuated over time for all countries under investigation. A number of factors may explain these fluctuations: domestic policies, movements in fundamentals, regional stability, and global liquidity. Given cyclically in each of these determinants, the share of FDI to GDP fluctuates over time in all of the countries[8].

Using averages over time (1975-2003), countries are ranked based on the share of FDI to

GDP in the following descending order: Tunisia, Egypt, Jordan, Oman, Qatar, Pakistan, Syria, Iran, and Libya.

[8] A number of investigations have analyzed causes of underinvestment in developing countries. Rodrik (1991) has focused on policy uncertainty and has pointed it out as a possible cause of underinvestment in developing countries. Lucas (1990) has also analyzed the issue by examining the question of why capital does not flow from rich to poor countries. Rodriguez-Clare (1996) explores how multinationals affect underdeveloped regions through the generation of linkages. Krugman (1991) and Fujita, Krugman, and Venables (1999) study the economic geography, where the theory of the location of economic activity is put up front.

Table 1 presents the shares of remittances inflows to GDP. Not all the countries under investigation are recipients of remittances flows, the only four are: Egypt, Jordan, Pakistan, and Tunisia. In contrast to FDI flows, fluctuations in remittances reflect cyclical conditions in host countries.

According to cyclicality, the share of remittances to GDP in Egypt has been decreasing over time from a high of 4.46 percent in 1990 to a low of 0.71 percent in 2003.

In contrast, in Jordan, the share of remittances to GDP has been increasing over time from a low of 12.42 percent of GDP in 1990 to a high of 19.91 percent in 2003.

In Pakistan, the share of remittances to GDP decreased in the nineties from 4.88 percent in 1999 to a low of 1.76 percent in 2000. Subsequently, this share increased to 5.39 percent of GDP in 2003.

The share of remittances to GDP in Tunisia appears to be the most stable to GDP over time hovering between a low of 4.07 percent in 1995 and a high of 5.39 percent in 2003.

Across the four countries recipient of remittances flows, they rank in the following descending order based on the average of remittance flows between 1977- 2003: Jordan, Egypt, Pakistan, and Tunisia.

Table 1 presents summary statistics for variables under investigation. Based on average time-series, the highest real growth is 5% for Libya and Pakistan, the highest inflation rate is %19 for Iran, the highest real consumption growth is %7 for Libya, the highest real investment growth is %6 for Pakistan, the highest real export growth is %5 for Pakistan, and the highest real import growth is %6 for Libya.

## III. Empirical Models

The empirical investigation analyzes annual time-series data of real GDP growth in eight countries in the Middle East: Egypt, Iran, Jordan, Libya, Oman, Pakistan, Qatar, Syria, and Tunisia. Data, for the majority of tests, range from 1975 to 2003[9].

In the first step, we estimate an empirical model in which real GDP growth varies with real government spending, the money supply, the nominal exchange rate, the energy price, and foreign direct investment. In the second step, we substitute remittances flows for FDI flows. The results will identify the effect of stabilization policies and assess cyclicality in real output growth with external inflows.

To formalize the investigation, we test real output growth for non-stationarity[10]. Given evidence of non-stationarity, the empirical model is specified in first-difference form as follows:

[9] Due to data availability, tests using remittances range from 1977-2003 for Egypt, and from 1976-2003 for Pakistan and Tunisia.

[10] For details, see Kwiatkowski et al. (1992), which tests the null-hypothesis of stationarity. 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 Al in the appendix summarizes the results of non-stationarity. The results are robust with respect to alternative tests for the null-hypothesis of non-stationarity.

$$Dy_t = A_0 + A_1 Dm_t + A_2 Dg_t + A_3 Dneer_t + A_4 Dinflow_t + A_5 Do_t + A_6 DC_{t-1} + v_{yi} \quad (1)$$

Here, $y_t$ is the log value of real output, where $D(.)$ is the first-difference operator. We denote the log values of the money supply, government spending, the nominal effective exchange rate, inflows (FDI or remittances), and the oil price by m-t, $g_t$, $neer_t$, $inflowt$, and $o_t$. Since the model is estimated in first-difference form, we should test if the non-stationary dependent variable $(y_t)$ is jointly cointegrated with all non-stationary right-hand side variables (in level form)[11]. Given evidence of cointegration (see Table A2), the error correction term is included in the empirical model[12]. The unexplained residual of the model is denoted by $v_{yi}$.

In the first model, real output varies with the growth in the money supply, real government spending, the nominal effective exchange rate, inflows and the energy price. If stabilization policies are effective real output varies positively with an increase in the money supply and/or government spending. An increase in the nominal exchange rate indicates currency appreciation. There are supply and demand channels that determine the response of real output to currency appreciation. On the supply side, currency appreciation decreases the cost of imported inputs and increases the output supply. On the demand side, currency appreciation decreases competitiveness and net exports. Also, on the demand side, currency appreciation may stimulate a reduction in money demand and an increase in velocity[13]. The final effect will depend on the dominant channel.

Channels determining the effect of inflows on real growth vary with the type of inflows. Initially, remittance inflows increase national savings. Their effect on real growth will depend, however, on their effects on demand composition. In one scenario, additional inflows maybe used to finance consumption spending. The initial increase in savings will be absorbed in consumption demand. If capacity constraints are binding, the increase in consumption will be inflationary with no effect on real growth. Moreover, the increase in consumption may stimulate an increase in imports. In another scenario, the increase in saving will finance an increase in investment, which contributes to real growth. If investment is export-oriented there will be a positive spillover effect of remittances inflows on exports. Concurrently, imports may increase. The effects of FDI flows are expected, however, to aim more directly at relaxing capacity constraints and expanding real growth. Moreover, there may be a positive spillover effect of growth on the external sector, increasing exports and maybe imports. Nonetheless, structural constraints may prevent immediate results of FDI flows on real growth.

[11] In theory, real output is endogenous with respect to domestic and external variables that appear on the right-hand side. It is possible, therefore, that they have a common stochastic trend in the long-run.

[12] As long as there exists at least one cointegrating 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, which is to say the lagged value of the residual from regressing the non-stationary dependent variable on the non-stationary variables in the model. For details, see Pesaran, Shin, and Smith (2001).

[13] For details, see Kandil and Mirzaie (2002).

An increase in the oil price is likely to decrease consumption demand and increase the cost of production, shrinking the output supply. Many of the countries under investigation are oil-producing or neighboring countries. Hence, there may be a positive, direct or indirect, effect of an increase in the oil price on real growth.

To verify channels of interaction between inflows and the macro economy, it is necessary to test the effects of these inflows on price inflation and the growth in real components of aggregate spending. To that end, we substitute price inflation or the real values of components of demand for the dependent variable in equation (1). An increase in consumption in response to inflows maybe inflationary, without a positive effect on real growth. In contrast, an increase in real investment and real exports are likely to stimulate real growth. Imports may increase with the increase in consumption and/or investment.

## IV. Empirical Results

Following our previous work (see Kandil and Mirzaie (2002, 2003, 2005)), the estimation methodology is described in Appendix A. The model equation is estimated using instrumental variables. In addition, the errors are assumed to be AR (1) and estimated accordingly.

The empirical investigation analyzes time-series data of real output growth, price inflation, the growth of real private consumption, real private investment, real exports and real imports in a sample of MENA countries. We summarize the results in Tables 2:7.

### *IV-A Results Explaining Real GDP Growth*

The first empirical model, in Table 2A, explains real GDP growth using domestic policy variables: the money supply and real government spending, the nominal effective exchange rate, FDI flows and the energy price.

#### *IV-A.1 Model with FDI Flows*

Monetary policy appears to be ineffective in stimulating real output growth across countries. Two factors may explain the results. Many countries under investigation have been following a fixed exchange rate policy. Under such a policy, the priority of the central bank is devoted to defending the peg, eliminating any role for monetary policy to stabilize domestic conditions. Moreover, there may not be a scope for an independent monetary policy as the priorities of the Central Bank are devoted to providing domestic financing to the budget deficit.

The growth of government spending has a positive and significant effect that contributes to output growth in Oman and Pakistan. While the results for other countries are statistically insignificant, there is no evidence of a negative significant effect, ruling out the possibility of a dominant crowding out effect of government spending.

Appreciation of the exchange rate has a positive and significant effect that stimulates output growth in Jordan and Oman. Given high dependency on imports, exchange rate appreciation decreases the cost of imported inputs and increases the output supply. There

is no evidence of a dominant contractionary effect of currency appreciation on real growth in any country.

