International Finance and Income Convergence:

Europe is Different

Abdul Abiad, Daniel Leigh, and Ashoka Mody[1]

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Abstract

Recent studies conclude that the ongoing global financial integration may have had little or no value in advancing economic growth, especially in poor countries. Capital is often found to flow "uphill" from poor to rich countries. And, when it does flow into the less developed economies, it is negatively correlated with growth, calling into question the desirability of foreign capital. In this paper we report that Europe—including the new member states of the European Union—provides a counterexample to these global anomalies. With increasing financial integration, capital in Europe has traveled "downhill" from rich to poor countries, and has done so with gathering strength. These inflows have been associated with significant acceleration of income convergence.

[1] The views expressed here should not be attributed to the International Monetary Fund. Earlier versions of this paper have been presented at the National Bank of Hungary and the IMF's European Department research seminar.

I. INTRODUCTION

Can emerging market countries derive benefits from access to international capital? The recent attention to this perennial question has, as yet, produced no consensus. In their sweeping survey, Kose, Prasad, Rogoff, and Wei (2006) find little robust evidence for long-run growth benefits from global financial integration. Because the benefits do not apparently occur directly through traditional channels such as capital accumulation, they speculate that capital inflows may, nevertheless, catalyze "collateral benefits" (such as financial sector development, better governance, and improved macroeconomic discipline). The indirect effects are, however, difficult to identify. Moreover, paradoxically, even such benefits may not accrue until threshold preconditions (again in terms of financial development, better governments, and improved policies) are achieved.[1] While they recognize the limits of capital flows in spurring growth—and also the risks of financial crises when such flows do occur—they are, nevertheless, not ready to abandon the traditional conception that international reallocation of capital to poor countries can be socially efficient.

Prasad, Rajan, and Subramanian (2006) go one step further. They report that capital has been flowing "uphill" from poor to rich countries. Within developing economies, the net amount of capital received by high-growth developing countries has been smaller than that received by those growing more slowly. Their provocative conclusion is (p. 10): "... while developing countries grow faster by relying less on foreign savings, it is just the opposite for industrial countries. Put another way, neither China nor the United States, both fast growing

[1] Borensztein, De Gregorio, and Lee (1998) find that foreign direct investment facilitates growth but mainly when there is depth in the receiving country's human capital. Klein (2005) focuses on the strength of domestic institutions as providing the framework for the absorption of foreign capital. And Mody and Murshid (2005) use an index of policy quality as the variable that determines the effectiveness of foreign capital inflows.

countries for their stage of development, are running perverse current account balances relative to the norm. They are just extreme examples of their respective class of country!" Thus, the example of China the "poor" country exporting capital to the "rich" United States is elevated to a generalization of observed flow patterns and, by association with the favorable growth outcomes, is represented as the desired outcome. The implication is that the traditional conceptions of international capital reallocation are invalid in both their descriptive and normative senses. Capital inflows into poor countries may hurt and are apparently not needed since fast growing developing countries generate more savings than they can use (to finance profligate consumers in rich countries).

This paper has two points of departure. First, global financial integration is an equilibrating process and its effects should primarily be reflected in income convergence rather than in a rise in the steady-state level of growth. Aghion, Howitt, and Mayer-Foulkes (2005) conclude theoretically and demonstrate empirically that domestic financial development works through its effects on income convergence. Henry (2006) emphasizes that capital account liberalization similarly influences income convergence rather than a discrete shift in the growth rate. We pursue that notion by examining the interplay between current account deficits (a summary measure of capital flows) and growth in per capita income, a relationship that evolves as countries become richer. Empirically, the implication is that it is insufficient to include just the current account balance as a right-hand-side variable in the growth equation; an interaction of the current account with the initial per capita income is needed. But that, by itself, does not resolve matters.

Second, it is important to recognize that growth processes around the world differ in substantive ways. While pooling the full range of countries from Algeria to Australia and

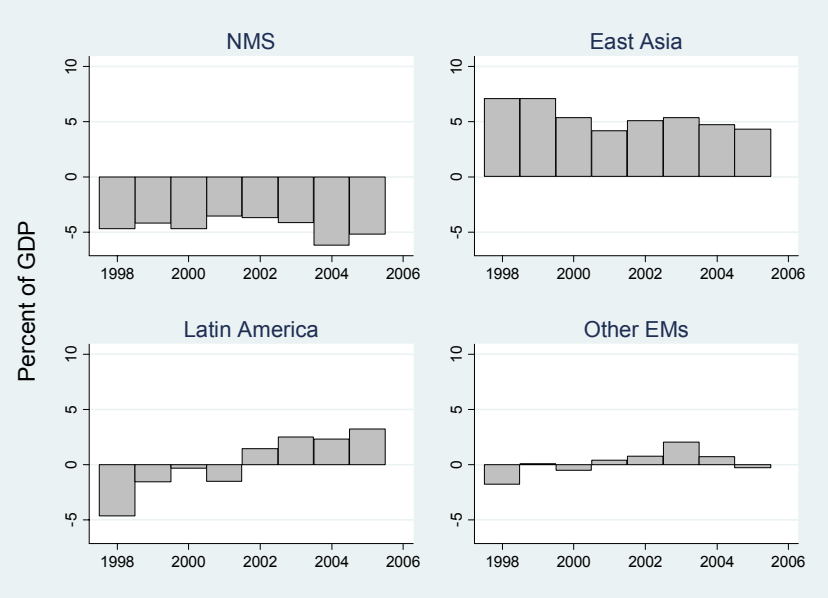
from Thailand to Switzerland is appropriate for some analyses, it does injustice to a variety of other enquiries. Development proceeds in non-linear ways, with important threshold effects. The prevalence of "convergence clubs" also points to differing growth dynamics. Aghion and Howitt (2005) emphasize that the growth process is the result of important interactions between policies and state variables, such as a country's distance to the world technology frontier and its level of financial development. Pritchett (2001) argues for distinguishing between alternative growth-generating processes—and, hence, cautions against forcing countries into the straightjacket of a common regression, which will fail to reveal the theoretically interesting forces at work. As such, if the level and context of financial integration operate differently for different countries (at different times), global regressions will, at best, average the range of outcomes. Instead, studying the growth process of countries with *prima facie* common dynamics is a valuable option. This is the line of enquiry we pursue.

Unlike in the global sample, this paper demonstrates in Europe the "downhill" flow of international capital, a flow that has accelerated with increased financial integration and supported income convergence. Europe is different. The generality of this observation, the conditions in which a similar pattern may be observed elsewhere or in the future, and its normative implications we leave for future research.

The focus on Europe, of interest in itself, is relevant to this research agenda because it provides fertile ground for testing the relationship between financial integration and income convergence. First, with its rapid progress in the past fifteen years, the extent of financial integration within Europe is greater than in any other significant geographical region. Eichengreen and Park (2003) note: "One of the most striking aspects of Europe's recent

development has been the growth and integration of financial markets. In Asia, in contrast, there has been less progress in financial integration. If anything, the countries of East Asia have developed stronger financial ties with Western Europe and the United States than with one another." The financial integration in Europe, Blanchard and Giavazzi (2001) document, has eroded the so-called "Feldstein-Horioka puzzle," increasing the dissociation of domestic savings and investment and, hence, generating a larger dispersion of current account balances across countries. A particular implication of increased financial integration in Europe has been the flow of foreign capital from advanced countries to the new member states of Europe (the NMS). In the past decade, following their initially traumatic transition to a market economy, a number of the NMS have run large current account deficits. The contrast with other emerging markets is stark (Figure 1). East Asian economies have run substantial surpluses in recent years. Even the emerging economies of Latin America have moved from deficits in the late 1990s to surpluses, in the aggregate. The natural question is, has European financial integration helped accelerate growth in the NMS?

Figure 1. Emerging Markets: Current Account Balance, 1998-2005
(percent of GDP, unweighted regional average)



Second, while much attention has been paid to Europe's lagging economic performance relative to the United States (see, for example, Aghion et al. 2003), in one respect Europe has been hugely successful. Caselli and Tenreyro (2005) note, Europe has been the quintessential "convergence club." While "divergence, big time" has been the dominant global outcome (Pritchett 1997), European countries have grown faster merely by virtue of being relatively poor (so-called "unconditional" convergence). While a number of factors probably contribute to convergence forces within Europe, financial integration is one possible driver, especially in recent decades. Gourinchas (2002 and 2004) and Gourinchas and Jeanne (2005) note that high capital mobility may accelerate the *achievement* of unchanging long-run levels of capital and output per capita. In addition, such mobility may be associated with stepped-up productivity and, hence, higher long-run *levels* of per capita income. Productivity gains, in turn, may accrue from a generalized knowledge transfer or an efficiency increase in the financial sector improving the allocation of resources.

The chain of logic we attempt to trace can be summarized as follows. With greater financial integration, current accounts become more differentiated, with poorer countries attracting capital from richer nations. The capital inflows are associated with accelerated growth, the poorer the country is. But as such a country becomes richer, current account deficits (capital inflows) decline (for given levels of international financial integration) as does the growth dividend from foreign capital flows. External finance, therefore, has a self-limiting and transitory influence, though the transition can be drawn out.

We first estimate a current account equation. Using 5-year, non-overlapping, averages for the dependent variable over the period 1975 to 2004, we reproduce the standard findings for the global sample (in line, for example, with Chinn and Prasad 2003). While the global

current account equation highlights the importance of domestic variables, such as domestic growth and dependency ratios, European current accounts are more fundamentally associated with the possibilities accorded by international finance. Thus, in European current accounts we see more of an influence of international consumption smoothing. More importantly, as countries have become more financial integrated (measured primarily as the sum of international assets and liabilities normalized by a country's GDP, but robust to other measures), the potential of transfer of capital from rich to poor countries has increased. All else equal, a country's current account deficit is larger the lower its income level and the higher its degree of financial integration. The statistically significant interaction of per capita income and financial integration confirms that the Blanchard and Giavazzi (2002) finding of increased sensitivity of current account balances to per capita European incomes is the result of a general increase in financial integration. However, since the pace of integration has varied across countries, the sensitivity varies across countries, depending on their degree of financial integration.

The growth equation shows somewhat greater similarity in the global and European samples when the traditional growth drivers (schooling, population growth, trade openness, and the costs of investment) are considered. However, the role of external capital is very different. While there is no evidence for a perceptible influence of foreign capital on domestic growth in the global regressions, more international capital is seen to raise a European country's growth the lower is its initial per capita income. We depart from the approach adopted by Prasad, Rajan, and Subramanian (2006) not only in allowing for foreign capital to influence the convergence process (by including a term that interacts the current account deficit with the initial per capita income) but also by using 5-year non-overlapping

averages as the units of observations, instead of the 30-year averages they use in their cross-sectional analysis.[2] This allows us to meaningfully use the variation in growth rates or capital flows over time within a given country, and to use lagged current accounts to minimize the likelihood of reverse causality from growth to current account deficits.

