Financial Integration, Investment, and Economic Growth.

Evidence From Two Eras of Financial Globalization

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Abstract:

Does international financial integration boost economic growth? The empirical literature has not yet established a robust link between openness to the international capital market and economic growth. In this paper we turn to the economic history of the first era of financial globalization (1880-1914) for new insights. Using identical empirical models and techniques as contemporary studies, we find a significant growth effect in the historical period. A key difference between now and then is that opening up to the international market led to net capital movements and higher investment in the historical period, but no longer does so today.

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JEL classification: F4; F15; F21; F30; N10; N20; O11; O16

1. Introduction

The nexus between international financial integration – the degree to which an economy is open to the global capital market – and economic growth continues to be one of the most debated issues among economists. Do economies that are financially more open grow faster than those that are closed, precisely because of their openness to financial markets? Are policies sensible that promote growing international financial integration and hence financial globalization?

These questions raise important issues both from a theoretical and a policy perspective. It is therefore hardly surprising that the number of contributions to the debate is high and growing. In this paper, we aim to provide new insights by looking at the first era of financial globalization from 1880-1914. Our study brings together two recent strands in research in international economics. First, we contribute to the literature focused on the empirical investigation of the financial integration-growth nexus such as Edison et al. (2002). Second, we take inspiration from research on "globalization in historical perspective" (Bordo et al., 2003; Obstfeld and Taylor, 2004; Schularick, 2006), a recent strand of research that explores the first episode of high international capital mobility with an eye on policy lessons for today.

In a perfect neoclassical textbook world, there exist good arguments for a positive growth impact of integration with the international capital market, especially for developing countries. By tapping the pool of global savings capital-poor countries could free themselves of a binding constraint on economic growth, i.e. lack of capital. Closer financial integration could also strengthen domestic financial systems leading to more efficient capital allocation, higher investment and growth (Levine, 2001). On a global level, the efficient allocation of capital and international risk sharing would be promoted (Obstfeld, 1994). However, arguments against the economic wisdom of openness to global capital flows have also been set forth. Financial integration need not to be welfare enhancing in the presence of other

distortions such as trade barriers and weak institutions or if information asymmetries affect the proper working of the international financial market (Bhagwati, 1998; Stiglitz, 2000).

Despite a rich body of contributions, the empirical literature remains inconclusive with regard to the financial integration-growth nexus. Empirical work by Grilli and Milesi-Ferretti (1995), Kraay (1998), Edison et al. (2002) and Fratzscher and Bussière (2004) has not confirmed a robust impact of financial openness on growth. Their results have mirrored the early and well-known study by Rodrik (1998, p. 9) who concluded that "*capital controls are essentially uncorrelated with long-term economic performance*". Yet some studies found support for a relationship between openness to the global capital market and economic growth such as Quinn (1997), Henry (2000, 2007), and Bekaert et al. (2001). More recently, researchers have analyzed whether the growth impact of financial integration was conditional on third factors such as a sound institutional framework or income levels, but the results remained mixed as well (Edwards, 2001; Edison et al., 2002; Alfaro et. al., 2003; Klein, 2005). Detailed reviews of the literature on financial openness and growth can be found in Eichengreen (2002), Edison et al. (2004) and Henry (2007).

A balanced summary of empirical research on the issue has been given in a study by the research department of the International Monetary Fund (IMF), one of the main proponents of capital account liberalization in the 1990s:

…taken as a whole, the vast empirical literature provides little robust evidence of a causal relationship between financial integration and growth. (Kose et al., 2006, p.8)

One simple reason why empirical research on the financial integration-growth link remained inconclusive to date is that different approaches and econometric techniques made it difficult to synthesize the results. While similar cross-country growth models were the starting point, marked differences remained with regard to the sample of countries, the period under

investigation and the estimation techniques employed.[1] It is for the sake of comparability that we are intentionally conservative throughout this paper with regard to changing the underlying empirical model, introducing new estimation techniques or proposing a new measure for financial integration.

On the contrary, we intentionally rely on models and techniques employed before in order to ensure the comparability of our results with those of previous studies. This is because the most important contribution of this paper is to a different field: we aim to set the present against a benchmark based on the past. Economic historians have often underscored the contribution that international capital flows made to economic growth in developing countries during the "first era of globalization" – the years of the classical gold standard from 1880-1914. Yet it has not been tested econometrically for a broad cross-section of countries whether the first era of financial globalization does provide evidence that financial globalization can indeed spur growth.

We have put considerable effort into assembling the largest possible dataset for the years 1880-1913 covering 24 countries from all world regions that accounted for more than 80 percent of world output at the time. We use a de facto measure of financial integration, capital flows from the United Kingdom – the world's leading financial centre at the time – as a proxy for the degree of financial openness of individual countries. Such detailed capital flow data are available from a recently published analysis of the geographical patterns of stock and bond issues at the London Stock Exchange (Stone, 1999). We also employ older data for foreign investment stocks (Woodruff, 1966) and net capital movements as implied by current account balances (Jones and Obstfeld, 1997) to corroborate our findings.

The new dataset allows us to show that international financial integration was positively correlated with economic growth in the first era of global finance. Moreover, we can exclude the possibility that the finding is driven by different estimation techniques or model specification as we first reproduce the results of – what we consider – the most

comprehensive contemporary study (Edison et al., 2002). In a second step we run the identical model with the same econometric methods on our newly collected historical dataset. It is thus the data, not different model specifications or econometric techniques that lead us to conclude that the first era of financial globalization saw a positive relationship between international financial integration and economic growth.

Our study also suggests that a comparable effect cannot be found today. If financial integration contributes to economic growth today, the effect would need to be conditional on certain types of capital flows or on third factors such as the domestic institutional framework (Alfaro et al., 2003). Yet our findings support all these economists who believe in the virtues of international capital mobility – and, incidentally, the profession of economic historians who have for a long time pointed to the important role of foreign capital for growth in the periphery before the First World War. The late 19th and early 20th centuries' experience demonstrates with real-world data that international financial integration can contribute to higher growth.

But why did financial openness promote growth back then? We show that before 1914 opening up to the international capital market was associated with higher domestic investment. Today by contrast, changes in financial openness are essentially uncorrelated with changes in domestic investment. Our explanation for this phenomenon focuses on the different patterns of financial globalization. The first era was marked by massive net capital flows from rich to poor economies ("development finance"). In contrast, today's globalization is marked by high gross flows ("diversification finance") and limited net capital transfers (Obstfeld and Taylor, 2004; Schularick, 2006). In other words, in the historical period financial globalization led to long-term net flows of capital from rich to poor economies.

This paper is structured as follows. In the following section, we briefly review the literature, present the empirical strategy and introduce our new dataset. The third part presents the estimation results for the contemporary and historical periods. Our regressions show a

robust growth effect only for the historical period. The fourth section asks through which channels financial integration promoted economic growth. We argue that the investment channel, not the total factor productivity (TFP) channel, was the link between international capital market integration and economic growth before 1914. We find no such correlation between financial openness and investment in the past three decades. The final section concludes.

