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1 February 2007

Online at <https://mpra.ub.uni-muenchen.de/1974/>

MPRA Paper No. 1974, posted 02 Mar 2007 UTC

SHORT- AND MEDIUM-TERM DETERMINANTS OF CURRENT ACCOUNT BALANCES IN MIDDLE EAST AND NORTH AFRICA COUNTRIES

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Abstract:

The main aim of the paper is to examine the short- and medium-term empirical link between current account balances and a broad set of (economic) variables proposed by theoretical and empirical literature. The paper focuses on the Middle East and North Africa (MENA), an economically diverse region, which has so far mainly been neglected in such empirical analyzes. For this purpose, a (dynamic) panel-regression technique is used to characterize the properties of current account variations across selected MENA economies in the 1971-2005 period. The results, which are generally consistent with theoretical and previous empirical analyses, indicate that higher (domestic and foreign) investment, government expenditure and foreign interest rates have a negative effect on the current account balance. On the other hand, a more open economy, higher oil prices and domestic economic growth generate an improvement in the external balance, whereas the latter implies that the domestic growth rate is associated with a larger increase in domestic savings than investment. Finally, the results show a relatively high persistency of current accounts and reject the validity of the *stages of development hypothesis* as poorer countries in the region reveal a higher current account surplus (or lower deficit).

Key words: MENA countries, current account, determinants, dynamic panel data

JEL Classification: C23, F32, O53

1. INTRODUCTION

The current account balance is an important indicator of any economy's performance and it plays several roles in policymakers' analyses of economic developments. First, its significance stems from the fact that the current account balance, reflecting the saving-investment ratio, is closely related to the status of the fiscal balance and private savings which are key factors of economic growth. Second, a country's balance on the current account is the difference between its exports and imports, reflecting the totality of domestic residents' transactions with foreigners in markets for goods and services. Third, since the current account balance determines the evolution over time of a country's stock of net claims on (or liabilities to) the rest of the world, it reflects the intertemporal decisions of (domestic and foreign) residents. Consequently, policymakers are endeavoring to explain current account balance movements, assess their sustainable (and/or excessive) levels and seek to induce changes to the balance through policy measures.

Recent financial crises and the growth of current account deficits in many countries has raised questions about their potential sustainability (and excessiveness) and concerns regarding the potential impact a rapid and disorderly correction of these imbalances might have. Several theoretical and empirical studies have tried to address these issues, including investigating the

determinants of external balances. However, Middle East and North Africa (MENA)¹ countries have not been the main focus of these analyses as the region consists of many oil-exporting countries with positive and thus relatively unproblematic external positions, especially in recent years. Nevertheless, this paper tries to fill in this gap by providing some important insights into the determination of current account balances in the MENA region in the last few decades.

The MENA region is an economically diverse group of countries that includes both oil-rich countries in the Gulf like Kuwait, Saudi Arabia and Oman, and resource-scarce countries such as Egypt, Jordan and Morocco. The region's economy over the past decades has basically been influenced by two factors, i.e. the oil price and the mix of economic structure and state policies. In the 1980s, many countries in the region undertook reforms which induced tremendous improvements in economic growth by the late 1990s. However, the region is still facing economic and social problems, with the most serious ones being unemployment, estimated at about 12.2% of the workforce (2005), and poverty (incl. inequality)². Indeed, much of the region is still characterized by large public sectors, with centralized governments, large and over-staffed civil services, and weak systems of accountability. This all hinders the development of the private sector and the creation of the jobs needed to significantly bring unemployment down (World Bank, 2004). The Iraq war and the ongoing Palestine-Israel conflict have also had a negative impact on the region's economic performance in recent years. Nevertheless, as oil prices continued their upward climb the MENA region grew by an average of 6.0 per cent in 2005, up from 3.2 per cent in 2001 and compared to average growth of only 3.7 per cent during the late 1990s.

The approach taken in the paper is to view current account positions as a reflection of their saving and investment balances and to thus characterize the fundamental determinants of their levels in the short- to medium-term perspective in the MENA region. Even though such an approach is essentially empirical, it relies primarily on various theoretical models for identifying these fundamental determinants and interpreting their impacts on current account levels. Accordingly, the paper chiefly focuses on the (short and medium-term)³ determinants of current account dynamics in selected MENA countries. In this respect, the empirical analysis expands and builds upon some previous similar attempts regarding a different group of developing and transition countries (see Debelle and Faruquee (1996), Roubini and Wachtel (1999), Calderon et al. (2002), Aristovnik (2002), Chinn and Prasad (2003), Doisy and Hervé (2003), Zanghieri (2004), Herrmann and Jochem (2005) etc.) in the following important ways:

- a) annual data for up to 17 MENA countries in the 1971-2005 period are included;
- b) a wide number of (internal and external) macroeconomic variables suggested by the theoretical and empirical literature is used;
- c) time-series cross-sectional (panel) data with the inclusion of a variety of modern econometric techniques are employed; and
- d) by dividing the MENA region into two diverse subgroups, i.e. oil-exporting and non-oil exporting countries, and by analyzing differences between these two groups.

¹ The MENA countries in our analysis comprise *Algeria, Bahrain, Djibouti, Egypt Arab Rep., Islamic Rep. of Iran, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syrian Arab Republic, Tunisia, United Arab Emirates* and Yemen Rep. (oil-exporting countries are marked with italics).

² At USD 2 per day, the MENA region has a higher incidence of poverty (with 23.2% of the population living in poverty), than Europe and Central Asia (24.5%) and is close to the level in Latin America (24.5%) in 2001 (World Bank, 2004).

³ The short-term, cyclical influence of selected current account determinants can be limited by including their average values. Indeed, to avoid such a bias we construct non-overlapping five-year averages of the data for each country in order to measure the medium-term determinants of the current account.

The paper is organized as follows. The next section briefly presents current account balance developments and trends in MENA countries in the 1971-2005 period. Section 3 describes the empirical methodology, assumptions, data and empirical results of the determinants of current account positions for the selected MENA countries. The final section provides empirical results and some concluding remarks.

2. CURRENT ACCOUNT DEVELOPMENTS IN MENA COUNTRIES IN 1971-2005

The 1970s and 1980s proved to be financially and economically volatile in the MENA region by challenging the ability of governments to achieve a stable macroeconomic environment, including a stable external position. This financial volatility was mainly driven by the two oil price booms in the 1970s that resulted in a spur in economic activity in both oil exporting and importing countries of the region, followed by oil price busts in 1981 and in the latter part of the decade. Hence, in the MENA oil-exporting countries the current account surpluses equivalent to an average of 14.6 per cent of GDP in the 1970s evaporated within a few years and shifted to an average surplus of 4.4 per cent of GDP in the 1980s (see Table 1, Appendix B). In the same period, public expenditure was not effectively adjusted to the adverse external developments which resulted in the emergence of severe internal imbalances. In addition, governments were unable to eliminate price distortions which led to chronic external imbalances. At the time, most MENA governments resorted to excessive external borrowing to finance their inefficient public investments and resource imbalances. These developments created an environment of economic instability and high inflationary expectations in many countries of the region.