Finally, in examining the channels through which foreign capital has an influence on European growth, we have two main findings. First, FDI inflows are largely associated with productivity growth while non-FDI inflows help capital accumulation. Second, foreign capital apparently works independently of the domestic financial sector, rather than through mainly bolstering local financial capabilities.

The remainder of the paper is structured as follows. Section II investigates the determinants of the current account in Europe, especially with a view to assessing the role of financial integration in facilitating international capital flows from rich to poor countries. Section III then explores whether these capital flows influenced income convergence and, if so, through what mechanisms. Section IV concludes.

II. Current Accounts and the Role of Financial Integration

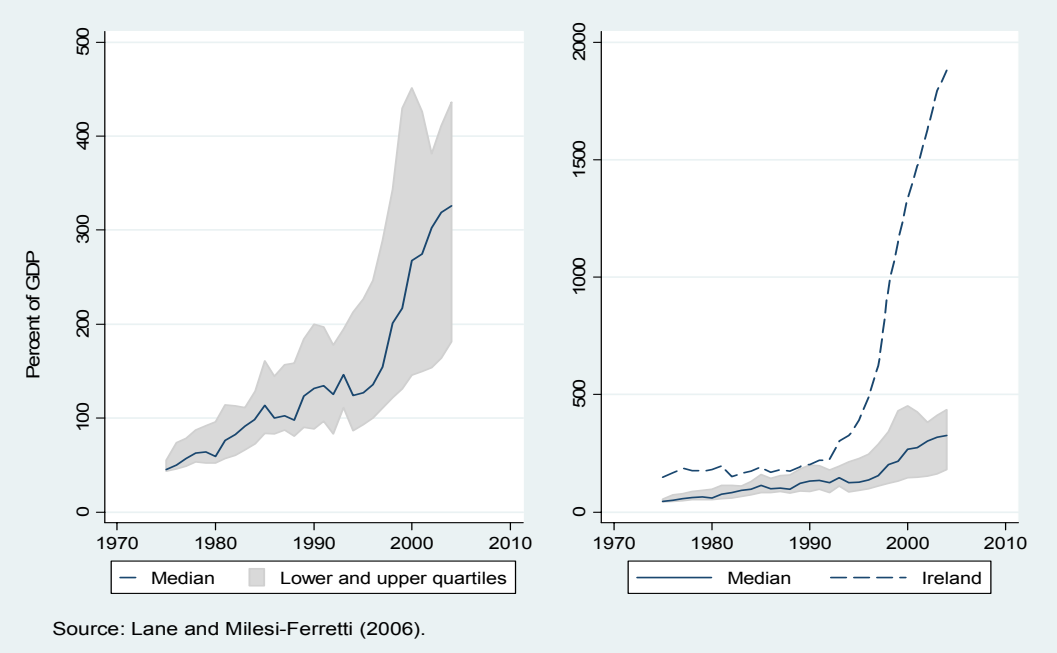
A country's current account balance is, by definition, the difference between its savings and investment rates. In assessing the determinants of this balance, therefore, researchers have been guided by the underlying determinants of savings and investment. In turn, these include domestic and international influences. Until recently, domestic

[2] They focus on the correlation between average real per capita GDP growth over the period 1970-2000 and capital flows, as measured by the current account balance. However, they also present results with a shorter spell of 12 years between 1985 and 1997. See, in this context, Collins (2006) in her comment on Prasad, Rajan, and Subramanian. Kose et al. (2006) also take a long-run view, investigating the correlation between average per capita growth and financial integration over 1984 to 2004.

determinants (such as domestic growth rates, the fiscal stance, and dependency rates) received the bulk of the attention, not least because domestic savings and investment rates tended to be highly correlated, as documented originally by Feldstein and Horioka (1980).

In their focus on Europe, Blanchard and Giavazzi (2002) argued that the ongoing process of international financial integration must have a bearing on the evolution of current accounts. Figure 2 shows the evolution of integration, measured here as the sum of international financial assets and liabilities divided by GDP. Over 1975-2004, the median European ratio increased from 45 percent to 326 percent of GDP. In the "old" member states (the EU-15), the median reached 403 percent of GDP by 2004. The less integrated NMS participated strongly in the integration process, with their median measure reaching 171 of GDP in 2004. Ireland and Luxembourg were outliers even by the standards of Europe, with, respectively, integration ratios of 1,880 and 20,000 percent of GDP in 2004.

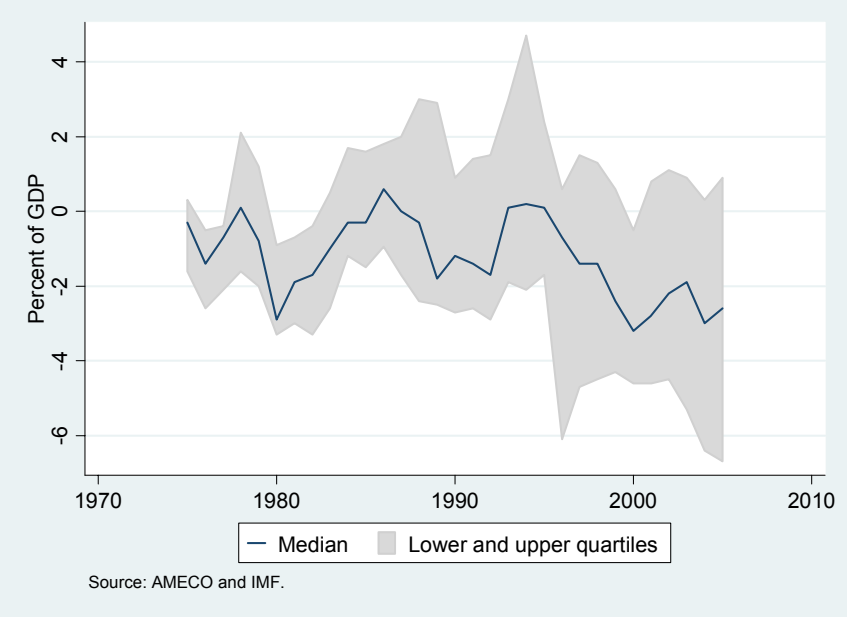
Figure 2. Europe: Financial Integration, 1975-2004
([Foreign Assets + Foreign Liabilities]*100/GDP)



Source: Lane and Milesi-Ferretti (2006).

Financial integration coincided with increased dispersion of current account balances, as documented by Blanchard and Giavazzi (2002) and illustrated in Figure 3. Blanchard and Giavazzi's important finding was that this greater dispersion reflected an increase over time in the tendency for capital to flow "downhill" from the richer to the poorer European countries. The increasing size of the coefficient on per capita income in the current account equation meant that the current account balances had become more responsive to a country's per capita income, with richer countries running larger surpluses and poorer countries running larger deficits. They conjectured, but did not directly test, that this tendency was associated with the parallel process of financial integration within Europe.

Figure 3. Europe: Dispersion of Current Account Balances, 1975-2005



In this section, we build on the Blanchard and Giavazzi insight. In doing so, we reach a number of conclusions. First, the role of financial integration in determining the size of the current account is yet mainly a European phenomenon. Second, instead of allowing the size of the coefficient on the per capita income to vary over time, as in Blanchard and Giavazzi,

the evolution can be modeled directly by interacting per capita income with measures of financial integration. Such an exercise shows that the time trend in the coefficient is indeed a reflection of the generally increasing financial integration; however, because countries are integrated to differing degrees, they are taking advantage of this process at differing rates. Third, in Europe, trade integration acts in the same way as financial integration, and the two processes are operating on sufficiently different time scales to make their independent effects distinguishable.

A. Empirical Approach

We begin with a reduced form specification similar to that proposed by Chinn and Prasad (2003) and widely used with small variations by, among others, Chinn and Ito (2005), and Gruber and Kamin (2005). The equation takes the following form:

$$\left(\frac{CA}{GDP}\right)_{it} = \alpha_{0t} + \alpha_x X_{it} + \varepsilon_{it} \qquad (1)$$

The dependent variable, $\left(\frac{CA}{GDP}\right)_{it}$, is the current account balance-to-GDP ratio. A positive observation denotes a surplus and a negative value represents a current account deficit. The term ε_{it} is the error or disturbance term. Since our interest is in the medium-term determinants of the current account, in our main regressions, we use 5-year, non-overlapping, observations of the current account balance constructed over 1975-79, 1980-84, 1985-89, 1990-94, 1995-99, and 2000-04. This procedure abstracts from short-run variations in current accounts and related variables. However, we also report estimation results using three-year averages and annual data. All regressions include a period fixed effect, α_{0t}, allowing the average current account balance to vary over time. Following the dominant approach in the

recent literature, we use the cross-sectional variation in the data. Estimation is performed via random effects generalized least squares (GLS) with clustered standard errors.[3]

The vector of explanatory variables, X_{it}, includes two contemporaneous variables, the government budget balance (as a ratio to GDP) and the growth rate of real PPP-adjusted GDP per capita. The other variables, the log of PPP-adjusted GDP per capita, the lagged net foreign assets-to-GDP ratio (NFA/GDP), the elderly and youth dependency ratios, and trade integration (i.e., the ratio of imports and exports to GDP) are all evaluated in the year prior to each five-year period. The data sources for these variables are presented in the Appendix.

To test for the role of financial integration, we include also a measure of financial integration and its interaction with the level of per capita income. If the rising financial integration has indeed facilitated the flow of capital from rich to poor countries, then the coefficient on the interaction term should be negative, implying that poorer countries are able to run larger deficits the more financially integrated they are.[4] We measure financial integration using two variables used in other studies and available for a large range of countries. Our primary measure of financial integration, a *de facto* degree of financial integration or openness, is the ratio of gross stocks of foreign assets plus liabilities to GDP, as measured by Lane and Milesi-Ferretti (2006). We also report results using a *de jure* measure of a country's capital openness from Chinn and Ito (2005). Because measures of integration using data on prices of assets are not available for the earlier years of our sample, we report the consistent results for the shorter time period in the Robustness Appendix.

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[3] With fixed effects estimation, the signs of the coefficients remain the same, but with the reduced variation, the significance of the findings drops, to about the 10 percent level.

[4] Testing for such an interaction is apparently novel; while Chinn and Prasad (2003) include measure of capital controls in their current account specification, they do not interact these with the level of income.

The European sample consists of 23 members of the European Union (EU), including the ten new members who started the process of accession in the mid-1990s and formally joined the EU in 2004. We exclude Luxembourg and Ireland from the analysis, both with an unusually high degree of financial integration. Blanchard and Giavazzi (2002) also exclude Luxembourg from their analysis of European current account dynamics. Kose et al. (2006) exclude Ireland from their analysis of the relationship between financial integration and GDP growth. In addition to its high financial integration, explanation of Ireland's exceptional performance—with per-capita GDP growth near double digits in the late 1990s—is, Blanchard (2002) notes, "complicated by a number of unusual mechanisms at work." The EU-15 are covered for the entire period from 1975 to 2004; the new member states are part of the sample starting in 1994 to exclude the disruptive period of transition from a centrally planned economy, and because their integration into Europe began in the mid-1990s.

