Why Doesn't Capital Flow from Rich Countries to Poor Countries? An Empirical Investigation *

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Abstract

We examine the role of the different explanations for the lack of flows of capital from rich countries to poor ones – the Lucas paradox – in an empirical framework. Broadly, the various theoretical explanations for this paradox include differences in fundamentals that affect the production structure versus capital market imperfections. First, we briefly test the predictions of the neoclassical model by performing a calibration exercise using U.S. states, EU and OECD countries. Then, we perform cross-country regressions using a sample of 50 countries. Our empirical evidence shows that for the period 1970-1998 institutional quality is the most important variable explaining the Lucas paradox. We also run regressions with a smaller set of countries for the period 1918-1948. We find that in that earlier period human capital was the determining factor for the lack of flows, as Lucas suggested.

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1 Introduction

In his 1990 paper, Robert Lucas used a standard neoclassical model to show that, contrary to what theory predicts, not enough capital flows from rich to poor countries. Under the assumptions that countries produce the same goods by using the same constant returns to scale production function and homogeneous factors - capital and labor - differences in income per capita are due to differences in capital per worker. Thus, if capital were allowed to flow freely, the expected value of investment in any location should be the same. However, in his now classic example, Lucas compares the U.S. and India in 1988 and finds that the marginal product of capital in India was about 58 times that of the U.S. He questions the validity of the assumptions that give rise to these differences in the marginal product of capital and he asks what assumptions should replace these? According to Lucas, this is the central question of economic development.

In very broad terms, the main theoretical explanations for the Lucas paradox can be grouped into two categories: international capital market failures and differences in fundamentals that lead to differences in the productivity of capital. For fundamentals, Lucas (1990) argues that omitted factors of production, such as human capital, may explain the lack of flows.[1] He also emphasizes the fact that countries may have different production functions and/or their production technology is characterized by a functional form that does not exhibit constant returns to scale.

For capital market imperfections, Lucas (1990) talks about the sovereign risk (in his terminology political risk), which he defines as the absence of a supranational legal authority that can enforce international borrowing agreements. However he argues that this cannot be an explanation before 1945 since during that time all of the third world was subject to European rules and European imposed legal arrangements due to colonialism. He argues that the explanation for the lack of flows before 1945 must be related to imperialism. Since Europe had control over the third world, they granted trading rights to monopoly companies.[2]

[1] In particular, he considers the differences in the quality of human capital and although this reduces the rate of return, the marginal product of capital in India would still be 5 times that of the U.S. He also explores the role of human capital externalities. He finds that accounting for human capital externalities do eliminate the predicted return differential. However his calculation assumed that the externalities from the country's stock of human capital accrue entirely to producers within the country, i.e., all knowledge spillovers are local.

[2] In theoretical terms, if we consider a large enough economy relative to the world, there can be monopoly

There have been various theoretical papers following Lucas (1990) that attempt to explain the Lucas Paradox. Some researchers have considered the effects of government policies and the role of institutions as explanations that create differences in the productivity of capital. Others put more emphasis on the role of international capital market imperfections, mainly sovereign risk and asymmetric information.[3]

Our objective in this paper is to investigate the role of these different theoretical explanations for the lack of flows of capital from rich countries to poor countries in an empirical framework.[4] To the best of our knowledge, this is the first systematic empirical study that investigates the role of different theoretical explanations for the Lucas paradox. We start by testing the predictions of the neoclassical model by performing a calibration exercise using U.S. states, the EU, and OECD countries. We find that the neoclassical model's prediction about the convergence of returns performs well when applied to the U.S. states. On the other hand, we cannot find similar convergence in returns among EU or OECD countries in spite of their similar development level. Then, we perform cross-country regressions to evaluate the role of the different explanations behind the lack of flows. We choose our independent variables according to the theoretical literature. Our empirical evidence shows that for the period 1970-1997, the most important variable in explaining the Lucas paradox is institutional quality. We find that this holds true even after controlling for other variables that might determine capital inflows and also after addressing concerns regarding endogeneity.

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power by a capital exporting economy to increase welfare by limiting capital flows in order to push interest rates in a favorable direction. However, Gordon and Bovenberg (1996) note that there is little evidence that large countries have restricting capital flows for this purpose.

[3]For the role of different production functions see King and Rebelo (1993); for the role of government policies see Razin and Yuen (1994). Gertler and Rogoff (1990) show asymmetric information problems may cause a reversal in the direction of the capital flows relative to the perfect information case. Imrohoroglu and Kumar (2002) show that intermediation costs can account for the fact that capital tends to flow to middle income countries rather than to poor countries. Gordon and Bovenberg (1996) develop a model with asymmetric information that explains the differences in corporate taxes and hence the differences in the real interest rates. Tornell and Velasco (1992) rationalize capital flight in poor countries in a model in which property rights are not well defined within the country.

[4]Obstfeld (1995) argues that the most direct approach would be to compare capital's rate of return in different countries. Unfortunately, it is difficult to find internationally comparable measures of after tax returns to capital. Mankiw et. al. (1992) argue that one can infer the marginal product of capital from real interest rates on financial assets only if investors are optimizing and capital markets are perfect. King and Rebelo (1993) took another approach to explore the role of each explanation by calibrating different models and exploring how much each can account for the paradox. However, some of the parameters needed for the calibration exercise have not been measured for most countries.

The work by North (1981), Hall and Jones (1999), Acemoglu, Johnson and Robinson (2001, 2002), Rodrik, Suramanian and Trebbi (2002), and others shows that countries with better institutions, rule of law, and secure property rights invest more in physical and human capital, use these factors more efficiently, and achieve a higher level of income. This paper suggests that institutional quality also shaped international capital flows in the period 1970-1998. We also run regressions with a smaller set of countries for the period 1918-1945. The purpose of this exercise is to see whether pre and post 1945 explanations differ, as Lucas claimed. We find that in that earlier period human capital explains the lack of flows, as Lucas suggested.[5]

The Lucas Paradox is related to some of the major puzzles in international macroeconomics and finance. These are the high correlation between savings and investment in OECD countries (the Feldstein-Horioka (1980) puzzle); the lack of investment in foreign capital markets by the home country residents (the home bias puzzle); the low correlations of consumption growth across countries (the lack of international capital market integration or risk sharing puzzle).[6] All of these puzzles deal with the question of the lack of international capital flows, more specifically the lack of international portfolio equity holdings. However, the empirical literature on these issues is extremely thin and not in agreement. In particular we still do not know what is more important in explaining the Lucas paradox: fundamentals or market failures? Recently two papers provide some indirect evidence. Manzocchi (1999) finds that growth models incorporating human capital as a production factor perform better than other models in accounting for the pattern of net capital flows over 1960-1982 in a sample of developing countries. Clemens and Williamson (2003), using data on British investment in 34 countries during 19th century, show that two thirds of the historical British capital exports went to labor-scarce New World and only about one quarter of it went to labor abundant Asia and Africa. They find that fundamentals, measured by schooling, natural resources and demographic factors, explain this fact.[7]

[5]Note that no data is available for the Bretton-Woods era; 1945-1970. This is an era of capital controls and restructuring.

[6]See Obstfeld and Rogoff (2000) for an overview of the major puzzles in international economies. In a recent paper Sorensen et. al. (2002) provide evidence that more international portfolio equity holdings are associated with greater international income and consumption insurance, linking the home bias and risk sharing puzzles.

[7]In the context of British investment experience before World War I, O'Rourke and Williamson (1999) found that capital chased after European emigrants and that both were seeking cheap land and natural resources.

The empirical literature has investigated the determinants of capital flows by focusing on the role of external (push) and internal (pull) factors. Calvo, Leiderman and Reinhart (1993, 1996) analyzed the role of external and internal factors in the surge of capital inflows to developing countries in the 1990s. They find that external factors, mostly low interest rates in the developed nations - in particular the U.S.- played an important role in accounting for this renewal of foreign lending to developing countries. The literature has paid particular attention to the determinants of foreign direct investment (FDI).[8] Edwards (1991), for example, using data for the developing countries between 1971 and 1981, finds that government size, openness, and political stability play an important role in determining the distribution of FDI. Wei and Wu (2001) find that corrupt countries receive substantially less FDI. In terms of the determinants of external debt for low and middle income countries between 1970 and 1995, Lane (2000) finds support for theories that emphasize imperfections in international credit markets. In a sample of bilateral cross-border equity flows between 14 developed countries for 1989-96, Portes and Rey (2002) find strong evidence that bilateral flows are dampened by informational asymmetries proxied by market size, efficiency of the transaction technology, and distance. These papers, however, have not paid particular attention to the role of institutions in shaping international capital flows.

The rest of the paper is organized as follows. Section 2 examines the standard neoclassical model and presents the main empirical implications in terms of the capital movements. Section 3 analyzes the rates of return and the capital movements implied by the model across the U.S. states, EU and OECD countries in a calibration exercise framework. Section 4 investigates the role of the different theoretical explanations of the Lucas Paradox in a cross-country regression framework. Section 5 concludes.

2 Conceptual Issues

Assume a small open economy where output is produced using capital (K) and labor (L) via a Cobb-Douglas production function.

$$Y_t = A_t F(K_t, L_t) = A_t K_t^{\alpha} L_t^{1-\alpha} \qquad F'(.) > 0, F''(.) < 0, F(0) = 0, \tag{1}$$

[8] See Reinhart and Rogoff (2002) for a review of the empirical literature on the determinants of FDI.

where Y denotes output and A is the productivity parameter. Agents can borrow and lend resources internationally. If all countries share a common technology, perfect capital mobility implies the instantaneous convergence of the interest rates. Hence, for countries i, j,

$$A_t f'(k_{it}) = r_t = A_t f'(k_{jt}), \tag{2}$$

where $f(.)$ is the net of depreciation production function in per capita terms. Investment in country i is given by,

$$I_t^i = K_t^{i*} - K_{t-1}^i, \tag{3}$$

where K_t^{i*} corresponds to the desired-optimal capital level in country i that solves the aggregate form of equation (2).[9] The property of diminishing returns to capital implies that in the transition process, resources will flow from capital abundant countries (low returns) to capital scarce countries (high returns). As Lucas (1990), King and Rebelo (1993) and others have noted, although widely used in the growth literature, the neoclassical model has counterfactual implications for rates of returns since not enough capital seems to flow to capital scarce countries and implied interest rates do not seem to converge.

We follow Lucas (1990) and the related literature in grouping the explanations for the Lucas paradox. The first group of explanations include differences in the *fundamentals* that affect the production structure and hence the productivity of capital. These can be omitted factors of production, government policies and institutions. All of these affect the marginal product of capital via the production function $F(.)$ or via the technology parameter A_t. The second group of explanations include the *capital market imperfections*, mainly the sovereign risk and the asymmetric information. Although the capital is productive and has a high return in developing countries, it does not go there because of the market failures.

[9] If we consider different currencies and inflation rates, foreign investment net of depreciation should adjust for changes in the price level and exchange rates as to achieve the desired-optimal capital level, $I_t = K_t^* - \frac{E_t P_t}{E_{t-1} P_{t-1}} K_{t-1}$, where E_t denotes the exchange rate in domestic currency per foreign currency, and P_t the domestic price level.