With the exception of Jordan, there is no evidence of an increase in output growth with FDI flows. In the case of Jordan, the surge in FDI flows over time (see Table 1) has contributed to the growth of real output, attesting to the country's success to maximize the benefits of FDI flows. For other countries, failure to institute speedy reforms has hindered the success of FDI flows to stimulate real growth.

The change in energy price appears insignificant on output growth across countries. In the case of Tunisia, higher oil price stimulates real output growth. Higher oil price may carry a positive spillover effect on output growth in Tunisia, a non-oil producing country.

In three cases, Jordan, Pakistan, and Syria, the sign and significance of the error correction term indicates a tendency for the cointegrated variables in the model to converge towards full-equilibrium in the short-run.

#### *IV-A.2 Model with Remittances Flows*

The evidence in Table 2B replaces FDI flows with remittances flows for the four countries where data are available. In contrast to previous results, the stabilizing effect of monetary policy on real output growth is positive and significant in Egypt. Moreover, the stabilizing effect of an increase in government spending is positive and significant on real output growth in Jordan. The expansionary effect of exchange rate appreciation remains significant on real output growth in Jordan.

Remittance flows contribute significantly to output growth in Jordan. Given a much larger share of remittances to GDP, compared to the share of FDI, the growth of remittances has been a large determinant of output growth in Jordan. Indeed, the significant effect of remittances on output growth in Jordan, 0.14, is much larger than the significant effect of FDI flows, 0.003. The positive significant effect of remittances flows on output growth in Jordan attests to the country's success to employ remittances in productive capacity.

The expansionary effect of an increase in the energy price remains positive and significant on output growth in Tunisia. The negative and significant coefficient on the error correction term for Pakistan indicates convergence towards full-equilibrium.

### *IV-B Results Explaining Price Inflation*

The first empirical model, in Table 3A, explains the rate of inflation in the GDP deflator using domestic policy variables; the nominal effective exchange rate, FDI flows, and the energy price.

#### *IV-B.l Model with FDI Flows*

The inflationary effect of monetary policy is evident and significant in Iran and Tunisia. It is interesting to note the negative and significant effects of an increase in real government spending on price inflation in Egypt, Jordan, Pakistan, and Syria. This indicates that an increase in real government spending contributes to capacity building and moderates price inflation. In contrast, an increase in government spending stimulates

price inflation in Iran. Higher government spending increases demand, which proved to be inflationary given capacity limitations in Iran[14].

An appreciation of the nominal effective exchange rate increases price inflation significantly in Libya. This may be the result of the effect of appreciation on money demand. Appreciation decreases money demand, increasing velocity and, therefore, price inflation. In contrast, price inflation decreases significantly with exchange rate appreciation in Iran, Oman and Syria. Currency appreciation decreases the cost of imports and price inflation.

In general, FDI flows do not increase price inflation. Nonetheless, all coefficients are not statistically significant, ruling out significant effects of FDI flows on the demand or supply sides. In Tunisia, however, there is a significant positive effect of FDI flows on price inflation, indicating a significant increase in demand.

An increase in the energy price has a positive and significant effect on price inflation in Oman and Qatar. Higher energy price is consistent with an increase in foreign reserves, a higher standard of living, and, therefore, a higher price inflation in oil-producing countries.

The negative and significant coefficient on the error correction term for Egypt, Iran, Syria, and Tunisia indicates fast convergence towards full-equilibrium following a shock in the short-run.

#### *IV-B.2 Model with Remittances Flows*

The evidence in Table 2B replaces FDI flows with remittances flows for the four countries where data are available.

Monetary growth remains insignificant on price inflation in Tunisia. Currency appreciation decreases the cost of imports and price inflation significantly in Jordan. In contrast, appreciation decreases money demand, increasing money demand, increasing velocity and price inflation significantly in Egypt. The evidence supports the literature advocating the countercyclical nature of remittances. There is a significant negative effect of remittances on price inflation in Egypt and Tunisia.

The negative and significant coefficient for the error correction term in Pakistan indicates fast adjustment towards full-equilibrium in the short-term.

### *IV-C Results Explaining Consumption*

Table 4A presents the results of the model explaining real private consumption, using domestic policy variables, the nominal effective exchange rate, FDI flows, and the energy price.

#### *IV-C.l Model with FDI Flows*

Monetary growth increases liquidity to finance the increase in private consumption in Jordan only. In general, monetary policy is not an important policy tool to determine liquidity and private consumption in many MEN A countries.

[14] Recall that the average rate of inflation was the highest in Iran, compared to other countries in the sample (Table 1).

The growth in government spending provides resources to finance private consumption in Iran, Libya, Oman, Pakistan, and Syria. Clearly, the increase in government spending (a dominant sector in production and employment) provides important resources to finance private consumption in several countries.

An increase in the nominal effective increases consumption growth in Jordan. As many imported goods are used for consumption, the appreciation of the exchange rate decreases the cost of imports and increases private consumption significantly.

The change in FDI flows does not stimulate consumption spending in any country. FDI does not provide direct incentives to increase consumption demand.

There is evidence of a significant effect of the change in energy price on consumption demand. Higher energy price increases final consumption, indicating inelastic demand.

The negative and significant coefficients on the error correction term for Iran, Jordan, Libya, Pakistan, and Syria indicates convergence towards full-equilibrium in the short-run for cointegrated variables in the model.

#### *IV-C.2 Model with Remittances Flows*

Turning to the model that employs remittances flows, the evidence for private consumption in Table 4B is as follows.

Monetary growth remains insignificant to determine private consumption growth. In contrast, real government spending finances the growth in real private consumption in Jordan and Pakistan.

Remittances flows finance the growth in private consumption in Jordan. As national savings increase initially with higher remittances flows, higher consumption absorbs the increase in savings.

An increase in the energy price does not determine private consumption significantly. The negative and significant coefficient on the error correlation term for Jordan indicates speedy convergence towards full-equilibrium for cointegrated variables in the short-run.

In the case of Jordan, significant output growth accommodates the increase in consumption attributed to remittances flows, moderating the inflationary effects. In the case of Tunisia, the increase in consumption attributed to remittances inflows may carry a higher risk of inflation, absent significant real growth. Nonetheless, price inflation decreases with remittances inflows in Tunisia, indicating a faster growth in supply relative to demand.

### *IV-D Results Explaining Investment*

Table 5A presents the results of the model explaining real private investment, using domestic policy variables, the nominal effective exchange rate, FDI flows and the energy price.

#### *IV-D.l Model with FDI Flows*

Consistent with the evidence for consumption, monetary growth does not determine variation in investment demand significantly. The change in government spending has

a significant positive effect on private investment in Libya. Higher government spending may entail direct spending on investment or may entail an increase in income that finances private investment spending.

There is no evidence of a significant effect of the change in nominal effective exchange rate on private investment. The effect of the change in exchange rate on supply and demand does not determine investment growth significantly.

An increase in FDI has a direct positive effect increasing private investment significantly in Tunisia. For other countries, FDI flows do not contribute significantly to private investment growth.

An increase in the energy price stimulates private investment demand significantly in Egypt. Higher energy price may stimulate additional investment in the oil sector in Egypt.

The negative and significant coefficient on the error correction indicates fast convergence towards full equilibrium in Pakistan and Tunisia.

#### *IV-D.2 Model with Remittances Flows*

Turning to the model that employs remittances flows, the evidence for private investment in Table 5B is as follows.

There is no evidence of an increase in real private investment with the growth in the money supply or real government spending. The appreciation of the exchange rate reduces the cost of imported inputs and stimulates an increase in private investment in Tunisia.

Remittances inflows stimulate an increase in private investment growth in Jordan. Recall, the share of remittances to GDP is the highest in Jordan. Remittances are used to finance private investment in real estate.

There is no significant effect of a change in the energy price on real private investment growth. The negative and significant coefficient on the error correction term indicates fast convergence towards full-equilibrium in Jordan and Pakistan.

### *IV-E Results Explaining Exports*

Table 6A presents the results of the model explaining real exports, using domestic policy variables, the nominal effective exchange rate, FDI flows, and the energy price.

#### *IV-E.l Model with FDI Flows*

An increase in the money supply has a negative and significant effect on export growth in Syria. Monetary growth maybe consistent with an increase in domestic demand that results in a switch in production towards non-tradables.

