Persistent Episodes of Current Account Imbalances: An Empirical Analysis

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Abstract

This paper empirically documents the important differences between persistent episodes of current account surplus and current account deficits in the last four decades. Motivated by a reversal of global imbalances in the last decades, results derived from this study show how persistent surplus episodes, associated to emerging markets in Asia and net exporters of natural resources, are driven by official capital flows, leave countries internationally more exposed and are less persistent than deficit episodes in developing economies. Positive imbalances seem to be prolonged by high investment or low domestic saving, slow output growth, improvements in the terms of trade and wide spreads between domestic and world interest rates. In contrast, high levels of international reserves and inflation increase the probability of a reversal. Opposite to the aftermath of persistent deficits, reversals from surplus episodes trigger massive inflows of private capital, significantly increasing output growth but surprisingly leaving the real effective exchange rate mainly unaltered. The paper is divided into three main sections. First, I analyze the economic performance of countries while running persistent imbalances. Second, I use a logit model to study the determinants of reversals at the end of these episodes. Finally, I examine the economic consequences of these reversals.

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Introduction

The persistent and growing negative external balances experienced by the US economy in recent years have relived the debate on the sustainability of current account deficits, as well as generated interest by many researchers and policy makers on what the consequences are of such episodes. Moreover, another phenomenon has emerged in recent years, large and persistent episodes of current account surpluses. The fact that this is a relatively rare phenomenon has fostered discussion on their determinants, their consequences and the factors that may drive them to an end. Nevertheless, thorough empirical studies on the consequences of running these imbalances seem to be non-existent. The main contribution of this paper is to fill this gap by providing an exhaustive empirical analysis of the stylized facts surrounding both, positive and negative persistent external imbalances in the last four decades.

A key motivational aspect for this paper relies on the extraordinary evolution of persistent episodes of current account surpluses[1] in the last fifteen years. At the end of the year 2004, approximately thirty developing countries were running persistent episodes of positive current account balances for a cumulative volume of almost 1.7 trillion $US, representing 20 times the volume accumulated by 1994, when only eighteen developing countries were involved in persistent episodes (see Figure 1). Although this seems to be a common trend across developing countries, the numbers are more dramatic when we focus on East Asian economies. A significant share of the global imbalances literature has paid attention to the two giants in the region, Japan and China (with accumulated surpluses of 2 and 0.3 $US trillion respectively), as the natural counterparts of the growing deficits in the United States. In spite of both countries large volume of accumulated surplus, it only represents 2.55 percent of their total output.

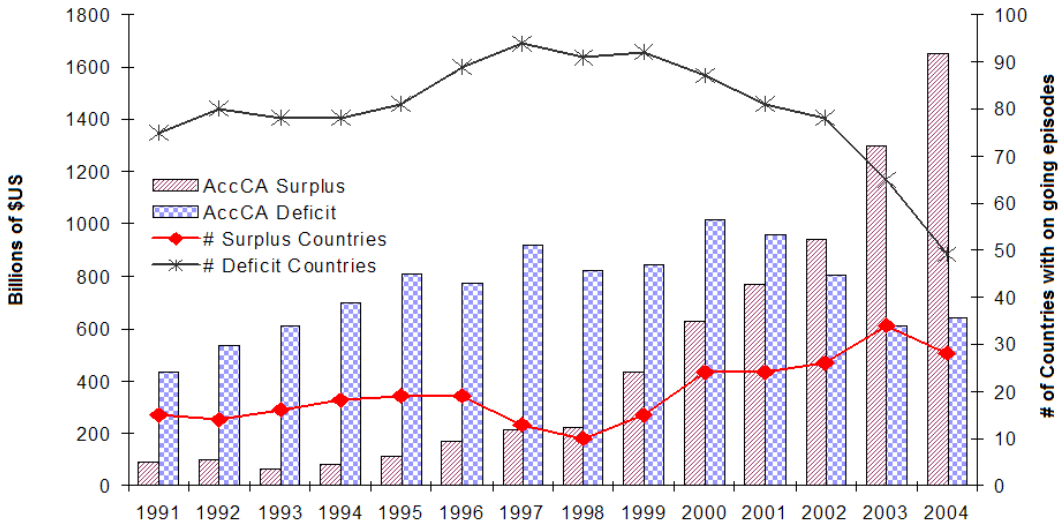
A less acknowledged fact is that, in 2004, all the newly industrialized economies (NIE) in South Asia; namely, Korea, Hong Kong, Singapore, Taiwan, Malaysia, Indonesia Thailand and Philippines, were involved in surplus episodes with a much more exposed

[1] Throughout the paper, we somewhat arbitrarily define a persistent current account episode as 3 or more consecutive years of either surplus or deficit balances. Changing the definition for a higher number of years does not change the main stylized facts derived in the paper

international position (averaging almost 7 percent of their aggregate accumulated output)[2].

Another set of countries, the biggest net exporters of natural resources, have also been characterized by running surpluses at the turn of the century, which were inexistent in the mid nineties. Countries such as, Canada, Norway, Arabia Saudi, Venezuela and Algeria were running accumulated positive external balances for almost one trillion US dollars, or 7 percent of their accumulated GDP, at the end of 2004.

Figure 1: Evolution of Persistent Current Account Episodes.



Notes: Based on episodes of current account surplus/deficits of 3 or more consecutive years active at the end of each year.
Sources: IFS, Author Calculations.

Among the main uncovered facts regarding the different characteristics of persistent surplus versus persistent deficit episodes, I observe that positive imbalances associated to emerging economies in Asia and net exporters of natural resources are largely offset by net official outflows. On the other hand, deficits in these countries and other developing markets are primarily financed by net private capital inflows. Furthermore, surplus runs tend to be shorter in length but more concentrated in size, leaving countries more exposed internationally. On the subject of reversals, factors such as, high capital formation, low domestic savings, fast output growth, high stock of international reserves, worsening of

[2] Out of the previously mentioned countries, only Singapore was running surpluses in 1994

terms of trade and wide domestic versus world interest rate spreads have a symmetrically opposite effect on the probability of reversals; helping sustain deficits and increasing the changes of ending surplus episodes. Inflation seems to be a factor associated to the ending of both types of persistent imbalances. Appreciation of real effective exchange rates, even though a key element in prolonging deficits, seems to be fairly unrelated to reversals from surplus episodes. Finally, reversals in both types of episodes are also followed by substantial turnarounds in the positions of net private capital flows. Output growth reacts immediately to surplus reversals with an average slowdown above 1 percent; meanwhile it takes two periods for output growth to accelerate after the end of deficit episodes. Divergences also arise in the reaction of real effective exchange rates to current account reversals. Whereas reversals from deficits are followed by significant real depreciations, real exchange rates remain fairly impervious to reversals from surplus episodes.

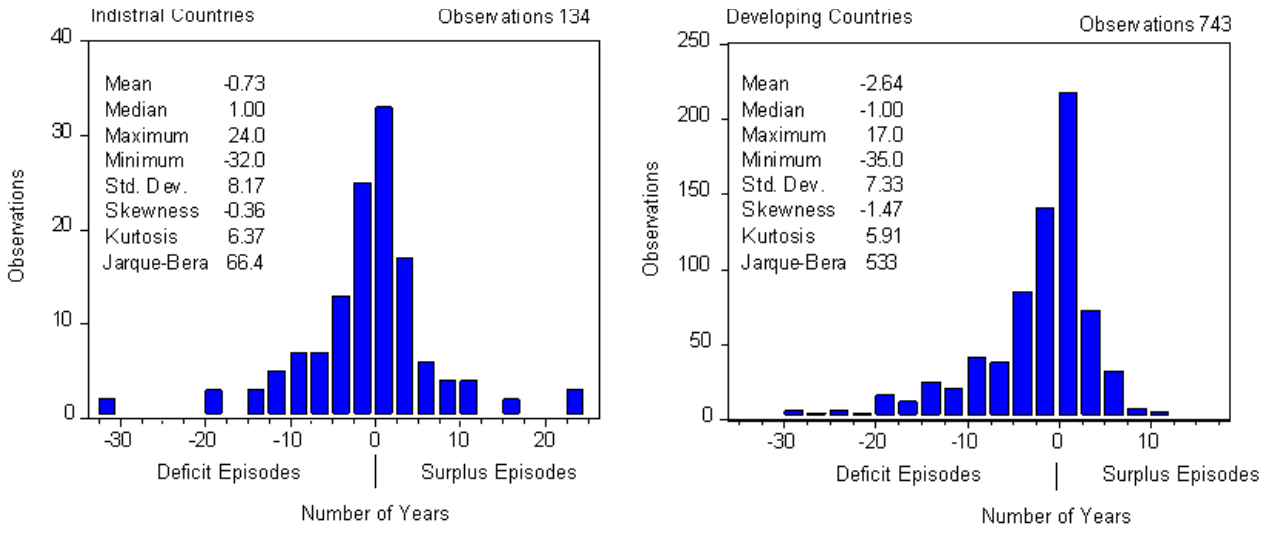
In section 1, I describe the economic characteristics of countries operating under persistent current account episodes. We specifically center on the length distribution of these, where the financial flows offsetting/financing them originate, and the economic performance of countries undergoing persistent current account runs. Section 2 presents a Conditional fixed-effects logistic regression to expose the main factors associated with reversals at the end of the episodes. In section 3, I turn to a graphical analysis surrounding the end-game for each run to analyze the reactions of output, net private flows and real exchange rates to current account reversals after persistent episodes. Section 4 concludes.

