Banco Central de Chile
Documentos de Trabajo

Central Bank of Chile
Working Papers

N° 51

Noviembre 1999

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BANCO CENTRAL DE CHILE

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Documentos de Trabajo del Banco Central de Chile
Working Papers of the Central Bank of Chile
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DETERMINANTS OF CURRENT ACCOUNT DEFICITS IN DEVELOPING COUNTRIES

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Resumen

El objetivo de este trabajo es realizar un exhaustivo análisis de la relación empírica entre déficits de cuenta corriente y un amplio conjunto de variables propuestas por la literatura. Para lograr este objetivo, complementamos y extendemos estudios empíricos previos a través de: (1) usar una extensa y consistente base de datos macroeconómicos de ahorro publico, privado y externo, junto con otras variables de ingreso nacional, (2) centrarse en países en desarrollo al usar una base de datos de panel con 44 países en desarrollo y con información anual para el período 1966-95, (3) adoptar el enfoque de "forma reducida" en vez de limitarse a un determinado modelo estructural, (4) desarrollar un modelo econométrico simple a fin de distinguir entre efectos permanentes y transitorios y (5) utilizar una clase de estimadores que controlan por problemas de simultaneidad y causalidad reversa. Alguno de los resultados encontrados son los siguientes: (i) los déficits de cuenta corriente son moderadamente persistentes, (ii) un alza en la tasa de crecimiento del producto interno genera mayores déficits de cuenta corriente, (iii) aumentos transitorios en el ahorro sea publico o privado tienen efectos positivos sobre la cuenta corriente, por el contrario, aumentos permanentes no tienen efectos significativos, (iv) shocks transitorios que mejoran los términos de intercambio o aprecian el tipo de cambio real están relacionados con mayores déficits de cuenta corriente, mientras que cambios permanentes no tienen efectos significativos y (v) el alza en la tasa de crecimiento de los piases industrializados o en las tasas de interés mundiales tienden a reducir los déficits de cuenta corrientes de los países en desarrollo.

Abstract

The objective of this paper is to provide an exhaustive characterization of the empirical linkage between current account deficits and a broad set of economic variables proposed by the literature. In order to accomplish this task, we complement and extend previous empirical research by (1) using a large and consistent macroeconomic data set on public and private domestic saving, external saving, and other national income variables, (2) focusing on developing economies by drawing on a panel data set consisting of 44 developing countries and annual information for the period 1966-95, (3) adopting a reduced-form approach, instead of holding to a particular structural model, (4) developing a simple econometric model to distinguish between transitory and permanent effects, and (5) employing a class of estimators that controls for the problems of simultaneity and reverse causation. Some of our findings are: (i) current account deficits are moderately persistent, (ii) a rise in domestic output growth generates a larger current account deficit; (iii) transitory increases in either public or private saving have a positive effect on the current account, and, in contrast, their permanent changes have insignificant effects, (iv) temporary shocks that increase the terms of trade or appreciate the real exchange rate are linked with higher current account deficits, but their permanent changes do not have significant effects, and (v) either higher growth rates in industrialized economies or larger international interest rates reduce the current account deficit in developing economies.

We are grateful for thoughtful comments from Klaus Schmidt-Hebbel, Luis Servén, and Luisa Zanforlin. Many thanks to Stephen Bond for providing the software to estimate dynamic models of panel data using GMM methods. The views are the authors' and should not be attributed to the Central Bank of Chile or the World Bank. The standard disclaimer applies. Email address: nloayza@condor.bcentral.cl

1. INTRODUCTION

Several macroeconomic crisis in developing countries in recent years have once again underscored the need for a clear understanding of the temporary and structural factors underlying a country's current account position. In spite of the relatively extensive body of theoretical literature on the subject, there are only a few comprehensive cross-country studies that empirically analyze the effect of macroeconomic variables on the current account deficit.[1] This lack of cross-country empirical evidence is surprising given the fact that the position of the current account is typically used as one of the main leading indicators for future behavior of an economy and is part of the everyday decision process of policy makers.

The objective of this paper is to provide an exhaustive characterization of the empirical linkage between current account deficits and a broad set of economic variables proposed by the theoretical and empirical literature. In order to accomplish this task, we intend to complement and extend previous empirical research by

- Using a large and consistent macroeconomic data set on public and private saving rates, as well as other national income variables (the World Saving Database; see Loayza, López, Schmidt-Hebbel, and Servén, 1998).
- Focusing on developing countries by drawing on a panel data set consisting of 44 developing countries and annual information for the period 1966-95.
- Adopting a reduced-form approach (instead of holding to a particular structural model) that includes a "pool" of determinants of current account deficits identified in the literature of international economics.
- Developing a simple econometric model to estimate separately the transitory and permanent (trend) relationships between the current account deficit and its determinants.
- Employing a class of estimators that controls for the problems of joint endogeneity of the explanatory variables (simultaneity and reverse causation) and correlated unobserved

country-specific effects (i.e. country heterogeneity) [see Arellano and Bond, 1991; Arellano and Bover, 1995].

Unlike typical developed countries, most developing countries are credit constrained. Both the behavior and response of the current account deficit to changes in internal and external conditions are thus likely to be different in the latter. We acknowledge this possible different behavior and also take into account the scarcity of empirical research on developing countries, and thus concentrate our study on them.

The paper is organized as follows. The next section presents a brief review of the theoretical and empirical literature. Section 3 describes the data. Section 4 presents the econometric methodology used to analyze transitory and permanent effects, and to control for joint endogeneity and country-specific effects. Section 5 presents the results. Section 6 concludes.

2. REVIEW OF THE LITERATURE

According to the intertemporal approach, the current account deficit is the outcome of forward-looking dynamic saving and investment decisions driven by expectations of productivity growth, government spending, interest rates, and several other factors. Within this framework, it has been stressed the role of the current account balance as a *buffer* against transitory shocks in productivity or demand (Sachs, 1981; Obstfeld and Rogoff, 1995, 1996; Ghosh, 1995; Razin, 1995).

One of the main lessons learned from this literature is that the impact of policy changes may vary according to the nature, persistence and timing of such changes. With respect to their nature, shocks may be country-specific or global. This is important since the literature finds that the latter tends to have a smaller impact on current account deficits than the former (Glick and Rogoff, 1995; Razin, 1995). Similarly, the persistence of the shocks, whether transitory or permanent, may produce a different response of the current account balance. For instance, a permanent productivity shock may widen the current account deficit as it may generate a surge in

investment and a decline in savings (given that it causes consumption to rise by more than gross output). On the other hand, transitory productivity shocks may move the current account into surplus as there may be no investment response to a purely temporary shock (Glick and Rogoff, 1995; Obstfeld and Rogoff, 1995). Finally, the timing of shocks, that is, the extent to which they are expected or unexpected by agents in the economy, may also matter in current account outcomes.

In the context of a real business cycle model, the intertemporal approach has been widely used to evaluate the impact on the current account balance of fiscal policy (Leiderman and Razin, 1991; Frenkel and Razin, 1996), real exchange rate (Stockman, 1987), terms of trade fluctuations (Obsfeld, 1982; Svensson and Razin, 1983; Greenwood, 1983; Mendoza, 1995; Tornell and Lane, 1998; Mansoorian, 1998), capital controls (Mendoza, 1991) and global productivity shocks (Glick and Rogoff, 1995; Razin, 1995)[2]. In assessing the effects of these variables, the RBC literature has been careful to recognize that dynamic general equilibrium models imply the existence of simultaneity between the current account deficits and its determinants. The same care has not been exercised in most traditional econometric studies.

Although primarily used to explain current account fluctuations at business cycle-frequencies, the intertemporal approach has attempted to introduce life-cycle implications to explain trend developments. In this regard, the literature on current account sustainability (Milesi-Ferreti and Razin, 1996) has proved to be a useful complement.[3] However, there are still unsolved issues regarding the factors that could trigger a policy reversal in situations of unsustainability. Events that might generate policy shifts are different across countries, and might reflect different degrees of vulnerability of external shocks, or differences in the ability to undertake policy adjustments.[4]

So far the empirical literature has focused on particular aspects only. Most of the evidence is concentrated on industrial countries, either as a group or individually, typically with emphasis on the response of the current account balance to shocks in one specific determinant (see Table 1 for

a summary of the findings of the empirical literature). An example of the focus on single variables is given by the many studies dealing with terms of trade shocks. The influence of this variable on the current account balance has been evaluated using econometric techniques (Rose and Yellen, 1989; Debelle and Faruqee, 1996) and calibration and simulation of RBC models for both industrial economies (Backus, Kehoe, and Kydland, 1994) and developing countries (Mendoza, 1995; Senhadji, 1998). Another example is fiscal policy. Not only has it been evaluated with impulse-response functions from simulations of dynamic general equilibrium models (Leiderman and Razin, 1991; Frenkel and), but also with econometric techniques –VAR and panel data analysis (Glick and Rogoff, 1995; Debelle and Faruqee, 1996).