2.1 Fundamentals

2.1.1 Omitted Factors of Production

We can account for the lack of capital flows from rich to poor countries by looking at the existence of other factors - such as human capital, land and other non-tradable resources- that positively affect the returns to capital but are generally ignored in the conventional neoclassical approach.[10] For example, if human capital positively affects capital's return, less capital tends to flow to countries with lower endowments of human capital. Thus, if the production function is in fact given by

$$Y_t = A_t F(K_t, Z_t, L_t) = A_t K_t^{\alpha} Z_t^{\beta} L_t^{1-\alpha-\beta} \qquad F'(.) > 0, F''(.) < 0, F(0) = 0, \tag{4}$$

where Z_t denotes another factor that affects the productive process, then (2) is a misrepresentation of the implied capital flows. Hence for countries i and j, the true return is given by,

$$A_t f'(k_{it}, z_{it}) = r_t = A_t f'(k_{jt}, z_{jt}). \tag{5}$$

2.1.2 Government Policies

Government policies can be another impediment to the flows and the convergence of the returns. For example, differences across countries on government tax policies can lead to substantial differences in capital-labor ratios.[11] Also, inflation may work as a tax and decrease the return to capital.[12] In addition, the government can explicitly limit capital flows through the imposition of capital controls. We can model the effect of these government distortive policies by assuming that governments tax capital returns at a rate τ, which differs across countries. Hence, for countries i and j, the true return is given by,

$$A_t f'(k_{it})(1 - \tau_{it}) = r_t = A_t f'(k_{jt})(1 - \tau_{jt}). \tag{6}$$

[10] Clarida (1993) considers a framework in which public capital enters the private production function.
[11] See Razin and Yuen (1994).
[12] See Gomme (1993).

2.1.3 Institutions

As North (1995) argues, institutions provide the incentive structure of an economy.[13] The early work by North (1981) and more recent contributions, among others, by La Porta et al. (1998), Hall and Jones (1998), Acemoglu et al. (2001, 2002) argue that institutions - social, legal and political organizations of a society - shape its economic performance. Institutions are understood to affect economic performance through their effect on investment decisions by protecting the property rights of entrepreneurs against the government and other segments of society and preventing elites from blocking the adoption of new technologies. In general, weak property rights due to poor institutions can lead to lack of productive capacities or uncertainty in returns in an economy. Indeed, as Tornell and Velasco (1992) show, capital flight can be a response to a weak system of property rights in poor countries. Moreover, as Eichengreen (2003) notes, capital per labor ratios across countries might differ because of differences in cultural context and technological capacity.[14] We model these as differences in A_t, which would capture overall differences in efficiency in the production across countries.[15] Hence, for countries i and j, the true return is given by,

$$A_{it}f'(k_{it}) = r_t = A_{jt}f'(k_{jt}). \tag{7}$$

2.2 International Capital Market Imperfections

2.2.1 Sovereign Risk

Sovereign risk is defined as any situation in which a sovereign defaults on loan contracts with foreigners, seizes foreign assets located within its borders or prevents domestic residents

[13] North (1995) defines institutions as the humanly devised constraints that structure political, economic and social interaction. Institutions consist of both informal constraints (traditions, customs) and formal rules (constitutions, laws, property rights); they are the determinants of the political and social structure. There is an important distinction between policies and institutions. Policies are choices made within a political and social structure, i.e., within a set of institutions.

[14] Although technology is available to all countries, there might be barriers and limitations to adopt the existing technologies, or differences in the efficient use of the same technology; see Parente and Prescott (2000); Acemoglu (2002), Rajan and Zingales (2003).

[15] In defining the parameter A_t, we cannot differentiate between the effect of institutions on investment opportunities versus that of total factor productivity, TFP, (i.e., A_t defined as the incentive structure that allows for innovations versus A_t defined as a productivity index). Indeed, as Prescott (1998) argues, the efficient use of the currently operating technology or the resistance to the adoption of new ones depends on the "arrangements" a society employs.

from fully meeting obligations to foreign contracts.[16] The problem stems from the fact that repayment incentives for sovereign debts differ from those of a contract between two nationals because little can be used as collateral and the ability of a court to force a sovereign entity to comply is extremely limited. Whether sovereign debtors repay some of their debts because of the threat of future exclusion from international capital markets or direct imposition of penalties, in general, the optimal level of borrowing and lending - and thus convergence in returns - cannot be achieved.

2.2.2 Asymmetric Information

Asymmetric information problems can be ex-ante (adverse selection), interim (moral hazard) or ex-post (costly state verification). In general, under asymmetric information problems, the main implications of the neoclassical model in terms of convergence of returns and capital flows do not tend to hold. Gertler and Rogoff (1990) show in a model with moral hazard, where lenders cannot monitor borrowers' investment, that in poor countries per capita investment depends positively on per capita wealth. Likewise, Gordon and Bovenberg (1996) develop a model in which foreign investors - handicapped in terms of domestic market information- tend to under-invest. This leads to higher interest rates in capital importing countries.

3 Implied Capital Flows by the Neoclassical Model

We analyze the neoclassical model's predictions for capital flows for the case of the U.S. states.[17] This is a benchmark case because there are fewer restrictions on interregional capital movements than across countries. Hence, we can think of the U.S. states as 50 small

[16] Lucas (1990) discusses monopoly power and capital controls, i.e., distortive government policies under capital market imperfections since he combines domestic and international capital market imperfections. Following Obstfeld and Rogoff (1995) we considered international capital market imperfections only those related to sovereign enforcement problems or those based on information asymmetries. We put all domestic distortions under fundamentals since they affect capital's productivity.

[17] Barro and Sala-i-Martin (1995) shows that, in 1900, in the U.S., per capita income among states could differ up to 5 times. By 1990, the differences had been reduced to less than 2.5 times between the poorest and the richest state. Note that neither Barro and Sala-i-Martin (1995) nor the other studies that estimate β-convergence for the income per capita for the U.S. states, look at the convergence of returns and/or the capital flows as implied by the neoclassical model.

open economies, producing a single good with the same constant returns to scale production function, using capital and labor inputs. We have to opt for a calibration strategy instead of a regression strategy since, to the best of our knowledge, there is no comprehensive series on actual capital stocks or flows across U.S. states during a long time period.[18]

Reconsider the Cobb-Douglas production function as in (1) in per capita terms,

$$y_{it} = A_t k_{it}^{\alpha} \tag{8}$$

We assume all states, denoted by i, share the same production function and the depreciation rate. If capital flows freely across the U.S. states, then optimality conditions as in (2) imply that returns across states will converge. Consequently, for states i, j the marginal return to capital in terms of output per worker is,

$$\alpha A_t^{1/\alpha} y_{it}^{(\alpha-1)/\alpha} = r_t = \alpha A_t^{1/\alpha} y_{jt}^{(\alpha-1)/\alpha} \tag{9}$$

For given values of A_t and α we calculate the "implied rate of return," r_t for each state from (9), using State Personal Income in 1995 dollars.[19] We then averaged across states that belong to the same region to obtain the regional return. The regional average was calculated by averaging across all eight regions.[20] Figure 1a plots the rate of return for each region relative to the regional average from 1929-1999. At the beginning of the sample, the

[18]Romans (1953) estimates the manufacturing capital stock for U.S. regions for the years 1953 and 1959 using his own methodology. Connolly (2003), extending Romans methodology, calculates the manufacturing capital stock for each state for the periods 1880, 1900, 1920, 1950. As another approach, in a recent paper Kalemli-Ozcan, Sorensen and Yosha (2003b) use income-output ratio as a measure of interregional capital movements to study the determinants of capital flows and geographical ownership within U.S. states during 1960-2000.

[19]Following Lucas (1990), we use $\alpha = 0.4$ and $A_t = 1$. We also performed the exercise using different values and obtained similar qualitative results. See Data Appendix for the data and for the division of states among regions. We excluded the District of Columbia due to its outlier character. We omitted Alaska and Hawaii because these two states received their statehood in the 1950s.

[20]Note that we need to make further assumptions regarding the origin of the capital flows across U.S. states. If we assume the U.S. to be a closed economy, then one possibility is for all new capital to have been accumulated locally through a state's investments, in which case there would be no implied capital flows across states. Historically, U.S. current account balances and capital inflows as a percentage of GDP have been relatively low up to the late eighties, which validates the treatment of the U.S. as a closed economy. The other extreme possibility from the neoclassical open economy model is for all capital changes to represent inflows-outflows of capital. In order to simplify our analysis, we assume that all capital changes represent capital flows across states.

marginal product of capital was higher in the Southeast, Southwest and Plains, and lower in the Mideast, Farwest and New England. This is consistent with the historic evolution of the U.S. regions - the South was relatively poorer than the North and converged throughout the twentieth century, although differences persist.[21]

Consider now the role of human capital and assume the production function to be given by,

$$y_{it} = A_t k_{it}^{\alpha} h_{it}^{\beta} \tag{10}$$

where h_{it} represents the per worker human capital in each state, the marginal return to capital in terms of output per worker for states i, j is,

$$\alpha A_t^{1/\alpha} h_{it}^{\beta/\alpha} y_{it}^{(\alpha-1)/\alpha} = r_t = \alpha A_t^{1/\alpha} h_{it}^{\beta/\alpha} y_{jt}^{(\alpha-1)/\alpha} \tag{11}$$

Again for the same given values of A_t and α, we calculate the "implied rate of return," r_t for each state from (11), using State Personal Income and elementary and secondary school enrollment.[22] Figure 1b plots the rate of return for each region relative to the regional average. In this case, it is interesting to notice greater dispersion across the regions with respect to the previous case that does not consider differences in human capital.

EU and OECD Countries

We repeated the previous exercise for EU and OECD countries using data from OECD National Accounts. A priori, in this case, we expect cross-border differences to play a higher role compared to the U.S. states. We divided the EU and OECD countries into groups according to their relative income ranking in 1975. We calculated the marginal product of capital for each country using the country's GDP at 1995 dollars in a similar fashion we did for U.S states. For human capital we try both years of higher and total schooling. We then averaged across countries within the same group. We use same values for α and A_t.

[21] We assume migration does not have any role for the convergence of returns since the work by Barro and Sala-i-Martin (1991) shows that migration played a minor role in the convergence of per capita income across U.S. states.

[22] For the human capital we try both enrollment in regular public elementary and secondary schools and the total number of high school graduates adjusted by population. They give similar qualitative results.

EU and OECD countries give very similar results so we only report the ones with OECD countries. Figure 1c plots the returns to capital of each group relative to the average of all groups. There does not seem to be convergence across the groups in the period considered, 1981-1995. Again, as shown in Figure 1d, the differences across groups do not disappear once human capital differences are considered.

The calibration exercises show us that the neoclassical model's prediction about the convergence of returns is not that bad after all when we consider the U.S. states. On the other hand, we clearly see that there is no convergence among OECD countries in spite of the fact that they are at the similar levels of development. However, we still cannot answer the question of why capital flows from rich to rich countries or from poor to rich countries but not vice versa as the model predicts. For that we turn to the empirical analysis.

4 Empirical Analysis: Explaining the Lucas Paradox

Table 1 gives descriptive statistics.[23] We have data available for 46 countries between 1971-1997.[24] It is clear that there is extensive cross sectional variation. Table 2 presents the correlation matrix. Data on capital stocks were taken from Kraay, Loayza, and Ventura (2000), which is a newly constructed data set. We calculated capital inflows as the change in the stock of foreign claims on domestic capital. These data correspond to inflows of direct and portfolio equity investment net of depreciation and considers adjustments in the value of the domestic capital stock owned by foreigners due to changes in market prices and exchange rates. Using long term averages of the yearly differences in this valuated stocks as capital inflows we capture the adjustments in foreign investments due to changes in the exchange

[23] All data is described in detail in Data Appendix. Capital flows can broadly be divided into flows of foreign capital (flows of equity) and loans issues between domestic residents and foreigners (flows of debt securities). We focus primarily on inflows of foreign capital which can further be divided into inflows of portfolio and direct investment. When a foreign investor purchases a local firm's securities without exercising control over the firm, that investment is regarded as a portfolio investment; direct investments include greenfield investments and equity participations giving a controlling stake. The International Monetary Fund classifies an investment as direct if a foreign investor holds at least 10 percent of a local firm's equity while the remaining equity purchases are classified under portfolio equity investment. This implies that in some cases, the differences might be vague. Following Lane and Milesi-Ferretti (2001) and Kraay et al. (2000), we do not distinguish between minority and majority shareholders, as this distinction is not important for our analysis.

