External Debts and Current Account Adjustments*

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September 22, 2009

Abstract

We empirically investigate the effect of net external debts on the size of medium-term current account balances. We utilize an approach where net external debt positions behave like a “shadow interest rate” in affecting the current account imbalances. In a simple accounting framework, we find supportive evidence of the adjustment role of the net external debt positions on the current account balances. Our findings show that net external debt holdings affect current account imbalances through their effect on domestic investment and private consumption. Government expenditures, on the other hand, isn’t affected by net external debt holdings. We also find that developing (OECD) countries in the sample would have run higher current account deficits (surpluses) in the absence of the negative impact of net external debt positions on investment and consumption. Net external debt positions, therefore, reduce the dispersions of current account imbalances, thus, increase the correlation of investment and saving ratios.

Keywords: External Debt Holdings; Feldstein-Horioka Puzzle; Current Account Adjustments.

JEL Codes: E21, F32, F41.

*I am especially grateful to Bent E. Sørensen for his very useful comments. Thanks also to Neven Valev, David Papell, Sebnem Kalemli-Ozcan, and Dietrich Vollrath, as well as seminar participants at the Federal Reserve Bank of Atlanta Brown Bag Seminars, the 76th Southern Economic Conference and University of Houston Workshop Series, for their comments.

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1 INTRODUCTION

Domestic saving and investment are highly correlated both across time and within OECD countries: in years, when and countries where, saving is high, so is investment. Feldstein & Horioka (1980) (henceforth FH) interpret this correlation as evidence of low international capital mobility which is known as the “Feldstein-Horioka puzzle” (FH puzzle). This is an anomaly because under the assumption that capital is perfectly mobile between countries, domestic investments do not depend strongly on domestic savings. Rather than saving being contained within the country of origin, individual countries’ savings should be added to funds in the world capital market and distributed amongst countries according to the most favorable returns. The FH puzzle has been one of the most robust and intractable puzzles in international finance as the anomaly hasn’t normalized with increased integration of world financial markets. The FH puzzle has been the subject of various attempts to reconcile the stylized facts of highly correlated investment-saving ratios with the increasing degree of capital mobility.\(^{1}\) There remains however an ignored and unexplored side of the FH puzzle which has a direct bearing on the degree of capital mobility. Given the fact that a country’s current account is the difference between national saving and domestic investment, as long as investment and saving ratios exhibit a strong correlation both across time and countries, the current account-to-GDP ratio will be fairly small in size relative to investment and saving ratios. Thus, we can conclude that observed dynamics of the current account balances are not compatible with the increasing degree of capital mobility as countries couldn’t take advantage of the globalized markets to finance their capital needs with foreign savings.

Blanchard & Giavazzi (2002) theoretically document the channels through which financial integration affects current account balances. The cost of borrowing is expected to decrease with increasing financial integration: poor but developing countries with a lower level of capital, higher marginal productivity and high growth prospects are expected to run current account deficits by increasing their external borrowing to finance domestic investment. Accordingly, advanced economies with a higher level of capital, lower marginal productivity, and a relatively stable level of investment are expected to run current account surpluses. The dispersion of the current account positions, therefore, is expected to increase with the increasing integration of financial markets. Data show that for the last 30 years, the world average current account balance in absolute value is less than 3 percent of world GDP and this ratio is similar for both developing and industrial countries. In theory, we expect that

\(^{1}\) Sinn (1992) investigates the time-dependent relation between investment and saving, Obstfeld (1986) considers the country specific saving-investment relation, and Cardia (1991) shows that persistent shocks may generate saving and investment correlation even under the perfect capital mobility assumption. Summers (N.d.) tries to explain the anomaly by means of a current account targeting motive, while on the other hand, Harberger (1980) and Murphy (1984) argue that FH’s results reflect a large country bias rather than low capital mobility. Coakley, Kulasi & Smith (1996) interpret the long-run strong correlation as a result of the external solvency constraint requiring the current account to be stationary in order for the external debts to be bounded. Levy (2004) claims that as long as the intertemporal budget constraint holds, long run correlation of investment and saving occurs regardless of the degree of capital mobility. Obstfeld & Rogoff (2001) explain the puzzle with transport costs in goods trade.
countries can achieve some welfare improvements by borrowing from or lending to the rest of the world. Yet it is a puzzle as to why countries, especially industrial countries, are not taking advantage of this and are running small-size current account balances on average even though the world financial markets have become more integrated over the last two decades.

We suggest in this paper that net external debt holdings have a role in this stylized fact of small-size current account balances.\(^2\) Specifically, we utilize an approach where net external debt holdings behave like a “shadow interest rate” in affecting the behavior of the current account balances in the medium run. Shadow interest rate occurs when there is a discrepancy between the ongoing market interest rate in the economy and the interest rate relevant for decision making. We suggest that running high current account deficits increases the cost of external borrowing for the domestic residents, thus debtor countries face a positive shadow interest rate on loans. On the other hand, running high current account surpluses decreases the benefit from lending abroad, thus creditor countries face a negative shadow interest rate on loans. As a result, the relevant real interest rate for decision making in the debtor countries is higher than the world real interest rate, while the real return to those lending abroad in creditor countries is below the world real interest rate. According to this construction, it will be harder for the debtor countries to run current account deficits and therefore there are current account adjustments in the medium-run. In other words, as countries keep borrowing from abroad, the accumulated external debt holdings start forcing the debtor countries to adjust or improve their current account imbalances. By the same logic, the creditor countries will be reluctant to run current account surpluses and in the medium run, they are also expected to adjust their current account imbalances. This method of current account adjustment mechanism working through the net external debt holdings is the contribution of our paper to the literature on the FH puzzle.

In this paper, we introduce a simple model in which there are convex external debt holding costs through which external debts dampen the widening of the current account. This is a better structure by which to comprehend the role of the “shadow interest rate” on the dynamic of the current account imbalances. By assuming that there are some hidden costs in holding external debts, our model allows us to capture the “shadow interest rate” on loans as an unobserved part of the interest rate that a domestic borrower has to pay. The way external debts create a “shadow interest rate” on loans can be driven by some internal and external factors: internal factors are related to the capital market structure of the debtor country. In the domestic economy, the existence of capital market imperfections and underdeveloped financial systems can cause intermediation of external credit costly to the domestic residents due to the weak banking system in most of the developing and emerging economies. Also,

\(^2\)We will use ‘net external debt holdings’, ‘net external debt positions’ and External Debt interchangeable throughout the paper to refer to net external debt liabilities and a positive (negative) number indicates a debtor (creditor) country.
high external debt ratio can force governments to reduce external borrowing to keep country creditworthiness at a reasonable level. External factors, on the other hand, summarize the behavior of the creditors in financing the debtor country. For instance, creditor countries will be reluctant to extend new loans or roll-over existing loans because of the increasing burden of external borrowing on the debtor country’s economy through the exchange rate channel. In the exchange rate channel, increase in external debts increases the need for foreign currency in order to service the debts. Herrero, Berganza & Chang (2004) find a positive relationship between a country’s risk premium and increases in the external debt service of the country. In addition, monitoring and repudiation costs may cause creditors to be reluctant to keep financing deficit countries. When the creditor allows for the funds to go to the debtor country, then the performance of the borrower is to be monitored in terms of default risk. This creates a cost that is relatively higher than the monitoring of any domestic borrower. Repudiation costs occur when the debtor country either fails to repay its debt obligations or prefers not to repay when external debt level reaches a threshold level. Therefore, creditors show their unwillingness to finance highly debtor countries by asking extra premiums. There may be some other observed or unobserved internal and external factors which may lead to the external debt holding costs - we assume to capture them all by using convex debt holding costs.

We organize the remainder of this paper as follows: In section (2), we provide a theoretical background for external debt holdings as a “shadow interest rate” for the borrower country. In section (3), we test the empirical validity of the external debt holding costs phenomena within a simple accounting framework: in the first stage, we separately estimate the effect of net external debt holdings on medium-run private consumption, government expenditure and domestic investment ratios. In the second stage, we obtain the overall effect on the current account balances. We conclude in Section (4).

