Financial Integration, Investment, and Economic Growth. Evidence From Two Eras of Financial Globalization

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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. Based on a newly compiled comprehensive data set, we test if capital market integration had a positive impact on economic growth in the first era of global finance. Using identical empirical models and techniques as contemporary studies, we find a significant growth effect which remains robust to a number of alternative specifications. To account for this finding, we show that a key difference between now and then is that opening up to the international market led to massive net capital movements and higher investment in the historical period, but no longer does so today. Unlike its historical predecessor, the current wave of financial globalization has not incited large investment augmenting flows of capital from rich to poor economies.

Keywords: capital market integration; economic growth; financial globalization; economic history.

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

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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 financially more open economies grow faster than closed ones, 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 1880-1913. Our study brings together two recent strands in research in international economics. First, we contribute to the literature which focuses 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 are 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 put forward. Financial integration does not have 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 remained 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 long-term 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), 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) and Edison et al. (2004), we thus content ourselves with this brief overview.

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 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 in a different field: we aim to benchmark the present to 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 1870-1914. 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 1880-1914 covering 24 countries from all world regions that accounted for more than 80 percent of world output at the time. We use 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 had a statistically significant effect on growth in the first era of global finance. In addition, we can exclude that this finding is driven by different estimation techniques or model specification as we first run our regressions on a dataset for 1980-2002 and 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 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 WW1. 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 can show that before 1914 opening up to the international capital market went hand in hand with higher domestic investment. Today, changes in identical measures for financial integration are essentially uncorrelated with changes in domestic investment. Our

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

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.

The structure of this paper is as follows. In the following section, we briefly review the literature, present the empirical strategy and introduce our new dataset. The next part presents the estimation results for the contemporary and historical periods which show a robust growth effect only for the historical period. The fourth part shows that before 1914 integration with the international capital market led to higher aggregate investment, whereas no clear relation between financial openness and aggregate investment can be found in the modern period. In the fifth section we relate these findings to previous research that has pointed to sizeable net flows of capital from rich to poor in the first and low net flows in the second era of financial globalization. We also reconsider Lucas' original numerical exercise to explain the markedly different patterns of international capital flows in the two periods. The last part 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 whether there is 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 use 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 for the important contribution European capital made to 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 growth driver. 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 typically regressed the growth rate of real per capita GDP growth on a measure for the degree of financial openness plus a vector of control variables which proxy fundamental growth drivers and the initial income level as a convergence term. 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 improve greatly as it would show a high degree of openness to international capital. However, in their comprehensive study Edison et al. (2002) test virtually all available indicators, rule-based as well as quantitative, but find no robust evidence for a positive growth effect of either set of indicators for the period 1980 to 2000. In this study we use a measure for financial openness that was also employed by Edison et al. (2002) – gross flows of foreign direct and portfolio investment over GDP. Edison and his coauthors did not find a robust growth effect of financial integration when testing this indicator. Our choice is also data-driven. For the first period of globalization gross flows of capital from the United Kingdom are the measure for which we possess the most detailed data which we can back-up by looking at changes in gross foreign capital stocks and changes in net international investment positions calculated from current account balances. Formal capital controls were unheard of in this period.

The second main issue in which contemporary studies differed relates to the specification of the empirical model. Some authors 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) 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.

We also follow the literature in carrying out the empirical analysis via two different econometric approaches (Edison et al., 2004; Eichengreen and Leblang, 2003; Fratzscher and Bussière, 2004). First, starting at the lower end of econometric sophistication, 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 move to the higher end of econometric techniques by running a system generalized methods of moment (GMM) panel estimation.[3] This two-step

[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.

approach allows to combine the advantages of both estimators. While the results of the cross-section are easy to interpret, this relatively simple method could bias the findings due to the omission of country fixed effects, a low number of observations, and possible endogeneity of explanatory variables. It should be noted that, in the present context, the system GMM estimation is particularly helpful because it 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 for 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:

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

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

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

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] Such an application of the system GMM estimator for empirical growth analysis is in line with previous studies. We examine and report the validity of the internal instruments (Hansen test) and tested for serial correlation of the error term. A detailed econometric discussion can be found in Bond et al. (2001), Edison et al. (2002), and Fratzscher and Bussière (2004).

