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Abstract

This paper is concerned with whether the persistence of the Lucas paradox (that unlike what the classical economic theory would predict, capital flows to richer economies rather than poorer ones where marginal returns to capital are expected to be higher) within developing countries is because of the unobservable county-specific effects. Perhaps capital has been flowing to where it has already flowed and not necessarily where it had already been. Using five-year (rolling-averaged) panel data for up to 47 developing countries over the period 1980-2006, it examines if including the institutional quality index removes the Lucas paradox intertemporally (i.e. in the short-run). The 'short-run' relationships are captured by employing linear static (principally within-group fixed effects) and dynamic (system GMM) panel data methods. I demonstrate that the persistence in the Lucas paradox within developing countries is so entrenched that allowing for unobserved country-specific effects, within-group (time series) variation and autoregressive dynamics do not resolve the paradox.

Keywords: Capital flows, Lucas paradox, Institutional quality, Economic growth, Within-group fixed effects, System GMM

JEL classification: E02, F20, F41, G15, J24, O16

1. Introduction

Ordinary least squares (OLS) estimators using time-aggregated (long-term averaged) data for cross-sections are charged not to take the *intertemporal* dependence into account but fit mainly long-run steady-state equilibrium models (Cameron and Trivedi, 2005, Sinn, 1992). In such cross-section models, the unobservable country-specific fixed effects that are correlated with the observed characteristics (i.e. explicitly controlled variables) included in the model can cause statistical difficulties in estimation: potential aggregation bias, loss of information (due to absorbed time variation), inconsistency and inefficiency. Neither can they account for the causes of behavioural persistence since they are unable to control for true state dependence (autoregressivity, especially in the dependent variable).[1]

Drawing largely on the theoretical considerations in Keskinsoy (2017), this paper addresses the methodological and measurement issues discussed above. It is concerned with the question: Is it (the persistence of the Lucas paradox within developing countries, as documented in Keskinsoy, 2017) because of the unobservable county-specific effects or is it actually due to the persistence of the capital in flowing to a certain market but appears as if its initial abundance in that market spurs further inflows? In other words, perhaps capital has been flowing to where it has already flowed and not necessarily where it had already been. Using five-year (rolling-averaged) panel data for up to 47 developing countries over the period 1980-2006, it examines if including the institutional quality index removes the Lucas paradox intertemporally (i.e. in the short-run). The 'short-run' relationships are captured by employing linear static (principally within-group fixed effects) and dynamic (system GMM) panel data methods (Pesaran and Smith, 1995, Houthakker, 1965, Baltagi and Griffin, 1984).[2]

In this paper, I additionally investigate the short-run prognoses of Acemoglu and Zilibotti (1997) who, in contrast to Lucas (1988, 1990), argue that economic growth, development and capital flow patterns are predicted by a neoclassical growth model augmented with assumptions of micro-level indivisibilities and uncertainty. According to their overlapping generations model of optimal portfolio choice, it is not a paradox at all (as it is already expected) that more foreign capital will flow to richer economies in the short-run. The data and methodology employed here enable such an empirical verification. Capital inflows per

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[1] In a time series context, state dependence means that state at a given moment depends on the previous state(s) of the system.

[2] Baltagi (2005) states that the *between* estimator (pooled OLS or equivalently cross-section OLS, which are based on the cross-section component of the data) tends to give long-run estimates while the *within* estimator (which is based on the time-series component of the data) tends to give short-run estimates.

capita (the dependent variable as the sum of foreign direct and portfolio equity investment) represent the cross-border risky financial investments in Acemoglu and Zilibotti (1997). The initial endowments were captured by the initial GDP per capita while the risk-return trade-off (insurance, investment security or risk conditions) is embodied in the institutional quality variable. Static and dynamic panel estimators that fit to 'time t' notion let us analyse the short-run or dynamic implications of their model. Comprehensive review of the derivation of Acemoglu and Zilibotti (1997) results that are particularly considered here is in the appendix.

[Table 1]

To compare space (between) and time (within) variations in the data, coefficients of variation and percentage proportions for standard deviations of over-time and cross-country averaged data are given in Table 1. Notwithstanding the fact that *between* coefficients of variation are larger for all variables, standard deviation proportions are either relatively close to each other or even higher in *within* cases for, at least, the first three most important variables. All in all, the figures in the table imply that time variation should not be ignored as incorporating time dimension through appropriate model specifications would not only alleviate aggregation bias but would also yield significant information and efficiency gains. Figure 1 shows per capita equity flows by subperiods. During the first two decades capital flows follow steadily declining trajectory and starting 1990s onwards the trend reverses in the direction of increase.

[Figure 1]

The rest of the paper proceeds as follows. Econometric methodology is devised in Section 2. Section 3 overviews the descriptive statistics and pairwise correlations. Results from static panel estimators are examined in Section 4, while dynamic panel regressions discussed in Section 5. Section 6 concludes.

2. Methodology

Given small T, relative to N, I avail of cross-section asymptotics in building up the following sections.[3]

[3] $N \to \infty$ asymptotics are more appropriate than $T \to \infty$ asymptotics, even though N is practically fixed while T can grow (Wooldridge, 2002). This is in fact the case in my country panel study. Nonetheless, if N is sufficiently large relative to T and one can assume rough independence in the cross section or make sure it to be so by introducing cluster robust estimators then the suitable approximations warranted (Ibid.).

2.1 Specification for Static Panel Estimators

The static two-way error components population regression function for sample estimations can be written as:

$$F_{it} = \mu + \alpha Y_{it} + \mathbf{x}_{it}\boldsymbol{\beta} + \vartheta_{it} \qquad i = 1, \dots, N; \quad t = 1, \dots, T \tag{1}$$

where F_{it} is the dependent variable (five-year averaged inflows of portfolio equity and foreign direct investment expressed as capital inflows per capita) for country i and time period t, μ is a constant, Y_{it} is the main regressor (the natural log of GDP per capita at first years of each panels), $\mathbf{x}_{it}$ is a $1 \times (K-1)$ row vector of any additional explanatory variables. The estimators of interest are the scalar α and $(K-1) \times 1$ column vector $\boldsymbol{\beta}$; $K \geq 1$ being the number of covariates. $\hat{\alpha}$ will be capturing the Lucas paradox and $\widehat{\boldsymbol{\beta}}$ the influence of the other regressors on capital inflows (and whether they account for, that is remove, the paradox). Assuming ϑ_{it}, the composite disturbances, follow a generalized two-way error components structure

$$\vartheta_{it} = u_i + \delta_t + \varepsilon_{it} \qquad i = 1, \dots, N; \quad t = 1, \dots, T \tag{2}$$

where u_i refers to country specific unobservable fixed effects, δ_t denotes period-specific effects which are assumed to have fixed parameters to be estimated as coefficients of time dummies, and ε_{it} denotes idiosyncratic errors.

Each of the three static panel data models (pooled OLS, fixed effects and random effects) applied specifies different orthogonality, rank and efficiency assumptions about the elements of ϑ_{it} and $\mathbf{x}_{it}$ in terms of conditional expectations, invertibility and variances. Pooled OLS (POLS) assumes that u_i is fixed over time and has a constant partial impact on the mean response in each time period. If u_i is correlated with any element of $\mathbf{x}_{it}$, then POLS estimator is biased and inconsistent. Because POLS does not offer any solution for potential cross section heterogeneity I consider two other estimators. Fixed effects model (FEM) allows for arbitrary correlation between u_i and $\mathbf{x}_{it}$ by relaxing the orthogonality assumption and deals with this through within transformation; time demeaning of Equation (1) removes observed and unobserved fixed effects. More intuitively, FEM accounts for unobserved country effects that are correlated with $\mathbf{x}_{it}$ but 'sweeps up' time-invariant variables. On the other hand, random effects model (REM) involves generalized least squares (GLS) transformation under stricter orthogonality assumptions. REM estimator is obtained by quasi time demeaning which implies the removal of only a pre-estimated fraction of the time averages. Having the advantage of explicitly allowing for time-invariant variables REM favoured over FEM if country effects are uncorrelated with $\mathbf{x}_{it}$ but is inconsistent if FEM is the true model. It is standard to choose between FEM and REM using a cross section-time series adapted version of the Hausman specification test. To avoid heteroscedasticity and serial correlation in ε_{it} I employ the Huber/White/sandwich cluster robust estimator.