2. Empirical strategy and data sources

The overall empirical strategy of this paper is as follows: we use a newly collected historical dataset to test for empirical evidence that financial integration translated into higher growth in the first era of financial globalization. To arrive at fully comparable results with contemporary studies on the financial integration-growth nexus, we rely on the same models and econometric techniques as the recent literature. We hence run identical growth regressions both on a contemporary (1980-2002) and a newly assembled dataset for the first era of financial globalization (1880-1913). We align our empirical analysis to the most comprehensive contemporary study (Edison et al., 2002) but also perform a number of robustness checks across different models.

There is substantial narrative evidence from economic history of the important contribution European capital made to the economic growth of peripheral economies before 1914 (Feis, 1965; Woodruff, 1966). The degree of international financial integration reached before 1914 was truly impressive. In the decades before WW1, gross foreign investments in relation to gross domestic product (GDP) in 1913 stood at about 200 percent in Argentina, Chile and South Africa, and at or above 100 percent in countries such as Brazil, Mexico, Egypt, and Malaysia – actually about twice as high as the corresponding figures at the end of the 1990s (Twomey, 2000; Obstfeld and Taylor, 2004; Schularick, 2006). Not only North and

South America were well integrated into the international capital market. Southern and Eastern Europe, Africa and Asia all attracted considerable amounts of capital (Stone, 1999). European investors financed American railroads, Argentinean farms, sewerage systems in the Middle East, ports in Asia and telegraph networks in Africa. The historical narrative suggests that integration into the global capital market was an important factor in driving growth. But does this narrative stand up to detailed econometric investigation along the lines of the recent literature on financial integration and growth?

Empirical research on the growth effects of international financial integration has related the growth of real per capita GDP to initial income (as a convergence term), the degree of financial openness and a vector of control variables which proxy other fundamental growth drivers. Financial integration – or financial openness as it has also been called in analogy to openness to trade in goods – has been measured in two different ways. First, by the extent to which legal barriers impede the free flow of capital (Quinn, 1997; Rodrik, 1998); second, along the lines of the empirical literature on trade openness and growth – in which trade openness is typically measured by the value of traded goods and services over GDP – financial openness has been measured quantitatively. Kraay (1998) and Edison et al. (2004) looked at various measures of gross capital flows and stocks over GDP as quantitative indicators for the degree of international financial integration. Eichengreen (2001) and Edison et al. (2004) discuss the advantages of both approaches.

Clearly, the choice of the indicator is not only a question of convenience and data availability. For example, a country may operate capital controls, but they could be leaky or selective so that despite formal legal barriers, the actual degree of international financial integration could be quite substantial. Using a quantitative measure for the degree of integration would in this case seem to be a better choice. However, in their comprehensive study Edison et al. (2002) test virtually all available indicators, rule-based and quantitative ones, but find no robust evidence for a positive growth effect for either set of indicators in the

period 1980 to 2000. In this study we use a measure for financial openness that was also tested by Edison et al. (2002) – inflows of foreign direct and portfolio investment over GDP. Yet our choice is also data-driven. For the first period of globalization gross flows of capital from the United Kingdom are the most detailed and reliable indicator for integration into the global capital market. This being said, we are able to corroborate our findings by looking at changes in gross foreign capital stocks and changes in net international investment positions which are derived from two different data sources. Formal capital controls were unheard of in this period.

The second main issue on which recent studies differ relates to the specification of the empirical model. Some authors have argued that short-term policy variables like the budget deficit and the inflation rate need to be included (Edison et al., 2002). Others opted to control for a smaller set of long-run determinants of economic growth mirroring the standard growth models of Barro and Sala-I-Martin (1992), Mankiw, Romer and Weil (1992) and the robustness analyses by Levine and Renelt (1992).[2] To make our findings independent from potentially parsimonious specifications, we specify three different models: Model (I) is an exact reproduction of the benchmark regression of Edison et al. (2002), i.e. we regress real per capita growth on initial income, average years of schooling (proxying human capital), average consumer price inflation and budget deficits, plus the period average of capital inflows to GDP as a measure of international financial integration. Model (II) is identical to (I), but adds openness to trade. Model (III) adds population growth taking inspiration from the robustness studies that found that population growth was an important explanatory variable for differences in growth performance (Levine and Renelt, 1992). Recall that we run all three models on contemporary and historical data to ensure full comparability. One potential shortcoming of the Edison et al. (2002) empirical survey is that the authors do not include aggregate investment in their model, presumably because it is expected that international financial integration spurs growth mainly via its effect on aggregate investment. We will first

reproduce the Edison et al. (2002) model, but then broaden our analysis to include other important growth determinants and investigate the relation between financial integration and investment more in detail.

We implement our empirical analysis via two different econometric approaches (Edison et al., 2004; Eichengreen and Leblang, 2003; Fratzscher and Bussière, 2004). First, we run a simple cross-sectional regression on the periods under investigation. This is to say, we use only one observation per country. Second, we run a system generalized methods of moment (GMM) dynamic panel model.[3] This two-step approach allows us to combine the advantages of both estimators. While the results of the cross-section are easy to interpret and reveal long-term cross-sectional variance, the findings could be biased due to the omission of country fixed effects, a low number of observations, and possible endogeneity of explanatory variables.

Henry (2007) criticized the cross-sectional models as they test for permanent growth effects over long-term horizons while the standard neoclassical model only predicts a temporary effect of financial integration on economic growth. More precisely, he argues that the statistically significant portion of the growth impact would occur in the near aftermath of liberalization, which he calculates as typically less than 5 years. However, it is not clear why the argument would also hold true in a panel setting (Rodrik and Subramanian, 2008). Fixed-effects panel models which rely on within-unit variation have produced similarly inconclusive results with regard to the growth effect of financial integration. Moreover, even though the neoclassical growth model predicts only temporary growth effects of financial integration, it does predict a permanent rise in the investment share of GDP (Rodrik and Subramanian, 2008). This gives us a clear strategy to address the Henry critique: test whether financial integration results in higher investment ratios, a question which we will address in section 4. In this regard, our analysis broadens the analysis of the effects of stock market liberalizations on aggregate investment by Henry (2000). It should also be noted that the system GMM

estimation enables us to explicitly address the potential endogeneity of the capital flow variable: an economy that exhibits high growth is likely to become more attractive to foreign investors.

The cross-sectional regression, which is estimated with robust standard errors, takes the following form:

$$\Delta y_i = \alpha + \beta IFI_i + \boldsymbol{\gamma}' \mathbf{X}_i + \varepsilon_i, \tag{1}$$

where Δy_i, the dependent variable, is the logarithmic growth of real GDP per capita, IFI_i denotes the average capital inflow to GDP ratio over the period under study, $\mathbf{X}_i$ a vector of control variables, ε_i represents an i.i.d. stochastic term, and subscript i indicates the countries, respectively. The vector of control variables always includes GDP per capita and the logarithm of schooling, the logarithm of period averages of inflation and the budget deficit. This is model (I). We add trade openness in model (II) and average population growth in model (III).