The effect of external trade shocks on the MENA region during the 1970s and 1980s, coupled with the resistance of several countries to quickly adjust to those shocks, was very well reflected in their current account balances. Many MENA non-oil exporting countries (like Mauritania, Morocco and Tunisia) could not contain their current account deficit below 5 per cent of GDP during most of the 1970s and 1980s. On the other hand, most MENA oil-exporting countries managed to accumulate extreme current account surpluses in the same period, especially in the 1970s (see Figure 1)⁴. However, the large surpluses were spent rapidly and, when oil prices fell, governments were obliged to undertake difficult and painful fiscal adjustments (Krueger, 2006).⁵ Eventually, these diverse trends in current account dynamics in both subgroups of the MENA countries helped to form a balanced external position of the MENA region as a whole.

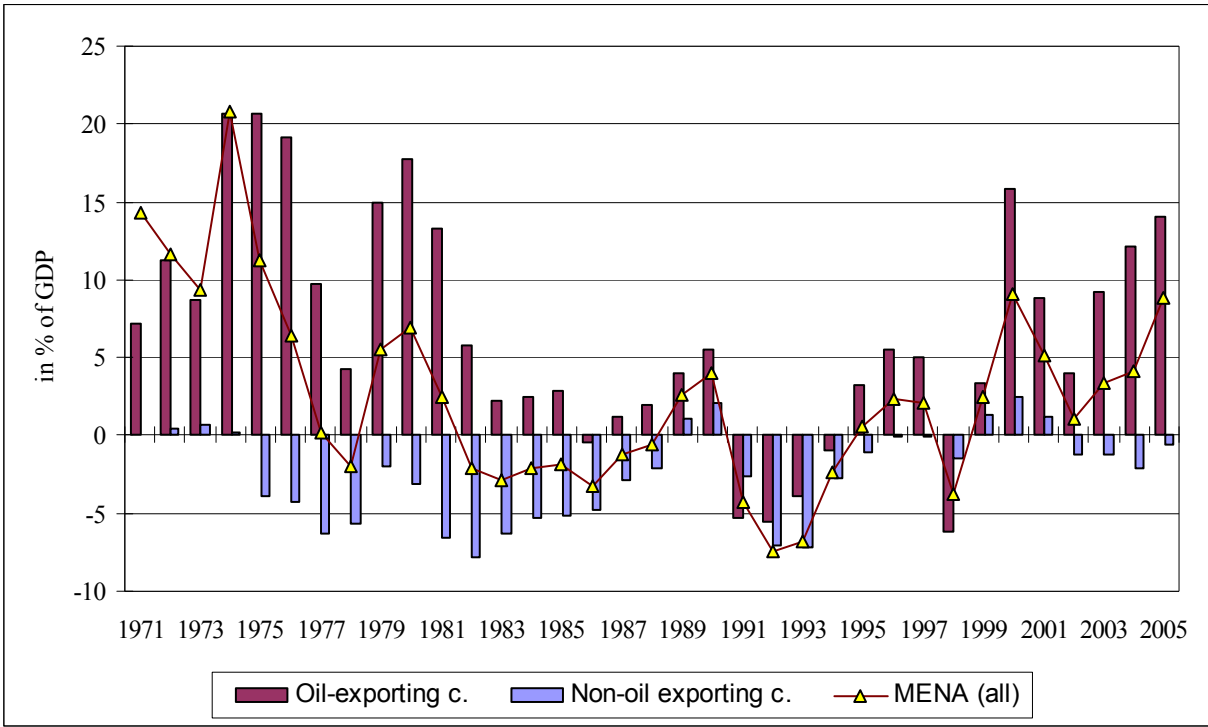
For the capital-attracting MENA countries, the first half of the 1990s witnessed increased volatility in external balances as seen by the share of the current account deficit in GDP in the whole of the 1990s (averaging out at 2.6 per cent of GDP). Debt restructuring in some countries reduced interest payments on debt and helped contain the current account deficit. In an extreme case, a structural current account surplus emerged in Egypt and the Islamic Republic of Iran. Meanwhile, Jordan and the Republic of Yemen was adversely affected by the Gulf war (with a current account deficit exceeding 10 per cent of GDP in the first half of the

⁴ Oil price, in nominal US dollars, declined by an average of five per cent annually during the 1980s (from an annual average of USD 37.42 in 1981 to USD 18.33 in 1989), and further declined by 5.6 per cent annually on average during the first half of the 1990s (from USD 23.19 in 1990 to USD 16.75 in 1995).

⁵ In the same period, the MENA region's non-oil exporting countries benefited significantly from the rising oil prices through a range of transmission mechanisms such as labor remittances, aid flows and interregional tourism.

1990s) and Lebanon (which had just emerged from its long civil strife) showed a very high external imbalance due to reconstruction-related imports. Similarly, oil-exporting countries faced the adverse effects of the Gulf war (in particular Saudi Arabia and Bahrain) which led to a relatively low aggregate current account surplus for the countries in the 1990s (averaging out at 2.5 per cent of GDP) (see Table 1, Appendix B).

Figure 1: Average current account balances (CA) in the MENA region (in percentage of GDP; unweighted averages)



Sources: WDI (2007); author’s calculations.

With the strong real growth of exports of goods and non-factor services, and despite the acceleration in the real growth of imports, the MENA’s current account moved from an average almost net balance in the 1990s to a surplus averaging out at 7.0 per cent of GDP over the 2001-2005 period, a reflection of the dramatic rise in oil prices. Indeed, riding the wave of higher oil export values and the rising demand for energy, the MENA countries have recently achieved exceptional export growth.⁶ The biggest contributors to the significant improvement of current account balance (as a ratio to GDP) have thus been the MENA oil-exporting countries (in particular Kuwait, Libya and Saudi Arabia), with the external balance averaging out at 21.1 per cent of GDP in the 2001-2005 period. Thus far, these countries have approached these rapidly-rising surpluses with considerable caution. Several countries (e.g. Algeria, Kuwait, Iran, Oman and Qatar) have stabilization funds intended to save much of the surpluses now accruing.⁷ In addition, recently current account positions have, similar to the 1975-1990

⁶ With oil exporters seeing a more than doubling of oil exports due to terms of trade movements (from about USD 186 billion in 2002 to USD 440 billion by 2005) (World Bank, 2006).