2.2 Representation of Dynamic Panel Estimators

As many economic relationships are inherently dynamic (Nerlove, 2002), the dynamics of adjustment can be represented by a dynamic two-way error components population regression:

$$F_{it} = \mu + \mathbf{f}_{it-s}\boldsymbol{\gamma} + \alpha Y_{it} + \mathbf{x}_{it}\boldsymbol{\beta} + \vartheta_{it} \qquad i = 1, \dots, N; \quad t = 1, \dots, T; \quad s = 1, 2 \qquad (3)$$

where $\mathbf{f}_{it-s}$ is the vector containing the lags of the dependent variable (capital inflows per capita) as regressors rendering (3) to include an autoregressive process. The parameter vector $\boldsymbol{\gamma}$ involves the scalars measuring the extent of state dependence (inertia), and the composite disturbance term is similarly specified as a two-way error components mechanism

$$\vartheta_{it} = u_i + \delta_t + \varepsilon_{it} \qquad i = 1, \dots, N; \quad t = 1, \dots, T \qquad (4)$$

where u_i represents, as before, state-specific effects, and δ_t denotes period-specific effects which are assumed to have fixed parameters to be estimated as coefficients of time dummies.

In a dynamic specification of the kind in (3) POLS, within-group FEM, and REM do not take the endogeneity of the lagged dependent variable into consideration and produce biased and inconsistent estimates. Therefore, a generalized method of moments (GMM) approach is required. Because my short time panel data are highly persistent I use the Blundell and Bond (1998) system GMM estimator which entails contemporaneous first differences to instrument the levels of the endogenous variables and past (two-period or earlier) lagged levels to instrument the first differences of the same variables simultaneously.[4] Because I conjecture

[4] Blundell and Bond (1998) show that as the concentration parameter approaches to zero, i.e. the data series becomes more persistent, the conventional instrumental variable estimator (Arellano and Bond (1991) difference GMM) performs poorly. They attribute the bias and the poor precision of the first-difference GMM estimator to the problem of weak instruments. Under the extra moment conditions of Ahn and Schmidt (1995) and Arellano and Bover (1995), with short T and persistent series Blundell and Bond (1998) also show that an additional mild stationarity restriction on the initial conditions process allows the use of an extended system GMM estimator that has dramatic efficiency gains over the basic first-difference GMM. These results are reviewed and empirically verified by Blundell and Bond (2000). In this study the time length is quite short as $T = 5$ most of the cases. In each of the simple autoregressive POLS with no exogenous regressors (results from which are available upon request) the positively significant (all at 1%) coefficients on the first lags of capital inflows per capita, real per capita initial output and institutional quality are respectively around 0.765, 0.912 and 0.698.

that only the lags of the dependent variable are structurally endogenous in my framework and the Hausman regressor endogeneity tests corroborate this I assume all the remaining explanatory variables to be strictly exogenous throughout the entire dynamic model estimations.[5] As a result, the composite instrument matrix with varying dimensions according to the relevant specification is composed of two blocks: GMM-style instruments for the lagged dependent variables and conventional IV-style instruments (essentially the rest of the covariates instrument themselves). I prefer the GMM instruments to be collapsed to create one instrument for each variable and lag distance rather than one for each time period, variable and lag distance since GMM estimators, including 2SLS and 3SLS, using too many over-identifying restrictions are known to have poor finite sample properties and to decrease the test powers.[6] Small-sample adjustment, two-step estimator optimization, and Windmeijer (2005) finite-sample corrected cluster-robust standard errors used in all GMM applications.

3. Descriptive Statistics and Pairwise Correlations

Data are organized as five-year sub-period moving averages (1980-84, 1985-89, 1990-94, 1995-99 and 2000-2006) over 1980-2006 for up to 47 developing countries. Variable definitions and sources are in the appendix. Data availability may limit the number of countries or periods for some variables. Given the panel structure, data in the first year of each sub-period are used as initial values for per capita gross domestic product (GDP) and gross capital formation (GCF), so some time variation is incorporated in addition to the variation across countries.

[Table 2]

Table 2 shows summary statistics for the five-year panel sample. Inserting time series information via sub-period averaging provides larger sample sizes, mean realizations, overall variations and ranges of almost all variables. Estimation efficiency and precision in short-run regressions are expected to improve due to degrees-of-freedom gains as a result of disaggregation.

[Table 3]

Table 3 reports pairwise correlations for the variables using the Pearson product-moment correlation coefficients. Equity flows per capita is highly correlated with all the other

[5] Endogeneity issues are exclusively examined in the static panel instrumental variable regressions section.

[6] See Tauchen (1986), Altonji and Segal (1996), Ziliak (1997), Sargan (1958), Bowsher (2002) and Roodman (2009).

variables (in the expected direction) except for total factor productivity growth. Initial per capita purchasing power parity (PPP) adjusted GDP has the highest positive correlation, with average years of schooling (0.707), the highest negative correlation, with country risk. This is unsurprising in the sense that relatively wealthier countries at the outset have better schooling and creditworthiness in subsequent years.

4. Static Panel Estimations

Three static panel data estimators are employed: pooled ordinary least squares (POLS), within-group fixed effects model (FEM) and random effects model (REM). In order to save space results of all these models are reported for only one specification in each table. For the other specifications, either FEM or REM results are given. To choose between FEM and REM, I first estimate the model with cluster-robust random effects. Then, I apply a panel data-adjusted version of the Sargan-Hansen over-identifying restrictions (OIR) test (Schaffer and Stillman, 2016).[7] Based on the test results, I finally choose fixed effects if the p-value is smaller than 0.10; and random effects otherwise. As economic theory suggests (that unobserved country-specific effects are likely to be correlated with the observable characteristics in $\mathbf{x}$, see above) and econometric tests mostly confirm, FEM is the preferred estimator.

4.1 Baseline Results

Table 4 reports the basic static panel data regression results. Since the Sargan-Hansen OIR test implies that REM is inconsistent only FEM estimates are given under the first specification. Controlling for time invariant country-specific heterogeneity, fixed effects estimation shows that capital moves to relatively wealthier economies; allowing for within-group variation the Lucas paradox exists. Under models (2) and (3), fixed effects (likewise POLS and REM) estimates for initial income and institutions are positive and highly significant (at 1% and 5% respectively). Hence, the quality of institutions cannot explain the paradox for developing countries in the short-run when time series variations are also taken into account.

[Table 4]

Table 5 includes additional covariates. The fraction of the composite error variance due to unobservable country-specific fixed effects (ρ) is very high leading the Sargan-Hansen OIR

[7] Arellano (1993) and Wooldridge (2002, pp. 290-91) propose more technical approaches for this test.

test to always reject the asymptotic appropriateness of the REM. Following the practices in some empirical papers testing the postulations of gravity models of trade I include both fixed distance and time varying remoteness variables simultaneously under the remaining regressions.[8] In line with the models under (2) and (3) in the previous table, all of the Table 5 estimations demonstrate that within developing countries the paradox prevails, not only across countries but also over time no matter how significant are the additional explanatory variables.

[Table 5]

4.2 Sensitivity Analyses

Through a number of alternative specifications with different proxy variables I document that all of the static panel within-group fixed effects, pooled OLS and random effects GLS techniques consistently deliver similar estimates that are implicationally robust.[9] Regressions reported in Table 6 include some aspects of the host country economic fundamentals alongside initial GDP per capita and institutional quality. Validated by the pertinent OIR tests, REM under (1) and (3) and FEM under (2) show that the paradox is still left unexplained despite controlling for corporate tax, trade openness and deposit money bank assets as well as institutions.