1. Economic Characteristics of Countries Running Persistent Current Accounts.

Current Account Dynamics: Evidence and Theory.

In this section, I consider the distribution of different extent of current account imbalances. We divide the sample between industrialized (mainly OECD countries) and developing countries (See Figure 2).

Figure 2: Length distribution of current account runs.



Notes: Each observation represents an episode of either current account surplus or deficit. Episodes may include any number of years
Source: Author Calculations

Regarding these distributions, a series of significant regularities and asymmetric behavior emerge:

First, in both sets of countries, most of the density of the distribution is concentrated around 0. To this extent, 70 percent of the current account imbalances in developing countries and 67 percent of those in industrial countries last 5 years or less.

Second, there is a significant difference in the mass of the distribution reserved for the shortest runs (1 and 2 years) between developing and industrial countries (approximately 49 and 42 percent, respectively).

Third, short periods of positive current account balances seem to be the most frequent occurrence. This fact is more prominent in the case of developing countries, where 30 percent of all observations are reserved for episodes of 1 or 2 years of current account surpluses.

Fourth, in contrast to the length distribution in industrial countries, which proves to be fairly symmetric around 0 (skewness equal to -.36), developing countries show a strong left-skewed distribution indicating a long end of deficit episodes.

With respect to the theoretical standpoint, I divide the study of the current account persistence distribution in two segments. The first section helps understand the dynamic behavior of current account around the economy's steady state equilibrium. In the second segment, I use a long run approach to study the behavior of external balances when the economy is distant from its steady state equilibrium and there are frictions impeding immediate adjustments.

Going beyond traditional static models where the current account was merely a residual only important for the determination of current output, I apply a dynamic-optimizing approach to better understand the dynamics involved in the movements of the current account. We start with a quick review of the basic identities defining the current account balance. Using the gross national product (GNP) of an economy as the sum of its consumption, investment, public expenditure, net exports and net interest earnings on debt, and acknowledging that current account (CA) is defined as net exports plus net interest earnings; we have that GNP ≡ Private Consumption + Investment + Public Expenditure + Net Exports – World Interest * Net International Investment Position (IIP). Defining Gross Domestic Savings (S_d) as GNP minus Private Consumption and Public Expenditure, we have the following key identity:

$$CA \equiv S_d - Investment = \Delta IIP \equiv KA$$

where KA refers to capital account. This identity establishes a direct link between the dynamics of the CA and the optimizing behavior of consumption (savings) and

investment. Using this key link and relying on auto-correlated productivity shocks, Razin (1993) demonstrates that changes in CA depend on how consumption and investment respond to different kinds of shocks. Under permanent productivity shocks, investment increases and the permanent income hypothesis ensures that consumption soars in excess of the surge in output creating a negative shock for the current account. In the case of a non-permanent shock, investment would barely react and consumption smoothing through asset accumulation would ensure a positive shock to the current account[3].

By definition, in an economy with zero growth steady state, output, net exports, stock of foreign assets, capital stock and consumption will not grow forcing CA=ΔIIP=0. The implication is that the current account balance around the steady state would be a stationary mean-zero-variable with its dynamics dominated by the stochastic productivity shocks mentioned above.

In order to better understand the persistence associated with the current account around a zero-growth steady-state-equilibrium, I employ a simplified small open economy[4] model, where I consider investment, as well as, government expending exogenous and equal to zero. A further simplification tool is the use of the linear-quadratic utility function, commonly used in "Permanent Income" models. With output modeled as an autoregressive variable around its equilibrium value:

$$Y_{t+1} - Y^* = \beta(Y_t - Y^*) + \varepsilon_{t+1}$$

The CA becomes:

$$CA_t = \beta\Psi(\beta, r)(Y_{t-1} - Y^*) + \Psi(\beta, r)\varepsilon_t$$

Where the first term represents the expected next period deviation of output from its permanent level at period t-1, and the second is just the expectations adjustment at period t. Most importantly, the first term in this equation shows that the current account has a predictable component. Following Aizenman (2006), in the vicinity of the steady state we can transform this equation in:

[3] See Glick and Rogoff (1992)
[4] See Obsfeld and Rogoff (1996)

$$ca_t \approx \beta ca_{t-1} + \Psi(\beta, r)\varepsilon_t$$

Where lower case represents the variable deflated by current output. In this study, Aizenman also finds clear evidence of stationarity for the deflated current account balance. Moreover, the estimated coefficient on the AR (1) process over a large set of countries is close to ½, indicating a relatively fast reversion to mean and complementing my first empirical result in the distribution of CA runs. The fact that developing countries exhibit a significantly higher mean reversion than industrial countries also corroborates my second empirical finding.

CA dynamics around steady-state equilibriums help us comprehend some of the properties displayed by the length distributions of CA episodes. Nevertheless, two important questions regarding the highly negative skewness and the excess of short surplus runs in the developing countries distribution remain unanswered.

In order to explain these two issues, we need to deviate from the vicinity of steady-state equilibriums. Following Taylor's argumentation[5], if we take a Solovian small open economy with no exogenous growth[6], low capital to labor ratio and frictions for the installation of new capital, this economy will persistently borrow to invest and to smooth consumption given its level of permanent income. Such economy is bounded by its long run budget constraint:

$$\lim_{i \to \infty} R^{-(i+1)} E_{t-1}(B_{t+i}) = 0$$

This constraint forces the expected present discounted value (by private agents with information sets limited to t-1) of future holding of foreign assets to be zero. Under these limitations, each country's borrowing will be restricted by the private agent's perception of their ability to pay in the future (through the accumulation of net exports):

[5] See Taylor (2002).

[6] Deterministic growth would give us a similar result as long as we deflated the variables in question by current output.

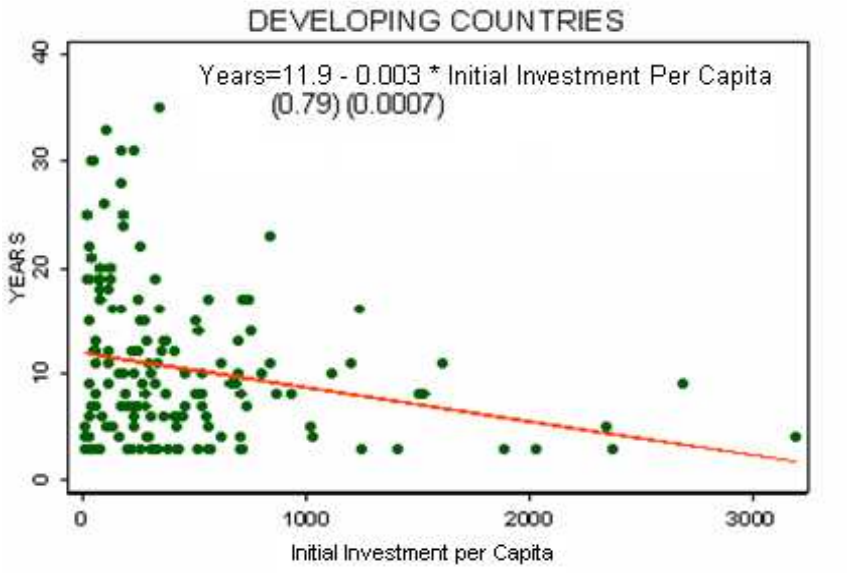
$$B_{t-1} = -\sum_{i=0}^{\infty} R^{-i+1} E_{t-1}(NetExports_{t+1})$$ [7]

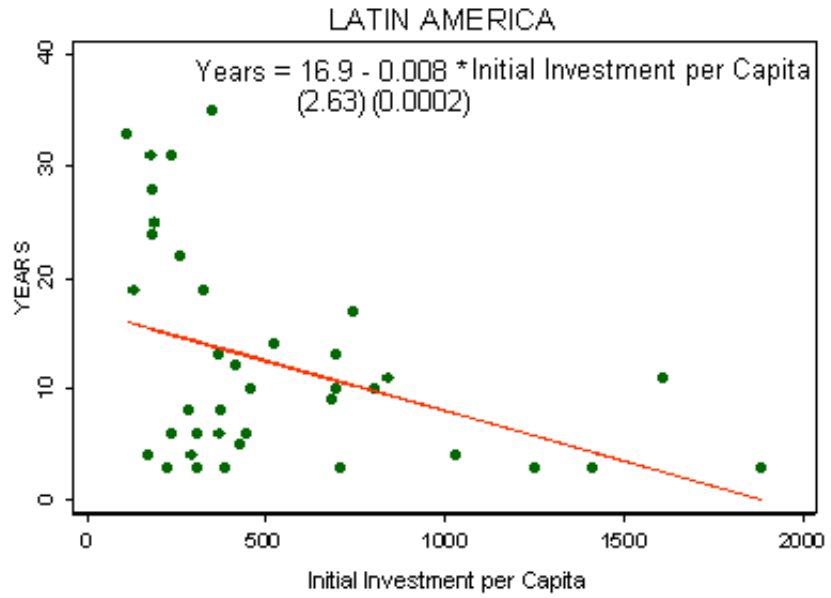
According to this framework, developing countries with capital scarcity and difficulties to quickly integrate capital formation will assume a debtor role during prolonged periods of time as long as private agents continue to perceive the country as "solvent". In order to reinforce this theoretical conclusion, I examine the relationship between initial levels of investment and the length of current account deficit episodes.