Our data for the contemporary period come from commonly used sources such as the World Development Indicator database (World Bank, 2004). 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 54 countries for the contemporary period (1980-2002) covering a large number of developing and developed 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. The data were collected by the authors both from primary and secondary sources. All real GDP data come from the seminal work of Angus Maddison (Maddison 1995, 2001). Capital flow data are taken from the work by 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 very 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 part 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 Hofmann (2000) and partly relied on unpublished worksheets by Maddison (1992). A detailed data appendix is available from the authors on request.

In total, we have assembled data for 24 countries over 1880-1914 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. The summary statistics of both the contemporary and the historical dataset can be read from Table 1.

[4] We use the Stata "xtabond2" routine implemented by Roodman (2005) with the one-step robust estimator. Two-step estimation yielded analogous results.

[5] Among the major economies, the only large country missing in the historical sample is China for which GDP series do not exist.

Table 1: Summary statistics*

1980-2002						
Variable	Groups	N	Mean	Std. Dev.	Min	Max
Per capita GDP growth*	56	336	0.091	0.011	-0.032	0.048
Initial income	56	336	5980	7625	552	32228
Capital inflows	56	317	0.054	0.085	0.000	0.472
Schooling	56	330	0.408	0.740	-2.244	1.748
Inflation*	56	330	0.536	1.010	-0.016	10.115
Government balance	56	291	-0.034	0.043	-0.201	0.162
Population growth	56	336	0.016	0.010	-0.002	0.057
Openness	56	334	0.554	0.436	0.110	3.218
Investment ratio	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	160	0.053	0.074	-0.357	0.347
Initial income	24	164	1185	1157	299	5581
Capital inflows	24	164	0.021	0.031	0.000	0.258
Schooling	24	164	0.075	0.013	0.024	0.087
Inflation*	24	164	0.014	0.040	-0.084	0.351
Government balance	24	160	0.001	0.003	-0.007	0.018
Population growth	24	164	0.013	0.008	-0.005	0.047
Openness	24	164	0.171	0.098	0.009	0.488
Investment ratio	19	104	0.146	0.055	0.024	0.283

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

3. Empirical results

First, we briefly turn to the cross-sectional analysis for the period 1980-2002 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 the 54 countries in the 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. But 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 insignificant. 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 also controlled for. It no longer exerts significant influence on the per capita growth rate. Given the apparent sensitivity to changes in the specification, we share the conclusion of Edison et al. that it does not seem justified to speak of a robust relationship between the two.

Yet, as discussed above, a cross-sectional analysis using 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. 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 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, also 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 an important topic for further dedicated research.

Table 2: International financial integration and economic growth, 1980-2002

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*	*0.000*
	(0.041)	*(0.295)*	*(0.621)*	*(0.100)*	*(0.665)*	*(0.829)*
Initial income	-0.244**	-0.246**	-0.354***	-0.040	-0.058*	-0.080**
	(0.022)	(0.026)	(0.000)	(0.237)	(0.089)	(0.012)
Initial schooling	0.277**	0.294**	0.226**	0.034	0.055	0.042
	(0.026)	(0.021)	(0.032)	(0.421)	(0.178)	(0.186)
Inflation	0.008	0.007	0.019	0.004	0.059***	0.077***
	(0.682)	(0.723)	(0.317)	(0.195)	(0.003)	(0.000)
Government balance	-0.021**	-0.016	-0.005	-0.020**	-0.011	-0.006
	(0.047)	(0.191)	(0.680)	(0.033)	(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	265	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	0.87	0.84

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 the historical period (regressions 7-9).[6] The cross-sectional results

[6] To avoid estimation bias we have to restrict the cross-sectional analysis to the period for which we dispose of an entirely balanced sample, i.e. 1900-1913. Separate results for the earlier decades and an unbalanced sample for 1880-1913 provided identical results – with the exception of the crisis decade of the 1890's during which there were no clear benefits from financial integration. See also Bordo and Meissner (2006).

