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Global Imbalances and Capital Account Openness: an Empirical Analysis[*]

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Abstract.

We investigate if capital account openness has played a major role in the evolution of global imbalances on the period 1980-2003. We estimate, with panel regression techniques, the impact of capital account openness on medium-term current account imbalances for industrialized and emerging countries by using a *de jure* measure of capital account openness (the Chinn-Ito index of capital account openness, 2002, 2006) and a *de facto* measure of capital account openness (the gross foreign assets measured as the sum of foreign assets and foreign liabilities). By increasing the opportunities of overseas investments, the relative capital account openness has had positive impact on medium-term current account balances of industrialized countries (because of downward pressures on domestic investment rates). Conversely, the relative capital account openness has had negative impact on medium-term current account balances of emerging countries (because of upward pressures on domestic investment rates). Nowadays, current account imbalances are larger in reason of higher capital mobility. Nevertheless, a large part of imbalances may be considered as unrelated with the evolution of macroeconomic fundamentals.

JEL Classification: C23, F31, F41.
Key words: Global Imbalances, Capital Account Openness, Panel Data.

1 Introduction

Current account imbalances have grown significantly the last fifteen years. Several factors have been designated, in the literature, as the main drivers of these imbalances: growth differentials, saving and investment rate differences, exchange rate misalignments and financial openness (i.e. capital account openness).

Since the middle of the 1990s, global imbalances intensify to reach a climax before the financial crisis in 2006-08. These evolutions can be considered as unsustainable and they have been one of the underlying causes of the financial crisis[1]. In 2006, the main contributors of these imbalances are the United States (with a deficit of more than 1.6 percent of world GDP), China and Asian countries and the oil exporters' countries (with a joint surplus of more than 1.8 percent of world GDP) as shown in figure 1.

Global imbalances are a threat to the global macroeconomic stability. Therefore identify the main causes and drivers of these imbalances seem to be crucial. We estimate, with panel regression techniques, the impact of capital account openness on medium-term current account imbalances for industrialized and emerging countries by using a *de jure* measure of capital account openness (the Chinn-Ito index of capital account openness, 2002, 2006) and a *de facto* measure of capital account openness (the gross foreign assets measured as the sum of foreign assets and foreign liabilities). The main finding is that the relative capital account openness (measured relatively to world average) has played a significant role on the magnitude of medium-term current account. By increasing the opportunities of overseas investments, the relative financial openness has had positive impact on medium-term current account balances of industrialized countries (because of downward pressures on domestic investment rates). Conversely, the relative financial openness has had negative impact on medium-term current account balances of emerging countries (because of upward pressures on domestic investment rates).

For a number of industrialized countries, the evolution of the relative financial openness (which has dropped since the middle of the 1980s since they have already liberalized their capital account and that the world average has followed an increasing trend) has had a negative impact on medium-term current account balances. For South-East Asian countries, the evolution of the relative financial openness (which has dropped since the middle of the 1980s since these countries have liberalized their capital account more slowly than the world average) has had a positive impact on medium-term current account balances. This paper is organized as follow. Section 2 presents various approaches which have been proposed to shed light on the development of global imbalances since the mid-1990s. Section

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[1]Serven and Nguyen (2010) examine the different views on the role of the global imbalances before and after the beginning of the crisis.

3 provides empirical results of the current account regressions. Section 4 studies in greater details the contributions of each explanatory variable to the medium-term current account. Section 5 concludes.

Figure 1: Current account balances as percent of world GDP
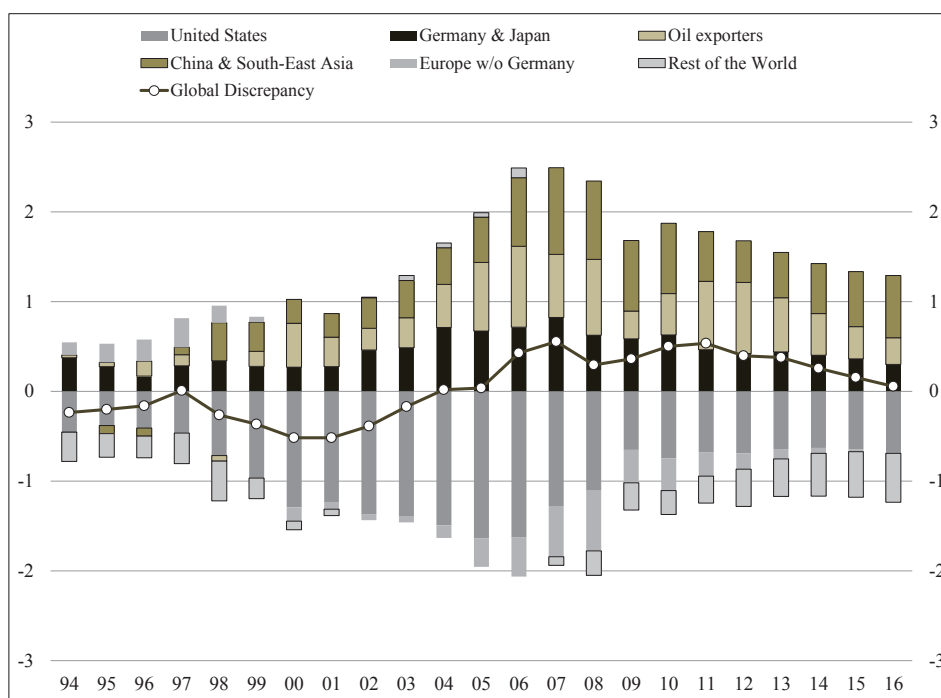
2   Explanatory approaches of global imbalances

Various explanations have been proposed to shed light on the surge of global imbalances observed since the middle of the 1990s among them we can find the Saving-Investment approach, the Intertemporal approach, the Global Saving Glut hypothesis, Bretton-Woods II and East Asian Mercantilism versus Self-protection[2].

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[2]Chinn (2011) provides a large survey on these different approaches and the corresponding empirical findings.

- *The Saving-Investment approach*

From the point of view of the national account identity, the external sector balance (the current account balance) can be seen as the sum of the public sector balance and the private sector balance:

$$Y + M \equiv C + I + G + X \tag{1}$$

If we introduce the public receipts net of transfer payments in the equation (1), we obtained this new relationship (equation (2)):

$$CA \equiv [T - G] + [S - I] \tag{2}$$

With Y, gross domestic product; C, private consumption; I, private investment; G, government spending; X, Exports; M, Imports; $[S - I]$, private sector saving-investment balance, CA, current account balance.

The issues surrounding global imbalances can be analyzed as imbalances in domestic saving rates and domestic investment rates in the main economic areas at world scale. These imbalances could have been accentuated by financial openness (i.e. openness of the capital account) which has increased on the period 1980-2003 at the world level.

- *The Intertemporal approach*

The intertemporal approach is based on the behavior of rational expectation agent which maximizes utility function under a budget constraint. They smooth consumption by borrowing and saving thus current consumption is equal to a discounted value of future expected net output or net wealth. Change in expectations about future growth caused by productivity shocks or reductions in investment and government spending induces change in consumption.

In this perspective, the huge deficits observed in the U.S. during the 2000s could be interpreted as an expectation of a productivity boom which will improve future growth significantly. This view could be more attractive if the GDP growth has been driven by investment rather than by consumption during this period. It seems that the profit motive was not the main reason behind the huge incoming flows in the U. S.

- *The Global Saving Glut hypothesis*

Introduced by Bernanke (2005), Clarida (2005), the "global saving glut" hypothesis explain the surge of U.S. deficit during the 2000s by a financial underdevelopment of Asian emerging countries. These differences in financial development

and financial openness have allowed Asian emerging countries to export their excess of saving (due to rising savings and dropping investments after the 1997 crisis) to the U.S. Following the oil price evolutions, the oil exporter has become an important provider of savings to international financial markets. In this view, the U.S. external imbalance is a problem made overseas. The solution is to develop financial system of emerging market with excess saving in order to reduce the financial flow to countries with better financial system.

- *Bretton-Woods II and East Asian Mercantilism versus Self-protection*

The East Asian surpluses can be attributed to mercantilist behavior as an outcome of this concerted effort, the U.S. run large external have surged. Dooley et al. (2003, 2007) argue that financing of America's trade deficit is an explicit *quid pro quo* to continued access to American markets. The accumulation of large amount of reserve can be explained by a precautionary demand or self-insurance against volatility of capital flows and macroeconomic consequences of sudden drop for instance and notably after the East-Asian crisis of 1997.