Figure 1 below displays the expected negative correlation between investment levels and episode duration for developing countries. The fact that the ability to borrow depends on private agents expectations renders the conversion process towards steady state equilibrium unstable. If new information reduces the expected solvency of the country, its ability to borrow will be greatly limited, possibly resulting in a premature end to its current account run. The subsequent forced surplus will be a short period of adjustment until investors regain confidence and start pouring capital in the country again.

[7] This equation is derived from the fact that in steady state $CA = 0 = KA \equiv B_t - B_{t-1}$ see Trehan and Walsh (1991) for the derivation.

Figure 1: Initial Investment Per Capita vs. CA Deficit Persistence in Developing Countries and Emerging Markets in Latin America.





Notes: Investment per capita refers to Gross Capital Formation per inhabitant. The variable "Years" is the total amount of years per episode of current account deficit. The reported regressions are OLS with robust standard errors.
Sources: Wdi, Author calculations

This development theory provides not only a framework to account for the "Deficit-Skewned" distribution in developing countries, but also some insight to explain the excess distribution mass captured by 1 and 2 year surplus (about 30 percent of the total distribution). If surplus years are just the intermission between deficit episodes while private agents adjust their expectations; hence, the average time span between CA deficits in developing countries should be lower than that in industrial economies. Besides, as shown in my empirical test, most of the surplus distribution should be compressed in the 1 and 2 year episodes. In order to support this argument, Table 1 calculates the average time span between the end of a persistent episode of current account deficit (surplus) and the next reversal back to CA deficits (surplus). In the table below, we observe that, following our premise, it takes developing countries approximately 2 years less than their industrial counterparts (on average) to go back to CA deficits . The extreme case comes forth in Latin America with emerging economies average time span of only 2.7 years.

Table 1: Time Span between CA Episodes.

	Average Time between episodes (years)	
	Surplus	**Deficits**
All countries	5.2	3.6
Industrial	6.2	5.3
Developing	4.9	3.4
South/East Asia (NIE)	7	4.3
Latin America	4.9	2.7
Natural Resource Countries	3.8	4.4
Manufactures Countries	5.1	5.6

Notes: See appendix for definitions of country subgroups. The condition to trigger the accounting of each time span is that the country ends an episode of 3 or more years of current account imbalance
Source: Author Calculations

Towards Persistent Current Account Surpluses

The theoretical framework mentioned above offers a simple scenario. In general, the CA is stationary around steady state with its dynamics generated from persistent stochastic shocks to the economy, affecting optimal inter-temporal income-saving decisions. In particular, emergent economies run CA deficits as part of their "natural" development strategies.

This view is clearly asymmetric, in the sense that, it is difficult to imagine countries with high capital to labor ratio running persistent current account surpluses to meet their steady state equilibriums[8]. This framework reserves a "residual" role for positive CA imbalances, where we find these occurrences as a result of either the inability of a country to borrow or its temporary excess of domestic savings due to temporary positive or permanent negative shocks to the economy.

In the last 10 years, current account surpluses have played a more prominent role than our theoretical framework had reserved for them. Table 2, proves this point by providing a snapshot comparison between persistent episodes (3 or more years) of global imbalances measured at the end of 1994 and those at the end of 2004. This table presents a series of interesting facts on the evolution of global imbalances in the last decade.

In absolute terms, both, global persistent deficits and surpluses have increased their face value by 3.2 and 4.2 fold, respectively since the end of 1994, reaching 5.5 and 5.2 trillion US dollars by the end 2004, respectively.

In relative terms, at the end of 2004, the weight of imbalances in terms of GDP increased by approximately .5 percentage points in the case of deficit episodes and .6 percentage points in the case of persistent surpluses.

There has been a rapid convergence between the number of economies under episodes of persistent negative external balances and economies under positive balances. To this regard, there were 87 countries running deficits at the end of 1994, more than 3.3 times the amount of economies running surpluses. In 2004, only 57 of these economies were running deficits, only 50 percent more than the number of countries running surpluses.

[8] The possible exception is Switzerland, the country with the highest investment ratio per capita in the world, which conveniently has been running CA surpluses for the last 20 years

Table 2: Persistent Episodes of CA Imbalances at the end of 1994 and 2004

		2004				1994			
		AccCA ($US B)	Countries With On Going Episodes	CA/GDP (%)	Years/ Run	AccCA ($US B)	Countries With On Going Episodes	CA/GDP (%)	Years/ Run
All Countries	**Surplus**	5226	38	3.12	8.2	1289	26	2.52	5.1
	Deficits	5593	57	3.08	14	1728	87	2.61	10.4
Industrial	**Surplus**	3538	11	3.06	12.6	1208	8	2.47	7.5
	Deficits	4953	8	2.99	17.6	1030	9	2.03	9.3
Developing	**Surplus**	1688	27	3.25	6.5	81	18	3.75	4
	Deficits	640	49	4.06	13.4	698	78	4.52	10.5
South/East Asia	**Surplus**	2967	9	2.93	9.7	952	2	2.63	10.5
	Deficits	0	0	0	0	166	5	2.49	10
South/East Asia (NIE)	**Surplus**	914	8	4.39	8.1	34	1	10.95	7
	Deficits	0	0	0	0	166	5	2.49	10
Latin America	**Surplus**	69	3	6.7	4	0	0	0	0
	Deficits	326	10	3.38	20	229	14	4.82	13.8
Natural Resources	**Surplus**	827	8	6.67	7.8	49	3	2.6	6
	Deficits	589	2	3.7	24	646	7	4.57	10.9
Manufactures	**Surplus**	2607	6	2.66	10	964	4	2.29	5.8
	Deficits	50	1	0.78	5	97	1	1.23	4

Notes: South/East Asia (NIE) excludes Japan from the subgroup South/East Asia
Sources: IFS, Author Calculations

The evolution of the previously mentioned episodes in industrial and developing countries cannot be characterized in any other way than a complete reversal. Industrial economies, which, at the end of 1994, displayed predominating surpluses, reversed their position, multiplying the face value of deficits almost by 5 times. The economic weight of these episodes also changed significantly with an increase of approximately half a percentage point for surpluses and nearly a full percentage point of GDP for deficits. Mainly, this increase can be attributed to the international position of the United States, which, with 3.3 trillion dollars of external deficits accumulated in the last 10 years, accounts for more than 60 percent of the total accumulated deficits from industrial economies. On the other side of the fence, Japan, with 1.1 trillion dollars in accumulated surplus since 1994, represents practically a third of the total accumulated surplus in these economies.

The shift in developing countries is even more salient. Whereas the face value of accumulated deficits in 2004 marginally decreased from 1994, the face value of persistence surplus increased 20 fold for a grand total of almost 1.7 trillion dollars.

Emerging markets in South/East Asia represent an extreme example of this shifting tendency in the sign of persistent CA imbalances. In 1994, about half of these economies were running persistent deficits and only Singapore was running continuing surpluses. Ten years later, all of these economies were involved in persistent current account surpluses for a face value of almost 1 trillion dollars.