2 THEORETICAL MODEL

We assume a small open economy populated by a large number of infinitely-lived households and describe its preferences by the following utility function

\[
Max U_t = \sum_{s=t}^{\infty} \beta^{s-t} U(c_t),
\]

where \(c_t\) denotes consumption in period \(t\) and \(\beta\) denotes the subjective discount factor. The representative agent gets income from production and holdings of foreign bond, and she invests her wealth net of consumption into domestic capital and/or foreign bond \((b_t)\).\(^3\)

\(^3\)Positive (negative) values of \(b_t\) indicate a debtor (creditor) economy. The absence of state contingent assets makes the model have incomplete markets, such that the insurance against country specific shocks is incomplete.
When she holds her wealth in foreign bonds, there will be convex external debt holding costs. For a debtor country, income from production \( y_t \) constitutes the only source of total current income. Expenditures on consumption goods \( c_t \), investment in gross domestic capital \( i_t \), interest payments on outstanding external debt holdings \( rb_{t-1} \), and payments due to convex external debt holding costs \( \psi_2(b_t^2) \) will be financed with total current income, and any excess expenditures over current period income will be financed from abroad by increasing the existing stock of external debt liabilities. The following is the inter-period budget constraint of a representative agent who borrows internationally:\(^4\)

\[
b_t - b_{t-1} = c_t + i_t + \left( \frac{\psi_2}{2} \right)(b_t^2) + rb_{t-1} - y_t. \tag{2}
\]

The following is for current consumption:

\[
c_t = b_t + y_t - i_t - (1 + r)b_{t-1} - \left( \frac{\psi_2}{2} \right)(b_t^2). \tag{3}
\]

A convex debt holding costs assumption is one of several ways to modify an incomplete small open economy model in order to have stationary equilibrium-policy function at the steady state.\(^5\) The convex debt holding costs assumption was offered first by Turnovsky (1985).\(^6\) It was later applied in Heathcote & Perri (2002), Schmitt-Grohe & Uribe (2003), and Neumeyer & Perri (2005). In fact, what is being introduced by the recent literature is not directly external debt holding costs but portfolio adjustment costs. It is assumed that there is a long run steady-state level of net external debt holdings, and when a country deviates from this steady state level, a cost is incurred in adjusting the existing portfolio composition. Thus, an \textit{a priori} assumption of non-zero long run level of net external debt holdings changes the structure of the cost in the following way: any amount of external debt holdings away from the long-run steady state level is punished in proportion to the increased size of the deviation from the equilibrium (long-run) level. If a country is very close to the long-run level, the costs associated with external debt holdings (e.g. monitoring costs, repudiation costs, transaction costs, etc.) are muted. But, the problem is to identify the long run steady state level of external debt holdings. To overcome this, we assume zero level of net external debt positions at the steady state, and we argue that no matter what the level of net external

\(^4\)For ease of interpretation, it is taken that \( b_t > 0 \) to allow inter-period budget constraint for debtor and creditor countries to have opposite signs. For the creditor country it will be: \( b_t - b_{t-1} = y_t + rb_{t-1} - c_t - i_t - \left( \frac{\psi_2}{2} \right)(b_t^2) \). By doing so, it will be easier to see the difference in the shadow interest rate for debtor and creditor countries.

\(^5\)In incomplete small open economy models, since there is no complete risk sharing, macroeconomic variability affects the mean net foreign asset position which results in a non-stationary equilibrium relation. This is because it depends on the initial level of net foreign asset positions. In order to overcome this technical difficulty, convex debt holding costs assumption is added to the model where there is a cost to adjust the existing portfolio composition of external debt holdings from its long run steady state level. See Schmitt-Grohe & Uribe (2003) for a recent survey.

\(^6\)Turnovsky (1985) rationalize the convex debt holding costs by addressing the fact that there is imperfect substitutability between domestic and foreign bonds within a certainty equivalent structure, and there is a cost differential in the acquisition of foreign bonds and domestic bonds. Information and transaction cost along with brokerage fees for obtaining foreign exchange to purchase foreign bonds are some possible sources of that cost differential.
debt holdings is, a cost is associated with holdings of external debt.

There is an aggregate production function that is homogenous to degree one with given labor and productivity parameters. Production function, $y = AF(k_t)$, represents constant returns to scale technology with the standard capital accumulation formula of $k_{t+1} = k_t + i_t$. We also assumed that goods are reversible such that one unit of consumption can be transformed into one unit of capital at no cost. After inserting the production function and capital accumulation function to the budget constraint and solving it for consumption, the maximization problem becomes:

$$\text{Max } U_t = \sum_{s=t}^{\infty} \beta^{s-t} U[b_t + AF(k_t) - (k_{t+1} - k_t) - (1 + r)b_{t-1} - \frac{\psi}{2}(h_t^2)].$$

Under the assumption that there is no uncertainty in the economy, the representative agent has two decision variables; the holdings of domestic physical capital ($k_t$) and next period holdings of external debt ($b_t$). The first order conditions with respect to those variables are:

$$[1 - \psi b_{t-1}]U'(c_{t-1}) = \beta(1 + r)U'(c_t),$$

$$U'(c_{t-1}) = \beta[AF'(k_t) + 1]U'(c_t).$$

The introduction of debt holding costs changes the traditional Euler equation for consumption by imposing a shadow interest rate in the domestic country. When we include the debt holding costs, consumption becomes sensitive to net external debt positions. As long as a country stays in debtor position, marginal utility of current consumption will be higher than the marginal utility of future consumption. This induces a reduction in consumption growth, because current consumption becomes more expensive in terms of foregone future consumption and it induces substitution effect toward future consumption with elasticity $\psi$. On the other hand, if the country is in a creditor position, then the marginal utility of present consumption becomes smaller than the marginal utility of future consumption which leads to consumption growth in the future.

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7 It is assumed that there is no depreciation.
8 Calculations are for a net debtor country, therefore, in the construction of the inter-period budget constraint, we take $b_t > 0$. So, the first order condition for the creditor country will be $[1 + \psi b_{t-1}]U'(c_{t-1}) = \beta(1 + r)U'(c_t)$ which implies different consumption patterns for creditor and debtor countries.
9 Uribe & Yue (2006) constructed a simple banking model in a small open economy with imperfectly established capital markets. By including a convex intermediation cost to the model, they find that when the intermediating atomistic banks maximize their profits, the country will observe an interest rate differential between the domestic country and the rest of the world, and the amount of external borrowing and the convexity of the cost structure will determine the degree of the interest rate differential.
## 2.1 Euler Equation for Consumption

We assume a logarithmic utility function such that \( U(c_t) = \ln(c_t) \). Then, from the Euler equation for consumption in (5), \( \frac{(1-\psi b_{t-1})}{c_{t-1}} = \beta \frac{(1+r)}{c_t} \), hence, \( \frac{c_t}{c_{t-1}} = \beta \frac{(1+r)}{(1-\psi b_{t-1})} \). After taking the natural logarithm of both sides and assuming that \( \beta(1 + r) = 1 \), we get:\(^{10}\)

\[
\ln(c_t) - \ln(c_{t-1}) \equiv \Delta c_t = \ln[\beta(1 + r)] - \ln[1 - \psi b_{t-1}],
\]

and by the linear approximation that \( \ln(x) = x - 1 \) for any \( x > 0 \) but close to 1, then the Euler equation for a debtor country becomes:\(^{11}\)

\[
\Delta c_t = -\ln[1 - \psi b_{t-1}] = \psi b_{t-1}.
\]

In contrast to the standard approach, consumption growth rate is sensitive to the net external debt holdings when the economy is off the equilibrium. Even though, in this paper we assume a constant discount factor and ignore the consumption tilting motive for current account behavior, the introduction of external debt holding costs creates an additional source of consumption tilting channel other than that of impatience. Based on the first order conditions, creditor countries tend to tilt their consumption upward while debtor countries tend to tilt downward. Ghironi, Iscan & Rebucci (2008) find the same kind of behavior with different sets of assumptions in a two country-OLG setting with a time-variant discount factor. They look for the effect of the long run level of non-zero net foreign asset (NFA) on consumption dynamics, and find that more patient countries with positive long run NFA positions tilt their consumption upward after a worldwide productivity shock, whereas less patient countries display downward consumption tilting. Even though our approach has the same implication as their paper, the basic differences in our paper are that, in this study we assume a time-invariant discount factor and zero steady-state level of net external debt position.

## 2.2 Euler Equation for Investment

What is the implication of the convex holding costs of external debt on the domestic economy’s investment demand? As shown in relation to consumption, in the existence of external debt holding costs, domestic residents of a net debtor country face a shadow interest rate which is higher than the ongoing domestic market rate, and this has some consequences for the aggregate investment demand in the economy. Based on the model we introduced above, the

\(^{10}\)Assuming \( \beta(1 + r) = 1 \) is the standard assumption to prevent any perpetual growth in the economy.