However, as important as the above studies are, comprehensive cross-country empirical studies on the determinants of the current account balance are quite scarce. The closest in spirit to our research is Debelle and Faruqee (1996). They use a panel of 21 industrial countries over 1971-93 and an expanded cross-sectional data set that includes an additional 34 industrial and developing countries. Their paper attempts to explain long-term variations and short-run dynamics of the current account by specifying cross-section and panel data models, respectively. Debelle and Faruqee find that the fiscal surplus, terms of trade and capital controls do not play a significant role on the long-term (cross-sectional) variations of the current account, while relative income, government debt and demographics do. Furthermore, with the purpose of estimating short-run effects, Debelle and Faruqee estimate both a partial-adjustment model with fixed-effects and an error-correction model (to account, respectively, for the possibilities of stationarity or non-stationarity of the ratio of net foreign assets to GDP). In both cases, they find that short-run changes in fiscal policy, movements in terms of trade, the state of the business cycle, and the exchange rate affect the current account balance. We complement Debelle and Faruqee's approach by applying recent econometric techniques to control for joint endogeneity and by developing a simple, internally consistent method to separate transitory and permanent

relationships. In general, we take a rather comprehensive approach with emphasis on developing countries, as our expanded data set allows.

3. DATA

We use an unbalanced panel of 753 annual observations from 44 developing countries over the period 1966-95. In order to ensure a minimum time-series dimension and allow adequate implementation of our econometric methodology, we keep countries that have at least six consecutive annual observations, only. The following are the key variables used[5]:

Income, Current Account, and Saving. The measure of income employed to construct and normalize the current account balance and savings is gross national disposable income *(GNDI)*. This corresponds closely to the concept of total income available for consumption and saving of national residents and is equal to gross national product *(GNP)* plus all net unrequited transfers from abroad. Gross national saving *(GNS)* is computed as *GNDI* minus consumption expenditure, and the current account deficit *(CAD)* is the difference between gross domestic investment *(GDI)* and gross national savings *(GNS)*. We normalize the current account deficit and public and private saving by dividing each of them by *GNDI*. Data on income, saving, and investment is taken from the World Saving Database (Loayza et al., 1998).

Public and Private Saving. We employ a broad definition of the public sector that includes central and local governments as well as non-financial public enterprises. Furthermore, we use adjusted saving data for capital gains and losses that accrue to the public and private sectors as a result of inflation (that is, the erosion of the real value of non-indexed public debt). The source of these variables is the World Saving Database (Loayza et al., 1998).

Exchange Rate. The effective real exchange rate was calculated as:

$$TCR = \frac{(P/e)}{\prod_k (P_k / e_k)^{d_k}}$$

where P is the consumer price index of the domestic country, e is the exchange rate (price of the US dollar in units of local currency), P_k and e_k are the consumer price index and exchange rate for the trading partners, and d_k represent the IMF-generated weights based on both bilateral trade shares and export similarity. An increase in the real exchange rate implies a real appreciation of the domestic currency.

Balance of Payments Controls and Black Market Premium on Foreign Exchange. Grilli and Milesi-Ferreti (1995) construct dummy variables on three forms of BoP restrictions: (i) payments for capital transactions; (ii) multiple exchange rate practices; and (iii) restrictions on current account transactions.[6] We use a simple average of (i), (ii), and (iii) as a first proxy of BoP restrictions. Following Dooley and Isard (1980), we use the black market premium on foreign exchange as an alternative measure of capital and current account controls. Employing this variable may be particularly important in empirical analysis that uses relatively high (annual) frequency data. Data on black market premium is obtained from Wood (1988) and International Currency Analysis Inc. (various years).[7]

Industrialized Output Growth Rate and International Interest Rates. The first is computed from dollar-denominated real GDP of OECD countries. For the second, we use the nominal Eurodollar London rate, adjusted with the CPI percentage change for industrial countries. The source is the IMF International Financial Statistics.

4. ECONOMETRIC METHODOLOGY

The response of the current account deficit to changes in economic variables depends primarily on whether those changes are transitory or permanent.[8] It is, therefore, imperative that this decomposition is undertaken either prior or in the context of econometric estimation. In practice, we cannot avoid arbitrariness since there is no single way to decompose economic shocks into transitory or permanent. Here, we outline an econometric model that distinguishes between the transitory and permanent (or trend) components of current account deficits and its

economic determinants. We make explicit assumptions to allow this decomposition and offer specification tests to examine the validity of our model. Although, as customary, these tests are performed under the null hypothesis of correct specification (that is, not considering the breath of alternative models), they do offer an internal consistency check that allow us to draw conclusions from the estimated coefficients.

The key identification assumption is that all variables in the model are stationary or, more specifically, that they follow a mean-reverting process.[9] Although assuming the absence of a (possibly non-linear) time trend for some of them may be questionable, estimation of a model that allows different time trends for variables and countries would have resulted in quite a cumbersome undertaking.

Our model is designed for pooled cross-country and time-series data, and it is characterized by, first, it is dynamic, since it allows for independent effects from the *lagged* current account deficit. Second, it relaxes the common assumption of strong exogeneity of the explanatory variables, thus allowing for (limited) reverse causality and simultaneity. And, third, it allows the identification of permanent and transitory effects on the current account deficit.

4.1. TRANSITORY AND PERMANENT EFFECTS

Let y_{it} be the current account deficit, as a ratio to national income, of country i in year t, and X_{it} be a set of its economic determinants. By construction,

$$y_{it} = y_{it}^{T} + y_{is}^{P} \quad \text{and} \quad X_{it} = X_{it}^{T} + X_{is}^{P} \tag{1}$$

where the superscripts T and P represent transitory and permanent components, respectively. Transitory fluctuations are defined as deviations from the trend or permanent component. In practice, whereas the transitory component represents short-lived fluctuations, the permanent component represents movements in the (long-run) tendency of a variable.

Transitory effects model. Consider the following model for the transitory components:

$$y_{it}^{T} = b_1 y_{it-1}^{T} + b_2 X_{it}^{T} + e_{it} \tag{2}$$

Assume that the permanent component is very similar over time (but not over countries):

$$y_{it}^{P} \cong y_{is}^{P} \quad and \quad X_{it}^{P} \cong X_{is}^{P} \quad For\ all\ t,s. \tag{3}$$

To obtain a regression equation in terms of the observed values of all variables, substitute (1) into (2). Then, collect all the permanent terms and use the approximation derived from the assumption stated in (3). After rearranging terms, we obtain:

$$y_{it} = b_1 y_{it-1} + b_2 X_{it} + h_i + e_{it} \tag{4}$$

where h_i is an unobserved country-specific effect, correlated with the observed explanatory variables. We use equation (4) to estimate the parameters b of the model on transitory effects.

Permanent effects model. Consider the following model for the permanent components:

$$y_{it}^{P} = a_2 X_{it}^{P} + m_{it} \tag{5}$$

Assume that over medium-sized time horizons (say five years), the average of transitory components are approximately equal to zero, that is,

$$\sum_{t=1}^{t} y_{it} \cong 0 \quad and \quad \sum_{t=1}^{t} X_{it} \cong 0 \tag{6}$$

Substituting (1) into (6), and taking averages over time-horizon t :

$$\sum_{t=1}^{t} X_{it} = a_2 \sum_{t=1}^{t} X_{it} + \left(\sum_{t=1}^{t} y_{it}^{T} - a_2 \sum_{t=1}^{t} X_{it}^{T} \right) + \sum_{t=1}^{t} m_{it} \tag{7}$$

Given the assumption in (6) and using the index t to denote averages over a time horizon of t years, we have:

$$y_{it} = a_2 X_{it} + m_{it} \tag{8}$$

It can be expected that m_{it} be serially correlated partly because of unobserved time-varying effects and partly because the period length t may not be long enough to ensure that the transitory components cancel out. To account for the likely serial correlation in m_{it}, and to keep certain

symmetry with the model on temporary effects, we introduce the lagged dependent variable in the set of regressors:

$$y_{it} = \alpha_1 y_{it-1} + \alpha_2 X_{it} + \mu_{it} \quad (9)$$

We use the expression in (9) as the regression equation for the permanent effects model.

4.2. JOINT ENDOGENEITY AND COUNTRY-SPECIFIC EFFECTS

Our models of transitory and permanent components (equations 4 and 9, respectively) are dynamic (i.e., the explanatory variable set includes a lag of the dependent variable) and include some explanatory variables that are potentially jointly endogenous (in the sense of being correlated with the error term). In addition, the model of transitory effects presents an unobserved country-specific factor, which is correlated with the explanatory variables. In what follows, we describe the methodology used to consistently and efficiently estimate the transitory effects model. The estimation of the permanent effects model follows similar lines but is simpler, given that it does not have to control for unobserved country specific factors. At the end of this section we highlight the differences in estimation between the transitory and permanent effect models.