An increase in government spending provides the necessary support to the export sector in many countries. Indeed, higher government spending stimulates real export growth in Iran, Libya, Pakistan and Syria. In contrast, there is a negative and significant effect of an increase in government spending on export growth in Tunisia. Higher government spending raises the interest rate and the price level, crowding out private resources in the export sector.

Exchange rate appreciation decreases competitiveness and, therefore, export growth. This is evident by the negative and statistically significant coefficient in Egypt, and Syria.

There is no evidence that FDI flows have determined export growth significantly in any country. Clearly, FDI flows are not targeting the export sector.

An increase in the energy price stimulates export growth significantly in a number of countries: Egypt, Iran, Jordan, Oman, Qatar, Syria, and Tunisia. A number of these countries are oil-producing. Other countries may benefit indirectly from a boom in neighboring oil-producing countries, by boosting export growth. One exception is the case of Libya. An

increase in the oil price has a negative statistically significant effect on export growth. Higher oil price may have an adverse effect, shrinking the non-oil export sector (the Dutch disease). The coefficient on the error correction term is negative and statistically significant in Libya, Syria, and Tunisia, indicating fast convergence towards full-equilibrium.

#### *IV-E.2 Model with Remittances Flows*

Turning to the model that employs remittances flows, the evidence for real exports in Table 6B is as follows.

Monetary growth is insignificant to explain real exports. Government spending stimulates real export growth significantly in Egypt, Jordan, and Pakistan. There is evidence, however, of a reduction in export growth in Tunisia with respect to an increase in government spending. Government spending may stimulate an increase in the price level and the interest rate. The latter may attract capital inflows, appreciating the exchange rate and depressing export growth.

In Jordan, there is further support for the adverse effect of currency appreciation on real export growth. Higher appreciation decreases competitiveness and, therefore, export growth, as evident by the negative and statistically significant coefficient. In Tunisia, however, the positive and significant coefficient provides a sharp contrast. Exports appear inelastic, increasing (decreasing) with appreciation (depreciation). Other factors related to quality and market access may have dominated.

Export growth increases significantly with remittances inflows in two countries (Jordan and Tunisia). This evidence indicates the success of reforms to target remittances inflows into the export sector and reinforce the positive effect of these inflows on the current account balance.

Higher energy price is consistent with higher exports in Egypt and Tunisia. The negative coefficient on the error correction term indicates fast convergence towards full-equilibrium.

### *IV-F Results Explaining Imports*

Table 7A presents the results of the model explaining real imports, using domestic policy variables, the nominal effective exchange rate, FDI flows and the energy price.

### *IV-F.l Model with FDI Flows*

Monetary growth does not determine import growth significantly. In contrast, the growth of government spending contributes to an increase in real imports in Egypt, Iran, Oman, and Pakistan. Higher government spending increases consumption and investment, increasing pressure on limited domestic resources.

The appreciation of the nominal effective exchange rate decreases the cost of imports. Indeed, appreciation has a positive and statistically significant effect on imports in Oman and Tunisia.

An increase in FDI flows has a positive and statistically significant effect on imports in Egypt. In Libya, where FDI flows have been negative (on average), imports have been increasing despite the reduction in FDI flows.

There is a strong positive effect of the increase in energy price on imports. This is evident by the positive and statistically significant effect in Egypt, Iran, Jordan, Syria and Tunisia. In oil-exporting countries, a higher oil price increases capacity for imports. In oil-importing countries, imports increase with the energy price.

There is a strong evidence of fast convergence towards full-equilibrium, as evident by the negative and statistically significant coefficients in Egypt, Jordan, Pakistan, Syria, and Tunisia.

### *IV-F.2 Model with Remittances Flows*

Turning to the model with remittances flows, the evidence for real imports in Table 7B is as follows.

Monetary growth remains insignificant to explain real imports. The growth in real government spending increases imports significantly in Jordan. An appreciation of the exchange rate increases imports significantly in Tunisia.

Higher remittances inflows increase imports significantly in Jordan. Remittances increase resources to import goods, reducing pressure on the current account deficit.

Higher energy price increases imports significantly in Jordan and Tunisia. The negative and significant coefficient on the error correction term in all countries indicates fast convergence towards full-equilibrium.

## V Summary and Conclusion

The analysis has focused on the role of inflows in determining domestic demand and supply. Two types of inflows are under consideration: FDI and migrants' remittances. Across a sample of nine industrial countries in the Middle East and North Africa (MENA), FDI flows are very moderate with shares that do not exceed three percent of GDP. In contrast, the share of remittances to GDP accounts for approximately 20% percent in Jordan, seven percent in Egypt and five percent in each of Pakistan and Tunisia.

We estimate empirical models that explain real output growth using domestic policies, the energy price, the exchange rate, and inflow of remittances or FDI. In general, the role of monetary growth appears rather limited. Monetary growth stimulates real output growth in Egypt and accelerates price inflation in Iran.

Monetary growth does not stimulate, however, growth in specific components of aggregate demand.

The growth of real government spending appears more relevant to economic activity across MENA countries. Higher growth of government spending stimulates real output growth significantly in Jordan, Oman, and Pakistan. Real government spending contributes to productive capacity, moderating price inflation significantly in Egypt, Jordan, Libya, and Syria. Real government stimulates the growth of real private consumption significantly in

Iran, Jordan, Libya, Oman, Pakistan and Syria. The effect of real government spending appears less pronounced on private investment, increasing significantly in Libya only. Nonetheless, government spending contributes positively to export growth in Egypt, Iran, Jordan, Libya, Pakistan, and Syria. Imports also increase significantly with real government spending in Egypt, Iran, Jordan, Oman, and Pakistan.

Exchange rate appreciation decreases the cost of imports, increasing real output growth significantly in Jordan and Oman. Appreciation may increase or decrease price inflation. The former channel, as evident in Libya and Egypt, indicates a reduction in money demand and an increase in velocity. The reduction in price inflation, as evident in Iran, Oman, and Syria, indicates a reduction in the cost of imported inputs and an increase in output supply. Exchange rate appreciation, by decreasing the cost of imports, increases consumption significantly in Jordan and Tunisia. The impact of exchange rate fluctuations is fess pronounced on investment growth. One exception is Tunisia where appreciation, by decreasing the cost of imported inputs increases investment demand. Appreciation has a negative and significant effect on export growth in Egypt, Jordan, and Syria. In contrast, appreciation increases import growth significantly in Oman and Tunisia.

FDI flows stimulate real output growth in Jordan and increase price inflation in Tunisia. FDI flows do not stimulate an increase in real consumption in any country; they increase investment significantly only in Tunisia. There is no evidence of a significant increase in export growth with FDI flows in any country. Imports increase significantly with FDI flows in one country, Egypt.

Remittances inflows increase real GDP growth significantly in Jordan and decrease price inflation significantly in Egypt and Tunisia. The growth in Jordan is consistent with an increase in consumption, investment and exports with respect to remittances inflows. Further the increase in remittances increases export growth significantly in Tunisia. Remittance inflows increase imports significantly in Jordan.

Overall, the evidence indicates a larger contribution of remittances flows to domestic resources. The inflow of these resources has financed consumption demand and reduced pressures on the current account. Moreover, these inflows, by contributing to national savings, have financed domestic investment and supported output growth in the largest recipient countries of these inflows, Jordan.

While the share of FDI flows remains very moderate, the evidence points to the potential positive effects of these flows on output growth. Moreover, sustaining FDI inflows may provide an incentive to improve domestic policies and strengthen

macroeconomic fundamentals. This is in contrast to remittances flows that are likely to vary with cyclicality in host countries beyond the control of domestic policies. As countries continue to search for means to supplement domestic resources, maximizing FDI flows should top the policy priority towards expanding productive capacity via long-term investment that provides its own financing.