suggest that the answer should be affirmative. The results can be directly compared to those in Table 2. In contrast to the mixed evidence we found for the contemporary period, the cross-sectional analysis of the historical period yields a much less unambiguous relationship between financial openness and growth: capital inflows over GDP appear as a significant growth driver in all three cross-sectional regressions. Given the limited number of observations we are inclined not to read too much evidence into the cross-sectional results for the historical period. However, they certainly lend some support to the idea of a more robust relationship between financial integration and growth in the first era of globalization.

We can further substantiate the idea that financial integration has 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 Sir George Paish (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 1914 was positively associated with higher growth rates. Second, we can make use of estimates for pre-War current account movements stemming from the studies by Obstfeld and Jones (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). In the regressions, these different measures for the degree of international financial integration are significantly positively correlated with higher GDP per capita growth after controlling for other growth determinants. They also remained highly significant when we included additional regressors such as the degree of trade openness and population growth. 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: International financial integration and economic growth, 1880-1913

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*
	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*	-0.02	-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)						0.23	0.19	0.13
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 valuable 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. Separate results for an unbalanced sample for 1880-1913 (for 7-11) and for individual decades provided identical results - with the exception of the crisis decade of the 1890's.

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 with data for the years 1980-2002 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 0.3 percentage points. The gains were hence not extremely large, but substantial.

Summing up, we have run identical regressions on the contemporary and historical datasets to examine the financial integration-growth nexus. Our regressions indicate that before WW1 international financial integration spurred economic growth, whereas there is no robust evidence of a comparable effect in the past two decades. Importantly, this finding appears robust to a number of different specifications. How can we explain that financial integration contributed to growth in the first era of financial globalization, but no longer does so today? The following part aims to answer this question.

4. Financial integration and aggregate investment

The main result of the preceding empirical section was that openness to the international financial market promoted economic growth in the first era of globalization but fails to do so in modern times. In order to explain this phenomenon, 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 channels through which integration with the international financial market can enhance economic growth: an investment channel and a total factor productivity (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 the latter. 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, a few additional estimations can shed some light on the question if 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 estimate a basic neoclassical growth model along the lines of Barro and Sala-I-Martin (1992). In such a standard growth model, GDP per capita growth is a function of the initial income level, the investment ratio, a human capital proxy and population growth. In a second step, we add the measure of financial openness as a further regressor. If financial openness affects growth predominantly through the investment channel, there is little reason to expect it to be significant in a regression alongside the investment ratio – but we might still see some interaction between the investment ratio and the financial openness measure. If financial integration affects growth through the TFP channel, we would expect to see a significant effect above and beyond the investment channel. In this case, the financial openness variable should be significantly positive in the regressions even after the inclusion of the investment ratio.[7]

Profiting from our two datasets, we can again perform identical regressions on contemporary and historical data to ensure comparability and robustness. In addition, to our knowledge this is the first time that a basic neoclassical growth regression is run with pre-WW1 data, so that such an estimation is interesting in its own right. Table 4 presents the results of the system GMM panel estimation for both periods.

[7] This presumed collinearity is the reason why most researchers, including our benchmark study by 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.

Table 4: Standard neoclassical growth model, 1880-1913

Dependent variable: growth rate of real GDP per capita				
	1980-2002	1980-2002	1880-1913	1880-1913
Regression	15	16	17	18
Initial income	-0.030	-0.027	-0.025	-0.030**
	(0.137)	(0.475)	(0.213)	(0.016)
Investment ratio	0.273***	0.284**	0.027*	0.015
	(0.000)	(0.000)	(0.082)	(0.425)
Human capital	0.033	0.037	0.027	0.027
	(0.122)	(0.265)	(0.126)	(0.162)
Population growth	-0.009	0.000	0.415	0.913
	(0.541)	(0.990)	(0.628)	(0.156)
Financial integration		*-0.115*		*-0.001*
		(0.267)		*(0.924)*
Observations (groups)	330	313	114	114
Groups	55	54	19	19
Arellano-Bond test (p-value)	0.84	0.74	0.74	0.72
Hansen-test (p-value)	0.22	0.65	0.94	0.94

Note: p-values are given in row below coefficients; for the system GMM estimation we treat international financial integration and average investment as potentially endogenous, initial income is 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 where appropriate, 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.