Our preferred method of estimation is the Generalized Method of Moments estimator for dynamic models of panel data introduced by Arellano and Bover (1995) and Blundell and Bond (1997). This so-called *system GMM* estimator joins in a single system the regression equation in both differences and levels, each with its specific set of instrumental variables. Now, we discuss each section of the system for ease of exposition, although the actual estimation is performed using the whole system jointly. Specifying the regression equation in differences allows direct elimination of the country-specific effect. First-differencing equation (4) yields,

$$y_{i,t} - y_{i,t-1} = b_1\left(y_{i,t-1} - y_{i,t-2}\right) + b_2\left(X_{i,t} - X_{i,t-1}\right) + \left(e_{i,t} - e_{i,t-1}\right) \quad (10)$$

The use of instruments is required to deal with two issues: first, the likely endogeneity of the explanatory variables, *X*, which is reflected in the correlation between these variables and the

error term; and, second, the new error term, ($e_{i,t}$ - $e_{i,t-1}$), is correlated by construction with the differenced lagged dependent variable, ($y_{i,t-1}$ - $y_{i,t-2}$). Instead of assuming strict exogeneity (that is, the explanatory variables be uncorrelated with the error term at all leads and lags), we allow for the possibility of simultaneity and reverse causation. We adopt the more flexible assumption of weak exogeneity, according to which current explanatory variables may be affected by past and current realizations of the dependent variable but not by its future innovations. Under the assumptions that (a) the error term, *e*, is not serially correlated, and (b) the explanatory variables are weakly exogenous, the following moment conditions apply:

$$E\left[y_{i,t-s} \cdot \left(e_{i,t} - e_{i,t-1}\right)\right] = 0 \quad for\ s \geq 2; t = 3, \ldots, T \tag{11}$$

$$E\left[X_{i,t-s} \cdot \left(e_{i,t} - e_{i,t-1}\right)\right] = 0 \quad for\ s \geq 2; t = 3, \ldots, T \tag{12}$$

The GMM estimator simply based on the moment conditions in (11) and (12) is known as the *differences* estimator. Although asymptotically consistent, this estimator has low asymptotic precision and large biases in small samples, which leads to the need to complement it with the regression equation in levels.[10]

For the regression in levels, the country-specific effect is not directly eliminated but must be controlled for by the use of instrumental variables. The appropriate instruments for the regression in levels are the lagged *differences* of the corresponding variables if the following assumption holds. Although there may be correlation between the levels of the right hand side variables and the country-specific effect, there is no correlation between the *differences* of these variables and the country-specific effect. This assumption results from the following stationarity property,

$$E\left[y_{i,t+p} \cdot h_i\right] = E\left[y_{i,t+q} \cdot h_i\right] \ \ and \ \ E\left[X_{i,t+p} \cdot h_i\right] = E\left[X_{i,t+q} \cdot h_i\right] \ \ for\ all\ p\ and\ q \tag{13}$$

Therefore, the additional moment conditions for the second part of the system (the regression in levels) are given by the following equations:[11]

$$E\left[\left(y_{i,t-s} - y_{i,t-s-1}\right)\cdot\left(h_i + e_{i,t}\right)\right] = 0 \quad for\ s = 1 \tag{14}$$

$$E\left[\left(X_{i,t-s} - X_{i,t-s-1}\right)\cdot\left(h_i + e_{i,t}\right)\right] = 0 \quad for\ s = 1 \tag{15}$$

Using the moment conditions presented in equations (11), (12), (14) and (15), and following Arellano and Bond (1991) and Arellano and Bover (1995), we employ a Generalized Method of Moments (GMM) procedure to generate consistent estimates of the parameters of interest.[12] The consistency of the GMM estimator depends on whether lagged values of the explanatory variables are valid instruments in the current account deficit 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 the instruments by analyzing the sample analog of the moment conditions used in the estimation process. Failure to reject the null hypothesis gives support to the model. The second test examines the hypothesis that the error term $e_{i,t}$ is not serially correlated. We test whether the differenced error term (that is, the residual of the regression in differences) is first-, second-, and third-order serially correlated. First-order serial correlation of the differenced error term is expected even if the original error term (in levels) is uncorrelated, unless the latter follows a random walk. Second-order serial correlation of the differenced residual indicates that the original error term is serially correlated and follows a moving average process at least of order one. If the test fails to reject the null hypothesis of absence of second-order serial correlation, we conclude that the original error term is serially uncorrelated and use the corresponding moment conditions.

Estimation of the permanent effects model. Given that the permanent effect model does not include an unobserved country-specific effect, estimation is performed with a levels specification for both the regression equation and the instrumental variables. Allowing for weak endogeneity of the explanatory variables entails the use of instruments but, since there is no country-specific effect to control for, these instruments can simply be the lagged *levels* of the

explanatory variables. The two tests of specification outlined in the previous section can be applied to the estimation of the permanent effects model, with the modification that, for the serial correlation test, rejecting no *first*-order serial correlation is a sign of misspecification.

5. RESULTS

The dependent variable is the current account deficit as ratio to gross national disposable income *(GNDI).* The set of core explanatory variables is chosen on the basis of their relevance in the literature. They are the lagged current account deficit, the domestic output growth rate, private and public saving ratios with respect to *GNDI*, the share of exports in *GNDI*, the real effective exchange rate, the terms of trade, the extent of balance of payment controls, the black market premium, the output growth rate of industrialized countries, and the international real interest rate. The explanatory variables are allowed to be jointly (weakly) endogenous, except for the terms of trade, the industrialized output growth rate, and the international real interest rate, variables which in our developing-country sample are likely to be exogenous. Table 2 shows summary statistics on all variables for both the sample of developing countries and the sub-sample of heavily-indebted countries.

5.1. TRANSITORY EFFECTS

We now consider the results of our simple econometric model to estimate the *transitory* effects on the current account deficit of *transitory* changes in domestic and international economic variables. First, we discuss the results obtained with the full sample of developing countries. Then, we compare the results obtained for a sample of highly indebted countries.

Table 3 reports the current account regressions using alternative estimators on the sample of developing countries and employing the core specification. For the reasons outlined in the previous section, our preferred estimation method is the GMM system estimator. Each of the alternative estimators has its particular shortcomings. Thus, the *pooled OLS* estimator does not control for the joint endogeneity of the explanatory variables nor for the presence of country-

specific effects, which in the context of annual data amounts to failing to distinguish between transitory and permanent effects (as discussed in the previous section). The *within OLS* estimator eliminates the country-specific effect but does not account for the joint endogeneity of the explanatory variables.[13] The *levels GMM* estimator controls for joint endogeneity but not for country-specific effects. Finally, the *differences GMM* estimator accounts for both joint endogeneity and country-specific effects but eliminates valuable information and uses weak instruments.

The first point to note is that the specification tests support the *system GMM* panel estimator. The test of over-identifying restrictions (i.e. Sargan test) can not reject the null hypothesis that the instruments are uncorrelated with the error term. Moreover, serial correlation tests do not reject the hypothesis that the differenced error term is not second- or third-order serially correlated (while rejecting that it is not first-order serially correlated). The two specification tests support the use of (appropriate) lags of the explanatory variables as instruments for estimation.[14] The Sargan test rejects the specification of the *levels GMM* estimator and only marginally supports that of the *differences GMM* estimator. In the cases of the simple *pooled OLS* and *within OLS* estimators, there is no counterpart to the Sargan test given that they do not rely on instrumental variables. However, in the case of the *pooled OLS* estimator, the presence of high serial correlation test is a sign of country-specific effects not being accounted for.

We now discuss the effects of each "core" explanatory variable on the current account deficit (Table 3). For each variable, the *system GMM* estimator is discussed first and then compared with those obtained under alternative techniques. We also discuss the effects of a few additional variables (Table 4), partly to allow comparison with the model of permanent effects and partly to test for robustness of the "core" variables.

Persistence. The coefficient of the lagged current account deficit (as ratio to GNDI) is positive and significant, estimated at around 0.36. The size of this coefficient reveals moderate persistence of transitory shocks, implying that the half-life of these shocks on the current account

deficit is about 1.67 years. The finding of moderate persistence is in line with our assumption that, controlling for country-specific effects, the current account deficit is stationary.[15] As can be seen in Table 3, the estimators that ignore country-specific (permanent) effects, namely, *pooled OLS* and *Levels GMM*, generate estimates for the lagged CAD coefficient almost twice as large as those obtained accounting for country-specific factors. This is to be expected given that when country-specific effects are ignored, the lagged CAD proxies for them.

Internal Economic Conditions:

Public and Private Saving. A temporary increase in either public or private saving rates contributes to decrease the current account deficit. However, whereas the coefficient on the public saving rate is strongly statistically significant, the one on the private saving rate is only marginally so. According to the estimated coefficients reported in column 5, the effect of a transitory increase in the public saving rate of 1 percentage point leads to a CAD fall of 0.35 percentage points; the corresponding figure for the private rate is 0.13, that is, almost three times smaller. Then, it appears that shocks in private saving rates are accompanied almost one-to-one by investment rate shocks, whereas shocks in public saving rates are only partially offset by increases in the investment rate. A practical implication derived from this result is that when short-run improvement of the current account deficit is needed, an increase in public saving is a mildly effective policy option.

The impact of private and public saving rises on the current account deficit is robustly negative and significant across all considered estimators. Although the size of these two estimated coefficients varies across estimators, a robust result is that the coefficient on the public saving rate is larger than the corresponding one on private saving.