[24] We also use data on inflows for 59 countries between 1971-1998 from IMF, IFS Statistics and Lane and Milesi-Ferretti (2001) as explained in the robustness section.

rate and local prices in order to achieve the desired-optimal long run capital stock, as shown in equation (3). We obtained similar results using capital inflows as calculated in the Balance of Payments as shown in the robustness section. Following Lane and Milesi-Ferretti (2001) and Kraay, Loayza, Serven and Ventura and (2000), data on inflows of equity include direct and portfolio equity investment.

In all our regressions the dependent variable is average capital inflows per capita. We believe this measure is more in line with the theoretical literature.[25] We use GDP per capita on the right hand side in each regression as a measure for the Lucas Paradox, in other words, the positive significance of this variable demonstrates the presence of the Lucas paradox.[26] Then we include other right hand side variables, which we group as fundamentals versus capital market imperfections. We analyze which one is going to make the GDP per capita variable insignificant when included, hence providing an explanation for the paradox.[27]

The Role of Fundamentals

The right hand side variables that we use to capture the fundamentals are human capital and institutional quality. To measure institutional quality, we use International Country Risk Guide's index of political safety.[28] Numerous theoretical papers show that low levels

[25]In addition a histogram revealed the fact that this measure has less outliers and hence is more normally distributed than the other measure, inflows/GDP, which is also used in the literature. Moreover, since we are interested in how the development level affects capital flows, the use of inflows/pop as a dependent variable is preferred over inflows/GDP.

[26]Clemens and Williamson (2003) use a dummy variable on the right hand side for rich countries to represent the "wealth" bias. However, they also include GDP per capita on the right hand side, which creates perfect multicollinearity.

[27]To be perfectly in line with the theory, for the disappearance of the paradox we need GDP per capita to be negatively significant when we control for the potential explanations of the paradox. Not getting this result should not be viewed as a negative for this paper though. Due to our limited sample size and high correlations between GDP per capita and the other independent variables it may be harder to get the significance. Indeed, we do get the negative sign in most of the specifications.

[28]We constructed the institutional quality index as follows. It is composed of indices of government stability, internal conflict, external conflict, no-corruption index, non-militarized politics, protection from religious tensions, law and order, protection from ethnic tensions, democratic accountability, bureaucracy quality. Previously (1982-1995), ICRG's index of political safety included protection from government repudiation of contracts, from risk of expropriation, from corruption, as well as index of law and order tradition (rule of law) and bureaucratic quality. After 1995, the variables corresponding to the risk of government repudiation of contracts and expropriation are reported under ICRG's Investment Profile category. We used protection from government repudiation of contracts and from risk of expropriation indices from the older ICRG classification

of human capital and weak institutions dampen the productivity of capital. Thus we expect these variables to be positively significant.[29] We use additional variables on the right hand side to capture domestic distortions associated with government policies. For example, we use inflation volatility to control for macroeconomic stability.[30] We also use capital controls, which, as discussed before, also cause lower returns to capital. Hence we expect them to be negatively significant.

The Role of International Capital Market Imperfections

We construct a variable called distantness, following Kalemli-Ozcan, Sorensen and Yosha (2003a), which is the weighted average of the distances from the capital city of the particular country to the capital cities of the other countries, using the population of each country as weights.[31] This variable is a proxy for the international market failures, mainly asymmetric information. In general it is difficult to get the appropriate information (from an investment point of view) about a country without visiting the country and hence how far that country is located should be a concern.[32] Hence we expect this variable to be negatively significant.

Results

Table 3 shows our main result. Institutional quality is the most important variable that explains the Lucas paradox. Column (1) demonstrates the Lucas paradox; capital flows to rich countries. Only in the regressions (3) and (5)-(8), where the institutional quality

as robustness checks since these two indices were used by Acemoglu et. al. (2001, 2002).

[29]We use initial values of human capital and GDP per capita on the right hand side to decrease the severity of the endogeneity problem. The institutional quality variable used was the average value since this variable does not change over time that much during the sample period. We present instrumental variable regressions results in the next section.

[30]We also use the level of inflation and get same qualitative results.

[31]We use Arcview software to get latitude and longitude of each capital city and calculate the great arc distance between each pair.

[32]Portfolio Managers and Investment Bankers who advise their clients about investing in China advertise themselves by pointing out the fact that how frequently they visit the country. See Portes and Rey (2002) for a similar interpretation of distance in the context of bilateral capital flows and Wei and Yu (2001) for the use of distance as a determinant of FDI and bank lending.

variable is included GDP per capita becomes insignificant.[33] Human capital and distantness are also significant in most of the specifications, however, they cannot account for the Lucas paradox on their own. We repeat the analysis using years of higher schooling as the human capital. In this case human capital is significant in all the specifications, though it still cannot account for the paradox.[34] All other variables have expected signs though in general they are insignificant.

We redo the analysis by using capital stock per capita instead of GDP per capita as a measure of the paradox. The results are given in Table 4. This is essential since the neoclassical theory implies that capital should flow to countries where the returns are high, meaning countries with low levels of capital stock. We also do worry less about the correlation with the institutional quality variable. We use the 1970 value of the domestic capital stock per capita since that will be the relevant value for the future flows. As shown in Table 4 the results are very similar. Here we have a lesser role for human capital. Institutional quality remains as the main explanation for the Lucas paradox.

Table 5 repeats the analysis for the decades in our sample period 1971-1997. We cannot perform the exercise for 1971-1980 since the ICRG-institutional quality variables start in 1984. For the 1980-1990 period as shown in column (1), the institutional quality variable is significant only at 15% level and none of the remaining variables is significant at conventional levels. For the other decades and subperiods, institutional quality remains the main explanation for the Lucas paradox as shown in columns (2) and (3). The lower significance of institutional quality in explaining capital inflows during 1980s can be accounted by the general cutoff of lending in the international capital markets following Mexico's announcement to halt foreign interest payments on August 15, 1982, which marked the beginning of international debt crisis. As Eichengreen and Lindert (1989) argue, during the 1980s private creditors tended to withhold capital from potential borrowers among developing countries, not just the conspicuous problem debtors.

[33] We are capturing the direct effect of the level of institutional quality on capital flows. Notice, however, that GDP per capita can also depend on the level of institutional quality, creating an indirect effect.

[34] We don't show these results due to space considerations.

4.1 Robustness

How Robust is the Role of Institutional Quality?

The institutional quality variable is a composite index of political safety components. We use each component of this index on its own to see which ones are driving the result. The results are reported in Table 6. As shown, our previous results are robust to using different indicators of institutional quality. Protection from the risk of expropriation, which is used by Acemoglu et. al. (2001, 2002) among others as a measure of institutional quality, is the most well known component. As shown in column (9), this measure of institutions is highly significant. Column (10) uses regulation of participation from the Polity data set. Although the ICRG variables are the most well known and widely used indicators of institutions, the Polity data set variables, constructed by Gurr (1974) and updated by Gurr and Jaggers (1996), have also been used in the literature. These variables, which include indicators of political authority for a wide range of countries, are used to proxy the autonomy of the state (restrictions to the power of the state) and its capacity (effectiveness). In particular, we use the variable regulation of participation. The result, as column (10) shows, is significant at 10% level. [35]

The results are also robust to the inclusion of linguistic ties defined as the fraction of the population that speaks English or any one of the five primary West European languages together with institutional quality index. These variables enter insignificantly and they do not affect other coefficients. We, therefore, do not report the results.[36]

Other Measures of Fundamentals

For other fundamentals we also experiment with some other variables. For example we use external debt to GDP ratio, which turns out to be negative but mostly insignificant,

[35] Other variables, such as constraints on the executive, were not significant at 10%. These political indicators are most likely capturing the indirect effect of political constraints on institutional quality (institutions that secure property rights are those that allow the state to credibly commit to upholding property rights and monitor and enforce contracts) while ICRG variables are reflecting the more direct effect of secure property rights.

[36] They have a t-statistics of 0.5 on average in general.

and hence not reported. Our capital control measure is an average of four dummy variables: exchange arrangements, payments restrictions for current transactions, payments restrictions for capital transactions, and surrender or repatriation requirements for export proceeds. We also try two of these measures on their own; restrictions on payments for capital transactions, surrender or repatriation requirements for export proceeds. The results are qualitatively the same and hence not reported. We also use land since it can be another omitted factor of production like human capital and hence countries with less land may have low marginal productivity of capital. It turns out to be insignificant and thus we do not report the results.

We also use financial market development as another variable that represents good domestic fundamentals. In theory, higher levels of financial development lead to higher productivity of capital. We try several standard measures of the credit market development. These are liquid liabilities of the financial system, total credit to private sector, credit by deposit money banks (all as share of GDP), and claims of deposit money banks on non-financial domestic sectors as share of claims of central bank and deposit money banks on non-financial domestic sectors. The latter two of these measures are significant in all specifications and give similar qualitative results, whereas the former two are mostly insignificant. We also try measures of the capital market development. We use stock market capitalization and total value traded on the stock market (as share of GDP). They both turn out to be insignificant. Inclusion of these measures together with the credit market variables and/or on their own did not change the overall picture. Results are reported in Table 7.

The negative, significant coefficient delivered by the bank credit measure is rather unusual.[37] This negative significant result, however, is not robust using other indices of financial market development, like capital markets.

Other Measures of Market Imperfections: Asymmetric Information and Sovereign Risk

To check if the result with the distantness variable as a measure of asymmetric infor-

[37] We hypothesize the following: financial market development is composed of two components; strong financial institutions and high domestic investment, which is proxied mostly by the bank credit. The institutions part is captured by our institutional quality variable. The high domestic investment part is creating a crowding out effect, i.e., foreign investment will not come since all investment opportunities are exhausted domestically. One needs to develop a model to investigate this.

mation is robust we try to replace this measure with a variable called Reuters. This is the number of times the country is mentioned in Reuters.[38] This measure should potentially reflect the awareness of the international business community about the country. The sign is positive, but the coefficient is not significant. We also use the sovereign debt ratings as a measure of sovereign risk. It is negative and significant. Our institutional quality variable is robust to the inclusion of sovereign risk variable in spite of the high correlation between them.[39]

Other Ways of Calculating Capital Inflows

As discussed at the beginning of section 4, capital flows are composed of flows of foreign capital (flows of equity) and loans issues between domestic residents and foreigners (flows of debt securities). Until now we focused on inflows of foreign capital composed of portfolio and direct investment. However we did not use "inflows" as calculated in the Balance of Payments statistics, rather we calculated inflows as the change in the stock of foreign claims on domestic capital. As explained above, this data corresponds to inflows of direct and portfolio equity investment net of depreciation and considers adjustments in the value of the domestic capital stock owned by foreigners due to changes in market prices and exchange rates. We repeat the analysis using capital inflows from IMF, IFS, specifically, inflows of direct and portfolio equity investment. This is the data also used by Lane and Milesi-Ferretti (2001) and Kraay, Loayza, Serven and Ventura (2000). We have data for 59 countries between 1971-1998.