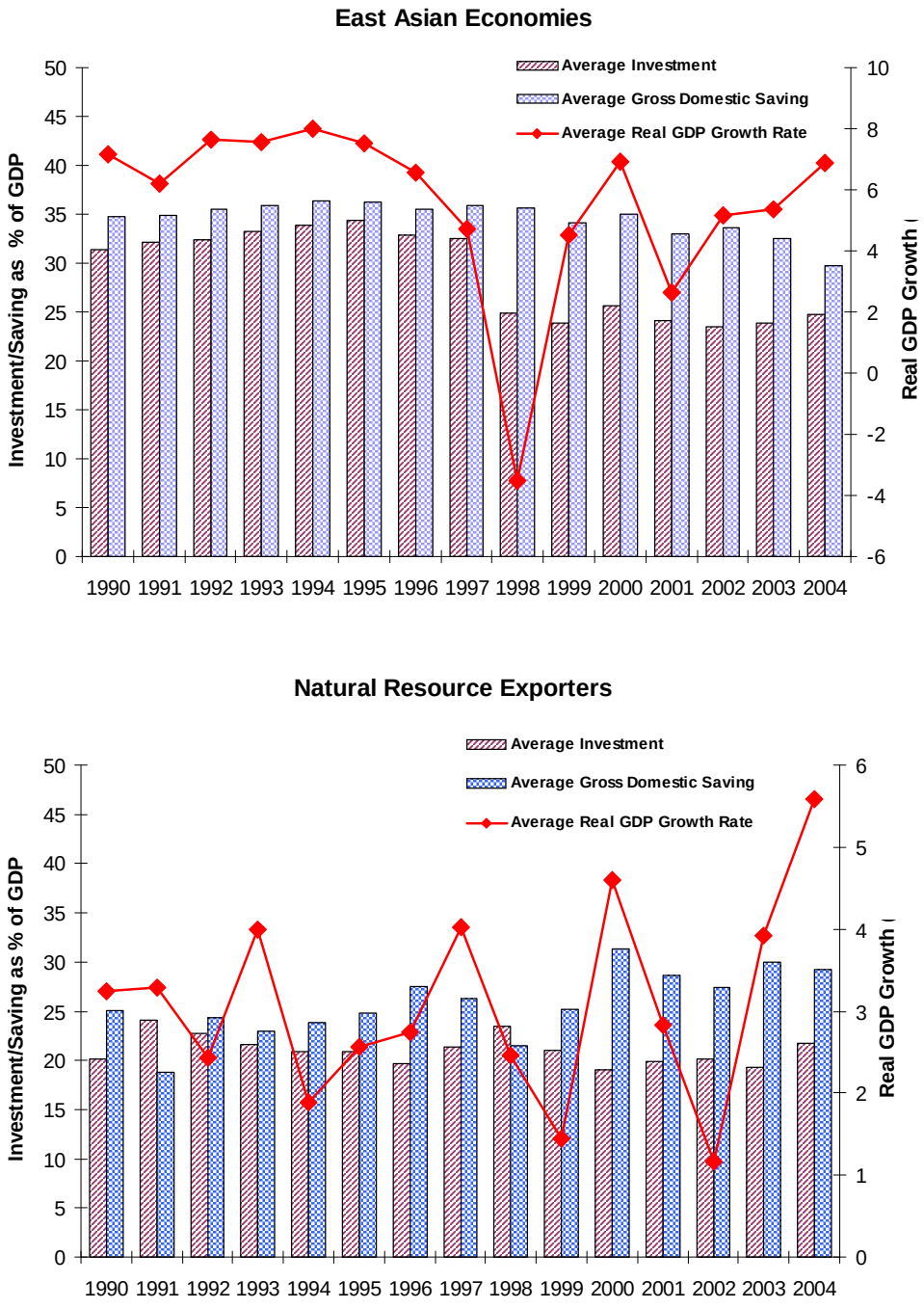
Another interesting subgroup of countries is composed by the top net exporters of natural resources. These countries have also experienced an impressive change in their net external positions in the last 10 years. Out of the seven countries engaged in deficits in 1994, only Australia, with a long history of deficits and South Africa, continued to run negative balances in 2004. The remaining countries shifted to positive balances with joined surpluses in excess of .8 trillion dollars, 17 times the face value of joined surpluses in 1994. The change in size of these imbalances relative to aggregate output is also remarkable with a net increase slightly above 4 percentage points.

Finally, Emerging markets in Latin America seem to break the trend and the region remained a bastion of negative balances. Curiously enough, the only three Latin American economies running surpluses in 2004 were Argentina, Venezuela and Chile. While the former was coming out of its 2001 crisis, the latter belong to the group of top natural resource exporters.

Supported by the facts exposed above, this paper highlights the fact that persistent surplus episodes have adopted a prominent role in global imbalances in the last decade. This important role may have its roots on export-led-growth (ELG) developing strategies and new stabilization policies from countries exporting natural resources.

Depending on each of these different roots, CA surpluses originate from distinct dynamics in the Investment-Saving decisions. Figure 3 below illustrates the evolution of investment and domestic savings for the cases of East Asian economies and natural resource exporters in the last 15 years.

Figure 3: Investment-Saving Dynamics in East Asia and Natural Resource Countries



Sources: Wdi, Author calculations

As we can observe, ELG is distinguished by substantial export growth, followed by high rates of real output growth and, depending on the absorption ability of the economy, high rates of domestic savings. If domestic savings are not matched with high levels of investment (as in the case of East Asia after the 1997 crisis); then, "savings gluts" will emerge and the external balance will turn positive.

In the case of Natural Resource countries, the use of fiscal stabilization policies (FSP) around export revenues will cause an increase in domestic savings when revenues are high. Given stable investment ratios, this burst of domestic savings will create persistent positive external imbalances linked to high export revenue periods.

Economic Characteristics of Persistent CA Episodes

A key factor to understand the economics behind CA episodes is the origin of the capital flows financing/offsetting these imbalances. From a theoretical point of view, we have seen there is an incentive for developing markets to become long term international debtors as long as international private creditors believe that the former are solvent in terms of future net exports. To the extent that this is a win-win situation for private agents (higher development in exchange of higher yields associated with higher growth); the opportunities for official intervention are scarce, with the exception of policies limiting the adverse effects of massive capital inflows[9]. In this scenario, we would expect the fraction of CA deficits financed by official capital inflows to be minor. In contrast, a common characteristic of the two possible roots of CA surplus mentioned above (ELG and FSP) is the need of substantial official intervention for these policies to work. As for ELG, these strategies require a subdued undervalued exchange rate. The combination of capital controls and foreign market interventions are the only effective way of ensuring the degree of export growth necessary for the development strategy to work. In the case of FSP, the official sector creates stabilization funds, denominated in foreign assets, to help inter-temporally smooth fiscal balances or simply act as saving funds for future

[9] see Williamson (1995)

generations[10]. Given that these funds work through the official sector accumulating foreign assets, we should expect surplus episodes in these economies to be offset for the most part by official outflows.

The empirical evidence of this paper seems to support the previous set of assumptions. In particular, table 3 below shows that official sectors in developing countries use capital outflows to offset more than 56 percent of total CA surpluses during persistent episodes, almost 10 percent more than the average official share for the entire period.

Table 3: Share of Official Financing/Offsetting of Current Account Episodes

	Total Percentage of CA Financed/Offset by Official Flows All Period (%)	Total Percentage of CA Financed/Offset by Official Flows During Episodes (%)		Excess Official Intervention During the Episodes (%)	
	All Episodes	Surplus	Deficits	Surplus	Deficits
All countries	40.6	32.8	45.8	-7.8	5.2
Industrial	38.4	20.9	49.7	-17.5	11.3
Developing	45.8	56.2	34.8	10.4	-11
South/East Asia (NIE)	50.4	60.1	28.2	9.7	-22.2
Latin America	34.6	38.4	31.6	3.8	-3
Natural Resource Countries	44.1	56.7	29.5	12.6	-14.6
Manufactures Countries	30	41	45.1	11	15.1

Sources: Author Calculations

The reverse is true for persistent episodes of current account deficits, where private inflows finance more than 73 percent of total CA deficits, 11 percent more than the average during the whole period. As predicted, these effects are reinforced by such cases as South/East Asian emerging markets and Natural Resources countries, with an official share differential between surplus and deficit episodes of 32 and 27 percent, respectively. Latin American economies, traditionally involved in persistent deficits, have their

[10] Countries like Canada, Norway, Venezuela, Kuwait, Oman or Russia have started stabilization funds denominated in foreign assets. See Ossowski & Barnett (2001) for a deeper analysis of these funds and policies.

external balances clearly dominated by net private flows. Interestingly, industrial economies display the opposite results, with private flows in the driver's seat of surplus episodes and official flows financing almost half the total of CA deficits. This result may be in part the consequence of European economies massive intervention to defend their overvalued currencies.

International Reserve Assets

International Reserve (IR) accumulation by surplus countries has captured the attention of many researchers in recent years. Indeed, international reserves are at the core of my previous analysis of official capital flows[11]. Table 4 provides an insight into the manner in which countries manage their foreign liquid assets during persistent runs of CA.

Table 4: International Reserves Assets during Current Account Episodes.