[Table 6]

From Table 7 it seems as if institutional quality accounts for the capital flows and the Lucas paradox under FEM (2) but when I replace initial income with initial GCF in FEM (2) of Table 5 the quality of institutions variable is not significant whilst initial capital stock is. Albeit not equivalently consistent, POLS and REM yield the results (unreported) that they both are significant under (2). All the other regressions maintain the finding that the paradox unresolved for developing countries.

[Table 7]

Table 8 reports the results considering proxy variables for sovereign risk (average risk level, OECD taxonomy), international knowledge spillovers (average international voice

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[8] See Brun *et al.* (2005), Guttmann and Richards (2006), and Coe *et al.* (2007) for empirical; and Deardorff (1998), and Anderson and van Wincoop (2003) for theoretical treatments.

[9] Outliers detecting added variable plots (available upon request) indicate that Chile and Panama may have influential observations. My key results are left unaltered, however, when I drop either of them in turn or suppress both at once.

traffic) and asymmetric information (average foreign bank asset share). The relevant estimations throughout the table reassure that including country risk, global phone traffic and foreign bank penetration have no influence at all on the prevalence of the paradox.

[Table 8]

4.3 Static Panel Instrumental Variable Regressions

It might be the case that there is a feedback from capital inflows per capita (the dependent variable) to the quality of institutions (one of the key regressors). More generally, there may be an omitted variable that influences both of these. Thus, one cannot discount the possibility of endogeneity of the institutional quality variable. To address this I adopt a panel instrumental variables approach. Table 9 below gives the linear cross section-time series instrumental variable (IV) regressions in addition to the first stage and primary panel data estimations throughout Panels A, B and C. Under (1) and (2) institutional quality is instrumented solely by the time invariant variable of log European settler mortality. Since this implicit instrument does not change over time FEM estimators do not work properly so that I am unable to report any within-group estimate. Considering all the other two-stage least squares (2SLS) for POLS and generalized two-stage least squares (G2SLS) for REM results, Hausman regressor endogeneity tests suggest that the corresponding models in Panels A and C are asymptotically equivalent. Excessively larger standard errors in Panel A reinforces this also that institutional quality is actually exogenous to the conventional static panel specifications. As a last remark, the second part of Panel C shows that the Lucas paradox persists even within the adjusted sample.

[Table 9]

To see whether the colonizer mortality (main instrument) is excludable in the second stage and to test the validity of all the instruments I run further two-way error components IV regressions and provide the results under specification (3) in Table 9. Here I additionally employ fixed but observable variables of British legal origin and English language as implicit instruments besides explicitly controlling for European settler mortality as another instrument for the quality of institutions. Albeit Sargan test for over-identifying restrictions validates those instruments, the Hausman regressor endogeneity test and very high standard errors (Panel A) imply that institutional quality is independent from the idiosyncratic errors (i.e. exogenous).

5. Dynamic Panel Estimations

As noted above, to capture dynamic relationships consistently I employ two-way error components models of generalized method of moments (GMM). I report results from the Blundell and Bond (1998) system GMM estimator as the main variables of interest are quite persistent over time.[10]

5.1 Fundamental Results

Through six dynamic model settings Table 10 provides the system GMM results testing the presence of the Lucas paradox and looking whether it disappears when allowing for institutional quality and other control variables. Specification fitted under (1) once again shows that the paradox indeed exists within this autoregressive dynamic panel framework. Inclusion of the quality of institutions leaves the paradox unresolved as in the static panel cases. In parallel with these, estimations controlling for human capital, unilateral distance, capital controls and remoteness in addition to initial income and institutions demonstrate that the Lucas paradox persists when the autoregressivity in the dependent variable is allowed for. Also there is positively significant (one period) state dependence under all specifications in the table.

[Table 10]

5.2 Robustness Checks

Controlling for trade openness, level of financial sector development, total factor productivity growth, initial capital stock per capita, malaria incidence and international communication traffic in Table 11 do not alter the mainstay of the dynamics characterized above. Coefficients on the lags of the dependent variable give a monotonic adjustment to a shock that is over after two 5-year periods. The positive significance of the first lag effectively narrows this decay to a 5-year period. This is consistent with my interpretation of the estimates from the five-year panel data as the short-run parameters in that it takes five years for an impact on the contemporaneous capital flows (i.e. F_{it}) to die out, after which F_{it} reverts to its long-run level.[11]

[Table 11]

[10] Arellano-Bond difference GMM results are demoted to the appendix.

[11] Because $T \leq 2$ for corporate tax, country risk and foreign bank penetration the dynamic models including them are unspecified. Hence, I am unable to report robustness checks for those extra explanatory variables.

6. Conclusion

This paper augments the analysis in Keskinsoy (2017) by implementing static (including within-group fixed effects) and dynamic (system GMM) panel estimators. These estimators are used to capture short-run dynamic relationships and to deal with any possible omitted variables problem. For a panel of five-year moving averages over 1980-2006 and for 47 developing countries, the paper probes whether the wealth bias in international financial flows (the Lucas paradox) is resolved in the short-run. It also tests if the short-run predictions of Acemoglu and Zilibotti (1997) hold. I demonstrate that the persistence in the Lucas paradox within developing countries is so entrenched that allowing for unobserved country-specific effects, within-group (time series) variation and autoregressive dynamics do not resolve the paradox.

The results are identical within and across static panel data methods. Within-group fixed effects regressions imply (as equivalently consistent random effects GLS regressions do in some cases) that the paradox remains in the short-run for developing economies. Although institutional quality has positive impact on capital flows to these economies, it is unable to resolve the wealth bias. Capturing the dynamics and controlling for endogeneity, Blundell-Bond style system GMM estimations indicate that the existence and persistence of the Lucas paradox is an intertemporal phenomenon within developing countries. They also show that real capital flows per capita have positive, one five-year period state dependence or inertia. This additionally justifies the short-run interpretation throughout the paper.

The persistence in the Lucas paradox and associated non-convergence in real incomes, factor prices and returns could be attributed to a Linder-type home bias in international finance. It may also be the case that excessive volatility in financial markets and related behavioural anomalies in certain types of external funding breed the negative shocks that cancel out the effects of positive shocks. This may eventually give rise to a permanent diversion in the direction of funding.

