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DOES FINANCIAL OPENNESS PROMOTE ECONOMIC INTEGRATION?

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Abstract

We estimate the effect of financial openness on economic integration for two clusters of countries: the formerly planned economies of Eastern Europe and central Asia (emerging market economies) and some western advanced economies. We focus on two dimensions of economic integration: convergence of per-capita incomes across countries and trade integration. We employ both single equation estimation and system estimation to account for endogenous links between trade integration and income convergence. Results show that in the cluster of emerging market economies, financial openness is a powerful instrument of economic integration. In the group of advanced economies, financial openness effectively facilitates income convergence, but its impact on trade integration is ambiguous.

I.   Introduction

The steady expansion of financial flows across the borders and the rapid increase in the number of regional economic integration agreements are two of the most evident aspects of globalization in the 1990s. The purpose of this paper is to study the link between the two. In particular, we estimate to what extent financial openness promotes regional economic integration in Europe and the Commonwealth of Independent States (CIS). We focus on two specific dimensions of the integration process: the convergence of per-capita incomes across countries in a regional cluster and the intensity of trade in goods and services between countries. With respect to financial openness, we separate between capital account liberalization and international financial integration. These two concepts have often been used interchangeably in the literature, but, in fact, they represent a mean-goal relationship.[1] Capital account liberalization is the process of lifting administrative or legal restrictions on capital movements, hence, creating the necessary conditions for the integration of the domestic financial system into the global market. International financial integration instead refers to the actual volume of capital flows that take place across the borders. Thus, financial openness is essential to achieve international financial integration, but the former does not necessarily lead to the latter. Operationally, the analysis in this paper will employ different proxies to measure international financial integration: (i) an index of capital account liberalization, and (ii) the volume of portfolio-based and equity-based capital flows.

Several innovations characterize our study vis-à-vis the existing literature. First, most of the literature on the effects of financial openness (or financial integration) on economic performance essentially looks at economic growth.[2] Instead this paper directly considers the income difference between richer and poorer countries in a regional cluster, thus assessing the differential impact of financial openness on the speed of catching-up. Moreover, in studying the contribution of financial openness to international trade, this paper extends the existing literature on trade empirics by considering variables not included in the gravity equations used in previous studies.[3]

Second, specific attention is devoted to disentangling the effect of financial openness from that of domestic financial development. As the two phenomena are expected to be positively correlated, the variables used to proxy for financial openness might also capture the effect of domestic financial development on the economic performance. The consequence might be the overestimation of the

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[1] See, for instance, the discussions in De Brouwer (1999) and Le (2000).

[2] See Hali et al. (2004) for a survey.

[3] Rose (2004) surveys the variables and channels that are most often investigated in the literature on the macroeconomic determinants of international trade.

actual impact of financial openness. To address this problem, the econometric model will include indicators of the depth of domestic financial markets in addition to measures of financial openness.[4]

Third, our investigation looks at two separate groups of countries: the formerly centrally planned economies (referred to as 'emerging market economies') and a cluster of western advanced economies. The estimates effectively indicate the existence of some significant differences between the two groups with respect to the structural channels linking financial openness and economic integration.

Finally, relative to our latest research on this topic (Carmignani and Chowdhury, 2006), we explicitly take into account the endogenous relationship between the two dimensions of economic integration (trade and income convergence) by estimating a system of two (simulateneous) equations. We therefore let trade integration be a determinant of the speed of convergence and, at the same time, the income gap will be a determinant of trade intensities. A three stages least squares estimator will then be used to allow for non-zero covariances between the residuals of the two equations.

The key results of the analysis can be summarized as follows. Financial openness significantly strengthens both income convergence and trade integration of the emerging market economies with the EU-15. These effects appear to work over and above any effect stemming from the development of domestic financial systems. In the case of advanced economies, however, the effect of financial openness on trade integration is almost negligible. Finally, system estimations confirm that deeper trade integration facilitates income convergence while faster convergence also promotes trade integration. This suggests that initially poorer and less integrated emerging market economies could fall into an 'isolation trap'. For these economies, financial openness proves to be a powerful instrument to avoid marginalization.

The rest of the paper is organized as follows. Section II briefly surveys the theoretical hypothesis on the impact of financial openness on the two dimensions of economic integration. Section III introduces the econometric methodology and explains the specification of the model. Section IV discusses the results. Section V concludes, drawing some policy implications and suggesting future lines of research. The appendix provides a full description of the variables used in the econometric analysis.

II. Some theoretical background

This paper evaluates the effect of financial openness on two dimensions of economic integration: international trade in goods and services and convergence of per-capita income across countries. The theoretical underpinnings of the analysis are spelled out in this section.[5]

A. Financial openness and convergence of per-capita income.

Economic growth theory provides the rationale for linking financial openness (and financial integration) to per-capita income. In both neo-classical and endogenous growth models, per-capita income at a generic time t is determined by technology and rates of accumulation of production factors (labour, physical and human capital).[6] Several arguments have been proposed in the literature to show that financial openness has an impact on such determinants of per-capita income.