⁷ On the contrary, in the 1973 oil boom a sudden huge spike in oil prices generated a sharp, if temporary, upswing in revenues that was quickly spent. The boost for current account positions quickly dissipated. Similarly, during the 1979 oil boom (due to the Islamic Revolution and the overthrow of the Shah of the Islamic Republic of Iran), the large surpluses of oil revenues were also rapidly depleted by a ratcheting up of expenditures (World Bank, 2005).

period, diverged strongly between the oil-exporting and non-oil exporting MENA countries. With rising oil import bills (and other external/internal economic and political reasons), resource-poor countries have faced widening current account deficits, which have been the most evident in Lebanon, Sudan and Tunisia (see Table 1, Appendix B).

3. THE EMPIRICAL FRAMEWORK

3.1. Empirical methodology

The initial aim of the empirical research is to identify the main (short- and medium-term) determinants of current account deficits in the MENA region in the 1971-2005 period. Following previous theoretical and empirical studies of Debelle and Faruqee (1996), Calderon et al. (2002) and Chinn and Prasad (2003), we estimate a model which may be expressed in the following general (dynamic) form:

$$CA_{it} = \alpha_i + \gamma_t + \beta CA_{it-1} + \lambda \mathbf{x}_{it} + u_i + \varepsilon_{it} \quad (1)$$

where the dependent variable is the current account balance (*CA*) (negative values indicate a deficit) for the *i*-th unit at time *t* and the vector of independent variables, (\mathbf{x}_i), includes real GDP growth (*GDPG*), domestic investment (*INVEST*), financial deepening (*M2*), relative income (*RELY*), general government consumption expenditure (*GOVEXP*), openness (*OPEN*), foreign direct investment (*FDI*), oil price (*OIL-P*), GDP growth of the OECD (*GDP-OECD*) and the foreign interest rate (*RIR-USA*). The vector β and λ is a vector of coefficients, γ_t denotes time-specific effects which are peculiar to a particular period but constant for all countries and u_i and ε_{it} denote a two-part error term. The first component of the latter, u_i , captures unobserved and time-invariant country effects that influence the current account while ε_{it} captures the residual errors. The term α_i represents the effects of those variables peculiar to the *i*-th individual country in more or less the same fashion over time. In our case, the dummy vector represents individual countries entering the panel data.

As heterogeneity is the main characteristic of the countries under consideration, other specifications are probably preferred to a simple OLS specification in our analysis. In fact, in the case of the MENA countries this argument is plausible once differences like macroeconomic and other conditions are taken into account. Moreover, since panel data typically exhibit group-wise heteroscedastic, contemporaneously and serially correlated residuals, we must take into account the existence of a non-spherical error structure. Therefore, we extended the benchmark OLS model by using special techniques, i.e. the Least Squares Dummy Variable (LSDV), the random effects method (REM) and the Parks-Kmenta method.

Thus, we first employed fixed (FEM or sometimes called a Least Squares Dummy Variable – LSDV) and REM estimators adding both country and time effects. Indeed, the Breusch-Pagan LM test confirms the appropriateness of the models based on panel data in all cases. Moreover, Hausman’s test indicates that for all (short-term determinants) the model’s variations the fixed-effect model (LSDV) provides a better specification. In addition, the Parks-Kmenta method was introduced which performs the estimation by using Generalized Least Squares (GLS) and consists of applying two sequential transformations on the estimated model. The first transformation removes the serial correlation, while the second simultaneously corrects for contemporaneous correlation and heteroscedasticity (see Beck and Katz, 1996)). The Parks-Kmenta method was revised by Beck and Katz (1996). They confirm that GLS have optimal

properties for panel data but note that GLS can only be used when the variance-covariance matrix of errors is known. Otherwise, it should be estimated from the sample implying the use of Feasible Generalized Least Squares (FGLS) instead of GLS. On the other hand, Beck and Katz (1996) proposed a less complex method, retaining OLS parameter estimates (consistent but inefficient) and replacing OLS standard errors with panel-corrected standard errors. Since the sample of the models contains more annual observations per country than countries, we propose using FGLS estimations.⁸

But these approaches do not correct the biases due to the presence of the lagged dependent variable.⁹ Indeed, since CA_{it} is a function of u_i , CA_{it-1} will also be a function of u_i thereby rendering OLS biased and inconsistent. Further, u_i is likely to be correlated with at least one or more of the RHS variables. Thus, in order to obtain consistent and efficient estimates of the model we employed the generalized method of moments GMM-IV of Arellano and Bond (1991). Initially, a first difference transformation of equation 1 is used to do away with the correlation between u_i and CA_{it-1} and \mathbf{x}_{it} :

$$CA_{it} - CA_{it-1} = \beta(CA_{it-1} - CA_{it-2}) + \gamma(\mathbf{x}_{it} - \mathbf{x}_{it-1}) + (\varepsilon_{it} - \varepsilon_{it-1}) \quad (2)$$

Next, the lagged dependent variable ($CA_{it-1} - CA_{it-2}$) is instrumented for. As long as ε_{it} are not serially correlated, a natural choice for an instrument is CA_{it-2} . Additional instruments can be obtained by utilizing the orthogonality conditions existing between the various available lagged CA_{it} and ε_{it} . The consistency of the GMM estimator depends on whether lagged values of the explanatory variables are valid instruments in the current account balance regression. We address this issue by considering two specification tests suggested by Arellano and Bond (1991) and Arellano and Bover (1995). The first is a Sargan test of over-identifying restrictions which tests the overall validity of instruments by analyzing the sample along with the momentary conditions used in the estimation process. Failure to reject the null hypothesis lends support to the model. The second test examines the hypothesis that the error term ε_{it} is not serially correlated. We test whether the differenced error term is first-, second-, or third-order serially correlated. If the test confirms the null hypothesis of the absence of a first-order serial correlation and rejects it of the second-order, then we conclude that the original error term is serially uncorrelated and use the corresponding momentary conditions.

Since all conventional estimators are not without their disadvantages, we estimate all presented econometric techniques. Indeed, while other estimators have superior asymptotic properties they might be less precise than the LSDV (see Kiviet, 1995). Bond (2002) also emphasizes that alternatives to the LSDV estimator may be subject to large sample biases where the instruments are weak. In what follows, we estimate the model's variations using the OLS, LSDV, FGLS and GMM-IV estimators and use all calculated estimators for analyzing the paper's topics on the joint evidence with special emphasis on the GMM-IV estimators. The results of the tests and partial regression coefficient for short-term current account determinants are presented in Tables 1, 2 and 3. In addition, Table 7 in Appendix B presents the regression where robustness tests favor REM estimators over other econometric estimators.

⁸ See Green (1997) for more details about the LSDV, REM and FGLS estimators.

⁹ In particular, the LSDV estimator introduces a correlation between the transformed βCA_{it-1} and a transformed error ε_{it} even when ε_{it} is not serially correlated. The LSDV estimator is thus biased while it can be consistent for a longer panel (i.e. a larger T).