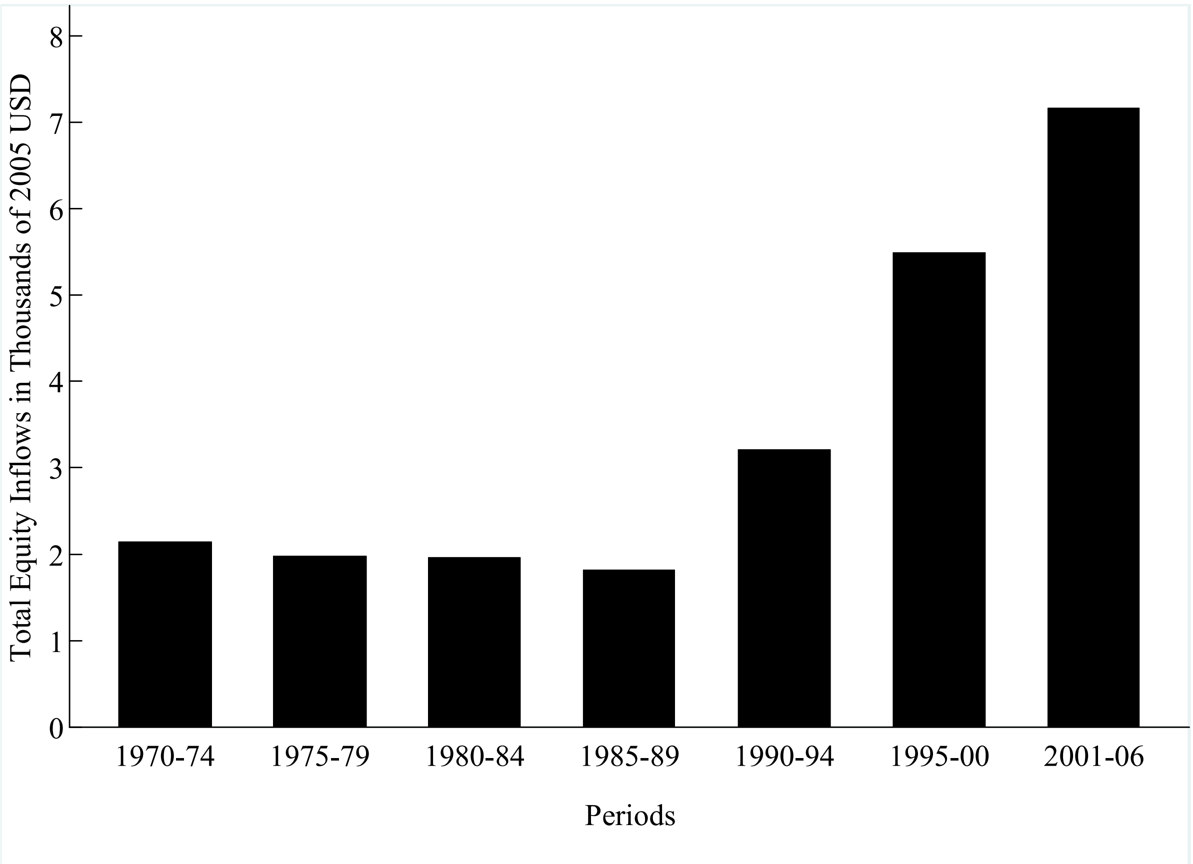
Tables and Figures

Table 1: Standard Deviation Decompositions and Coefficients of Variation of the Data

Variables	Proportional Deviations				Coef. of Variation	
	Annual Sample		5-Year Sample		Annual Sample	
	Between	Within	Between	Within	Between	Within
Per capita equity flows	46.81	53.19	51.92	48.08	1.40	0.65
Per capita initial GDP	100	0	49.41	50.59	0.67	—
Institutional quality	43.84	56.16	46.42	53.58	0.11	0.10
Average years of schooling	64.55	35.45	64.55	35.45	0.45	0.23
Weighted-average remoteness	86.43	13.57	87.89	12.11	0.19	0.01
Capital mobility barriers	44.49	55.51	48.35	51.65	0.31	0.16
Corporate tax rate	70.39	29.61	79.90	20.10	0.18	0.02
Trade openness	66.29	33.71	69.66	30.34	0.49	0.12
Deposit money bank assets	58.32	41.68	59.12	40.88	0.56	0.21
TFP growth	26.26	73.74	38.26	61.74	-6.81	-4.38
Per capita initial GCF	100	0	55.84	44.16	1.04	—
Malaria contagion risk	100	0	100	0	0.87	—
Risk level, OECD	78.93	21.07	81.81	18.19	0.30	0.02
International voice traffic	73.46	26.54	75.37	24.63	1.85	1.11
Foreign bank asset share	77.77	22.23	84.62	15.38	0.93	0.12

Notes: Equity flows are the sum of international portfolio equity and direct investment inflows expressed in constant 2005 US dollars divided by the total population. Percentage proportions for standard deviations of each variable across countries, *between*, versus over time, *within*, under annually observed and five-year averaged samples. Cross country (time averaged data) and over time (country averaged data) coefficient of variations are calculated for annual sample only. GCF is gross capital formation.

Figure 1: Capital Inflows per Capita by Sub-periods, 1970-2006



Notes: See notes to Table1.

Table 2: Summary Statistics, Five-Year Panel Data

Variables	**Sample**	**Mean**	**Std. Dev.**	**Min**	**Max**
Per capita equity flows	231	51.047	78.533	-147.875	482.952
Per capita initial GDP ($PPP)	231	3.439	2.303	0.406	11.647
Institutional quality	231	5.733	1.103	3.168	7.804
Average years of schooling	231	4.352	1.887	0.370	9.740
GDP- weighted average remoteness	231	8.913	1.617	5.840	12.501
Average capital mobility barriers	231	0.585	0.303	0.000	1.000
Corporate tax rate	68	30.118	5.542	15.000	42.220
Trade openness	231	64.961	35.735	12.146	207.290
Deposit money bank assets	212	0.355	0.251	0.040	1.526
TFP growth	180	-0.422	2.675	-8.390	5.166
Per capita initial GCF (2005 $US)	230	0.524	0.482	0.019	2.783
Malaria contagion risk as of 1994	141	0.418	0.398	0.000	1.000
Risk level, OECD	94	5.106	1.542	2.000	7.000
International voice traffic	160	27.011	42.203	0.066	289.080
Foreign bank asset share	77	0.224	0.202	0.006	0.900

Notes: See notes to Table 1.

Table 3: Pearson Product-Moment Correlation Coefficients, Five-Year Panel Data

	Equity Flows pc	*Log pc IGDP*	*Quality of Institutions*	*Log Schooling*	*Log Distance*	*Barriers to Cap. Mob.*
L. pc IGDP	0.444					
p-value	0.000					
Institutions	0.508	0.496				
p-value	0.000	0.000				
Log schooling	0.367	0.707	0.424			
p-value	0.000	0.000	0.000			
Log distance	0.103	0.101	0.090	0.273		
p-value	0.033	0.036	0.146	0.000		
Restrictions	-0.307	-0.258	-0.385	-0.208	-0.172	
p-value	0.000	0.000	0.000	0.000	0.000	
Corporate tax	-0.236	-0.082	-0.197	-0.069	0.033	0.099
p-value	0.043	0.487	0.102	0.565	0.782	0.400
Log openness	0.359	0.287	0.261	0.180	-0.020	-0.329
p-value	0.000	0.000	0.000	0.001	0.675	0.000
L. Bank assets	0.373	0.527	0.339	0.378	-0.020	-0.265
p-value	0.000	0.000	0.000	0.000	0.706	0.000
TFP growth	0.107	-0.062	0.106	-0.003	0.057	-0.175
p-value	0.125	0.373	0.129	0.968	0.410	0.012
Log pc IGCF	0.454	0.687	0.368	0.514	0.046	-0.187
p-value	0.000	0.000	0.000	0.000	0.359	0.000
Malaria	-0.250	-0.539	-0.295	-0.461	0.029	0.018
p-value	0.000	0.000	0.000	0.000	0.563	0.728
Country risk	-0.237	-0.578	-0.553	-0.449	-0.113	0.090
p-value	0.010	0.000	0.000	0.000	0.229	0.336
Voice traffic	0.626	0.374	0.379	0.286	-0.120	-0.187
p-value	0.000	0.000	0.000	0.000	0.081	0.006
Foreign bank	-0.218	-0.348	-0.067	-0.195	0.215	-0.121
p-value	0.043	0.001	0.544	0.083	0.045	0.266

Notes: *Barriers-to-Capital* and *Restrictions* are interchangeably used terms for the same variable of average restrictions to and controls on capital mobility imposed by a country. The abbreviations *L*, *I*, and *pc* refer to 'logs', 'initial' and 'per capita' respectively. Country observations change from pair to pair adjusting to data availability. See notes to Table 2.

Table 4: Static Panel Regressions of Capital Inflows per Capita, 5-Year Panel Data

	(1)	(2)			(3)
	FEM	POLS	FEM	REM	FEM
Log per capita initial GDP (PPP$)	0.658*** (0.168)	0.415*** (0.063)	0.443*** (0.128)	0.426*** (0.064)	
Average institutional quality		0.226*** (0.043)	0.173** (0.065)	0.207*** (0.047)	0.142** (0.063)
Log average per capita GDP (PPP$)					0.592*** (0.147)
Observations	231	231	231	231	231
Countries	47	47	47	47	47
R^2	0.236	0.424	0.276		0.300
R^2***_Overall***	0.358		0.421	0.423	0.428
ρ	0.313		0.279	0.157	0.295
Sargan-Hansen OIR Test (p-value)	0.000			0.028	0.015

Notes: Cluster-robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$ denote significance at 10%, 5%, and 1% respectively. Unreported constant and time dummies included in all estimations. POLS, FEM, REM, and OIR are standing for pooled ordinary least squares, fixed effects model, random effects model, and over-identifying restrictions respectively. ρ is known either as the fraction of the variance due to unobserved country-specific effects or as interclass correlation of the country-specific error.