One channel points to possible technological spillovers arising from capital account liberalization which spurs capital inflows and investments from abroad. Related arguments emphasise the spillovers eventually stemming from transfers of skills and increased competition. Another strand of research

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[4] Guiso et al. (2004) provides an in-depth analysis of the link between financial development and financial integration focusing on the EU countries. They claim that most of the growth pay-off from financial integration occurs through domestic financial development.

[5] This section draws on our previous work, Carmignani and Chowdhury (2006).

[6] For a formal treatment of the neo-classical model see Mankiw et al. (1992). For a review of models of endogenous growth see Barro and Sala-i-Martin (1995: chapters 4 and 5).

suggests that financial openness will broaden risk-sharing opportunities for domestic investors, thus reducing the cost of equity capital and increasing investment and the rate of capital accumulation. Moreover, better risk-sharing options will allow countries to shift their investment mix towards riskier, hence, higher-return projects. On a different ground, the political economy literature has pointed out the role of financial openness as a commitment technology device. When economic policies are dynamically inconsistent, capital account liberalization signals government's intention to stick to macroeconomic and financial discipline. This, in turn, reduces economic uncertainty favouring longer-term investment and factors accumulation. Finally, financial openness might be linked to income growth via the domestic financial system. In this view, lifting capital account restrictions promotes faster development of the domestic financial intermediation leading to a greater volume of credit being available to finance profitable projects as well as higher efficiency in the allocation of resources.[7]

The central message of this literature is that financial openness positively correlates with per-capita income (and with the rate of economic growth). Hence, the implication is that, *if a country maintains capital account restrictions and limits the degree of international integration of its financial markets, it will then experience a widening gap in per capita income relative to a partner which is more financially open*. That is, for a given level of financial openness of the partner country, the income gap between the partner country and the domestic country will be greater the lower the degree of financial openness of the domestic country.

However, this prediction does not go unchallenged. Several models emphasise possible counter-effects of financial openness on income which might, in turn, complicate the relationship between financial openness and income catching-up. If domestic institutions are weak, increasing financial openness will lead to a capital flight (even if the country is capital-scarce). This will hamper investment and hence long term growth prospects. Similarly, since the capital account is a channel of contagion in financial crises, its liberalization will make the country more vulnerable to speculative attacks, sudden stops and capital reversal, which are in turn all likely to have large negative output effects. Finally, informational asymmetries and/or pre-existing distortions (such as, trade restrictions) might well imply that foreign capital will be allocated inefficiently, for instance, going to sectors where the country has a comparative disadvantage.[8] All of these counter-arguments, thus, point to the possibility that an increase in financial openness might in fact have perverse effects on the income gap of the domestic country relative to richer partners.

B.   Financial openness and international trade

Assuming that internationally well integrated capital markets will effectively emerge from it, financial openness can influence the extent of international trade in goods and services through two main channels. The first operates through risk-sharing and production specialization.[9] Consider a region where countries are affected by idiosyncratic shocks. If such shocks are large and volatile or, alternatively, if households are risk averse to a sufficient degree, then incentives to diversify domestic production will be stronger, thus, leading to low specialization. Open and well integrated financial markets facilitate the diversification of ownership. This, in turn, has two effects. First, if economic agents in one country hold debt and equity claims on the output of the other country, then the dividend, interest and rental income derived from these holdings contribute to smoothing shocks across

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[7]   Bailliu (2000) proposes a simple formalization of several links between financial openness and growth within an AK setting. Bekaert and Lundblad (2001) and Henry (2003) discuss the effect of financial openness on the cost of capital. Obstfeld (1994) shows that financial openness, when resulting in capital market integration, supports risk-taking. Bartolini and Drazen (1997) examine the argument that capital account liberalization can work as a signal.

[8]   See Boyd and Smith (1992) for a critique of the perverse effects of financial openness when domestic institutions are inefficient. A sceptical view of capital account liberalization based on various arguments is put forward by Rodrik (1998). The empirical literature also provides mixed evidence on the growth-effects of financial liberalization. For a broad assessment see Eichengreen (2001).

[9]   For a discussion of the theoretical and empirical link between capital markets, risk sharing and production specialization see Kalemli-Ozcan et al. (2003). For more empirical evidence see Imbs (2003).

countries. This is, thus, a form of ex-ante international insurance. Second, to achieve consumption smoothing, households in each country will undertake ex-post adjustment of their asset portfolios following the realization of idiosyncratic shocks in the region. Again, this will lead to smoothing the income of all countries. Once insurance is available through international trade in financial assets, each country will have stronger incentive to specialize in one production (or technology) in order to fully exploit economies of scale (or technological competitive advantage). Specialization in production will then create greater scope for international trade in goods and services, as predicted from a standard neo-classical trade theory.