3   Current account regressions

As the current account equals the difference between domestic saving and investment (i.e. the saving-investment balance), the current account developments are examined from the perspective of the medium- to long-term determinants of saving and investment behaviors (Faruqee and Isard, 1998; Chinn and Prasad, 2003). According to these authors, the main determinants of the current account at medium term are, *inter alia*, the demographic characteristics, such as, the dependency ratios of dependent populations relative to the working age population or the population growth, which is expected to exert a negative influence, with a higher dependency ratio leading to more spending; the government budget balance, with a public deficit having a negative effect on the current account, but this effect may be regarded as a simple accounting one which has not to be introduced[3].

The equations of current account are estimated with panel data over the period 1980-2003[4] and for two groups of countries. In a medium term perspective, we use

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[3]Contrary to the empirical literature on economic growth, current account regressions have not major explanatory variables. There is a series of variables which explains a little part of the current account. The risks of omitted variable bias is more limited than in other areas of the empirical literature.

[4]We want to study the impact capital account openness. Most of the movement of capital account liberalization took place in the 1980s for industrialized countries and in the 1990s for emerging countries.

non-overlapping four years average of annual data (Lee et al., 2008):

$$CA_{i,t} = S_{i,t} - I_{i,t} \tag{3}$$

$$CA_{i,t} = \alpha_i + \alpha_t + \beta_0 + \beta_1 RPG_{i,t} + \beta_2 ROG_{i,t} + \beta_3 RKAOPEN_{i,t} + \varepsilon_{i,t} \tag{4}$$

$$CA_{i,t} = \alpha_i + \alpha_t + \beta_0 + \beta_1 RPG_{i,t} + \beta_2 ROG_{i,t} + \beta_3 RGFA_{i,t} + \varepsilon_{i,t} \tag{5}$$

The variables of equation (4) and (5) are defined as follows: CA, current account as % of GDP; RPG, relative population growth (relative to the weighted world average), as percent of the total population[5]; ROG, relative output gap (relative to the weighted world average) expressed as the percentage difference between actual GDP in constant prices, and estimated potential GDP; $RKAOPEN$, relative financial openness (relative to the weighted world average) based on the Chinn-Ito index; $RGFA$, relative gross foreign assets (relative to the weighted world average) in % of GDP measured as the sum of foreign assets and foreign liabilities. The sources of the different variables are presented in appendix A.

One group is composed of 18 industrial countries (Australia, Austria, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, the United Kingdom and the United States). The other group, composed of 21 emerging economies (Argentina, Brazil, Chile, China, Colombia, Ecuador, Egypt, India, Indonesia, Korea, Malaysia, Mexico, Morocco, Pakistan, Peru, Philippines, South Africa, Sri Lanka, Thailand, Tunisia and Turkey).

In the current account regressions for industrialized country group (table 1), the coefficients are significant and have the expected signs: the increase of the relative population growth (RPG) reduces the current account balance (because of a higher proportion of dependent population), the increase of the relative output gap (ROG) deteriorates the current account (via the induced imports caused by the increase of the output gap of the country relatively to world average). For industrialized countries, an increase of relative financial openness ($RKAOPEN$ or $RGFA$) allows to make investment abroad more extensively. Consequently, there is a downward pressure on the domestic investment rate and so, this evolution have a positive impact on the current account[6].

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[5]This variable is more homogeneous than dependency ratios for comparison between industrialized and emerging countries in reason of large differences in life expectancy and child labour between these two groups of countries.

[6]In order to check this point, we replace in the regressions the current account balance by the domestic investment rate (see appendix A for the source of the data). We find that financial

The sign of this coefficient express the impact of a variation financial openness on the current account balance. This kind of relationship is connected with the extensive literature on the capital account openness and economic growth nexus. If financial openness enhance growth then the current account deteriorates because of an increase of induced imports.

However, the survey works on this issue by Eichengreen (2001) and by Kose et al. (2006) reports that the literature failed to provide a robust and systematic (positive) evidence between growth and capital account openness.

As an illustration of this last point, two recent empirical studies (Carmignani, 2008; Quinn and Toyoda, 2008) found different results on this issue. Carmignani (2008) argues (thanks to a system estimation and a *de jure* measure of financial openness) that capital account openness stimulated growth through trade openness and financial development and that the direct effect of capital account on growth is negligible.

Quinn and Toyoda (2008) found empirical evidence of positive link between capital account openness and growth by using a *de jure* measure of capital account openness.

Ordinary least square (OLS) specifications with individual fixed effects raise the coefficient of determination. The generalized method of moments panel estimators (Arellano and Bond, 1991; Arellano and Bover, 1995; Blundell and Bond, 1998) show that there is no problem of endogeneity for the chosen specification in the current account regressions for industrialized countries group (appendix B).

For a number of industrialized countries, the $RKAOPEN$ variable follows a negative trend since the beginning of the 1980s. The $RKAOPEN$ variable describes the magnitude of financial openness relative to global average of financial openness (which corresponds to a weighted average[7] of the $KAOPEN$ index (Chinn and Ito, 2002, 2006)).

Since the global average follows a positive trend since the middle of the 1980s and that many industrialized countries have already liberalized their capital account in early 1980s, the relative capital openness variable ($RKAOPEN$) dropped in these countries. These evolutions have contributed negatively to the current account since the estimated coefficient is positive and statistically significant for the

openness has a **negative and statistically significant** impact on the domestic investment rate for the industrialized countries group. Results are not reported for the sake of brevity but are available upon request.

[7]The weights are equals to the share of each country in world GDP in dollar PPP terms. More precisely, the more the $KAOPEN$ index is high, the more the country is open to cross-border capital transactions. In order to avoid the complexity of interpreting the estimated coefficients, this variable ($KAOPEN$) is adjusted such that the minimum value is zero, i.e., they range between zero and some positive value. The demeaning of the series allows controlling for rest of the world effects (Chinn and Ito, 2007).

Table 1: Determinants of the current account for industrialized countries

	OLS Pooled	Individual Fixed Effects	Time Fixed Effects
Constant	-2.54***	-1.43***	-2.45***
	(0.09)	(0.21)	(0.37)
RPG	-3.00***	-1.20**	-3.03***
	(0.28)	(0.51)	(0.61)
ROG	-0.37*	-0.48***	-0.39***
	(0.19)	(0.12)	(0.14)
RKAOPEN	1.08***	0.92***	0.92***
	(0.15)	(0.10)	(0.25)
Adjusted R^2	0.40	0.77	0.36
Nb. of observations	108	108	108
Hausman Test	-	2.60	-
		[0.45]	

Notes: The independent and dependent variables are non-overlapping 4-year averages of the corresponding annual variables. Heteroskedasticity robust standard errors are reported in parentheses. The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively. The last row shows Hausman test statistics for random effects versus fixed effects specifications. P-values are reported in square brackets. Source: author's estimates.

Table 2: Panel unit root tests for industrialized countries

Variables	CA	RPG	ROG	RKAOPEN	$\Delta RGFA$
Industrialized countries	-11.01***	-19.49***	-51.20***	-28.83***	-2.50***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]

Notes: The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, using the IPS test statistic (Im et al., 2003); the rejection of the null hypothesis (of the presence of unit root), leads to reject non-stationarity of the series. P-values are reported in square brackets. Source: author's calculations.

industrialized countries' panel in all regressions (see appendix C, for the linear correlation between current account and $RKAOPEN$).

In order to check the consistency of the results, we introduce an alternative measure of financial openness ($RGFA$) which corresponds to the sum of the foreign assets and foreign liabilities of the country relatively to world average in % of GDP. The coefficient of the $RGFA$ variable[8] is positive and statistically significant for the industrialized country like in regression with the $RKAOPEN$ variable[9]. This is reassuring about the robustness of the results (see appendix D).