Table 5: Static Panel Regressions with Alternative Covariates, 5-Year Panel Data

	(1)	(2)			(3)
	FEM	**POLS**	**FEM**	**REM**	**FEM**
Log per capita initial GDP (PPP$)	0.592** (0.240)	0.375*** (0.089)	0.531*** (0.194)	0.400*** (0.096)	
Log average years of schooling	0.161 (0.310)	0.0478 (0.107)	-0.199 (0.309)	0.0357 (0.111)	0.573** (0.225)
Average institutional quality		0.180*** (0.044)	0.0785 (0.082)	0.147*** (0.050)	0.124 (0.091)
Log average distance		-3.332 (2.399)	–	-3.736* (2.040)	–
Log average remoteness		3.571 (2.489)	5.278*** (1.734)	3.975* (2.112)	5.977*** (2.032)
Average restrictions to capital mobility		-0.313 (0.233)	-0.398 (0.269)	-0.323 (0.205)	-0.368 (0.277)
Log per capita initial GDP (2005 US$)					0.379** (0.178)
Observations	231	231	231	231	231
Countries	47	47	47	47	47
R^2	0.237	0.451	0.318		0.309
R^2***_Overall***	0.361		0.147	0.450	0.174
ρ	0.313		0.774	0.167	0.839
Sargan-Hansen OIR Test (p-value)	0.000			0.000	0.000

Notes: The dash "–" signifies automatic drop of corresponding regressor because of collinearity or model algorithm. See notes to Table 4.

Table 6: Robustness Static Panel Regressions of Capital Inflows, 5-Year Panel Data

	(1)	(2)			(3)
	REM	**POLS**	**FEM**	**REM**	**REM**
Log per capita initial GDP (PPP$)	0.712*** (0.126)	0.410*** (0.063)	0.475*** (0.155)	0.417*** (0.065)	0.457*** (0.073)
Average institutional quality	0.550*** (0.111)	0.212*** (0.042)	0.176** (0.067)	0.199*** (0.048)	0.229*** (0.050)
Average corporate tax rate	-0.0190 (0.030)				
Log average trade openness		0.131 (0.102)	-0.104 (0.184)	0.111 (0.101)	
Log average deposit money bank assets					0.0222 (0.081)
Observations	68	231	231	231	212
Countries	36	47	47	47	46
R^2		0.431	0.277		
R^2_Overall	0.552		0.401	0.431	0.448
ρ	0.603		0.298	0.149	0.123
Sargan-Hansen OIR Test (p-value)	0.169			0.004	0.179

Notes: The number of observations may change due to data availability. See notes to Table 5.

Table 7: Robustness Static Panel Regressions of Capital Inflows, 5-Year Panel Data

	(1)			(2)	(3)
	POLS	**FEM**	**REM**	**FEM**	**REM**
Log per capita initial GDP (PPP$)	0.496*** (0.072)	0.495*** (0.139)	0.516*** (0.068)		0.617*** (0.117)
Average institutional quality	0.229*** (0.059)	0.0916 (0.094)	0.187*** (0.066)	0.251*** (0.075)	0.326*** (0.062)
Log average TFP growth	0.0305* (0.018)	0.0377 (0.024)	0.0313* (0.019)		
Log per capita initial GCF (2005 $US)				0.0291 (0.108)	
Malaria contagion risk					0.134 (0.166)
Observations	180	180	180	230	141
Countries	39	39	39	47	47
R^2	0.501	0.293		0.237	
R^2_Overall		0.485	0.499	0.330	0.480
ρ		0.348	0.153	0.356	0.297
Sargan-Hansen OIR Test (p-value)			0.006	0.000	0.174

Notes: See notes to Table 6.

Table 8: Robustness Static Panel Regressions of Capital Inflows, 5-Year Panel Data

	(1)			(2)	(3)
	POLS	**FEM**	**REM**	**FEM**	**REM**
Log per capita initial GDP (PPP$)	0.660*** (0.090)	0.421 (0.485)	0.648*** (0.089)	0.288* (0.166)	0.598*** (0.169)
Average institutional quality	0.503*** (0.078)	0.159 (0.193)	0.447*** (0.074)	0.186 (0.132)	0.306*** (0.086)
Average risk level, OECD taxonomy	0.0108 (0.062)	-0.290 (0.244)	-0.0201 (0.066)		
Average Int'l voice traffic				0.0030 (0.002)	
Average foreign bank asset share					-0.434 (0.476)
Observations	94	94	94	160	77
Countries	47	47	47	46	41
R^2	0.555	0.125		0.273	
R^2***_Overall***		0.427	0.553	0.431	0.409
ρ		0.627	0.406	0.372	0.431
Sargan-Hansen OIR Test (p-value)			0.440	0.011	0.116

Notes: See notes to Table 7.

Table 9: Static Panel IV Regressions of Capital Inflows per Capita, 5-Year Panel Data

	(1)		(2)		(3)	
	POLS	**REM**	**POLS**	**REM**	**POLS**	**REM**
			Panel A: Instrumental Variable Estimations			
Average institutional quality	1.009*** (0.352)	1.007 (0.620)	0.318 (0.342)	0.286 (0.361)	1.212* (0.734)	1.212 (1.556)
Log per capita initial GDP (PPP$)			0.355 (0.284)	0.370 (0.324)		
Log European settler mortality					0.0427 (0.177)	0.0434 (0.376)
Hausman RE (p)	0.374	0.756	0.999	0.999	0.859	0.988
Sargan OIR (p)					0.812	
			Panel B: First Stage for Average Institutional Quality			
Log European settler mortality	-0.210** (0.084)	-0.212* (0.128)	0.166** (0.082)	0.212* (0.114)	-0.221** (0.085)	-0.222* (0.133)
Log per capita initial GDP (PPP$)			0.918*** (0.102)	1.023*** (0.123)		
British legal origin					-0.200 (0.175)	-0.199 (0.274)
English language					0.473 (0.408)	0.473 (0.639)
R^2	0.137	0.137	0.397	0.396	0.146	0.146
			Panel C: Primary POLS and REM Regressions			
Average institutional quality	0.392*** (0.045)	0.333*** (0.046)	0.230*** (0.050)	0.210*** (0.050)	0.371*** (0.045)	0.323*** (0.046)
Log per capita initial GDP (PPP$)			0.426*** (0.072)	0.434*** (0.086)		
Log European settler mortality					-0.134** (0.052)	-0.145* (0.074)
Observations	194	194	194	194	194	194
Countries	39	39	39	39	39	39

Notes: In Panels A and C the response variable is average capital (foreign direct and portfolio equity) flows per capita whereas in B it is the composite index of institutional quality. Hausman regressor endogeneity (RE) test compares each model between Panels A and C whilst Sargan over-identifying restrictions (OIR) test assesses the validity of model instruments. For both tests given are p-values. Standard errors are in parentheses. Consult also notes to Table 8.