B. Estimation Results

For the global sample, our results are very similar to those obtained by others. Column 1 of Table 1 shows that the current account balance is larger when the fiscal balance is larger. The positive sign on the NFA/GDP variable is what virtually all researchers find. However, as Chinn and Prasad (2003) and Chinn and Ito (2005) note, the expectation is that the sign would be negative, since countries with large external liabilities will need to run larger balances, while those that have accumulated assets should be able to run deficits. The implication is that such a dynamic, consistent with consumption smoothing, is not being facilitated by financial markets on a global basis.[5] Higher GDP growth is associated with a

[5] The implication that countries running deficits can continue indefinitely to accumulate liabilities raises concerns that the equation is misspecified, possibly because of omitted variables.

smaller balance (or larger deficit), and higher dependency ratios are associated with a lower current account balance, presumably because higher dependency reduces the savings rate.

Table 1. Benchmark Current Account Regressions, Global and European Samples

	Dependent variable: 5-year average CA/GDP					
	Global			Europe		
Log of GDP per capita	0.0187	0.0176	0.0178	0.058	0.0225	-0.0081
	[3.08]***	[2.88]***	[2.87]***	[2.82]***	[0.92]	[0.29]
Contemporaneous growth in GDP per capita	-0.005	-0.005	-0.005	0.002	0.001	0.004
	[2.54]**	[2.53]**	[2.53]**	[0.35]	[0.30]	[1.10]
Contemporaneous fiscal balance/GDP	0.389	0.387	0.388	0.040	-0.015	-0.119
	[3.55]***	[3.54]***	[3.59]***	[0.31]	[0.11]	[0.76]
NFA/GDP	0.032	0.033	0.033	-0.020	-0.023	-0.028
	[4.95]***	[5.04]***	[4.42]***	[1.13]	[1.34]	[1.88]*
Old dependency ratio	-0.335	-0.342	-0.340	-0.142	-0.380	-0.292
	[3.93]***	[3.86]***	[3.84]***	[0.67]	[1.56]	[1.39]
Young dependency ratio	-0.061	-0.066	-0.066	0.270	0.002	-0.018
	[1.84]*	[1.90]*	[1.89]*	[1.51]	[0.01]	[0.12]
Trade openness/GDP	-0.015	-0.018	-0.018	-0.007	-0.026	-0.014
	[1.67]*	[1.74]*	[1.75]*	[0.47]	[1.53]	[1.04]
Financial integration/GDP		0.002	0.005		0.018	-0.430
		[0.80]	[0.23]		[2.13]**	[2.64]***
Log of GDP per capita*(Financial integration/GDP)			-0.0004			0.045
			[0.15]			[2.70]***
Observations	488	488	488	87	87	87
Number of countries	115	115	115	23	23	23
R-squared	0.38	0.38	0.38	0.20	0.31	0.39

Robust t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Note: Estimates are on five-year nonoverlapping intervals, using random effects with clustered standard errors. Unless otherwise indicated, the values for the right-hand side variables are for the year preceding the five-year interval (e.g., 1994 for the 1995-99 period). Constants and time dummies are not reported.

The relationship between initial per capita income and the current account balance is positive and statistically significant. This result is in line with previous work and is consistent with the standard theory prediction that capital flows from rich to poor countries. However, the size of the effect is small: a doubling of a country's per capita income will improve the current account balance by ln(2)*0.019 = 1.3 percent of GDP. Finally, in columns 2 and 3, we examine the effect of financial integration on the current account. In the global sample, there is no relationship between the degree of a country's financial integration and its current account—either directly or indirectly through making it easier for poorer countries to gain access to capital.

In next three columns, we present the same regressions for the European sample. The results are sharply different. Now there is no statistically significant relationship between the current account balance and several "conventional" determinants. Thus, contemporaneous growth is statistically insignificant (and even of the wrong sign), as are the dependency ratios. These domestic factors are apparently not driving European current accounts. An especially interesting contrast is with respect to net foreign assets: a larger NFA/GDP *is* associated with a lower current account balance in the European sample. The negative coefficient is even marginally significant in our preferred regression (column 6). This, as discussed above, is the expectation if liabilities and assets are not to be accumulated indefinitely and is an indication of international consumption smoothing as countries borrow abroad to consume now and pay later.

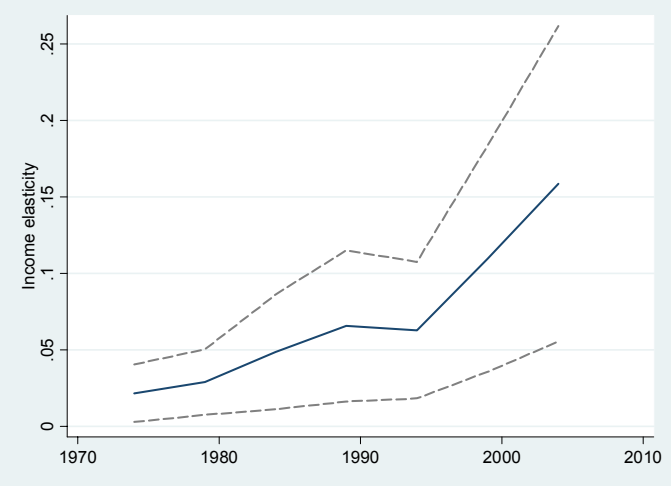
The average coefficient on per capita income in column 4 is substantially larger in the European than in the global sample. Thus, there is more of a tendency for capital to move from the richer to poorer countries in Europe than in the rest of the world. We explore the source of this process by including financial integration and its interaction with per capita GDP in columns 5 and 6.

The new finding is striking: in Europe, financial integration has a strong relationship with the current account deficit, and the direction of that relationship depends on a country's income. While poorer countries that are more financially integrated run larger deficits, richer countries that are more financially integrated run larger surpluses. In other words, financial integration leads countries to borrow more from abroad if they are poorer, and rich countries to lend more abroad if they are richer. The coefficient on *Financial Integration/GDP*, given by -0.430+0.045*log(*per capita income*), is negative for lower-income EU members (those

with per capita incomes below $e^{(0.430/0.045)}$ = $14,640), and is positive for higher-income EU members. As such, all else equal, an increase in financial integration by 100 percent of GDP would increase Lithuania's current account *deficit* by 3.5 percent of GDP, and would raise the Netherlands's *surplus* by 2.1 percent of GDP. This is our key result on current accounts. It shows that the general increase in financial integration in Europe is an important force in explaining the increased dispersion of current accounts.

Alternatively, we can focus on the coefficient on income, -0.0081+0.045**Financial Integration/GDP*. This coefficient is always positive (because all EU members exceed the financial integration threshold of 18 percent of GDP (0.045/0.0081) when this coefficient switches sign). Hence increasing income implies larger surpluses (or lower deficits). Blanchard and Giavazzi (2001) find that the income coefficient for the EU sample as a whole increased over time, reaching 0.2 by the year 2000. Our results (reported in Figure 4, based on column 6 of Table 1) have the same time trend and order of magnitude: the average income coefficient increased from small but positive values in the 1970s to more than 0.15 by 2004.

Figure 4. Europe: Coefficients on Output per Capita over Time for the Observed Range of Financial Integration (± 1 standard deviation)

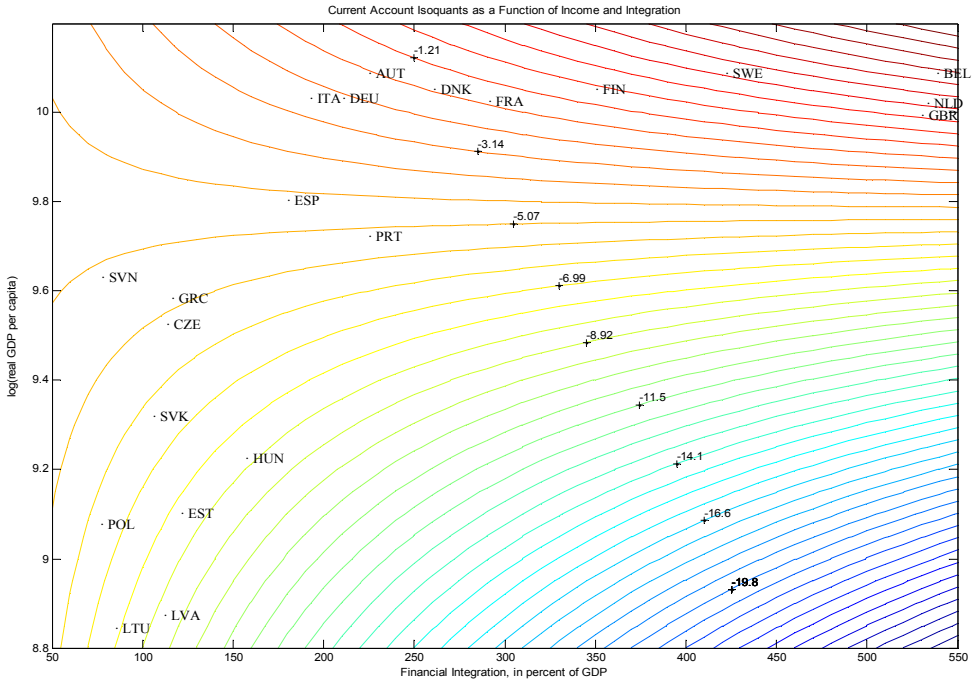


While the Blanchard-Giavazzi approach provides an average income coefficient per year for all the countries in the sample, our approach estimates a different income coefficient for each country, every year. Thus, in 2004, for the most financially integrated country in our sample, the estimated coefficient exceeds 0.25. The variations in this respect across countries can be important. The size of the income coefficient for Lithuania (*FI/GDP*=0.8 in 1999) is 0.028, so that if Lithuania were to double its income, its current account balance would improve by 0.69*0.028=1.9 percent of GDP. Because the size of the income coefficient for Estonia (*FI/GDP*=1.4 in 1999) is higher at 0.055, if Estonia were to double its income, its current account balance would increase by twice the amount (0.69*0.055=3.8 percent of GDP).

These non-linearities are summarized in current account "isoquants" derived from column 6 of Table 1. Along each isoquant in Figure 5, financial integration and income levels change but current account deficit remains constant. For countries at the lower end of the income distribution, where countries tend to run current account deficits, the isoquants slope upwards. In other words, as income rises, the current account deficit will tend to fall, but a higher degree of financial integration would keep the deficit unchanged. As a country moves along an isoquant and its income level increases, the marginal effect of additional financial integration on its current account deficit declines (the slopes of the isoquants become flatter as income levels increase). Thus, larger and larger increases in financial integration are required to induce the current account deficit to stay unchanged. The isoquants have negative slopes at higher levels of income. These "rich" countries will tend to run current account surpluses, especially if they are also highly financially integrated. As a rich country's income increases, it would, other things equal, run larger current account

surpluses. Thus, for an unchanged current account surplus, the level of financial integration has to decline.