A number of interesting general observations emerge from the estimation results. First, the basic neoclassical model seems to work well for both periods. The regression confirms conditional convergence and an important role played by physical capital investment and human capital. Second, the implied speed of convergence is relatively similar in both eras – approximately 5 percent annually. This result is in line with standard estimates on the rate of convergence (Bond et al., 2001). Third, it is interesting to observe that – unlike today – population growth enters the historical regressions with a positive sign, possibly an indication of the beneficial effects of large-scale migration to the New World before WW1 (Taylor and Williamson, 1994).

Looking at the channels through which financial integration influences growth, it is evident from regression (16) that there are no signs for a TFP channel in the contemporary sample.[8] The financial openness measure is insignificant and has no discernible effect on any of the other parameter estimates. Also in the historical period, there is little evidence of a TFP effect as shown by regression (18). However, with regard to the investment channel a number of interesting observations emerge from the regressions. Once the investment ratio is explicitly controlled for, financial integration is no longer associated with higher growth rates. However, it can also be seen that in contrast to the contemporary period the interaction between the financial openness measure and the investment ratio is rather large. If we include the financial openness measure in regression (18), the coefficient of the investment ratio is almost cut in half and the significance falls below conventional thresholds. This suggests a fair degree of collinearity between the two in the historical period, but not in the contemporary sample.

[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, f.i. of equity markets (Bekaert et al., 2001).

Did international financial integration in the historical period increase growth through the investment channel? This would explain the seemingly paradoxical result that capital flows appeared as a significant factor for economic growth in regressions (12) to (14) above, but turn insignificant once aggregate investment is explicitly controlled for in regression (18). In order to gain clarity, we run a final set of regressions investigating the link between financial integration and aggregate investment. The key issue here is to see if we can find a significant relation between the degree of financial openness and the investment ratio while controlling for other potentially important determinants. In other words: did higher financial integration lead to higher investment?

The fixed-effects panel regressions presented in Table 5 show a close relation between financial integration and investment in the first era of financial globalization. This link can no longer be found in the modern data.[9] For each period, we present three different specifications. First, we regress aggregate investment (over five year averages) on initial income, the financial integration measure and country-specific effects. The second specification adds two policy variables that are likely to have a bearing on aggregate investment, namely inflation and budget balances. The third model adds a human capital proxy.

But all three regressions (22-24) essentially tell the same story: before WW1, a higher degree of financial openness was closely correlated with increases in aggregate investment. The financial openness measure is statistically significant at the 1 percent level in all three models. In other words, countries that opened up to the international market saw an increase in domestic investment. Higher investment in turn led to higher growth (as regression 17 above demonstrated). This effect is no longer discernible in the contemporary data (19-21). It would seem that pre-1914 financial globalization – almost in a neoclassical textbook-like way – enabled countries to tap the global pool of savings, become net recipients of capital and thereby removed a binding constraint on growth.

[9] Henry (2000) argued that investment rates rose following stock market liberalizations. While our country sample is broader, it is also conceivable that stock market liberalization has more direct beneficial effects than increases in overall financial openness.