Table 10: System GMM Regressions of Capital Inflows per Capita, 5-Year Panel Data

	(1)	(2)	(3)	(4)	(5)	(6)
Average per capita equity flows, $t-1$	0.606*** (0.123)	0.564*** (0.133)	0.536*** (0.138)	0.598*** (0.125)	0.531*** (0.150)	0.541*** (0.135)
Average per capita equity flows, $t-2$	-0.257 (0.196)	-0.215 (0.178)	-0.218 (0.177)	-0.252 (0.196)	-0.189 (0.160)	-0.227 (0.168)
Log per capita initial GDP (PPP$)	0.348*** (0.059)	0.190*** (0.048)		0.310*** (0.072)	0.161** (0.073)	
Average institutional quality		0.185*** (0.035)	0.171*** (0.033)		0.157*** (0.033)	0.171*** (0.033)
Log average per capita GDP (PPP$)			0.247*** (0.054)			
Log average years of schooling				0.0779 (0.111)	0.0645 (0.096)	0.0926 (0.077)
Log average distance					-1.328 (1.457)	-2.175 (1.437)
Log average remoteness					1.292 (1.486)	2.161 (1.493)
Average restrictions to capital mobility					-0.184 (0.249)	-0.175 (0.235)
Log per capita initial GDP (2005 US$)						0.153*** (0.050)
Observations	229	229	229	229	229	229
Countries	47	47	47	47	47	47
m_1 (p-value)	0.021	0.026	0.026	0.021	0.026	0.025
m_2 (p-value)	0.624	0.527	0.516	0.610	0.474	0.636
$Hansen\ J$ (p-value)	0.803	0.740	0.739	0.800	0.735	0.736

Notes: All specifications comprise finite-sample adjustment, two-step estimator optimization and collapsed GMM-style instruments. Unreported constant and time dummies included in all estimations. m_1 and m_2 are the Arellano-Bond tests for first order and second order autocorrelations in the residuals whilst $Hansen\ J$ is the test of over-identifying restrictions for all the model instruments. Because sample size is not an entirely well-defined concept in system GMM which effectively runs on two samples (in levels and in first-differences) simultaneously, I report the size of the untransformed (level) sample. Windmeijer's finite-sample corrected cluster-robust standard errors in parentheses. See notes to Table 9.

Table 11: Robustness System GMM Regressions of Capital Inflows, 5-Year Panel Data

	(1)	(2)	(3)	(4)	(5)	(6)
Average per capita equity flows, $t-1$	0.566***	0.548***	0.552***	0.599***	0.511***	0.539***
	(0.128)	(0.134)	(0.144)	(0.121)	(0.110)	(0.124)
Average per capita equity flows, $t-2$	-0.205	-0.192	-0.0391	-0.249	-0.259	-0.355
	(0.180)	(0.178)	(0.252)	(0.178)	(0.295)	(0.280)
Log per capita initial GDP (PPP$)	0.191***	0.247***	0.225**		0.306**	0.279***
	(0.050)	(0.050)	(0.086)		(0.115)	(0.089)
Average institutional quality	0.182***	0.211***	0.156***	0.209***	0.260***	0.250***
	(0.035)	(0.037)	(0.044)	(0.037)	(0.055)	(0.064)
Log average trade openness	0.0149					
	(0.070)					
Log average deposit money bank assets		-0.0441				
		(0.050)				
Log average TFP growth			0.0175			
			(0.015)			
Log per capita initial GCF (2005 $US)				0.0878**		
				(0.036)		
Malaria contagion risk					-0.0686	
					(0.153)	
Log average Int'l voice traffic						0.0029
						(0.034)
Observations	229	212	178	228	141	160
Countries	47	46	39	47	47	46
m_1 ***(p-value)***	0.026	0.034	0.057	0.026	0.043	0.047
m_2 ***(p-value)***	0.504	0.372	0.482	0.674	0.257	0.442
Hansen J (p-value)	0.744	0.750	0.626	0.778	0.584	0.743

Notes: See notes to Table 10.

Appendix A: Capital Flows in Acemoglu and Zilibotti (1997)

International capital flows are modelled through a problem of optimal portfolio choice in a two-country world. The model assumptions are: *(i)* free international trade in final goods and financial instruments, *(ii)* intermediate goods cannot be traded internationally, *(iii)* both countries face identical constant returns to scale (CRS) technologies, micro-level indivisibilities (nonconvexities or inefficiencies implying that a certain minimum size investment or start-up cost is required to be productive) and uncertainty, *(iv)* there are two countries such that Country 1 is richer (has higher initial endowments) while Country 2 is poorer. Under these assumptions, there are two forces to be taken into account when comparing the profitability of investments in two different countries: *risk diversification* (larger stock of savings → more open or operating sectors → larger amount of intermediate goods ≡ more diversification opportunities in Country 1) and *differential prices for intermediate goods* (higher in Country 2, hence marginal product of capital is higher there). The risk-return trade-off that an agent faces is determined by these two forces.

Because all agents can run any of the intermediate sector firms, can buy any security issued in either country and are equally distributed between the two countries; an agent $h \in \Omega_1 \cup \Omega_2$ is allowed to invest her funds in any combination of the two safe assets and $2 \times [0, 1]$ risky assets, where Ω_i is the set of young agents in Country $i = 1,2$ and $[0, 1]$ is the unit interval. Uncertainty is considered by a continuum of equally likely states of nature such that an intermediate sector $j \in [0, n_i, 1]$ pays a positive return only in state j and nothing otherwise. In each country, larger sectors will open after smaller ones and, presumably, the number of open projects in Country 1 is at least the same as in Country 2 (i.e. $n_1 \geq n_2$). Since investing in a sector is equivalent to buying a basic Arrow security that pays in only one state of nature, dropping t (the time subscript) and h (the agent indicator) for notational convenience, the optimal portfolio problem of the agent h is written as

$$\begin{aligned} \max_{F_1,F_2,G,\phi_1,\phi_2} \; & n_2 \log\left[\rho_1^{(q_1)}(RF_1 + r\phi_1) + \rho_2^{(q_1)}(RF_2 + r\phi_2)\right] \\ & +(n_1 - n_2)\log\left[\rho_1^{(q_2)}(RG + r\phi_1) + \rho_2^{(q_2)}(r\phi_2)\right] \\ & +(1 - n_1)\log\left[\rho_1^{(q_3)}(r\phi_1) + \rho_2^{(q_3)}(r\phi_2)\right] \end{aligned} \tag{A.1}$$

subject to

$$n_2(F_1 + F_2) + (n_1 - n_2)G + \phi_1 + \phi_2 = s^* \tag{A.2}$$

F is the amount of savings invested in risky asset and $F^j \geq M_j = \max\left\{0, \frac{D}{1-\gamma}(j-\gamma)\right\}$, where M_j is the minimum investment to ensure productivity or positive return and the expression on the right hand side (RHS) is its distribution function. There is no minimum investment requirement for the sectors to be open if they satisfy $j \leq \gamma$. For the rest of the sectors, the minimum investment requirement increases linearly in D (> 0), which captures the presence of nonconvexities or indivisibilities that in turn shape the trade-off between insurance and productivity or risk and return. ϕ is the amount of savings invested in safe asset that has a nonstochastic gross rate of return r $(< R)$, where R is the rate of return on or payoff from the investment in risky security. ρ refers interchangeably to the price of intermediate goods, the aggregate rate of return on safe and risky financial investments and the marginal product of capital. As intermediate goods are nontradable (Asmp. ii), $\rho_1^j \neq \rho_2^j$. Given that $n_1 \geq n_2$; if the realized state of nature is $j \in q_1 \equiv [0, n_2]$, a risky investment in both countries will have a positive payoff. If $j \in q_2 \equiv [n_2, n_1]$, however, only risky investments in Country 1 will have a positive payoff. Finally, if $j \in q_3 \equiv [n_1, 1]$, no risky projects will be successful. G is the amount of investment in risky assets of Country 1 such that $\forall h$ and $\forall j$, $j' \in [n_2, n_1]$, there exists $F_1^j = F_1^{j'} \equiv G$. From the constraint, s^* is the optimal savings of the agent.