Table 3: Determinants of the current account for emerging countries

	OLS Pooled	Individual Fixed Effects	Time Fixed Effects
Constant	-0.97**	-0.30	-1.19***
	(0.40)	(0.50)	(0.52)
RPG	-1.94***	-3.21***	-1.66***
	(0.36)	(0.41)	(0.43)
ROG	-0.44***	-0.35***	-0.33***
	(0.06)	(0.06)	(0.10)
RKAOPEN	-0.47**	-0.63**	-0.45*
	(0.17)	(0.23)	(0.18)
Adjusted R^2	0.47	0.68	0.35
Nb. of observations	126	126	126
Hausman Test	-	9.51**	-
		[0.02]	

Notes: The independent and dependent variables are non-overlapping 4-year averages of the corresponding annual variables. Heteroskedasticity robust standard errors are reported in parentheses. The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively. The last row shows Hausman test statistics for random effects versus fixed effects specifications. P-values are reported in square brackets. Source: author's estimates.

The results of unit root tests are presented in table 2 and 4. As it can be seen, the null hypothesis of non-stationarity is rejected in all the series.

In the current account regressions for emerging country group (table 3), the coefficients are significant and have the expected signs. Once again, OLS specifi-

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[8]The $RGFA$ variable is not stationary in level so we use the variation, to avoid fallacious regressions' problems, of this variable but the interpretation remains basically the same than for the $RKAOPEN$ variable.

[9]A distinction between short- and long-term flows would be an interesting extension of this paper.

Table 4: Panel unit root tests for emerging countries

Variables	CA	RPG	ROG	RKAOPEN	$\Delta RGFA$
Emerging countries	-5.88***	-6.19***	-27.17***	-4.74***	-4.74***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]

Notes: The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively, using the IPS test statistic (Im et al., 2003); the rejection of the null hypothesis (of the presence of unit root), leads to reject non-stationarity of the series. P-values are reported in square brackets. Source: author's calculations.

cations with individual fixed effects raise the coefficient of determination. GMM panel estimators shows that there is no problem of endogeneity for the chosen specification in the current account regressions (appendix B). The main difference with the current account regression for industrialized countries group is the sign of the coefficient of the $RKAOPEN$ variable which is negative for emerging countries group (see appendix C for the linear correlation between current account and $RKAOPEN$)[10].

For emerging countries, an increase of relative financial openness ($RKAOPEN$ or $RGFA$) allows to receive investments from abroad more extensively. Consequently, there is an upward pressure on the domestic investment rate[11] and so, this evolution have a negative impact on the current account (Ito and Chinn, 2007).

Once again, the *de facto* measure of financial openness ($RGFA$) is statistically significant and has the same sign (i.e. negative) than that of the $RKAOPEN$ variable for the emerging countries group (see appendix D).

For a number of emerging countries, the $RKAOPEN$ variable follows a negative trend since the beginning of the 1980s. The $RKAOPEN$ variable describes the magnitude of financial openness relative to global average of financial openness (which corresponds to a weighted average[12] of the KAOPEN index).

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[10]The coefficient of the RPG is relatively higher in the SGMM estimation for the industrialized countries group. As most of these countries have completed the demographic transition, the variation of the RPG variable is limited. The mean is equal to -0.39 and the standard deviation is equal to 0.42.

[11]In order to check this point, we replace in the regressions the current account balance by the domestic investment rate (see appendix A for the source of the data). We find that financial openness has a **positive and statistically significant** impact on the domestic investment rate for the emerging countries group. Results are not reported for the sake of brevity but are available upon request.

[12]See note 7.

For these countries, the drop of the relative capital openness ($RKAOPEN$) variable means that they have liberalized their capital account more slowly than the global average. These evolutions have contributed positively to the current account since the estimated coefficient is negative and statistically significant for the emerging countries' panel in all regressions.

4 Medium-term current accounts

As it been explained in the previous section, the drop of the $RKAOPEN$ variable has induced an increase of the medium-term deficits in a number of industrialized countries and an increase of the medium-term surpluses of South-East Asia's emerging countries. This section illustrates this point by studying some striking cases.

- *The United States and the United Kingdom*

The case of the United States (table 5 to 10) is very interesting because it illustrates very well the case of countries which have totally liberalized its capital account in the early 1980s (thus the $KAOPEN$ index, which is an inverse measure of capital controls, reached its upper limit). In addition, the global average of financial openness had increase on the period 1980-2003 (see appendix E). These two evolutions have induced a drop of the $RKAOPEN$ variable for the United States. The medium-term current account[13], which was around - 1.7 % at the beginning of the 1980s, have reached around - 2.5 % at the beginning of the 2000s. In this evolution, the relative financial openness has played a negative role. In fact, the contribution of the $RKAOPEN$ variable was near from 1.3 % in the beginning of the period was reduced to only 0.9 % because the domestic and foreign evolution of the financial openness which have been already describe and because of positive coefficients of the $RKAOPEN$ variable in the current account regressions for industrialized countries[14].

The case of the United Kingdom (table 5 to 10) is very similar to that of the United States, in a smaller scale. However, the capital account was totally liberalized only at the middle of the 1980s. The medium-term current account have dropped to -1.7 % at the end of the period whereas it was equal to - 1 % in 1980. Once again the reduction of the relative capital openness (the $RKAOPEN$

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[13]We use the OLS individual fixed effects specification to calculate the medium-term current account (i.e. equilibrium current account) for all the countries. A simple Fisher test indicates that the fixed effects are not redundant. In order to capture medium- to long-term trends, we set the output gaps at zero.

[14]Chinn et al. (2011) have found that the "saving glut" variables (which include capital account openness) have induced a reduction of the medium-term current account in the United States.

variable) has played a negative role in the evolution of the medium-term current account from the middle of the 1980s to the end of the period.

- *South-East Asian countries and India*

For South-East Asian's emerging countries, the story is completely different. These countries have also seen the $RKAOPEN$ variable decrease but for different reasons of those of the United States or the United Kingdom. The main explanation of this drop is that, globally, East Asian's emerging countries have opened they capital account more slowly than the world average (see appendix E). For China (table 5 to 10), the medium-term current account have grown significantly from the beginning of the period (from 1% in 1980 to 2.5% in 2003) in this evolution the reduction of the relative population growth and the stability of the financial openness have played a positive role[15].

The cases of Malaysia and Indonesia (table 5 to 10) are similar on several points. They have increased their medium-term current account since the beginning of the 1980s (from around -2% in 1980 to 1 % in 2003 for Indonesia; from 0% to 2% for Malaysia). In these evolutions the reduction of the relative population growth and the drop of the relative financial openness (due to the fact that these countries have liberalized their capital account more slowly than the world average) have played a positive role.

The medium-term current accounts of Thailand and the Philippines have different profiles (table 5 to 10) but, in these two countries, the stability of the relative financial openness has had a positive impact on the underlying capital flows, on the whole period. The medium-term current account, which was very negative in the beginning of the sample (-4% for Thailand and -2.5 % for the Philippines), have progressively improved to reach 0 % in Thailand and -2% in the Philippines. In this evolution, the depletion of the population growth has played a positive role.

The evolution of the relative financial openness in the South-East Asian's emerging countries reflect the fact these countries have liberalized their capital account more slowly than the world average. This relative decrease has had a positive impact on the current for these countries since the coefficient associated to the $RKAOPEN$ variable is negative for the emerging countries group.

The evolutions of the medium-term current account of India and its contributions (table 5 to 10) can be compared to those of South-East Asian's emerging countries. Insofar the medium-term current account has improved steadily during

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[15]It seems to be important to recall that the signs of the coefficients are **negative and statistically significant** for the $RKAOPEN$ variable in all current account regression of the emerging countries group. Chinn et al. (2011) have found that the contribution to the medium-term current account of the "saving glut" variables (which include capital account openness) is positive and remains stable over the period in China.

the whole period (from around -2% to around 0%). In addition, the stability of relative financial openness has contributed positively (about 1%) to the medium-term current account and the reduction of the dependency ratio has also had a positive impact but to a lesser extent than small South-East Asian countries which are submitted to weaker demographic constraints (comparatively to demographic giants like China and India[16]).

- *Latin American countries*

The case of Latin American countries is more dispersed than those of South-East Asian countries on the period 1980-2003. For Brazil (table 5 to 10), the evolution of the relative financial openness has had a positive impact until the end of the 2000s. At the beginning of the 2000, Brazil opened his capital account more rapidly (see appendix E) and this evolution induced a drop in the positive contribution of relative financial openness observed earlier. In spite of this decreasing evolution of financial openness, the reduction of the population growth has had a positive impact on the medium-term current account which has slowly improved (from -4% to -2%).