Table 5: Determinants of aggregate investment

Dependent variable: investment /GDP						
	1980-2002	1980-2002	1980-2002	1880-1913	1880-1913	1880-1913
Regression	19	20	21	22	23	24
Financial integration	*0.017*	*0.034*	*0.023*	*0.087****	*0.091****	*0.092****
	(0.710)	*(0.587)*	*(0.713)*	*(0.000)*	*(0.000)*	*(0.000)*
Initial income	-0.038***	-0.034***	-0.016	0.102***	0.096***	0.102***
	(0.000)	(0.004)	(0.240)	(0.000)	(0.000)	(0.000)
Government balance		0.000	0.000		-0.033*	-0.034*
		(0.691)	(0.836)		(0.088)	(0.079)
Inflation		0.004	0.004		0.003**	0.003**
		(0.179)	(0.213)		(0.014)	(0.017)
Human capital			-0.021**			-0.011
			(0.033)			(0.611)
Constant	0.570***	0.526***	0.387***	-0.639***	-0.594***	-0.553***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Observations	317	273	268	111	101	101
Groups	55	55	55	19	17	17

Note: fixed-effects panel estimation using 5-year non-overlapping periods. P-values are given in the row below coefficients. See text.

5. Now and then: financial globalization and the Lucas paradox

In the first era of financial globalization, openness to the global capital market had a positive effect on the growth rate of an economy through its impact on 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 effect on domestic investment is minimal, presumably because outflows offset the positive contribution of inflows.[10] Consequently, the growth effects of international financial integration are much more muted.

We are not the first to arrive at the conclusion that the patterns of capital market integration differ markedly between the two globalizations. In an important study, Obstfeld and Taylor (2004) have compared international investment in the first era of global finance and today. They concluded on the basis of their analysis of net foreign asset positions in the world economy that the contemporary financial globalization was characterized by "diversification finance" as opposed to "development finance" before WW1:

> *Today's foreign asset distribution is much more about asset "swapping" by rich countries – diversification – than it is about the accumulation of large one-way positions—a critical component of the development process in poorer countries in standard textbook treatments.* (Obstfeld and Taylor, 2002, p. 55)

In the first era of financial globalization, gross capital flows gave rise to substantial net capital movements. In the contemporary globalization gross capital mobility is equally high,

[10] Outflows can take various forms, among them capital flight and the accumulation of reserve assets.

but it does not translate into substantial net capital flows between rich and poor economies. 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). Put differently, in the pre-1914 capital market boom, there was little difference between gross flows and net flows. Most international capital flows were one-directional in the sense that they went from the rich core to the poor periphery (Obstfeld and Taylor, 2004; Schularick, 2006). As a result, the Lucas paradox of missing rich-poor capital flows was less pronounced.[11]

How can we account for these differences between now and then? Why was capital market integration before 1914 marked by massive net capital flows and noticeable growth effects while the contemporary globalization is characterized by diversification finance, limited net capital movements and a muted growth impact? In the following, we aim to sketch a potential theoretical explanation for this phenomenon, yet given the complexity of the matter we consider this merely a first step to guide future research on the divergent patterns of international capital movements in two eras of globalization.

Why are net capital flows so small in spite of substantial differences in capital endowments between countries? Lucas (1990) has argued that differences in the relative human capital endowments could be an explanation for the absence of substantial net capital movements from rich and poor countries during the post-WW2 period. In this line of thought, physical capital is in fact comparably unproductive in poor countries because complementary factors such as human capital are missing. This perspective can be referred to as the "unproductive capital view".

The alternative position, the "capital market failure view", stresses factors such as distortionary policies, asymmetric information, and unenforceable property rights as the main explanation for the Lucas paradox. This strand of the literature in particularly highlights the quality of institutions – such as the protection of creditors and the enforcement of property rights across international borders – as a necessary condition for net investment flows and the buildup of sizeable net foreign asset positions (Shleifer, 2003). Creditors need to be well protected to be willing to take the risk of large one-way bets on the economic development of foreign countries. In a related line of thought, it has been argued that it was precisely the secure institutional framework that was responsible for the large amount of international lending in the first globalization (Ferguson, 2003).[12]

Recent empirical studies have indeed confirmed the important contribution made to development finance before 1913 by legal and political arrangements that increased creditor protection (Mitchener and Weidenmier, 2005; Ferguson and Schularick, 2006). Similar factors have also been made responsible for the paucity of rich-poor capital flows in the

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[11] While Clemens and Williamson (2004) found that the Lucas paradox was as strong before 1914, other studies have questioned the robustness of this result after controlling for outliers and pointed to a much less pronounced "wealth bias" in international capital flows before WW1 (Obstfeld and Taylor, 2004; Schularick, 2006). This also mirrors the earlier findings by Edelstein (1982) who had shown substantial net investment flows from Europe to overseas areas.