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## Table 1: Summary Statistics

a) Shares of FDI Inflow to GDP (numbers are in percentages)

| | 1990 | 1995 | 2000 | 2003 | Average 1975-2003 |
|---|---|---|---|---|---|
| Egypt | 0.8 | 0.99 | 1.25 | 0.29 | 1.48 |
| Iran | -0.44 | 0.02 | 0.04 | 0.09 | 0.09 |
| Jordan | 0.94 | 0.20 | 9.3 | 3.8 | 1.44 |
| Libya | 0.55 | -0.27 | -0.41 | 3.0 | -0.60 |
| Oman | 1.22 | 0.21 | 0.08 | 0.64 | 1.33 |
| Pakistan | 0.61 | 1.14 | 0.50 | 1.91 | 0.57 |
| Qatar | 0.07 | 1.15 | 1.42 | 1.69 | 0.87 |
| Syria | 0.58 | 0.60 | 1.42 | 0.70 | 0.43 |
| Tunisia | 0.73 | 1.79 | 4.00 | 0.24 | 2.23 |

b) Shares of Workers' Remittances Inflow to GDP (numbers are in percentages)

| | 1990 | 1995 | 2000 | 2003 | Average 1977-2003 |
|---|---|---|---|---|---|
| Egypt | 4.46 | 1.58 | 0.84 | 0.71 | 6.66 |
| Jordan | 12.42 | 18.48 | 19.66 | 19.91 | 19.19 |
| Pakistan | 4.88 | 2.72 | 1.76 | 5.39 | 4.83 |
| Tunisia | 5.05 | 4.07 | 4.43 | 5.39 | 4.46 |

c) Means and Standard Deviations of Dependent Variables

| | GDP Growth | | Inflation | | Price Growth | | Consumption | |
|---|---|---|---|---|---|---|---|---|
| | Means | STD | Means | STD | Means | STD | Means | STD |
| Egypt | 0.04 | 0.03 | 0.11 | 0.08 | 0.04 | 0.05 | | |
| Iran | 0.02 | 0.09 | 0.19 | 0.1 | 0.01 | 0.08 | | |
| Jordan | 0.04 | 0.05 | 0.06 | 0.06 | 0.04 | 0.11 | | |
| Oman | 0.03 | 0.07 | 0.06 | 0.13 | 0.02 | 0.16 | | |
| Libya | 0.05 | 0.05 | 0.04 | 0.13 | 0.07 | 0.12 | | |
| Pakistan | 0.05 | 0.02 | 0.08 | 0.03 | 0.05 | 0.03 | | |
| Qatar | 0.03 | 0.09 | 0.05 | 0.17 | | | | |
| Syria | 0.04 | 0.06 | 0.1 | 0.08 | 0.02 | 0.11 | | |
| Tunisia | 0.04 | 0.02 | 0.06 | 0.06 | 0.05 | 0.03 | | |

| | Investment Growth | | Export Growth | | Import Growth | |
|---|---|---|---|---|---|---|
| | Means | STD | Means | STD | Means | STD |
| Egypt | 0.03 | 0.2 | 0.01 | 0.09 | 0.01 | 0.18 |
| Iran | 0.04 | 0.35 | 0.02 | 0.17 | 0.04 | 0.31 |
| Jordan | 0.03 | 0.2 | 0.03 | 0.05 | 0.04 | 0.12 |
| Oman | -0.04 | 0.41 | 0.01 | 0.14 | 0.02 | 0.04 |
| Libya | 0.04 | 0.24 | 0.03 | 0.09 | 0.06 | 0.13 |
| Pakistan | 0.06 | 0.04 | 0.05 | 0.08 | 0.04 | 0.05 |
| Qatar | | | -0.004 | 0.12 | | |
| Syria | 0.01 | 0.36 | -0.05 | 0.39 | 0.02 | 0.15 |
| Tunisia | 0.03 | 0.22 | -0.10 | 0.65 | 0.03 | 0.22 |

## Table 2A: 2SLS Parameter Estimates

Model A: Real GDP as a function of Money Supply, Real Government Spending, Nominal Effective Exchange Rate, Foreign Direct Investment, and Energy Prices

| | A0 | A1 | A2 | A3 | A4 | A5 | A6 | RH0 |
|---|---|---|---|---|---|---|---|---|
| Egypt | | | | | | | | |
| | 0.03 | 0.07 | 0.01 | 0.04 | -0.01 | -0.02 | | 0.56** |
| | (1.10) | (0.98) | (0.54) | (1.10) | (-1.11) | (-1.31) | | (3.10) |
| | R-square: 0.41 | | | | | | | |
| Iran | | | | | | | | |
| | 0.10 | -0.11 | 0.09 | 0.06 | 0.0001 | 0.07 | -0.40 | 0.55** |
| | (0.84) | (-0.46) | (1.14) | (0.84) | (0.06) | (1.00) | (-1.69) | (2.57) |
| | R-square: 0.51 | | | | | | | |
| Jordan | | | | | | | | |
| | 0.03** | 0.12 | 0.01 | 0.39** | 0.003* | -0.001 | -0.45** | -0.28 |
| | (3.24) | (0.92) | (0.18) | (2.99) | (1.94) | (-0.02) | (-2.58) | (-1.49) |
| | R-square: 0.67 | | | | | | | |
| Libya | | | | | | | | |
| | 0.005 | -0.02 | 0.13 | -0.06 | 0.004 | 0.04 | -0.71 | -0.01 |
| | (0.26) | (-0.09) | (1.33) | (-0.56) | (0.62) | (0.65) | (-1.10) | (-0.02) |
| | R-square: 0.37 | | | | | | | |
| Oman | | | | | | | | |
| | 0.04** | 0.08 | 0.21** | 0.19* | -0.001 | -0.04 | | 0.16 |
| | (3.84) | (1.02) | (2.79) | (1.92) | (-0.10) | (-1.36) | | (0.96) |
| | R-square: 0.68 | | | | | | | |
| Pakistan | | | | | | | | |
| | 0.03** | 0.04 | 0.14** | 0.03 | 0.001 | 0.004 | -0.26** | 0.47** |
| | (2.53) | (1.19) | (2.61) | (0.73) | (0.02) | (0.58) | (-2.19) | (2.90) |
| | R-square: 0.74 | | | | | | | |
| Qatar | | | | | | | | |
| | 0.01 | 0.04 | 0.30 | -0.09 | - 0.002 | 0.002 | -0.31 | 0.42 |
| | (0.28) | (0.30) | (1.33) | (-0.23) | (-0.31) | (0.02) | (-0.97) | (1.16) |
| | R-square: 0.10 | | | | | | | |
| Syria | | | | | | | | |
| | 0.05* | -0.10 | 0.12 | -0.02 | - 0.0001 | -0.02 | -0.34* | -0.10 |
| | (1.85) | (-0.47) | (1.58) | (-0.42) | (-1.16) | (-0.50) | (-1.83) | (-0.37) |
| | R-square: 0.34 | | | | | | | |
| Tunisia | | | | | | | | |
| | 0.05** | 0.03 | -0.13 | 0.14 | 0.005 | 0.05** | 0.04 | -0.27 |
| | (5.62) | (0.41) | (-1.28) | (1.23) | (0.56) | (2.24) | (0.36) | (-1.20) |
| | R-square: 0.49 | | | | | | | |

A0 Intercept
A1 Change in Money Supply
A2 Change in Real Government Spending
A3 Change in Nominal Effective Exchange Rate
A4 Change in Foreign Direct Investment
A5 Change in Energy Prices
A6 Error Correction
RH0 Serial correlation

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

## Table 2B: 2SLS Parameter Estimates

Model B: Real GDP as a function of Money Supply, Real Government Spending, Nominal Effective Exchange Rate, Inflow of Workers' Remittances, and Energy Prices

| | B0 | B1 | B2 | B3 | B4 | B5 | B6 | RH0 |
|---|---|---|---|---|---|---|---|---|
| Egypt | | | | | | | | |
| | -0.06 | 0.34** | -0.02 | 0.05 | -0.03 | -0.01 | | 0.65** |
| | (-0.76) | (2.50) | (-0.67) | (1.48) | (-1.48) | (-0.35) | | (3.52) |
| | R-square: 0.49 | | | | | | | |
| Jordan | | | | | | | | |
| | 0.02* | 0.15 | 0.17* | 0.41** | 0.14** | -0.02 | -0.20 | -0.36 |
| | (2.06) | (1.38) | (1.98) | (3.48) | (2.30) | (-0.67) | (-1.18) | (-2.39) |
| | R-square: 0.70 | | | | | | | |
| Pakistan | | | | | | | | |
| | 0.04** | 0.02 | 0.09 | 0.04 | -0.02 | 0.01 | -0.23* | 0.52** |
| | (3.54) | (0.50) | (1.49) | (1.05) | (-1.42) | (0.60) | (-2.00) | (2.97) |
| | R-square: 0.16 | | | | | | | |
| Tunisia | | | | | | | | |
| | 0.05** | 0.05 | -0.16 | 0.17 | -0.01 | 0.05** | -0.01 | -0.24 |
| | (5.90) | (0.51) | (-1.36) | (1.24) | (-0.22) | (2.19) | (-0.10) | (-0.99) |
| | R-square: 0.46 | | | | | | | |