Domestic output growth. A temporary increase in the domestic output (GDP) growth rate has the effect of enlarging the current account deficit. A 1 percentage point rise in the GDP growth rate leads to an increase of about 0.21 percentage points in the current account deficit. Although a temporary rise in growth may be associated with an increase in the saving rate, it

seems that its correlation with the investment rate is somewhat larger, thus leading to a worsening of the current account deficit. If the increase in growth rates were solely the result of a temporary productivity surge, then it would be expected to move the current account towards surplus (see Glick and Rogoff, 1995). The coefficient on domestic output growth is robustly positive and significant across all estimators. The size of this estimated coefficient seems to be larger when weak endogeneity is allowed and accounted for (*Levels GMM, Differences GMM,* and *System GMM*). This is consistent with the notion that a larger current account deficit brings about poorer growth performance; this negative effect would be controlled for through the use of the GMM estimators.

In Table 4, we examine the effect of two other variables dealing with internal economic conditions. The first is the ratio of ***liquid liabilities*** to GDP, whose short-run changes measure mostly monetary and credit expansions. Its effect on the current account deficit is positive and significant. Its likely mechanism is through the interest rate: a monetary expansion leads to an interest rate drop, which in turn encourages investment and, in the absence of an important saving effect, a rise in the current account deficit. The second variable is the standard deviation of ***inflation***, which serves as a measure of macroeconomic uncertainty. Its effect on the current account deficit is negative and significant. This is consistent with the notion that macroeconomic uncertainty both lowers investment and, through a precautionary saving motive, rises saving -- both effects lead to a lower current account deficit (see Gosh and Ostry, 1997).

External Economic Conditions:

Exports. A temporary increase in exports, relative to GNDI, has the effect of lowering the current account deficit. However, although this effect is statistically significant, its economic impact is quite small. An increase in the ratio of exports to GNDI of 5 percentage points leads to a CAD reduction of about 0.2 percentage points.

The result on exports is not robust across estimators. In fact, the estimators that ignore country-specific (permanent) effects, *Pooled OLS* and *Levels GMM*, obtain positive, though

small, coefficients. This is consistent with the idea that country-specific effects that lead a country to run larger current account deficits also generate a larger export sector (see the discussion on permanent effects of export rises). In general, according to the model presented in the previous section, ignoring country-specific effects amounts to mixing together transitory and permanent effects. In this case, the estimated coefficients would represent the "net" effects, which are difficult to interpret.

Real Exchange Rate. We find a significant relationship between the real exchange rate and the current account deficit that is consistent with the predictions of the Mundell-Fleming model. A transitory depreciation of the domestic currency (that is, a fall in the real effective exchange rate) has the effect of reducing the current account deficit, though by a small amount. Thus, a 10% depreciation of the real exchange rate leads to a temporary current account deficit reduction of 0.34 percentage points. Recent evidence argues that the relationship between the real exchange rate fluctuations and current account deficits may not be monotonic.[16] Thus, we study the delayed effects of the real exchange rate on the current account deficit in Table 4 by including the RER lagged one year as an additional regressor. First, we find no evidence in support for the J-curve hypothesis (as it applies to yearly data; regarding higher frequencies, clearly we have nothing to say). Second, the contemporaneous positive impact of changes in the RER is offset by about half the following year. The "net" effect (adding the coefficients on contemporaneous and lagged RER in Table 4, column 4) is quite similar to the coefficient of the RER in the core specification. Regarding alternative estimators, none of them obtains statistically significant coefficients for the real effective exchange rate.

Terms of Trade. We find a negative and significant relationship between temporary changes in the terms of trade and current account deficits, which is consistent with the Harberger-Laursen-Metzler effect (Obstfeld, 1982; Svensson and Razin, 1983; Greenwood, 1983; Mendoza, 1992, 1995).[17] Hence, according to our preferred estimation, an increase of 10% in the terms of trade will reduce the current account deficit in 0.44 percentage points. Only the estimators that

both control for country-specific effects and allow for (weak) joint endogeneity obtain significant (and negative) coefficients for the terms of trade.

Controls on External Transactions:

Balance of Payments Controls. BoP controls have no significant transitory effect on the current account deficit; this result is similar to one found by Debelle and Faruqee (1996). One caveat to consider in interpreting this result is that the proxies on BoP controls we use vary very little over time and do not measure accurately the *intensity* of controls, but only their presence (as stressed by Grilli and Milesi-Ferreti, 1995). The lack of significance of the coefficient on BoP controls seems to be robust across alternative estimators.

Black Market Premium on Foreign Exchange. In contrast to the BoP controls examined above, controls on the exchange rate manifested in the size of the black market premium have the effect of temporarily decreasing the current account deficit. The effect is statistically significant, although economically rather small. Imposing foreign exchange controls that result in an increase in the black market premium from 0 to 20% lead to a decrease in the current account deficit of 0.6 percentage points. Without affecting the importance of this result, the alternative estimators obtain dissimilar results in both sign and statistical significance, which reflects the presence of complex biases from ignoring country-specific (permanent) effects or joint endogeneity..

Evolution of the World Economy:

Output Growth Rate of Industrialized Countries. A temporary increase in the growth rate of industrialized countries leads to a reduction in the current account deficits of developing countries. This can be explained by both a rise in the demand for the exports of developing countries and increased capital flows between industrialized countries at the expense of flows to developed countries. Given the limited influence of exports on the current account deficit, we tend to favor the capital flow explanation. Our estimates indicate that a 1 percentage point rise in the growth rate of industrial countries would generate a reduction of 0.46 percentage points in the

current account deficit. This result is quite robust, in sign, size, and significance, across alternative estimators.

International Real Interest Rate. We find a negative association between the international real interest rate and the current account deficit in developing countries. This result is in line with the argument that net debtor countries, as most developing countries are, widen their demand for international capital in response to interest rate reductions (Reisen, 1998). On the side of the supply of capital, lower real interest rates induce international investors to look for investment opportunities in developing countries (Milesi-Ferreti and Razin, 1996 and 1998). According to our estimates, a temporary rise in international real interest rates of 1 percentage point leads to a current account deficit reduction of about 0.18 percentage points. In contrast to the industrialized countries growth rate, the estimated coefficient on the international real interest rate varies considerably across alternative estimators.

EXTERNAL INDEBTEDNESS

A country's current account deficit is likely to be affected by its stock of foreign assets. More specifically, it is likely that the stock of foreign assets affects the response of the current account deficit to changes in various economic variables. We would like to study this conjecture. Unfortunately, data on foreign asset positions are mostly unavailable for a large sample of developing countries. However, we do have data on total external debt (mostly from the World Bank), which can be used as indicator of a country's net foreign asset position (NFA). For most of our sample, external debt is a good indicator of NFA given that by far external financing has taken the form of debt issues; this assumption is less appropriate in the most advanced developing countries and in the most recent years.

Our approach to analyze the influence of external indebtedness is to estimate our core model on the sample of "heavily" indebted developing countries and, for comparison purposes, on the sample of all developing countries with external debt data available. We follow the World Bank criterion (in the World Development Indicators) by which a "heavily" indebted

country/year is one that has either the ratio of external debt to GDP higher than 50% or the ratio of total debt service to exports greater than 25%. We need to account for the fact that being a heavily indebted country has repercussions that extend beyond the year at which the criterion is met; furthermore, we need to smooth the (over time) country composition of both samples in order to be able to use our dynamic panel procedures. Therefore, we modify the World Bank criterion in the following way: a country is classified as heavily indebted in a given year if it meets the above condition in any two years of the five year window surrounding the year in question.

The results are presented in Table 5. The first thing to notice is that the heavily-indebted country sample is almost 80% of the sample containing all developing countries. Most developing countries have suffered of long periods of high external indebtedness. Not surprisingly, the results for both samples are quite similar. There are, however, a couple of noteworthy differences. First, an increase in the private saving rate lowers the current account deficit only in the case of highly indebted countries. It appears that in non-heavily indebted countries, which are likely to face less stringent external borrowing constraints, an increase in private saving is accompanied by a corresponding rise in domestic investment. Second, in contrast to the result for all developing countries, a fall in international real interest rates does not have a significant effect on the current account deficits of heavily indebted countries have. This result can be explained by the fact that international investors tend to avoid putting their capital in debt-ridden countries, even if real interest rates fall in developed countries. The fact that there are contrasting results for the two samples regarding the response to interest rate changes may indicate that international investors discriminate between types of developing countries.

5.2 PERMANENT EFFECTS

Core Variables:

Table 6 shows the results related to the model of permanent effects for both the full sample and the sample of heavily-indebted countries. Here the discussion of results follows a

different format with respect to the previous sub-section, that is, we now emphasize how the results on the permanent effects model contrast with those of the transitory model. Also, we compare the results obtained with the sample of heavily indebted countries.

Before proceeding, we must recognize that we place less confidence on the permanent effects model than on the transitory one because the identifying assumptions of former model are more stringent. In particular, the assumption that transitory shocks average out in a period of five years is controversial. It may be argued that five-year periods are too short for this assumption to be sensible. We chose this period length for two reasons. The first one is that is our sample size is quite limited; thus, if we were to consider longer periods, the lack of sufficient degrees of freedom would prevent us from implementing our dynamic panel data procedures. The second reason is that, in using five-year periods, we are following the empirical literature on endogenous growth, where this period length is customarily used to average out cyclical fluctuations, thus isolating the long-run component of output growth (see Caselli, Esquivel, and Lefort 1996; and, Easterly, Loayza, and Montiel 1997).