[12] A similar argument can also be made with regard to the international monetary system. The historical period under study spans the time of the international gold standard. This monetary system produced a comparably stable internal (inflation rate) and external (exchange rate) monetary environment. Despite the fact that the gold standard did not give rise to strict price stability, as argued by Cooper (1982), it created stable monetary conditions across the world economy, especially in contrast to the experiences of many developing countries in the post-WW2 period.12 In addition, the frequency of exchange rate crises was lower during that time (Eichengreen, 2002). The monetary stability of the gold standard era can be thought of as having had economic effects similar to higher property rights protection, because it reduced the risks associated with the effects of unexpected inflation or unanticipated exchange rate changes.

contemporary globalization. The comprehensive cross-country study by Alfaro et al. (2003) concludes that weak institutional quality was the most important variable for explaining the paucity of rich-poor capital flows between 1971 and 1998. More recently Ju and Wei (2006) have shown how the quality of property rights can be a cause for the observed paradoxes in global capital flows. As a matter of fact, Lucas himself proposed that institutional factors could play an important role (1990, pp. 94/95):

> *Until around 1945, much of the Third World was subject to European-imposed legal and economic arrangements, and had been so for decades or even centuries. A European lending to a borrower in India or the Dutch East Indies could expect his contract to be enforced with exactly the same effectiveness and by exactly the same means as a contract with domestic borrowers.*

In the following, we reconsider Lucas' (1990) numerical exercise using data both for the historical and modern periods. In so doing, we aim to understand the changing patterns of global capital flows between rich and poor. The exercise will demonstrate that it is possible – within the Lucas framework – to explain why rich-poor capital movements are negligible in modern times but were substantial before WW1. It will be seen that the combination of differences in human capital endowment and property rights protection can account for the different patterns of capital flows in both eras of financial globalization.

Our overall approach is as follows. Allowing for differences in human capital and different levels of property rights protection we can calculate the implied rate of return differential between rich and poor economies in both the modern and historical period. For this exercise we will use the data from our data set. However, while we can use actual data for the modern period, we need to work with a counterfactual rate of return differential for the historical period. The latter is calculated on the basis of hypothetical output differentials.[13] The reason for this procedure is that in the historical period substantial net capital movements between rich and poor are likely to have lowered or even eliminated the initial gap in the rate of return between rich and poor economies. We therefore need to construct a counterfactual situation assuming rate of return equalizing rich-poor capital movements have not taken place.[14]

Assume, following Lucas (1990), that the production technology is of the following shape $Y = A(hL)^{1-\alpha} K^{\alpha} h^{\gamma}$, where Y is final output, $A > 0, 0 < \alpha < 1, \gamma > 0$ denote constant technology parameters, h is human capital per capita, L (unskilled) labor, K represents the stock of physical capital, and h^{γ} captures a positive production externality. Output per effective labor, $y := Y/(hL)$, is given by $y = Ak^{\alpha} h^{\gamma}$, where $k := K/(hL)$. The competitive and private rate of return on capital may then be expressed as $r = \mu\alpha A k^{\alpha-1} h^{\gamma}$, where $0 < \mu < 1$ captures the degree of property rights protection. By solving $y = Ak^{\alpha} h^{\gamma}$ for k and

[13] A similar procedure has been recently applied in a historical study focusing on the effect of capital movements and mass migration on wage differentials by Hatton and Williams (2006).