The second channel relies on the ability of the financial sector to divert savings to the private sector. When domestic financial intermediation is weak and inefficient, firms in export-oriented sectors are burdened by significant liquidity constraints and hence trade less. Financial openness can help overcome those constraints by making more external finance available to domestic firms. An implication of this model is that international trade will tend to increase particularly in those sectors that more heavily rely on external finance, such as projects in the manufacturing sector. A related argument is that financial openness, by eventually facilitating the development of financial intermediation and, hence, contributing to the establishment of efficient systems of international payments, can work as a trade facilitation factor.[10]

Overall, with respect to international trade, the prediction on the effects of financial openness is that *countries that are more financially open should experience greater volumes of international trade; that is, financial openness should facilitate a country's trade integration with any partner.*

III. Methodology and data

Based on the discussion in Section II, the paper estimates two equations. One links financial openness to the difference in per-capita income across countries; the other links financial openness to a country's international trade. Modelling strategy and estimation methodology are described below.

A. Equation I: the income gap across countries

The log of per-capita income y in country i at time t is assumed to be a function of K variables plus the degree of financial openness z (as suggested by the arguments reviewed in Section II):

$$y_{it} = f(x_{1,it}, x_{2,it}, ... x_{K,it}, z_{it}) \tag{1}$$

Let j be the partner country, then the income gap between i and j can be written as:

$$y_{jt} - y_{it} = f((x_{1,jt} - x_{1,it}), (x_{2,jt} - x_{2,it}), ... (x_{K,jt} - x_{K,it}), (z_{jt} - z_{it})) \tag{2}$$

Denoting by d the difference between country j and country i (i.e., $dx_{1,t} = x_{jt} - x_{it}$), equation (2) can be re-written in the more compact form:

$$dy_t = \alpha_0 + \alpha_1 dz_t + \alpha_2 dx_{1t} + \alpha_3 dx_{2t} + ... + \alpha_4 dx_{Kt} + \varepsilon_t \tag{3}$$

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where, $\alpha_0 = c_j - c_i$, ε_t is a normally distributed stochastic disturbance term, and the α's are parameters to be estimated. Note that if $\alpha_1 > 0$, then the more country i falls behind country j in terms of financial openness, the larger the income-gap will be. This means that to reduce the income-gap, country i will have to increase its degree of financial openness for any given degree of financial openness achieved by the partner j. The role of financial openness in the process of per-capita income convergence can, thus, be tested through the null hypothesis H_0: $\alpha_1 = 0$.

The baseline specification of (3) includes the following regressors (expressed in difference between reference country j and country i: (i) the rate of labour accumulation (dn), (ii) the rate of human capital accumulation (dh), (iii) the depth of domestic financial intermediation (dq). The first two variables are standard, theory based, determinants of income per-capita[11]. The third one is included so as to disentangle the effect of financial openness on convergence from the effect of domestic financial development. The baseline will then be integrated by the rate of physical capital accumulation (dk) and an indicator of the quality of institutions ($dIquality$).

B. Equation II: the gravity equation

The second equation is a gravity model of bilateral trade. The gravity approach posits that the volume of trade between two partners is positively related to their economic size and inversely related to their distance. This approach has received wide empirical support, and recent studies have shown how it can be closely linked to formal theories of international trade.[12] Therefore, it seems to be the most appropriate tool to test whether financial openness promotes trade integration.

For a given year t, the gravity equation expresses trade of country i with the partner country j (T_{ij}) as a function of the economic size of the two countries (Y), the geographical distance between them (D) and a set of additional geographical, economic and environmental variables W:

$$T_{ij,t} = \frac{Y_{i,t}Y_{j,t}}{D_{ij,t}}\exp(W_{ij,t}) \tag{4}$$

$$\ln(T_{ij,t}) = \ln(Y_{i,t}Y_{j,t}) - \ln(D_{ij,t}) + W_{ij,t} \tag{5}$$

Following the arguments presented in Section II, financial openness of country i (z_i) will be included in the set W. Similarly to the specification of the per-capita income gap equation, a proxy for domestic financial depth in country i will also enter the r.h.s. so as to disentangle the effect of financial openness from that of financial development. Thus, the gravity equation to be estimated is:

$$\ln(T_{ij,t}) = \beta_0 + \beta_1 \ln(Y_{i,t}Y_{j,t}) + \beta_2 \ln(D_{ij,t}) + \beta_3 z_{i,t} + \beta_4 q_{i,t} + \upsilon_{ij,t} \tag{6}$$

where υ is a stochastic disturbance term, and β's are the parameters to be estimated. It goes without saying that, whilst formally indexed by the subscript t, distance D is constant over time. Again, the sign and statistical significance of the coefficient β_3 will provide empirical evidence on the impact of financial openness on the degree of trade integration of country i with partner j. A statistically significant and positive value of β_3 would indicate that financial openness promotes trade integration.

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[11] See Mankiw et al. (1992).

[12] For a discussion of gravity equations, see, inter alia, Evenett and Keller (2002).

Drawing on the gravity literature, equation (6) will be expanded by adding some dummy variables to the set *W* in order to isolate specific trade facilitating conditions. Furthermore, as recently shown by De Groot et al. (2003), ineffective institutions tend to increase transaction costs and therefore reduce trade. An indicator of institutional quality in country *i* (*Iquality*) will then be added to the set of regressors.