As expected, the lagged current account deficit has a positive and highly significant coefficient. Given that we are dealing with permanent changes, the size of the ***persistence*** coefficient determines the long-run multiplier effect on the current account deficit (and not the "half-life" of transitory shocks as in the previous model). Therefore, according to the estimated coefficient on lagged CAD for the full sample, the long-run impact of a permanent change in any variable is equal to almost twice its contemporaneous impact (which is given by the estimated coefficient on the respective variable).[18] Note that the level of persistence is much smaller in the case of heavily indebted countries.

Permanent changes in the ***domestic growth rate*** have a positive effect on the current account deficit, though its statistical significance is marginal. Unlike the case of transitory effects, in theory a permanent growth improvement is related to both a decrease in saving rates and an increase in investment rates, even if the growth improvement is driven by productivity

surges (see Glick and Rogoff, 1995). Another variable whose permanent effects have the same sign, though not quite the same significance, as its transitory effects is the ***industrialized output growth rate***. Changes in this variable have the effect of decreasing the current account deficit. This can be explained by considering that higher output growth in industrialized countries means larger demands for developing countries' goods (thus improving their trade balance) and higher investment demand in industrialized countries (with the corresponding decrease of external financing to developing countries).

Conversely, the results related to permanent changes in the ***private and public saving rates*** differ from those on transitory effects: Permanent changes in saving rates do not affect the current account deficit significantly. This is consistent with the notion that permanent changes in saving are accompanied with corresponding changes in domestic investment. An interesting exception is present for the sample of heavily indebted countries, for which an increase in private saving does lead to a drop in the current account deficit. This result can be explained by considering that heavily-indebted countries must destine an increase of available resources to paying off their debts.

The effect on the current account deficit of permanent changes in ***exports*** (relative to GNDI) is positive and significant, which is the opposite of the effect of transitory changes in this variable. It seems that while a transitory increase in exports lowers the current account deficit through a direct effect on the trade balance, a permanent rise in exports indicates an improved capacity to repay external debts and, thus, leads to an expansion of the current account deficit (Milesi-Ferreti and Razin, 1996).[19] Again in contrast to the results related to the transitory effects model, the ***black market premium on foreign exchange*** and the measure of ***BoP restrictions*** have, respectively, positive and negative coefficients, both statistically significant. It appears that the long-run effect of the black market premium is to increase the current account deficit rather than control its expansion, as it does in the short run. On the other hand, BoP restrictions do seem to lower the current account deficit in the long run. The sign and size of the coefficients related

to exports, black market premium, and BoP restrictions estimated using the full sample are quite similar to those using the sample of heavily indebted countries; however, the latter are estimated with less precision.

Regarding the relative price variables, namely, the ***real exchange rate***, ***terms of trade***, and ***real interest rate***, only the latter one has a significant permanent impact on the current account deficit, impact which, as in the transitory effects model, is negative. The non-significance of the coefficients on the real exchange rate and terms of trade in the permanent effects model is not surprising for two reasons. First, changes in these variables mainly affect the inter-temporal allocation of saving and investment; and second, their low frequency variation is rather small, particularly when compared to their annual fluctuations. On the other hand, it is somewhat surprising that the estimated permanent effect of the international interest rate does not follow the same pattern. We can speculate that this may be partly due to our inability to isolate the permanent component through averaging over too short a period (5 years).

Other Long-Run Effects

In Tables 7 and 8 we consider the permanent effect of (also permanent) changes in other interesting variables. In Table 7, we consider some popular hypothesis regarding the determinants of current account trends. The first column of Table 7 examines the ***stages of development*** hypothesis, which states that the size of current account deficits decreases as a country develops in relation to the rest. In other words, a poor country would tend to run large current account deficits because its investment needs cannot be met with its limited saving, but as the country develops, it requires less external financing and starts devoting resources to pay back its external debt. Our proxy for the (relative) stage of development of a given country is the log of the ratio of per capita GDP of such country to the (weighted average of) per capita GDP of industrialized countries. This ratio is expressed in logs to account for likely non-linear effects. As the first column shows, we do find a negative and significant effect of relative per capita GDP on the current account deficit, which gives support to the *stages of development* hypothesis.

In the next two columns of Table 7, we assess the relevance of demographic variables in driving the current account deficit. We do this by adding to the set of explanatory variables, first the ***age dependency ratio***, and second, its components, the *young* and *old dependency ratios*, separately. Although their estimated coefficients are consistently negative, they all fail to be statistically significant. We conclude that demographic variables do not produce trend changes in the current account deficit beyond their effect through private saving.

Table 8 examines the permanent effects of additional financial variables. The first column of Table 8 considers the permanent effect of the ***ratio of liquid liabilities to GDP***. Although in the short run, changes in this ratio mostly capture monetary and credit expansions, in the long run, the ratio of liquid liabilities to GDP represents financial depth (see King and Levine 1993). The estimated coefficient is negative but not statistically significant; its negligible impact may be due to contrasting effects of financial depth on the current account deficit. On the one hand, stronger financial depth may prepare a country to accommodate larger external financing; but on the other hand, it may be associated with higher income and internal resources for investment. In the second column, we address the issue of macroeconomic uncertainty, proxied by the ***standard deviation of (monthly) inflation***. We do not find a significant coefficient in the permanent effects model. Again, this could be due to contrasting effects: on the one hand, macroeconomic instability decreases domestic investment and increases saving; but on the other hand, an aspect of deficient macroeconomic policy is excessive borrowing from abroad. Finally, the last column of Table 8 considers ***external debt as ratio to GDP*** as an additional explanatory variable for current account deficits in the long run. We fail to find a statistically significant coefficient. The effect of the stock of debt on its flow (which to a large extent is given by the current account deficit) is a complex relationship marked by non-linearities, asymmetries, and threshold effects. Our simple linear specification does not capture the complexity of this relationship, but such purpose is beyond the scope of this paper.

6. CONCLUSIONS

In this paper we study the empirical relationship between the current account deficit (as ratio to GNDI) to economic variables postulated as its determinants by the theoretical and empirical literature. Given that the effect of changes in economic conditions depend on whether they are transitory or permanent, we study separately the transitory and permanent (trend) relationships between the current account deficit and its determinants. Furthermore, taking into account that most relevant variables are jointly endogenous with the current account deficit, we implement an econometric methodology that controls for simultaneity and reverse causation. This methodology is an application of the *GMM* estimator proposed by Arellano and Bond (1991) and Arellano and Bover (1995) for dynamic models employing panel data.

Our sample consists of an unbalanced panel of 44 developing countries for the period 1966-95. We use annual data and non-overlapping five-year averages in the study of transitory and permanent (trend) effects, respectively. We concentrate on developing countries because the response of their current account deficit to changes in internal and external conditions is likely to be different from that of industrialized countries: whereas the latter largely face unobstructed access to financial markets, most developing countries are credit constrained. In addition, there are comparatively few studies focusing on developing countries.

Our main findings are the following:

- There is a moderate level of persistence in the current account deficit beyond what can be explained by the behavior of its determinants. This persistence is present in both the transitory and permanent-effects models; and in the latter, the level of persistence is much smaller in the case of heavily-indebted countries.
- The domestic output growth rate has a positive effect on the current account deficit in both the transitory and permanent effects models, indicating that in both the short and long runs

the domestic growth rate produces a larger increase in domestic investment than in national saving.

- The growth rate of industrialized countries contributes to reduce the current account deficits of developing countries, both in the short and long runs. This may occur through either an increase in the demand for developing-countries' exports or a rise in investment going to other industrialized countries at the expense of external financing to developing countries. Particularly in the permanent effects model, the negative effect on the current account deficit is stronger in the sample of heavily indebted countries.
- Whereas transitory changes in private and public saving rates contribute to a moderate decrease in the current account deficit, permanent changes in either saving rate do not affect the current account deficit. This is consistent with the notion that permanent changes in saving are accompanied with corresponding changes in domestic investment. An interesting departure of this finding is obtained for the sample of highly-indebted countries. In this group of countries, a permanent increase in the private saving rate does lead to a drop in the current account deficit, which may reflect the need to destine any increase in available resources to the payment of debts.
- While a transitory increase in exports (relative to GNDI) lowers the current account deficit, likely through a direct effect on the trade balance, a permanent rise in exports indicates an improved capacity to repay external debts and, thus, leads to an expansion of the current account deficit.
- Transitory changes in the level of restrictions on balance of payments flows do not have a significant impact on current account deficits; however, in the long run, they are linked to smaller current account deficits. On the other hand, the impact of transitory changes in the black market premium is deficit-reducing while permanent changes are deficit increasing.