The system GMM panel estimation improves over the pure cross-section regression for several reasons. It uses both the cross-sectional and the time dimension of the data, increases the number of observations, controls for country-fixed effects and allows us to take the potential endogeneity of the regressors into account. Five year averages have become the standard method to reduce the cyclicality of the data. The starting point for the panel estimation is the following growth regression:

$$y_{i,t} - y_{i,t-1} = (\alpha - 1) y_{i,t-1} + \beta IFI_{i,t} + \boldsymbol{\gamma}' \mathbf{X}_{i,t} + \eta_i + \varepsilon_{i,t}, \tag{2}$$

where $y_{i,t}$ is the logarithm of per capita income, $\mathbf{X}_{i,t}$ represents a set of weakly exogenous and predetermined control variables (as above), η_i is a (time-invariant) country-specific effect, and subscript t indicates the time periods under consideration. We also include strictly exogenous time-dummies which are not reported to save space. Minor reformulation of equation (2) leads to a dynamic panel regression model of first order:

$$y_{i,t} = \alpha y_{i,t-1} + \beta IFI_{i,t} + \boldsymbol{\gamma}'\mathbf{X}_{i,t} + \eta_i + \varepsilon_{i,t}. \quad (3)$$

To eliminate the country specific effects η_i, the preceding equation is formulated in first differences:

$$y_{i,t} - y_{i,t-1} = \alpha(y_{i,t-1} - y_{i,t-2}) + \beta(IFI_{i,t} - IFI_{i,t-1}) + \boldsymbol{\gamma}'(\mathbf{X}_{i,t} - \mathbf{X}_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}). \quad (4)$$

The system GMM estimator, introduced by Arellano and Bover (1995) and Blundell and Bond (1997), combines the standard set of equations in first differences with suitably lagged levels as instruments with an additional set of equations in levels with suitable lagged first differences as instruments (Bond et al., 2001).[4] We examine and report the validity of the internal instruments (Hansen test) and test for serial correlation of the error term. A detailed econometric discussion can be found in Bond et al. (2001) and Edison et al. (2002).

Our data for the contemporary period come from commonly used sources such as the World Development Indicator database (World Bank, 2006). Inflows of portfolio and equity capital over GDP are taken from the International Financial Statistics (IMF, 2005). Data on educational attainment (average years of schooling) are taken from the updated Barro-Lee-dataset (Barro and Lee, 2000). In total, we count observations for 56 countries for the contemporary period covering 35 developing and 20 high income countries.

More demanding was the construction of the historical dataset. This effort would not have been possible without the support of numerous scholars. To a substantial extent, our dataset builds on three recently compiled datasets for the first era of financial globalization, namely those of Obstfeld and Taylor (2003), Clemens and Williamson (2004) and Ferguson and Schularick (2006). From these datasets come all data for schooling (primary school enrollment), the government balance and population growth. All real GDP data come from the seminal work of Maddison (1995, 2001). Capital flow data are taken from the work of Stone (1999). It is important to note that the data from Stone cover capital flows from Great Britain which is the only country for which a detailed by-country breakdown of capital outflow data exists. However, Britain was by far the most important capital exporter of the time, trailed by a large distance by France and Germany. British data are likely to be a reliable proxy for integration into the international capital market. They are also highly correlated with the overall stocks of international investment in 1914 which are available from different sources (Feis, 1965; Woodruff, 1966).

The most challenging task consisted in collecting investment data for pre-WW1 period, which are needed for the estimations conducted in Section 4. For many countries, we could rely on Taylor (2002) and Jones and Obstfeld (1997). To these data we added information from Hofman (2000) and partly relied on Maddison (1992). A detailed data appendix is available from the authors on request. A word of caution relating to the historical data is warranted. All national accounts data, especially aggregate investment data, are later reconstructions from economic historians, partly inferred from rough proxies for output and investment activity from directly measured data such as coal consumption and railroad construction. We will have to interpret the results of this study carefully, but working with the best available data we still think that an investigation of the historical period can be instructive.

In total, we have assembled data for 24 countries over 1880-1913 covering more than 80 percent of global GDP in 1914.[5] The historical dataset comprises of European countries (Austria-Hungary, Denmark, France, Germany, Greece, Italy, Norway, Portugal, Russia, Spain), North American and Australasian settler economies (Canada, USA, Australia, New Zealand) as well as South American (Argentina, Brazil, Chile, Mexico, Uruguay), Asian (Ceylon, India, Japan) and Middle Eastern (Egypt, Turkey/Ottoman Empire) economies. As usual with historical data not all series are available for all countries across the different specifications in what constitutes an unbalanced panel.

A final word on the comparability of the two samples: in the historical era our sample consists of about ten high income countries (out of 24 in total) from the core economies in Europe and the rich European offshoots. In the modern period we count 20 high income OECD countries and 35 developing countries resulting in a very similar proportional representation of rich and poor countries. Moreover, in both periods the average income level of the high income countries was about 3-4 times that of the poor economies. The summary statistics of both the contemporary and the historical dataset can be read from Table 1.

(table 1 about here)

Table 1: Summary statistics*

1975-2002						
Variable	Groups	N	Mean	Std. Dev.	Min	Max
Per capita GDP growth**	56	336	0.097	0.011	-0.032	0.048
Initial income	56	336	5980	7625	552	32227
Capital inflows / GDP	56	318	0.056	0.075	0.000	0.575
Schooling	56	324	0.408	0.740	-2.244	1.748
Inflation**	56	330	0.536	1.010	-0.016	10.115
Government balance / GDP	56	291	-0.034	0.043	-0.201	0.162
Population growth	56	336	0.016	0.010	-0.002	0.057
Trade / GDP	56	334	0.554	0.436	0.110	3.218
Investment ratio / GDP	56	336	0.240	0.069	0.109	0.601
1880-1913						
Variable	Groups	N	Mean	Std. Dev.	Min	Max
Per capita GDP growth**	24	163	0.053	0.074	-0.357	0.347
Initial income	24	168	1185	1157	299	5581
Capital inflows / GDP	24	168	0.021	0.031	0.000	0.258
Schooling	24	168	0.751	0.130	0.243	0.866
Inflation**	24	164	0.014	0.040	-0.084	0.351
Government balance	24	164	0.010	0.030	-0.071	0.180
Population growth	24	168	0.013	0.008	-0.005	0.047
Trade / GDP	24	168	0.171	0.098	0.009	0.488
Investment / GDP	17	104	0.146	0.055	0.024	0.283

*Non-overlapping 5-year averages.
**Logarithmic change over 5-year period.