C. Estimation methodology and data

1. Sample and data

Equations (3) and (6) are estimated on two groups of countries. The first group includes only formerly planned economies (so-called emerging market economies). The second group consists of advanced western economies. The sample covers the period 1990–2003.[13] For each variable, convergence is measured relative to the EU-15 average. In other words, equations (3) and (6) are estimated using the EU-15 average as the reference partner *j*. This makes it possible to assess the effect of financial openness on the process of economic integration of country *i* with the EU-15. In fact, the main findings are qualitatively unchanged if the United States or the richest among EU-15 economies are used as reference partners.

To operationalize equation (3), *y* is measured by a country's real per-capita GDP; *n* is proxied by the fertility rate; *h* is proxied by the enrolment rate in tertiary schooling; *k* is proxied by the real investment share of GDP, and *q* is defined as a country's ratio of M2 minus narrow money to narrow money. In equation (6), instead, trade is measured by a country's exports to, and imports from, the EU-15 in logarithm of millions USD (*tradeeu*); *Y* is given by real aggregate GDP, and *dst* is the logarithm of distance (in kilometres) between the capital of a country and Frankfurt am Main. Finally, drawing on Henisz (2000), institutional quality *Iquality* is measured by an index of effectiveness of political and institutional constraints on policy changes. A complete list of variables, definitions and sources is given in the Appendix.

Crucial to the estimation of equations (3) and (6) is the empirical definition of the variable *z*, the degree of financial openness. Previous studies have employed two types of proxies: indicators of capital account liberalization and measures of the actual volume of capital flows across countries. Since capital account liberalization and international financial integration constitute two distinct, *albeit* tightly correlated, concepts of financial openness, we make use of different indicators to capture the effect of both.

A first suitable strategy, indeed rather common in the literature, is to construct an index of capital account liberalization using the information available from the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAR).[14] We follow the approach proposed by Chinn and Ito (2002) and construct our first proxy z_1 as follows.

From the AREAR we define for each country and each year four dummies: (i) R_1 takes value 1 in the absence of multiple exchange rates; (ii) R_2 takes value 1 if current account transactions are not restricted, and (iii) R_3 takes value 1 if capital account transactions are not restricted; (iv) R_4 takes value 1 in the absence of a requirement of surrender of export proceeds. A variable $SHARE_3$ is then constructed for each year as the average of R_3 in that year and in the four preceding years. Finally, *z* is obtained for each country and each year as the first standardized principal component of R_1, R_2,

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[13] The panel is, however, unbalanced as for some countries the first available observation comes later than 1990. The group of emerging market economies includes: Albania, Armenia, Azerbaijan, Belarus, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Moldova, Poland, Romania, Russian federation, Slovak Republic, Slovenia, Ukraine. The group of advanced economies consists of: Austria, Belgium, Canada, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, UK, USA.

[14] See Miniane (2004) for a survey of various approaches adopted in the construction of such indices.

$SHARE_3$ and R_4. Thus, z_1 is an indicator of overall cross-border capital liberalization: higher values denote greater financial openness.

To measure the degree of international financial integration of country i instead we follow Lane and Milesi-Ferretti (2003) and define the following two indices:

$$z_{2,it} = \frac{FA_{it} + FL_{it}}{GDP_{it}} \quad \text{and} \quad z_{3,it} = \frac{PEA_{it} + PEL_{it} + FDIA_{it} + FDIL_{it}}{GDP_{it}}$$

where, as usual, i denotes a country and t a given year; FA is the stock of foreign assets; FL is the stock of foreign liabilities; PEA and PEL are the stocks of portfolio equity assets and liabilities respectively, and $FDIA$ and $FDIL$ are the stock of foreign direct investment assets and liabilities respectively. Thus, the variable z_2 measures the overall volume of cross-holdings for a given country in a given year. The variable z_3 measures instead the volume of cross-holdings in equity.

2. Estimation methodology

Two different estimation methods are used. With the first one (single equation estimation), each equation is estimated independently from the other. To account for reverse causality; that is, for the possibility that financial openness is determined by trade volumes and per-capita income growth, two stages weighted least squares (2SLS) are applied, using lagged and initial values of endogenous variables as instruments. The estimator is then further corrected to account for the fact that the annual panel is unbalanced.[15]

The second method (system estimation) allows for non-zero covariances between the residuals of the two equations. Open economy growth models indicate that trade integration is likely to speed up-convergence[16]. To account for this effect, the income-gap equation should then include bilateral trade between the country and the EU-15 among the regressors. Since bilateral trade is the dependent variable of the gravity model, we can gain in efficiency by estimating the two equations as a system through three stages least squares (3SLS). Again, endogenous variables are instrumented by their lagged values.

IV. Econometric results

A. Financial openness and per-capita income-gaps

The results for the income gap equation (dy is the dependent variable) are reported in table 1. The estimates for the group of emerging market economies are shown in columns I to V; the estimates for the full sample of western economies are displayed in columns VI to X.