B0 Intercept
B1 Change in Money Supply
B2 Change in Real Government Spending
B3 Change in Nominal Effective Exchange Rate
B4 Inflow of Workers' Remittances
B5 Change in Energy Prices
B6 Error Correction
RH0 Serial correlation

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

## Table 3A: 2SLS Parameter Estimates

Model A: Price deflator as a function of Money Supply, Real Government Spending, Nominal Effective Exchange Rate, Foreign Direct Investment, and Energy Prices

| | A0 | A1 | A2 | A3 | A4 | A5 | A6 | RH0 |
|---|---|---|---|---|---|---|---|---|
| Egypt | | | | | | | | |
| | 0.13** | -0.002 | -0.14** | 0.06 | -0.02 | -0.04 | -0.17** | 0.70** |
| | (2.12) | (-0.02) | (-4.14) | (1.20) | (-1.35) | (-1.26) | (-2.19) | (3.91) |
| | R-square: 0.80 | | | | | | | |
| Iran | | | | | | | | |
| | 0.05* | 0.55** | 0.23 | -0.09** | 0.001 | 0.02 | -1.06** | 0.06 |
| | (1.84) | (3.29) | (6.89) | (-2.68) | (1.17) | (0.53) | (-5.28) | (0.46) |
| | R-square: 0.92 | | | | | | | |
| Jordan | | | | | | | | |
| | 0.04* | 0.07 | -0.15** | -0.10 | -0.002 | -0.02 | | 0.50** |
| | (1.75) | (0.64) | (-2.18) | (-0.99) | (-1.18) | (-0.53) | | (3.48) |
| | R-square: 0.65 | | | | | | | |
| Libya | | | | | | | | |
| | 0.04* | 0.23 | 0.43** | 0.31** | -0.01 | -0.18 | -0.64** | 0.02 |
| | (1.73) | (1.03) | (3.57) | (2.49) | (-0.82) | (-1.58) | (-3.31) | (0.19) |
| | R-square: 0.66 | | | | | | | |
| Oman | | | | | | | | |
| | 0.01 | 0.03 | 0.16 | -0.51** | -0.01 | 0.43** | -0.32 | 0.29** |
| | (0.19) | (0.19) | (1.11) | (-2.63) | (-1.11) | (7.31) | (-1.55) | (2.19) |
| | R-square: 0.84 | | | | | | | |
| Pakistan | | | | | | | | |
| | 0.07** | 0.10 | -0.27* | -0.02 | 0.10 | -0.01 | | 0.35 |
| | (2.85) | (1.05) | (-2.02) | (-0.21) | (0.92) | (-0.49) | | (1.69) |
| | R-square: 0.36 | | | | | | | |
| Qatar | | | | | | | | |
| | 0.03 | 0.02 | 0.09 | -0.17 | 0.01 | 0.55** | 0.26* | |
| | (1.12) | (0.16) | (0.50) | (-0.52) | (1.23) | (5.90) | | (1.81) |
| | R-square: 0.76 | | | | | | | |
| Syria | | | | | | | | |
| | 0.10** | -0.03 | -0.16** | -0.12* | 0.0001 | 0.02 | -0.70** | 0.35 |
| | (2.12) | (-0.14) | (-2.29) | (-2.25) | (0.06) | (0.36) | (-3.15) | (1.63) |
| | R-square: 0.74 | | | | | | | |
| Tunisia | | | | | | | | |
| | 0.01 | 0.44* | 0.08 | -0.20 | 0.05** | -0.01 | -0.58* | 0.01 |
| | (0.21) | (1.96) | (0.31) | (-0.82) | (2.47) | (-0.24) | (-1.83) | (0.05) |
| | R-square: 0.48 | | | | | | | |

A0 Intercept
A1 Change in Money Supply
A2 Change in Real Government Spending
A3 Change in Nominal Effective Exchange Rate
A4 Change in Foreign Direct Investment
A5 Change in Energy Prices
A6 Error Correction
RH0 Serial correlation

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

## Table 3B: 2SLS Parameter Estimates

Model B: Price deflator as a function of Money Supply, Real Government Spending, Nominal Effective Exchange Rate, Inflow of Workers' Remittances, and Energy Prices

| | B0 | B1 | B2 | B3 | B4 | B5 | B6 | RH0 |
|---|---|---|---|---|---|---|---|---|
| Egypt | | | | | | | | |
| | 0.08** | 0.43 | -0.04 | 0.36** | -0.17** | -0.34** | | 0.01 |
| | (2.19) | (1.39) | (-0.55) | (3.27) | (-2.21) | (-3.64) | | (0.05) |
| | R-square: 0.64 | | | | | | | |
| Jordan | | | | | | | | |
| | 0.02 | 0.15 | -0.11 | -0.21** | 0.06 | 0.002 | | 0.45** |
| | (1.01) | (1.37) | (-1.47) | (-2.12) | (0.98) | (0.07) | | (2.74) |
| | R-square: 0.60 | | | | | | | |
| Pakistan | | | | | | | | |
| | 0.06** | 0.03 | -0.02 | -0.03 | 0.02 | 0.03 | -0.38** | 0.43 |
| | (2.17) | (0.27) | (-0.15) | (-0.31) | (0.77) | (0.96) | (-2.23) | (1.44) |
| | R-square: 0.47 | | | | | | | |
| Tunisia | | | | | | | | |
| | 0.06 | 0.06 | 0.74** | -0.31* | -0.37** | -0.15* | -0.52 | 0.23 |
| | (1.48) | (0.17) | (2.15) | (-0.90) | (-2.62) | (-1.92) | (-1.53) | (0.82) |
| | R-square: 0.40 | | | | | | | |

B0 Intercept
B1 Change in Money Supply
B2 Change in Real Government Spending
B3 Change in Nominal Effective Exchange Rate
B4 Inflow of Workers' Remittances
B5 Change in Energy Prices
B6 Error Correction
RH0 Serial correlation

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

## Table 4A: 2SLS Parameter Estimates

Model A: Real Consumption as a function of Money Supply, Real Government Spending, Nominal Effective Exchange Rate, Foreign Direct Investment, and Energy Prices

| | A0 | A1 | A2 | A3 | A4 | A5 | A6 | RH0 |
|---|---|---|---|---|---|---|---|---|
| Egypt | | | | | | | | |
| | 0.03* | 0.03 | 0.02 | 0.09 | 0.02 | 0.08** | -0.02 | -0.27 |
| | (1.86) | (0.24) | (0.63) | (1.37) | (1.39) | (2.15) | (-0.14) | (-1.28) |
| | R-square: 0.52 | | | | | | | |
| Iran | | | | | | | | |
| | 0.08 | -0.15 | 0.18** | 0.10 | 0.001 | 0.05 | -0.58** | 0.33* |
| | (1.04) | (-0.70) | (2.56) | (1.64) | (0.39) | (0.86) | (-2.94) | (1.77) |
| | R-square: 0.58 | | | | | | | |
| Jordan | | | | | | | | |
| | 0.02* | 0.39** | 0.09 | 1.23** | 0.001 | 0.04 | -0.71** | -0.62** |
| | (1.92) | (2.69) | (1.02) | (6.17) | (0.71) | (0.88) | (-3.42) | (-3.52) |
| | R-square: 0.87 | | | | | | | |
| Libya | | | | | | | | |
| | 0.02 | 0.39 | 0.35** | 0.13 | 0.01 | -0.12 | -1.12** | 0.52* |
| | (0.35) | (1.60) | (2.60) | (0.97) | (1.20) | (-1.02) | (-3.02) | (1.84) |
| | R-square: 0.74 | | | | | | | |
| Oman | | | | | | | | |
| | 0.04* | 0.04 | 0.76** | 0.05 | -0.02 | 0.01 | -0.69** | -0.14 |
| | (2.02) | (0.17) | (4.22) | (0.24) | (-1.58) | (0.14) | (2.64) | (-0.05) |
| | R-square: 0.73 | | | | | | | |
| Pakistan | | | | | | | | |
| | 0.02 | -0.01 | 0.26** | -0.14 | -0.01 | 0.02 | -0.65** | 0.36 |
| | (1.35) | (-0.15) | (2.16) | (-1.54) | (-1.21) | (1.02) | (-2.66) | (1.37) |
| | R-square: 0.58 | | | | | | | |
| Qatar | | | | | | | | |
| Syria | | | | | | | | |
| | 0.05 | -0.27 | 0.37** | -0.01 | - 0.000 | 0.12 | -0.42* | -0.31 |
| | (1.16) | (-0.71) | (2.33) | (-0.12) | (-1.24) | (1.57) | (-1.80) | (-1.16) |
| | R-square: 0.46 | | | | | | | |
| Tunisia | | | | | | | | |
| | 0.03 | 0.12 | -0.06 | 0.07 | 0.01 | 0.06 | -0.51 | 0.28 |
| | (1.13) | (0.77) | (-0.40) | (0.46) | (0.82) | (1.40) | (-1.37) | (0.91) |
| | R-square: 0.31 | | | | | | | |