	(1) Average Reserves During Episode as % of GDP		(2) Average Excess Reserves During Episode		(3) % Change of Reserve Position During Episode		(4) Average Change Of Reserves Per Year As Percent of GDP	
	Surplus	**Deficits**	**Surplus**	**Deficits**	**Surplus**	**Deficits**	**Surplus**	**Deficits**
All countries	15.97	9.84	1.85	-1.06	113.77	187.89	1.14	0.01
Industrial	6.27	5.57	0.03	-0.17	54.03	-2.97	0.38	-0.16
Developing	18.86	10.53	2.38	-1.23	132.02	221.57	1.37	0.05
South/East Asia (NIE)	26.61	11.06	4.77	-3.35	111.37	41.01	1.24	0.17
Latin America	11.05	6.98	1.29	-0.79	81.5	56.5	1.39	0.02
Natural Resource Countries	12.38	7.8	0.71	-1.33	70.81	20.97	0.85	-0.19
Manufactures Countries	5.64	4.67	0.5	-1.1	82.94	-4.02	0.31	-0.11

Sources: Author Calculations

The data displayed in the first two columns of table 4 confirm that, on average, the holdings of international reserves are significantly higher during surplus episodes. Similarly, during these persistent episodes of CA surplus, the average IR position consistently exceeds the average over the whole sample. South/East Asia is worth

[11] Some degree of international liquidity is always desirable for developing economies. See Aizenman and Marion (2002), Aizenman and Riera-Crichton (2006), Obsfeld et al (2008).

mentioning here as the extreme case with average IR holdings of approximately 26.6 percent of aggregate output and average excess holdings of nearly 4.8 percent of GDP. The last two columns in table 4 provide information about the evolution of IR during the different CA episodes. Column 3 seems to indicate that, on average, developing countries increase their IR positions significantly during deficit runs. This result can be misleading, since concluded from table 2, on average, persistent deficit episodes last twice as long as persistent positive external balances. To obtain a more accurate proxy for reserves accumulation intensity during persistent episodes of current account imbalances, I deflate the change in the country's IR position by the length of the episode. The results are presented in column 4 above, where the change in IR is measured as yearly increases in terms of GDP. This intensity measure provides a more realistic view of the dynamics of IR associated with CA episodes. The new measure indicates that surplus episodes in developing countries are characterized by severe accumulations of IR (1.37 percent of GDP per year during the episodes). In contrast, deficit episodes in those countries are distinguished by minor increments in their IR position (.05 percentage points per year). In this case, even though close to zero, the positive accumulation of reserves may be puzzling. We believe that sterilizations of net private capital inflows may lead to limited, but positive increments of IR. As anticipated, NR countries display a positive correlation between reserve accumulation and current account that can be associated with the works of stabilization funds. Industrial countries exhibit this positive correlation, as well. The active utilization of IR by countries defending their overvalued currencies may explain the significant .16 percent GDP annual loss of IR during deficit periods in those countries.

Real Aggregate Output Growth

According to our basic theoretical premises, current account dynamics can be positively associated with persistent but non-permanent output shocks. Besides, countries using international borrowing against future net exports to converge to their steady state will grow at faster rates during CA deficits. ELG strategies are less committed to a specific international position. With high output growth as a result of the development strategy,

the final CA sign will depend on the ability of the country to offset increases in gross domestic savings with higher rates of investment.

Table 5 below displays the results of economies output performance during persistent CA episodes. Industrial countries, presumably operating around their steady state, show a small but positive correlation between excess output growth and the sign of current account imbalances during the episodes. Latin American economies, paladins of net borrowing as a development strategy, exhibit output growth rates during deficit episodes twice as large as those of surplus episodes. These countries are clearly affected by their short surplus periods (see table 1), experiencing growth rates lower by more than 1 percentage point per year during these episodes.

Table 5: Real GDP Growth during Episodes of Persistent CA

	Average Yearly Real GDP Growth During Episodes (%)		Average Excess Yearly Real GDP Growth Over whole sample (%)	
	Surplus	**Deficits**	**Surplus**	**Deficits**
All countries	3.8	3.54	0.27	0.02
Industrial	2.66	2.73	0.07	-0.09
Developing	4.14	3.67	0.32	0.03
South/East Asia (NIE)	6.3	6.64	-0.69	0.53
Latin America	1.74	3.73	-1.02	0.45
Natural Resource Countries	3.57	3.07	0.16	-0.61
Manufactures Countries	3.71	3.76	0.55	0.01

Sources: Wdi, Author calculations

South/East Asian markets reveal a similar pattern. However, due to their high growth rates during the entire period, the relative impact of different CA imbalances is significantly smaller than in other emerging markets.

Inflation and Interest Rates

Both short-term domestic interest rates and price level inflation are important factors determining the current account. Interest rates affect the attractiveness of investment versus domestic savings. Moreover, both variables have a key role in the determination of the real exchange rate; subsequently, in the attraction of foreign capital.

Table 6 below shows striking differences between Latin American and South/East Asian economies. These divergences are better understood if we assume that persistent surpluses in Latin America are probably associated with periods where these economies are unable to borrow due to economic turmoil. High inflation and high interest rates are related to these periods of economic trouble. In fact, the third column in table 6 offers a measure of "pressure", confirming a significant decrease in both variables rates during the episode; hence, leading towards the next run of deficits with a more "healthy" economy.

Table 6: Inflation and Short Term Interest Rates during Current Account Episodes

		Inflation			Interest Rates		
		Average Rate During Episode	Excess Rate During Episode	Average Change Per Year	Average Rate During Episode	Excess Rate During Episode	Average Change Per Year
All countries	**Surplus**	11.49	1.63	-0.42	10.93	0.36	-0.68
	Deficits	12.38	0.16	0.12	13.44	0.3	-0.08
Industrial	**Surplus**	5.93	-0.11	-0.27	6.71	-0.78	-0.47
	Deficits	10.01	1.48	0.06	10.58	0.94	0.29
Developing	**Surplus**	13.15	2.14	-0.47	12.39	0.79	-0.74
	Deficits	12.76	-0.09	0.13	13.98	0.16	-0.16
South/East Asia	**Surplus**	4.68	-0.9	-0.14	5.83	-0.84	-0.61
	Deficits	9.82	0.96	-0.26	9.33	0.74	0.07
South/East Asia (NIE)	**Surplus**	4.76	-1.4	-0.05	5.96	-1.14	-0.57
	Deficits	9.59	0.35	-0.16	9.27	0.43	-0.01
Latin America	**Surplus**	30.72	8.98	-2.39	27.99	2.91	-1.13
	Deficits	18.97	0.77	1.45	23.71	-0.5	0
Natural Resource Countries	**Surplus**	19.36	4.99	-1.72	18.45	2.58	-0.54
	Deficits	12.41	-1.29	1.5	12.34	-2.04	-0.51
Manufactures Countries	**Surplus**	4.37	-1.56	-0.22	5.74	-1.6	-0.53
	Deficits	9.35	2.07	-0.33	9.34	1.19	0.17

Sources: IFS, Wdi, Author calculations.

In contrast, South/East Asian economies under ELG strategies will need to control both interest rates at low levels to promote investment and inflation to keep the real exchange rate at low levels[12].

2. What are the determinants behind reversals of persistent CA imbalances?

This section is framed around a conditional fixed-effects logistic model aimed at identifying which variables affect the probability of ending a persistent current account episode.

Conditional fixed-effects logistic regression

Our econometric model is based on a conditional fixed-effect logistic model. This approach is used to cleanse my regression from possible correlations steaming from common factors to each country.

$$\text{logit}\{E(Y_{it}|\mathbf{X}_i)\} = q_i + X'_{it}\beta$$

where X_{it} is a vector of time-varying covariates, β a vector of regression coefficients, $\mathbf{X}_i$ the matrix $\mathbf{X}_i = (X_{i1}, \ldots, X_{iJ})'$ and q_i the country-specific intercept that accounts for the fact that the components of the vector $\mathbf{Y}_i = (Y_{i1}, \ldots, Y_{iJ})'$ are repeated measures on a single country *i*. Y_{it} represents the binary outcome variable on country i at time t:

$$Y_{it} = \begin{cases} 1 & \textit{IF CA REVERSAL} \\ 0 & \textit{IF NO REVERSAL} \quad (\textit{Conditional on being in a CA episode}) \end{cases}$$

[12] See for example Rajan (2005) in a recent talk about the Chinese CA surplus.

Tables 7 and 8 below show the results for deficit and surplus reversals, respectively.

High ratios of investment (Savings) over GDP improve (decline) the sustainability of deficit episodes and increase (decrease) the probability of surplus reversals. This result comes from the combination of several effects. The direct effect is definitional, with I = S_d-CA, such that, increments in investment for a given level of domestic savings will reduce the CA balance. For countries running deficits as part of their development strategy, higher investment translates into larger output growth and greater future exports helping the country be perceived as solvent. For countries following ELG strategies, high levels of investment help absorb the output generated by fast export growth and, thus, sustain deficits.

Even though, we theoretically uncovered the positive relationship between CA and non-permanent output shocks around steady state equilibriums, high levels of output growth seem to help preserve negative imbalances while increasing the probability of surplus reversals. For net borrowers, high output growth represents proof of future solvency. Natural resource countries may opt to reduce their accumulated foreign assets to mitigate the negative effects of output slowdown creating a negative relationship between CA and GDP growth rates.