To start with emerging market economies, the baseline specification in column I clearly indicates that a larger gap in financial openness (greater values of dz_1) implies a greater income gap (dy). Thus, the less financially open an emerging market economy is relative to the EU-15 average, the more difficult it will be for this economy to catch-up with the EU-15. This effect holds over and above any difference in financial depth (dq), human capital accumulation (ds), and demographic dynamics (dn). Columns II and III show the same baseline equation re-estimated with measures of international

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[15] The unbalanced panel estimator follows Verbeek and Nijman (1996). An alternative to the 2SLS instrumental variable estimator would be a 3SLS system estimator (see Wooldridge 2002). In this case, equations (3) and (6) are estimated as a system together with an equation where financial openness is the dependent variable and trade and per-capita income enter as explanatory variables. In fact, a set of estimates from the 3SLS procedure are available from the authors upon request. The qualitative thrust of results does not change relative to the single-equation 2SLS presented in the next section. We prefer reporting the 2SLS and not the 3SLS because the focus of this analysis is more on the estimation of reduced-form equations than on structural models.

[16] Ben David (1996) provides evidence of income convergence among major trade-partners.

financial integration (dz_2 and dz_3). The evidence is complementary to that in column I: countries that fall behind the EU-15 average in terms of their degree of international financial integration tend to experience greater income gaps. In column IV the baseline specification is augmented by differences in physical capital accumulation, dk. The strength and statistical significance of dz_1 are not substantially modified. This suggests that the mechanism through which differences in the degree of financial openness affect income convergence with the EU-15 does not work through the rate of investment. Interestingly, dq also does not lose significance when dk is added to the model. The interpretation is that the different stage of financial development matters not much because it determines different rates of capital accumulation, but because it implies a different level of allocative efficiency. Finally, the model in column V includes the indicator of institutional quality $dIquality$. In broad terms, dz_1 still plays its role, while domestic financial depth becomes insignificant. As a matter of fact, the estimated coefficient of $dIquality$ could, to some extent, already capture the contribution of dq to the determinantion of the income gap. Indeed, the development of the domestic financial system heavily relies upon the establishment of efficient institutions to protect economic rights. It then follows that the two variables $dIquality$ and dq might be representing partially overlapping effects on dy and hence they might be collinear.

Turning to the group of western economies, the basic result concerning financial openness seems to be confirmed. In all specifications, dz is positive and statistically different from zero, irrespective of the three proxies used. At the same time, dq always fails to pass a zero restriction test. This lack of effect of domestic financial depth, together with the equally negligibe role played by dk, is probably the most striking change relative to emerging market estimates. In fact, column X of the table seems to suggest that in advanced economies, the income gap dy is a function only of differences in institutional quality and in financial openness.

Various robustness checks have been performed to test the sensitivity of the results. First, to test for the impact of 'absolute' rather than 'relative' financial openness, the income-gap equation has been re-estimated using country i's level of financial openness (z) rather than the difference between the EU-15 and country i (dz). Similarly, dq has been replaced by q. In the basic specification without dk, the estimated coefficient on z turns out to be –0.121 (significant at 1 per cent) for the emerging market economies and –0.234 (significant at 1 per cent) for the western advanced economies. This means that, as expected, countries that are more financially open in absolute terms tend to experience smaller per-capita income gaps *vis-à-vis* the EU-15 average.

Second, different proxies for human capital accumulation and labour force growth have been tried (e.g., enrolment in secondary rather than tertiary school, population growth rather than fertility rate). Similarly, different indicators of the depth of domestic financial intermediation have been considered (e.g., the M2 to GDP ratio and the domestic credit to the private sector to GDP ratio). In general, the coefficient on dz always retains its sign and level of statistical significance.

B. Financial openness and trade in goods and services

Estimates of the gravity equation (6) are presented in table 2 (*tradeeu* is the dependent variable). As before, columns I to V refer to estimates for the group of emerging economies; columns VI to X refer to estimates for the group of western countries.

All variables in the baseline specification estimated for emerging market economies exhibit highly significant coefficients with the expected sign. Trade flows between a country and the EU-15 increase the larger the economic size of the country and the geographically closer the country is to the EU-15. Financial openness stimulates trade integration. Again, this effect is present over and above the positive impact on trade of a more developed domestic financial system. Using different proxies for financial openness (columns II and III) and introducing dummy variables to account for landlockedness and common borders (column IV) does not change the results. In line with the findings of De Groot et al. (2003), we also find (column V) that better institutions help trade integration with the EU-15. However, this effect adds to, instead of replacing, the effect of the financial variables q and z.

An intriguing pattern emerges from the sample of western economies. When measured by the Chinn and Ito's index of capital account liberalization, financial openness does not appear to play any significant role in the gravity model. However, when proxies of international financial integration are used, the effect of financial openness becomes strongly significant and positive. To some extent, the lack of statistical significance of z_1 might be due to the limited variability that this indicator has in the sample of advanced economies. On the contrary actual capital flows display greater variability both across countries and over time. This makes the estimation of the coefficients of z_2 and z_3 more precise. Another difference relative to the emerging market economies concerns landlocked countries. In the group of western economies, apparently, being landlocked does not cause economic marginalization. Finally, it is worth noting the marginally insignificant contribution of institutional quality to trade integration in this group of countries.