The equilibrium solutions can be characterized from the first order conditions of the form

$$\frac{n_2 \rho_1^{(q_1)} R}{\rho_1^{(q_1)}(RF_1 + r\phi_1) + \rho_2^{(q_1)}(RF_2 + r\phi_2)} = \lambda n_2 \tag{A.3}$$

$$\frac{n_2 \rho_2^{(q_1)} R}{\rho_1^{(q_1)}(RF_1 + r\phi_1) + \rho_2^{(q_1)}(RF_2 + r\phi_2)} = \lambda n_2 \tag{A.4}$$

$$\frac{(n_1 - n_2) \rho_1^{(q_2)} R}{\rho_1^{(q_2)}(RG + r\phi_1) + \rho_2^{(q_2)}(r\phi_2)} = \lambda (n_1 - n_2) \tag{A.5}$$

$$\frac{n_2 \rho_1^{(q_1)} r}{\rho_1^{(q_1)}(RF_1 + r\phi_1) + \rho_2^{(q_1)}(RF_2 + r\phi_2)} + \frac{(n_1 - n_2) \rho_1^{(q_2)} r}{\rho_1^{(q_2)}(RG + r\phi_1) + \rho_2^{(q_2)}(r\phi_2)} + \frac{(1 - n_1) \rho_1^{(q_3)} r}{\rho_1^{(q_3)}(r\phi_1) + \rho_2^{(q_3)}(r\phi_2)} = \lambda \tag{A.6}$$

$$\frac{n_2 \rho_2^{(q_1)} r}{\rho_1^{(q_1)}(RF_1 + r\phi_1) + \rho_2^{(q_1)}(RF_2 + r\phi_2)} + \frac{(n_1 - n_2) \rho_2^{(q_2)} r}{\rho_1^{(q_2)}(RG + r\phi_1) + \rho_2^{(q_2)}(r\phi_2)} + \frac{(1 - n_1) \rho_2^{(q_3)} r}{\rho_1^{(q_3)}(r\phi_1) + \rho_2^{(q_3)}(r\phi_2)} = \lambda \tag{A.7}$$

Given that $n_2^* < 1$, from (A.3) and (A.4) it follows that $\rho_1^{(q_1)} = \rho_2^{(q_1)}$, hence

$$RF_1 + r\phi_1 = RF_2 + r\phi_2 \tag{A.8}$$

Using (A.3)-(A.5) to obtain the ratio

$$\frac{\rho_1^{(q_1)}}{\rho_1^{(q_2)}} = \frac{\rho_1^{(q_1)}(RF_1+r\phi_1)+\rho_2^{(q_1)}(RF_2+r\phi_2)}{\rho_1^{(q_2)}(RG+r\phi_1)+\rho_2^{(q_2)}(r\phi_2)} \quad \text{(A.9)}$$

Given the production function $Y = AK^{\alpha}L^{1-\alpha}$, factor prices $w = (1-\alpha)AK^{\alpha}$ as the wage earning or returns to labour and $\rho = \alpha AK^{\alpha-1}$ as the marginal product of capital and optimal savings $s^* = \frac{\beta}{1+\beta}(1-\alpha)AK^{\alpha}$ in addition to $n_2^* < 1$, it follows from the law of decreasing marginal returns to capital (DMRC) that there exists such a nontrivial relation (otherwise contradiction arises); $\rho_1^{(q_2)} < \rho_1^{(q_1)} = \rho_2^{(q_1)} \equiv \rho^{(q_1)}$, hence $G^* > F_1^*$, which is also the case due to higher minimum size requirement (Asmp. iii). Observing now that $r\phi_2 < RF_2 + r\phi_2 = RF_1 + r\phi_1$, decreasing marginal productivity once again implies that $\rho_2^{(q_2)} > \rho_1^{(q_1)} = \rho_2^{(q_1)} \equiv \rho^{(q_1)} > \rho_1^{(q_2)}$. Finally, subtracting (A.7) from (A.6)

$$\frac{(n_1-n_2)}{\rho_1^{(q_2)}(RG+r\phi_1)+\rho_2^{(q_2)}(r\phi_2)}\left(\rho_1^{(q_2)} - \rho_2^{(q_2)}\right) = \frac{(1-n_1)}{\rho_1^{(q_3)}(r\phi_1)+\rho_2^{(q_3)}(r\phi_2)}\left(\rho_2^{(q_3)} - \rho_1^{(q_3)}\right) \quad \text{(A.10)}$$

From $\rho_1^{(q_2)} < \rho_2^{(q_2)}$ it follows that $\rho_2^{(q_3)} < \rho_1^{(q_3)}$ which, in turn, implies by DMRC that

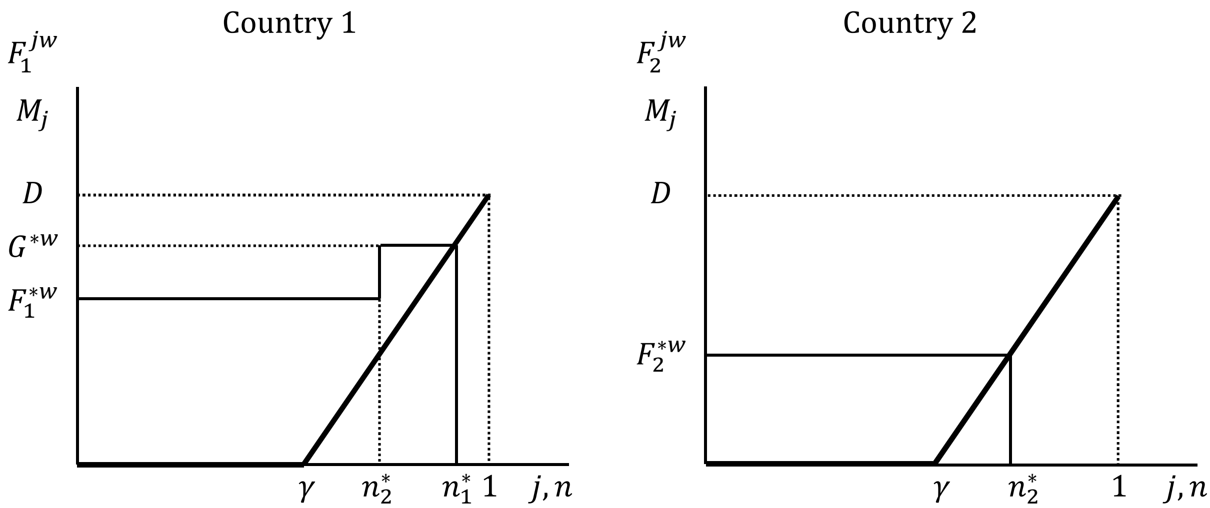
$$\phi_2^* > \phi_1^* \quad \text{(A.11)}$$

Since the optimal condition was $RF_1 + r\phi_1 = RF_2 + r\phi_2$, it finally proves

$$G^* > F_1^* > F_2^* \quad \text{(A.12)}$$

Equation (A.8) shows that the marginal product of capital or return on financial investments is equal across countries (no matter whether they are rich or poor) for the equilibrium subset of states $q_1^* \equiv [0, n_2^*]$, where the size of open sectors and the level of associated investments are lower. The eleventh equation implies that the insurance role of the safe asset is more important in Country 2 than in Country 1, so the risk free investments are higher in the poorer country. Ultimately, the inequality in Equation (A.12) means that larger scale and risky financial investments ($G^*$and F_1^*) are higher in the richer country. Because the return on risky assets is greater than the return on safe assets (i.e. $R > r$) and risky asset purchases increase with the size and number of open sectors within the countries, risky financial investments are more significant than safe ones. In other words, what is meant by international capital flows are essentially those risky financial investments that are promoted by return and diversification motives and take place across countries. Figure A.1 sketches the resulting aggregate equilibrium capital flows in this two-country world. Both equilibrium solutions at time t (recall that the time subscripts were dropped) and their aggregate images in the figure (areas within the solid lines) demonstrate that more capital flows to the richer country in the short-run.

Figure A.1: International Capital Flows in Acemoglu and Zilibotti (1997)



This open economy model of optimal portfolio choice provides an alternative approach to the direction and allocation of international capital, which is different than the approaches previously considered. The model offers a time-dependent explanation and implies that the neoclassical view, that the new financial investments will accrue to poorer economies, can only be achieved in the long-run. In the short-run and under the governing assumptions of micro-level nonconvexities (or indivisibilities) and uncertainty, it expects the foreign capital to be destined to richer economies. Hence, there would be no paradox in such circumstances.