Terms of trade are considered exogenous shocks, par excellence. Assuming slow adjustment in the demand for imports, sudden improvement in terms of trade will increase net exports[13], the probabilities of a reversal from deficit episodes and will help perpetuate surplus runs.

Increases in real exchange rate appreciation (REER) rates help sustain persistent external deficits. More surprising is the coefficient for REER in levels. This coefficient, although marginally significant, seems to indicate that low values of REER will also be associated reversals from surplus episodes.

[13] Running a fixed-effects panel regression on the effect of changes in the ToT on net exports as a percentage of GDP results in the following clear positive relationship:

$$Net\ Exports = \underset{(0.01)}{0.08} * \Delta ToT$$

with robust standard errors between brackets

Both logistic models show a symmetric reaction to changes in short-term international interest rates spreads. Low (or negative) spreads rates will drive private savings abroad increasing capital outflows; hence, enlarging CA balance. Accordingly, we observe a positive correlation between relative interest rates and the probability of reversal for negative external balances. Similarly, increments in relative interest rates will reduce the probability of surplus reversals.

The stock of international reserve assets (IR) also seems associated to reversals of the current account. High ratios of IR over GDP will signal solvency to foreign investors helping prevent reversals from deficit positions. Conversely, excess holdings of reserves may be a sign of excess pressure from net private inflows and may enhance the probability of surplus reversals indicated by the positive coefficient in my regression.

Price inflation and its associated distortions seem to have the same negative effect on the persistence of both surplus and deficit episodes enhancing the probability of reversals in both cases.

From a private investor's perspective, high ratios of external debt to GDP will act in detriment to the perceived solvency of the country. Bearing this premise in mind, external debt helps increase the probability of reversals during deficit episodes. The negative coefficient in the surplus regression may be triggered by countries whose high levels of debt force them into persistent periods of CA surplus given their inability to borrow internationally.

Neither fiscal balances nor my measure of trade openness had significant coefficients across any of the specifications I tried for both models.

Table 7: Results from a Pooled Logit Model for Reversals of CA Deficit Episodes.

Dependent Variable: Deficit Reversals	Specification 1	Specification 2	Specification 3	Specification 4	Specification 5
Investment	-3.618***	-3.412***	-2.695**		-3.398***
	[1.021]	[0.914]	[1.185]		[0.899]
Domestic Savings	2.482***	2.112***	2.657**	1.052*	2.430***
	[0.747]	[0.639]	[1.080]	[0.582]	[0.742]
GDP Growth	-13.420***	-14.963***	-18.970***	-10.487***	-17.260***
	[3.144]	[2.889]	[4.318]	[2.950]	[3.418]
Trade Openness	-1.523	-0.976	-0.869	-0.825	-0.605
	[1.378]	[1.354]	[1.952]	[1.708]	[1.390]
∆REER	-4.402***		-3.433**	-3.781***	-3.990***
	[0.978]		[1.348]	[0.921]	[0.995]
∆TOT	5.233***	5.323***	5.278***	3.447***	5.522***
	[1.364]	[1.212]	[1.912]	[1.191]	[1.313]
Interest Differential	5.188**	5.320***			
	[2.182]	[1.969]			
Foreign Reserves		-5.684*			
		[3.135]			
Fiscal Balance			-0.629		
			[0.555]		
External Debt				2.818**	
				[1.309]	
Price Inflation					2.802*
					[1.455]
Observations	778	939	511	540	820
Number of Countries	53	62	37	35	52

Notes: Estimation by pooled logit with country fixed effects (standard errors in brackets). For this regression I only take into account periods under persistent current account episodes and their reversals. Dependent variable takes the value 1 if a reversal takes place at time t and zero otherwise. * Significant at 10%; ** significant at 5%; *** significant at 1% confidence level. All variables are lagged 1 period except for the percent changes of REER and TOT. Time dummies were excluded based on a joint F-test.

Table 8: Results from a Pooled Logit Model for Reversals of CA Surplus Episodes.

Dependent Variable: Surplus Reversals	**Specification 1**	**Specification 2**	**Specification 3**	**Specification 4**
Investment	5.935***	2.424**		5.845*
	[1.887]	[1.220]		[3.260]
Domestic Savings	-4.672***		-2.432***	-9.697***
	[1.687]		[0.670]	[3.562]
GDP Growth	13.509*	13.033*	13.859***	18.607
	[7.289]	[7.207]	[4.334]	[13.696]
∆TOT	-10.663***	-7.573***		-9.443***
	[2.696]	[2.196]		[3.665]
Trade Openness	0.767	-0.799	1.436	-8.557
	[2.370]	[2.159]	[1.382]	[5.804]
Interest Differential	-7.832*	-6.095*	-5.354**	-10.275*
	[4.094]	[3.682]	[2.622]	[5.878]
REER	-2.427*	-1.524		-5.093**
	[1.251]	[1.154]		[2.290]
∆REER	-0.019	-2.066		
	[2.255]	[2.117]		
Foreign Reserves		7.035*	6.891**	28.671***
		[4.250]	[3.123]	[10.680]
Price Inflation			4.267**	
			[2.046]	
External Debt				-11.814*
				[6.575]
Observations	333	350	486	105
Number of Countries	31	33	46	13

Notes: Estimation by pooled logit with country fixed effects (standard errors in brackets). For this regression I only take into account the periods under persistent current account episodes and their reversals. Dependent variable takes the value 1 if a reversal takes place at time t and zero otherwise. * Significant at 10%; ** significant at 5%; *** significant at 1% confidence level. All variables are lagged 1 period except the percent changes of REER and TOT. Time dummies were excluded based on a joint F-test.

3. The Aftermath of Persistent Current Account Episodes

Real Output Growth

Could a simple RBC open economy model predict the aftermath of current account reversals for surplus and deficit episodes? As for the theoretical framework, I follow Chari, Kehoe & McGrattan (2006) in designing a simple small open economy with collateral constrains to borrowing where the country's budget constrain is:

$$c(s_t) + b(s_t) + k(s_t) \leq F(k(s_{t-1}), l(s_t)) + (1-\sigma)k(s_{t-1}) + \sum_{s_{t+1}/s_t} q(s_{t+1})b(s_{t+1})$$

Where s_t represents the history of events up to time t (the state of nature), and q is the state contingent price of next period debt. The amount of borrowing is limited by a collateral constraint and net exports are defined as:

$$F(k(s_{t-1}), l(s_t)) + (1-\sigma)k(s_{t-1}) - c(s_t) - k(s_t)$$

Net exports are also exactly equal to the net change in foreign assets defined as:

$$b(s_t) - \sum_{s_{t+1}/s_t} q(s_{t+1})b(s_{t+1})$$

Chari, Kehoe & McGrattan demonstrate that an abrupt rise in net exports in this economy is analogous with an increase in government consumption for a closed economy[14]. From this type of RBC models, it is a well known fact that increments in government consumption rise labor and thus output[15].

This simple model predicts output increases from deficit reversals and output falls from surplus reversals.

Figure 4 sets up the evolution of average output growth rates during the end-game for surplus and deficit episodes[16]. As we can observe, surplus episodes seem to follow the rules exposed by our simple model with a drop in the average growth rates in excess of 1 percentage point. Similarly, deficit episodes also seem to observe these rules; however,

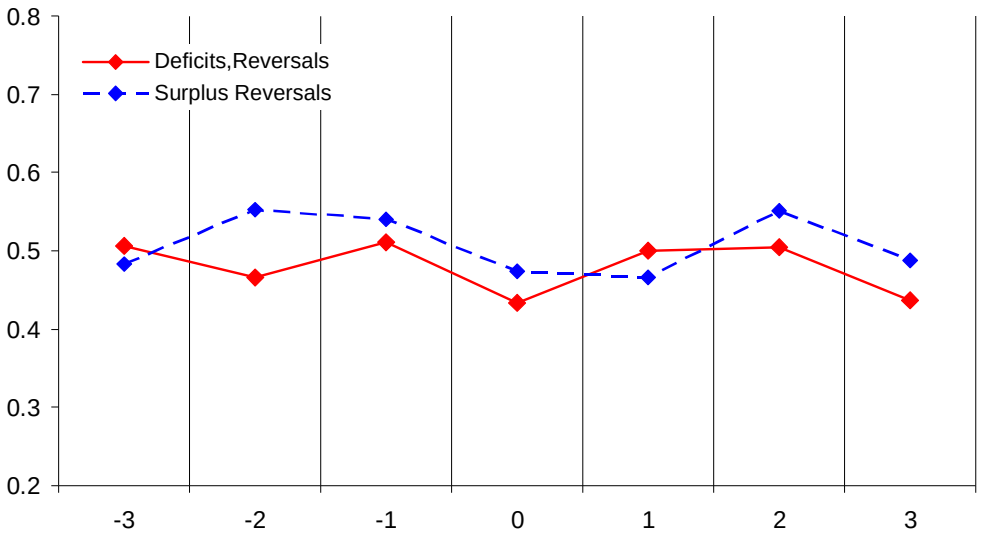
[14] See Chari, Kehoe & McGrattan (2004)
[15] See Aiyagari, Christiano & Eichembaum (1992)
[16] A similar analysis has been done for the case of CA and REER in Dooley and Garber (2005)

after the reversal, it takes one more period for the output growth to soar. This delayed pattern is followed by all subgroups in the sample.