Figure 5. Current Account Isoquants as a Function of Income and Financial Integration



What are the implications of our findings for the current account balances of the new member states in the future? The answer depends in part on how their levels of financial integration may evolve. While the financial integration of the NMS has more than doubled over the past 10 years, it has not yet reached the levels observed in the old member states. As of end-2004, the median level of financial integration in the old member states was 403 percent of GDP versus only 170 percent in the NMS. Therefore, the NMS' financial integration could plausibly be expected to increase further in the future. That possibility of increasing financial integration should, our results suggest, keep the current account deficits large enabling sustained capital inflows. But, in the meantime, these countries will also increase their income levels, which will dampen the current account deficit. Consider a

country at an income level that is half the EU average and a financial integration ratio equal to the NMS average of 170 percent of GDP. The current account-income elasticity for such a country, estimated at about 0.07, implies a current account deficit of 3.4 percentage points greater than the EU average. If this country's financial integration increases to 403 percent of GDP—the median for the old member states—its current account-income elasticity will rise to about 0.19 and the current account deficit will be 9.7 percentage points of GDP above the EU average, other things equal. However, if at the same time its income rises sufficiently quickly (i.e. it moves along the current account isoquant), the current account deficit could remain unchanged.

We subject these findings to a series of substantive robustness tests. An immediate question is whether the observed influence of financial integration reflects other global and domestic developments. Clearly, while financial integration was increasing, so was trade openness; moreover, the countries made important headway in their domestic financial and institutional development. Does the effect of financial integration identified here hold up even when these other trends are accounted for? The answer in Table 2 is "yes."

Three findings are worth noting. First, trade openness operates in much the same way as the financial integration measure, and the effects appear to coexist. More trade openness is associated with a smaller balance (a larger deficit) in poorer economies (those with per capita incomes less than exp(0.834/0.088) = $13,015) but with an improved balance in richer countries. The relative magnitudes of the trade and financial integration effects will depend, of course, on a country's income level. For countries with per capita incomes below $11,500, the marginal effect of a one percentage point increase in trade openness has a larger effect on

the current account than the same increase in financial integration; above this threshold, financial integration has a larger marginal effect.

Table 2. Europe: What has Strengthened the CA-Income Link? Financial Integration vs. Other "Enabling Mechanisms"

	Dependent variable: 5-year average CA/GDP					
Log of GDP per capita	-0.09	-0.10	0.01	-0.07	-0.05	-0.16
	[2.92]***	[3.98]***	[0.23]	[1.57]	[1.41]	[3.73]***
NFA/GDP	-0.03	-0.03	-0.03	-0.03	-0.03	-0.03
	[1.78]*	[2.22]**	[1.97]**	[1.79]*	[1.65]*	[1.52]
Financial integration/GDP	-0.35	-0.50	-0.49	-0.49		
	[2.37]**	[3.73]***	[3.00]***	[2.95]***		
Trade openness/GDP	-0.834	0.009	-0.009	-0.794	0.003	-1.291
	[2.63]***	[0.70]	[0.72]	[2.20]**	[0.23]	[3.41]***
Capital account openness index		-0.27			-0.48	-0.37
		[4.17]***			[5.16]***	[3.48]***
Private credit/GDP			1.03	0.73	-0.23	-0.25
			[2.31]**	[1.55]	[0.45]	[0.50]
Log of GDP per capita*(Financial integration/GDP)	0.04	0.05	0.05	0.05		
	[2.41]**	[3.75]***	[3.07]***	[2.98]***		
Log of GDP per capita*(Trade openness/GDP)	0.09			0.08		0.14
	[2.60]***			[2.19]**		[3.43]***
Log of GDP per capita*Capital account openness index		0.03			0.05	0.04
		[4.15]***			[5.23]***	[3.56]***
Log of GDP per capita*(Private credit/GDP)			-0.11	-0.08	0.02	0.02
			[2.31]**	[1.55]	[0.39]	[0.47]
Observations	96	87	92	92	83	83
Number of countries	23	23	23	23	23	23
R-squared	0.42	0.53	0.35	0.42	0.44	0.53

Robust t statistics in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%
Note: Estimates are on five-year nonoverlapping intervals, using random effects with clustered standard errors. Unless otherwise indicated, the values for the right-hand side variables are for the year preceding the five-year interval (e.g., 1994 for the 1995-99 period). Constants and time dummies are not reported.

Second, a *de jure* measure of the country's own capital account openness from Chinn and Ito (2005) also accelerates the inflow of capital for poorer countries. Once again, greater financial integration and capital account openness, though measuring similar underlying concepts are sufficiently different to reveal independent effects. Finally, a low level of domestic financial development, measured as the ratio of private credit/GDP, appears to attract more international capital. In other words, countries where domestic credit systems are still in early stages of development seek and obtain more external finance—and, this effect is more pronounced the more lower its initial per capita income.[6]

[6] Measures of domestic institutional quality did not show any significant effect.

III. The Impact of Current Accounts on Growth

A. Empirical Methodology

Do the capital inflows facilitated by the process of increased financial and trade integration help to raise growth? We turn to that question in this section in the context of a standard empirical specification, building on Bosworth and Collins (2003) and Sala-i-Martin, Doppelhofer, and Miller (2004). The equation, motivated by determinants of economic growth, takes the following form:

$$g_{it} = \beta_{0t} + \beta_y Z_{it} + \eta_{it} \quad (2)$$

where the dependent variable, g_{it}, is the annual average growth rate of per capita PPP-adjusted real GDP over each five-year period. The vector of explanatory variables, Z_{it}, includes explanatory variables that are typically thought to be robust correlates of growth. In particular, it includes the following variables evaluated in the year prior to each five-year period: the log of per-capita GDP; the population growth rate; the level of schooling; the trade openness ratio; and the relative price of investment goods. In addition to these standard controls, we include the current account balance-to-GDP ratio, a measure of a country's capital "outflows"—a negative current account balance is a capital inflow. To allow for the possibility that capital flows may have transitory or "convergence" effects, we include the interaction of each country's current account balance with its level of per capita GDP. If capital inflows raise growth more in poorer than in richer countries, then the coefficient on the interaction of per capita GDP and the current account balance should be positive.

As in the estimation of the current account equation, our sample consists of non-overlapping five-year periods constructed over 1975-2004 for the same 23 EU countries. The independent variables take the values in the year prior to the five-year interval; for the

current account, our main regressions include the average of the current account balance in the previous five-year period (as discussed in more detail below). All regressions include a period fixed effect, β_{0t}, allowing the average growth rate to vary over time. The principal estimation technique once again is random effects GLS with clustered standard errors, though we show the robustness of our main results to estimation using country fixed-effects.

B. Estimation Results

For the global sample, we find all the standard explanatory variables have the conventional signs and are statistically significant when the cross-sectional variation is retained, whether using OLS (with standard errors allowing country clusters) or random-effects (Table 3). Thus, on average, poorer countries grow faster (indicating conditional income convergence), schooling and trade openness raise growth, and population growth and the relative price of investment goods lower growth rates.

European growth differs in several respects from the global growth process. "Unconditional" convergence has characterized Europe for the past 30 years, i.e., poorer countries are seen to have grown faster even when no account is taken of other growth drivers (Figure 6). In contrast, global growth has exhibited divergence (as displayed in Figure 6) and only conditional convergence (Table 3). It is not surprising, therefore, that the European speed of conditional convergence is clearly higher than the global average, as the larger absolute size of the coefficient on per-capita GDP indicates. The effects of schooling and trade openness, though statistically significant, are economically less important. And population growth and the relative price of investment have the same directional influence but their statistical significance is lower, a reflection of the much smaller variation in these dimensions within Europe relative to the variation across the global sample of countries.

Table 3. Benchmark Growth Regressions, Global and European Samples

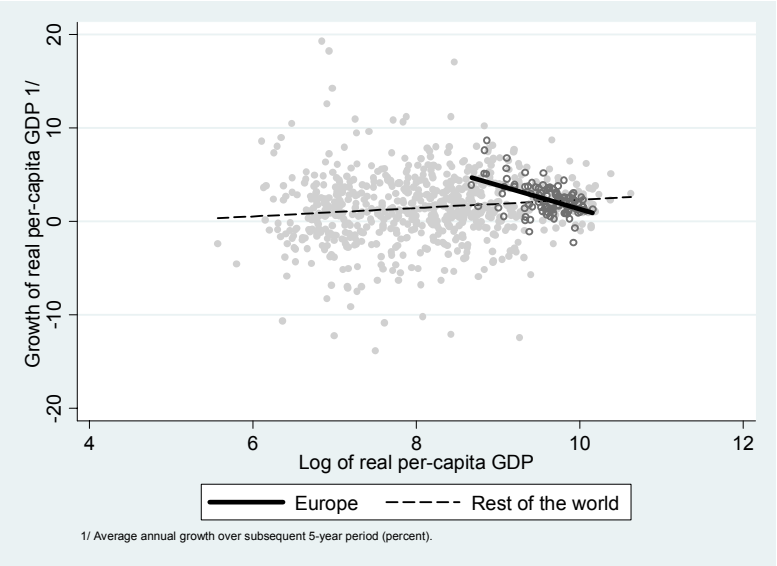
	A. Random Effects						*B. Fixed Effects*					
Dependent variable: 5-year average growth in GDP per capita												
	Global			Europe			Global			Europe		
Log of GDP per capita	-1.38	-1.31	-1.31	-3.51	-3.36	-2.98	-5.85	-5.72	-5.66	-10.85	-11.27	-11.79
	[4.70]***	[4.33]***	[4.03]***	[5.23]***	[5.24]***	[4.47]***	[8.67]***	[8.41]***	[8.27]***	[3.22]***	[3.35]***	[3.84]***
Schooling	0.69	0.71	0.71	0.25	0.19	0.21	-0.02	0.07	0.05	-0.18	-0.12	-0.10
	[3.85]***	[4.03]***	[4.00]***	[2.98]***	[2.42]**	[2.71]***	[0.05]	[0.18]	[0.13]	[0.43]	[0.27]	[0.23]
Population growth	-0.27	-0.26	-0.26	-0.29	-0.12	-0.09	-0.15	-0.15	-0.14	-0.23	-0.22	-0.31
	[3.82]***	[3.89]***	[3.92]***	[0.67]	[0.32]	[0.27]	[2.21]**	[2.18]**	[2.08]**	[0.47]	[0.45]	[0.74]
Trade openness/GDP	1.321	1.240	1.240	0.963	0.945	0.628	1.702	1.602	1.675	1.126	1.392	1.855
	[4.03]***	[3.65]***	[3.60]***	[3.25]***	[3.63]***	[1.77]*	[1.94]*	[1.80]*	[1.87]*	[0.63]	[0.85]	[1.26]
Relative price of investment	-0.59	-0.59	-0.59	-1.22	-0.89	-0.22	-0.36	-0.36	-0.39	-8.18	-7.31	-4.41
	[2.10]**	[2.09]**	[2.12]**	[0.99]	[0.68]	[0.14]	[1.02]	[1.02]	[1.11]	[7.89]***	[4.95]***	[2.30]**
Average CA/GDP in previous 5-year period		-3.19	-2.70		-10.49	-262.49		-2.24	-16.70		-6.66	-361.72
		[1.75]*	[0.12]		[2.39]**	[3.09]***		[1.36]	[0.76]		[1.06]	[3.34]***
Log of GDP per capita*			-0.06			26.72			1.78			37.04
Average CA/GDP in previous 5-year period			[0.02]			[2.97]***			[0.69]			[3.33]***
Observations	616	616	616	95	95	95	616	616	616	95	95	95
Number of countries	135	135	135	23	23	23	135	135	135	23	23	23
R-squared	0.11	0.11	0.11	0.60	0.63	0.66	0.24	0.24	0.24	0.67	0.68	0.74

Robust t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Note: Estimates are on five-year nonoverlapping intervals. Unless otherwise indicated, the values for the right-hand side variables are for the year preceding the five-year interval (e.g., 1994 for the 1995-99 period). Constants and time dummies are not reported.