\(^{11}\)Similarly, the Euler equation for consumption in a creditor country will be: \( \Delta c_t = -\ln[1 + \psi b_{t-1}] = -\psi b_{t-1} \).
The first order condition for domestic physical capital of a debtor country is

\[ AF'(k_t) + 1 = \frac{(1 + r)}{(1 - \psi b_{t-1})}. \]  

(9)

The introduction of external debt holding costs to the model introduces a non-standard investment decision. In a standard small open economy with frictionless trade in goods and financial assets, domestic investors’ actual gross return, if they decide to invest in the domestic physical capital is \((1 + r)\) where \(r\) stands for the exogenous world real interest rate. When there is friction in the financial markets in the form of external debt holding costs, the optimality condition becomes equation (9). After defining the marginal product of domestic physical capital as \(AF'(k_t) = r^d\) where \(r^d\) refers to real domestic interest rate, domestic residents face the following gross return on domestic physical capital:

\[ (1 + r^d) = \frac{(1+r)}{(1 - \psi b_{t-1})}. \]

We call this as “shadow rate of return” where the actual return is not independent of their net external debt holdings. Depending on the current position of net holdings of external debt, countries hold domestic physical capital different from that which would be held if there was no external debt holding costs in the economy. In the absence of external debt holding costs, \(\psi = 0\), then \((1 + r^d) = (1 + r)\), the economy decides investment behavior and holdings of domestic physical capital based on the exogenous world interest rate. When economy is off-the steady state, the creditor and debtor countries exhibit different preferences on domestic physical capital at the margin: creditor countries face a shadow domestic interest rate that is lower than the world interest rate such that \(\frac{1}{(1 - \psi b_{t-1})} < 1\) for creditor countries with \(b_{t-1} < 0\). From the optimality condition \((1 + r^d) = \frac{(1+r)}{(1 - \psi b_{t-1})}\), we get \((1+r) > (1+r^d)\) when \(b_{t-1} < 0\). This straightforward result comes from the following partial derivation:

\[ \frac{\partial[AF'(k_t)]}{\partial b_{t-1}} = -\frac{\psi(1 + r)}{(1 - \psi b_{t-1})^2} < 0. \]

(10)

If a creditor country increases its holdings of external debt and gives loans to the rest of the world \((b_{t-1} \text{ goes down})\), domestic real interest rate increases which will crowd out domestic investment. Debtor countries, on the other hand, exhibit foreign bias at the margin as they have a “shadow interest rate” in the domestic market which is higher than the world interest rate; from equation (9), given that \(\frac{1}{(1 - \psi b_{t-1})} > 1\), we get \((1+r) < (1+r^d)\). These findings are crucial because when there are no external debt holding costs, \(\psi = 0\), net external debts have nothing to do with the optimum investment decision; only factors that will shape the investment decision will be the world real interest rate along with productivity shocks. Then, external borrowing only functions to smooth consumption. When external debt holding costs are introduced to the model, then, external debt holdings matter. The creditor countries temper their lending to the rest of the world. As they lend more, the domestic economy will observe higher interest rate. For the debtor countries, as they increase their borrowing from
abroad, that increases the cost of capital at home which decreases the investment incentives in the economy. The implications of the model are tested in the empirical part to see the role of external debt holdings on consumption and investment behaviors.

3 EMPIRICAL FINDINGS

Empirical methodology is based on investment-saving approach to the current account which defines the current account balance as the difference between national saving and domestic investment, therefore, it allows determinants of saving and investment to explain the current account adjustments.

In this paper, we look at the role of net external debt holdings on the current account adjustments by estimating its effect on national savings (thus private consumption and government expenditures) and gross domestic investment. For this purpose, we run separate regressions for domestic investment, private consumption, and government expenditures to see the indirect role of net external debts on the variation of these variables. Then, the indirect effect of net external debt positions on the current account balances is estimated through the following national income identity:

\[
GNP = \text{Private Consumption} + \text{Domestic Investment} \\
+ \text{Government Expenditures} + \text{Current Account Balances}
\]  

In that respect, this paper is in line with the current literature on the medium-run determination of current account balance to GDP ratio. Beginning with the seminal work of Chinn & Prasad (2003), Gruber & Kamin (2007), and Chinn & Ito (2007) and etc. try to uncover the medium term determinants of current account to GDP ratio.

This paper does not aim to extrapolate all possible factors which explain the current account adjustment, and attention is focused on the effect of net external debt holdings in the adjustment process of the current account. In the remainder of the paper, after summarizing the observed size of current account balances in the sample countries, we look for the role of external debt holdings on gross investment, private consumption, and government expenditures. Finally, we analyze the overall effect of net external debt holdings on the current account adjustment within the context of the investment-saving approach to the current account.

3.1 Data

The sample for our analysis covers both industrial and developing countries. There are 62 countries in the sample of which 17 of them are OECD countries while the remaining 45 are
developing countries. Sample selection is solely determined by the data availability and the dataset covers the period 1972-2006. We provide the list of the sample countries as well as data descriptions at the end of the paper. Since our primary interest is the variation in the medium run current account balances, we consider multi-year averages of annual observations as in Chinn & Prasad (2003). We constructed averages over 1972-1976, 1977-1981, 1982-1986, 1987-1991, 1992-1996, 1997-2001, and 2002-2006.\footnote{In cases of missing annual observations, we calculate averages based on the remaining years in a period.}

Figure 1 summarizes the evolution of mean values of cross country dispersion of current account to GDP ratios, absolute values of the GDP weighted current account to GDP ratios, and external debt to GDP ratios through 5 year time intervals for the 89 countries in the sample. Values are standardized to make a comparison. The data exhibits a noteworthy increase in cross country capital flows in 1970s and a sharp decline in the following decade. The broken trend in capital flows has started to show a gradual improvement in 1990s and 2000s. The evolution of external debt positions on the other hand was in the same direction as with capital flows up until the first half of 1980s, and started to move in the opposite direction thereafter.

### 3.2 External Debt Positions and Investment

We estimate the following regression equation to uncover the relationship between gross investment ratios and net external debt positions:\footnote{Data descriptions are provided at the end of the paper.}

\[
\text{Investment} = \beta_0 + \beta_1 \text{External Debt} + \beta_2 \text{Real Interest Rate} + \beta_3 \text{Inflation Uncertainty} \\
+ \beta_4 \text{Domestic Credit} + \beta_5 \text{Legal} + \beta_6 \text{School Enrollment} + \beta_7 \text{Openness} \\
+ \beta_8 \text{Initial GDP per capita} + \beta_9 \text{Relative Income} + \beta_{10} \text{Period} + \varepsilon
\] (12)

In the derivation of investment equation, the theoretical model is only used to put \textit{External Debt} into the regression model. We borrow both from theoretical and empirical literatures in selecting the other control variables. As shown in the Euler equation for investment in equation (9), we propose that non-zero external debt positions alters optimal investment decisions and therefore, we expect to see a negative relationship between net external debt positions and gross domestic investment ratios. Table (1) shows that there is a significantly negative relationship between domestic investment and net external debt positions confirming depressing role of external debt positions on domestic investment. For the full sample, a one percentage point increase in net external debt to GDP ratio reduce domestic investment ratio
by 0.016 percentage point.\textsuperscript{14} While we failed to show a statistically significant relation for the OECD countries, the affect is stronger and statistically significant for the developing countries.

Especially for developing countries, real interest rate functions as a cost of capital, therefore, we expect to see a negative relationship between real interest rates and domestic investments. As shown in Table (1), for both full sample and sub-samples, our findings confirm this relation. In the full sample, a one percentage point increase in real interest rate reduces domestic investment by 0.088 percentage points.

In regards to relation between domestic investment and \textit{Domestic Credit}, we expect financial development (higher domestic credit) to facilitate the channeling of loanable funds from savers to highest-return investment activities, and to soften the liquidity constrained faced by investors. Therefore, a large and liquid financial system with higher domestic credit reduces the overall costs and risks of investment, thereby improves domestic investment. Table (1) shows that relation to hold only in the OECD countries sub-sample: a one percentage point increase in domestic credit provided to private sector improves the domestic investment ratio by 0.052 percentage points. On the other hand, for the developing countries sub-sample, we have insufficient evidence of a positive effect of domestic credit on investment as conventional theory would suggest.