A0 Intercept
A1 Change in Money Supply
A2 Change in Real Government Spending
A3 Change in Nominal Effective Exchange Rate
A4 Change in Foreign Direct Investment
A5 Change in Energy Prices
A6 Error Correction
RH0 Serial correlation

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

## Table 4B: 2SLS Parameter Estimates

Model B: Real Consumption as a function of Money Supply, Real Government Spending, Nominal Effective Exchange Rate, Inflow of Workers' Remittances, and Energy Prices

| | B0 | B1 | B2 | B3 | B4 | B5 | B6 | RH0 |
|---|---|---|---|---|---|---|---|---|
| Egypt | | | | | | | | |
| | 0.02 | 0.20 | 0.01 | 0.10 | 0.03 | 0.05 | -0.07 | -0.16 |
| | (0.73) | (0.89) | (0.23) | (1.36) | (0.56) | (1.49) | (-0.43) | (-0.65) |
| | R-square: 0.38 | | | | | | | |
| Jordan | | | | | | | | |
| | 0.01 | 0.37** | 0.23** | 1.08** | 1.08** | 0.02 | -0.51** | 0.67** |
| | (0.98) | (0.40) | (2.97) | (2.97) | (7.22) | (0.56) | (-3.35) | (5.69) |
| | R-square: 0.91 | | | | | | | |
| Pakistan | | | | | | | | |
| | 0.03 | -0.001 | 0.28** | -0.05 | -0.03 | 0.02 | -0.55 | 0.25 |
| | (1.56) | (-0.01) | (2.14) | (-0.40) | (-0.93) | (0.84) | (-1.69) | (0.78) |
| | R-square: 0.47 | | | | | | | |
| Tunisia | | | | | | | | |
| | 0.04** | 0.08 | -0.13 | 0.29* | 0.03 | 0.01 | -0.23 | 0.19 |
| | (2.30) | (0.59) | (-0.88) | (1.79) | (0.41) | (0.23) | (-0.73) | (0.66) |
| | R-square: 0.29 | | | | | | | |

B0 Intercept
B1 Change in Money Supply
B2 Change in Real Government Spending
B3 Change in Nominal Effective Exchange Rate
B4 Inflow of Workers' Remittances
B5 Change in Energy Prices
B6 Error Correction
RH0 Serial correlation

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

## Table 5A: 2SLS Parameter Estimates

Model A: Real Investment as a function of Money Supply, Real Government Spending, Nominal Effective Exchange Rate, Foreign Direct Investment, and Energy Prices

| | A0 | A1 | A2 | A3 | A4 | A5 | A6 | RH0 |
|---|---|---|---|---|---|---|---|---|
| Egypt | | | | | | | | |
| | 0.01 | 0.06 | 0.04 | -0.27 | -0.06 | 0.37** | -0.58 | 0.14 |
| | (0.14) | (0.10) | (0.28) | (-1.04) | (-0.93) | (2.20) | (-1.04) | (0.27) |
| | R-square: 0.34 | | | | | | | |
| Iran | | | | | | | | |
| | 0.33 | -0.82 | 0.55 | -0.01 | -0.003 | 0.44 | | 0.43 |
| | (0.56) | (-0.72) | (1.56) | (-0.04) | (-0.41) | (1.39) | | (0.87) |
| | R-square: 0.40 | | | | | | | |
| Jordan | | | | | | | | |
| | 0.004 | 0.58 | -0.08 | -0.12 | 0.002 | 0.16 | | -0.24 |
| | (0.07) | (0.97) | (-0.19) | (-0.18) | (0.25) | (0.81) | | (-0.95) |
| | R-square: 0.18 | | | | | | | |
| Libya | | | | | | | | |
| | -0.05 | 0.06 | 0.85* | 0.33 | 0.001 | 0.54 | | -0.11 |
| | (-0.55) | (0.06) | (1.71) | (0.67) | (0.04) | (1.23) | | (-0.51) |
| | R-square: 0.34 | | | | | | | |
| Oman | | | | | | | | |
| | 0.03 | 0.12 | 0.54 | 0.83 | -0.04 | -0.07 | -0.56 | -0.11 |
| | (0.50) | (0.21) | (1.08) | (1.34) | (-1.12) | (-0.43) | (-1.36) | (-0.22) |
| | R-square: 0.48 | | | | | | | |
| Pakistan | | | | | | | | |
| | 0.04 | 0.17 | -0.11 | 0.10 | 0.0002 | 0.03 | -0.65** | 0.36 |
| | (1.21) | (1.33) | (-0.64) | (0.65) | (0.01) | (0.96) | (-2.24) | (1.06) |
| | R-square: 0.53 | | | | | | | |
| Qatar | | | | | | | | |
| Syria | | | | | | | | |
| | 0.06 | -0.08 | 0.59 | 0.27 | - 0.0004 | -0.38 | -0.81* | 0.01 |
| | (2.32) | (-0.07) | (1.36) | (0.77) | (-0.89) | (-1.58) | (-2.03) | (0.01) |
| | R-square: 0.46 | | | | | | | |
| Tunisia | | | | | | | | |
| | 0.06 | -0.14 | -0.39 | 0.92 | 0.15** | 0.28 | -0.97* | 0.14 |
| | (0.61) | (-0.18) | (-0.43) | (1.02) | (2.05) | (1.50) | (-1.82) | (0.34) |
| | R-square: 0.58 | | | | | | | |

A0 Intercept
A1 Change in Money Supply
A2 Change in Real Government Spending
A3 Change in Nominal Effective Exchange Rate
A4 Change in Foreign Direct Investment
A5 Change in Energy Prices
A6 Error Correction
RH0 Serial correlation

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

## Table 5B: 2SLS Parameter Estimates

Model B: Real Investment as a function of Money Supply, Real Government Spending, Nominal Effective Exchange Rate, Inflow of Workers' Remittances, and Energy Prices

| | B0 | B1 | B2 | B3 | B4 | B5 | B6 | RH0 |
|---|---|---|---|---|---|---|---|---|
| Egypt | | | | | | | | |
| | -0.12 | 0.82 | -0.16 | -0.10 | -0.19 | 0.30 | -0.53 | 0.30 |
| | (-0.48) | (0.80) | (-0.69) | (-0.30) | (-0.79) | (1.53) | (-0.69) | (0.40) |
| | R-square: 0.36 | | | | | | | |
| Jordan | | | | | | | | |
| | 0.01 | -0.35 | 0.27 | 0.17 | 0.56** | 0.04 | -0.62** | -0.18 |
| | (0.32) | (-0.91) | (1.00) | (0.45) | (2.68) | (0.36) | (-2.96) | (-0.71) |
| | R-square: 0.71 | | | | | | | |
| Pakistan | | | | | | | | |
| | 0.03 | 0.19 | -0.04 | 0.10 | -0.02 | 0.07 | -0.63* | 0.43 |
| | (0.80) | (1.31) | (-0.22) | (0.56) | (-0.60) | (1.62) | (-1.83) | (1.17) |
| | R-square: 0.54 | | | | | | | |
| Tunisia | | | | | | | | |
| | 0.09 | -0.25 | 0.55 | 1.89* | -0.24 | 0.04 | -0.48 | -0.23 |
| | (1.25) | (-0.31) | (0.51) | (1.72) | (-0.51) | (0.19) | (-1.48) | (-0.61) |
| | R-square: 0.50 | | | | | | | |

B0 Intercept
B1 Change in Money Supply
B2 Change in Real Government Spending
B3 Change in Nominal Effective Exchange Rate
B4 Inflow of Workers' Remittances
B5 Change in Energy Prices
B6 Error Correction
RH0 Serial correlation