Figure 6. "Unconditional" Convergence in Europe: Growth vs. Per-Capita GDP, 1975-2004



The fixed-effects models (allowing only for within-country variation in the data) show a broadly similar pattern. The speed of conditional convergence in fixed-effects estimates is higher than in the random-effects estimates, as others have found, possibly reflecting the tendency towards mean reversion in addition to convergence in per capita incomes. In general, the other variables show less statistical significance since changes within a country over time tend to be limited. One exception is the relative price of investment, which is more significant in the European sample.

When we add in Table 3 the relationship between current accounts and growth, the difference between the European and global samples is, once again, sharp. In the global sample, as others have documented, capital inflows financing the current account deficit have no bearing on growth. In Europe, the effects are important. A larger current account deficit raises growth and this is all the more so the lower a country's per capita income. In other words, a larger current account deficit contributes to the speeding up the convergence process. Thus, the dispersion of the current account in Europe—reflecting the financial

integration process—has, by adding a new mechanism, reinforced the historical convergence tendency in the region.

In Table 4, we explore the timing of the relationship between capital flows and growth. Unlike in Table 3, where all variables, including the current account deficit, were for the year preceding the five-year interval over which growth was measured, in column 1 of Table 4 the current account is the contemporaneous average over the same five-year period as growth. The finding is that there is no contemporaneous relationship. Thus, capital inflows do not appear to have an immediate impact on investment and productivity. In columns 2 through 6, we lag the five-year current account average successively by one year. The growth influence appears to kick-in sometime between two and three years after the capital inflows occur. The relationship remains strong and robust even when we allow for a five-year lag, i.e., the average current account deficit in the previous five-year period appears strongly associated with raising growth and convergence in the following five years.

Before proceeding, it is important to consider the issue of reverse causality: is high growth "causing" the capital inflows? Two factors argue against this possibility. First, we have used lagged values of the current account deficit. This, however, may not be sufficient since it is possible that lagged current accounts may be driven by the future prospects of growth. Such would be the case if a growth or productivity shock" in period t-1 persisted into period t, and capital flows increase in t-1 in anticipation of this. In other words, the error term in the growth equation would need to be serially correlated, and you would need to see current accounts in period t-1 responding to shocks to growth in period t-1. We find that neither of these conditions hold. The Arellano-Bond test statistic for serial correlation in the residuals of the growth regression is 0.04, with a p-value of 0.97, indicating no serial

correlation. And as noted in Section II, the impact of contemporaneous growth on the current account is insignificant in the European sample.

Table 4. Europe: Foreign Savings' Effect on Growth, at Different Lags

A. Random effects

	Dependent variable: 5-year average growth in GDP per capita					
	5-year CA	5-year CA(t-1)	5-year CA(t-2)	5-year CA(t-3)	5-year CA(t-4)	5-year CA(t-5)
Log of GDP per capita	-2.91	-2.77	-2.62	-2.70	-2.74	-2.82
	[5.20]***	[5.96]***	[5.53]***	[4.91]***	[4.86]***	[4.92]***
Schooling	0.23	0.22	0.21	0.21	0.20	0.20
	[2.68]***	[2.82]***	[2.62]***	[2.47]**	[2.30]**	[2.16]**
Population growth	-0.24	-0.15	-0.08	-0.12	-0.13	-0.07
	[0.62]	[0.40]	[0.23]	[0.41]	[0.48]	[0.25]
Trade openness/GDP	0.894	0.788	0.582	0.526	0.551	0.581
	[3.13]***	[2.61]***	[1.94]*	[1.96]*	[2.17]**	[2.42]**
5-year average CA/GDP 1/	125.24	25.92	-160.23	-221.84	-249.31	-267.94
	[0.70]	[0.15]	[1.13]	[2.69]***	[3.50]***	[4.36]***
Log of GDP per capita*	-12.90	-2.50	16.76	23.00	25.62	27.28
5-year average CA/GDP 1/	[0.70]	[0.14]	[1.13]	[2.62]***	[3.36]***	[4.16]***
Observations	95	95	95	95	95	95
Number of countries	23	23	23	23	23	23
R-squared	0.59	0.59	0.60	0.62	0.64	0.66

B. Fixed effects

	Dependent variable: 5-year average growth in GDP per capita					
	5-year CA	5-year CA(t-1)	5-year CA(t-2)	5-year CA(t-3)	5-year CA(t-4)	5-year CA(t-5)
Log of GDP per capita	-10.02	-10.04	-12.00	-12.85	-13.03	-12.27
	[2.68]***	[2.74]***	[3.44]***	[3.87]***	[4.19]***	[3.97]***
Schooling	0.19	-0.03	-0.34	-0.25	-0.14	0.01
	[0.31]	[0.05]	[0.57]	[0.46]	[0.26]	[0.02]
Population growth	-0.16	-0.12	-0.27	-0.38	-0.43	-0.32
	[0.28]	[0.22]	[0.53]	[0.82]	[1.02]	[0.70]
Trade openness/GDP	-0.933	-1.584	-1.240	-0.257	0.774	1.560
	[0.36]	[0.53]	[0.37]	[0.09]	[0.35]	[0.90]
5-year average CA/GDP 1/	276.48	-7.72	-445.71	-468.56	-509.22	-525.36
	[1.12]	[0.03]	[2.82]***	[5.91]***	[5.99]***	[6.11]***
Log of GDP per capita*	-28.55	1.15	46.17	48.25	52.13	53.53
5-year average CA/GDP 1/	[1.12]	[0.04]	[2.83]***	[5.71]***	[5.81]***	[5.91]***
Observations	95	95	95	95	95	95
Number of countries	23	23	23	23	23	23
R-squared	0.46	0.44	0.52	0.61	0.67	0.70

Robust t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

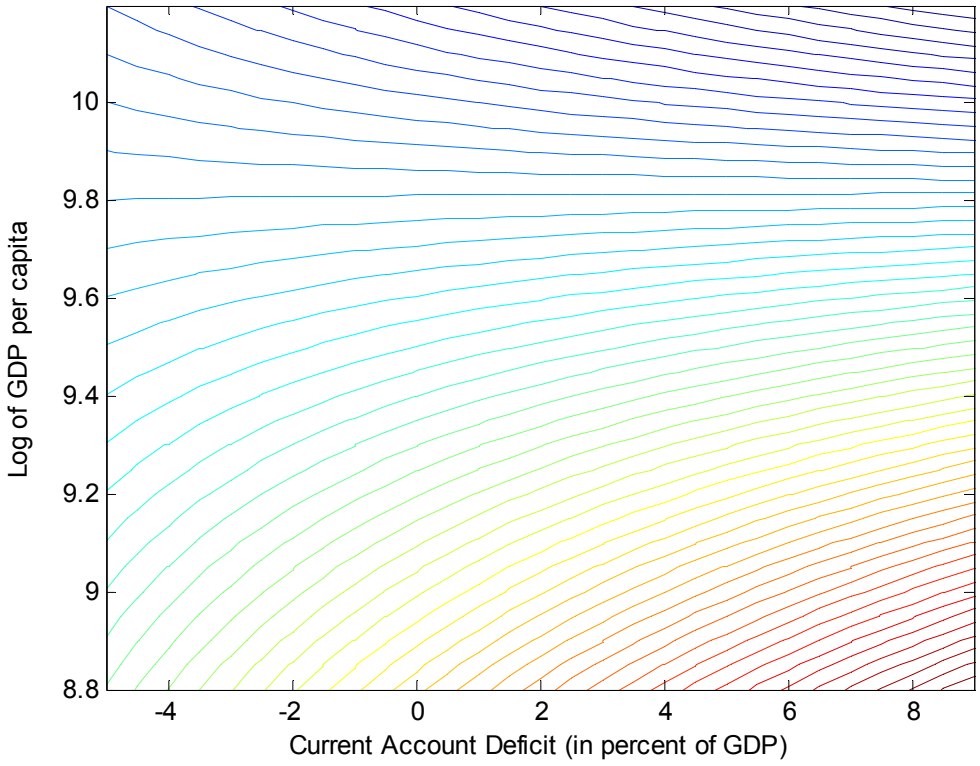
Note: Estimates are on five-year nonoverlapping intervals. Unless otherwise indicated, the values for the right-hand side variables are for the year preceding the five-year interval (e.g., 1994 for the 1995-99 period). Time dummies are not reported.

1/ The 5-year period over which CA/GDP is averaged is for different horizons: for column 1 it is in the contemporaneous 5-year period as growth, and for columns 2 through 6 the five-year period is lagged by one through 5 years, respectively.

The finding that emerging economies experience faster income convergence when they run larger current account deficits can be understood again by examining growth isoquants derived from the estimation results (column 6 of panel A in Table 4, i.e., the five-year lagged estimation with the random-effects estimation method). Figure 7 presents these

isoquants, i.e., lines along which the current account deficits and income levels change but growth remains constant.