3.2. Data

We estimate the model on the basis of pooled cross-sectional and time-series (panel) data for the MENA countries in the 1971-2005 period. The data set comes from the World Development Indicators (WDI; World Bank), International Financial Statistics (IFS; International Monetary Fund), the WTRG Economics data base and covers the 17 MENA countries. Our estimates are based on unbalanced panel data while data for some countries included in the sample were unavailable for the whole period. The dependent variable is a current account balance (*CA*), expressed as a ratio to GDP (negative values indicate a deficit). Independent variables are: a) the lagged *CA*; b) domestic investment (*INVEST*) expressed by gross capital formation (in per cent of GDP); c) growth rate of gross domestic product (*GDPG*), where the real economic growth is taken; d) financial deepening (*M2*), measured as money and quasi money as a per cent of GDP; e) income per capita relative to income per capita in the high-income OECD countries (*RELY*); f) general government expenditure (*GOVEXP*) as measured by general government final consumption expenditure (in per cent of GDP); g) openness (*OPEN*), expressed as the ratio of goods and services exports to GDP; h) foreign direct investment (*FDI*), measured as net inflows of foreign direct investment (in per cent of GDP); i) the oil price (*OIL-P*), measured by the annual average of the crude oil price (in USD per barrel, inflation-adjusted); j) real economic growth in the high income OECD countries (*GDPG-OECD*); and, k) real foreign interest rate (*RIR-USA*), measured as the lending interest rate of the USA adjusted for inflation as measured by the GDP deflator.¹⁰ Variable descriptions and data sources as well as the countries included in the sample are presented in Appendix A. In addition, summary statistics of the variables are shown in Tables 3, 4 and 5 in Appendix B.

3.3. Empirical results

The results of the empirical analyses of the (short-term) current account determinants of transition countries by using the OLS, LDSV, FGLS and GMM-IV estimators are presented in Tables 1, 2 and 3 (and for medium-term determinants in Table 7, Appendix B).¹¹ In addition, simple correlations between the current account and selected independent variables are presented in Table 6 in Appendix B. The estimates of partial regression coefficients are generally in line with the theoretical and previous empirical analyses. Since we estimate a dynamic panel data model, the most appropriate technique is the GMM-IV estimator. However, in order to ensure the robustness of the estimates the estimators of other econometric techniques are also employed and considered in the analysis.

¹⁰ Additional variables, like age dependency ratio, inflation rate (as a proxy for macroeconomic uncertainty) and real exchange rate (lack of observations) do not improve the model since they express theoretically expected, but statistically insignificant results.

¹¹ Since there is no high pair-wise correlation among explanatory variables and variance inflation factors (VIF) are within the permitted borders, multicollinearity seems not to be a problem in our analyses.

Table 1: Estimates of Regression Coefficients –
 MENA Countries, 1971-2005 (Dependent Variable: CA)

Explanatory Variables	LSDV	FGLS	GMM-IV	GMM-IV
<i>Persistency</i>				
CA_{-1}	0.398 (0.044; 0.00)	0.617 (0.038; 0.00)	0.606 (0.049; 0.00)	0.516 (0.055; 0.00)
<i>Internal Economic Conditions</i>				
<i>GDPG</i>	0.099 (0.054; 0.07)	0.004 (0.055; 0.95)	0.436 (0.106; 0.00)	0.627 (0.121; 0.00)
<i>INVEST</i>	-0.500 (0.065; 0.00)	-0.307 (0.043; 0.00)	-0.705 (0.082; 0.00)	-0.721 (0.087; 0.00)
<i>RELY (in logs)</i>	-0.02566 (0.020; 0.20)	0.0202 (0.006; 0.00)	-0.441 (0.097; 0.00)	-0.622 (0.113; 0.00)
<i>GOVEXP</i>	-0.291 (0.065; 0.00)	-0.198 (0.041; 0.00)	-0.459 (0.123; 0.00)	-0.240 (0.132; 0.07)
<i>External Sector</i>				
<i>OPEN</i>	0.333 (0.042; 0.00)	0.101 (0.024; 0.00)	0.481 (0.061; 0.00)	0.510 (0.071; 0.00)
<i>FDI</i>		-0.596 (0.158; 0.00)		-0.690 (0.161; 0.00)
<i>Evolution of the World Economy</i>				
<i>OIL-P</i>	0.073 (0.032; 0.02)	0.025 (0.015; 0.09)	0.113 (0.031; 0.00)	0.074 (0.037; 0.04)
<i>GDPG-OECD</i>		-0.554 (0.236; 0.02)		-0.388 (0.321; 0.23)
<i>RIR-USA</i>				-0.756 (0.342; 0.03)
Adj. R²	0.708			
No. of countries	16	14	15	13
No. of obs.	344	287	316	263
Hausman test (χ^2) (p)	315,0 (0.00)	13,72 (0.13)		
Modified Wald test (χ^2) (p)	73.38 (0.00)	3.3e+31 (0.00)		
Breusch-Pagan LM (χ^2) (p)	23.17 (0.00)	16.86 (0.00)		
Woolbridge test (F) (p)	20.96 (0.00)	19.49 (0.00)		
Sargan test (p)				
Arellano-Bond test AR(1) (p)			0.000	0.000
Arellano-Bond test AR(2) (p)			0.891	0.616

Note: standard errors (*se*) and *p*-values are presented below their corresponding coefficient (*se*; *p*).

Source: author's calculations.

Persistence: Empirical analysis shows that the lagged current account balance (as a ratio to GDP) has a positive and statistically significant effect on the current account. The size of this partial regression coefficient (0.52-0.61) reveals the relatively strong persistence of transitory shocks, implying that the half-life persistency of these shocks on the current account is up to three years (similar to developing countries as found by Calderon et al. (2002)). The results reflect a relatively slow current account adjustment process, which could be influenced by foreign creditors as well as by decisions of the private sector. Surprisingly, more intensive persistency is noticed in non-oil exporting MENA countries with a partial regression coefficient of between 0.51-0.65 which contradicts Edwards' (2004) finding that the degree of persistence of large surpluses is higher than that of large deficits (see Tables 2 and 3). The alternative estimators yield approximately similar results regarding the size and significance of the lagged current account balance.