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

## Table 6A: 2SLS Parameter Estimates

Model A: Real Export as a function of Money Supply, Real Government Spending, Nominal Effective Exchange Rate, Foreign Direct Investment, and Energy Prices

| | A0 | A1 | A2 | A3 | A4 | A5 | A6 | RH0 |
|---|---|---|---|---|---|---|---|---|
| Egypt | | | | | | | | |
| | -0.01 | -0.17 | 0.20 | -0.42* | 0.05 | 0.48** | | 0.46** |
| | (-0.10) | (-0.31) | (1.47) | (-1.78) | (0.90) | (4.13) | | (2.37) |
| | R-square: 0.62 | | | | | | | |
| Iran | | | | | | | | |
| | 0.19 | -0.70 | 1.19** | 0.01 | 0.002 | 0.77** | -0.53 | 0.27 |
| | (0.62) | (-0.71) | (3.94) | (0.03) | (0.35) | (2.76) | (-1.38) | (0.97) |
| | R-square: 0.65 | | | | | | | |
| Jordan | | | | | | | | |
| | 0.02 | 0.27 | 0.25 | -0.26 | -0.002 | 0.19** | | 0.15 |
| | (0.60) | (0.95) | (1.34) | (-0.88) | (-0.42) | (2.21) | | (0.77) |
| | R-square: 0.46 | | | | | | | |
| Libya | | | | | | | | |
| | -0.03 | 0.55 | 1.33** | 0.31 | -0.01 | -0.47** | -0.61** | -0.05 |
| | (-0.72) | (1.19) | (5.08) | (1.17) | (-0.78) | (-2.11) | (-2.11) | (-2.11) |
| | R-square: 0.75 | | | | | | | |
| Oman | | | | | | | | |
| | 0.01 | 0.34 | 0.41 | 0.11 | 0.01 | 0.49** | | -0.12 |
| | (0.27) | (1.23) | (1.64) | (0.35) | (0.91) | (5.42) | | (-0.93) |
| | R-square: 0.82 | | | | | | | |
| Pakistan | | | | | | | | |
| | 0.001 | 0.18 | 0.51** | -0.12 | 0.01 | -0.01 | -0.26 | 0.18 |
| | (0.06) | (1.34) | (2.67) | (-0.88) | (0.44) | (-0.44) | (-1.25) | (0.89) |
| | R-square: 0.57 | | | | | | | |
| Qatar | | | | | | | | |
| | 0.01 | -0.09 | 0.32 | 0.73 | 0.01 | 0.49** | | 0.004 |
| | (0.29) | (-0.41) | (0.99) | (1.03) | (1.34) | (3.88) | | (0.02) |
| | R-square: 0.63 | | | | | | | |
| Syria | | | | | | | | |
| | 0.14 | -0.83* | 0.52** | -0.50** | -0.00001 | 0.36** | -0.70** | 0.14 |
| | (1.69) | (-1.93) | (3.01) | (-5.33) | (-0.09) | (4.74) | (-2.92) | (0.92) |
| | R-square: 0.79 | | | | | | | |
| Tunisia | | | | | | | | |
| | 0.04 | 0.39 | -1.03** | 0.29 | 0.01 | 0.33** | -0.82** | 0.37** |
| | (0.90) | (1.46) | (-2.96) | (0.88) | (0.40) | (3.78) | (-3.13) | (2.45) |
| | R-square: 0.56 | | | | | | | |

A0 Intercept
A1 Change in Money Supply
A2 Change in Real Government Spending
A3 Change in Nominal Effective Exchange Rate
A4 Change in Foreign Direct Investment
A5 Change in Energy Prices
A6 Error Correction
RH0 Serial correlation

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

## Table 6B: 2SLS Parameter Estimates

Model B: Real Export as a function of Money Supply, Real Government Spending, Nominal Effective Exchange Rate, Inflow of Workers' Remittances, and Energy Prices

| | B0 | B1 | B2 | B3 | B4 | B5 | B6 | RH0 |
|---|---|---|---|---|---|---|---|---|
| Egypt | | | | | | | | |
| | 0.26 | -0.69 | 1.27** | 0.07 | -0.37 | 0.79** | -0.50 | 0.28 |
| | (0.82) | (-0.74) | (4.41) | (0.22) | (-1.06) | (3.00) | (-1.35) | (1.06) |
| | R-square: 0.67 | | | | | | | |
| Jordan | | | | | | | | |
| | -0.01 | 0.18 | 0.41** | -0.59** | 0.34** | 0.07 | | 0.07 |
| | (-0.32) | (0.75) | (2.40) | (-2.82) | (2.70) | (1.00) | | (0.41) |
| | R-square: 0.57 | | | | | | | |
| Pakistan | | | | | | | | |
| | 0.01 | 0.09 | 0.46** | -0.18 | 0.05 | -0.03 | -0.34 | 0.23 |
| | (0.27) | (0.62) | (2.43) | (-1.19) | (1.36) | (-0.70) | (-1.43) | (1.11) |
| | R-square: 0.60 | | | | | | | |
| Tunisia | | | | | | | | |
| | 0.03 | 0.34 | -0.99** | 0.81* | 0.27* | 0.25** | -0.60** | 0.15 |
| | (0.94) | (1.22) | (-2.83) | (1.96) | (2.01) | (2.96) | (-2.65) | (0.81) |
| | R-square: 0.56 | | | | | | | |

B0 Intercept
B1 Change in Money Supply
B2 Change in Real Government Spending
B3 Change in Nominal Effective Exchange Rate
B4 Inflow of Workers' Remittances
B5 Change in Energy Prices
B6 Error Correction
RH0 Serial correlation
** Significant at 5%.
* Significant at 10%.
t-ratios are in parenthesis

## Table 7A: 2SLS Parameter Estimates

Model A: Real Import as a function of Money Supply, Real Government Spending, Nominal Effective Exchange Rate, Foreign Direct Investment, and Energy Prices

| | A0 | A1 | A2 | A3 | A4 | A5 | A6 | RH0 |
|---|---|---|---|---|---|---|---|---|
| Egypt | | | | | | | | |
| | -0.11 | 0.42 | 0.24** | 0.03 | 0.10** | 0.29** | -0.88** | 0.36* |
| | (-1.45) | (1.04) | (2.62) | (0.15) | (2.49) | (3.26) | (-5.15) | (1.82) |
| | R-square: 0.75 | | | | | | | |
| Iran | | | | | | | | |
| | 0.23 | -0.65 | 1.27** | 0.22 | 0.004 | 0.36* | -0.52 | 0.29 |
| | (1.01) | (-1.00) | (6.35) | (1.34) | (0.99) | (1.88) | (-1.57) | (1.37) |
| | R-square: 0.74 | | | | | | | |
| Jordan | | | | | | | | |
| | 0.06* | -0.08 | 0.23 | 0.43 | -0.0001 | 0.24** | 0.25** | -0.004 |
| | (2.77) | (-0.28) | (1.28) | (1.44) | (0.01) | (3.04) | (-2.74) | (-0.01) |
| | R-square: 0.67 | | | | | | | |
| Libya | | | | | | | | |
| | 0.01 | -0.14 | 0.38 | -0.12 | -0.05** | 0.16 | -0.48 | 0.95 |
| | (0.01) | (-0.32) | (1.12) | (-0.47) | (-2.94) | (0.70) | (-1.19) | (1.60) |
| | R-square: 0.74 | | | | | | | |
| Oman | | | | | | | | |
| | 0.04 | -0.11 | 0.70** | 0.58* | -0.01 | -0.06 | -0.22 | -0.003 |
| | (1.30) | (-0.40) | (3.01) | (2.02) | (-0.30) | (-1.01) | (-1.01) | (-0.01) |
| | R-square: 0.59 | | | | | | | |
| Pakistan | | | | | | | | |
| | 0.001 | -0.01 | 0.45* | -0.13 | -0.02 | 0.05 | -0.81* | 0.45 |
| | (0.03) | (-0.06) | (1.94) | (-0.72) | (-1.26) | (1.37) | (-2.03) | (1.36) |
| | R-square: 0.54 | | | | | | | |
| Qatar | | | | | | | | |
| Syria | | | | | | | | |
| | 0.07 | -0.31 | 0.08 | -0.12 | -0.0003 | 0.28** | -0.56** | 0.20 |
| | (0.75) | (-0.65) | (0.36) | (-1.12) | (-1.35) | (3.14) | (-2.19) | (0.66) |
| | R-square: 0.56 | | | | | | | |
| Tunisia | | | | | | | | |
| | 0.08 | -0.06 | -0.50 | 0.73* | 0.05 | 0.37** | -1.22** | 0.38** |
| | (1.22) | (-0.18) | (-1.35) | (1.90) | (1.64) | (3.73) | (-4.45) | (2.52) |
| | R-square: 0.45 | | | | | | | |