The results are given in columns (1)-(8) of Table 8. Institutional quality remains to be the main explanation for the paradox while human capital turns out to be significant in all specifications. In column (9) we add data on flows of loan liabilities, which are calculated by adding the difference in stocks of the portfolio debt liabilities and other investment liabilities, where the stocks are taken from Lane and Milesi-Ferretti (2001).[40] The results are robust

[38] We thank Doug Bond for providing the data.

[39] The correlation between the institutional quality variable and the sovereign risk variable is -0.85.

[40] As Lane and Milesi Ferretti (2001) note, for developing countries there are discrepancies between the capital inflows reported in the IMF Balance of Payments Statistics and the changes in external debt stocks as reported by the World Bank's Global Development Finance Database. The latter data, however, is available only for developing countries.

to this addition of inflows of loan liabilities to the inflows of equity, however capital controls become significant upon this addition. Column (10) uses capital inflows calculated as the difference in stocks of direct investment liabilities and portfolio equity, where stocks are taken from Lane and Milesi-Ferretti (2001). Although this column only focuses on inflows of foreign capital and omits inflows of loan liabilities, it is a good robustness check given that this is a different source than what we used before. The results still hold.

4.2 Endogeneity Issues

So far there has been no discussion of the endogeneity problem. Theoretically it is plausible that the capital flows affect the institutional quality of a country. More flows can generate incentives to reform and to create investor friendly environment by improving the property rights.[41] Moreover, as Acemoglu et al. (2001) argue, most institutional quality measures are constructed ex-post, and the analysts may have had a natural bias in 'assigning' better institutions to countries with higher capital flows. One way to solve this problem is to find variables that are not subject to reverse causality and can account for the institutional variation.

La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997, 1998) emphasize the importance of colonial origin (the identity of the colonizer) and legal origin on the current institutions. They examine the laws governing investor protection, the enforcement of these laws, and the extent of concentration of ownership of shares in firms across countries (more popularly known as the LLSV variables). They find that countries with different legal histories offer different types of legal protection to their investors. Most countries' legal rules, either through colonialism, conquest, or outright borrowing, can be traced to one of four distinct European legal systems: English common-law, French civil law, German civil law, and Scandinavian civil law. They show that countries whose legal rules originate in the common law tradition offer the greatest protection to investors. As far as law enforcement is concerned, German civil law and Scandinavian civil law countries emerge superior. The French civil law countries offer both the weakest legal protection and the worst enforcement. These legal origin variables have been increasingly adopted as exogenous determinants of institutional quality in the

[41] See Gourichas and Jeanne (2002) and Rajan and Zingales (2003).

economic growth literature.

In contrast, Acemoglu et al. (2001, 2002) emphasize the conditions in the colonies. They show that it is not the identity of the colonizer or the legal origin what matters, but whether the European colonialist could safely settle in a particular location. If the European settlement was discouraged by diseases (Acemoglu et al., 2001) or where the surplus extraction was beneficial via an urbanized and prosperous population (Acemoglu et al., 2002), the Europeans set up worse institutions. Given the nature of our sample - which includes industrialized countries - we cannot use European settler mortality rates as an instrument. However, in order to take into consideration local conditions when creating institutions, we complement legal origins indicators with variables from Berkowitz et al. (2003). These variables are mainly corrections for the familiarity with the adopted legal code. Berkowitz et al. (2003) analyze the determinants of effective legal institutions and test the proposition that the way in which the legal order was transplanted (demand) is more important than the supply of the law (legal family). They find that countries that developed legal orders or had a population familiar with the law had more effective legality. Following Berkowitz et al. (2003) we construct a variable called "familiarity," which considers whether the country is the origin of the legal family or exhibited familiarity with the imported law.

We complement these with early indicators of regime type and political constraints to the executive power from the Polity data set. North (1981, 1995) argues that since the state has the legitimate use of force, one of its central functions is to protect property rights. However, this also means that secure property rights also imply restrictions on the state's ability to use its force: "establishing a credible commitment to secure property rights over time requires either a ruler who exercises forbearance and restraint in using coercive force, or the shackling of the ruler's power to prevent arbitrary seizure of assets."[42] A critical role of the political institutions is then to place restrictions on the state in order to produce rules that foster long-term growth.[43] We use these variables as proxies of whether the political insitutions place restrictions on the state. In order to avoid any effect on capital inflows other than through institutions, we used indicators for 1900. The recent values of these variables are

[42]North (1995), p.101.

[43]See Acemoglu (2002) for a model that captures the relation of lack of commitment (or inability to commit) by political actors and bad institutions.

used as alternative measures of institutional quality in Acemoglu et al. (2002), and also in this paper as shown in Table 6.

Table 9 presents the results of the first stage regressions. Table 10 reports the corresponding second stage regressions. Thus, column (1) in Table 10 reports the results of the IV regression using the legal origin variables and the familiarity with legal code variable as instruments. The institutional quality variable is positive and significant at 10% level. Column (2) adds autocracy and executive recruitment regulation from the Polity data set to the list of instruments used in column (1). Column (3) uses in addition to legal origin and the familiarity variable, the monocratism and regulation of participation variables from the Polity data set as well as the fraction of the population speaking English.[44] Column (4) uses executive recruitment regulation, monocratism and executive constraints from Polity data set together with the instruments used in column (1). Column (5) uses autocracy measures and executive constraints from Polity data set with legal origins and familiarity with legal code as instruments. Column (6) uses measures of democracy, executive constraints and regulation of participation from Polity data set in addition to British and German legal origins and the familiarity variable. Finally, column (7) adds an index of the depth of experience with state-level institutions, (state antiquity) developed by Bockstette, et al. (2002) as another instrument. They show that that state antiquity is significantly correlated with measures of political stability and institutional quality. In all these IV specifications, the institutional quality variable is always positive and significant and has a coefficient similar to the one in the OLS regressions.

4.3 Historical Perspective: 1918-1946

We obtained data on capital inflows from the League of Nations Balance of Payments for the period between 1918-1948 for 15 countries. Despite the limited sample, this analysis not only complements previous work in the literature, but more importantly, provides a historical perspective to our examination of the determinants of the Lucas-Paradox.

[44] Hall and Jones (1999) used this latter variable as an instrument for what they called as social infrastructure. They proxy social infrastructure by combining ICRG rates on (i) law and order, (ii) bureaucratic quality, (iii) corruption, (iv) risk of expropriation and (v) government repudiation of contracts with a measure of openness to trade constructed by Sachs and Warner (1995).

The literature characterizes different periods in terms of the evolution of capital mobility.[45] As the work by Obstfeld and Taylor (2002) suggests, there was an upswing in capital mobility from 1880 to 1914 during the Gold Standard period. Before 1914, capital movements were free and net flows reached unprecedented levels. The international financial markets broke up during World War I. During the 1920s, policymakers around the world tried to reconstruct the international financial markets. Britain return to gold in 1925 and led the way to restore the international gold standard for a limited period and was followed by a brief period of increased capital mobility between 1925 and 1930. As the world economy collapsed into depression in 1930, so did international capital markets. World War II was followed by a limited capital mobility. Capital flows began to increase in the 1960s, becoming faster in the early 1970s after the demise of the Bretton Woods system. As Eichengreen (2003) mentions, the importance of contextual factors is evident in the contrast between periods.

Clemens and Williamson (2003) analyze the determinants of British capital exports during first period of capital boom, between 1870 and 1913. During this period, international migration, trade and foreign finance were free. In effect, they found that British capital went to labor scarce countries chasing after European emigrants and cheap labor. In the pre-war period, capital and labor flowed in same channels. In this section, we analyze the interwar period and study the determinants of capital inflows between 1918-1946. Following the work by Obstfeld and Taylor (2002) and others, we distinguish between the period pre Great Depression (1918-1929) and the Great Depression-War Period (1929-1946). We additionally analyze the years of 1925-1929 which was the period where most countries returned to the Gold Standard following Great Britain.

We run a OLS regression using as dependent variable the average annual capital inflows per capita.[46] Table 11 presents the basic results of the regression analysis for each of the periods analyzed. The main result is that human capital accounts for the Lucas paradox in this period, although we have much lower levels of significance then the conventional levels due to our small sample size. The variable distantness is constructed as before and it proxies transaction costs of information flows limitations. However it enters insignificantly. We

[45] See Obstfeld (1998), Eichengreen (1996, 2003), Obstfeld and Taylor (2002).

[46] For the period 1918-1929 we have 12 countries; for 1930-1949 we have 15 countries. We are in the process of expanding the data set with complementary data sources.

also use telegraph communications per capita and mail per capita as proxies for asymmetric information obtaining similar results to those delivered by the distantness variable.

As discussed above the origin of a country's legal history is a good proxy for institutional quality. The French civil law countries offer both the weakest legal protection and the worst enforcement. Hence we include a dummy for French legal origin. This variable has a negative and significant role in accounting for the capital flows. In this case the GDP variable, however, remains positive and significant. According to these preliminary results, in the period of 1918-1946, human capital has an important role in accounting for the Lucas paradox together with the institutions. Nevertheless, this period needs further exploration by using additional data.

5 Conclusion

We examine the role of the different explanations for the lack of flows of capital from rich countries to poor ones - the Lucas paradox - in an empirical framework. To the best of our knowledge this is the first systematic empirical investigation of the Lucas paradox.

Broadly speaking, there are two alternate explanations for the Lucas Paradox: differences in fundamentals versus capital market imperfections. Our empirical evidence shows that for the period 1970-2000, institutional quality, which is a fundamental, is the most important variable in explaining the Lucas paradox. Human capital and asymmetric information that is proxied by distance do also have a role. The results are robust to the consideration of omitted variables and the endogeneity issues. We also run regressions with a smaller set of countries for the period 1918-1948. We find that in that earlier period human capital was the determinant factor for the lack of flows, as Lucas suggested.

Data Appendix

U.S. States

The states are grouped according to census regions for the calibration exercise. Farwest: Alaska, California, Hawaii, Nevada, Oregon, Washington; Great Lakes: Illinois, Indiana, Michigan, Ohio, Wisconsin; Mideast: Delaware, Maryland, New Jersey, New York; New England: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont; Plains: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota; Rocky Mountains: Colorado, Idaho, Montana, Utah, Wyoming; Southeast: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia; Southwest: Arizona, New Mexico, Oklahoma, Texas.

Total Gross State Product (GSP): 1977 - 1999, Bureau of Economic Analysis (BEA).
Consumer price index (CPI): 1977-2000, Bureau of Labor Statistics.
Population: 1929-2000, BEA.
Annual State Personal Income per capita: 1929-2000, BEA.
Enrollment in regular public elementary and secondary schools: Data for 48 states - excludes Alaska and Hawaii - by decades (1979-80 to 1999). Source: National Center for Education Statistics.
Total number of high school graduates: Data for 50 states in averages of two consecutive years (1964-65 to 1998-99). Source: Southern Regional Education Board.

Countries

OECD Countries Sample: Group 1: Greece, Spain, Ireland, New Zealand; Group 2: Italy, United Kingdom, Canada, Australia; Group 3: Finland, France, Netherlands, Belgium-Luxembourg; Group 4: United States Austria, Sweden, Germany; Group 5: Norway, Denmark, Switzerland.