The case of Mexico (table 5 to 10) can be seen as the opposite of South-East Asian's emerging countries cases. Indeed, Mexico had strongly reduced its relative capital openness (see appendix E) after the debt crisis. The $RKAOPEN$ variable decreased until 1986 and after that the openness index increased steadily until the beginning of the 2000s. This evolution of relative financial openness has contributed negatively to the medium-term current account from the middle of the 1980s to the beginning of the 2000s. In spite of this negative contribution of financial openness, the medium-term current account has improved strongly (from around -4% to around 0%) mainly thanks to favorable demographic evolution.

Argentina is the country in which the medium-term current account has known the most contrasted movements (table 5 to 10) mainly due to large variation in the relative financial openness. The medium-term current account has improved on the whole period (from -1.5% to -0.5%) but with large variations notably during the period of the currency board system. At the beginning of the currency board scheme, the relative financial openness has been more pronounced and, thus, the contribution of the $RKAOPEN$ variable which has been positive (around 1%) in 1988-1991, became negative (around -0.3%) in 1996-1999. This evolution of the relative financial openness has participated to accentuate the current account deficit during the currency board era. After the burst of the crisis in 2001, the medium-term current account became less negative (about -0.5%).

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[16]In spite of similar demographic profiles, China and India have had different policy of fertility. The "one-child policy" has allowed an impressive reduction of the population growth and dependency ratios in China.

For Chile, the medium-term current account remains stable to around -4% (table 5 to 10). The relative financial openness is relatively stable and contributed positively to the medium-term current account until the beginning of the 2000s. At this moment, Chile has opened its capital account more rapidly[17] and so the contribution to the medium-term current account of the $RKAOPEN$ variable decreased sharply.

For Colombia, the medium-term current account has steadily improved from -2% to -1% on the whole period (table 5 to 10). The stability of the relative financial openness has contributed positively (like in the case of South-East Asian's emerging countries) to the medium-term current account. An impressive reduction of the relative population growth has, also, contributed to the medium-term current account progression.

5   Conclusion

Global imbalances are a threat to the global macroeconomic stability. Therefore identify the main causes and drivers of these imbalances seems to be crucial. The objective of this paper was to investigate if financial openness has played a major role in the evolution of global imbalances on the period 1980-2003.

The main finding is that the relative financial openness (measured as the deviation relatively to world average) has played significant role on the magnitude of medium-term current account. By increasing the opportunities of overseas investments, the relative financial openness has had positive impact on medium-term current account of industrialized countries (because of downward pressures on domestic investment rates). Conversely, the relative financial openness has had negative impact on medium-term current account of emerging countries (because of upward pressures on domestic investment rates). For a number of industrialized countries, the relative financial openness has had a negative impact on medium-term current account. For South-East Asian countries, the relative financial openness has had a positive impact on medium-term current account. The evolution of domestic and foreign financial openness has allowed increasing the medium-term current account balances in absolute value.

Nowadays, deficits and surpluses are larger in reason of higher capital mobility. Nevertheless, a large part of these imbalances may be considered as unrelated with the evolution of macroeconomic fundamentals. These results show that in spite of higher capital mobility, we should continue to prevent the return of large imbalances at the world level in order to ensure global macroeconomic stability.

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[17]Interestingly, Brazil and Chile have opened more rapidly their capital account at the beginning of the 2000s whereas Argentina has known the inverse evolution.

Table 5: Contribution to the medium-term current account on the period 1980-1983

	CA	CAM	RPG	RKAO	CST	FX
	[1]	[2]	[3]	[4]	[5]	[6]
Industrialized						
United States	-0.26	-1.77	0.06	1.33	-1.44	-1.73
Japan	0.45	2.07	0.34	0.96	-1.44	2.20
Germany	-0.28	0.94	1.20	1.33	-1.44	-0.16
France	-1.09	-0.60	0.59	-1.34	-1.44	1.59
United Kingdom	0.96	-1.08	1.17	0.96	-1.44	-1.76
Italy	-2.38	-2.14	1.08	-1.90	-1.44	0.11
Canada	-1.65	-1.39	-0.22	1.33	-1.44	-1.07
Emerging						
China	1.06	0.79	-1.16	1.74	-0.30	0.52
Brazil	-6.65	-3.64	-4.23	1.84	-0.30	-0.95
India	-1.54	-1.91	-3.88	1.41	-0.30	0.86
Mexico	-2.64	-4.21	-4.26	0.17	-0.30	0.20
Korea	-4.97	-1.05	-1.71	1.08	-0.30	-0.12
Indonesia	-2.31	-1.96	-3.54	-0.51	-0.30	2.39
Argentina	-2.60	-1.62	-1.64	1.08	-0.30	-0.75
Thailand	-5.92	-3.48	-2.46	0.75	-0.30	-1.47
Colombia	-3.72	-2.40	-3.82	1.84	-0.30	-0.12
Malaysia	-8.89	-0.33	-4.79	-0.51	-0.30	5.28
Chile	-8.99	-4.14	-1.70	1.30	-0.30	-3.44
Philippines	-5.51	-2.49	-4.80	1.41	-0.30	1.21

Notes: The independent and dependent variables are non-overlapping 4-year averages of the corresponding annual variables. Contributions are expressed in % of GDP. CA corresponds to the actual current account, CAM corresponds to the medium-term current account, RPG corresponds to the contribution of the population growth variable, $RKAO$ corresponds to the contribution of the financial openness variable, CST et FX correspond to the intercept and to the fixed effects, respectively. Source: author's calculations.

Table 6: Contribution to the medium-term current account on the period 1984-1987

	CA	CAM	RPG	$RKAO$	CST	FX
	[1]	[2]	[3]	[4]	[5]	[6]
Industrialized						
United States	-2.97	-1.88	0.03	1.26	-1.44	-1.73
Japan	3.58	2.43	0.40	1.26	-1.44	2.20
Germany	3.05	0.88	1.22	1.26	-1.44	-0.16
France	-0.10	-0.40	0.62	-1.17	-1.44	1.59
United Kingdom	-0.80	-1.09	0.86	1.26	-1.44	-1.76
Italy	-0.54	-1.41	1.09	-1.17	-1.44	0.11
Canada	-2.05	-1.41	-0.16	1.26	-1.44	-1.07
Emerging						
Chine	-1.37	0.10	-1.68	1.57	-0.30	0.52
Brazil	-0.61	-3.11	-3.75	1.90	-0.30	-0.95
India	-1.75	-1.81	-3.83	1.46	-0.30	0.86
Mexico	1.13	-2.18	-3.67	1.60	-0.30	0.20
Korea	2.30	0.71	-0.33	1.46	-0.30	-0.12
Indonesia	-2.93	-1.97	-3.20	-0.86	-0.30	2.39
Argentina	-2.45	-1.43	-1.84	1.46	-0.30	-0.75
Thailand	-2.29	-2.72	-1.75	0.80	-0.30	-1.47
Colombia	-1.64	-2.23	-3.70	1.90	-0.30	-0.12
Malaysia	0.25	-1.95	-6.07	-0.86	-0.30	5.28
Chile	-7.45	-4.22	-2.38	1.90	-0.30	-3.44
Philippines	1.46	-2.59	-4.79	1.30	-0.30	1.21

Notes: The independent and dependent variables are non-overlapping 4-year averages of the corresponding annual variables. Contributions are expressed in % of GDP. CA corresponds to the actual current account, CAM corresponds to the medium-term current account, RPG corresponds to the contribution of the population growth variable, $RKAO$ corresponds to the contribution of the financial openness variable, CST et FX correspond to the intercept and to the fixed effects, respectively. Source: author's calculations.