3. Financial integration and economic growth

First, we briefly turn to the cross-sectional analysis for the modern period to see if we can reproduce the findings of the study by Edison et al. (2002). Our model (I) is an exact reproduction of their specification. The only difference is that we work with data for two additional years. Table 2 displays the results for entire sample. Regression (1) neatly reproduces the finding in Edison et al. (2002). In the cross section there appears to be a positive growth impact of financial openness. Also the other regressors seem well behaved. There is evidence of conditional convergence, indicated by the negative sign of the coefficient on initial income. The schooling variable carries the expected sign,while inflation enters negatively. In regressions (2) and (3), using the different models discussed above, the control variables remain well behaved. However, the financial openness variable sees both its statistical significance and its impact on the growth rate greatly reduced once trade openness and population growth are controlled for. It no longer exerts significant influence on the per capita growth rate.

Yet, as discussed above, a cross-sectional analysis using Ordinary-Least-Squares (OLS) regressions could be biased if capital inflows were themselves influenced by the growth rate. The system GMM estimation helps to address this potential fallacy to the degree possible. The results of the estimation are also presented in Table 2 and are consistent with much of the recent literature. Regression (4) again confirms the results of Edison et al. (2002) as it lends no clear support to the idea of an effect of financial openness on growth: countries that were more open to the international capital market did not, *ceteris paribus*, grow faster than more closed economies. While the variable has the correct sign, the effect is economically unimportant and statistically only weakly significant. Moreover, the robustness checks we perform in regressions (5) and (6) urge caution with regard to the economic effects of financial openness. According to these results, in the past two decades financially more

integrated countries did not, on average, grow faster than closed economies. While it remains possible that a growth effect of financial integration is conditional on certain types of capital flows or on third factors such as the institutional framework or wealth levels (Edwards, 2001; Alfaro et al., 2003), exploring these issues in greater detail is a topic for further dedicated research.

(table 2 about here)

Table 2: International financial integration and economic growth – modern sample

Dependent variable: growth rate of real GDP per capita						
Regression	1	2	3	4	5	6
	OLS	OLS	OLS	System GMM	System GMM	System GMM
Financial integration	*0.017***	*0.010*	*0.004*	*0.003**	*0.001*	*0.001*
	(0.041)	*(0.295)*	*(0.621)*	*(0.070)*	*(0.665)*	*(0.829)*
Initial income	-0.244**	-0.246**	-0.354***	-0.070**	-0.058*	-0.080**
	(0.022)	(0.026)	(0.000)	(0.045)	(0.089)	(0.012)
Initial schooling	0.277**	0.294**	0.226**	0.063	0.055	0.042
	(0.026)	(0.021)	(0.032)	(0.124)	(0.178)	(0.186)
Government balance	0.008	0.007	0.019	0.004	0.004*	0.005*
	(0.682)	(0.723)	(0.317)	(0.123)	(0.092)	(0.062)
Inflation	-0.021**	-0.016	-0.005	-0.018*	-0.011	-0.006
	(0.047)	(0.191)	(0.680)	(0.070)	(0.231)	(0.426)
Openness		0.122	0.234**		0.004*	-0.041***
		(0.297)	(0.040)		(0.096)	(0.001)
Population growth			-0.252***			-0.005*
			(0.000)			(0.055)
Constant	2.447***	2.007*	2.939***			
	(0.009)	(0.058)	(0.002)			
Observations	54	54	54	260	268	265
Groups	54	54	54	54	54	54
R^2 (adj.)	0.34	0.35	0.52			
Arellano-Bond test for second order autocorrelation (p-value)				0.34	0.47	0.85
Hansen test (p-value)				0.54	0.91	0.91

Note on regressions (1-3): OLS estimation with heteroskedasticity robust standard errors. P-values are given in row below coefficients.

Note on regressions (4-6): Robust one-step Arellano-Bond system GMM dynamic panel estimation. P-values are given in second row. For the system GMM estimation we treated international financial integration and openness as potentially endogenous, initial income as predetermined, population growth as well as the time dummies (not reported) as exogenous, and all other variables are weakly exogenous. We use the entire lag structure for instrumentation, i.e. starting from the (t-2) lag of the difference for the levels equation, and the (t-1) lag of the level for the difference equations.

Was the relationship between financial integration and economic growth different in the first era of global finance? Table 3 presents the results of identical cross-sectional regressions using data for years 1900-1913 (regressions 7-9). We chose to examine at the 1900-1913 sub-period first, because we dispose of alternative measures for financial integration (gross investment stocks and changes in net international investment positions) and an entirely balanced sample only for this sub-period. Robustness test for the entire period (1880-1913) and individual decades will be presented below. In contrast to the mixed evidence we found for the contemporary period, the cross-sectional analysis of the historical period yields a less ambiguous relationship between financial openness and growth: capital inflows over GDP appear as a significant growth driver in all three cross-sectional regressions.

As mentioned above, we can substantiate the idea that financial integration had a statistically significant effect on economic growth before WW1 by testing two alternative measures for the degree of financial openness which are derived from different sources. First, economic historians have compiled statistics for gross inward foreign investment stocks of a large number of countries in two benchmark years (1900 and 1913). The first estimates for Britain's foreign investment stocks in other countries were already presented on the eve of WW1 by Paish (1911). Other scholars have revised and extended these data to provide a comprehensive picture of the patterns of financial linkages before the war (Feis, 1965; Woodruff, 1966). This allows us to test whether the change in gross foreign liabilities (relative to GDP) between the two benchmark estimations for 1900 and 1913 was positively associated with higher growth rates. Second, we can make use of estimates for pre-War current account movements by Jones and Obstfeld (1997) and Taylor (2002). Looking at the cumulative change in net international investment (relative to GDP) we can gauge the robustness of the results from the detailed gross flow data from Stone (1999). The results are also shown in table 3 (regressions 10-11). Both alternative measures for the degree of

international financial integration are also significantly correlated with GDP per capita growth after controlling for other growth drivers. They also remained highly significant when we included additional regressors such as the degree of trade openness and population growth (not reported). With the basic idea of a positive relation between financial integration and growth being corroborated in the cross-section, the dynamic panel estimation will show whether these findings remain robust.

(table 3 about here)

Table 3: International financial integration and economic growth: historical period