A0 Intercept
A1 Change in Money Supply
A2 Change in Real Government Spending
A3 Change in Nominal Effective Exchange Rate
A4 Change in Foreign Direct Investment
A5 Change in Energy Prices
A6 Error Correction
RH0 Serial correlation

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

## Table 7B: 2SLS Parameter Estimates

Model B: Real Import as a function of Money Supply, Real Government Spending, Nominal Effective Exchange Rate, Inflow of Workers' Remittances, and Energy Prices

| | B0 | B1 | B2 | B3 | B4 | B5 | B6 | RH0 |
|---|---|---|---|---|---|---|---|---|
| Egypt | | | | | | | | |
| | -0.05 | 0.21 | 0.15 | 0.23 | -0.11 | 0.18 | -0.96** | 0.18 |
| | (-0.74) | (0.44) | (1.37) | (1.17) | (-0.86) | (1.65) | (-5.01) | (0.75) |
| | R-square: 0.66 | | | | | | | |
| Jordan | | | | | | | | |
| | -0.001 | -0.17 | 0.39** | 0.13 | 0.29** | 0.17** | -0.67** | -0.02 |
| | (-0.07) | (-0.77) | (2.48) | (0.55) | (2.34) | (2.61) | (-2.58) | (-0.08) |
| | R-square: 0.75 | | | | | | | |
| Pakistan | | | | | | | | |
| | -0.02 | 0.05 | 0.39 | -0.13 | -0.01 | 0.08 | -0.85* | 0.47 |
| | (-0.36) | (0.26) | (1.57) | (-0.53) | (-0.14) | (1.46) | (-1.77) | (1.24) |
| | R-square: 0.50 | | | | | | | |
| Tunisia | | | | | | | | |
| | 0.07 | -0.19 | -0.14 | 1.15** | 0.16 | 0.17** | -0.81** | 0.22 |
| | (1.71) | (-0.70) | (-0.40) | (2.61) | (1.12) | (2.33) | (-3.43) | (0.98) |
| | R-square: 0.56 | | | | | | | |

B0 Intercept
B1 Change in Money Supply
B2 Change in Real Government Spending
B3 Change in Nominal Effective Exchange Rate
B4 Inflow of Workers' Remittances
B5 Change in Energy Prices
B6 Error Correction
RH0 Serial correlation

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

## Appendix A: Econometric Methodology

To account for endogenous variables in the empirical model (1), instrumental variables are used in estimation. The instrument list includes three lags of the growth rate of real government spending, the money supply, energy prices, the nominal exchange rate, FDI or remittances, nominal GDP and CPI. 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 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. Moreover, the residuals are orthogonal to variables in the instruments list and right hand-side variables in the final empirical model.

## Appendix B: Data Sources

The sample period for the majority of tests ranges from 1975-2003. Due to data availability, the sample period for models with remittances ranges as follows: 1977-2003 (Egypt), and 1976-2003 (Pakistan and Tunisia).

### 1. Data Base: WEO

- Gross Domestic Product in Constant Prices.
- Gross Domestic Product in Current Prices.
- GDP Deflator.
- Private Consumption Expenditure.
- Gross Private Capital Formation.
- Export of Goods and Services.
- Import of Goods and Services.
- Consumer Price Index.
- Government Expenditures.
- Foreign Direct Investment, Inflow.

### 2. Data Base: IFTS

- Money.
- Nominal Exchange Rate.

### 3. Data Base: WDI2K5

- Workers' Remittances: CRE.
- Energy Price: Crude Oil Dubai Prices.

**Table A1: The KPSS Statistics for Null of Level Stationary.**

(The 10% critical value is 0.347)

| | LM Statistic (Bandwidth)+ | | | | | |
|---|---|---|---|---|---|---|
| Countries | GDP | Consumption | Investment | Export | Import | Price |
| Egypt | 0.68* (4) | 0.45*(0) | 0.44*(0) | 0.45*(3) | 0.40*(0) | 0.66*(4) |
| Iran | 0.59* (4) | 0.28 (4) | 0.71*(0) | 0.54*(4) | 0.46*(4) | 0.57*(4) |
| Jordan | 0.69*(4) | 0.66*(4) | 0.50*(4) | 0.68*(4) | 0.66*(4) | 0.68*(4) |
| Libya | 0.21 (3) | 0.61*(3) | 0.49* (0) | 0.31 (4) | 0.32 (4) | 0.64*(4) |
| Oman | 0.68* (4) | 0.13 (2) | 0.64*(4) | 0.62*(4) | 0.66*(4) | 0.62*(4) |
| Pakistan | 0.69* (4) | 0.69*(4) | 0.68*(4) | 0.69*(4) | 0.69*(4) | 0.64*(4) |
| Qatar | 0.69* (4) | | | 0.16 (4) | | 0.71*(4) |
| Syria | 0.66* (4) | 0.41*(4) | 0.29 (0) | 0.60*(4) | 0.41*(4) | 0.64*(4) |
| Tunisia | 0.68* (4) | 0.69*(4) | 0.59*(4) | 0.66*(4) | 0.65*(4) | 0.67*(4) |

Test description:
The KPSS (Kwiatkowski, 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).

* The variable has a unit root.

## Table A2: Cointegration Test Results (Continued)

ADF test statistics for the null hypothesis of non-stationary residuals.
Critical value at 10% = -2.61

Model A: Cointegration regression includes: Real value of the dependent variable, Money Supply, Real Government Spending, Nominal Effective Exchange Rate, Energy Price, and Inflow of Foreign Direct Investment

t-Statistic (# of Lags)+

| Countries | GDP | Consumption | Investment | Export | Import | Price |
|---|---|---|---|---|---|---|
| Egypt | -2.12 (0) | -6.87*(0) | -5.15*(0) | -2.50(3) | -6.99*(0) | -2.81*(0) |
| Iran | -4.67*(2) | -3.59*(2) | -5.06*(1) | -3.94*(0) | -3.19*(0 | -3.76*(0) |
| Jordan | -2.86*(0) | -5.55*(0) | -2.11 (0) | -2.05(0) | -3.25*(0) | -1.44(0) |
| Libya | -4.44*(0) | -5.45*(1) | -2.37(8) | -4.46*(0) | -4.91*(0) | -3.76*(0) |
| Oman | -2.31(0) | -2.86*(0) | -3.83*(0) | -1.99(4) | -3.71*(0) | -3.28*(0) |
| Pakistan | -3.94*(7) | -4.62*(8) | -3.18*(3) | -3.70*(8) | -3.72*(0) | -2.17(0) |
| Qatar | -4.53*(7) | | | -2.26 (0) | | -2.53(0) |
| Syria | -4.88*(7) | -4.00*(0) | -3.70*(0) | -3.70*(6) | -3.15*(0) | -3.06*(5) |
| Tunisia | -2.68* (0) | -4.30*(1) | -5.15*(0) | -3.31*(0) | -4.15*(0) | -3.51*(0) |

+ All variables are in real values.

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Model B: Cointegration regression includes: Real value of the dependent variable, Money Supply, Real Government Spending, Nominal Effective Exchange Rate, Energy Price, and Inflow of Workers' Remittances

| Countries | GDP | Consumption | Investment | Export | Import | Price |
|---|---|---|---|---|---|---|
| Egypt | -1.26 (0) | -3.76*(0) | -4.99*(5) | -3.27*(3) | -4.87*(1) | -3.42*(0) |
| Jordan | -3.02*(0) | -4.27*(6) | -3.11*(0) | -2.60(0) | -5.19*(0) | -1.01(0) |
| Pakistan | -2.44(0) | -3.83*(1) | -3.65*(1) | -2.88*(0) | -3.47*(0) | -3.05*(0) |
| Tunisia | -2.82*(0) | -5.51*(1) | -4.31*(0) | -3.12*(0) | -4.17*(0) | -2.76*(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 levels 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)