\textit{School Enrollment} is used as a proxy for human capital. Levine & Renelt (1992) has gathered robust evidence that school enrollment rates play a considerable role in determining economic growth. Countries with higher human capital will experience rapid rate introduction of new technology, goods, and ideas. As we expected, Table (1) shows a positive relationship between gross domestic investment and school enrollment ratios. Estimation results show that countries that face a one percentage point increase in their school enrollment ratios, keeping all other factors constant, observe higher domestic investment ratios by 0.035 percentage point for the full sample and 0.044 percentage point for the developing countries sub-sample. Though the coefficient estimate for the OECD countries sub-sample is not statistically significant, it has the correct sign.

The relationship between domestic investment and \textit{Openness} is very much correlated with the consumption and capital goods composition of exports and imports. We use trade volume to GDP ratio as a measurement of openness. A country with higher volume of exports will have sufficient foreign exchange to pay for its imports. For a country, if imports predominantly consist of investment goods and if the access to investment goods in the international markets increases with import, then we expect a positive correlation between gross domestic investment and openness ratio. If, on the other hand, imports are predominantly consisted of consumer goods, then, trade will negatively affect domestic investment. As shown in Table

\textsuperscript{14}The economic size of the impact of external debts on domestic investment seems too small but considering the fact that countries borrowed a lot from the international markets during the sample period, the implied size of the impact is non-negligible.
(1), for the developing countries sub-sample, we find robust positive relationship between domestic investment and trade openness thus confirming the Levine & Renelt (1992) findings, while robust negative association occurs for the OECD countries sub-sample.

*Inflation Uncertainty* and *Legal* are used to control for economic and political stability. We expect to see a negative association between *Inflation Uncertainty* and domestic investment because higher inflation uncertainty means larger realizations of unexpected inflation, so any costs associated with unexpected inflation are naturally associated with an increase in inflation uncertainty, thus with domestic investment. There is also less incentive to invest in countries with higher political instability, thus with lower *Legal* values. As pointed out in the investment literature, poorly enforced property rights and contracts create an inefficient legal system, therefore we expect to see a positive relationship between *Legal* and domestic investment.\(^\text{15}\) As shown in Table (1), for both full sample and developing countries sub-sample, we get supporting evidence to show a statistically significant negative relationship between *Inflation Uncertainty* and domestic investment, and a positive relationship between better legal structure and domestic investment. Though statistically insignificant, coefficient estimates for both variables have the wrong sign for the OECD countries sub-sample. One can argue that higher inflation uncertainty raises the expected profitability of capital in OECD countries, thereby increasing the desired capital stock, hence investment.

*Initial GDP per capita* variable is included to the regression equation to control for the Neo-classical hypothesis that, due to the diminishing returns to physical capital, capital poor countries tend to grow faster than the capital rich countries. Countries with higher *Initial GDP per capita* have abundant physical capital at the beginning of the sample period, therefore will accumulate capital at a relatively slow rate than countries with lower *Initial GDP per capita* levels. Therefore, a negative association between domestic investment and *Initial GDP per capita* occurs. Estimation results in Table (1) confirm this hypothesis: for the full sample, countries which have started the sample period with one percentage point higher GDP per capita level will experience lower domestic investment by 0.940 percentage points for the subsequent periods. In the sub-samples, we only find robust results for the OECD countries, while for the developing countries sub-sample, we have the statistically insignificant correct sign.

Finally, we add *Relative Income* variable to the regression equation to control for the “stages of development” hypothesis which suggests that countries, as they move from a low to an intermediate stage of development, typically import capital, thus invest more. As they reach an advanced stage of development, countries export capital to less advanced economies, therefore invest less. The results in Table (1) confirms the “stages of development” hypothesis: in the full sample, the coefficient estimate of *Relative Income* is not statistically significant

\(^{15}\)Since political instability is not observable, we use *Legal* as a proxy for that. Svensson (1998) provides theoretical and empirical support on the relationship between investment and legal system.
as the sample is composed of both developed and developing countries. When we split to sample into two, we find supporting evidence that in the developed nations, the OECD countries sub-sample, *Relative Income* is negatively associated with domestic investment, while in the less developed nations, the developing countries sub-sample, *Relative Income* is positively correlated with domestic investment.

For all of the regressions, we include a period fixed effect, thereby allowing the average domestic investment ratios across countries to vary from period to period. We do not include country fixed effects, because allowing country-specific means would prevent us from analyzing cross-country differences in domestic investment. Coefficient estimates of period dummies are not shown in Table (1) due to the space constraint.

The cost of holding external debts channels through the implicit interest rate in the domestic economy and has implications for national savings as well. The implicitly higher domestic interest rate increases savings which necessitates a decrease in total consumption. As no country can continue to be financed by the rest of the world, whether private or public sectors should start paying off the accumulated external debts so as to achieve solvency constraint. In the following two sections, we investigate whether the private or public sector is most affected by net external debt holdings.

### 3.3 External Debt Positions and Private Consumption

Aggregate private consumption is the biggest component of GDP with an average ratio of more than 65 percent in the sample countries. Yet, to date there exists no fully satisfactory explanation for the behavior of the aggregate consumption which is valid at different time periods or sample selection. Since there are various unobservable factors such as cultural, physiological, institutional and economical factors, a period fixed effect panel regression is used in the following panel regression equation:

\[
Consumption = \gamma_0 + \gamma_1 \text{External Debt} + \gamma_2 \text{Real Interest Rate} + \gamma_3 \text{Inflation Uncertainty} + \gamma_4 \text{Domestic Credit} + \gamma_5 \text{Average Growth} + \gamma_6 \text{Openness} + \gamma_7 \text{Dependency} + \gamma_8 \text{Density} + \gamma_9 \text{Relative Income} + \gamma_{10} \text{Relative Income Square} + \gamma_{11} \text{Initial GDP per capita} + \gamma_{12} \text{Period} + \nu
\]

(13)

In the above regression equation, the dependent variable, the ratio of aggregate private consumption to GDP, is in fact measuring the long-run average propensity to consume for the sample countries. As shown in equation (5), the Euler equation for consumption suggests

---

16From the national income accounting, national saving is the residual income after spending for private and government expenditures, \(Y - C - G = S\).
that level of non-zero net external debt positions will alter the optimal consumption decision. Therefore we add External Debt to the regression equation. Table (2) shows a robust negative relationship between net external debt holdings and aggregate private consumption both for the full sample and each sub-sample. After an increase in net external debt positions by one percentage point, the private consumption decreases by 0.032 percentage point for the full sample and the effect is significant at conventional levels. When we split the sample, we see that the impact is stronger for developing countries sub sample.

The effect of Real Interest Rate on consumption behavior has been subject to controversy. A rise in the real interest rate has a theoretically ambiguous effect on consumption because of offsetting positive income and negative substitution effects. Without going into detail in this much debated issues, we just want to report the significantly positive relationship we find between real interest rate and consumption which is shown in Table (2).

We add Inflation Uncertainty to the regression model in equation (13) to test the hypothesis that, in times of inflation, real income is seriously mis-measured therefore unexpected inflation can lead to decreases in consumer spending. Unfortunately, our estimation results failed to support this hypothesis, instead, we find robust evidence that in times of higher unexpected inflation, measured by higher Inflation Uncertainty, countries tend to consume more.

As it is shown in Loayza, Schmidt-Hebbel & Servén (2000), Domestic Credit which is an indicator of financial depth is an important determinant of private saving. They find a negative and significant relationship between domestic credit and private saving rates. Therefore, we included Domestic Credit to the regression equation for consumption to capture this relation. Since, financial development allows households and small firms to use collateral more widely to reduce down payments on loans for housing and other consumption goods, we expect lower private saving and higher private consumption after an increase in Domestic Credit. Table (2) shows supporting evidence for this notion only for the OECD countries sub-sample, while in other regressions we failed to support this argument in a statistical sense.

Average Growth and Initial GDP per capita variables are included to the regression equation (13) to capture the differences in consumption levels due to the differences in productivity of physical capital. The countries with lower Initial GDP per capita levels or the ones that experience higher Average Growth throughout the sample period will substitute their current consumption with future consumption as physical capital will be more productive in these countries. Hence, people will save more and consume less in these economies. The results confirm this expectation, and robust negative relations between aggregate private consumption and Average Growth, and with Initial GDP per capita have been documented in the estimation results.

As it has been documented by Rodrik (1998), there is an observed positive empirical
relationship between trade openness and government size as open countries are more subject
to external shocks which force them to increase their expenditures to stabilize the economy.
Rodrik (1998) also argues that external shocks is a significant determinant of the volatility of
private consumption. We, therefore, included Openness variable into the private consumption
regression equation to see if private sector saves more to absorb external shocks. Table (2)
shows that the increasing volume of trade depresses the private sector consumption in all
three regressions.