Dependent variable: growth rate of real GDP per capita								
Regression	7	8	9	10	11	12	13	14
	inflow/GDP	*inflow/GDP*	*inflow/GDP*	*gross int'l investment/GDP*	*net int'l investment/GDP*	*inflow/GDP*	*inflow/GDP*	*inflow/GDP*
Period	1900-1913	1900-1913	1900-1913	1900-1913	1900-1913	1880-1913	1880-1913	1880-1913
Estimation	OLS	OLS	OLS	OLS	OLS	System GMM	System GMM	System GMM
Financial integration	*0.268***	*0.279***	*0.175**	*0.003***	*0.002***	*0.040***	*0.043***	*0.039***
	(0.003)	*(0.001)*	*(0.072)*	*(0.005)*	*(0.003)*	*(0.018)*	*(0.002)*	*(0.027)*
Initial income	-0.016	-0.011	-0.025	-0.024	0.033	-0.033*	-0.021	-0.019
	(0.702)	(0.775)	(0.569)	(0.603)	(0.477)	(0.095)	(0.332)	(0.338)
Initial schooling	0.062**	0.060**	0.067**	0.026	0.027	0.026**	0.022**	0.021*
	(0.032)	(0.022)	(0.025)	(0.358)	(0.317)	(0.014)	(0.031)	(0.051)
Inflation	0.164*	0.160	0.165*	0.249**	0.178*	0.000	0.000	0.000
	(0.066)	(0.089)	(0.078)	(0.011)	(0.076)	(0.718)	(0.933)	(0.965)
Government balance	0.014	0.014	0.003	0.044	0.027	-0.023	-0.023	-0.023
	(0.640)	(0.669)	(0.928)	(0.232)	(0.372)	(0.152)	(0.153)	(0.156)
Openness		-0.594	0.201				-0.009	-0.006
		(0.742)	(0.926)				(0.503)	(0.657)
Population growth			0.209					-0.409
			(0.286)					(0.551)
Constant	-0.213	-0.228	-0.208	-0.299	-0.321			
	(0.311)	(0.267)	(0.301)	(0.209)	(0.175)			
Observations	23	23	23	21	21	156	156	156
Groups	23	23	23	21	21	24	24	24
R2 (adj.)	0.50	0.50	0.52	0.62	0.60			
Arellano-Bond test for second order autocorrelation (p-value)						0.19	0.18	0.14
Hansen-test (p-value)						0.89	0.89	0.90

Notes on regression (7-9): OLS estimation with heteroskedasticity robust standard errors. P-values are given in row below coefficients. Financial integration variable is gross inflow of capital from the UK in regressions (7-9) from Stone (1999), change in gross foreign liabilities to GDP between 1900 and 1914 in (10) from Feis (1965), Woodruff (1966) and Twomey (2000). In (11), the financial integration variable is the change in net international investment to GDP between 1900 and 1913/14 which was derived from current account balances in Jones and Obstfeld (1997), Taylor (2002) and international investment positions from Twomey (2000).
To provide comparability and avoid estimation bias arising from missing data for some countries in some years, the sample is restricted to a balanced sample for 1900-1913. See table 4 for various sub-periods.

Regressions (12) to (14) display the results of the system GMM panel estimation for the historical period. We start again by running the base model from Edison et al. (2002) in regression (12). It yields a highly significant effect of financial openness on growth. Recall that the identical regression for the modern period failed to exhibit a robust link. The other control variables are well-behaved and enter with the 'right' sign. In other words, there is evidence of conditional convergence and higher levels of schooling were associated with higher growth rates at conventional significance levels.

This analysis rests on the largest possible historical dataset covering 156 observations for 24 countries. Using annual data (instead of the non-overlapping five year averages employed here) would increase the number of observations and allow for a more efficient instrument estimation, but we stick to general practice of looking at five year averages to avoid purely cyclical fluctuations in the data and alleviate data quality issues. To test the robustness of our benchmark result, we also estimate the two additional models discussed above. Regressions (13) and (14) add openness to trade and population growth to the basic model. The addition of further variables does not affect the significance levels of the financial openness variable which remains highly significant. Yet statistical and economic significance do not always go hand in hand. How large were the economic benefits of integration into the international capital market in the first era of financial globalization? At average regressor values we find that, all else equal, a 1 percentage point increase (decrease) in the capital inflows to GDP ratio increased (decreased) GDP per capita growth over the period by 0.1 percentage points. The gains were maybe not extremely large, but substantial.

Two potentially critical factors might impede on the robustness of our results. First, we have so far restricted the cross-sectional regression to the years 1900-1913 as this is the only sub-period for which we have a complete set of variables and alternative measures of the degree of financial integration. Second, recent research has stressed the importance of institutions for economic growth. The omission of an indicator for the quality of institutions

would be particularly problematic if capital flows were merely a proxy for institutional quality. In this case, our financial integration measure would pick up the superior growth performance associated with a better institutional environment, but not the effect of capital flows per se.

In the robustness analysis shown in table 4 we proceed in three steps. We first look at the entire historical period. In order to work with a meaningfully large country sample, we must opt for a more parsimonious specification and leave out inflation as one of the policy variables we control for. The simple reason is that inflation data only start in the 1890s for a number of countries. However, inflation was generally low and stable during the gold standard era – annualizing at less than 2 percent for the entire sample – so that the negative growth effects stemming from monetary instability in developing countries are likely to have been less of an issue in the historical period. Regressions (15-16) demonstrate that the correlation between growth and financial integration remains statistically significant over the entire 1880-1913 period and across a broader set of 30 countries. The coefficient on financial integration even indicates that the growth benefits of financial integration increased over a longer time-horizon.

Second, we address the question whether the inclusion of a proxy for the quality of the institutional framework significantly alters the results. We use the settler mortality data introduced to empirical growth research by Acemoglu et al. (2001) and amended by Albouy (2006) as a proxy.[6] The idea here is that Europeans exported "good" institutions to regions of low settler mortality and set-up institutions that were not conducive to growth in areas where settlement was risky. Regression (17) demonstrates that better institutions as measured by lower settler mortality were indeed statistically significantly associated with higher growth rates confirming the importance of institutions. Yet more importantly for the purpose of our study, the inclusion of institutions does not reduce the positive correlation of financial integration and economic growth.

Third, we try to disentangle the temporal dynamics of the financial integration-growth nexus. Importantly, Bordo and Meissner (2006) have argued that the financial crises of the 1890s hit financially more open economies more strongly and reduced much of the potentially positive effects of financial integration. In regressions (18-20), we divide the entire period into three decades (1880-1890, 1890-1900, 1900-1913). Unlike Bordo and Meissner (2006) we do not introduce a crisis dummy directly but test for the net effects of financial integration over the entire decade. Our estimations confirm the finding by Bordo and Meissner (2006). In the crisis decade of the 1890s there was no net growth effect of financial integration. The coefficient on financial openness actually turns negative. All else equal, financially more closed economies did better in this decade of turbulence. However, in both the 1880s and the 1900s financial integration reappears as a significant growth driver.

(table 4 about here)

Table 4: Robustness tests

Dependent variable: growth of real GDP per capita						
Regression	15	16	17	18	19	20
Period	1880-1913	1880-1913	1880-1913	1880-1890	1890-1900	1900-1913
Estimation	OLS	OLS	OLS	OLS	OLS	OLS
Financial integration	*0.396***	*0.458**	*0.501***	*0.154***	*-0.046*	*0.201***
	(0.030)	*(0.051)*	*(0.016)*	*(0.041)*	*(0.828)*	*(0.027)*
Initial income	-0.173	-0.181*	-0.268**	-0.128*	0.013	-0.010
	(0.127)	(0.092)	(0.021)	(0.081)	(0.865)	(0.855)
Human capital	0.121***	0.123***	0.529**	0.114**	0.032	0.071**
	(0.004)	(0.002)	(0.017)	(0.011)	(0.223)	(0.034)
Inflation				-0.585	-0.021	0.159
				(0.182)	(0.849)	(0.114)
Government balance	-0.054	-0.047	-0.042	0.105	0.061	0.013
	(0.810)	(0.834)	(0.829)	(0.471)	(0.213)	(0.702)
Population growth		-0.070	-0.036	0.075	-0.523	0.146
		(0.723)	(0.856)	(0.832)	(0.485)	(0.471)
Settler mortality			-2.248**	0.071	-0.005	0.023
			(0.045)	(0.171)	(0.925)	(0.608)
Constant	0.719	0.792	2.860**	-0.132	0.060	-0.426
	(0.225)	(0.173)	(0.012)	(0.798)	(0.920)	(0.282)
Number of observations	30	30	30	18	23	23
Adjusted R2	0.289	0.293	0.375	0.569	0.315	0.537

Note: OLS estimation with heteroskedasticity robust standard errors. P-values are given in row below coefficients.