Cross-Country Sample 47 countries: Argentina, Australia, Austria, Bolivia, Brazil, Canada, Colombia, Costa Rica, Germany, Denmark, Dominican Republic, Ecuador, Spain,

Finland, France, United Kingdom, Greece, Guatemala, Honduras, Indonesia, India, Ireland, Israel, Italy, Jamaica, Japan, Korea, Sri Lanka, Mexico, Mauritius, Malaysia, Netherlands, Norway, New Zealand, Pakistan, Peru, Philippines, Portugal, El Salvador, Sweden, Thailand, Trinidad and Tobago, Tunisia, Turkey, United States, Venezuela, South Africa.

Cross-Country Sample 59 countries: Argentina, Australia, Austria, Belgium-Luxembourg, Bolivia, Brazil, Botswana, Canada, Switzerland, Chile, China, Colombia, Costa Rica, Germany, Denmark, Dominican Republic, Ecuador, Egypt, Spain, Finland, France, United Kingdom, Greece, Guatemala, Indonesia, India, Ireland, Iceland, Israel, Italy, Jamaica, Jordan, Japan, Korea, Kuwait, Sri Lanka, Mexico, Malaysia, Netherlands, Norway, New Zealand, Pakistan, Peru, Philippines, Portugal, Paraguay, El Salvador, Sweden, Syria, Thailand, Trinidad and Tobago, Tunisia, Turkey, Uruguay, United States, Venezuela, South Africa, Zimbabwe.

Inflows of Foreign Capital: 1971-1998, Data on flows of foreign capital (equity) include inflows of direct and portfolio equity investment from the IMF, International Financial Statistics (lines 78bed and 78bmd respectively). Flows are expressed in constant 1995 USD.

Stocks of Foreign Capital: 1970-1997, Foreign claims on domestic capital in 1990 constant USD, from Kraay, Loaza, Serven, and Ventura (2000). Kraay, Loaza, Serven, and Ventura (2000) construct estimates of stocks of foreign capital using initial stocks and flows of direct and portfolio investment and adjusting the capital stock to reflect the effects of changes in market prices and exchange rates according to $S_{it} = V_{it}S_{it-1} + F_{it}$, where S_{it} denotes the initial stock of the asset in country i at the end of period t in constant 1990 USD; F_{it} the flow of new investment in constant 1990 USD; and V_{it} the gross change between periods *t-1* and t in the value of the asset. The gross change in the value of the asset was calculated using $V_{it} = (1-\delta)\frac{P_{t-1}}{P_t}\frac{e_{it}}{e_{it-1}}\frac{P^I_{it}}{P^I_{it-1}}$; where $\delta = 0.6$ is the depreciation rate; P_t the U.S. price level; e_{it} the exchange rate in local currency units per USD; and P^I the investment deflator in country i at time t. Data on initial stocks were taken from the IMF, Balance of Payments Statistics and OECD's (1967) "Stocks of Private Direct Investment by DAC countries in Developing Countries End 1967." Flows data on direct investment and portfolio equity liabilities were

taken from IMF, IFS statistics as described above.

Stocks of Foreign Capital and Loan: 1970-1998, Foreign claims on domestic capital in 1995 constant USD, from Lane and Milesi-Ferretti (2001). Lane and Milesi-Ferretti (2001) construct estimates of stocks of equity and foreign direct investment using initial stock data and flow data that are adjusted to reflect the effect of changes in market prices and exchange rates. For equity stocks, they cumulated flows adjusting outstanding USD stocks for changes in stock market value. For equity liabilities, stocks were adjusted for changes in the end year US value of domestic stock market. Stocks of loan liabilities are composed of stocks of portfolio investment debt liabilities and other investment liabilities. The initial values for stocks in their calculations were taken from from the IMF, Balance of Payments Statistics, OECD's (1967) "Stocks of Private Direct Investment by DAC countries in Developing Countries End 1967" and Sinn (1990) "Net External Asset Position of 145 Countries: Estimation and Interpretation." Flows data on direct investment and portfolio equity liabilities were taken from IMF, IFS statistics as described above.

Capital Stock: 1970, Domestic capital stock including gold reserves per capita in 1970 expressed in constant 1990 USD, from Kraay, Loayza, Serven, and Ventura (2000).

GDP per capita: 1971-1997, Purchasing Power Parity Basis 1990 USD, from Kraay, Loaza, Serven, and Ventura (2000).
Mid-year population: 1971-1997, From Kraay, Loaza, Serven and Ventura (2000).
Human Capital: 1970,75,80,85,90,95, Years of secondary, higher and total schooling in the total population, from Barro, Robert J. and Jong-Wha Lee (2000).
Land Area: Square Km, 1995, from World Bank, World Development Indicators (2000).
Distance: Km, from Arcview 3.x software.
Reuters: 1987-1997, Number of times a country mentioned in Reuters, Reuters database following Goldstein (1992) coding, from "Integrated Data for Events Analysis (IDEA) project" by Doug Bond, Joe Bond, Churl Oh (Harvard University), 2001, provided by Doug Bond.
Inflation: 1970-98, Consumer Price Index based, annual percentage change from World Bank, World Development Indicators (2002).

Inflation Volatility: 1971-97, Standard deviation of annual CPI inflation.
External Debt: Total External Debt as percentage of GDP, from World Bank, World Development Indicators (2000).
Capital controls: 1971-97, Four dummy variables: 1) Exchange Arrangements: separate exchange rates for some or all capital transactions and/or some or all invisibles; 2) Payments Restrictions: restrictions on payments for current transactions; 3) Payments Restrictions: restrictions on payments for capital transactions; 4) Surrender or Repatriation Requirements for Export Proceeds. Mean values for all the four measures. From International Monetary Fund, Annual Report on Exchange Arrangements and Exchange Restrictions, provided by Dennis Quinn.
Stock market capitalization: 1976-97, Stock market capitalization as share of GDP, from Beck, Demirguc-Kunt and Levine (2000).
Total value traded: 1975-1997, Total value traded on the stock market as share of GDP, from Beck et al. (2000).
Private credit: 1971-97, Claims on private sector by deposit money banks and other financial institutions as share of GDP, from Beck et al. (2000).
Bank credit: 1971-97, Claims on private sector by deposit money banks as share of GDP, from Beck et al. (2000).
Deposit Money-Central Bank: 1971-97, Claims of deposit money banks on non-financial domestic sectors as share of claims of central bank and deposit money banks on non-financial domestic sectors, from Beck et al. (2000).
Liquid liabilities: 1971-97, Liquid liabilities of the financial system as share of GDP, from Beck et al. (2000).

Political safety measures:
Government Stability: 1984-1998, The government's ability to carry out its declared program(s), and its ability to stay in office. Average yearly rating from 0 to 12, where a higher score means lower risk. Data come from International Country Risk Guide, the PRS Group.
Internal Conflict: 1984-1998, Political violence in the country and its actual or potential impact on governance. Average yearly rating from 0 to 12, where a higher score means lower risk. Data come from International Country Risk Guide, the PRS Group.

External Conflict: 1984-1998, Assessment both of the risk to the incumbent government from foreign action, ranging from non-violent external pressure (diplomatic pressures, withholding of aid, trade restrictions, territorial disputes, sanctions, etc) to violent external pressure (cross-border conflicts to all-out war). Average yearly rating from 0 to 12, where a higher score means lower risk. Data come from International Country Risk Guide, the PRS Group.
Non-corruption index: 1984-1998, Assessment of corruption within the political system. Average yearly rating from 0 to 6, where a higher score means lower risk. Data come from International Country Risk Guide, the PRS Group.
Non-militarized politics: 1984-1998, Protection from the military involvement in politics. Average yearly rating from 0 to 6, where a higher score means lower risk. Data come from International Country Risk Guide, the PRS Group.
Protection from religious tensions: 1984-1998, Protection from the religious tensions in society. Average yearly rating from 0 to 6, where a higher score means lower risk. Data come from International Country Risk Guide, the PRS Group.
Law and Order: 1984-1998, The Law sub-component is an assessment of the strength and impartiality of the legal system; the Order sub-component is an assessment of popular observance of the law. Average yearly rating from 0 to 6, where a higher score means lower risk. Data come from International Country Risk Guide, the PRS Group.
Protection from Ethnic Tensions: 1984-1998, Assessment of the degree of tension within a country attributable to racial, nationality, or language divisions. Average yearly rating from 0 to 12, where a higher score means lower risk. Data come from International Country Risk Guide, the PRS Group.
Democratic Accountability: 1984-1998, Average yearly rating from 0 to 6, where a higher score means lower risk. In general, the highest number of risk points is assigned to Alternating Democracies, while the lowest number of risk points is assigned to autarchies. Data come from International Country Risk Guide, the PRS Group.
Quality of Bureaucracy: 1984-1998, Institutional strength and quality of the bureaucracy is another shock absorber that tends to minimize revisions of policy when governments change Average yearly rating from 0 to 4, where a higher score means lower risk. Data come from International Country Risk Guide, the PRS Group.
Socioeconomic Conditions: 1984-1998, Socioeconomic pressures at work in society that could

constrain government action or fuel social dissatisfaction. Average yearly rating from 0 to 12, where a higher score means lower risk. Data come from International Country Risk Guide, the PRS Group.

Investment Profile: 1984-1998, Factors affecting the risk to investment that are not covered by other political, economic and financial risk components. Average yearly rating from 0 to 12, where a higher score means lower risk. Data come from International Country Risk Guide, the PRS Group.

Institutions: Composite political safety: 1984-1998, Sum of all the rating components from International Country Risk Guide except for Socioeconomic Conditions and Investment Profile, Average yearly rating from 0 to 76, where a higher score means lower risk. Data come from International Country Risk Guide, the PRS Group.

Protection from Government repudiation of contracts: 1982-95, Average yearly rating from 0 to 10, where a higher score means lower risk. Data come from IRIS Time-Series of International Country Risk Guide Data.

Protection from Expropriation: 1984-1998, Average yearly rating from 0 to 10, where a higher score means lower risk. Data come from IRIS Time-Series of International Country Risk Guide Data.

Legal Family Variables:

Legal origin: Origin of formal legal code in the country: English common-law, French civil law, German civil law, and Scandinavian civil law from La-Porta, Lopez-de-Silanes, Scheleifer, Vishny (1997, 1998).

Familiarity with the legal code: Variable taking a value of 1 - if country is origin of legal family or exhibited familiarity with imported law; 0 - otherwise. Berkowitz et al. (2003).

Polity Data:

Autocracy Score: variable taking values from 0 to 10; with 0 denoting low autocracy and 10 high autocracy. Data for 1900 and averages for 1984-94, from Gurr (1974) and Gurr and Jaggers (1996).

Democracy Score: variable taking values from 0 to 10; with 0 denoting low democracy and 10 high democracy. Data for 1900 and averages for 1984-94, from Gurr (1974) and Gurr and

Jaggers (1996).

Executive Recruitment Regulation: Variable reflecting institutionalized procedures; taking values of (1) = unregulated; (2) = Designation/Transitional; (3) = Regulated. Data for 1900 and averages for 1984-94, from Gurr (1974) and Gurr and Jaggers (1996).

Monocratism: variable reflecting Institutional (de jure) independence of chief executive; taking values (1) = Pure individual; (2) = Intermediate category; (3) = Qualified individual; (4) = Intermediate category; (5) = Collective executive. Data for 1900 and averages for 1984-94, from Gurr (1974) and Gurr and Jaggers (1996).

Regulation of Participation: variable reflecting development of institutional structures for political expression; taking values of (1) = Unregulated;(2) = Factional/Transitional; (3) = Factional/Restricted; (4) = Restricted; (5) = Institutionalized. Data for 1900 and averages for 1984-94, from Gurr (1974)and Gurr and Jaggers (1996).