- Whereas a transitory appreciation of the real exchange rate or worsening of the terms of trade generate an increase in the current account deficit, their permanent effects are not significantly different from zero. The contrast between transitory and permanent effects of these relative price variables is consistent with the idea their changes variables mainly affect the inter-temporal allocation of saving and investment.
- Transitory and permanent reductions in international real interest rates generate an increase in current account deficits. The transitory effect is consistent with both an increased demand for foreign financing and a rise in the supply of foreign capital when international real interest rates are temporarily low. This result applies to the sample of all developing countries; in contrast, for the sample of heavily indebted countries, a transitory fall in international real interest rates does not have a significant effect on the current account deficit, which indicates that international investors discriminate between debt-ridden and the rest of developing countries.
- In the transitory effects model, a rise in the standard deviation of inflation, which proxies for macroeconomic uncertainty, generates a reduction of the current account deficit. This can be explained by the fact that uncertainty both lowers investment and increases saving, through a precautionary motive.
- Finally, the *stages of development* hypothesis receives support from the result that a country's current account deficit tends to decrease as its per capita GDP approaches that of industrialized countries.

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Table 1
Determinants of Current Account Deficits

Category	Variable	Expected Sign	Empirical Sign
Persistence	Current Account Deficit lagged one period	+	**+0.67 for CA/GDP [2] +0.50 for CA/GDP [12]**
Income	**Domestic Output Gap**	+	**+ [1]**
	Country-Specific Productivity Shock: Transitory/Permanent	+ / -	**+ [3,4,11,12]**
	Global Specific Productivity Shock: Transitory/Permanent	+ / 0	**0 [12]**
	Domestic Output Growth	+	**+ [8,9]**
Saving/ Investment	**Saving: National / Private**	-	
	Investment	+	**+ [2,4,12]**
Fiscal Policy	**Public Saving**	-	**- [5]**
	Budget Surplus	-	**- [2]**
	Government Spending Shocks: Temporary / Permanent	+ / 0	**0 [4]**
External Indicators	**Degree of Openness**	**Ambiguous**	**- [8,9]**
	Real Effective Exchange Rate	**Marshall-Lerner: +**	**+ [2]**
		Intertemporal: Ambiguous	**0 [11]**
		Non-Monotonic	**J-Curve: 0 [13]**
	Terms of Trade	**Harberger-Laursen-Metzler: -**	**- [2,7,11,12]**
		Non-Monotonic	**J-Curve: [6,15] S-Curve: [1,14]**
	Exchange Controls	+	**0 [2]**
Foreign Indicators	Industrialized Countries Growth Rate	-	**- [8,9]**
	World Real Interest Rate	**Net Debtor: - Net Creditor: +**	**0 [12]**

Note: The empirical findings in this table summarizes: [1] Backus, Kehoe and Kehoe (1994); [2] Debelle and Faruqee (1996); [3] Elliot and Fatas (1996); [4] Glick and Rogoff (1995); [5] Leiderman and Razin (1991); [6] Mansoorian (1998); [7] Mendoza (1995); [8] Milesi-Ferreti and Razin (1996); [9] Milesi-Ferreti and Razin (1998); [10] Razin and Rose (1992); [11] Razin (1995); [12] Reisen (1998); [13] Rose and Yellen (1989); [14] Senhadji (1998); [15] Tornell and Lane (1998).

Table 2
Current Account Deficit Determinants in Developing Countries: Summary Statistics
Annual Data, 1966-1995

A. Sample of Developing Countries

Variable	Mean	Std.Dev.	Minimum	Maximum
Current Account Deficit (% GNDI)	0.0327	0.0468	-0.1224	0.1704
Internal Conditions:				
Domestic Output Growth	0.0370	0.0464	-0.1963	0.2400
Private Saving (% GNDI)	0.1329	0.0647	-0.1368	0.3133
Public Saving (% GNDI)	0.0554	0.0444	-0.1255	0.3762
External Sector:				
Exports (% GNDI)	0.2524	0.1481	0.0442	0.9619
Real Effective Exchange Rate a/	4.7483	0.3314	3.5211	6.2032
Terms of Trade a/	0.0424	0.1848	-0.5764	0.9342
Black Market Premium b/	0.1831	0.2675	-0.3314	1.7918
BoP Controls	0.5811	0.3388	0.0000	1.0000
Evolution of the World Economy:				
OECD's Output Growth	0.0281	0.0331	-0.1342	0.0624
International Real Interest Rate b/	0.0197	0.0226	-0.0406	0.0563

B. Sample of Heavily-Indebted Developing Countries

Variable	Mean	Std.Dev.	Minimum	Maximum
Current Account Deficit (% GNDI)	0.0345	0.0486	-0.1224	0.1687
Internal Conditions:				
Domestic Output Growth	0.0427	0.0828	-0.1335	0.9209
Private Saving (% GNDI)	0.1309	0.0656	-0.1368	0.3133
Public Saving (% GNDI)	0.0560	0.0448	-0.1255	0.3762
External Sector:				
Exports (% GNDI)	0.2622	0.1313	0.0515	0.7881
Real Effective Exchange Rate a/	4.7354	0.2993	3.6480	5.6846
Terms of Trade a/	0.0312	0.1849	-0.3741	0.8901
Black Market Premium b/	0.1911	0.2571	-0.3314	1.7918
BoP Controls	0.6482	0.3370	0.0000	1.0000
Evolution of the World Economy:				
OECD's Output Growth	0.0281	0.0331	-0.1342	0.0624
International Real Interest Rate b/	0.0197	0.0226	-0.0406	0.0563

C. Simple Correlation of Current Account Deficit with Determinants

Variable	Developing Countries	Heavily-Indebted Developing Countries
Persistence:		
Current Account Deficit (% of GNDI) lagged 1 year	0.66	0.67
Internal Conditions:		
Domestic Output Growth	-0.04	0.03
Private Saving (% GNDI)	-0.34	-0.38
Public Saving (% GNDI)	-0.17	-0.20
External Sector:		
Exports (% GNDI)	0.11	0.07
Real Effective Exchange Rate a/	0.11	0.25
Terms of Trade a/	-0.03	-0.01
Black Market Premium b/	0.03	0.04
BoP Controls	-0.07	-0.06
Evolution of the World Economy:		
OECD's Output Growth	-0.17	-0.03
International Real Interest Rate b/	-0.07	-0.06

a/ Expressed in logs.
b/ The variable is expressed in log(1+Variable).

Table 3
Transitory-Effects: Various Estimation Techniques
Dependent Variable: Current Account Deficit as percentage of Gross National Disposable Income (CAD)
(t-Statistics are presented below their corresponding coefficients)

Type of Model:	Pooled	Within	Levels	Differences (D)	System D-L
Estimation Technique:	OLS	OLS	GMM-IV	GMM-IV	GMM-IV
Instruments:			Levels (L)	Levels (L)	Combined L-D
	[1]	**[2]**	**[3]**	**[4]**	**[5]**
Constant	0.0834	-	0.0095	-	-0.1560
	3.6081		0.4012		-2.6146
Persistence:					
CAD lagged 1 year	0.5489	0.3495	0.6452	0.3084	0.3559
	13.4069	7.7365	14.5867	5.5698	7.6818
Internal Conditions:					
Domestic Output	0.1658	0.1318	0.3075	0.3397	0.2128
Growth Rate	4.9509	3.6790	3.4183	4.0703	4.3595
Private Saving	-0.2231	-0.3215	-0.0513	-0.4318	-0.1265
(as % of GNDI)	-7.6538	-7.1298	-1.6088	-2.6246	-1.5727
Public Saving	-0.2591	-0.3714	-0.1087	-0.6075	-0.3451
(as % of GNDI)	-6.4870	-6.1612	-2.3404	-4.5213	-5.4781
External Sector:					
Exports	0.0074	-0.0170	0.0025	-0.0389	-0.0362
(as % of GNDI)	2.8310	-1.7173	1.1741	-1.7403	-2.8576
Real Effective Exchange	-0.0001	-0.0036	0.0047	-0.0290	0.0361
Rate (in logs)	-0.0237	-0.5034	0.9879	-0.9893	3.4071
Terms of Trade (in logs)	0.0058	-0.0059	-0.0133	-0.0670	-0.0465
	0.6722	-0.5164	-1.5046	-3.1956	-3.8810
Black Market Premium (BMP)	-0.0038	-0.0094	0.0150	0.0033	-0.0327
(in log[1+BMP])	-0.7996	-1.8326	1.4779	0.1943	-2.8429
Balance of Payments	-0.0027	-0.0095	-0.0027	0.0023	-0.0034
Controls	-0.5825	-1.4483	-0.6779	0.1792	-0.3803
Evolution of the World Economy:					
Industrialized Output	-0.5520	-0.5679	-0.6131	-0.3883	-0.4641
Growth Rate	-7.3145	-7.0668	-6.6976	-4.0653	-6.6942
International Real Interest	-0.1244	-0.0711	-0.0280	0.1177	-0.1790
Rate (in log[1+r*])	-2.8758	-1.2553	-0.7303	0.8523	-2.3612
No. Countries	44	44	44	44	44
No. Observations	753	709	753	709	709
SPECIFICATION TESTS (P-Values)					
(a) Sargan Test			0.009	0.158	0.224
(b) Serial Correlation :					
First-Order	0.006	0.000	0.750	0.003	0.000
Second-Order	0.089	0.550	0.595	0.533	0.624
Third-Order	0.053	0.696	0.257	0.879	0.789

Observations: The Arellano-Bover (1995) System Estimator is our preferred estimator. This combines regressions in levels and differences (column 5). In addition, the definition of government used to define private and public saving is the consolidated non-financial public sector, adjusted for inflationary capital capital gains or losses.