Summing up this part of our exploration, we have run identical regressions on the contemporary and historical datasets to examine the financial integration-growth nexus. Our regressions provide evidence that before WW1 international financial integration was associated with higher economic growth, whereas there is not much evidence of a comparable effect in the past three decades. This finding appears robust to a number of different specifications, the inclusion of a proxy for the quality of institutions and across different sub-periods (with the exception of the crisis decade of the 1890s). The next step will be to look more closely at the channels through which financial integration promoted economic growth in the historical period in an attempt to provide a temptative explanation for the differences between now and then. The following part aims to shed more light on these issues.

4. Financial integration and investment

To explain the findings of the preceding section, we need to take a step back and look at the theoretical channels through which openness to the international capital market can boost economic growth. It would seem that at least one of these channels operated in the historical period, but is no longer present today.

Theory suggests distinguishing between two main channels through which integration with the international financial market can enhance economic growth: an investment channel and a TFP channel. The investment channel refers to net inflows of foreign savings which augment domestic investment and thereby increase the rate of economic growth. In open-economy versions of neoclassical growth models, such net capital flows would take place between capital-rich and capital-poor countries induced by the higher marginal productivity of capital in poor economies. But financial integration could also spur growth through the TFP

channel. This could be the case if openness to the international financial market leads to a better utilization of domestic savings and efficiency gains in the domestic financial sector. Even without net movements of capital, increased domestic competition, technology transfers, policy discipline or institutional improvements associated with integration into the global market could exert a positive influence on the growth rate (Levine, 2006).

Empirically, these issues are not easily disentangled. However, we shall try to shed some light whether the growth effects of international financial integration in the first era of globalization came through the investment channel or the efficiency channel. Our strategy is as follows. We first look at the TFP channel. If the growth effect of financial integration operates through efficiency gains, our proxy for the degree of financial integration can be expected to show positive growth effects above and beyond its potential effect on investment. In other words, if the TFP channel is important, the financial integration variable will be significant in a regression alongside the investment rate. On the other hand, if the investment channel is the main channel through which financial integration spurs economic growth, we would expect to see a significant effect of financial integration on the rate of aggregate investment. Because of collinearity, however, such an effect could be difficult to discover in a standard growth regression containing both investment and financial integration as right-hand side variables.[7] But in this case, we would still expect to find an effect in a separate regression of aggregate investment on the financial integration proxy. This then calls for a two-step strategy. We will first estimate a basic neoclassical growth model along the lines of Barro and Sala-I-Martin (1992) and Mankiw, Romer and Weil (1992). In such a standard model, GDP per capita growth is a function of the initial income level, the investment ratio, a human capital proxy and population growth. We will then add the measure of financial openness as a further regressor alongside the investment ratio. If the TFP channel is operative, financial integration will still be significant.

Profiting from our two datasets, we can again perform identical regressions on contemporary and historical data to ensure comparability and robustness. As mentioned above, we are aware of potential weaknesses in the historical national accounts data, especially the investment rate. To check the sensitivity of the results to the inclusion of more uncertain data, we run identical regressions for the entire dataset (23-24) and a higher quality dataset excluding the more arguable estimates for Latin American economies and the European periphery before 1900 (25-26). Table 5 presents the results of the system GMM panel estimation.

Two key insights emerge immediately from the regressions. First, the basic neoclassical model seems to work reasonably well for both periods. There is evidence of conditional convergence and of an important role played by physical capital investment and human capital. Second, in both periods there is little direct evidence that international financial integration increased TFP[8]: the financial openness measure is insignificant and has no discernible effect as soon as physical investment is controlled for. Also in the historical period, there is little direct evidence of a TFP effect as shown by regressions (24) for the entire sample and (26) for the higher quality subsample.

(table 5 about here)

Table 5: Financial integration and the TFP channel

Dependent variable: growth rate of real GDP per capita						
Regression	21	22	23	24	25	26
Period	modern	modern	historical	historical	historical	historical
Estimation	System GMM	System GMM	System GMM	System GMM	System GMM	System GMM
Financial integration		*0.134*		*0.005*		*-0.011*
		(0.321)		*(0.831)*		*(0.271)*
Initial income	-0.027*	-0.041*	-0.029**	-0.022**	-0.021**	-0.022*
	(0.082)	(0.082)	(0.017)	(0.040)	(0.045)	(0.084)
Investment ratio	0.028***	0.025***	0.030*	0.022	0.019*	0.021
	(0.000)	(0.000)	(0.056)	(0.128)	(0.074)	(0.100)
Human capital	0.036	0.052*	0.020**	0.020**	0.019*	0.019*
	(0.109)	(0.094)	(0.022)	(0.019)	(0.065)	(0.097)
Population growth	-0.007	-0.009	0.461	0.164	-0.688	-0.437
	(0.533)	(0.474)	(0.434)	(0.814)	(0.213)	(0.466)
Observations	330	303	120	120	94	94
Groups	55	53	20	20	15	15
Arellano-Bond test (AR2)	0.95	0.63	0.31	0.27	0.41	0.49
Hansen test	0.61	0.94	0.99	0.99	0.99	0.99

Note on regressions (21-26): Robust one-step Arellano-Bond system GMM dynamic panel estimation. P-values are given in second row. For the system GMM estimation we treated international financial integration and investment as potentially endogenous, initial income as predetermined, population growth as well as the time dummies (not reported) as exogenous, and all other variables are weakly exogenous. We use the entire lag structure for instrumentation, i.e. starting from the (t-2) lag of the difference for the levels equation, and the (t-1) lag of the level for the difference equations. Estimation 25 and 26 are for a restricted high quality sub-sample of investment.