Demographic indicators that are used as explanatory variables in the private consumption
regression equation are Dependency and Density. As Dependency increases, whether through
increase in the number of very young or very old people in the total population, the number
of people who tend consume more than they produce will increase, therefore, the added
burden of dependents will reduce national savings and increase consumption in the economy.
As we expected, the estimation results show a robust positive association between private
consumption and Dependency and the impact is being stronger in the OECD countries sub-
sample. Even though Density is not as a major determinant of private consumption as
Dependency, yet, we included it in our regression model to see if high population density areas
have much greater access to basic infrastructure services such as central heating, water supply,
central gas, and telephones than the low population density areas. In Table(2), we show
that countries that have higher population density consume more than the lower population
density countries and the relationship is statistically significant in both sub-samples.

Finally, we add both Relative Income and Relative Income Square to the private consump-
tion regression equation by arguing that stages of developments are important determinant
of saving. At the initial stages of development with low level of relative income, subsistence
consumption will be higher, and saving rate will increase and consumption will decrease
as countries reach to higher stages of development. The expected negative relationship be-
tween private consumption and Relative Income has been supported with the results in Table
(2). Also, the significance of Relative Income Square suggests that dividing the sample into
higher-income (OECD) and lower-income (Developing) countries may be useful.

In Table (2), we only include period fixed effects and restrain from including the country
fixed effects in the regression equations. This way of treatment not only allows the cross-
country average private consumption to GDP ratios to vary from period to period and but also
helps controlling for cross-country differences in private consumption. Coefficient estimates
of period fixed effects are not shown in Table (2) to reserve space.

3.4 External Debt Positions and Government Expenditures

In both industrial and developing countries, external borrowing constitutes a big portion of
the financing source of governments. Hence, as in the case of the private sector, the public
sector might also be subject to external debt holding costs. Therefore, the following parsimo-
nious regression equation is estimated by using the 5-year average government expenditures to isolate the effect of short run government policies and some other business cycle effects:

\[
\text{Government} = \delta_0 + \delta_1 \text{External Debt} + \delta_2 \text{Left winged Government} + \delta_3 \text{Fixed Regime} \\
+ \delta_4 \text{Legal} + \delta_5 \text{Openness} + \delta_6 \text{Dependency} + \delta_7 \text{Density} \\
+ \delta_8 \text{School Enrollment} + \delta_9 \text{Period} + \omega
\] 

(14)

As it is shown in Table (3), in contrast to our predictions, we find robust evidence of a positive relation between net external debt positions and government expenditures which is mostly driven by OECD countries sub-sample. We, on the other hand, failed to find robust evidence that shows depressing role of net external debt holdings on government expenditures of the developing countries. Maybe, the external debt holding cost is a phenomena which is only relevant for the private sector, instead political factors play a bigger role in the determination of level of public expenditures.

Estimation results also show that on average expenditures in countries with \text{Left-winged Government} are lower than that of countries with centrist or right-winged governments. Even though the findings are not statistically significant, we find the signs of the coefficient estimate surprising because right-wing governments are more benevolent than the left-wing ones and are reluctant to increase taxes. Left wing governments, on the other hand, are more expenditure and deficit prone.

We also control for the exchange rate regime in estimating the government expenditures. The traditional view on the relationship between exchange rate regime and fiscal policies claims that a fixed exchange rate is an effective policy for fiscal discipline. Since excessive fiscal expenditures are deterred by the risk of losses in foreign reserves, it might ultimately lead to a costly abandonment of the peg. On the other hand, a moral hazard problem in fiscal expenditures can occur under a fixed exchange rate regime. Under a fixed regime, observable costs will not materialize until inflation takes place at some time in the future, therefore excessive spending can occur. Conversely, a sovereign government under a flexible exchange rate regime cannot overspend in government expenditures due to the inflationary effect of government expenditures at the time of spending. The estimation results in Table (3) shows that, in the OECD countries sub sample, the governments under fixed exchange rate regime are spending 2.872 percentage points higher than in the countries under floating exchange rate regime. On the other hand, though not statistically significant, in developing countries sub-sample, the results show that fixed exchange rate regime seeking government are spending less than the floating ones by 0.737 percentage points. We can infer from these results that while fear of inflation is an important concern of the advanced economies’ governments, the
moral hazard problem is the dominant factor in developing countries.

We use Legal as a proxy for the period average legal and institutional developments and put it in the regression equation in (14). In a society, the legal foundations and institutions define the context wherein financial transactions and economic decisions are made. If, in a country, the legal system clearly establishes law and order, minimizes corruption, and the property rights are efficiently protected, then, we should expect the well-established institutional mechanisms to constrain discretionary expenditure policies and strengthen fiscal control. Yet, the findings show a robust positive relation between public expenditures and Legal.

Rodrik (1998) and other trade literature show evidence that countries with high degrees of trade openness are more likely to have higher government expenditures and large budget deficit, and our estimation results confirm this early findings. We find that a one percentage point increase in Openness improves the government expenditures by 0.0439 percentage point in the full sample, and by 0.053 percentage point in the developing countries sub-sample, and the findings are statistically significant. While we estimated a positive relation for the OECD countries sub-sample, it is statistically insignificant.

As for the relation between government’s share of output and Dependency, we expect to see a positive relationship. The greater the proportion of the population 0-15 years of age, the youth population, the greater the demand for such services as public education and child-care programs. Also, the greater the proportion of population that 65 and over, the old population, the greater the demand for income maintenance and the health care for the elderly. As shown in Table (3), we find confirming evidence of a robust positive relation between Dependency and government expenditures.

Density is another control variable we include to the regression equation for government expenditures and it has two offsetting effects on government expenditures: infrastructure expenditures tend to decline with increases in population density which will reduce government expenditures. On the other hand, government expenditures on services and on operating expenditures tend to increase with population density. In the full sample, we find a robust negative association between Density and government expenditures. But, when we split the sample, we find a robust positive relation for the OECD countries and a robust negative relation for the developing countries. One can argue that in the OECD countries, since they already established their infra-structures, the increase in density mostly increase the service expenditures, while in developing countries infra-structure expenditures play a major role in regards to impact of increasing Density on government expenditures.

We can think of School Enrollment as an effective demand for education in an economy. Therefore, the higher the School Enrollment is, the higher the government expenditure share on education should be. We find robust evidence of a positive relation between School Enrollment and government expenditures in the full sample as well as in each sub-sample.
3.5 External Debt Positions and Current Account Adjustments

What is the overall effect of net external debt positions on the medium-term current account dynamics? As we suggested in the theoretical part, when we introduce external debt holding costs, external debt positions create a shadow interest rate in the domestic economy which alters the investment and saving decisions. Accordingly, after an increase in the external debt positions, we expect domestic investment to deteriorate while national saving to improve through declined expenditures, both private and public. Therefore, from the standpoint of the national income identity, we expect to see a positive relationship between current account balances and net external debt positions.

In Table(4), the overall effect of net external debt holdings on the current account adjustments is estimated through the channels of investment, private consumption and government expenditure. The current account is affected by external debt holdings in the following way; the investment channel through the coefficient of $\beta_1$ from equation (12), private consumption channel through the coefficient of $\gamma_1$ of equation (13), and government expenditure channel through the coefficient of $\delta_1$ of equation (14). The overall effect of external debt holdings on the current account is $-(\beta_1 + \gamma_1 + \delta_1)$. As shown in Table(4), we find supportive evidence of the adjustment role of net external debt holdings on the current account balances. For the full sample, we estimate the overall impact of a one percentage point increase in net external debt positions on the current account balances to be 0.029 percentage point. While this effect is very negligible for the OECD countries sub-sample (0.007 percentage point), for the developing countries, we estimate this adjustment effect to be 0.107 percentage point which is economically sizable considering the actual size of the change in net external debt positions in the developing countries throughout the sample period.

How sizable are the estimated coefficients? To get a better understanding of the magnitude of the adjustment effect, we compare the actual patterns of investment, private consumption and government expenditure ratios across countries with an estimate of what those ratios would have been in the absence of the effect of net external debt on spending. More specifically, for each spending component, three series are constructed: one is called Actual Series and it is the 5-year average actual series observed in the data by taking the GDP weighted averages for each time period. The second series, Predicted Series, is the GDP-weighted predicted values of 5-year average investment, private consumption and government expenditure ratios obtained from estimation of regression equations of (12), (13), and (14), respectively. The last series which will show the effect of external debt on spending is called Predicted Series without External Debts and it is the GDP-weighted predicted values of 5-year average investment, private consumption and government expenditure ratios obtained from estimation of regression equations of (12), (13), and (14) in the absence of net external debts.