Capital Flows

According to sudden stop literature, strong reversals in current account deficits are normally accompanied by reversals in private capital inflows. This is clearly displayed in the second graph in Figure 5, where, in the period previous to the reversal, net private inflows accounted for 2.2 percent of GDP; whereas, in the next period, net private outflows amounted to 2.7 percent of GDP, representing an average reversal of practically 5 percent of GDP. Less acknowledged is the behavior of private flows during surplus reversals. Gathered from the first graph in Figure 5, net private flows in these cases react symmetrically to deficit episodes with an average reversal from net outflows to net inflows of almost 4.2 percent of GDP.

Figure 7: Percent of the Financing/Offsetting of the CA attributed to Official Flows



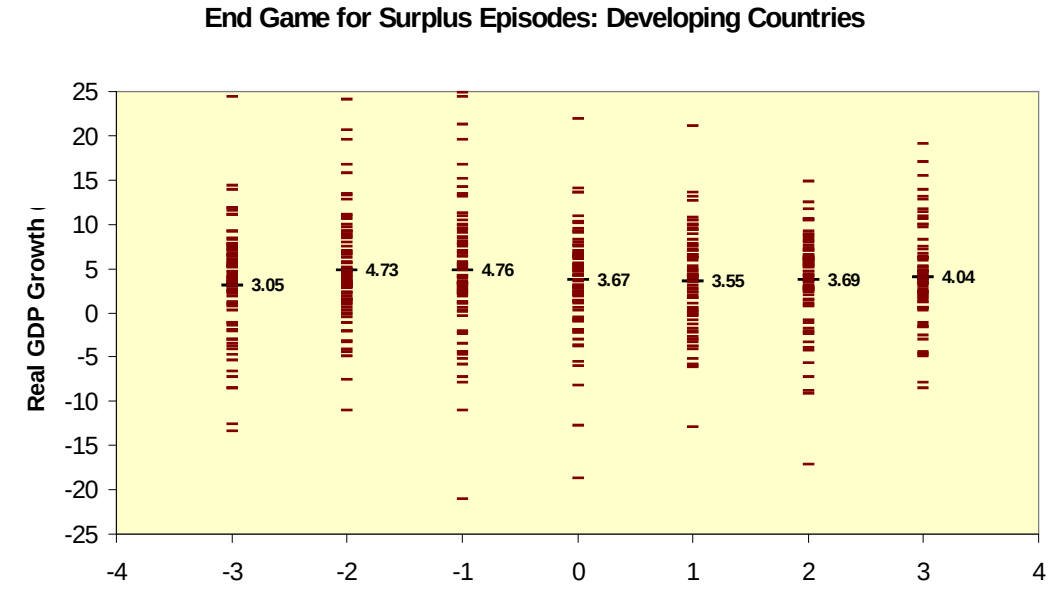
Notes: Y-axis represents the percentage of CA financed/offset by official flows, X-axis is the periods around CA episodes reversals for developing countries with 0 representing the first period after the reversal
Sources: Author Calculations

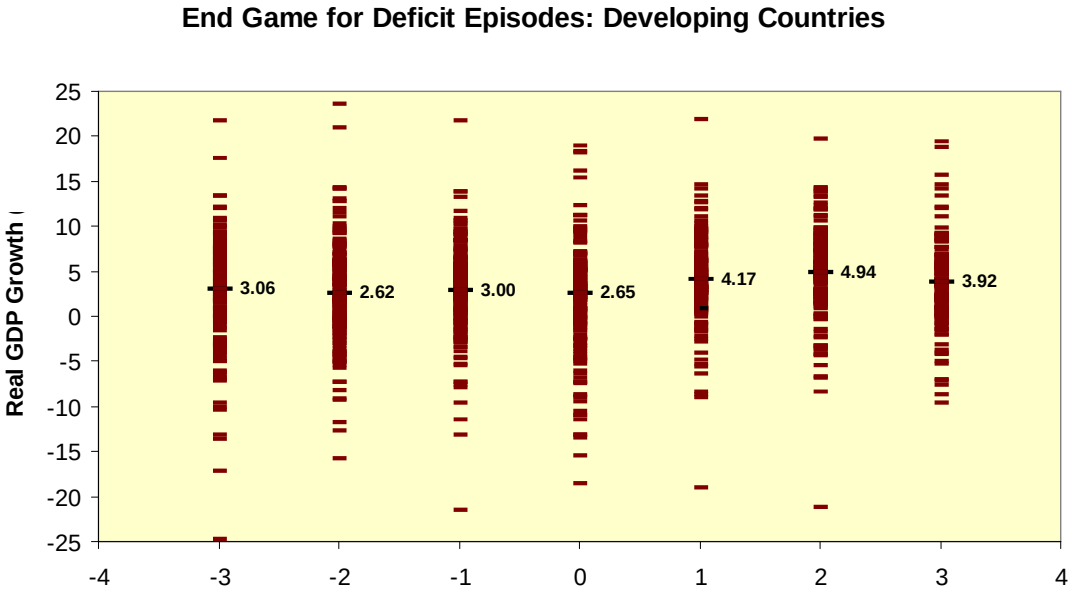
Interestingly, the relative position between private and official flows is not symmetric and, in both cases, private flows increase their influence in the determination of the CA (see Figure 7). In the case of emerging market in South/East Asia, this fact is even more noticeable with an approximate 25 percent drop in the official role of CA determination

Real Effective Exchange Rates

From Figure 5 and the reaction of net private flows to both surplus and deficit reversals, we would expect strong real depreciations/appreciation accompanying such reversals. Figure 6 displays the evolution of REER around the end-game. As predicted, deficit reversals are matched with significant real depreciations (averaging 6 percent). This is not the case for surplus episodes, where, we observe, on average, a small depreciation in the real exchange rate. This depreciation is more salient for South/East Asian economies averaging nearly 3 percent.

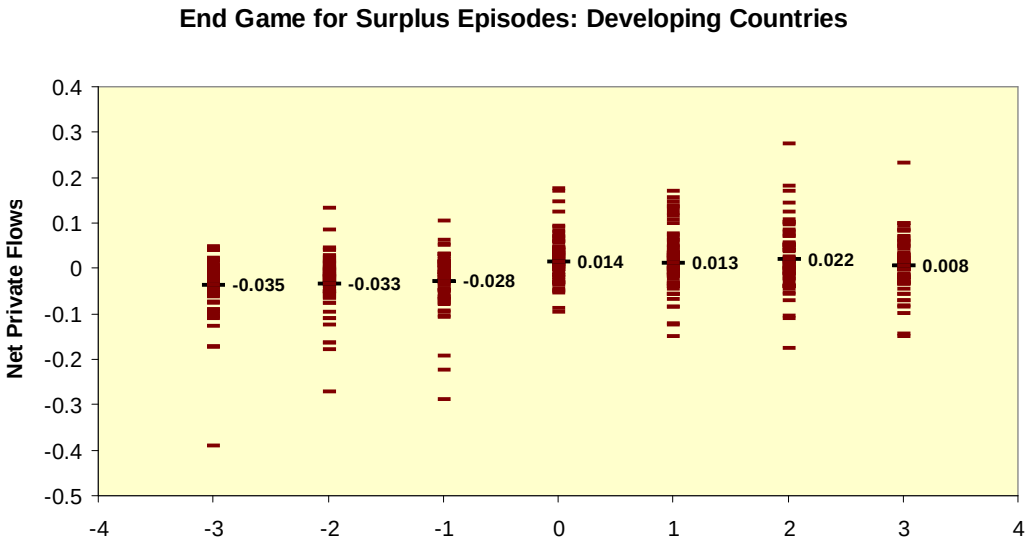
Figure 4: Output Growth Dynamics at the End-Game.