Domestic Economic Conditions

Real Economic Growth: An increase in the domestic output growth rate (*GDPG*) is expected to expand the current account deficit. However, the empirical result for the MENA countries is inconsistent with theoretical expectations that domestic economic growth accelerates demand for foreign goods and services and consequently deteriorates the current account balance (see Abel and Bernanke, 2001 and Gandolfo, 2004). A one-percentage point rise in GDP growth leads to about a 0.44 to 0.63 of a percentage point improvement in the current account balance. Although a rise in domestic output growth may be associated with a greater investment rate, it seems that its correlation with the savings rate is somewhat stronger, thus leading to an improvement of the current account balance.¹² When endogeneity is not controlled for, a smaller coefficient on growth may be the result of positive reverse causality. This finding is consistent with the notion that a higher current account surplus brings about a better growth performance in the region. However, these results confirm the results of Chinn and Prasad (2003) for industrial countries and contradict the findings of Calderon et al. (2002) for developing countries and the IMF (2005) for emerging market economies.

Domestic investment: The partial regression coefficient is as (theoretically) expected negative and higher for the calculations based on a short-term basis suggesting that temporary shocks in investment activities are more greatly financed with foreign capital inflow than permanent ones (see Table 7, Appendix B). Moreover, MENA oil-exporting countries show higher (negative) partial correlation coefficients (between 0.90-1.20) confirming the extremely high degree of integration of their domestic economy with international capital markets, in particular, in comparisons with non-oil exporting countries (with a coefficient of around 0.50). Indeed, these results confirm the previous findings of current account determinants of Debelle and Faruqee (1996), Reisen (1998) and Bussière et al. (2004).

Relative income: We find a negative association between relative income (*RELY*) and the current account balance. A per capita income of one per cent below the average of the OECD high-income countries improves the current account by approximately 0.44 to 0.62 of a percentage point. However, we would theoretically expect that less developed countries grow faster than the average and are thus borrowing against future income (consistent with the *stages of development hypothesis*). Thus, our results reject the *stages of development hypothesis* as being applicable to the MENA region. This result contradicts the findings of Chinn and Prasad

¹² Indeed, the results are consistent with the observation that many MENA countries (especially oil-exporting countries) have generally been net creditors to other economies over the last three-and-a-half decades.

(2003) for industrial countries and Bussière et al. (2004) for selected OECD and new EU member states.

*Table 2: Estimates of Regression Coefficients –
Oil-Exporting MENA Countries, 1971-2005
(Dependent Variable: CA)*

Explanatory Variables	LSDV	FGLS	GMM-IV
<i>Persistency</i>			
CA_{t-1}	-0.034 (0.036; 0.34)	0.106 (0.043; 0.01)	0.426 (0.086; 0.00)
<i>Internal Economic Conditions</i>			
INVEST	-0.572 (0.141; 0.00)	-1.200 (0.126; 0.00)	-0.906 (0.147; 0.00)
M2	-0.011 (0.086; 0.90)	0.225 (0.033; 0.00)	-0.017 (0.121; 0.89)
GOVEXP	-1.012 (0.193; 0.00)	-0.503 (0.146; 0.00)	-1.106 (0.292; 0.00)
<i>Evolution of the World Economy</i>			
OIL-P	-0.250 (0.146; 0.10)	0.400 (0.073; 0.00)	0.157 (0.085; 0.07)
GDPG-OECD	-8.860 (2.397; 0.00)	-4.492 (1.753; 0.01)	1.184 (0.581; 0.04)
RIR-USA	-1.788 (1.124; 0.12)	-2.427 (0.833; 0.00)	-1.191 (0.543; 0.03)
Adj. R²	0.805		
No. of countries	6	6	6
No. of obs.	147	147	138
Hausman test (χ^2) (p)	256.5 (0.00)		
Modified Wald test (χ^2) (p)	3.55 (0.74)		
Breusch-Pagan LM (χ^2) (p)	113.7 (0.00)		
Woolbridge test (F) (p)	7.98 (0.04)		
Sargan test (p)			0.662
Arellano-Bond test AR(1) (p)			0.000
Arellano-Bond test AR(2) (p)			0.207

Note: standard errors (*se*) and *p*-values are presented below their corresponding coefficient (*se*; *p*).

Source: author's calculations.

Public expenditure: A potentially important determinant of the current account is public sector consumption. Government consumption expenditure (*GOVEXP*) appears to be negative and statistically significant in relation to the current account balance. A one-percentage point rise in

government expenditure leads to about a 0.20-0.46 of a percentage point deterioration in the current account balance. The estimated coefficient for GOVEXP suggests that a one-percentage point decrease in government expenditure is associated on average with an approximately four-fifths to two-thirds of a percentage point increase in the (net) private saving-to-GDP ratio, with all other things being equal. Such results imply moderate liquidity constraints and the inelasticity of domestic (private) consumption and are similar to the results of Roubinni (1988), Chinn and Prasad (2003) and Zanghieri (2004). Finally, the significant negative relationship between government expenditure and the current account provides some evidence in favor of the so-called *twin deficits hypothesis* in the MENA region.

Financial deepening: The assessment of the relevance of a financial deepening variable (usually proxied by money and quasi money (M2) as a per cent of GDP – M2) shows positive and statistically significant results (FGLS estimators). This positive (short-term) relationship between the variables is closely related with those reported by authors such as Edwards (1995), who examined the effects of this variable on private saving and which has been confirmed by the empirical research of Chinn and Prasad (2003) for developing countries. Indeed, the traditional interpretation of this variable as a measure of the depth and sophistication of the financial system suggests that financial deepening could induce saving relatively more than investment.

External Economic Conditions

Openness: We find that the degree of openness (*OPEN*) of an economy is positively related to its current account position. In fact, an increase in the ratio of exports to GDP of one percentage point leads to a current account balance improvement of about 0.50 (in the short term). Actually, the openness variable could be indicative of attributes such as liberalized trade¹³, receptiveness to technology transfers, and the ability to service external debt through export earnings (see Milesi-Ferretti and Razin, 1996). Thus, the results confirm that those MENA countries with greater exposure to international trade (especially oil-exporting countries) tend to be more export-orientated. When taking into consideration the medium-term time span the results are similar albeit somehow less robust, suggesting the importance of temporary shocks in the region. In any case, the results are similar to the conclusions of Chinn and Prasad (2003) for industrial countries and contradict the few other previous empirical studies (such as Calderon et al. (2002) and Doisy and Hervé (2003)).

Foreign direct investment: Increasing net inflows of foreign direct investment (FDI) have a negative and statistically significant effect on the current account balance in the region. Indeed, an increase of FDI by one percentage point has the effect of reducing the current account balance by around 0.60-0.70 of a percentage point. Generally, FDI is considered to be most favored way to finance the resulting current account deficits because the investors have long-term interests in the economy. Moreover, FDI serves as an important vehicle for the transfer of technology and new knowledge for the host country. Indeed, capital flows to the MENA region have traditionally been modest, with net FDI flows of up to one per cent of GDP per year in the 1971-1999 period, implying the lack of economic reform and deficiencies in the economic environment (see Aysan et al., 2005). However, one implication of this modest scale of private capital flows has been that the region has been less exposed to sharp volatility and associated

¹³ The MENA region has, by and large, not kept pace with worldwide progress especially in the area of trade reform, the region lags behind most other middle income regions, with continued high tariffs in many countries and the widespread use of non-tariff barriers (World Bank, 2006a).

currency and financial crises. Nevertheless, in recent years net FDI flows have helped to deteriorate the external balance, especially in the non-oil exporting MENA countries.