17Since the primary interest is the low-frequency current account dynamic, the factors which affects the short-run current account such as supply or demand shocks or transitory or permanent shocks are not differentiated.
Figures (2), (3), and (4) show these calculated series for the developing countries sub-sample where we have the highest impact of net external debt positions on spending components.

As shown in Figure (2), we overestimate investment for almost all time periods, but the prediction errors follow a narrow band. The negative impact of net external debts on investment is minimal in the 1977-1982 period (1.13 percentage point), and it gets as large as 1.81 percentage point during the period of 1991-2001.\textsuperscript{18} We also see that the deterring effect is prevalent later in the sample period, as well. In Figure (3), on the other hand, we show the negative impact of net external debts on private consumption in developing countries. We estimate an economically sizable negative impact of net external debts on aggregate private consumption: according to our calculations, on average, developing countries would have 3.52 percentage point higher consumption ratio in the absence of impact of net external debts. The negative impact is at the highest level (4.24 percentage point) during 1987-1991 period. Finally, in Figure (4), we show that government expenditures are not being affected by net external debt positions regardless of the time period.

Figure (5) shows the overall impact of net external debts on current account balances in developing countries sub-sample. We show that, on average, developing countries in the sample would have run 4.92 percentage point higher current account deficit in the absence of the negative impact of net external debts. In figure (6), we have the findings for current account balances in OECD countries sub-sample. Our estimation results show that, on average, advanced countries in the sample would have run 5.06 percentage point higher current account surpluses in the absence of the negative impact of net external debts positions. We can conclude that we have robust evidence that net external debt positions play a role in the medium term small-sized current account balances and the adjustment role of net external debts can help explaining the puzzling strong correlation of domestic investment and national saving ratios.

\textit{Direct Effect}

We also regress the current account balances on net external debt positions along with some other control variables to look at the direct relationship between these variables. By being consistent with the current literature on medium-term determination of current account balances in the selection of control variables, we estimate the following regression equation:

\textsuperscript{18}In measuring the negative impact of net external debts on investment, we use the difference between Predicted Investment without External Debts and Predicted Investment. If we look at the difference from Actual Investment, the estimated effect would have been even higher.
Current Account = $\theta_0 + \theta_1$Lagged External Debt + $\theta_2$Changes in Growth Rates
+ $\theta_3$Fiscal Balance + $\theta_4$Dependency + $\theta_5$Openness + $\theta_6$Domestic Credit
+ $\theta_7$Relative Income + $\theta_8$Relative Income Square + $\theta_9$Kopen
+ $\theta_{10}$Terms of Trade Uncertainty + $\theta_{11}$Legal + $\theta_{12}$Period + $\nu$

In equation (15), to control for the rest-of-the-world effects, we convert all variables but Lagged External Debt into the deviations from the GDP-weighted sample mean before we calculate the five-year averages. As in Gruber & Kamin (2007), we only include a period fixed effect but not country fixed effect. Therefore, we allow average current account balances across countries to vary from period to period and control for the cross-country differences in current account balances. Table (5) presents the estimation results for equation (15) for the full sample as well for sub-samples. Almost all of the coefficients have the expected sign: Larger current account balances are associated with lower changes in growth rates, higher fiscal balances, lower shares of youth and elderly in the population (dependency ratio), higher degrees of economic openness, higher per capita incomes, higher terms of trade uncertainty, higher capital controls, and better institutions. We find that larger current account balances are associated with lower degree of financial deepening (domestic capital) which indicates that positive impact of financial development on investment dominates its impact on national savings.

External debt position is a component of net foreign asset position which is, in effect, the accumulation of past current account balances. We therefore, use the lagged value of net external debts to avoid correlation with the independent variable. Even though we should interpret our findings with caution due to potential multi-collinearity problem, we find a negative relationship between current account balances and net external debt positions. Our estimation results are in line with the findings in Chinn & Prasad (2003), Chinn & Ito (2007), and Gruber & Kamin (2007) where they find that net foreign liabilities (assets) are negatively (positively) correlated with current account balances, therefore they find no stabilizing role of net foreign asset positions for the current account.\textsuperscript{19} We use net external debt positions instead of NFA, yet find the non-stabilizing role for net external debts. When we compare these findings with the ones in Table (4), we interpret the contrasting findings as the direct and indirect impacts of net external debt positions on current account balances. When we look at the net effect by incorporating both the direct and indirect impacts, findings in Table (4)

\textsuperscript{19}We run the same regression by replacing the Lagged External Debt with initial level of net external debt position and find the similar results. Also, including net foreign asset positions into the regression equation gives the similar results.
and Table (5), we find robust evidence of a depressing effect of net external debts on current account imbalances only in the developing countries sub-sample. In the OECD countries sub-sample, while we failed to find a significant relationship, the sign of the coefficient estimates indicates a non-stabilizing role of net external debts on current account balances.

4 Concluding Remarks

From the standpoint of Feldstein-Horioka puzzle, we believe that researchers should also analyze the small-sized current account balances to get a better understanding of the puzzling investment-saving correlations. We propose and find evidence that, especially for the developing countries sub-sample, net external debt positions indirectly reduce the dispersion of current account imbalances, thus, increase the correlation of saving and investment rates.

Even though our findings indicate small role for net external debts on current account adjustments, the historical data on net external debt positions in the sample countries imply sizable adjustment role. We failed to find robust evidence for external debts to dampen current account imbalances in the OECD countries sub-sample. The well-established financial markets and banking sectors in these economies can reduce the cost of intermediation and provide alternative borrowing instruments other than non-contingent liabilities.

One caveat in our analysis is that the convex net external debt holding cost assumption can not capture the fundamental factors that shape the investment and saving decisions of the underlying agents, therefore, it is not appropriate for modeling foreign direct investments (FDI) and portfolio equity flows. One other caveat in our analysis is that since we derive current account from national income accounts, the net international investment income component of current account balances is not captured in our measurements. In other words, in this paper we find a robust positive relationship between net external debt liabilities and trade balance. Therefore, we should be careful in interpreting and generalizing our results especially for those countries with high level of net international investment incomes.

References


Data Descriptions and Sources

- **Average Growth**: It is calculated as the sample averages of annual percentage growth rate of GDP (in percentage points) at market prices based on constant local currency. Source: World Bank’s World Development Indicators (WDI) Database.

- **Changes in Growth Rates**: It is the change in the growth rate of GDP per capita in percentage points. The growth rates were constructed as the five-year average of the difference of annual growth from the GDP-weighted sample mean. Source: WDI.

- **Consumption**: It is the household final consumption expenditures as a fraction of GDP in percentage points. It covers the market value of all goods and services including durable products purchased by households. Source: WDI.

- **Current Account**: It is the current account balances as a fraction of GDP in percentage points. Current account balances are calculated as the sum of net exports of goods, services, net income, and net current transfers. Source: WDI.

- **Density**: It is defined as, in percentage points, the midyear population divided by land area in square kilometers. Source: WDI.

- **Dependency**: Age dependency ratio is the ratio in percentage points of dependents—people younger than 15 or older than 64—to the working-age population—those ages 15-64. Source: WDI.

- **Domestic Credit**: It refers to financial resources provided to the private sector in an economy and defined as the domestic credit to private sector as a fraction of GDP in percentage points. Source: WDI.

- **Fiscal Balance**: It is calculated as the difference between revenue and grants received on the one hand and expenditure and lending minus repayments on the other. It is calculated as a ratio to GDP in percentage points and expressed as the difference from the mean GDP-weighted ratio for the sample. Source: WDI and Government Finance Statistics.

- **Fixed-regime**: It is a dummy variable which takes the value of 1 for fixed-exchange rate regime countries and 0 for the floating countries. Countries that are coded 1 and 2 in the original database are recorded as fixed countries, and the ones with 3, 4, 5, and 6 are considered as floating. If the 5-years average for Fixed-regime dummy is higher than 0.5, it has been recorded as 1; if, on the other hand, the 5-years average is less than or equal to 0.5, the dummy variable for that period is recorded as 0. Source: Reinhart & Rogoff (2004).
• **Government:** It is the general government final consumption expenditures as a fraction of GDP in percentage points. It includes all government current expenditures for purchases of goods and services including compensation of employees. It also includes most expenditures on national defense and security. Source: WDI.