[14] The counterfactual rate of returns are determined as follows: First, we adjust per capita incomes (taken from our data set) of the average poor and rich economy by the output effect of rich-poor capital movements. This is based on the following assumptions: (i) the stock of physical capital in poor countries owned by foreign investors averaged to 100% of GDP in poor countries (Twomey, 2000; Schularick, 2006, Table 6) and (ii) a capital-output ratio of three. Second, we combine these income data with data on human capital and property rights protection to reconsider the Lucas exercise as explained (a technical appendix is available from the authors).

plugging the result into the previous expression for the rate of return, we get $r = \mu\alpha A^{1/\alpha} y^{(\alpha-1)/\alpha} h^{\gamma/\alpha}$. Hence, the ratio of the rate of returns on capital in poor and rich countries may be expressed as follows:

$$\frac{r_p}{r_r} = \frac{\mu_p}{\mu_r}\left(\frac{y_p}{y_r}\right)^{(\alpha-1)/\alpha}\left(\frac{h_p}{h_r}\right)^{\gamma/\alpha} = \frac{\mu_p}{\mu_r}\left(\frac{Y_p/L_p}{Y_r/L_r}\frac{h_r}{h_p}\right)^{(\alpha-1)/\alpha}\left(\frac{h_p}{h_r}\right)^{\gamma/\alpha}, \qquad (5)$$

where the subindex p stands for "poor" and r for "rich". Equation (5) shows that the rate of return differential, r_p / r_r, depends on the relative protection of property rights, μ_p / μ_r, on relative output per capita, $(Y_p / L_p)/(Y_r / L_r)$, and on the relative stocks of human capital per capita, h_p / h_r.

The underlying data set is shown in Table 6. The technology parameters (α and γ) are standard. The relative property rights protection parameter for the modern period, $\mu_p^m / \mu_r^m = 0.5$, is motivated by data on property rights protection in 1995, as provided by the Heritage Foundation (2006).[15] For the historical period we set $\mu_p^h / \mu_r^h = 0.9$. This value is motivated by and accounts for the observation that, as argued above, the differential in property rights protection between the average poor and the average rich country appeared much lower during the pre-WW1 period (Ferguson, 2003; Ferguson and Schularick, 2006).[16] The ratios "relative human capital" and "relative GDP per capita" are taken from our data sets, which underlie the empirical estimations presented above.

Table 6: Baseline set of parameters

Technology	$\alpha = 0.3$; $\gamma = 0.15$;
Relative property rights	$\mu_p^m / \mu_r^m = 0.5$; $\mu_p^h / \mu_r^h = 0.9$;
Relative human capital[a]	$h_p^m / h_r^m \cong 0.41$; $h_p^h / h_r^h \cong 0.45$
Relative GDP per capita[a]	$(Y_p^m / L_p^m)/(Y_r^m / L_r^m) \cong 0.25$ (modern period; actual)
	$(Y_p^h / L_p^h)/(Y_r^h / L_r^h) \cong 0.31$ (historical period; hypothetical)[b]

(*a*) The underlying data set is described in Table 1. For each period, the entire sample has been split into two subsamples. All economies with an average GDP per capita above the average level are classified as "rich", the rest as "poor". (*b*) The construction of the hypothetical relative GDP per capita is described in a technical appendix available from the authors.

[15] More precisely, the average property rights index for all OECD countries in 1995 divided by the average property rights index for all remaining economies amounts approximately to 0.5. This is, of course, only a preliminary indication since the calculation of the arithmetic mean for this ordinal indicator is not without problems.

[16] The factors behind the higher degree of property rights protection are, as outlined above, the presence of colonial Empires fostering legal and political integration as well as "financial policing" of the periphery by the Great Powers.

We can now evaluate equation (5) using data from our data set. For the modern period, this exercise yields a rate of return differential of about 1.01. This rather insignificant rate of return differential indicates that the economic incentives for capital flows from rich to poor countries were relatively small over the past 25 years. This is due to two opposing and largely offsetting forces: on the one hand, the lower GDP per capita in poor countries, indicated by $(Y_p^m / L_p^m)/(Y_r^m / L_r^m) \cong 0.25$, together with diminishing returns to capital creates a positive rate of return differential. On the other hand, the smaller amount of human capital (per capita), as expressed by $h_p^m / h_r^m \cong 0.41$, as well as the comparably weak property rights protection in poor countries, captured by $\mu_p^m / \mu_r^m = 0.5$, reduce the rate of return differential to negligible levels.[17]