*Table 3: Estimates of Regression Coefficients –
Non-oil Exporting MENA Countries, 1971-2005
(Dependent Variable: CA)*

Explanatory Variables	OLS	FGLS	GMM-IV
<i>Persistency</i>			
CA_t	0.653 (0.052; 0.00)	0.630 (0.051; 0.00)	0.507 (0.060; 0.00)
<i>Internal Economic Conditions</i>			
INVEST	-0.124 (0.069; 0.07)	-0.144 (0.045; 0.00)	-0.524 (0.097; 0.00)
M2	0.008 (0.013; 0.53)	0.024 (0.013; 0.06)	-0.047 (0.077; 0.55)
GOVEXP	-0.107 (0.055; 0.05)	-0.085 (0.046; 0.06)	-0.098 (0.153; 0.53)
<i>Evolution of the World Economy</i>			
OIL-P	0.057 (0.042; 0.18)	0.037 (0.026; 0.15)	0.089 (0.041; 0.03)
GDPG-OECD	1.361 (0.784; 0.08)	-1.313 (1.539; 0.39)	0.092 (0.336; 0.78)
RIR-USA	-0.054 (0.377; 0.89)	0.054 (0.165; 0.74)	-0.319 (0.309; 0.30)
Adj. R²	0.572		
No. of countries	11	11	10
No. of obs.	222	222	206
Hausman test (χ^2) (p)	45.63 (0.06)		
Modified Wald test (χ^2) (p)	1.9e+28 (0.00)		
Breusch-Pagan LM (χ^2) (p)	0.00 (0.99)		
Woolbridge test (F) (p)	95.53 (0.00)		
Sargan test (p)			0.492
Arellano-Bond test AR(1) (p)			0.000
Arellano-Bond test AR(2) (p)			0.160

Note: standard errors (*se*) and *p*-values are presented below their corresponding coefficient (*se*; *p*).

Source: author's calculations.

Evolution of the World Economy

Oil price: We find a positive and statistically significant relationship between the oil price and the current account balance, which is somewhat consistent with the Harberger-Lauresen-Metzler effect¹⁴. In fact, an increase in the oil price by USD 10 leads to a current account surplus that is between 0.7-1.1 percentage points higher. However, when comparing oil-exporting countries to non-oil exporting countries, the former, according to the expectations, indicate an even higher partial regression coefficient when the same oil price hike emerges, i.e. up to a four percentage points improvement in the external balance. Since many MENA countries are oil-exporting countries, a result of positive transitory terms of trade shocks leads primarily to an increase in savings in the region. On the other hand, permanent oil shocks show no statistically significant results for the MENA countries (see Table 7, Appendix B).

OECD economic growth: An increase in the growth rate of high-income OECD countries (*GDPG-OECD*) leads to an increase in the current account surplus of both oil-exporting and non-oil exporting MENA countries (see Tables 2 and 3). This can be explained by both a rise in demand for MENA country exports and the increased capital flows between developed countries at the expense of flows to MENA countries. According to our estimates, a one-percentage point rise in the growth rate of OECD countries would generate an improvement of between 1.18 and 1.36 percentage points in the current account balance. However, when limiting short-term, cyclical influences of the foreign growth rate, the results seem to be even more robust (see Table 7, Appendix B). Indeed, the results are consistent with previous findings of Milesi-Ferretti and Razin (1996) and Calderon et al. (2002).

International real interest rate: A country's current account balance is likely to be effected by the international real interest rate (proxied by the real lending interest rate of the USA – RIR-USA). We find a negative and statistically significant association between the US real interest rate and the current account balance of the MENA countries. A one-percentage point rise in RIR-USA leads to an about 0.76 of a percentage point decline in the current account balance. This result is not in line with the argument that net creditor countries, as most MENA countries are, widen their supply of financial capital in response to an interest rate increase. Obviously, the negative effect of reduced (world) GDP growth due to a higher (USA) real interest rate prevails over the positive effect of capital outflows on the external balance. Thus, the results are in line with the previous findings of Reisen (1998) and Chinn and Prasad (2003).

4. CONCLUSIONS

Since several studies have highlighted the part played by large current account deficits in the run-up to financial crisis episodes, considerable investigations of current account determinants have emerged recently. Although Middle East and North Africa (MENA) countries have been facing turbulent current account dynamics over the past three-and-a-half decades, they have not been the subject of many empirical studies. In this respect, the current paper seeks to fill in this gap in the empirical literature by assessing a wide range of (short- and medium-term) determinants of the current account balance in the MENA region, as suggested by the (theoretical and empirical) literature.

¹⁴ The Harberger-Lauresen-Metzler effect predicts that positive transitory terms of trade shocks (i.e. oil price shocks) produce an improvement in current income that is greater than that in permanent income. Accordingly, an increase in savings follows and an improvement in current account positions emerges (see Obstfeld, 1982 and Mendoza, 1995).

The empirical results, which are in ways consistent with previous theoretical and empirical literature, highlight the importance of the negative impact of (domestic and foreign) investment and the foreign interest rate on the external positions of the MENA countries. Moreover, the empirical analysis shows that a more open economy, higher oil prices and domestic economic growth generate an improvement in the external balance, reflecting the original characteristics of the considered countries. Indeed, the domestic economic growth impetus is associated with a larger increase in domestic savings than investment in the MENA region. Further, the analysis somewhat supports the claim of current account persistency as well as the existence of the *twin deficit hypothesis* in the MENA countries as government expenditure evidently deteriorates domestic saving and consequently the external equilibrium. Finally, the results also reject the validity of the *stages of development hypothesis* since poorer countries in the region show a higher current account surplus (or a lower deficit).

Since this paper is one of the few studies to address the current account determinants in the MENA countries, there remains much to study by way of extending and improving the presented analysis. In particular, in order to investigate these issues in more depth it would be worthwhile to undertake a detailed analysis at each particular country level (e.g. time series analysis). Such an analysis could take into account the country-specific characteristics which were not captured in this paper.

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APPENDIX A. VARIABLE DESCRIPTIONS AND DATA SOURCES

The data used in this paper were drawn from a number of different sources. Below we provide a list of the abbreviations (symbols) for the variables used in the analysis, a description of the variables and the source(s) from which the primary data used for constructing these variables were taken.