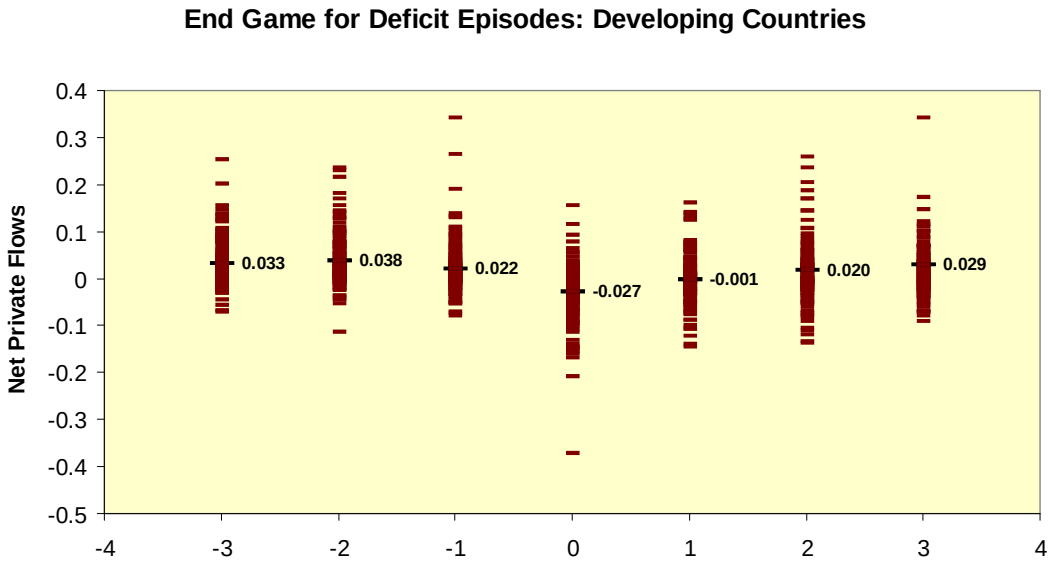




Notes: Averages in Bold. 0 represents the X-axis represents the periods around each country's reversal with 0 being first period after the reversal
Sources: Wdi, Author Calculations

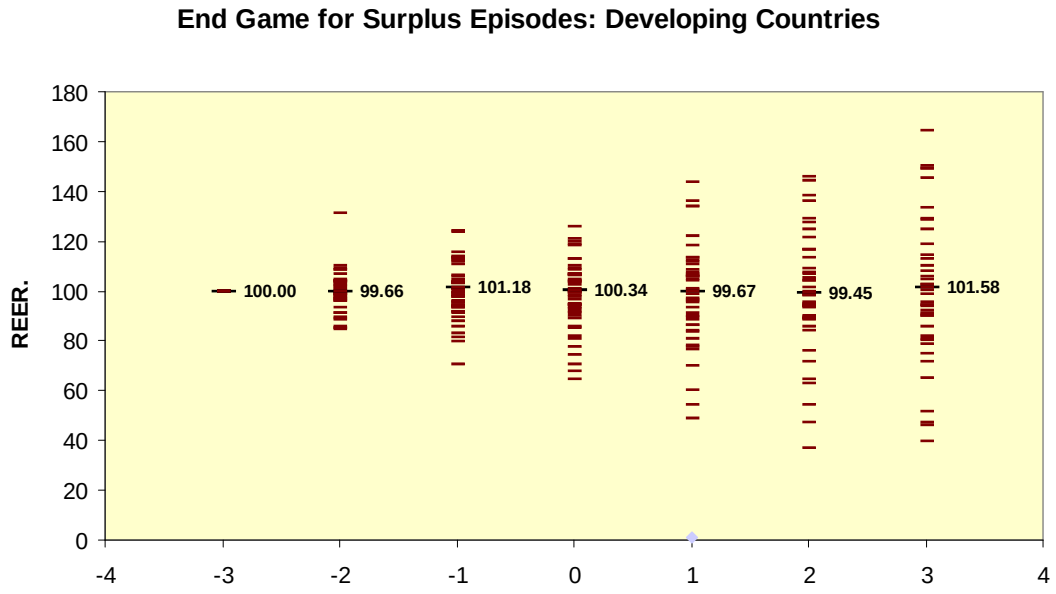
Figure 5: Net Private Capital Flows Dynamics at the End-Game.

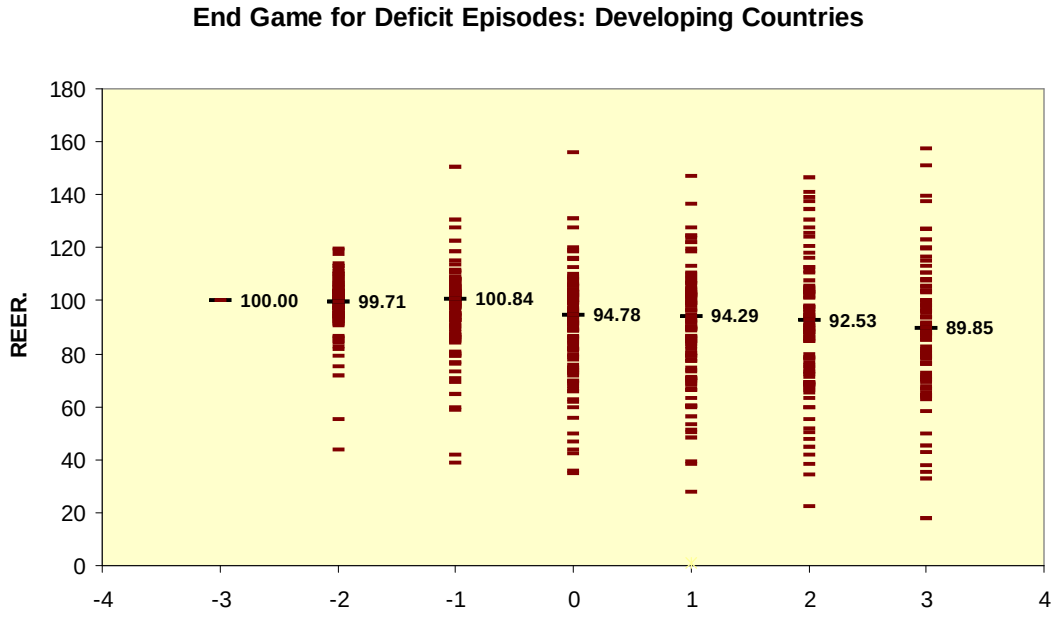




Notes: Averages in Bold. 0 represents the X-axis represents the periods around each country's reversal with 0 being first period after the reversal
Sources: Wdi, Author Calculations

Figure 6: REER Dynamics at the End-Game.





Notes: Averages in Bold. 0 represents the X-axis represents the periods around each country's reversal with 0 being first period after the reversal. REER has been rebased so t-3=100
Sources: Wdi, Author Calculations

4. Final Remarks

Economic theory demonstrates that persistent surplus can be associated with persistent non-permanent positive shocks to output, or to long periods where developing economies are unable to borrow given their perceived insolvency. This paper highlights export-led-growth and fiscal stabilization policies as two other possible scenarios for persistent positive external imbalances. To this end, my empirical results show that emerging markets in Asia, following fast export growth development strategies, as well as top net exporters of natural resources have been running persistent CA surpluses in the last fifteen years.

Among the main characteristics of persistent CA episodes, I reveal that deficit episodes are financed mainly by private net capital inflows; whereas, official flows have a more prominent role in the determination of persistent surpluses. This role may be attributable to official sectors by either, offsetting private inflows to maintain the desired level of exchange rate[17], or accumulating savings in foreign assets to create funds with the purpose of stabilizing fiscal revenue from net exports. Fast increase in official reserves is generally attributed to all surplus episodes; while, on average, industrial as well as natural resource exporter countries experience a loss of these assets during deficit episodes.

In addition, I uncover significant differences in the characteristics of deficit and surplus episodes across emerging markets in Latin America and those in Asia. In terms of output performance, Latin American economies suffer a significant decrease in output growth during surplus episodes. Conversely, in Asian economies, the negative effect is small with a similar average output growth in both types of episodes. Moreover, while higher inflation and interest rates are associated with surplus episodes in Latin America, in Asian emerging markets, both variables are significantly lower in surplus than in deficit episodes.

Regarding the determinants of current account reversals, I conclude that higher investment, faster output growth, higher interest rates differentials, worsening in the terms of trade, and finally, increase in international reserve holdings help sustain current

[17] There is also a collateral story were official savings in foreign assets may serve as collateral for foreign investment; see Dooley, Folkerts-Landau & Garber (2003).

account deficits, while increasing the probability of reversal during episodes of current account surplus. Interestingly, surplus episodes seem to be resilient to real appreciations, whereas changes in the appreciation rates will significantly reduce the probability of ending deficit episodes. Finally, higher inflation rates increase the probability of reversals in both cases.

The end-games to surplus episodes also provide some interesting results. Firstly, whereas output growth reacts negatively to surplus reversals, it takes 1 year, on average, to increase output growth rates after the end of a deficit run. Secondly, the reverse of sudden stops of net private flows for deficit episodes holds true for surplus reversals, where net private outflows become net private inflows with an average shift over 4 percent of GDP. Accordingly, real exchange rates, after deficit episodes end, rapidly depreciate. Surplus episodes differ from their deficit counterparts in an unexpected small average depreciation after the reversal.

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