Robustness checks analogous to those performed for equation (3) are carried out for the gravity model (i.e. changes in the definition of q and inclusion of additional variables on the r.h.s. of the model). Of some specific interest is the inclusion of a dummy variable to control for the existence of preferential trade agreement between a country and the EU-15. This dummy turns out to have a large and positive coefficient. Furthermore, the variable *dst*, distance, has been recomputed using different cities as the EU-15 reference. Overall, results on financial openness are qualitatively unchanged.

C. System estimates

If trade integration facilitates income convergence, then equation (3) has to be extended with the inclusion of *tradeeu* on the r.h.s. However, since *tradeeu* is the dependent variable of equation (6), some efficiency gain in estimation can be obtained by applying a 3SLS system estimator that allows for correlation of residuals across the two equations. Equations (3) and (6) are thus estimated as a system. These estimates are reported in table 3. As usual, we separate the group of emerging market economies (columns I to V) from the group of western economies (columns VI to X). Financial openness is always measured by Chinn and Ito's indicator of capital account liberalization. Results obtained by using the other two proxies are not different from those discussed below and they can be obtained from the authors upon request.

Column I combines the two baselines specifications, with the inclusion of *tradeeu* in the income-gap equation. Qualitatively, results are not different from those obtained from the single equation 2SLS squares. In particular, financial openness still plays its important role in determining economic integration: (i) a less financially open economy (relative to the EU-15 average) will experience a wider gap in per-capita incomes relative to the EU-15 and (ii) a less financially open economy will trade less with the EU-15. Since *tradeeu* turns out to reduce *dy*, then the trade-enhancing effect of financial openness feeds back on income convergence trhough *tradeeu*. We can thus conclude that financial openness affects the speed of convergence through two channels: a direct effect, captured by the positive coefficient of dz_1 in the income-gap equation, and an indirect effect, captured by the positive coefficient of z_1 in the gravity equation combined with the negative coefficient of *tradeeu* in the income-gap equation.

Columns II through IV expand the baseline specifications in line with what was described in subsections IV.A and IV.B. The key findings concerning the role of financial openness are all confirmed. In the income gap equation, the variable *dk* has a positive and significant coefficient, while both financial variables *dq* and dz_1 remain significant. This confirms the previous findings that differences in financial openness and in domestic financial depth do not affect the income gap through the investment rate. Greater allocative efficiency is a plausible transmission channel. In addition, one can think of transmission through increased policy discipline. The liberalization of international capital flows as well as the existence of more efficient financial intermediaries can put pressure on authorities to stabilize and improve the macroeconomic framework, which would in turn foster a more rapid catching-up.

Differently from single equation estimates, instead, the dummy variables in the gravity equation are statistically significant only when the income-gap equation includes *dk*. Institutional quality also

fails to be significant both in the gravity equation and in the income gap equation. It would be desirable in future work to focus more on the causes that determine these differences between single equation and system equation estimates. A final note concerns the coefficient of population growth dn in the income gap equation. While in single equation estimates this coefficient displayed some instability, in the system estimates it is always negative, as expected from the neo-classical theory of growth, and different from zero.

Column V proposes a fully endogenous model, with the income gap dy that enters the gravity model. That is, each of the two dependant variables now figures as regressor in the other equation. The results on all other variables are unchanged, at the same time dy exhibits a negative coefficient in the gravity equation. Thus, poorer countries tend to trade less with the EU-15 than richer countries. The endogenous relation between trade integration and income gap may lead to an 'isolation trap': countries whose per-capita GDP is significantly below the EU-15 average tend to trade less with the EU-15, but weaker trade integration reduces the speed of catching-up, so that the country is trapped in an equilibrium characterized by low-integration with the EU-15. Our results suggest that financial openness is a way to break this vicious circle. By opening more to international capital flows, initially poorer emerging market economies can catch-up faster and at the same time trade more with the EU-15.

Estimates on the sample of western advanced economies point to a more ambiguous role of financial openness. While the coefficient of dz_1 is always positive and significant in the income gap equation, the contribution of z to trade integration is negligible or even negative. Therefore, an increase in financial openness relative to the average of EU-15 has different effects on different dimensions of the integration process. The negative trade effect of the income gap is confirmed. However, there is no evidence of 'isolation trap' for western advanced economies, since *tradeeu* does not significantly feed back on income gap. Institutional quality now matters: *dIqual* increases dy while *Iqual* increases trade. Institutional reforms are thus a key factor fostering the economic integration of western economies.

V.   Conclusions and directions of future research

The main result of the empirical analysis is that financial openness facilitates the economic integration of emerging market economies with the EU-15. This integration effect takes the form of faster per-capita income catching-up and greater bilateral trade in goods and services. Furthermore, the effect of financial openness occurs over and above the effect of domestic financial deepening. Since system estimates show that trade integration feeds back on the income gap and, at the same time, the income gap reduces trade integration, financial openness is a powerfull instrument through which initially poorer and less integrated countries can overcome their marginalization. Thus our results add to the literature on the benefits of capital account liberalization.