• **Inflation Uncertainty:** It is a constructed variable to measure inflation uncertainty. By using the consumer price indices (CPI) for each country, a univariate GARCH (1,1) model with a constant and/or a trend is fitted for each country to measure the conditional variance of CPI as a proxy for inflation uncertainty. The natural logarithms of the conditional variance estimations are used to get interpretable numbers. Source: WDI and Author’s calculations.

• **Initial GDP per capita:** It is defined as the natural logarithm of the GDP per capita level in constant 2000 USD as of 1972. Source: WDI.

• **Investment:** It is the gross fixed capital formation as a fraction of GDP in percentage points. It is the conventional variable used in the literature to measure gross domestic fixed investment. Source: WDI.

• **Kaopen:** It is an index of financial openness indicator based on IMF’s Annual Report on Exchange Arrangements and Exchange Restrictions. The higher the index value, the more open the country is to cross-border capital transactions. Since the observations are sometime negative in the original database, we adjust the data to all positive numbers to make meaningful comparison. It is expressed as the difference from the mean GDP-weighted ratio for the sample. Source: Chinn & Ito (2008).

• **Left-winged Government:** It is a dummy variable which takes the value of 1 for left-winged governments, and 0 for right-winged or centrist governments. If the 5-years average for the *Left-winged Government* dummy variable is higher than 0.5, we considered that country ruled by a left-winged government. On the other hand, if the 5-years average is less than or equal to 0.5, that period is recorded as a right-winged or centrist government era. Source: Database of Political Institutions, DPI(2006)-Beck, Clarke, Groff, Keefer & Walsh (2001).

• **Legal:** It is the sample average of first principle components of Bureaucracy Quality, Law and Order, and Corruption variables in the International Country Risk Guide (ICRG) Database. Since the data coverage is 1984-2006, for each country, we used average of the estimated first principal components to control for institutions. Higher values imply better legal system. Source: ICRG: International Country Risk Guide (2007).
• **Net External Debt:** It is measured as the portfolio debt and other investment liabilities minus the portfolio debt and other investment assets as a fraction of GDP in percentage points. Source: Lane & Milesi-Ferretti (2007)

• **Openness:** It is calculated as the sum of exports and imports of goods and services measured as a share of gross domestic product in percentage points. Source: WDI.

• **Period:** It is a vector of dummy variables that takes the value of 1 for each 5-years period and 0 elsewhere.

• **Real Interest Rate:** It is the lending interest rate adjusted for inflation as measured by the GDP deflator. It is defined in percentage points. Source: WDI.

• **Relative Income:** Gross domestic product converted to international dollars (constant 2005 international $) using purchasing power parity rates are used as a proxy for countries’ income levels. In the calculation of the relative income, each country’s income level is divided by the United State’s income level for each year. The relative income ratio is defined in percentage points. Source: WDI.

• **School Enrollment:** It is (in percentage points) the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Source: WDI.

• **Terms of Trade Uncertainty:** It is a constructed variable to measure terms of trade uncertainty. For terms of trade data, for each country, a univariate GARCH (1,1) model with a constant and/or a trend is fitted for each country to measure the conditional variance of terms of trade as a proxy for uncertainty. It is expressed as the difference from the mean GDP-weighted ratio for the sample. Source: WDI and Author’s calculations.

**Country List:**

**OECD Countries:**
Australia, Canada, Denmark, Finland, France, Greece, Iceland, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Switzerland, and United States.

**Developing Countries:**
Bangladesh, Benin, Bolivia, Botswana, Burkina Faso, Cameroon, Chad, Chile, Costa Rica, Cote d’Ivoire, Ecuador, Egypt, El Salvador, Gabon, Guatemala, Honduras, India, Indonesia, Jordan, Kenya, South Korea, Madagascar, Malawi, Malaysia, Mali, Mauritius, Morocco, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Senegal, South Africa, Sri Lanka,
Swaziland, Syrian Arab Republic, Thailand, Togo, Trinidad and Tobago, Uganda, Uruguay, Venezuela, Zambia, and Zimbabwe.
Table 1: Period Fixed Effect Panel Regression for Domestic Investment

<table>
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<tr>
<th>VARIABLES</th>
<th>Full</th>
<th>OECD</th>
<th>Developing</th>
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<tbody>
<tr>
<td>External Debt</td>
<td>-0.016*</td>
<td>-0.008</td>
<td>-0.031**</td>
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<tr>
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<td>(0.008)</td>
<td>(0.007)</td>
<td>(0.012)</td>
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<tr>
<td>Real Interest Rate</td>
<td>-0.088**</td>
<td>-0.065</td>
<td>-0.069**</td>
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<tr>
<td></td>
<td>(0.036)</td>
<td>(0.098)</td>
<td>(0.035)</td>
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<td></td>
<td>(0.354)</td>
<td>(0.762)</td>
<td>(0.356)</td>
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<td>Domestic Credit</td>
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<td>0.052***</td>
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<td></td>
<td>(0.012)</td>
<td>(0.008)</td>
<td>(0.022)</td>
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<td></td>
<td>(0.390)</td>
<td>(0.635)</td>
<td>(0.487)</td>
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<td>0.044**</td>
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<td>(0.019)</td>
<td>(0.020)</td>
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<td>Openness</td>
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<td>0.071***</td>
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<td></td>
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<td>(0.014)</td>
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<td></td>
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<td>(1.085)</td>
<td>(0.522)</td>
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<td>-0.075***</td>
<td>0.553***</td>
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<td>(0.008)</td>
<td>(0.168)</td>
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<td>Adjusted $R^2$</td>
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<td>0.48</td>
<td>0.30</td>
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</table>

Notes: Dependent variable is the gross domestic investment to GDP ratio in percentage points. The data span 1972-2006 period. There are 62 countries in the full sample and 17 and 45 countries in the OECD and developing countries sub-samples, respectively. For all variables but period dummies, we take the 5-years averages of annual observations. Period fixed effects are used in all regressions. Robust standard errors are in parenthesis. *** , ** and * denote significance at 1 percent, 5 percent and 10 percent, respectively. The estimated coefficients for the time-fixed dummies and constants are not shown. Descriptions of variables and data sources are provided at the end of the paper.
Table 2: Period Fixed Effect Panel Regression for Private Consumption

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<thead>
<tr>
<th>VARIABLES</th>
<th>Full</th>
<th>OECD</th>
<th>Developing</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Debt</td>
<td>-0.032**</td>
<td>-0.036*</td>
<td>-0.075***</td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td>(0.019)</td>
<td>(0.022)</td>
</tr>
<tr>
<td>Real Interest Rate</td>
<td>0.090*</td>
<td>0.247</td>
<td>0.103*</td>
</tr>
<tr>
<td></td>
<td>(0.048)</td>
<td>(0.242)</td>
<td>(0.058)</td>
</tr>
<tr>
<td>Inflation Uncertainty</td>
<td>0.426</td>
<td>3.237*</td>
<td>0.976*</td>
</tr>
<tr>
<td></td>
<td>(0.384)</td>
<td>(1.790)</td>
<td>(0.512)</td>
</tr>
<tr>
<td>Domestic Credit</td>
<td>0.007</td>
<td>0.036**</td>
<td>0.016</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.018)</td>
<td>(0.028)</td>
</tr>
<tr>
<td>Average Growth</td>
<td>-3.524***</td>
<td>0.001</td>
<td>-4.160***</td>
</tr>
<tr>
<td></td>
<td>(0.612)</td>
<td>(0.899)</td>
<td>(0.792)</td>
</tr>
<tr>
<td>Openness</td>
<td>-0.083***</td>
<td>-0.193***</td>
<td>-0.056*</td>
</tr>
<tr>
<td></td>
<td>(0.022)</td>
<td>(0.041)</td>
<td>(0.029)</td>
</tr>
<tr>
<td>Dependency</td>
<td>0.114**</td>
<td>0.290**</td>
<td>0.122*</td>
</tr>
<tr>
<td></td>
<td>(0.047)</td>
<td>(0.140)</td>
<td>(0.063)</td>
</tr>
<tr>
<td>Density</td>
<td>0.008***</td>
<td>0.014**</td>
<td>0.012**</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.007)</td>
<td>(0.005)</td>
</tr>
<tr>
<td>Relative Income</td>
<td>-0.346***</td>
<td>-0.632***</td>
<td>-0.526</td>
</tr>
<tr>
<td></td>
<td>(0.108)</td>
<td>(0.171)</td>
<td>(0.758)</td>
</tr>
<tr>
<td>Relative Income Square</td>
<td>0.004***</td>
<td>0.006***</td>
<td>-0.025</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.002)</td>
<td>(0.040)</td>
</tr>
<tr>
<td>Initial GDP per capita</td>
<td>-4.165***</td>
<td>-9.432***</td>
<td>-5.698***</td>
</tr>
<tr>
<td></td>
<td>(0.698)</td>
<td>(1.580)</td>
<td>(0.956)</td>
</tr>
<tr>
<td>Observations</td>
<td>321</td>
<td>101</td>
<td>220</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.56</td>
<td>0.47</td>
<td>0.55</td>
</tr>
</tbody>
</table>