Executive Constraints: variable reflecting operational (de facto) independence of chief executive: taking values of (1) = Unlimited authority; (2) = Intermediate category; (3) = Slight to moderate limitations; (4) = Intermediate category; (5) = Substantial limitations;(6) = Intermediate category. Data for 1900 and averages for 1984-94, from Gurr (1974) and Gurr and Jaggers (1996).

English-fraction: Fraction of population speaking English as a mother tongue. Hall and Jones (1999).

Western European languages-fraction: Fraction of population speaking one of the five primary Western European Languages (including English) as a mother tongue. Hall and Jones (1999).

State Antiquity: Index of the antiquity of the state. The period from 1 to 1950 were divided into 39 half centuries. The index is an average of three question: Is a government above the tribal level? (1 yes, 0 no); is the government foreign of locally based? (0.5 the government is a colony, 0.75 the government is local with substantial foreign oversight; 1 locally based); how much of the territory of the modern country was ruled by this government (1 for over 50 percent; 0.75 from 25 percent and 50 percent; 0.5 between 10 percent and 25 percent ; and 0.4 points if less than 10 percent). The scores where multiplied by one another and by 50. Data from Bockstette, Chanda and Putterman (2002).

Historical Data

Sample: Argentina, Australia, Canada, Czechoslovakia, Denmark, Finland, France, Germany, India, Indonesia, Italy, Japan, Korea, Netherlands, Norway, South Africa, Sweden, United Kingdom, United States.

Capital Inflows: From League of Nations, Balance of Payments, 1918-1946, various issues.
GDP Per capita: From Maddison, Monitoring the World Economy 1820-1992.
Population: From Maddison, Monitoring the World Economy 1820-1992 and Mitchell B.R, International Historical Statistics.
Human Capital: Pupils enrolled in primary and secondary school per population from Mitchell B.R, International Historical Statistics.
Legal Origin: La-Porta, Lopez-de-Silanes, Scheleifer, Vishny (1997, 1998).

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Table 1: **Descriptive Statistics**

Sample: 46 countries (1971-97)

	Mean	Std. dev.	Minimum	Maximum
Capital Inflows per capita	48.53	62.74	-42.39	197.38
GDP per capita	6136.15	4276.09	894.90	16068.80
Capital Stock per capita	13215.75	12877.51	711.79	54789.60
Human Capital	4.887	2.511	0.914	10.094
Institutional Quality	5.5440	1.1490	3.4366	7.2747
Distantness	8987.75	2301.92	5961.71	12962.55
Inflation Volatility	122.95	408.97	1.873	2179.70
Capital Controls	0.492	0.248	0.000	0.969
Bank Credit	0.276	0.178	0.051	0.722
Liquid Liabilities	0.402	0.194	0.084	0.861
Capitalization	0.133	0.145	0.000	0.637
Total Value Traded	0.023	0.033	0.000	0.108
Reuters	5153.50	13251.34	48.5330	86397.47
Sovereign Risk	7.615	5.312	1.000	16.667

Notes: All variables are in levels. All variables are sample averages except GDP per capita, Capital Stock per Capita, and Human Capital, which are initial values. Capital inflows are calculated as the difference in stocks of foreign claims on domestic capital and they are at Purchasing Power Parity Basis in 1990 U.S. Dollars. The estimates of the stocks come from Kraay, Loayza, Serven, and Ventura (2000). GDP per capita is 1971 value and it is at Purchasing Power Parity Basis in 1990 U.S. Dollars. Capital Stock is domestic capital stock including gold reserves per capita in 1970 expressed in constant 1990 U.S. Dollars from Kraay, Loayza, Serven, and Ventura (2000). Human Capital is 1971 value for the years of total schooling in the total population. Institutional Quality is represented by the composite political safety index calculated as the sum of all the rating components from International Country Risk Guide (the PRS Group) except for Socioeconomic Conditions and Investment Profile. This is an average yearly rating for the period from 1984 to 1998 ranging from 0 to 76, where a higher score means lower risk. Distantness is calculated as the distance between countries in Km using average mid-year population as weights for 1971-97. Inflation Volatility equals to standard deviation of annual CPI inflation, average from, 1971-1997. Capital controls is an index calculated as the mean values for the four dummy variables as described in data appendix, average from 1971 to 1997. Bank credit is the claims on private sector by deposit money banks as share of GDP, average from 1971 to 1997. Private credit is the claims on private sector by deposit money banks and other financial institutions as share of GDP, average from 1971 to 1997. Liquid liabilities is liquid liabilities of the financial system as share of GDP, average from 1971 to 1997. Capitalization stands for stock market capitalization as share of GDP, average from 1976 to 1997. Total value traded represents the total value traded on the stock market as share of GDP, average from 1975 to 1997. Reuters stands for the number of times the country is mentioned in Reuters, average from 1987 to 1997. Sovereign risk is an index number based on Standard and Poors long term foreign currency denominated sovereign debt ratings, average from 1971 to 1997. Index ranges from 1 (An obligor rated "AAA") to 23 (An obligor rated "SD" (Selective Default)). Non-rated debt is considered missing.

Table 2: **Correlation Matrix**

	GDP per capita	Human Capital	Institutional Quality	Distantness	Inflation Volatility	Capital Controls
GDP per Capita	1.00					
Human Capital	0.89	1.00				
Institutional Quality	-0.82	0.77	1.00			
Distantness	-0.06	-0.08	-0.18	1.00		
Inflation Volatility	-0.21	-0.12	-0.29	0.15	1.00	
Capital Controls	-0.72	-0.68	-0.63	-0.20	0.12	1.00

Notes: This correlation matrix is for the main explanatory variables. See notes to Table 1 for detailed explanation of these variables.

Table 3: **Explaining the Lucas Paradox I**

Dependent Variable: Capital Inflows per capita

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Countries	47	47	46	47	46	46	46	46
GDP per capita	4.99***	2.94**	0.10	5.01***	-0.59	-0.59	-0.63	-0.64
	(5.75)	(2.40)	(0.08)	(5.96)	(-0.42)	(-0.42)	(-0.46)	(-0.47)
Human Capital	–	3.60**	–	–	2.33*	2.30*	2.21*	2.15
	–	(1.97)	–	–	(1.88)	(1.75)	(1.79)	(1.60)
Institutional Quality	–	–	4.10***	–	3.57***	3.60***	3.49***	3.54***
	–	–	(4.39)	–	(4.29)	(4.13)	(4.00)	(4.00)
Distantness	–	–	–	-5.83**	-2.72	-2.82	-2.70	-2.91
	–	–	–	(-2.25)	(-1.12)	(-0.95)	(-1.12)	(-0.96)
Inflation Volatility	–	–	–	–	–	0.03	–	0.07
	–	–	–	–	–	(0.10)	–	(0.22)
Capital Controls	–	–	–	–	–	–	-1.12	-1.22
	–	–	–	–	–	–	(-0.39)	(-0.42)
R^2	0.43	0.46	0.58	0.48	0.61	0.61	0.61	0.61

Notes: All regressions include a constant and are estimated by OLS with White's correction of heteroskedasticity. t-statistics are in parentheses denoting *** 1%, ** 5%, and * 10% significance. Human Capital, Inflation, and Distantness are in logs to smooth the effect of outliers, the other variables are in levels. Capital inflows per capita are divided by 10. All variables are sample averages (1971-1997) except GDP per capita and Human Capital, which are initial values (1971). See notes to Table 1 for the description of the variables.

Table 4: **Explaining the Lucas Paradox II**

Dependent Variable: Capital Inflows per capita

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Countries	47	47	46	47	46	46	46	46
Capital stock per capita	3.77*** (7.27)	2.73*** (4.03)	0.76 (0.98)	3.76*** (7.32)	0.65 (0.79)	0.64 (0.76)	0.61 (0.75)	0.59 (0.70)
Human Capital	– –	2.73* (1.82)	– –	– –	1.74 (1.50)	1.73 (1.43)	1.65 (1.48)	1.61 (1.36)
Institutional Quality	– –	– –	3.30*** (4.48)	– –	2.70*** (4.27)	2.71*** (3.69)	2.65*** (4.12)	2.69*** (3.72)
Distantness	– –	– –	– –	-5.84** (-2.50)	-3.56 (-1.60)	-3.60 (-1.33)	-3.53 (-1.60)	-3.67 (-1.33)
Inflation Volatility	– –	– –	– –	– –	– –	0.02 (0.05)	– –	0.05 (0.15)
Capital Controls	– –	– –	– –	– –	– –	– –	-0.91 (-0.31)	-0.98 (-0.33)
R^2	0.51	0.53	0.61	0.56	0.64	0.64	0.64	0.64

Notes: All regressions include a constant and are estimated by OLS with White's correction of heteroskedasticity. t-statistics are in parentheses denoting ***1%, **5%, and *10% significance levels. Capital Stock per capita, Human Capital, Inflation, and Distantness are in logs to smooth the effect of outliers, the other variables are in levels. Capital inflows per capita are divided by 10. All variables are sample averages (1971-1997) except Capital Stock per capita and Human Capital, which are initial values (1970). See notes to Table 1 for the description of the variables.

Table 5: **Explaining the Lucas Paradox III: Analysis by Decades**
Dependent Variable: Capital Inflows per capita

	(1)	(2)	(3)	(4)
Countries	46	46	46	46
Time period	(1980-1990)	(1990-1997)	(1980-1997)	(1971-1997)
GDP per capita	-1.20 (-0.39)	-3.40 (-0.88)	-2.98 (-1.06)	-0.64 (-0.47)
Human Capital	0.48 (0.22)	6.18 (1.58)	2.79 (1.28)	2.15 (1.59)
Institutional Quality	2.14† (1.60)	7.78*** (2.59)	5.00*** (3.10)	3.54*** (4.00)
Distantness	-2.61 (-0.64)	-2.00 (-0.22)	-3.21 (-0.75)	-2.91 (-0.96)
Inflation Volatility	0.22 (0.46)	-0.57 (-0.48)	0.34 (0.80)	0.07 (0.22)
Capital Controls	-4.77 (-1.46)	-7.37 (-1.44)	-4.47 (-1.44)	-1.22 (-0.42)
R^2	0.33	0.43	0.56	0.61

Notes: All regressions include a constant and are estimated by OLS with White's correction of heteroskedasticity. t-statistics are in parentheses denoting ***1%, **5%, *10 and †15% significance levels. Human Capital, Inflation, and Distantness are in logs to smooth the effect of outliers, the other variables are in levels. Capital inflows per capita are divided by 10. All variables are sample averages for the corresponding sub-period except GDP per capita and Human Capital, which are initial values for the corresponding sub-periods. See notes to Table 1 for the description of the variables.