Figure 7. Growth Isoquants as a Function of Income and Current Account Deficit

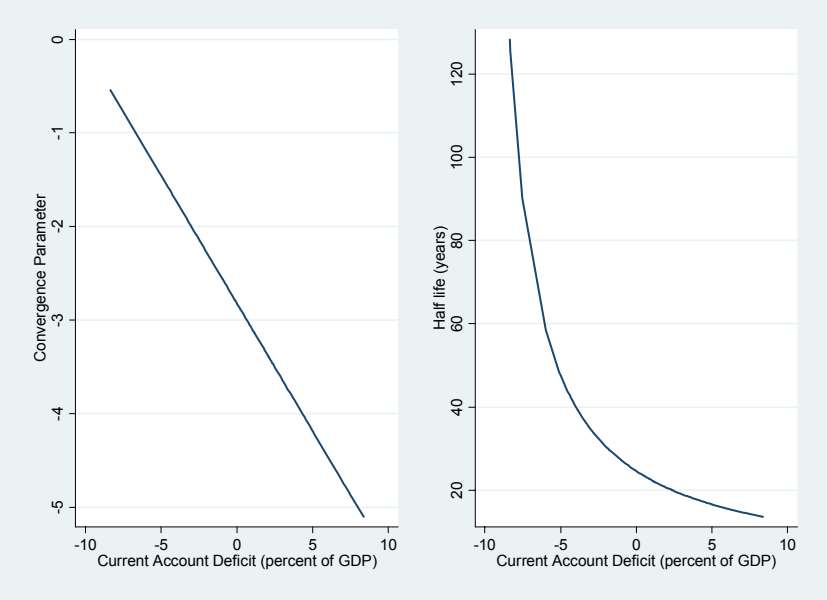


Note that the x-axis in this figure has been shown as a current account deficit (not balance, as in the rest of the paper). Growth slows with rising per capita incomes, implying that the lower isoquants represent higher growth rates. At low initial income levels, the isoquants slope upwards. In this low-income range, an increase in the current account deficit (i.e., a rightward movement parallel to the x-axis) makes possible an even higher growth rate. As a country becomes richer along an isoquant, the flattening slope of the isoquant with rising income levels, implies that the marginal effect of the current account deficits on growth declines; alternatively stated, larger and larger increases in current account deficits are required to keep the growth rate unchanged. Indeed, once countries reach a threshold

income level, estimated here at about $18,000 per capita (with a log value of 9.8) the effect of larger current account deficits on growth becomes negligible.

What are the implications of our findings for the convergence prospects of the NMS? Figure 8 suggests that as an emerging market's current account deficit increases from 0 to 5 percent of GDP, the "convergence half life," or the time taken for it to close half the income gap between itself and the EU average, declines by 8 years. Interestingly, the convergence parameter is negative for the full range of current account positions observed in our sample, including current account surpluses of more than 8 percent of GDP. Hence, all the countries in our sample experienced convergence.[7]

Figure 8. Europe: Convergence Parameter and Half Life over the Observed Current Account Deficit Range



[7] Convergence implies that all countries move to the income level of the country on the technological frontier. Some authors (such as Aghion et al., 2005) assume that this country is the United States and define growth rates and income levels relative to the U.S. However, as Aghion et al. (2005) point out, such transformations do not change the estimation results since they are the same for all countries in the sample and are thus absorbed in the intercept "constant" term. Our approach is agnostic about the level of income of the country on the frontier.

Next, in Table 5, we distinguish between countries that export capital (run a current account surplus) and those that import capital (run a deficit). The evidence suggests that capital exporting countries accumulate capital at a lower rate the more capital they export. But this effect is mitigated the richer the capital exporting country is. In other words, the relatively low income countries lose most when they export capital. A capital receiving country is able to accumulate capital more rapidly than in the absence of such an inflow, and the effect is also stronger the lower its income. The capital transfer process offers an even more enticing prospect with regard to productivity gains. The capital exporting country suffers no loss, but importing countries are beneficiaries. Finally, the benefits of superior education occur mainly through productivity gains. In Table 6, we distinguish between the foreign direct investment (FDI) and non-FDI component of capital flows. For GDP growth, we find that both FDI and non-FDI flows matter. Non-FDI flows matter especially for capital accumulation; FDI is mainly relevant for productivity growth.

Table 5. Europe: The Channels Through Which Foreign Savings Affects Growth

	Dependent variable is growth in:		
	GDP per capita	Capital per capita	TFP
Log of GDP per capita	-1.98	-1.88	-2.18
	[1.85]*	[2.75]***	[2.83]***
Schooling	0.21	-0.07	0.28
	[1.76]*	[0.37]	[1.98]**
Population growth	0.01	-0.23	0.12
	[0.04]	[0.77]	[0.41]
Trade openness/GDP	0.639	0.963	0.440
	[2.26]**	[1.46]	[1.32]
CA/GDP if CA/GDP>0	-84.45	-219.95	-2.54
	[0.51]	[2.12]**	[0.02]
Log of GDP per capita*CA/GDP if CA/GDP>0	8.31	21.68	0.63
	[0.47]	[1.94]*	[0.05]
CA/GDP if CA<0	-574.35	-180.92	-308.32
	[3.80]***	[2.12]**	[2.41]**
Log of GDP per capita*CA/GDP if CA/GDP<0	59.07	20.25	30.57
	[3.76]***	[2.18]**	[2.32]**
Observations	95	94	94
Number of countries	23	22	22
R-squared	0.67	0.55	0.58

Robust t statistics in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%
Note: Estimates are on five-year nonoverlapping intervals, using random effects with clustered standard errors. Unless otherwise indicated, the values for the right-hand side variables are for the year preceding the five-year interval (e.g., 1994 for the 1995-99 period). CA/GDP is the average over the previous five-year period. Constants and time dummies are not reported.

Table 6. Europe: The Channels Through Which FDI and Non-FDI Flows Affect Growth

	Dependent variable: 5-year average growth in GDP per capita					
	GDP per capita		Capital per capita		TFP	
Log of GDP per capita	-1.57	-3.13	-0.81	-1.59	-2.24	-3.01
	[3.03]***	[4.60]***	[0.89]	[2.29]**	[5.03]***	[6.85]***
Schooling	0.21	0.18	-0.17	-0.21	0.36	0.30
	[2.65]***	[1.95]*	[0.77]	[1.01]	[2.66]***	[2.06]**
Population growth	0.47	-0.22	-0.16	-0.45	0.47	0.02
	[0.92]	[0.77]	[0.44]	[1.59]	[1.22]	[0.08]
Trade openness/GDP	0.580	0.716	0.825	1.108	0.180	0.618
	[1.58]	[2.95]***	[1.35]	[1.48]	[0.42]	[1.73]*
Average FDI/GDP in previous 5-year period	572.77		232.33		401.42	
	[2.23]**		[1.30]		[2.29]**	
Log of GDP per capita*	-57.29		-23.40		-39.73	
Average FDI/GDP in previous 5-year period	[2.24]**		[1.33]		[2.29]**	
Average Non-FDI Flows/GDP in previous 5-year period		172.22		205.25		83.05
		[2.71]***		[2.81]***		[2.10]**
Log of GDP per capita*		-17.20		-20.79		-8.20
Average Non-FDI Flows/GDP in previous 5-year period		[2.61]***		[2.78]***		[2.08]**
Observations	93	93	92	92	92	92
Number of countries	23	23	22	22	22	22
R-squared	0.64	0.62	0.49	0.45	0.55	0.52

Robust t statistics in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%
Note: Estimates are on five-year nonoverlapping intervals, using random effects with clustered standard errors. Unless otherwise indicated, the values for the right-hand side variables are for the year preceding the five-year interval (e.g., 1994 for the 1995-99 period). Constants and time dummies are not reported.

If, as our results suggest, capital inflows raise the speed of convergence in Europe, then do they act through the domestic financial system? It is possible, as Gourinchas (2002 and 2004) suggests, that international capital flows are not a substitute for domestic financial development but serve mainly to raise the level of domestic financial capabilities. If that were the case, then we would expect that if domestic financial development were accounted for, the independent influence of international capital flows would disappear. This possibility is given special credence in light of results obtained by Aghion et al. (2005), who find, in an approach parallel to the one adopted in this paper, that domestic financial development (proxied by various measures of domestic credit relative to a country's GDP) raises the rate of a country's rate of income convergence in a global sample of countries.

In Table 7 we examine the effects of financial development (private credit/GDP) and its interaction with initial per capita income following Aghion et al. (2005), but in a panel

data setting (using the random-effects estimation procedure) rather than for only a single cross-section of countries. The results for the global sample, in column 1, support their finding of more rapid income convergence with higher financial development, though we also find a direct effect of financial development on growth. When, in column 2, we add the current account balance and its interaction with initial per capita income, these remain insignificant as before, implying that foreign capital flows do not have a bearing on growth in the global sample; the domestic financial development measure and its interaction with initial per capita income continue to show their influence on the level of growth and the rate of convergence, though with somewhat reduced statistical significance suggesting mild correlation between international flows and domestic financial capabilities. In the global sample, we also do not find any direct effect on growth resulting from increased financial integration (columns 3 and 4).

Table 7. The Impact of Domestic vs. Foreign Finance on Growth, Global and European Samples

	Dependent variable: 5-year average growth in GDP per capita							
	Global				Europe			
Log of GDP per capita	-1.00	-0.99	-1.27	-1.22	-2.19	-2.23	-0.78	-1.21
	[2.71]***	[2.75]***	[3.23]***	[3.29]***	[2.52]**	[1.99]**	[0.92]	[1.00]
Schooling	0.64	0.66	0.56	0.58	0.22	0.21	0.33	0.32
	[3.55]***	[3.68]***	[3.03]***	[3.19]***	[2.91]***	[2.42]**	[3.23]***	[3.09]***
Population growth	-0.86	-0.85	-0.92	-0.92	-0.10	-0.12	-0.05	-0.11
	[4.75]***	[4.73]***	[5.03]***	[5.10]***	[0.27]	[0.35]	[0.13]	[0.34]
Trade openness	1.089	1.021	1.061	0.997	0.809	0.589	0.115	0.029
	[2.65]***	[2.41]**	[2.24]**	[2.05]**	[3.04]***	[2.23]**	[0.29]	[0.06]
Private Credit/GDP	12.47	11.83	12.54	13.00	6.30	9.69	1.77	7.24
	[1.71]*	[1.64]	[1.45]	[1.54]	[0.46]	[0.54]	[0.15]	[0.51]
Log of GDP per capita*Private Credit/GDP	-1.36	-1.29	-1.38	-1.44	-0.68	-1.02	-0.24	-0.80
	[1.82]*	[1.76]*	[1.52]	[1.62]	[0.47]	[0.55]	[0.19]	[0.54]
Average CA/GDP in previous 5-year period		2.63		-8.05		-268.19		-248.79
		[0.13]		[0.38]		[3.81]***		[3.37]***
Log of GDP per capita*		-0.61		0.58		27.42		25.74
Average CA/GDP in previous 5-year period		[0.26]		[0.23]		[3.64]***		[3.26]***
Financial integration/GDP			-0.72	-1.12			21.42	16.16
			[0.88]	[1.45]			[2.57]**	[1.81]*
Log of GDP per capita*(Financial integration/GDP)			0.08	0.12			-2.15	-1.62
			[0.89]	[1.39]			[2.56]**	[1.80]*
Observations	522	522	493	493	91	91	91	91
Number of countries	120	120	112	112	23	23	23	23
R-squared	0.15	0.15	0.16	0.16	0.60	0.66	0.65	0.69

Robust t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Note: Estimates are on five-year nonoverlapping intervals, using random effects with clustered standard errors. Unless otherwise indicated, the values for the right-hand side variables are for the year preceding the five-year interval (e.g., 1994 for the 1995-99 period). Constants and time dummies are not reported.