Table 7: Contribution to the medium-term current account on the period 1988-1991

	CA	CAM	RPG	RKAO	CST	FX
	[1]	[2]	[3]	[4]	[5]	[6]
Industrialized						
United States	-1.38	-2.05	-0.09	1.20	-1.44	-1.73
Japan	2.07	2.74	0.77	1.20	-1.44	2.20
Germany	2.57	-0.01	0.39	1.20	-1.44	-0.16
France	-0.55	-0.39	0.49	-1.04	-1.44	1.59
United Kingdom	-3.63	-1.11	0.89	1.20	-1.44	-1.76
Italy	-1.76	-1.23	1.13	-1.04	-1.44	0.11
Canada	-3.51	-1.88	-0.57	1.20	-1.44	-1.07
Emerging						
China	1.10	0.58	-1.56	1.94	-0.30	0.52
Brazil	0.08	-1.74	-2.42	1.94	-0.30	-0.95
India	-2.29	-1.26	-3.32	1.50	-0.30	0.86
Mexico	-2.85	-1.84	-2.89	1.16	-0.30	0.20
Korea	1.64	0.45	0.03	0.84	-0.30	-0.12
Indonesia	-2.34	-0.93	-2.20	-0.82	-0.30	2.39
Argentina	0.80	-0.88	-1.33	1.50	-0.30	-0.75
Thailand	-5.49	-1.72	-0.79	0.84	-0.30	-1.47
Colombia	1.14	-1.74	-3.03	1.72	-0.30	-0.12
Malaysia	-1.20	-1.70	-5.86	-0.82	-0.30	5.28
Chile	-1.29	-4.19	-2.38	1.94	-0.30	-3.44
Philippines	-2.69	-1.97	-4.38	1.50	-0.30	1.21

Notes: The independent and dependent variables are non-overlapping 4-year averages of the corresponding annual variables. Contributions are expressed in % of GDP. CA corresponds to the actual current account, CAM corresponds to the medium-term current account, RPG corresponds to the contribution of the population growth variable, $RKAO$ corresponds to the contribution of the financial openness variable, CST et FX correspond to the intercept and to the fixed effects, respectively. Source: author's calculations.

Table 8: Contribution to the medium-term current account on the period 1992-1995

	CA	CAM	RPG	RKAO	CST	FX
	[1]	[2]	[3]	[4]	[5]	[6]
Industrialized						
United States	-1.33	-2.59	-0.35	0.92	-1.44	-1.73
Japan	2.72	2.46	0.83	0.86	-1.44	2.20
Germany	-1.16	-0.09	0.59	0.92	-1.44	-0.16
France	0.50	1.33	0.74	0.44	-1.44	1.59
United Kingdom	-1.55	-1.39	0.88	0.92	-1.44	-1.76
Italy	0.46	0.27	1.15	0.44	-1.44	0.11
Canada	-2.63	-1.63	-0.05	0.92	-1.44	-1.07
Emerging						
China	0.24	1.50	-0.51	1.80	-0.30	0.52
Brazil	-0.34	-0.88	-1.75	2.13	-0.30	-0.95
India	-0.97	-0.44	-2.69	1.69	-0.30	0.86
Mexico	-4.73	-2.31	-2.63	0.43	-0.30	0.20
Korea	-0.91	0.47	-0.14	1.03	-0.30	-0.12
Indonesia	-1.98	-0.22	-1.68	-0.63	-0.30	2.39
Argentina	-3.12	-1.80	-1.08	0.33	-0.30	-0.75
Thailand	-5.95	-1.24	-0.50	1.03	-0.30	-1.47
Colombia	-2.53	-1.14	-2.73	2.02	-0.30	-0.12
Malaysia	-6.31	-0.07	-5.02	-0.03	-0.30	5.28
Chile	-3.07	-4.45	-2.46	1.76	-0.30	-3.44
Philippines	-3.61	-2.45	-4.07	0.72	-0.30	1.21

Notes: The independent and dependent variables are non-overlapping 4-year averages of the corresponding annual variables. Contributions are expressed in % of GDP. CA corresponds to the actual current account, CAM corresponds to the medium-term current account, RPG corresponds to the contribution of the population growth variable, $RKAO$ corresponds to the contribution of the financial openness variable, CST et FX correspond to the intercept and to the fixed effects, respectively. Source: author's calculations.

Table 9: Contribution to the medium-term current account on the period 1996-1999

	CA	CAM	RPG	RKAO	CST	FX
	[1]	[2]	[3]	[4]	[5]	[6]
Industrialized						
United States	-2.24	-2.57	-0.32	0.92	-1.44	-1.73
Japan	2.34	2.24	0.80	0.67	-1.44	2.20
Germany	-0.76	0.25	0.93	0.92	-1.44	-0.16
France	2.41	1.76	0.69	0.92	-1.44	1.59
United Kingdom	-0.91	-1.53	0.75	0.92	-1.44	-1.76
Italy	2.08	0.65	1.05	0.92	-1.44	0.11
Canada	-0.43	-1.65	-0.07	0.92	-1.44	-1.07
Emerging						
China	2.31	1.61	-0.29	1.69	-0.30	0.52
Brazil	-3.64	-1.27	-1.93	1.91	-0.30	-0.95
India	-1.20	-0.42	-2.67	1.69	-0.30	0.86
Mexico	-2.16	-1.64	-1.76	0.23	-0.30	0.20
Korea	2.84	1.50	0.23	1.69	-0.30	-0.12
Indonesia	0.75	0.40	-1.59	-0.09	-0.30	2.39
Argentina	-3.91	-2.21	-0.86	-0.29	-0.30	-0.75
Thailand	3.25	-1.35	-0.61	1.03	-0.30	-1.47
Colombia	-3.18	-1.40	-2.67	1.69	-0.30	-0.12
Malaysia	4.62	0.46	-5.12	0.60	-0.30	5.28
Chile	-3.32	-3.32	-1.59	2.02	-0.30	-3.44
Philippines	-2.81	-2.10	-3.89	0.89	-0.30	1.21

Notes: The independent and dependent variables are non-overlapping 4-year averages of the corresponding annual variables. Contributions are expressed in % of GDP. CA corresponds to the actual current account, CAM corresponds to the medium-term current account, RPG corresponds to the contribution of the population growth variable, $RKAO$ corresponds to the contribution of the financial openness variable, CST et FX correspond to the intercept and to the fixed effects, respectively. Source: author's calculations.

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Table 10: Contribution to the medium-term current account on the period 2000-2003

	CA	CAM	RPG	RKAO	CST	FX
	[1]	[2]	[3]	[4]	[5]	[6]
Industrialized						
United States	-4.30	-2.45	-0.21	0.92	-1.44	-1.73
Japan	2.70	2.47	0.78	0.92	-1.44	2.20
Germany	0.59	0.20	0.87	0.92	-1.44	-0.16
France	1.44	1.33	0.26	0.92	-1.44	1.59
United Kingdom	-2.01	-1.69	0.58	0.92	-1.44	-1.76
Italy	-0.67	0.28	0.68	0.92	-1.44	0.11
Canada	1.98	-1.64	-0.06	0.92	-1.44	-1.07
Emerging						
China	2.06	2.48	0.57	1.69	-0.30	0.52
Brazil	-2.18	-1.89	-1.86	1.23	-0.30	-0.95
India	0.56	-0.25	-2.34	1.53	-0.30	0.86
Mexico	-2.21	-0.40	-0.85	0.56	-0.30	0.20
Korea	1.75	1.44	0.67	1.20	-0.30	-0.12
Indonesia	4.14	0.77	-1.54	0.23	-0.30	2.39
Argentina	2.67	-0.50	-0.48	1.03	-0.30	-0.75
Thailand	4.77	-0.65	0.09	1.03	-0.30	-1.47
Colombia	-0.72	-1.04	-2.31	1.69	-0.30	-0.12
Malaysia	9.21	2.07	-3.94	1.03	-0.30	5.28
Chile	-1.18	-4.40	-0.99	0.34	-0.30	-3.44
Philippines	-1.35	-2.20	-3.99	0.89	-0.30	1.21

Notes: The independent and dependent variables are non-overlapping 4-year averages of the corresponding annual variables. Contributions are expressed in % of GDP. CA corresponds to the actual current account, CAM corresponds to the medium-term current account, RPG corresponds to the contribution of the population growth variable, $RKAO$ corresponds to the contribution of the financial openness variable, CST et FX correspond to the intercept and to the fixed effects, respectively. Source: author's calculations.

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A Data source

Table A.1: Data source

Variable	Source
CA	World Economic Outlook, IMF, April 2012.
GFA	P.R. Lane and G.M. Milesi-Ferretti's database, 2009.
INV	World Development Indicators, World Bank, 2011.
KAOPEN	Chinn-Ito Index, 2010.
OG	Economic Outlook, OECD, May 2012.
PG	World Development Indicators, World Bank, 2011.

Notes: author's calculations for the output gap of the emerging countries. On the period 1970-2010, we use an HP filter on the real GDP to obtain the potential output. We select a lower smoothing parameter than in the case of industrialized countries in order to take in account that the business cycle is shorter in emerging countries.