What about the investment channel? It is clear from the regressions above that once the investment ratio is controlled for, financial integration is no longer associated with higher growth rates. However, a clear-cut interpretation is compromised by the potential collinearity of investment and financial integration. In the modern period, the inclusion of the financial integration proxy has no discernible effect on the investment coefficient (21-22). For the historical sample, however, the inclusion of the financial integration proxy markedly reduces the coefficient estimate for investment in (24) and decreases its significance in (26). While this could be a sign of interaction between the two, a dedicated analysis of the impact of

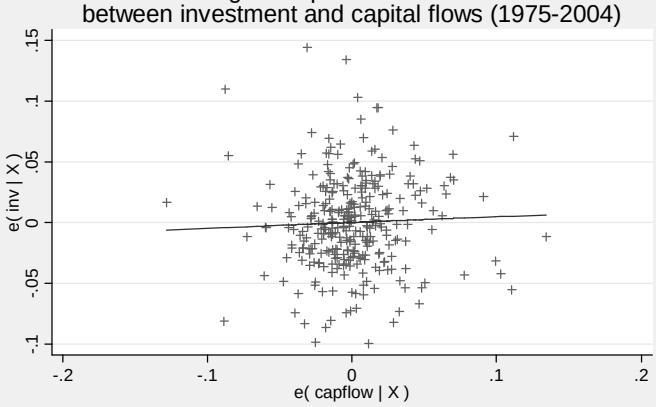
financial integration on aggregate investment should be able to answer the underlying question whether countries in the historical period were savings-constrained so that an exogenous increase in available resources boosted the investment rate. In other words, we have to ask whether there is evidence for a positive correlation between financial integration and aggregate investment in the historical period.

In order to gain clarity, we run a final set of regressions exploring the link between financial integration and aggregate investment in both periods. Barro (1991, 2000) has pioneered cross-country regressions of the determinants of aggregate investment. In these regressions, investment is a function of initial income and human capital as well as additional controls such as political instability and inflation.[9] Basic neoclassical reasoning suggests that the impact of initial income should be negative since a low level of per capita income reflects a low capital intensity which, in turn, implies a high rate of return to fixed capital formation. Human capital should exert a positive influence as human capital and physical capital are complementary inputs in production (Lucas, 1990).

Adding a proxy variable for the degree of international financial integration, we ask whether the receiving economies in either period were savings-constrained (so that inflowing resources boosted the investment rate) or investment-constrained in the sense that an (exogenous) increase in available resources did not lead to higher investment (Rodrik and Subramanian, 2008). We start by looking at two scatter-plots showing the partial correlation between investment and financial integration from a standard fixed-effects panel model. The two charts clearly suggest that financial integration was more closely associated with higher investment in the historical period.

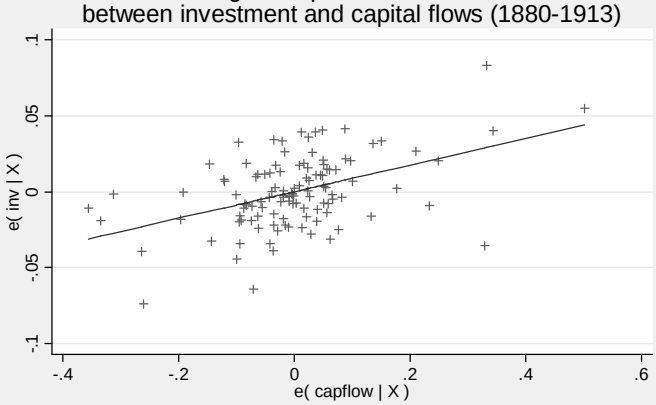
(Charts 1 and 2 about here)

Figure 1: partial correlation
between investment and capital flows (1975-2004)



Note: partial correlation between the investment ratio and financial integration controlling for country fixed effects, initial income, human capital, and time dummies

Figure 2: partial correlation
between investment and capital flows (1880-1913)



Note: partial correlation between the investment ratio and financial integration controlling for country fixed effects, initial income, human capital, and time dummies

In table 6 we turn again to a system GMM estimation using lags of differences and levels as instruments for potentially endogenous variables. The results remain essentially the same across different specifications: there is at best a small positive but at conventional confidence levels statistically insignificant effect from financial integration on aggregate investment in the modern period. In the historical period the correlation is considerably closer. The financial openness measure is statistically significant at the 5 and 1 percent levels in both specifications (29-30). In other words, before 1914 countries that opened up to the international capital market saw, on average, an increase in domestic investment. Higher

investment in turn led to higher growth. This investment channel effect is no longer discernible in the contemporary data (27-28).[10]

Here is our reasoning in a nutshell: in the pre-1914 financial globalization receiving economies were saving-constrained in the sense of Rodrik and Subramanian (2008), i.e. there were many profitable investment opportunities but a lack of funds to finance these projects at reasonable cost. Financial integration increased aggregate investment and thereby increased the rate of economic growth. Capital-poor countries were able to tap the global pool of savings, become net recipients of capital and thereby remove a binding constraint on growth. Yet in the past three decades, there is little evidence that openness to global capital increased investment activity. Foreign savings might have displaced domestic savings or gone into consumption instead of investment, but a net positive effect on investment is not evident. As Obstfeld and Taylor (2004) noted, globalization today is more about diversification finance than about development finance. It is possible although beyond the scope of this paper to show that institutions, political stability and poor country policies play a crucial role for this difference.

(table 6 about here)

Table 6: Financial integration and investment

Dependent variable: investment / GDP				
Regression	27	28	29	30
Period	modern	modern	historical	historical
Estimation	System GMM	System GMM	System GMM	System GMM
Financial integration	*0.990*	*0.364*	*0.718***	*0.974****
	(0.370)	*(0.711)*	*(0.046)*	*(0.008)*
Initial income	-0.315**	-0.245*	-0.115	-0.427
	(0.020)	(0.053)	(0.795)	(0.262)
Human capital	0.265*	0.350	0.186	0.355
	(0.086)	(0.101)	(0.555)	(0.231)
Political risk	-0.050*	-0.025	-0.496***	-0.684***
	(0.052)	(0.348)	(0.009)	(0.004)
Inflation		-0.030		-0.016
		(0.343)		(0.234)
Observations	286	281	119	109
Groups	50	50	20	18
Arellano-Bond test (AR2)	0.49	0.84	0.14	0.18
Hansen test	0.49	0.15	0.33	0.58

Notes: Robust one-step Arellano-Bond system GMM dynamic panel estimation. P-values are given in second row. For the system GMM estimation we treated international financial integration and human capital as potentially endogenous, initial income as predetermined, political risk and the time dummies (not reported) as exogenous, and all other variables are weakly exogenous. We use the entire lag structure for instrumentation, i.e. starting from the (t-2) lag of the difference for the levels equation, and the (t-1) lag of the level for the difference equations.

5. Conclusion

Considerable empirical effort has been devoted to investigate whether international financial integration boosts economic growth. The overall result of studies focused on the post-WW2 period was rather sobering. Financial openness did not seem to accelerate economic development in a meaningful way. However, substantial narrative evidence from economic history suggests that European capital made an important contribution to economic growth of peripheral economies in the first era of financial globalization before WW1. Does the history of the first globalization show that financial integration can be a powerful force for global growth and convergence?

The empirical results presented in this paper suggest that financial integration was correlated with economic growth before WW1, but is no longer today. We arrived at this result by intentionally relying on models and techniques employed before to ensure the comparability with previous research. We also looked at the channels through which financial integration affected growth and provide evidence that in the first era of financial globalization openness to the global capital market increased aggregate investment. Today, opening up to the international capital market is no longer systematically associated with net inflows of foreign savings that increase the domestic capital stock. Countries can be highly open to the international market, measured by the amount of foreign capital crossing their borders, but the net effect on domestic investment is minimal.