Table 6: **Robustness I: Institutions**

Dependent Variable: Capital Inflows per capita

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Observat.	46	46	46	46	46	46	46	46	46	46
GDP per capita	-0.64 (-0.47)	1.07 (0.92)	2.09* (1.92)	1.97* (1.74)	0.87 (0.64)	-0.26 (-0.22)	-0.69 (-0.44)	1.01 (0.77)	0.91 (0.69)	2.05 (1.63)
Human Capital	2.15* (1.60)	3.38* (2.11)	0.97 (0.75)	2.37* (1.66)	3.39** (2.09)	0.51 (0.48)	2.25* (1.79)	1.80 (1.22)	1.76 (1.24)	2.91** (1.90)
Institut.	3.54*** (4.00)	3.51*** (3.19)	2.22*** (2.98)	1.62* (1.79)	0.97*** (3.06)	3.41*** (3.66)	3.10*** (3.81)	1.61*** (2.69)	1.78*** (3.14)	1.02* (1.66)
Distantn.	-2.91 (-0.96)	-1.17 (-0.35)	-0.92 (-0.27)	-2.45 (-0.68)	-3.25 (-1.05)	-1.65 (-0.53)	0.79 (0.24)	-1.29 (-0.38)	0.06 (0.02)	-3.62 (-1.18)
Inflation Volatility	0.07 (0.22)	0.01 (0.04)	-0.04 (-0.10)	-0.15 (-0.39)	-0.14 (-0.41)	0.10 (0.29)	-0.07 (-0.23)	0.08 (0.22)	-0.13 (-0.37)	-0.17 (-0.48)
Capital Controls	-1.22 (-0.42)	1.31 (0.34)	0.88 (0.25)	-0.76 (-0.20)	-0.54 (-0.17)	-3.73 (-1.09)	1.28 (0.40)	-1.06 (-0.32)	-1.01 (-0.32)	-2.29 (-0.72)
R^2	0.61	0.58	0.58	0.54	0.57	0.64	0.62	0.56	0.57	0.57

Notes: All regressions include constant and are estimated by OLS with White's correction of heteroskedasticity. t-statistics are in parentheses denoting *** 1%, ** 5%, and * 10% significance levels. Human Capital, Inflation, and Distantness are in logs to smooth the effect of outliers, the other variables are in levels. Capital inflows per capita are divided by 10. All variables are sample averages (1991-1997) except GDP per capita and Human Capital, which are initial values. Institutions are captured by: (1) Composite political safety index (ICRG, 1984-1997) without socioeconomic condition and investment profile components; (2) Government Stability - the government's ability to carry out its declared program(s), and its ability to stay in office (1984-1997); (3) Socioeconomic Conditions - protection from socioeconomic pressures at work in society that could constrain government action or fuel social dissatisfaction (1984-1997); (4) Investment Profile - factors affecting the risk to investment that are not covered by other political, economic and financial risk components (1984-1997); (5) Internal Conflict - protection from political violence in the country and its actual or potential impact on governance (1984-1997); (6) Non-corruption index - assessment of corruption within the political system (1984-1997); (7) Law and Order: the Law sub-component is an assessment of the strength and impartiality of the legal system; the Order sub-component is an assessment of popular observance of the law (1984-1997); (8) Protection from government repudiation of contracts (1982-95); (9) Protection from Expropriation (1982-95). (10) Regulation of Participation (Polity Data, 1984-94).

Table 7: **Robustness II: Fundamentals vs. Market Imperfections**

Dependent Variable: Capital Inflows per capita

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Observations	44	44	46	46	46	46	44	44
GDP per capita	-1.75*	-1.75	-1.02	-0.64	0.77	-0.02	-0.33	-0.44
	(-1.75)	(-1.49)	(-0.79)	(-0.47)	(0.48)	(-0.01)	(-0.22)	(-0.33)
Human Capital	1.20	1.20	2.25*	2.11	1.43	1.95	2.12	2.23
	(0.95)	(0.94)	(1.82)	(1.63)	(1.06)	(1.35)	(1.54)	(1.56)
Institutional Quality	2.54***	2.53***	3.68***	3.55***	3.90***	3.66***	3.47***	3.46***
	(2.71)	(2.80)	(4.00)	(4.03)	(4.10)	(3.99)	(4.01)	(4.08)
Distantness	–	0.19	–	-2.80	-5.27*	-3.87	-4.50	-4.62
	–	(0.06)	–	(-0.90)	(-1.93)	(-1.09)	(-1.33)	(-1.34)
Sovereign Risk	-3.91***	-3.95***	–	–	–	–	–	–
	(-3.51)	(-3.86)	–	–	–	–	–	–
Reuters	–	–	0.22	0.04	–	–	–	–
	–	–	(0.50)	(0.09)	–	–	–	–
Inflation Volatility	0.43	0.43	-0.12	0.07	-0.30	0.00	0.19	0.20
	(1.67)	(1.33)	(-0.48)	(0.21)	(-0.79)	(-0.01)	(0.50)	(0.53)
Capital Controls	3.22	3.27	-0.71	-1.17	0.25	-0.79	-1.08	-1.24
	(1.06)	(1.06)	(-0.24)	(-0.40)	(0.09)	(-0.29)	(-0.32)	(-0.39)
Bank Credit	–	–	–	–	-2.96**	–	–	–
	–	–	–	–	(-2.14)	–	–	–
Liquid Liabilities	–	–	–	–	–	-1.39	–	–
	–	–	–	–	–	(-0.78)	–	–
Capitalizat.	–	–	–	–	–	–	-0.16	–
	–	–	–	–	–	–	(-0.40)	–
Total Value Traded	–	–	–	–	–	–	–	-0.13
	–	–	–	–	–	–	–	(-0.63)
R^2	0.66	0.66	0.60	0.61	0.65	0.61	0.62	0.62

Notes: All regressions include a constant and are estimated by OLS with White's correction of heteroskedasticity. t-statistics are in parentheses denoting *** 1%, ** 5%, and * 10% significance levels. Human Capital, Inflation, and Distantness are in logs to smooth the effect of outliers, the other variables are in levels. Capital inflows per capita are divided by 10. All variables are sample averages (1971-1997) except GDP per capita and Human Capital, which are initial values (1971). See notes to Table 1 for the description of the variables.

Table 8: **Robustness III: Calculation of Capital Inflows**

Dependent Variable: Capital Inflows per capita

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Countries	59	59	59	59	59	59	59	59	59	57
GDP per capita	1.41*** (4.12)	0.70** (2.23)	0.57* (1.86)	1.41*** (4.17)	0.23 (0.85)	0.20 (0.76)	0.10 (0.35)	0.13 (0.45)	0.70 (0.80)	1.08 (1.31)
Human Capital	– –	2.28** (2.50)	– –	– –	1.76** (2.23)	2.04** (2.38)	1.60** (1.96)	1.93** (2.03)	2.81 (1.54)	1.88 (0.97)
Institut. Quality	– –	– –	1.32*** (4.57)	– –	1.00*** (3.76)	0.79** (2.53)	1.01*** (3.87)	0.82*** (2.54)	2.72*** (2.95)	2.06** (2.32)
Distant.	– – –	– – –	– – –	-1.51 (-1.61)	-0.88 (-0.99)	0.02 (0.02)	-0.67 (-0.73)	0.04 (0.05)	-2.74 (-1.39)	-2.80 (-1.46)
Inflation Volatility	– –	– –	– –	– –	– –	-0.38* (-1.94)	– –	-0.34 (-1.58)	-0.46 (-1.08)	-0.36 (-0.83)
Capital Controls	– –	– –	– –	– –	– –	– –	-1.32 (-1.36)	-0.71 (-0.62)	-5.73** (-1.98)	-2.03 (-0.59)
R^2	0.26	0.30	0.31	0.27	0.34	0.35	0.34	0.35	0.53	0.33

Notes: All regressions include a constant and are estimated by OLS with White's correction of heteroskedasticity. t-statistics are in parentheses denoting *** 1%, ** 5%, and * 10% significance levels. Capital inflows per capita are divided by 100. Human Capital, Inflation, and Distantness are in logs to smooth the effect of outliers, the other variables are in levels. All variables are sample averages (1971-1998) except GDP per capita and Human Capital, which are initial values (1971). This table uses a different data source for capital. In columns (1) – (8) the capital inflows is calculated as the flows of direct investment liabilities and portfolio equity liabilities in constant 1995 U.S. Dollars. (Descriptive statistics: Mean: 246.10; Std.Dev.: 406.26; Min.: 0.32; Max.: 2624.00). In column (9) we add differences in stocks of the portfolio debt liabilities and other investment liabilities in constant 1995 U.S. Dollars. (Descriptive statistics: Mean: 606.03; Std.Dev.: 958.57; Min.: -3.57; Max.: 4602.06). In column(10) the capital inflows is calculated as the differences in stocks of direct investment liabilities and portfolio equity in constant 1995 U.S. Dollars. (Descriptive statistics: Mean: 450.01; Std.Dev.: 957.52; Min.: 1.45; Max.: 5159.77). Flows data are from IMF, IFS and the estimates of stocks come from Lane and Milesi-Ferretti (2001). The descriptive statistics for the right-hand side variables are similar to those that are provided in Table 1. For FDI and portfolio liability flows we omit observations with the missing values; for debt liabilities we replace missing values with zero to keep the same sample size. See notes to Table 1 for the description of the other variables.

Table 9: **Explaining the Lucas Paradox: IV Analysis (First Stage Regressions)**

Dependent Variable: Index of Institutional Quality

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Countries	46	46	46	46	46	46	46
French legal Origin	0.05 (0.20)	0.13 (0.44)	0.26 (0.99)	0.24 (0.91)	0.21 (0.96)	-0.36 (-1.49)	-0.38 (-1.55)
German legal Origin	0.72* (1.79)	0.73* (1.83)	0.81* (1.94)	0.79** (2.51)	0.57** (2.17)	– –	– –
Common law Origin	– –	– –	– –	– –	– –	-0.54** (-2.23)	-0.56** (-2.11)
Familiarity w. Legal Code	1.89*** (9.38)	1.85*** (8.60)	1.63*** (7.10)	1.72*** (7.06)	1.70*** (7.94)	1.44*** (7.58)	1.45*** (7.51)
Autocracy	– –	-0.01 (-0.27)	– –	– –	0.12*** (2.79)	– –	– –
Executive Recruitment Reg.	– –	0.15 (0.64)	– –	-0.06 (-0.28)	– –	– –	– –
Monocratism	– –	– –	0.22* (1.74)	0.08 (0.59)	– –	– –	– –
Executive Constraints	– –	– –	– –	0.11** (2.23)	0.24*** (3.64)	0.31*** (3.92)	0.32*** (4.08)
Regulation of Participation	– –	– –	0.15* (1.89)	– –	– –	0.23*** (3.24)	0.23*** (3.16)
Democracy	– –	– –	– –	– –	– –	-0.14*** (-2.82)	-0.14*** (-3.00)
Antiquity of the State	– –	– –	– –	– –	– –	– –	-0.10 (-0.31)
English Language	– –	– –	0.22 (0.97)	– –	– –	– –	– –
R^2	0.66	0.66	0.70	0.70	0.74	0.79	0.79

Notes: All regressions include a constant and are estimated by White's correction of heteroskedasticity. French, British-Common and German Legal Origin correspond to the Legal family. Familiarity with legal code corresponds to whether the country is the origin of the legal family or exhibited familiarity with the imported law. Autocracy and Democracy correspond to regime type. Executive Recruitment Regulation, Monocratism, Regulation of Participation scores correspond to restrictions to the executive power and participation rules in the country. English language is the the fraction of the population speaking English. Antiquity of the State is an index constructed by Bockstette et al. (2002).