In the European case, the results are the opposite. Here domestic finance has no statistically significant effect on growth (column 5 of Table 7). The international capital flows' influence remains strongly significant even when allowing for the possibility that it is mediated through the domestic system (column 6). Thus, the strong result is that capital inflows act independently of the domestic financial system. This result is consistent with a highly integrated international financial market and institutions, which implies that the geographical location of the financial institutions is not crucial.[8] The result also suggests that we are indeed picking up a causal relationship between capital inflows and growth. If domestic financial institutions, with their local information, are not anticipating domestic growth, it seems unlikely that international capital is mainly responding to growth opportunities in a passive manner. Finally, the index of international financial integration complements capital inflows in the European sample (columns 7 and 8). Thus, while financial integration is seen to directly raise growth (especially for countries with relatively low per capita income), the effect through international capital movements remains strong.

IV. CONCLUSIONS

The absence of a more substantial flow of capital from rich to poor countries was spotlighted as a paradox by Lucas (1990). Prasad, Rajan, and Subramanian (2006) suggest that not only may there be no paradox but rather the observed pattern of flows may be the

[8] It is possible, as Guiso, Sapienza, and Zingales (2004) conclude, that even within financially integrated areas, local financial development does matter for small firms. We are unable to make that distinction in this paper.

norm. Before we reach that conclusion, however, and proceed to make predictions and policy on that basis, it is important to reassess the evidence.

In this paper, we emphasize that a proper test of the role of international capital flows must recognize its role as primarily influencing the income convergence process (rather than raising the steady-state rate of growth), and further must allow for differential dynamics in different groups of countries. With that in mind, we focus on Europe and find strong evidence in favor of a conventional view of international capital flows. The "downhill" flow of capital has reinforced the traditional European tendency towards income convergence. This transitional process, made possible by rapid financial integration, is self-limiting. The logic of the evolution proceeds as follows. Greater financial integration allows for a further dissociation between domestic savings and investment, leading to a transfer of capital from rich to poor countries. That transfer accelerates income growth. But with higher incomes, financial integration plays less of a role in attracting foreign capital, reducing that growth impulse.

Clearly, Europe is different. This may reflect, first, historical and geographical linkages that have facilitated both financial integration and income convergence. If so, the European example may well be *sui generis* with no relevance for other regions. Second, even though there are considerable differences in per capita incomes within Europe, European nations are concentrated in a relatively small range at the middle to high end of the world income distribution. It may be that financial integration and its implications described in this paper apply only for middle-income and advanced economies and thus have no bearing for a wide range of poorer countries. Finally, there is a more intriguing possibility. Collins (2006, p. 9) comments that the focus on the apparently perverse direction of capital flows may be

misplaced since it could be "...a slowly dissipating vestige of an old pattern." If so, the patterns we see in a highly integrated Europe may well be the leading edge, the bellwether. As global financial integration proceeds apace, it may draw a wider circle of countries within its fold, changing the direction and effects of international capital flows.

We have not dealt in this paper with policy questions. But there are at least two issues that need to be considered. First, the "downhill" flow of capital brings risks that are all too familiar from the emerging market crises of the 1990s. Capital flows can be fickle and may reverse at inopportune moments, with costly consequences. Deeper financial integration may imply that investors are better diversified and hence willing to take a longer view, reducing the risk of a "sudden stop" in capital flows. Nevertheless, these risks must be monitored and managed (see Schadler et al. 2006). Second, a gush of capital inflows can hurt if they lead to overvaluation of the exchange rate and a loss of international competitiveness. The seriousness of this possibility depends on whether the inflows are channeled to raising productivity. The evidence in this paper is that gains in productivity have accompanied especially the foreign direct investment. Fabrizio, Mody, and Igan (2006) also show that the new member states of the European Union, as substantial recipients of international capital, have also achieved significant transformation of their production structures, raising the technology content and quality of their products. Again, such a favorable outcome is not a given and the risks of exchange rate overvaluation cannot be ruled out.

These findings speak to broader themes. A key benefit of being part of Europe has often been advertised as enhancing the opportunities for trade. Gravity models suggest that proximity to rich countries with large markets will increase trade, tendencies that will be reinforced by the dismantling of trade barriers and reduced transactions costs through

monetary integration.[9] More trade will translate into higher growth. Our findings imply that financial integration is no less, and possibly more, potent than trade integration. Also, European financial markets have been often criticized for lagging behind the dynamic developments in the United States. La Porta et al. (1998) conclude that "civil law" countries, with a French, German, or Scandinavian legal system, have weaker investor protection. Possibly for that reason, banks play a greater role in Europe, while financial markets lag behind in fostering entrepreneurship, as in the United States. However, Allen, Bartiloro, and Kowalewski (2005) point out that the European banking system is significantly more efficient than in the United States. Similarly, Blanchard (2005) reaches the assessment that "Europe has done better than is often perceived; ... there has been and continues to be a steady process of reform in the product and financial markets, that this process is likely to continue." Our findings suggest that European financial markets have performed their role of reallocating capital in the region.

[9] For recent estimates, see Baldwin (2006).

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Data Appendix

The sample of analysis is 1975-2004 and includes the 25 countries of the EU. As noted in Section II, due to their financial integration outlier status Luxembourg and Ireland are excluded from the sample. The new member states are included in the sample starting from the year 1994 to avoid the structural breaks associated with the shift to a market economy, and because their accession to the EU started in the mid-1990s.

Following the growth literature, income per capita is real PPP GDP per capita in 1985 dollars, using the `rgdpch` variable from *Penn World Tables 6.1* (http://pwt.econ.upenn.edu) up to 2000, and extrapolated using per capita real GDP growth rates from the IMF's *World Economic Outlook* (WEO) database in subsequent years. The current account is measured as a ratio to GDP and is taken from the Annual Macroeconomic (AMECO) database of the European Commission's Directorate General for Economic and Financial Affairs (http://ec.europa.eu/economy_finance/indicators_en.htm) where available, and from the WEO database otherwise. Per capita income growth and average current accounts are calculated over the following five-year non-overlapping periods: 1975-79, 1980-84, 1985-89, 1990-94, 1995-99, and 2000-04.

Unless otherwise noted in the tables, the values for the right-hand side variables in the regressions are for the year preceding the five-year interval (e.g., 1994 for the 1995-99 period). Data on schooling comes from the Barro-Lee educational attainment dataset (http://www.economics.harvard.edu/faculty/barro/data.html); we use the average years of schooling in the total population. Population growth and dependency ratio data come from the World Bank's *World Development Indicators* (WDI) database; the old (young) dependency ratio is calculated as the ratios of population aged above 64 (below 15) years of age, relative to the population aged 15-64. Trade openness is defined as the sum of exports and imports divided by GDP, and is the variable `openc/100` in the Penn World Tables. The relative price of investment is calculated as the price level of investment divided by the GDP deflator, `pi/p` in the Penn World Tables. The fiscal balance is the overall fiscal balance of the general government divided by GDP, taken from the WEO database.

Growth accounting data is taken from Bosworth and Collins (2003). However, the Bosworth-Collins growth accounts do not cover any of the countries from Central and Eastern Europe. For these countries the capital stock is constructed using the perpetual inventory method, with a depreciation rate of 5 percent (for consistency with Bosworth and Collins) and using investment data from the WEO database. The initial capital stock for these countries is obtained using predicted values from a regression of capital stock on per capita income and investment/GDP ratios for countries in the Bosworth-Collins dataset.

Financial integration is calculated as the sum of foreign assets and foreign liabilities divided by GDP, using the External Wealth of Nations Mark II database of Lane and Milesi-Ferreti (2006). The same database was used to construct the net foreign asset position, defined as foreign assets *minus* foreign liabilities divided by GDP. Financial deepening is measured as bank credit to the private sector divided by GDP, and is from the Financial Structure dataset (http://siteresources.worldbank.org/INTRES/Resources/FinStructure_60_05_final.xls) of the World Bank.

Robustness Appendix

This Appendix reports additional robustness tests of the results in the main text. First, Appendix Table 1 presents results from estimating the current account regressions at different horizons, using annual data, 3-year non-overlapping averages, and 5-year nonoverlapping averages. The results are similar regardless of the horizon used, with financial integration remaining significant throughout. The table also shows that the effect of financial integration increases over time; a doubling of Lithuania's financial integration, for example, would increase its current account deficit by 2 percent of GDP in the first year, but by an average of 2.7 percent over a five-year horizon.

Appendix Table 1. Europe: Benchmark Current Account Regression, at Different Horizons

	Dependent variable: Average CA/GDP		
	Annual	3-year horizon	5-year horizon
Log of GDP per capita	0.0004	-0.0014	-0.0081
	[0.02]	[0.05]	[0.29]
Contemporaneous growth in GDP per capita	0.0007	0.0014	0.0044
	[0.56]	[0.49]	[1.10]
Contemporaneous fiscal balance/GDP	-0.0032	-0.0695	-0.1187
	[0.04]	[0.63]	[0.76]
NFA/GDP	-0.0086	-0.0129	-0.0277
	[0.42]	[0.52]	[1.88]*
Old dependency ratio	-0.1588	-0.1403	-0.2917
	[0.68]	[0.84]	[1.39]
Young dependency ratio	0.17	0.06	-0.02
	[1.24]	[0.39]	[0.12]
Trade openness/GDP	0.006	-0.005	-0.014
	[0.25]	[0.41]	[1.04]
Financial integration/GDP	-0.26	-0.39	-0.43
	[2.11]**	[2.92]***	[2.64]***
Log of GDP per capita*(Financial integration/GDP)	0.03	0.04	0.04
	[2.12]**	[2.91]***	[2.70]***
Observations	477	145	87
Number of countries	23	23	23
R-squared	0.26	0.34	0.39

Robust t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Note: Estimates are on annual data (column one), three-year nonoverlapping intervals (column 2), and five-year nonoverlapping intervals, using random effects with clustered standard errors. Unless otherwise indicated, the values for the right-hand side variables are for the year preceding the five-year interval (e.g., 1994 for the 1995-99 period). Constants and time dummies are not reported.

We also considered an alternative, price-based measure of financial integration. Our alternative indicator, which measures the extent of bond market integration within Europe, is the proportion of daily bond yield movements in each country that can be explained by movements in German bond yields. However, this measure is only available for 16 countries, and covers only the period 1996-2004, which requires us to use annual as opposed to 5-year data in our regressions. The results (Appendix Table 2) corroborate the findings using the quantity-based measures of financial integration.