Table 4
Transitory Effects: Additional Financial Variables
Dependent Variable: Current Account Deficit as percentage of Gross National Disposable Income (CAD)
Estimation Technique: GMM System Estimator
(t-Statistics are presented below their corresponding coefficients)

Variable	[1]	[2]	[3]	[4]
Constant	-0.1132	-0.1552	-0.1996	-0.1687
	-2.0589	-2.5294	-2.7158	-2.7402
Persistence:				
CAD lagged 1 year	0.3504	0.3699	0.4070	0.3873
	7.6106	8.5724	7.1465	8.5252
Internal Conditions:				
Domestic Output	0.2043	0.2386	0.1620	0.1553
Growth Rate	4.0352	4.8639	2.5472	3.0232
Private Saving	-0.1917	-0.1228	0.0714	-0.0160
(as % of GNDI)	-2.2494	-1.3885	0.8289	-0.1929
Public Saving	-0.3863	-0.3120	-0.2399	-0.2489
(as % of GNDI)	-5.8476	-4.3606	-3.4985	-4.2711
External Sector:				
Exports	-0.0411	-0.0598	-0.0363	-0.0455
(as % of GNDI)	-2.5828	-3.4622	-2.6254	-3.5259
Real Effective Exchange	0.0267	0.0225	0.0369	0.0652
Rate (in logs)	2.4164	1.8823	3.1733	2.7379
Real Effective Exchange				-0.0339
Rate lagged 1year (in logs)				-1.4136
Terms of Trade	-0.0405	-0.0636	-0.0576	-0.0629
(in logs)	-3.5785	-4.8917	-4.8326	-4.6784
Black Market Premium (BMP)	-0.0333	-0.0372	-0.0315	-0.0315
(in log[1+BMP])	-2.9413	-3.0383	-2.6157	-2.6741
Balance of Payments	-0.0025	-0.0005	0.0086	-0.0012
Controls	-0.3278	-0.0542	1.6384	-0.1278
Evolution of the World Economy:				
Industrialized Output	-0.4208	-0.4647	-0.5531	-0.4335
Growth Rate	-6.6350	-5.6041	-6.4108	-5.7344
World Real Interest Rate	-0.1222	-0.1372	-0.1977	-0.1827
(in log[1+r*])	-1.9064	-1.6711	-2.9473	-2.3283
Additional Financial Variables				
Standard Deviation of	-0.0007			
(monthly) Inflation	-2.1529			
Liquid Liabilities		0.0631		
(as % of GDP)		3.1356		
External Debt			0.0181	
(as % of GNP)			1.2870	
No. Countries	42	44	40	44
No. Obs.	670	672	557	709
SPECIFICATION TESTS (P-Values)				
(a) Sargan Test	0.519	0.345	0.229	0.267
(b) Serial Correlation :				
First-Order	0.001	0.001	0.000	0.000
Second-Order	0.537	0.706	0.797	0.581
Third-Order	0.747	0.959	0.998	0.496

Table 5
Transitory Effects:
Heavily-Indebted vs. All Developing Countries a/
Dependent Variable: Current Account Deficit as percentage of GNDI (CAD)
Estimation Technique: GMM System Estimator
(t-Statistics are presented below their corresponding coefficients)

Variable	All Countries	Heavily-Indebted Developing Countries
Constant	-0.1572	-0.1772
	-2.6363	-2.5305
Persistence:		
CAD lagged 1 period	0.3954	0.4148
	7.2639	8.1906
Internal Conditions:		
Domestic Output	0.1369	0.3318
Growth Rate	1.9854	4.3298
Private Saving	0.0231	-0.1667
(as % of GNDI)	0.3200	-2.0052
Public Saving	-0.2374	-0.2917
(as % of GNDI)	-3.2528	-4.2124
External Sector		
Exports	-0.0394	-0.0561
(as % of GNDI)	-2.4505	-5.4291
Real Effective Exchange	0.0300	0.0365
Rate (in logs)	2.7215	2.7563
Terms of Trade	-0.0544	-0.0760
(in logs)	-4.6649	-5.2339
Black Market Premium (BMP)	-0.0336	-0.0492
(in log[1+BMP])	-2.1879	-4.3229
Balance of Payments	0.0087	-0.0015
Controls	1.2925	-0.3367
Evolution of the World Economy:		
Industrialized Output	-0.4985	-0.6423
Growth Rate	-6.6804	-4.0851
International Real Interest	-0.1829	-0.0979
Rate (in log[1+r*])	-2.3070	-1.1333
No. Countries	40	35
No. Obs.	557	434
SPECIFICATION TESTS (P-Values)		
(a) Sargan Test	0.123	0.193
(b) Serial Correlation :		
First-Order	0.000	0.007
Second-Order	0.855	0.705
Third-Order	0.957	0.959

a/ A country is classified as "heavily indebted" in a given year if it meets the following criterion in any two years of a five-year window: the country has either the ratio of external debt to GNP higher than 50% or the ratio of total

Table 6
Permanent Effects: Heavily-Indebted vs. All Developing Countries a/
Dependent Variable: Current Account Deficit as percentage of GNDI (CAD)
Estimation Technique: GMM System Estimator
(t-Statistics are presented below their corresponding coefficients)

Variable	Developing Countries	Heavily Indebted Developing Countries
Constant	0.1400	0.1513
	1.5689	0.9052
CAD lagged 1 period	0.4684	0.2079
	4.4050	1.4785
Internal Conditions:		
Domestic Output	0.4383	0.3565
Growth Rate	1.4385	1.3884
Private Saving	-0.0417	-0.2307
(as % of GNDI)	-0.4652	-2.6212
Public Saving	0.0319	-0.1885
(as % of GNDI)	0.2165	-1.1898
External Sector:		
Exports	0.0142	0.0155
(as % of GNDI)	2.4410	1.4944
Real Effective Exchange	-0.0159	-0.0036
Rate (in logs)	-0.8973	-0.1199
Terms of Trade	-0.0183	0.0206
(in logs)	-0.8073	0.4697
Black Market Premium (BMP)	0.0655	0.0619
(in log[1+BMP])	1.7460	1.0947
Balance of Payments	-0.0254	-0.0188
Controls	-3.0165	-0.9839
Evolution of the World Economy:		
Industrialized Output	-0.7787	-1.6470
Growth Rate	-1.5611	-2.3895
International Real Interest	-0.6590	-0.4840
Rate (in log[1+r*])	-4.0337	-2.7797
No. Countries	41	26
No. Obs.	126	68
SPECIFICATION TESTS (P-Values)		
(a) Sargan Test	0.817	0.232
(b) Serial Correlation :		
First-Order	0.220	0.436
Second-Order	0.267	0.470
Third-Order	0.766	0.642

a/ For the estimation of the permanent-effects model, we use non-overlapping five-year averages of all variables.

Table 7
Permanent Effects: Testing Some Popular Hypothesis
Dependent Variable: Current Account Deficit as percentage of GNDI (CAD)
Estimation Technique: GMM System Estimator
(t-Statistics are presented below their corresponding coefficients)

Variable	[1]	[2]	[3]
Constant	0.1591	0.2232	0.2535
	1.8739	1.4799	1.2922
CAD lagged 1 period	0.4204	0.5632	0.5538
	3.8088	3.0360	2.8617
Internal Conditions:			
Domestic Output	0.3918	0.4456	0.3761
Growth Rate	1.1539	1.4354	0.8618
Gap in GDP per capita with	-0.0075		
respect to OECD a/	-1.7915		
Private Saving	-0.0402	-0.0629	-0.0879
(as % of GNDI)	-0.4696	-0.6515	-0.5793
Public Saving	0.0714	-0.0261	-0.0304
(as % of GNDI)	0.4897	-0.1803	-0.2009
External Sector:			
Exports	0.0186	0.0119	0.0121
(as % of GNDI)	3.0017	1.8890	1.8525
Real Effective Exchange	-0.0223	-0.0125	-0.0104
Rate (in logs)	-1.2990	-0.6839	-0.4896
Terms of Trade	-0.0089	-0.0202	-0.0160
(in logs)	-0.3894	-0.7800	-0.5047
Black Market Premium (BMP)	0.0486	0.0776	0.0726
(in log[1+BMP])	1.2896	1.5113	1.2579
Balance of Payments	-0.0263	-0.0281	-0.0300
Controls	-2.8727	-2.3101	-2.0628
Evolution of the World Economy:			
Industrialized Output	-0.4272	-1.0101	-0.9609
Growth Rate	-0.9594	-1.6598	-1.4554
International Real Interest	-0.6200	-0.7038	-0.6889
Rate (in log[1+r*])	-3.5739	-3.7719	-3.4191
Demographic Variables:			
Age Dependency Ratio		-0.0974	
		-0.7732	
Young Dependency Ratio			-0.1124
			-0.7241
Old Dependency Ratio			-0.0186
			-0.4273
No. Countries	41	41	41
No. Obs.	126	126	126
SPECIFICATION TESTS (P-Values)			
(a) Sargan Test	0.513	0.885	0.801
(b) Serial Correlation :			
First-Order	0.219	0.329	0.374
Second-Order	0.164	0.256	0.333
Third-Order	0.910	0.763	0.714

a/ The gap in GDP per capita is computed as the log of the ratio of the GDP per capita in any developing country to the weighted average of the OECD economies.