Table 10: **Explaining the Lucas Paradox: IV (Second Stage Regressions)**

Dependent Variable: Capital Inflows per capita

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Countries	46	46	46	46	46	46	46
GDP per capita	-2.69 (-0.88)	-2.14 (-0.75)	-2.44 (-0.84)	-2.23 (-0.87)	-2.73 (-1.20)	-2.31 (-1.15)	-2.68 (-1.32)
Human Capital	1.69 (1.03)	1.81 (1.17)	1.74 (1.11)	1.79 (1.16)	1.68 (1.09)	1.77 (1.15)	1.69 (1.07)
Institutional Quality	5.71* (1.88)	5.13* (1.83)	5.45* (1.89)	5.23** (2.07)	5.75*** (2.74)	5.31*** (2.73)	5.70*** (2.92)
Distantness	-2.35 (-0.72)	-2.50 (-0.78)	-2.41 (-0.73)	-2.47 (-0.77)	-2.34 (-0.70)	-2.45 (-0.79)	-2.35 (-0.74)
Inflation Volatility	0.33 (0.69)	0.26 (0.59)	0.30 (0.67)	0.27 (0.63)	0.33 (0.83)	0.28 (0.66)	0.33 (0.77)
Capital Controls	-0.36 (-0.13)	-0.59 (-0.21)	-0.46 (-0.16)	-0.55 (-0.19)	-0.34 (-0.12)	-0.52 (-0.18)	-0.36 (-0.13)
R^2	0.61	0.61	0.61	0.61	0.61	0.61	0.61
OIR Test (Prob.$> \chi^2$)	7.551 (0.023)	8.988 (0.061)	10.137 (0.071)	9.179 (0.102)	7.686 (0.104)	5.280 (0.383)	7.807 (0.253)

Notes: All regressions include constant and are estimated by with White's correction of heteroskedasticity. t-statistics are in parentheses denoting *** 1%, ** 5%, and * 10% significance levels. Capital Inflows per capita are divided by 10. The OIR Test reports the χ^2-statistics for overidentifying restrictions with corresponding p-values in parentheses. The null hypothesis is that there are no overidentifying restrictions. Institutional Quality is instrumented by (1) French and German Legal Origin and Familiarity with Legal Code variables. In column (2) Autocracy and Executive Recruitment Regulation scores are added; in (3) we use Monocratism, Regulation of Participation scores, and the fraction of the population speaking English in addition to instruments used in (1); in (4) we use Executive Recruitment Regulation, Monocratism, and Executive Constraints scores in addition to instruments in (1); in (5) we use Autocracy and Executive Constraint scores in addition to instruments in (1); in (6) we use Democracy, Executive Constraint, Regulation of Participation scores in addition to British and German Legal Origin and Familiarity with Legal Code; in (7) we add Antiquity of the State score to instruments used in (6).

Table 11: **Explaining the Lucas Paradox: Historical Perspective**
Dependent Variable: Capital Inflows per Capita

	(1)	(2)	(3)	(4)	(5)	(6)
1918-1929						
Observations	12	12	12	12	12	12
GDP per Capita	0.019**	-0.006	0.020***	0.023***	0.017**	-0.009
	(2.53)	(-0.28)	(3.06)	(3.68)	(1.98)	(-0.28)
Human Capital	–	0.150	–	–	–	0.214
	–	(1.38)	–	–	–	(1.04)
Land	–	–	-0.0014	–	–	-0.0004
	–	–	(-0.31)	–	–	(-0.07)
Distantness	–	–	–	-0.015	–	0.033
	–	–	–	(-0.55)	–	(-0.81)
Legal Origin	–	–	–	–	-0.008**	0.0035
	–	–	–	–	(-2.09)	(-0.35)
R^2	0.24	0.38	0.25	0.25	0.31	0.45
1929-1946						
Observations	15	15	15	15	15	15
GDP per Capita	0.014**	-0.002	0.0142*	0.016**	0.011	0.006
	(2.17)	(-0.12)	(1.93)	(2.47)	(1.63)	(0.41)
Human Capital	–	0.133	–	–	–	0.123
	–	(0.83)	–	–	–	(0.84)
Land	–	–	0.0039	–	–	0.007
	–	–	(0.77)	–	–	(1.12)
Distantness	–	–	–	-0.010	–	-0.046
	–	–	–	(-0.38)	–	(-1.29)
Legal Origin	–	–	–	–	-0.010**	0.003
	–	–	–	–	(-2.20)	(-0.63)
R^2	0.10	0.15	0.13	0.10	0.20	0.30
1925-1929						
Observations	12	12	12	12	12	12
GDP per Capita	0.018***	-0.005	0.018***	0.016**	0.016**	-0.006
	(2.76)	(-0.39)	(2.57)	(2.37)	(2.33)	(-0.28)
Human Capital	–	0.155**	–	–	–	0.223
	–	(1.90)	–	–	–	(1.34)
Land	–	–	0.003	–	–	0.004
	–	–	(0.76)	–	–	(0.73)
Distantness	–	–	–	0.0099	–	-0.050
	–	–	–	(0.37)	–	(-1.19)
Legal Origin	–	–	–	–	-0.007**	0.005
	–	–	–	–	(-2.13)	(0.59)
R^2	0.22	0.46	0.27	0.25	0.29	0.52

Notes: All regressions include a constant and are estimated by OLS with White's correction of heteroskedasticity. t-statistics are in parentheses denoting *** 1%, ** 5%, and * 10% significance levels. Land and distantness are in logs to smooth the effect of outliers, other variables are in levels. Legal Origin corresponds to French Legal System.

FIGURE 1. Case 1: US – No Human Capital
Region's MPK Relative to Regional Average MPK

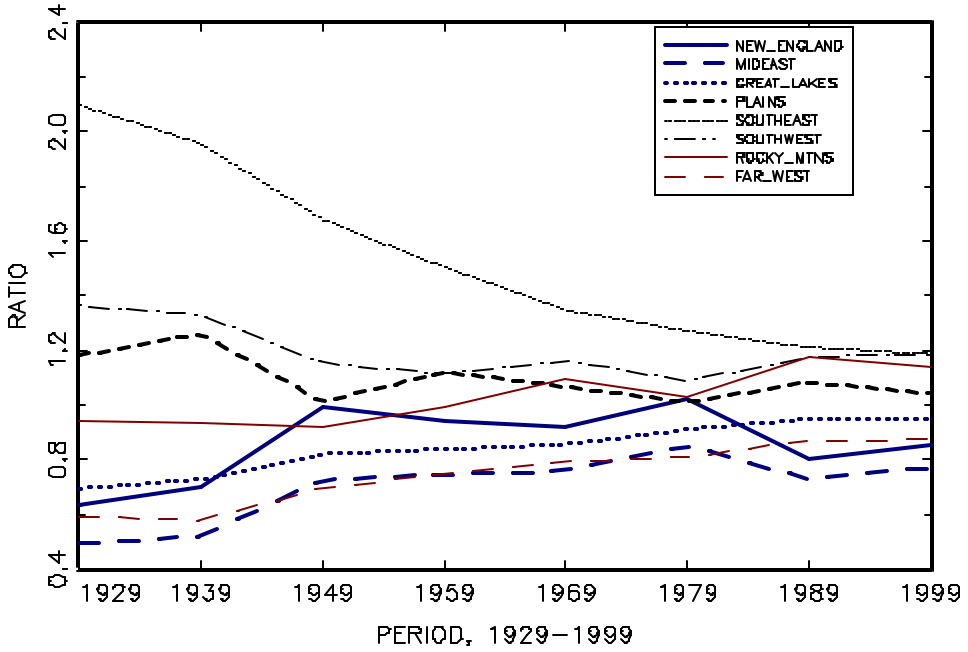

FIGURE 2. Case 1: US – Human Capital
Region's MPK Relative to Regional Average MPK

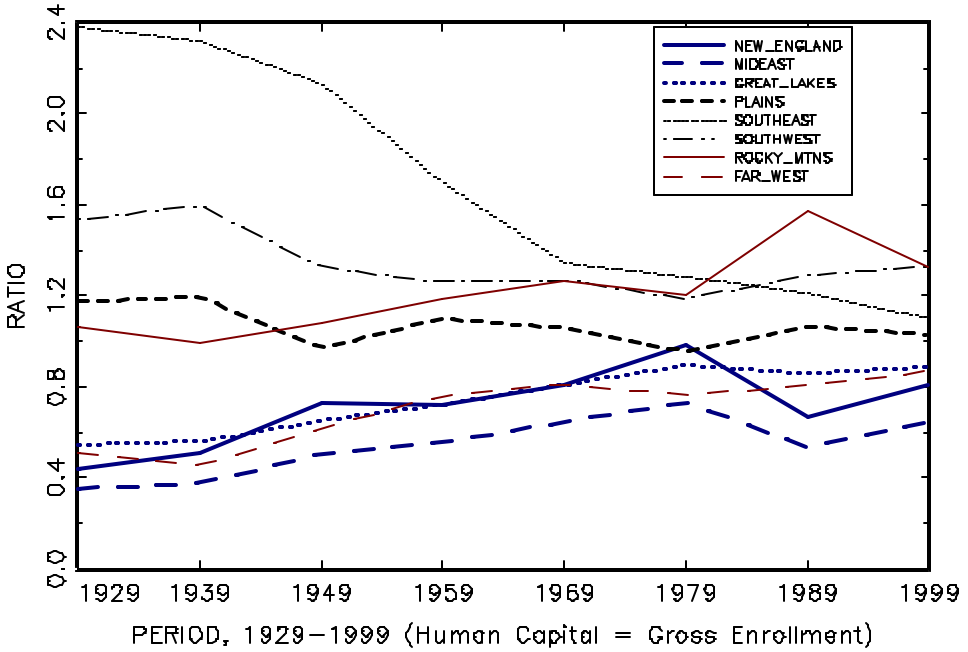

FIGURE 3. Case 2: OECD – No Human Capital
Group's MPK Relative to Group's Average MPK

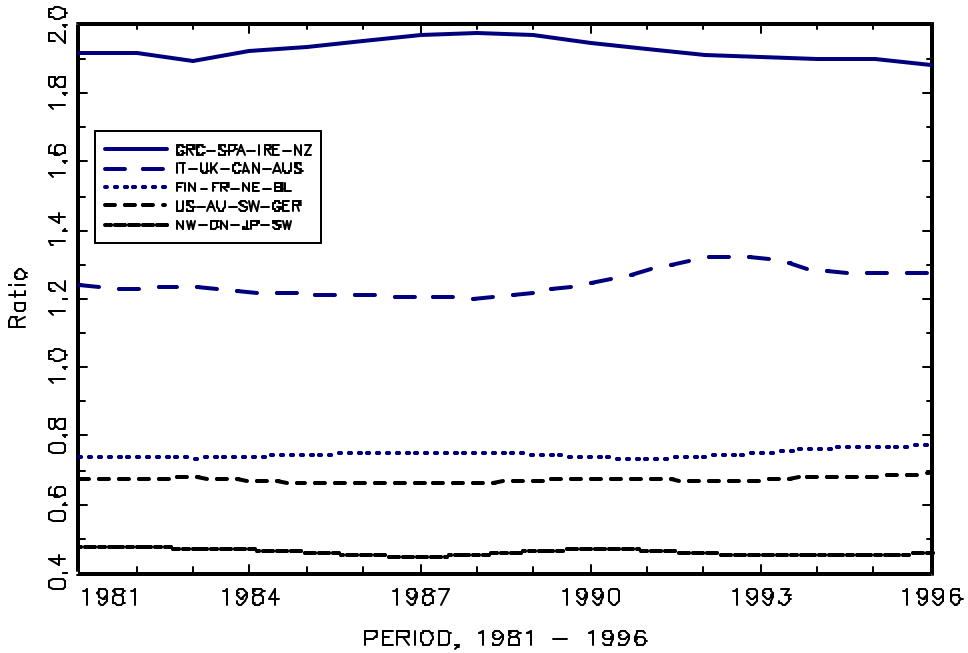

FIGURE 4. Case 2: OECD – Human Capital
Group's MPK Relative to Group's Average MPK