B Robustness tests

Table B.1: Robustness test: Difference GMM

	Difference GMM (Industrialized)	Difference GMM (Emerging)
CA(-1)	0.45***	0.13***
	(0.03)	(0.06)
RPG	-2.55***	$-2.08^{12\%}$
	(0.53)	(1.31)
ROG	-0.61***	-0.19*
	(0.04)	(0.10)
RKAOPEN	0.84***	-0.81***
	(0.17)	(0.21)
Significant time dummies	92-95, 96-99, 00-03	96-99, 00-03
Nb. of observations	72	84
J-Statistic	11.95	5.22
	[0.21]	[0.81]

Notes: The independent and dependent variables are non-overlapping 4-year averages of the corresponding annual variables. Heteroskedasticity robust standard errors are reported in parentheses. The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively. The last row show the J-statistic is the Sargan statistic for the validity of over-identifying restrictions. P-values are reported in square brackets. Source: author's estimates.

Table B.2: Robustness test: System GMM

	System GMM (Industrialized)	System GMM (Emerging)
CA(-1)	0.89***	0.35**
	(0.22)	(0.13)
RPG	-6.65**	-0.21
	(2.63)	(1.09)
ROG	-0.83***	-0.22
	(0.27)	(0.17)
RKAOPEN	1.44**	-1.01**
	(0.67)	(0.45)
Nb. of observations	90	105
Nb. of instruments	17	15
AR(1)	[0.00]	[0.02]
AR(2)	[0.66]	[0.22]
Sargan Test	[0.15]	[0.44]
Hansen Test	[0.68]	[0.28]

Notes: The independent and dependent variables are non-overlapping 4-year averages of the corresponding annual variables. Heteroskedasticity robust standard errors are reported in parentheses. The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Sargan and Hansen test the validity of over-identifying restrictions. AR(1) and AR(2) correspond to the Arellano-Bond residual autocorrelation tests. P-values are reported in square brackets. Source: author's estimates.
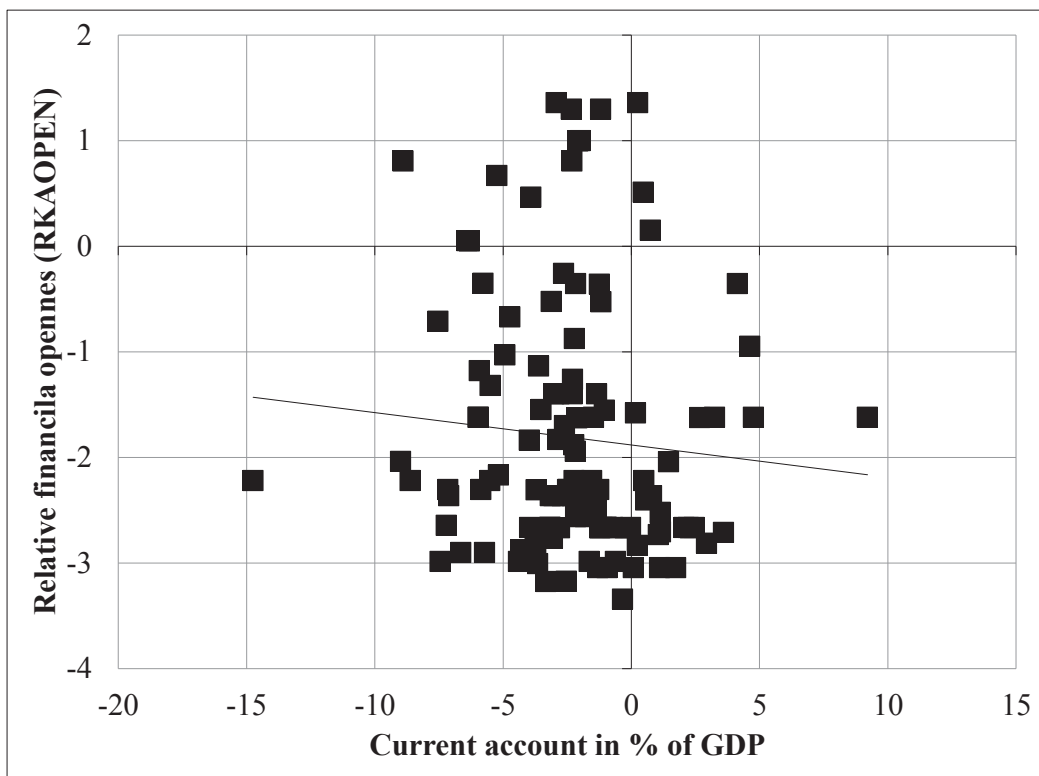
C Correlations

Figure C.1: Industrialized countries
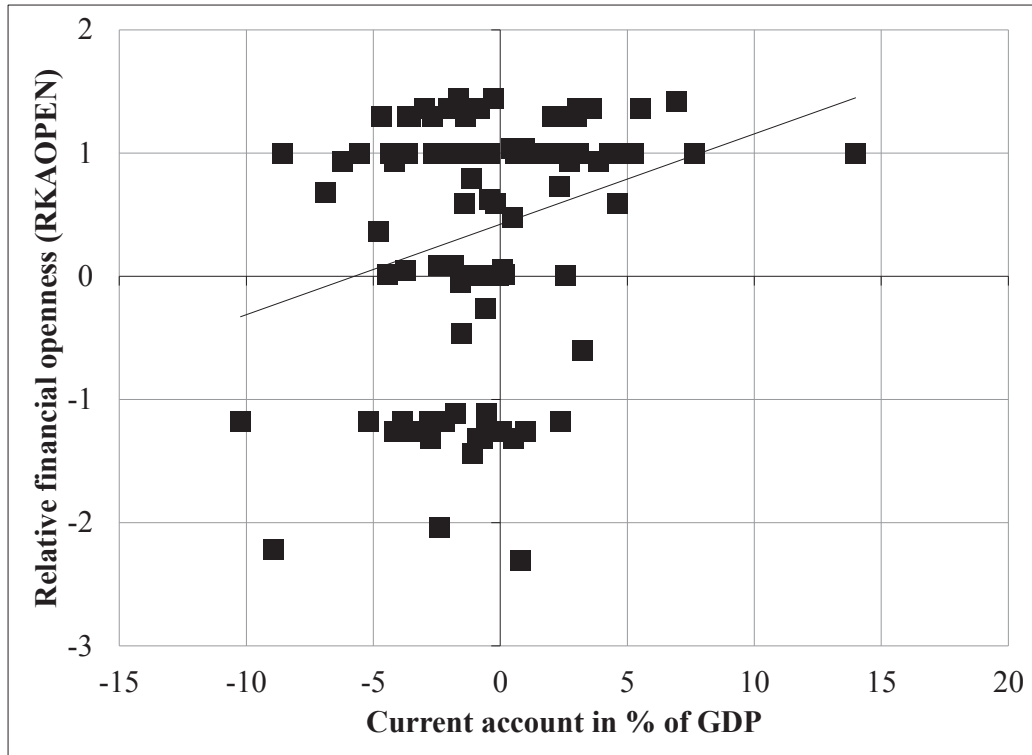
Figure C.2: Emerging countries

Source: author's calculations

D Regressions with a de facto measure

Table D.1: Industrialized

	OLS Pooled	*Individual Fixed Effects*
Constant	-2.03***	-0.96***
	(0.13)	(0.23)
RPG	-2.57***	-0.89**
	(0.52)	(0.39)
ROG	-0.56**	-0.55***
	(0.17)	(0.11)
$\Delta RGFA$	0.01***	0.007***
	(0.00)	(0.00)
Adjusted R^2	0.43	0.92
Nb. of observations	90	90

Notes: The independent and dependent variables are non-overlapping 4-year averages of the corresponding annual variables. Heteroskedasticity robust standard errors are reported in parentheses. The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Source: author's estimates.

Table D.2: Emerging countries

	OLS Pooled	*Individual Fixed Effects*
Constant	-0.67	-0.71**
	(0.48)	(0.34)
RPG	-1.20***	-1.53***
	(0.46)	(0.38)
ROG	-0.43***	-0.34***
	(0.11)	(0.05)
$\Delta RGFA$	-0.02**	-0.02***
	(0.00)	(0.00)
Adjusted R^2	0.23	0.70
Nb. of observations	105	105

Notes: The independent and dependent variables are non-overlapping 4-year averages of the corresponding annual variables. Heteroskedasticity robust standard errors are reported in parentheses. The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Source: author's estimates.