VARIABLE	SYMBOL	DESCRIPTION	NOTE	SOURCE*
Current account balance	CA	Current account balance (% of GDP)	positive (negative) values indicate a surplus (deficit)	WDI
Investment rate	INVEST	Gross capital formation (% of GDP)		IFS
Financial deepening	M2	Money and quasi money (M2) as % of GDP		IFS
Real economic growth	GDPG	Growth rate of real GDP (%)		WDI
Relative income	RELY	Income per capita relative to income per capita in the high income OECD countries (in logs)		WDI
General government consumption expenditure	GOVEXP	General government final consumption expenditure (% of GDP)		IFS
Openness	OPEN	Exports of goods and services (% of GDP)		IFS
Foreign direct investment	FDI	Foreign direct investment, net inflows (% of GDP)		WDI
Oil price	OIL-P	Annual average of crude oil prices (in USD per barrel, inflation adjusted)		WTRG Economics
Real economic growth of the OECD	GDPG-OECD	Growth rate of real GDP the high income OECD countries (%)		WDI
Real interest rate of USA	RIR-USA	Real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator (%)		IFS
MENA COUNTRIES included in the sample		Algeria, Bahrain, Djibouti, Egypt Arab Rep., Islamic Rep of Iran., Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Saudi Arabia, Sudan, Syrian Arab Republic, Tunisia, Yemen Rep.		
MENA OIL-EXPORTING COUNTRIES included in the sample		Algeria, Bahrain, Kuwait, Libya, Oman, Saudi Arabia		
MENA NON-OIL EXPORTING COUNTRIES included in the sample		Djibouti, Egypt Arab Rep., Iran Islamic Rep., Jordan, Lebanon, Mauritania, Morocco, Sudan, Syrian Arab Republic, Tunisia, Yemen Rep.		

* WDI – World Development Indicators (World Bank); IFS – International Financial Statistics (IMF); WTRG Economics.

APPENDIX B. FIGURES AND TABLES

Table 1: *Current Account Balances in MENA countries, 1971-2005*
(in percentage of GDP; unweighted averages)

	Current account balances				
	1971-1980 average	1981-1990 average	1991-2000 average	2001-2005 average	1971-2005 average
Oil-exporting countries					
Algeria	-7.2	-0.5	5.2	n.a.	-1.9
Bahrain	6.0	2.7	-3.7	10.4	0.2
Kuwait	47.3	28.8	18.6	38.9	28.1
Libya	13.1	-2.5	4.3	22.4	4.4
Oman	7.7	3.8	-3.8	15.8	2.5
Qatar	n.a.	n.a.	n.a.	n.a.	n.a.
Saudi Arabia	20.7	-6.1	-5.9	17.9	4.6
United Arab Emirates	n.a.	n.a.	n.a.	n.a.	n.a.
Total	14.6	4.4	2.5	21.1	6.3
Non-oil exporting countries					
Djibouti	n.a.	n.a.	-10.0	n.a.	-10.0
Egypt Arab Rep.	-5.5	-3.4	1.5	-0.9	-1.1
Islamic Rep. of Iran	5.4	-0.5	3.4	12.3	2.1
Jordan	0.6	-3.3	-4.3	0.7	-1.6
Lebanon	n.a.	n.a.	n.a.	-24.4	-24.4
Mauritania	-16.8	-16.9	-2.0	n.a.	-11.9
Morocco	-10.5	-4.8	-1.3	-1.4	-3.7
Sudan	-2.4	-1.8	-6.7	-7.1	-4.2
Syrian Arab Republic	2.0	0.0	1.0	5.9	1.3
Tunisia	-7.2	-4.8	-4.3	-4.2	-4.8
Yemen Rep.	n.a.	15.3	-2.8	11.3	0.7
Total	-4.3	-2.2	-2.6	2.1	-10.0
ALL MENA COUNTRIES	3.8	0.4	-0.7	7.0	-1.2

Sources: WDI (2007), IFS (2007); author's calculations.

Table 2: *Determinants of Current Account Deficits*

Variable	Theoretically Expected Sign	Empirical Sign and Sources
Persistency	+	+ Debelle and Faruqee (1996), Reisen (1998), Calderon et al. (2002), Chinn and Prasad (2003), Zanghieri (2004), Bussière et al. (2004), Herrmann and Jochem (2005)
Internal Economic Conditions		
Growth Rate	+	+ Milesi-Ferretti and Razin (1996, 1998), Aristovnik and Zajc (2001), Aristovnik (2002), IMF (2005)
	Local productivity shock (temporary/permanent): +/-	+ Glick and Rogoff (1995), Razin (1995), Reisen (1998)
	Global productivity shock (temporary/permanent): +/-	0 Reisen (1998)

Relative income	-	- Backus et al. (1994), Chinn and Prasad (2003), Bussière et al. (2004), Herrmann and Jochem (2005)
Investments	+	+ Glick and Rogoff (1995), Debelle and Faruqee (1996), Reisen (1998), Bussière et al. (2004), Herrmann and Jochem (2005)
Savings	-	- Calderon, et al. (2002), Aristovnik (2002)
Financial deepening	+/-	+ Edwards (1995), Chinn and Prasad (2003) - Zanghieri (2004)
Demographics	+	- Doisy and Hervé (2003), IMF (2005)
Fiscal policy	+	+ Debelle and Faruqee (1996), Aristovnik and Zajc (2001), Doisy and Hervé (2003), Zanghieri (2004), Bussière et al. (2004), Herrmann and Jochem (2005), IMF (2005)
<i>External Sector</i>		
Degree of Openness	+/-	- Milesi-Ferretti and Razin (1996, 1998), Calderon, et al. (2002), Aristovnik (2002), Chinn and Prasad (2003), Doisy and Hervé (2003)
Real Effective Exchange Rate	Marshall-Lerner effect: +	+ Debelle & Faruqee (1996), Aristovnik and Zajc (2001), Calderon, et al. (2002), Herrmann and Jochem (2005)
Terms of Trade	Harberger-Laursen- Metzler effect: -	- Razin (1995), Debelle & Faruqee (1996), Reisen (1998), Iscan (1998), Calderon, et al. (2002), Duncan (2003), IMF (2005)
	+/-	J-krivulja: Tornell and Lane (1994), Serven (1999) S-krivulja: Senhadji (1998)
Net Foreign Assets	+/-	+/- Calderon, et al. (2002), Chinn and Prasad (2003) + Aristovnik (2002)
<i>Evolution of the World Economy</i>		
Developed Countries Growth Rate	-	- Milesi-Ferretti and Razin (1996, 1998), Calderon, et al. (2002)
World Real Interest Rate	Net Creditor: + Net Debtor: -	0 Reisen (1998) - Calderon, et al. (2002)

Note: + deficit increase; - deficit decrease.