Robustness Check 2. Using a Price-Based Measure of Financial Integration

	Dependent variable: CA/GDP		
Log of GDP per capita	0.0004	-0.0307	-0.1253
	[0.02]	[0.56]	[2.46]**
Contemporaneous growth in GDP per capita	0.0007	0.0005	-0.0017
	[0.56]	[0.34]	[0.71]
Contemporaneous fiscal balance/GDP	-0.0032	0.5277	0.6248
	[0.04]	[2.10]**	[2.36]**
NFA/GDP	-0.0086	0.0081	0.0008
	[0.42]	[0.38]	[0.05]
Old dependency ratio	-0.1588	0.0259	0.1992
	[0.68]	[0.10]	[0.91]
Young dependency ratio	0.1691	0.2217	0.1727
	[1.24]	[1.02]	[0.68]
Trade openness/GDP	0.0055	0.0108	0.0123
	[0.25]	[0.68]	[0.71]
Financial integration/GDP	-0.262		-0.6381
	[2.11]**		[2.65]***
Log of GDP per capita*(Financial integration/GDP)	0.0268		0.0638
	[2.12]**		[2.68]***
Bond market integration measure		-1.4009	-0.3968
		[2.45]**	[0.57]
Log of GDP per capita*Bond market integration measure		0.1431	0.0424
		[2.46]**	[0.60]
Observations	477	127	127
Number of countries	23	16	16
R-squared	0.26	0.58	0.65

Robust t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

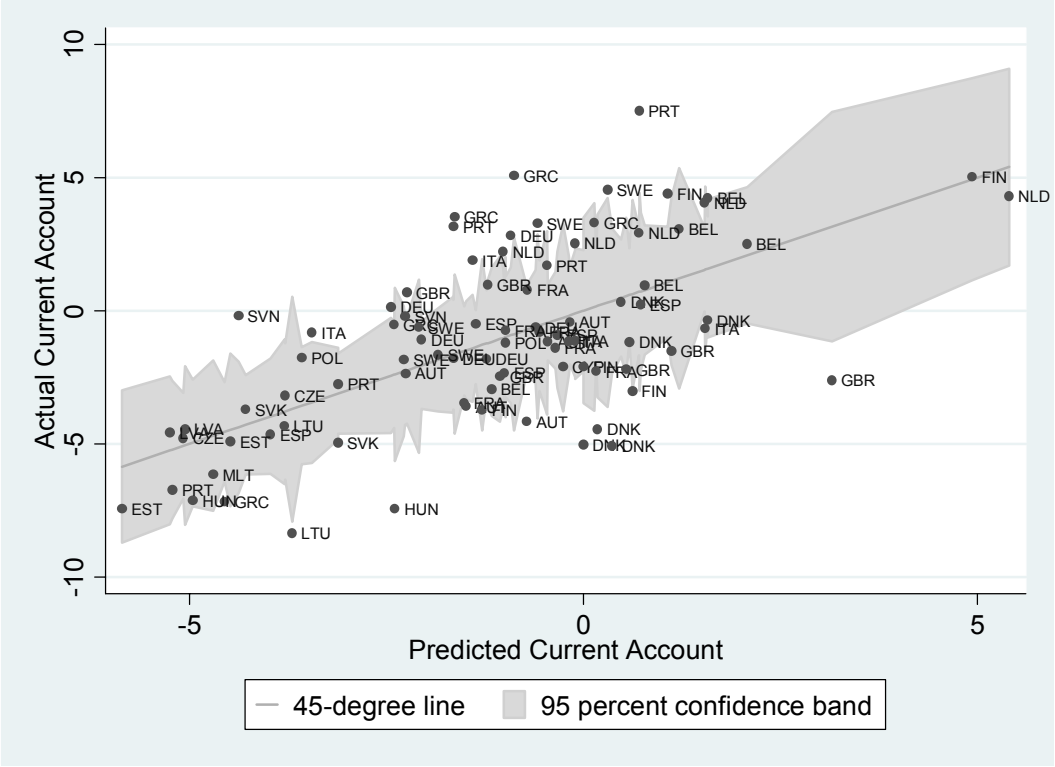
Note: Estimates are on annual data, using random effects with clustered standard errors. Unless otherwise indicated, the values for the right-hand side variables are for the year preceding the five-year interval for the 1995-99 period). Constants and time dummies are not reported.

How well does the estimated current account model (Table 1, column 6) capture the actual evolution of current account balances in Europe? Appendix Figure 1 plots the model's predicted current account ratios on the x-axis against the actual values on the y-axis, for the five-year non-overlapping periods used in the regression (countries appear more than once because we are looking at multiple periods).[10] Countries whose current account balances were predicted exactly lie on the 45-degree line. Countries that ran smaller current account balances (larger deficits) than predicted lie below the 45-degree line. The shaded area indicates the 95 percent confidence interval of the prediction.

[10] A similar graphical technique for comparing predicted and actual values is used by Gruber and Kamin (2005).

The figure suggests that the model fits the current account performance of European countries closely. In particular, the large current account deficits of the NMS lie, broadly speaking, within the range that is consistent with the fundamental determinants included in the model. Notable deviations from these "fundamentals" include Hungary, whose current account deficit of 7-7.5 percent of GDP exceeded the prediction by more than 5 percentage points of GDP during 1994-99, and by more than 2 percentage points during 2000-04.

Appendix Figure 1. Europe: Predicted and Actual Current Accounts, 1975-2004
(in percent of GDP)



Finally, we examine whether the effects of capital inflows on growth were being driven by a few outliers by dropping one country at a time from the regressions. Appendix Table 3 shows that the results are robust to this test.

Appendix Table 3. Robustness to Dropping One Country at a Time

	Europe	excl. GBR	excl. AUT	excl. BEL	excl. DNK	excl. FRA	excl. DEU	excl. ITA	excl. NLD	excl. SWE	excl. FIN	excl. GRC
Log of GDP per capita	-2.82	-2.92	-2.82	-2.71	-2.83	-2.85	-2.74	-2.89	-2.79	-2.80	-2.89	-3.17
	[4.92]***	[4.82]***	[4.64]***	[4.37]***	[4.76]***	[4.82]***	[4.71]***	[4.71]***	[4.78]***	[4.76]***	[4.70]***	[5.05]***
Schooling	0.20	0.22	0.21	0.18	0.19	0.21	0.20	0.23	0.20	0.21	0.20	0.26
	[2.16]**	[2.20]**	[1.86]*	[1.81]*	[2.11]**	[2.18]**	[1.81]*	[2.22]**	[2.16]**	[2.19]**	[1.97]**	[2.42]**
Population growth	-0.07	-0.04	-0.06	-0.10	-0.07	-0.05	-0.09	-0.02	-0.05	-0.08	-0.09	0.13
	[0.25]	[0.14]	[0.22]	[0.36]	[0.24]	[0.20]	[0.33]	[0.07]	[0.16]	[0.27]	[0.32]	[0.51]
Trade openness/GDP	0.58	0.63	0.60	0.67	0.57	0.60	0.55	0.63	0.64	0.58	0.60	0.59
	[2.42]**	[2.57]**	[2.44]**	[2.25]**	[2.38]**	[2.41]**	[2.28]**	[2.44]**	[2.36]**	[2.27]**	[2.22]**	[2.14]**
Average CA/GDP in previous 5-year period	-267.94	-272.35	-251.30	-272.39	-279.54	-263.60	-248.42	-260.24	-269.40	-283.65	-272.86	-310.58
	[4.36]***	[4.27]***	[3.63]***	[4.32]***	[4.03]***	[4.23]***	[3.83]***	[4.11]***	[4.07]***	[4.87]***	[4.48]***	[5.27]***
Log of GDP per capita*	27.28	27.77	25.49	27.80	28.56	26.84	25.18	26.50	27.50	29.01	27.71	31.98
Average CA/GDP in previous 5-year period	[4.16]***	[4.06]***	[3.44]***	[4.13]***	[3.83]***	[4.04]***	[3.62]***	[3.92]***	[3.85]***	[4.66]***	[4.24]***	[5.07]***
Observations	95	89	89	89	89	89	89	89	89	89	89	89
Number of countries	23	22	22	22	22	22	22	22	22	22	22	22

	excl. MLT	excl. PRT	excl. ESP	excl. CYP	excl. CZE	excl. SVK	excl. EST	excl. LVA	excl. HUN	excl. LTU	excl. SVN	excl. POL
Log of GDP per capita	-2.86	-2.94	-2.90	-2.72	-2.80	-2.84	-2.78	-2.45	-2.93	-3.39	-2.77	-2.79
	[4.67]***	[4.24]***	[4.93]***	[4.82]***	[4.84]***	[4.87]***	[4.76]***	[5.08]***	[4.65]***	[5.78]***	[4.60]***	[4.14]***
Schooling	0.22	0.24	0.19	0.18	0.18	0.19	0.20	0.16	0.16	0.29	0.19	0.20
	[2.31]**	[2.11]**	[1.97]**	[2.09]**	[2.05]**	[2.12]**	[2.24]**	[2.03]**	[1.88]*	[3.01]***	[1.97]**	[2.09]**
Population growth	-0.12	0.11	-0.01	-0.20	-0.09	-0.05	-0.04	0.06	-0.14	-0.07	-0.14	-0.07
	[0.38]	[0.33]	[0.04]	[0.77]	[0.33]	[0.20]	[0.09]	[0.20]	[0.54]	[0.26]	[0.52]	[0.26]
Trade openness/GDP	0.44	0.63	0.54	0.52	0.61	0.61	0.49	0.63	0.50	0.69	0.51	0.62
	[1.39]	[2.46]**	[2.00]**	[1.99]**	[2.59]***	[2.56]**	[1.76]*	[2.30]**	[2.53]**	[3.02]***	[1.93]*	[2.44]**
Average CA/GDP in previous 5-year period	-287.65	-268.69	-276.79	-270.42	-274.35	-264.08	-269.02	-275.50	-311.23	-294.44	-281.54	-280.85
	[4.77]***	[4.02]***	[4.14]***	[4.47]***	[4.32]***	[4.26]***	[4.36]***	[2.79]***	[6.32]***	[2.83]***	[4.71]***	[4.73]***
Log of GDP per capita*	29.42	27.03	28.23	27.67	27.95	26.84	27.45	28.04	31.62	30.13	28.64	28.64
Average CA/GDP in previous 5-year period	[4.56]***	[3.86]***	[3.95]***	[4.31]***	[4.13]***	[4.05]***	[4.16]***	[2.74]***	[5.86]***	[2.78]***	[4.49]***	[4.51]***
Observations	94	89	89	94	93	94	93	93	93	93	93	93
Number of countries	22	22	22	22	22	22	22	22	22	22	22	22

Robust t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Note: Estimates are on annual data, using random effects with clustered standard errors. Unless otherwise indicated, the values for the right-hand side variables are for the year preceding the five-year interval (e.g., 1994 for the 1995-99 period). Constants and time dummies are not reported.