Table 8
Permanent Effects: Additional Financial Variables
Dependent Variable: Current Account Deficit as percentage of GNDI (CAD)
Estimation Technique: GMM System Estimator
(t-Statistics are presented below their corresponding coefficients)

Variable	[1]	[2]	[3]
Constant	0.12508	0.14365	0.32473
	1.27373	1.54335	1.48303
CAD lagged 1 period	0.49429	0.46963	0.13144
	3.99316	4.34362	0.39207
Internal Conditions:			
Domestic Output	0.40880	0.45888	0.82144
Growth Rate	0.77543	1.51927	1.13807
Private Saving	-0.03695	-0.04066	-0.25474
(as % of GNDI)	-0.29744	-0.41187	-1.20911
Public Saving	-0.00124	-0.00821	-0.08934
(as % of GNDI)	-0.00809	-0.05126	-0.32611
External Sector:			
Exports	0.01184	0.01694	0.02527
(as % of GNDI)	1.60694	1.92344	2.05732
Real Effective Exchange	-0.01293	-0.01202	-0.05064
Rate (in logs)	-0.66304	-0.64844	-1.17348
Terms of Trade	-0.01894	-0.01242	-0.00301
(in logs)	-0.59543	-0.56086	-0.09396
Black Market Premium (BMP)	0.05894	0.05552	0.03666
(in log[1+BMP])	0.90917	1.56397	0.92387
Balance of Payments	-0.02295	-0.02171	-0.01879
Controls	-1.42767	-2.73084	-1.10362
Evolution of the World Economy:			
Industrialized Output	-0.86004	-1.10338	0.41191
Growth Rate	-1.60246	-2.06057	0.29639
World Real	-0.62693	-0.55730	-1.08473
Interest Rate	-2.80038	-3.13778	-1.78899
Additional Financial Variables:			
Standard Deviation of	0.00004		
(monthly) Inflation	0.01025		
Liquid Liabilities		-0.02908	
(as % of GDP)		-0.75374	
External Debt			0.02918
(as % of GNP)			0.95963
No. Countries	39	40	36
No. Obs.	119	119	92
SPECIFICATION TESTS (P-Values)			
(a) Sargan Test	0.779	0.836	0.525
(b) Serial Correlation :			
First-Order	0.170	0.163	0.876
Second-Order	0.240	0.331	0.741
Third-Order	0.649	0.816	

Appendix
Sources for Ancillary Variables

External Debt. To characterize the external debt position of a country we draw the ratios of total external debt to gross national product (EDT/GNP) and total debt service to exports of goods and services (TDS/XGS) from the World Bank's World Development Report. Relying on these coefficients, we define a country as heavily-indebted if either its ratio of total external debt to GNP exceeds 0.50 or its ratio of total debt service to exports of goods and services exceeds 0.25 in at least two years within a window of 5 years. Finally, for our nested model, we construct a dummy variable that takes the value of 1 for any country and period satisfying the previous rule of thumb.

Demographics. To assess the generational accounting effects on current account, we use the age dependency ratio (number of total dependents over total population), and its components, say, the young and old dependency ratios. The data were taken from the World Bank's World Development Indicators.

Financial Deepening and Uncertainty. From Levine, Loayza and Beck (1998) we used the ratio of liquid liabilities as a percentage of GDP, while we construct the standard deviation of monthly inflation rates as a measure of uncertainty from the IMF's International Financial Statistics.

Endnotes

[1] One of them is Debelle and Faruqee, 1996.

[2] We present the response of the current account to changes in some of its determinants in Table 1.

[3] Milesi-Ferreti and Razin (1996) define a current account position as unsustainable if the continuation of the current policy stance and/or the private sector behavior entails the need of a drastic policy shift or leads to a crisis.

[4] Based on the analysis of solvency and willingness to lend considerations, Milesi-Ferreti and Razin propose several operational indicators of current account sustainability, classified in the following groups: (i) structural features (investment/savings, economic growth, openness, composition of external liabilities, and financial structure); (ii) macroeconomic policy stance (exchange rate policy, fiscal policy, trade policy and capital account regime); (iii) political economy factors (i.e. political instability); and, (iv) market expectations.

[5] Appendix 1 provides information on the additional variables used and on the data sources.

[6] Their dummy variables take the value of one when a restriction is in place for a given country and year (and zero otherwise).

[7] We use the black market premium as log(1+BMP).

[8] The terms "permanent" and "transitory" are used in this paper interchangeably with the terms "long run" and "short run," respectively. The term "permanent" is not used literally; rather, it is used to denote effects or relationships related to the behavior of the trend (tendency) of the variables of interest.

[9] Stationarity is a natural assumption considering that all these variables are either rates or ratios, in most cases bounded between 0 and 1.

[10] Alonso-Borrego and Arellano (1996) and Blundell and Bond (1997) show that when the lagged dependent and the explanatory variables are persistent over time, lagged levels of these variables are weak instruments for the regression equation in differences. This weakness has repercussions on both the asymptotic and small-sample performance of the *differences* estimator. As persistence increases, the asymptotic variance of the coefficients obtained with the *differences* estimator rises (i.e., deteriorating its asymptotic precision). Furthermore, Monte Carlo experiments show that the weakness of the instruments produces biased coefficients in small samples. This is exacerbated with the variables' over time persistence, the importance of the specific-effect, and the smallness of the time-series dimension. An additional problem with the simple *differences* estimator relates to measurement error: Differencing may exacerbate the bias due to errors in variables by decreasing the signal-to-noise ratio (Griliches and Hausman, 1986). Blundell and Bond (1997) suggest that the use of Arellano and Bover's (1995) *system* estimator that reduces the potential biases and imprecision associated with the usual *differences* estimator.

[11] Given that lagged levels are used as instruments in the differences specification, only the most recent difference is used as instrument in the levels-specification. Other lagged differences would result in redundant moment conditions. (Arellano and Bover 1995)

[12] The weighting matrix for GMM estimation can be any symmetric, positive-definite matrix, and we obtain the most efficient GMM estimator if we use the weighting matrix corresponding to the variance-covariance of the moment conditions. Since this variance-covariance is unknown, Arellano and Bond (1991) and Arellano and Bover (1995) suggest the following two-step procedure. First, assume that the residuals, $e_{i,t}$, are independent and homoskedastic both across countries and over time. This assumption corresponds to a specific weighting matrix that is used to produce first-step coefficient estimates. We construct a consistent estimate of the variance-covariance matrix of the moment conditions with the residuals obtained in the first step, and we use this matrix to re-estimate our parameters of interest (i.e. second-step estimates). Asymptotically, the second-step estimates are superior to the first-step ones in so far as efficiency is concerned. In this paper the moment conditions are applied such that each of them corresponds to all available periods, as opposed to each moment condition corresponding to a particular time period. In the former case the number of moment conditions is independent of the number of time periods, whereas in the latter case, it increases more than proportionally with the number of time periods. Most of the literature dealing with GMM estimators applied to dynamic models of panel data treats the moment conditions as applying to a particular time period. This approach is advocated on the grounds that it allows for a more flexible variance-covariance structure of the moment conditions (see Ahn and Schmidt 1995). Such flexibility is achieved without placing a serious limitation on the degrees of freedom required for estimation of the variance-covariance matrix because the panels commonly used in the literature have both a large

number of cross-sectional units and a small number of time-series periods (typically not more than five). We have, however, chosen to work with the more restricted application of the moment conditions (each of them corresponding to all available time periods) because of a special characteristic of our panel, namely, its large time-series dimension (for some countries in our sample, we work with as many as 20 time-series observations). This approach allows us to work with a manageable number of moment conditions, so that the second-step estimates, which rely on estimation of the variance-covariance matrix of the moment conditions, do not suffer from over-fitting biases (see Altonji and Segal 1994, and Ziliak 1997).

[13] Given that our model is dynamic, the data transformation involved in the within estimator also introduces a correlation between the transformed error term and the lagged dependent variable, which may lead to significant biases when the time-dimension of the data is not large.

[14] As explained in the section on methodology, the fact that the differenced error term is first-order but not higher-order serially correlated implies that the error term in levels does not follow a random walk and is not serially correlated.

[15] For further empirical evidence on CAD stationarity, see Sheffrin and Woo, 1992; Ghosh and Ostry, 1995; and Debelle and Faruqee, 1996.

[16] Theoretically, this non-monotonically relationship (consistent with the J-curve pattern) could be derived from models with voracity effects (Tornell and Lane, 1998) or models of consumption with habits developed over the flow of services of durable goods (Mansoorian, 1998).

[17] According to the Harberger-Laursen-Metzler effect, adverse transitory terms of trade shocks produce a decline in current income that is greater than that in permanent income. Hence, a decline in savings follows and, thus, a deterioration in the CA position ensues.

[18] To be exact, the long-run multiplier is 1.88; that is 1/(1-0.4684).

[19] The size of the export sector leads to a greater willingness to honor debt commitments since the possibility of trade disruptions raises the cost of debt default for the more open economies. Likewise, a weak export sector hinders the ability of the country to sustain external imbalances.

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