Evaluating equation (5) with data for the historical period, employing adjusted output figures, yields a counterfactual rate of return differential of 1.44. In other words, assuming no rich-poor capital flows, the rate of return on capital earned in the typical poor economy was about 44 percent higher than the rate of return on capital in the typical rich economy. Even if transaction costs and risk aversion are taken into account, this difference remains substantial.[18] What are the reasons behind this rather significant rate of return differential when contrasted with the modern period? On the one hand, the lower gap in per capita incomes, $(Y_p^h / L_p^h)/(Y_r^h / L_r^h) \cong 0.31$ instead of $(Y_p^m / L_p^m)/(Y_r^m / L_r^m) \cong 0.25$, depresses the rate of return differential. This effect is dominated, however, by higher relative property rights protection, captured by $\mu_p^h / \mu_r^h = 0.9$, and a larger relative human capital endowment, indicated by $h_p^h / h_r^h \cong 0.45$; notice that the rate of return differential is convex in relative human capital endowment. Moreover, the rate of return differential could have been even larger if the impact of mass migration during the pre-WW1 period (Hatton and Williamson, 2006, Table 1; Ferguson, 2003, pp. 11/12) was taken into account. In this case, there are reasons to assume that the human capital proxy underestimates the human capital endowment in poor countries before 1914.

In sum, our historical version of Lucas' numerical exercise suggests that there were clear incentives for net capital movements from rich to poor countries in the first era of globalization: the rate of return differentials between rich and poor economies were pronounced in the historical period. At the same time, this exercise also helps to explain the absence of economic incentives for net capital flows in the modern period if rate of return differentials are much smaller.

6. Summary and 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

[17] This result is qualitatively identical to Lucas (1990, p. 94), who compares the United States to India. We reach the same conclusion despite the fact that we take property rights differentials into account. The reason is that we assume $h_p^m / h_r^m \cong 0.41$, whereas Lucas employs $h_p^m / h_r^m \cong 0.2$. Moreover, Lucas sets $(Y_p^m / L_p^m)/(Y_r^m / L_r^m) \cong 0.067$, whereas we have $(Y_p^m / L_p^m)/(Y_r^m / L_r^m) \cong 0.25$.

[18] Using actual output data for the historical period yields a rate of return differential of 1.04. This is further compatible with our reasoning since there were no impediments to capital mobility during the first era of globalization such that capital movements eliminated substantial rate of return differentials.

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 prove that financial integration can be a powerful force for global growth and convergence?

The empirical results presented in this paper show that financial integration spurred economic growth before WW1, but no longer does so today. It is important to note that in this paper we intentionally relied on models and techniques employed before to ensure the comparability of our results with previous research. In other words, it is the data not the model or estimation issues that drive the findings. Our preliminary explanation for the differences between now and then is straightforward. In the first era of financial globalization, opening up to the international capital market was closely associated with net inflows of foreign savings. Foreign savings increased the domestic investment ratio and thereby boosted economic growth. Today, the data show no robust relation between changes in an economy's openness to international capital flows and subsequent changes in aggregate domestic investment. This result mirrors previous research which had shown that – unlike today – the first financial globalization was marked by a high degree of net capital movements from rich to poor countries (Obstfeld and Taylor, 2004; Schularick, 2006).

In the last part of the paper we aimed to sketch a potential explanation for the different patterns of capital flows within the simple framework originally presented in Lucas' (1990) seminal paper. Taking relative human capital endowments and property rights protection into account, the simple model suggests that rate of return differentials between rich and poor economies could have been much more substantial before WW1 than they are today. This in turn could have provided the economic incentives for large-scale net capital movements from rich to poor economies. Differentials in relative human capital endowment and property rights protection between rich and poor economies could, therefore, be an important part of an explanation for the divergent patterns of capital flows in the two eras of financial globalization. Mark Twain famously said that history does not repeat itself, but 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 to enahnce economic growth, but the proper conditions need to be in place.

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