E The KAOPEN variable

The KAOPEN index is a measure of financial openness (i.e. openness of the capital account). Introduced for the first time by Chinn and Ito in 2002, this index aims to measure the extensity of the capital controls (as it is an inverse measure of the intensity of capital controls) based on the information of the IMF's Annual Report on Exchange Rate Arrangements and Exchange Restrictions ($AREAR$).

The KAOPEN index is computed from binary dummy variables. These dummy variables are used to codify the restrictions on cross border financial transaction reported in the AREAR. Until 1996, the AREAR assign dummy variables for the four major categories on the restriction on the capital account (the existence of multiple exchange rates (k_1), restrictions on current account transactions (k_2), restrictions on capital account transactions (k_3) and requirement of the surrender of export proceeds (k_4)). In order to understand the complexity of capital control policies, these four categories have been more disaggregated in 1996 (the variables indicating restrictions on current account transactions have been divided into thirteen categories).

Since they are focused on the effect of financial openness, Chinn and Ito reverse these binary variables. When variables are equal to zero, the capital account restrictions exist. In addition for the k_3 category, they used a five-year window where capital controls where not in effect ($SHAREk_3$).

$$SHAREk_{3,t} = \left(\frac{k_{3,t} + k_{3,t-1} + k_{3,t-2} + k_{3,t-3} + k_{3,t-4}}{5} \right)$$

Then, they construct their index for capital account openness, which the first standardized principal component of k_{1t}, k_{2t}, $SHAREk_{3t}$, k_{4t} (Chinn and Ito, 2007). The more the country is open to cross-border capital flows, the more the $KAOPEN$ index is high. This index has the merit to try to measure the intensity of capital restriction. The index was firstly designed to measure the extensity of capital controls, but as it incorporates various kinds of restrictions it may be a good proxy to gauge the intensity of capital account restrictions. Note that the $KAOPEN$ index is highly correlated with other measures of financial openness (Chinn and Ito, 2007).

For a number of industrialized countries (the United States, the United Kingdom, Canada, Germany, Japan), the $RKAOPEN$ variable follows a negative trend since the beginning of the 1980s. The $RKAOPEN$ variable describes the magnitude of capital openness relative to global average (which corresponds to a weighted average of the $KAOPEN$ index (Chinn and Ito, 2002, 2006). The weights are equal to the share of each country in world GDP in PPP terms. More precisely, $RKAOPEN = KAOPEN - \overline{KAOPEN}$).

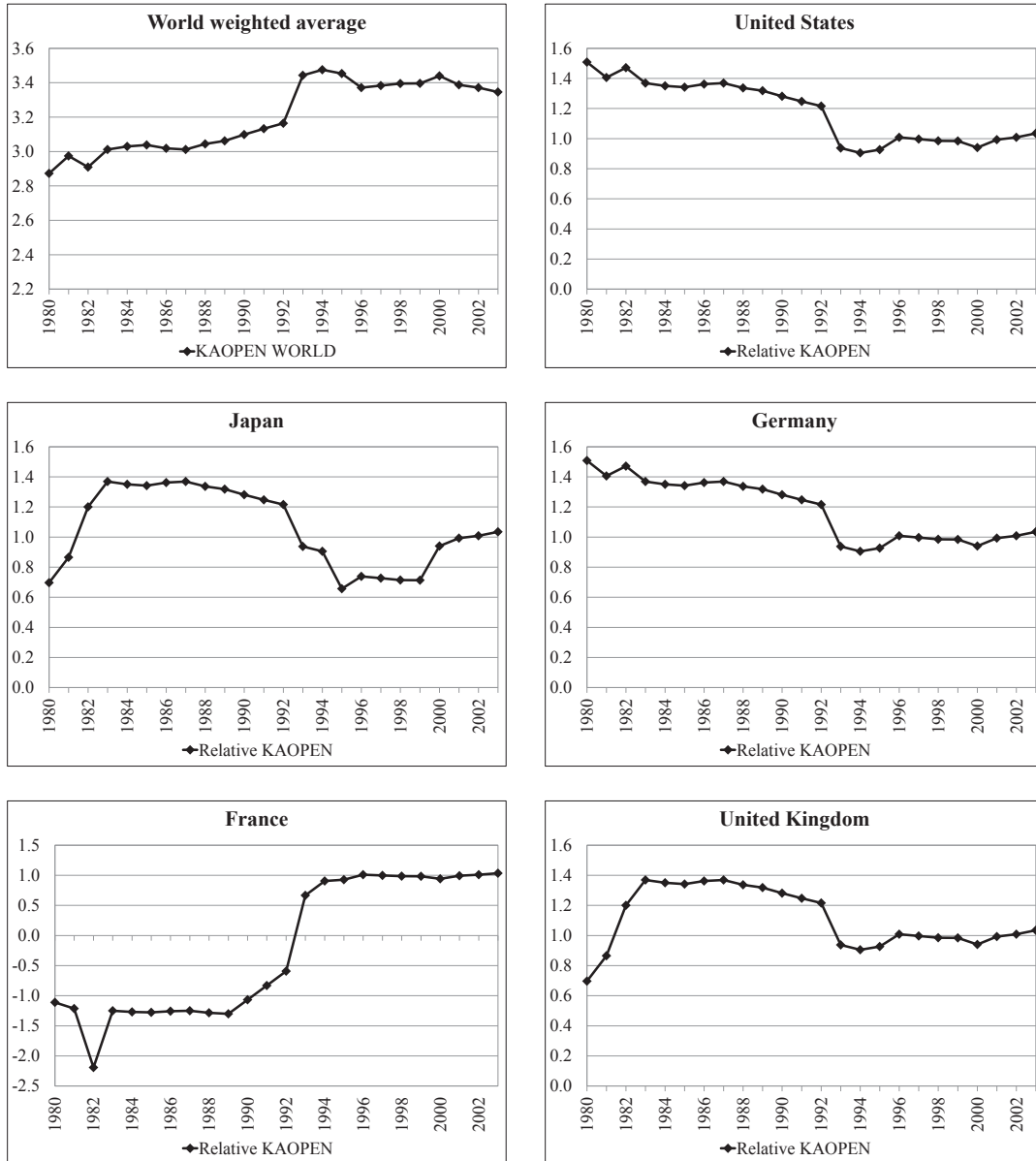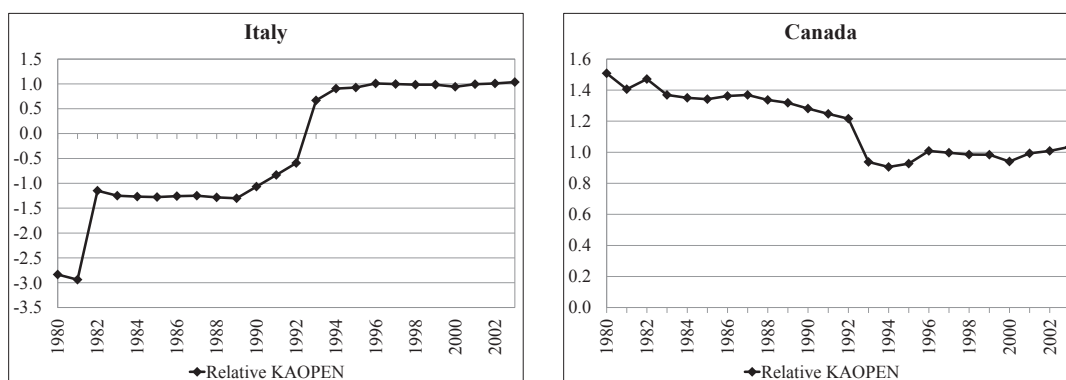Figure E.1: Industrialized countries

Figure E.2: Industrialized countries (continued)

Since the global average follows a positive trend since the mid-1980 and that many industrialized countries have already liberalized their capital account in early 1980s, the relative capital openness variable ($RKAOPEN$) dropped in these countries. These evolutions have contributed negatively to the current account since the estimated coefficient is positive and statistically significant for the industrialized countries' panel in all regressions.