However, a number of qualifications are necessary. First, with respect to per capita income convergence, the regressions show that even if a country were to achieve the same degree of financial openness as the EU-15, the gap in per-capita income levels would persist as long as there are differences in technology and in the rates of factors accumulation, particularly human capital accumulation. Therefore, financial liberalization is only one of the several policies that countries need to implement in order to sustain income catching-up. Similarly, with respect to international trade, the empirical evidence indicates that financial openness ought to be embedded in a broader context of policies for trade facilitation, including the abatement of tariff and non-tariff barriers (e.g., inefficient custom procedures, inadequate transport infrastructures). Furthermore, some ambiguity on the role of financial openness exists in the case of more advanced western economies. In particular, for these countries there is evidence that reducing the financial openness gap with the EU-15 alse reduces the income gap, but the effect of greater capital account liberalization on trade is negligible and might even be negative.

Possibly, the most crucial qualification of all concerns the possible side-effects and downward risks of financial openness. While our empirical analysis emphasises the benefits of free international capital movements for the process of economic integration, the experience of several other emerging economies world-wide calls for a careful design and implementation of financial and capital account

liberalization in the formerly centrally planned economies.[17] The increased economic vulnerability that is associated with integration into global financial links needs to be managed by combining capital account liberalization with: (i) domestic financial sector reforms to strengthen regulation and supervision, enforce sound and prudential lending practices, achieve high-standards of governance of banks and other financial institutions; (ii) trade policy and competition policy reforms to eradicate distortions that financial openness might exacerbate; (iii) implementation of a coherent macroeconomic policy mix characterized by low inflation and fiscal stability, and (iv) design of redistributive tools to shield the most vulnerable socio-economic groups against the potential damages of increased volatility. Finally, in the transition towards financial liberalization, temporary and market-based capital controls might eventually be considered to tilt the composition of inflows towards longer term maturities and so prevent a maturity mismatch between investment projects and financing.[18]

A number of issues deserve investigation in future research. One concerns a better understanding of the channels through which financial openness affects per-capita income catching up. Several theoretical possibilities exist, and our empirical analysis indicates that financial openness does not produce its impact only through the development of domestic financial systems and a faster accumulation of physical capital. A more structural model is therefore needed to evaluate other possible mechanisms, such as allocative efficiency and policy discipline. Future work should also consider whether, in addition to the two considered in this paper, financial openness affects other dimensions of economic integration, such as the sustainability of fixed exchange rate regimes and macroeconomic policies convergence. Finally, our estimates point to a difference between emerging market economies and advanced western economis in the contribution of financial openness to economic integration. On the one hand, this difference should not come as a surprise since the two groups of countries are still characterized by some sharp differences in economic structures. On the other hand, they suggest that the research should be expanded to examine other clusters of countries in order to establish the structural conditions under which financial openness is more (or less) favourable to economic integration. This requires re-estimating equations like (3) and (6) on samples of countries selected along different criteria (i.e. membership in a given regional economic community, initial level of per capita income, etc.) and then comparing the estimated strength of the relationship between financial openness and economic integration dimensions across clusters.

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[17] See, i.e. the discussion in Johnston et al. (1997), Dailami (2000) and Daianu and Vranceanu (2002).

[18] Successful experiences with those type of controls are reported for Chile and other Latin American and East Asian economies. See, inter alia, Edwards (2002) and World Bank (2000).

Table 1: Income gap equation

	Emerging market economies					Western economies				
	I	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*	*IX*	*X*
constant	1.112***	0.807***	0.401	1.724***	1.205***	0.011	-0.083***	-0.005	0.013	-0.020
dq	0.706***	0.709***	0.559***	0.813***	0.211	-0.038	0.016	0.059	-0.031	-0.010
dz_1	0.126***			0.150***	0.083**	0.258***			0.264***	0.265***
ds	2.352***	3.131***	3.769***	1.125***	1.976***	0.252**	0.015	0.336**	0.264**	0.010
dn	*-3.488*	-17.142	27.575	-27.881***	33.045***	12.675***	-17.153***	-7.659	13.134***	5.923
dz_2		0.002***					0.001***			
dz_3			0.007***					0.002***		
dk				1.441***					-0.108	
dlqual					0.092*					0.068***
N. Obs	110	66	55	109	96	189	138	110	188	185

Note: Dependant variable is the difference between log average real per-capita income in the European Union and country's log real per-capita income (*dy*). Estimation is by weighted two stages least squares. *,**,*** denote statistical significance of estimated coefficient at 1%,5% and 10% confidence level. See appendix for details on variables definition.