Notes: Dependent variable is the gross private consumption to GDP ratio in percentage points. The data span 1972-2006 period. There are 62 countries in the full sample and 17 and 45 countries in the OECD and developing countries sub-samples, respectively. For all variables but period dummies, we take the 5-years averages of annual observations. Period fixed effects are used in all regressions. Robust standard errors are in parenthesis. *** , ** and * denote significance at 1 percent, 5 percent and 10 percent, respectively. The estimated coefficients for the time-fixed dummies and constants are not shown. Descriptions of variables and data sources are provided at the end of the paper.
Table 3: Period Fixed Effect Panel Regression for Government Expenditures

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Full</th>
<th>OECD</th>
<th>Developing</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Debt</td>
<td>0.019***</td>
<td>0.040***</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.009)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>Left-winged Government</td>
<td>-0.471</td>
<td>-0.195</td>
<td>-0.352</td>
</tr>
<tr>
<td></td>
<td>(0.425)</td>
<td>(0.533)</td>
<td>(0.540)</td>
</tr>
<tr>
<td>Fixed Regime</td>
<td>0.451</td>
<td>2.872***</td>
<td>-0.737</td>
</tr>
<tr>
<td></td>
<td>(0.428)</td>
<td>(0.595)</td>
<td>(0.514)</td>
</tr>
<tr>
<td>Legal</td>
<td>2.444***</td>
<td>2.035***</td>
<td>2.962***</td>
</tr>
<tr>
<td></td>
<td>(0.195)</td>
<td>(0.402)</td>
<td>(0.336)</td>
</tr>
<tr>
<td>Openness</td>
<td>0.039***</td>
<td>0.006</td>
<td>0.053***</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.012)</td>
<td>(0.011)</td>
</tr>
<tr>
<td>Dependency</td>
<td>0.160***</td>
<td>0.076</td>
<td>0.176***</td>
</tr>
<tr>
<td></td>
<td>(0.021)</td>
<td>(0.074)</td>
<td>(0.024)</td>
</tr>
<tr>
<td>Density</td>
<td>-0.002**</td>
<td>0.005**</td>
<td>-0.002*</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.002)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>School Enrollment</td>
<td>0.057***</td>
<td>0.051**</td>
<td>0.049***</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.020)</td>
<td>(0.018)</td>
</tr>
<tr>
<td>Observations</td>
<td>395</td>
<td>119</td>
<td>276</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.48</td>
<td>0.58</td>
<td>0.43</td>
</tr>
</tbody>
</table>

Notes: Dependent variable is the general government final consumption expenditures to GDP ratio in percentage points. The data span 1972-2006 period. There are 62 countries in the full sample and 17 and 45 countries in the OECD and developing countries sub-samples, respectively. For all variables but period dummies, we take the 5-years averages of annual observations. Period fixed effects are used in all regressions. Robust standard errors are in parenthesis. *** , ** and * denote significance at 1 percent, 5 percent and 10 percent, respectively. The estimated coefficients for the time-fixed dummies and constants are not shown. Descriptions of variables and data sources are provided at the end of the paper.
Table 4: Current Account Adjustment Channels

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>-(1)+(2)+(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Investment</strong></td>
<td>0.016*</td>
<td>0.032**</td>
<td>0.019***</td>
<td></td>
</tr>
<tr>
<td><strong>Consumption</strong></td>
<td>0.008</td>
<td>0.036*</td>
<td>0.040***</td>
<td>0.004</td>
</tr>
<tr>
<td><strong>Government</strong></td>
<td>0.002</td>
<td>0.075***</td>
<td></td>
<td>0.104</td>
</tr>
<tr>
<td><strong>Current Account Balance</strong></td>
<td>0.029</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Column (1) is obtained from the 1st row of Table (1), column (2) is obtained from the 1st row of Table (2) and column (3) is obtained from the 1st row of Table (3). The last column is the negative of sum of the first three columns.
Table 5: Period Fixed Effect Panel Regression for Current Account Balances

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Full</th>
<th>OECD</th>
<th>Developing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lagged External Debt</td>
<td>-0.055***</td>
<td>-0.050</td>
<td>-0.056***</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.032)</td>
<td>(0.010)</td>
</tr>
<tr>
<td>Changes in Growth Rates</td>
<td>-0.134</td>
<td>-0.688**</td>
<td>-0.166</td>
</tr>
<tr>
<td></td>
<td>(0.117)</td>
<td>(0.295)</td>
<td>(0.135)</td>
</tr>
<tr>
<td>Fiscal Balance</td>
<td>0.393***</td>
<td>0.333</td>
<td>0.335***</td>
</tr>
<tr>
<td></td>
<td>(0.074)</td>
<td>(0.202)</td>
<td>(0.088)</td>
</tr>
<tr>
<td>Dependency</td>
<td>-0.068***</td>
<td>-0.098</td>
<td>-0.047**</td>
</tr>
<tr>
<td></td>
<td>(0.021)</td>
<td>(0.087)</td>
<td>(0.024)</td>
</tr>
<tr>
<td>Openness</td>
<td>0.043***</td>
<td>0.085***</td>
<td>0.044***</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.024)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>Domestic Credit</td>
<td>-0.032***</td>
<td>-0.027</td>
<td>-0.047***</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.018)</td>
<td>(0.017)</td>
</tr>
<tr>
<td>Relative Income</td>
<td>0.313***</td>
<td>0.437***</td>
<td>1.384***</td>
</tr>
<tr>
<td></td>
<td>(0.059)</td>
<td>(0.093)</td>
<td>(0.281)</td>
</tr>
<tr>
<td>Relative Income Square</td>
<td>-0.000***</td>
<td>-0.000***</td>
<td>-0.001***</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Terms of Trade Uncertainty</td>
<td>0.000**</td>
<td>0.035**</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.015)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Kaopen</td>
<td>-0.556***</td>
<td>-0.794**</td>
<td>-0.343</td>
</tr>
<tr>
<td></td>
<td>(0.186)</td>
<td>(0.339)</td>
<td>(0.233)</td>
</tr>
<tr>
<td>Legal</td>
<td>0.167</td>
<td>1.354*</td>
<td>0.953**</td>
</tr>
<tr>
<td></td>
<td>(0.222)</td>
<td>(0.777)</td>
<td>(0.449)</td>
</tr>
<tr>
<td>Observations</td>
<td>301</td>
<td>91</td>
<td>210</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.40</td>
<td>0.44</td>
<td>0.42</td>
</tr>
</tbody>
</table>

Notes: The dependent variable is the current account to GDP ratio in percentage points. Lagged External Debt refers to non-overlapping period average net external debt ratios in the previous period. The data span 1972-2006 period. There are 62 countries in the full sample and 17 and 45 countries in the OECD and developing countries sub-samples, respectively. For all variables but period dummies, we take the 5-years averages of annual observations. Also, all variables except for Lagged External Debt are converted into the deviations from the GDP-weighted sample mean before being calculated into the five-year averages. Period fixed effects are used in all regressions. Robust standard errors are in parenthesis. ***, ** and * denote significance at 1 percent, 5 percent and 10 percent, respectively. The estimated coefficients for the time-fixed dummies and constants are not shown. Descriptions of variables and data sources are provided at the end of the paper.
There are 89 countries in the sample. Source: WDI and Lane and Milesi-Ferretti (2004). (Standardized Values, non-weighted)

Figure 1: Current Account Dispersion and Net External Debt Positions
Figure 2: Domestic Investments in Developing Countries

Figure 3: Private Consumption in Developing Countries
Figure 4: Government Expenditures in Developing Countries

Figure 5: Current Account Balances in Developing Countries
Figure 6: Current Account Balances in OECD Countries