For a number of emerging countries (China, Malaysia, Thailand, Indonesia), the $RKAOPEN$ variable follows a negative trend since the beginning of the 1980s. The $RKAOPEN$ variable describes the magnitude of capital account openness relatively to global average (which corresponds to a weighted average of the $KAOPEN$ index (Chinn and Ito, 2002, 2006). The weights are equal to the share of each country in world GDP in PPP terms. More precisely, $RKAOPEN = KAOPEN - \overline{KAOPEN}$).

For these countries, the drop of the relative capital openness ($RKAOPEN$) variable means that they liberalized their capital account more slowly than the global average. These evolutions have contributed positively to the current account since the estimated coefficient is negative and statistically significant for the emerging countries in all regressions.
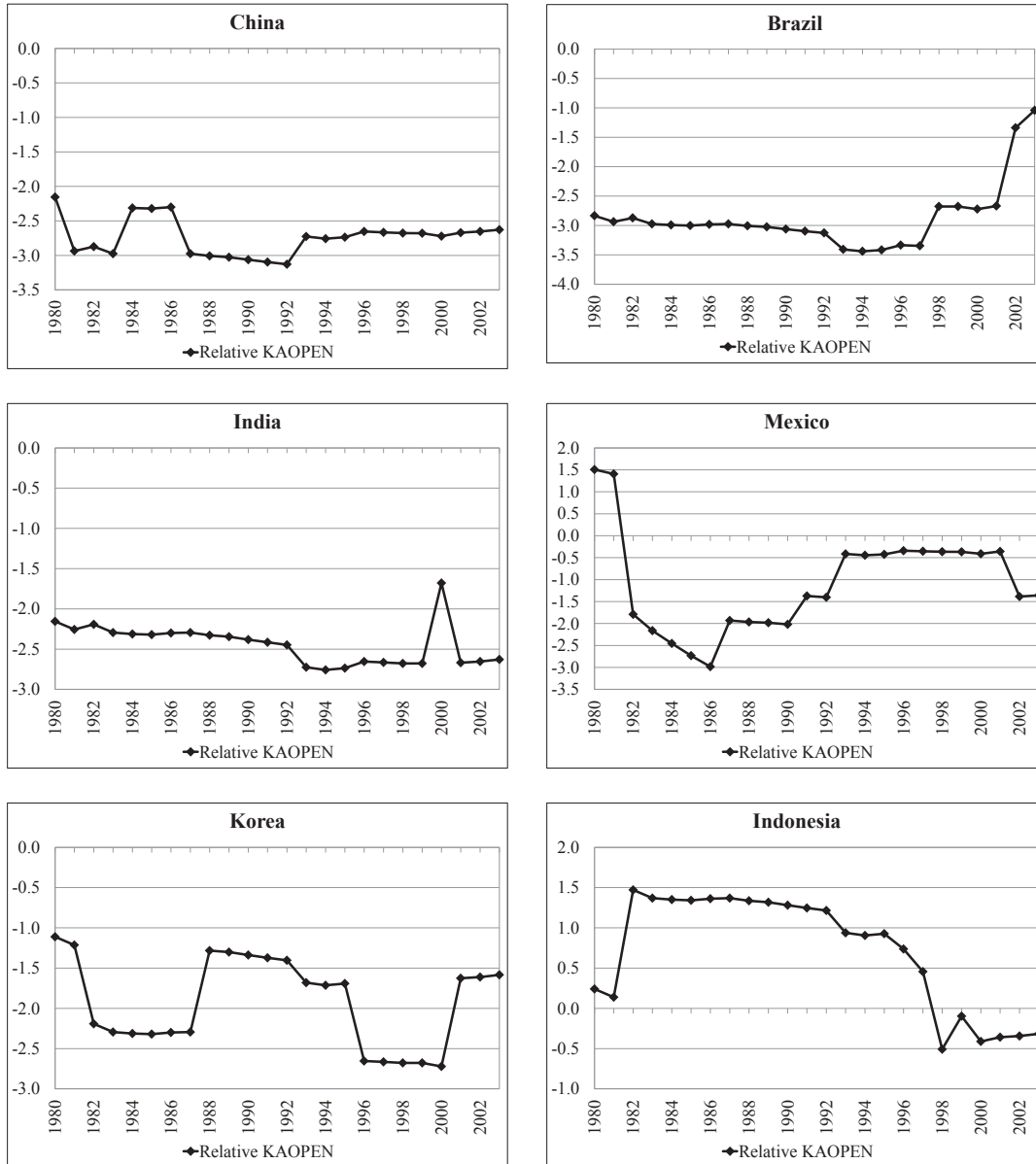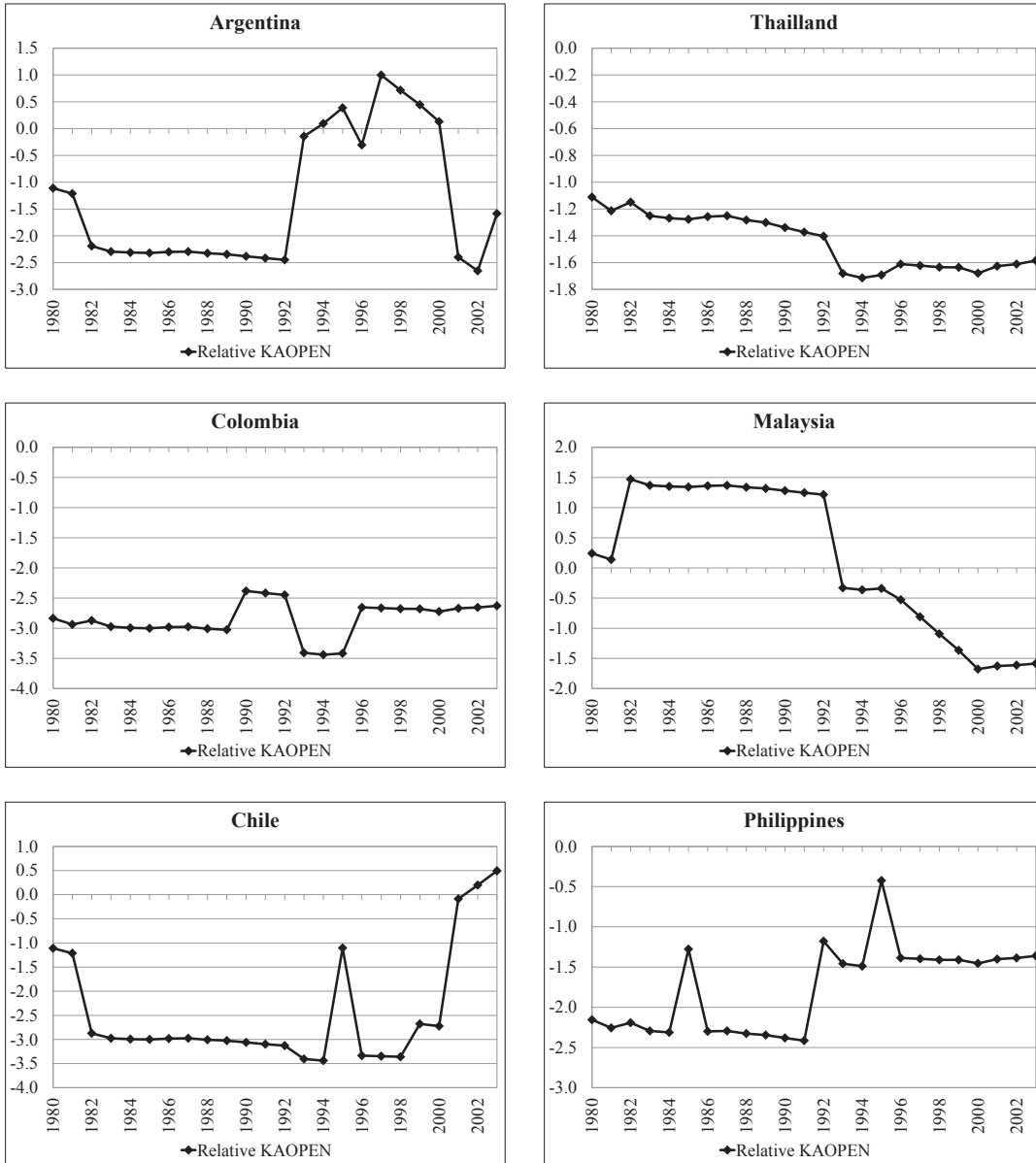
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Figure E.3: Emerging countries

Figure E.4: Emerging countries (continued)

Source: author's calculations. Chinn-Ito index (2002, 2006).