Table 2: Gravity equation

	Emerging market economies					Western economies				
	I	II	III	IV	V	VI	VII	VIII	IX	X
constant	-36.664***	-31.852***	-31.203***	-34.902***	-32.689***	-24.173***	-21.581***	-22.164	-25.926***	-25.182***
q	0.252***	0.192***	0.165***	0.221***	0.175***	-0.128***	-0.154***	-0.055***	-0.056***	-0.042**
z_1	0.167***			0.164***	0.115***	-0.001			0.000	0.000
dst	-0.862***	-0.678***	-0.517***	-0.886***	-0.780***	-0.254***	-0.201***	-0.431***	-0.109***	-0.107***
YY	0.971***	0.854***	0.825***	0.943***	0.884***	0.696***	0.639***	0.673***	0.690***	0.675***
z_2		0.003***					0.001***			
z_3			0.014***					0.001***		
border				0.117***	0.168***				0.847***	0.813***
Llock				-0.140***	-0.171***				0.256***	0.216***
Iqual					0.073***					0.006
N. Obs	139	110	92	139	114	311	216	174	311	279

Note: Dependant variable is log trade between country and the European Union (*tradeeu*). Estimation is by weighted two stages least squares. *,**,*** denote statistical significance of estimated coefficient at 1%,5% and 10% confidence level. See appendix for details on variables definition.

Table 3: System estimation

	Emerging market economies					Western economies				
	I	II	III	IV	V	VI	VII	VIII	IX	X
Equation 1: dependent variable *dy*										
constant	4.766***	4.721***	4.403***	5.122***	4.719***	0.249	0.383	0.211	0.008	0.413
dz	0.088**	0.093***	0.103***	0.105**	0.088**	0.223***	0.222***	0.236***	0.245***	0.213***
dq	0.288***	0.300***	0.468***	0.325***	0.320***	-0.030	-0.031	-0.031	-0.014	-0.020
dn	-14.633***	-14.507***	-27.087***	-17.924**	-17.905***	14.472***	14.830***	14.439***	7.338	12.113**
ds	1.340***	1.379***	0.965***	1.349***	1.381***	0.577**	0.480**	0.336	0.053	0.488*
tradeeu	-0.349***	-0.347***	-0.284***	-0.392***	-0.344***	-0.021	-0.033	-0.018	-0.001	-0.036
dk		0.913***						-0.305		
dIqual				-0.029					0.075***	
Equation 2: dependent variable *tradeeu*										
constant	-35.767***	-34.861***	-35.271***	-32.415***	-28.605***	-21.944***	-24.185***	-24.393***	-23.527***	-23.251***
q	0.245***	0.189***	0.194***	0.053	0.128**	-0.177***	-0.090**	-0.086*	-0.074	-0.029
z	0.223***	0.221***	0.224***	0.152***	0.163***	0.062*	0.031	0.028	0.019	-0.075**
dst	-0.843***	-0.834***	-0.809***	-0.681***	-0.305**	-0.219***	-0.146***	-0.144***	-0.140***	-0.121***
YY	0.952***	0.937***	0.941***	0.872***	0.777***	0.652***	0.667***	0.670***	0.647***	0.645***
Border		0.156	0.143	0.124***	0.190**		0.651***	0.662***	0.067***	0.734***
Landl		-0.052	-0.051	0.287**	0.017		0.282***	0.256**	0.691***	-0.001
Iqual				-0.150					0.280***	
dy					-0.624***					-0.735***
N. Obs.	230	230	228	198	230	393	393	392	374	393

Note: Estimation is by three stages least squares. *,**,*** denote statistical significance of estimated coefficient at 1%,5% and 10% confidence level. See appendix for details on variables definition.

Variables	Definition	Source
Dy	Per-capita income gap. Difference between EU average log per-capita income and country's log per-capita income	WDI
Dn	Difference between EU average log fertility rate and country's log fertility rate	WDI
Dh	Difference between EU average tertiary school enrolment rate and country's tertiary school enrolment rate	WDI
Dk	Difference between EU average real investment share of GDP and country's real investment share of GDP	WDI and PWT
Q	Index of domestic financial development: country's ratio of liquid liabilities to narrow money. Alternative definitions used for sensitivity analysis: domestic credit to private sector to GD ratio and liquid liabilities to GDP ratio.	IFS
Iqual	Indexs of intensity/effectiveness of political and institutional constraints on policy changes.	Henisz (200)
Dq	Difference between EU average q and country's q	IFS
Tradeeu	Log of country's exports to and imports from EU.	DoTS
$Y_i Y_j$	Log of country's aggregate GDP times EU's aggregate GDP	WDI
Locked	Dummy variable taking value if country is landlocked	CIA World Factbook
Border	Dummy variable taking value 1 if country shares a land border with any EU-15 member	CIA World Factbook
Dst	Log of distance (in km) between country and Frankfurt am Main	CIA World Factbook
z_1	Index of capital account openness	See Section III
z_2, z_3	Index of international financial integration. Two versions are proposed: p_1 and p_2	See Section III
Dz	Difference between EU average open and country's open	
Dp	Difference between EU average integr and country's p. Two versions are computed: dp_1 uses p_1 and dp_2 uses p_2.	
dIqual	Difference between EU average value of *check* and country's *check*	

Notes: WDI is World Development Indicators Database 2004, World Bank;

IFS is International Financial Statistics Database June 2004, IMF;

PWT is Heston A., Summers L., and Aten B. Penn World Tables Version 6, CICUP, October 2002;

DoTS is Direction of Trade Statistics 2004, IMF.

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