We are not the first to note these differences in the patterns of financial globalization. In an important study, Obstfeld and Taylor (2004) compared international capital flows in the first era of global finance and today. On the basis of an analysis of net foreign asset positions in the world economy, they concluded that the contemporary financial globalization was characterized by "diversification finance" as opposed to "development finance" before WW1. Also the Feldstein-Horioka (1980) test indicates that net capital movements were considerably higher in the historical era (Bayoumi, 1990; Eichengreen, 1990; Taylor, 1996; Jones and Obstfeld, 1997). Most international capital flows were hence one-directional in the sense that they went from the rich core to the poor periphery. In contemporary globalization gross capital mobility does not translate into substantial net capital flows between rich and poor economies (Obstfeld and Taylor, 2004; Schularick, 2006).

Mark Twain once famously remarked that history does not repeat itself, but that it rhymes. In the light of our analysis, a key lesson from the first era of financial globalization is that capital market integration *can* play an important role for economic growth, but only under important side conditions. Examining more closely why the patterns of capital flows in the world economy have changed markedly from one globalization to the next (despite similar

differences in capital stocks per capita between rich and poor countries), is a promising avenue for future research.

7. Data appendix

a. Country samples

Modern sample		Historical sample	
Argentina	Kenya	Argentina	Italy
Australia	Korea	Australia	Japan
Austria	Lesotho	Austria	Mexico
Botswana	Malaysia	Brazil	New Zealand
Brazil	Mauritius	Canada	Norway
Canada	Mexico	Ceylon	Peru
Chile	Morocco	Chile	Portugal
China	Nepal	China	Russia
Colombia	Netherlands	Colombia	Serbia
Costa Rica	New Zealand	Denmark	Siam
Denmark	Norway	Egypt	Spain
Dominica	Pakistan	France	Sweden
Ecuador	Peru	Germany	Turkey
Egypt	Philippines	Greece	Uruguay
El Salvador	Portugal	India	United States
Finland	Singapore		
France	Spain		
Germany	Sri Lanka		
Greece	Swaziland		
Guatemala	Sweden		
Haiti	Syria		
India	Thailand		
Indonesia	Tunisia		
Ireland	Turkey		
Israel	United Kingdom		
Italy	United States		
Japan	Uruguay		
Jordan	Zimbabwe		

b. Variables and sources

Descriptor	Variable	Description	Data sources
Per capita GDP growth	"dgdp"	Change in GDP per capita over period (ln)	World Bank (2006)
			Maddison (1995, 2001)
Initial income	"gdpcap"	GDP per capita at beginning of period (ln)	World Bank (2006)
			Maddison (1995, 2001)
Capital inflows / GDP	"ifi"	Inflows of capital over GDP	IMF, World Bank (2006)
			Stone (1999)
	'"dfigdp"	Change in gross foreign liabilities (reg. 10)	Feis (1965), Twomey (2000), Woodruff (1966)
	"dfigdp2"	Change in net international investment position (reg. 11)	Jones and Obstfeld (1997), Taylor (2002), Twomey (2000)
Human capital	"edu"	Years of secondary schooling	Barro and Lee (2000)
		Primary school enrollment rate	Clemens and Williamson (2004)
Investment / GDP	"inv"	Gross capital formation to GDP over period (ln)	World Bank (2006)
			Jones and Obstfeld (1997), Taylor (2002), Maddison (1992), Hofman (2000)
Inflation	"cpi"	Change in consumer price index over period	World Bank (2006)
			Obstfeld and Taylor (2003)
Government balance	"def"	Budget deficit in percent of GDP over period	World Bank (2006)
			Ferguson and Schularick (2006), Obstfeld and Taylor (2003)
Population growth	"dpop"	Population growth over period	World Bank (2006)
			Maddison (1995, 2001)
Trade / GDP	"open"	Exports and imports over GDP (ln)	World Bank (2006)
			Ferguson and Schularick (2006)

Settler mortality	"settler"	Settler mortality rates (ln)	Acemoglu, Johnson and Robinson (2001)
Political risk	"polrisk"	Political instability	Country Risk Guide (2006)
		Domestic or external war	Correlates of War Data (2000)

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[1] See the discussion in Edison et al. (2002).

[2] It can be argued that additional policy variables are appropriate if international financial integration is measured on a quantitative ("de facto") basis as policy performance is a factor determining the attractiveness of a country to foreign investors.

[3] As an intermediate step two-stage instrumental variables regressions are possible, too (Edison et al., 2002). Yet just like other authors, we found it hard to define suitable instruments as neither geographical distance nor legal origin seem particularly suitable, and opted for the system GMM estimation.

[4] We use the Stata "xtabond2" routine implemented by Roodman (2005) with the one-step robust estimator as in Bond et al. (2001) as it is more reliable for inference in finite samples.

[5] Among the major economies, the only large country missing in the historical sample is China for which GDP series do not exist. In a more parsimonious specification, we can even work with data for 30 countries. See below.

[6] As there are no settler mortality data for the core nations in "old" Europe such as France and Germany, we assumed that the institutional framework was equally good as in the European settler economies across the Atlantic.

[7] If financial openness affects growth predominantly through the investment channel, we might not see a significant effect in a regression alongside the investment ratio because of collinearity – but we might be able to discover a relationship in a separate regression. This is the reason why most researchers including Edison et al. (2002) did not include the investment

ratio as a regressor in their models. In the first part, we aimed at reproducing these studies and hence did not dwell on this distinction. It is important, however, in the context of exploring the different channels through which financial integration spurred growth.

[8] This seems true if financial integration is defined in a broad and unconditional sense. Previous studies have found some evidence for positive effects of partial liberalization of equity markets (Bekaert et al., 2001).

[9] Such a specification appears for the fundamental determinants of cross-country investment rates over the medium and long run. We are not interested in the cyclical variation of investment, which would call for a Tobin's q approach. Rodrik (1998) employs a similar model to assess the partial correlation between the investment rate and capital-account liberalization. We use the Correlates of War Database for domestic and international war as a proxy for political instability in regressions (27-30). For the modern period, we used the political instability measure from the International Country Risk Guide (2006).

[10] In our analysis, we focus on changes in growth rates over 5-year sub-periods. Our estimation results can therefore be interpreted as evidence for a temporary growth impact of financial openness. A temporary growth effect is indeed consistent with the neoclassical model. Assuming that the autarky interest rate in a country is above the interest rate in the world capital market, financial integration can be expected to result in a temporary increase in the growth rate of GDP per capita (Henry, 2007). The increase in the investment rate, however, is expected to be permanent (Rodrik and Subramanian, 2008). We estimated a simple cross-sectional regression relating the change in investment to the change in capital flows over the entire 1880-1913 period. The relation between financial openness and investment was significantly positive. This can be seen as an indication for a permanent increase in the investment ratio.