Table 3: Current Account Determinants: Descriptive Statistics – 19 MENA Countries
(Annual Data, 1971–2005)

Variables	No. of obs.	Mean	Std. Dev.	Minimum	Maximum
Current account balance (CA)	408	0.93652	12.40481	-36.9	56.7
<i>Internal Economic Conditions</i>					
Real economic growth (GDPG)	536	4.30355	7.26424	-42.5	38.2
Investments (INVEST)	519	23.7212	7.77801	-17.4	52.2
Financial deepening (M2)	586	51.14079	30.6689	5.2	217.3
Relative income (RELY)*	464	3.0753	0.96262	0.99683	5.6
Government consumption expenditure (GOVEXP)	520	19.67808	7.93838	5.4	76.2
<i>External Sector</i>					
Openness (OPEN)	519	39.59422	21.89291	3.4	131.1
Net foreign direct investment (FDI)	416	0.98918	2.60079	-25.8	19.6
<i>Evolution of the World Economy</i>					
Oil price (OIL-P)	665	37.85829	18.48615	14.83	92.26
Real economic growth of the EU (GDPG-OECD)	536	4.303545	7.264.239	-42.5	38.2
Real foreign interest rate (RIR-USA)	665	14.91656	2.227743	6.666667	19.02874

Note: * in logs.

Source: author's calculations.

Table 4: Current Account Determinants: Descriptive Statistics – Oil-exporting MENA Countries
(Annual Data, 1971–2005)

Variables	No. of obs.	Mean	Std. Dev.	Minimum	Maximum
Current account balance (CA)	161	7.08882	15.39216	-22.5	56.7
<i>Internal Economic Conditions</i>					
Real economic growth (GDPG)	215	4.231628	8.450102	-20.6	34.0
Investments (INVEST)	225	23.86578	9.137982	-17.4	52.2
Financial deepening (M2)	259	46.4278	20.4555	5.2	103.6
Relative income (RELY)*	172	4.067094	0.5922503	2.953755	5.646086
Government consumption expenditure (GOVEXP)	225	21.83689	7.758712	7.2	76.2
<i>External Sector</i>					
Openness (OPEN)	224	54.67143	22.07543	12.9	131.1
Net foreign direct investment (FDI)	98	0.5642857	1.100726	-3.7	5.1
<i>Evolution of the World Economy</i>					
Oil price (OIL-P)	280	37.85829	18.50532	14.83	92.26
Real economic growth of the EU (GDPG-OECD)	280	2.908571	1.43352	0.1	6.3
Real foreign interest rate (RIR-USA)	280	14.91656	2.230054	6.666667	19.02874

Note: * in logs.

Source: author's calculations.

Table 5: Current Account Determinants: Descriptive Statistics – Non-oil exporting MENA Countries (Annual Data, 1971–2005)

Variables	No. of obs.	Mean	Std. Dev.	Minimum	Maximum
Current account balance (CA)	247	3.073684	7.71856	-36.9	15.3
<i>Internal Economic Conditions</i>					
Real economic growth (GDPG)	321	4.351713	6.361295	-42.5	38.2
Investments (INVEST)	294	23.61054	6.564138	6.3	45.4
Financial deepening (M2)	327	54.8737	36.40166	7.4	217.3
Relative income (RELY)*	292	2.491169	0.5868995	0.9968337	3.884753
Government consumption expenditure (GOVEXP)	295	18.03153	7.687258	5.4	64.4
<i>External Sector</i>					
Openness (OPEN)	295	28.14576	13.04346	3.4	61.9
Net foreign direct investments (FDI)	318	1.120126	2.900251	-25.8	19.6
<i>Evolution of the World Economy</i>					
Oil price (OIL-P)	385	37.85829	18.49628	14.83	92.26
Real economic growth of the EU (GDPG-OECD)	385	2.908571	1.43282	0.1	6.3
Real foreign interest rate (RIR-USA)	385	14.91656	2.228964	6.666667	19.02874

Note: * in logs.

Source: author's calculations.

Table 6: Simple Correlation of the Current Account Balance with Determinants (Annual Data, 1971–2005)

Variables	MENA Countries	MENA Oil-exporting Countries	MENA Non-oil exporting Countries
Current account balance (CA) – lagged 1 year	0.832	0.819	0.714
Real economic growth (GDPG)	-0.072	-0.150	-0.047
Investments (INVEST)	-0.363	-0.472	-0.282
Financial deepening (M2)	0.060	0.226	0.0650
Relative income (RELY)*	0.510	0.724	0.067
Government consumption expenditure (GOVEXP)	-0.166	-0.321	-0.423
Openness (OPEN)	0.440	0.671	-0.059
Net foreign direct investment (FDI)	-0.265	-0.302	-0.292
Oil price (OIL-P)	0.023	0.288	-0.231
Real economic growth of the EU (GDPG-OECD)	0.048	0.057	0.035
Real foreign interest rate (RIR-USA)	-0.093	-0.283	0.042

Note: * in logs.

Source: author's calculations.

Table 7: Estimates of Medium-Term Determinants of the Current Account Balance, MENA Countries, 1971-2005 (Dependent Variable: CA)

Explanatory Variables	OLS	REM	FGLS
<i>Internal Economic Conditions</i>			
<i>INVEST</i>	-0.669 (0.177; 0.00)	-0.598 (0.171; 0.00)	-0.101 (0.165; 0.54)
<i>M2</i>	0.011 (0.037; 0.77)	-0.048 (0.40; 0.23)	0.025 (0.028; 0.38)
<i>GOVEXP</i>	-0.803 (0.135; 0.00)	-0.845 (0.129; 0.00)	-0.707 (0.094; 0.00)
<i>External Sector</i>			
<i>OPEN</i>	0.141 (0.057; 0.02)	0.203 (0.065; 0.00)	0.113 (0.044; 0.01)
<i>Evolution of the World Economy</i>			
<i>OIL-P</i>	-0.039 (0.057; 0.02)	0.125 (0.086; 0.15)	-0.101 (0.165; 0.54)
<i>GDPG-OECD</i>	9.457 (5.894; 0.11)	6.448 (3.118; 0.04)	8.090 (4.119; 0.05)
<i>RIR-USA</i>	-2.492 (2.067; 0.23)	-0.037 (0.548; 0.95)	-2.991 (1.481; 0.04)
Dummy for oil-exporting countries	9.190 (2.537; 0.00)		8.549 (1.098; 0.00)
Adj. R²	0.482	0.526	
No. of Countries	17	17	17
No. of obs.	89	89	89
Hausman test (χ^2) (p)	1.67 (0.99)		
Modified Wald test (χ^2) (p)	512.5 (0.00)		
Breusch-Pagan LM (χ^2) (p)	26.86 (0.00)		
Woolbridge test (F) (p)	0.095 (0.76)		

Note: standard errors (*se*) and *p*-values are presented below their corresponding coefficient.
Source: author's calculations.