Appendix B: Difference GMM Estimations

Table B.1: Difference GMM Regressions of Capital Inflows per Capita, 5-Year Panel Data

	(1)	(2)	(3)	(4)	(5)	(6)
Average per capita equity flows, $t-1$	0.638** (0.268)	0.537** (0.259)	0.492** (0.244)	0.624** (0.248)	0.501** (0.227)	0.493** (0.206)
Average per capita equity flows, $t-2$	-0.312 (0.202)	-0.260 (0.192)	-0.219 (0.182)	-0.272 (0.196)	-0.226 (0.171)	-0.205 (0.171)
Log per capita initial GDP (PPP$)	0.151 (0.251)	-0.0050 (0.256)		-0.0331 (0.347)	-0.149 (0.341)	
Average institutional quality		0.214*** (0.056)	0.172*** (0.062)		0.179*** (0.057)	0.159*** (0.055)
Log average per capita GDP (PPP$)			0.261 (0.275)			
Log average years of schooling				0.426 (0.439)	0.262 (0.409)	0.226 (0.295)
Log average distance					–	–
Log average remoteness					0.0397 (1.591)	1.374 (1.905)
Average restrictions to capital mobility					-0.298 (0.296)	-0.262 (0.315)
Log per capita initial GDP (2005 US$)						0.172 (0.145)
Observations	184	182	182	184	182	182
Countries	47	47	47	47	47	47
m_1 ***(p-value)***	0.028	0.040	0.042	0.027	0.036	0.036
m_2 ***(p-value)***	0.810	0.689	0.515	0.678	0.632	0.569
Hansen J (p-value)	0.624	0.542	0.587	0.654	0.591	0.587

Notes: See notes to Table 11.

Table B.2: Difference GMM Regressions of Capital Inflows per Capita, 5-Year Panel Data

	(1)	(2)	(3)	(4)	(5)	(6)
Average per capita equity flows, $t-1$	0.523*	0.570**	0.236	0.483***	0.476	0.327
	(0.262)	(0.256)	(0.639)	(0.170)	(0.341)	(0.347)
Average per capita equity flows, $t-2$	-0.261	-0.224	-0.0827	-0.279	-0.348	-0.397
	(0.193)	(0.193)	(0.273)	(0.168)	(0.309)	(0.293)
Log per capita initial GDP (PPP$)	0.0615	0.110	0.314		0.0654	-0.0448
	(0.249)	(0.260)	(0.562)		(0.544)	(0.680)
Average institutional quality	0.224***	0.240***	0.166**	0.214***	0.237***	0.226***
	(0.059)	(0.064)	(0.070)	(0.055)	(0.073)	(0.077)
Log average trade openness	-0.270					
	(0.231)					
Log average deposit money bank assets		-0.164				
		(0.135)				
Log average TFP growth			0.0182			
			(0.020)			
Log per capita initial GCF (2005 $US)				-0.0054		
				(0.096)		
Malaria contagion risk					_	
Log average Int'l voice traffic						0.165
						(0.103)
Observations	182	166	139	181	139	112
Countries	47	46	39	47	47	45
m_1 (p-value)	0.042	0.040	0.325	0.017	0.120	0.146
m_2 (p-value)	0.757	0.441	0.668	0.703	0.561	0.904
Hansen J (p-value)	0.512	0.604	0.561	0.613	0.516	0.549

Notes: See notes to Table B.1.

Appendix C: Data and Samples

Table C.1 Variable Descriptions and Sources

Variable	Definition	Source
Capital flows	Sum of foreign direct and portfolio equity flows (also known as total equity flows) expressed in per capita 2005 $US.	World Development Indicators (WDI), World Bank.
Initial GDP	Purchasing power parity (PPP) adjusted per capita GDP as of the model-corresponding initial year (mostly 1970), expressed in 2005 $US and in logs.	Heston *et al.* (2009), Penn Wold Table (PWT), Center for International Comparisons of Production, Income and Prices (CIC), University of Pennsylvania.
Institutional quality	A composite index constructed by adding up annual scores of twelve sub-indices (government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religion in politics, law and order, ethnic tensions, democratic accountability, bureaucratic quality), rescaled by 10 and averaged over 1984-2006.	International Country Risk Guide (ICRG), Political Risk Services Group (PRS, 2007).
Years of schooling	Educational attainment of total population aged 25 and over in some levels (primary, secondary or tertiary) for some years, averaged over 1970-2000 and expressed in logs.	Barro and Lee (2001).
Distance	Unilateral distance constructed as a GDP weighted average of the geodesic distances between capital city of a country and capital cities of all the other countries in the world, averaged over 1970-2006 and expressed in logs.	Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) and World Development Indicators (WDI), World Bank.
Capital mobility restrictions	Taking values between 0 (if no restriction) and 1 (if there is restriction), it is the mean of four dummy variables (multiple exchange rate practices, restrictions on current account transactions, barriers on capital account dealings, and surrender and repatriation requirements for export proceeds), averaged over 1970-2005.	Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), IMF.
Corporate tax	A percentage rate levied on the company profits in a country, averaged over 1999-2006.	Corporate and Indirect Tax Rate Survey (various years), KPMG.
Trade openness	Exports plus imports expressed as a percentage of GDP and in logs, averaged over 1970-2006.	World Development Indicators (WDI), World Bank.

(continued on next page)

Table E.1 *(continued)*

Variable	Definition	Source
Deposit money bank assets	Ratio of deposit money bank assets to GDP, averaged over 1970-2006 and expressed in logs.	Financial Development and Structure Database, Beck *et al*. (2000).
TFP growth	The effect of technological change, efficiency improvements and immeasurable contribution of all inputs other than capital and labour which is estimated as the residual (i.e. Törnqvist index) by subtracting the sum of two-period average compensation share of capital and labour inputs weighted by their respective growth rates from the output growth rate. Usage of log level differences delivers the annual percentage TFP growth rates averaged over 1982-2006.	Total Economy Database, The Conference Board (2010).
Initial GCF	Gross capital formation (GCF) per capita as of the model-corresponding initial year (mostly 1970) refers to outlays on additions to the fixed assets of the economy plus net changes in the level of inventories, expressed in 2005 $US and in logs.	World Development Indicators (WDI), World Bank.
Malaria	The proportion of a country's population at risk of falciparum malaria infection as of 1994.	Sachs (2003).
Country risk	Countries are assessed in terms of credit risk and classified into eight numerical categories between 0 (lowest credit risk) and 7 (highest credit risk) using both quantitative and qualitative methods. Data is averaged over 1999-2006.	OECD, 2010.
International voice traffic	The sum of international incoming and outgoing telephone calls in minutes divided by the total population, averaged over 1970-2006 and expressed in logs.	World Development Indicators (WDI), World Bank.
Foreign bank asset share	Equals to the share of foreign bank assets in total banking sector assets, averaged over 1990-1997.	Financial Development and Structure Database, Beck *et al*. (2000).
European settler mortality	The mortality rates of European settlers per 1,000 mean strength in the 19^{th} century, expressed in logs.	Acemoglu *et al*. (2001).
British legal origin	A dummy variable indicating whether the origin of the current formal legal code of a country is British common law.	La Porta *et al*. (1997).
English language	Fraction of the population speaking English as mother tongue.	Hall and Jones (1999).

Table C.2: Country Samples

Baseline Sample		IV Regressions Sample	
Algeria	Kenya	Algeria	Mexico
Argentina	Malawi	Argentina	Nicaragua
Bangladesh	Malaysia	Bangladesh	Niger
Bolivia	Mali	Bolivia	Pakistan
Botswana	Mexico	Brazil	Panama
Brazil	Nicaragua	Cameroon	Papua New Guinea
Bulgaria	Niger	Chile	Paraguay
Cameroon	Pakistan	China	Peru
Chile	Panama	Colombia	Senegal
China	Papua New Guinea	Costa Rica	South Africa
Colombia	Paraguay	Dominican Republic	Sri Lanka
Costa Rica	Peru	Ecuador	Thailand
Dominican Republic	Philippines	Egypt	Tunisia
Ecuador	Senegal	El Salvador	Uruguay
Egypt	South Africa	Ghana	Venezuela
El Salvador	Sri Lanka	Guatemala	
Ghana	Thailand	Guyana	
Guatemala	Tunisia	Honduras	
Guyana	Turkey	India	
Honduras	Uruguay	Indonesia	
India	Venezuela	Jamaica	
Indonesia	Zambia	Kenya	
Jamaica	Zimbabwe	Malaysia	
Jordan		Mali	

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