Does Capital Account Liberalization Lead to Growth?

Dennis P. Quinn
McDonough School of Business, Georgetown University

A. Maria Toyoda
Villanova University

We test whether capital account liberalization led to higher economic growth using *de jure* measures of capital account and financial current account openness for 94 nations, from 1950 (or independence) onward. We argue that measurement error, differing time periods used, and collinearity among independent variables account for conflicting results in prior scholarship. We use pooled time-series, cross-sectional OLS and system GMM estimators to examine economic growth rates, 1955–2004. Capital account liberalization had a positive association with growth in both developed and emerging market nations. We confirm that equity market liberalization has an independent effect on economic growth. (*JEL* F02, F43, P16)

In this paper, we reexamine the effects of capital account liberalization on economic growth in the context of addressing the inconsistent and widely diverging results that have been reported in the scholarly literature over the last decade. (See the comprehensive review essays on the topic by Eichengreen, 2001 and Kose et al., 2006; henceforth KPRW.) We strive to untangle the reasons behind this inconsistency, and to situate our results in the broader literature on finance and growth.

- We propose that conflicting prior results are associated in part with measurement error in capital account variables. We offer a new dataset that contains more precise *de jure* measures of capital account regulation for a wide sample of countries (94) for up to 50 years (1950 to 1999). The

A related version of the paper was presented at the 2001 American Political Science Association meeting. The paper was also presented at seminars at the International Monetary Fund, the McDonough School of Business at Georgetown University, the Wharton School at the University of Pennsylvania, and Trinity College, Dublin. Carla Inclan was a coauthor on the 2001 APSA paper, and we miss her participation in the project. We thank Cam Harvey, an anonymous referee, Philip Lane, Thomas Plumper, John Freeman, Lawrence Broz, Areedam Chanda, Ron Davies, Barry Eichengreen, Michael Klein, David Leblang, Brian Roberts, Frank Warnock, Tom Willet, Bennet Zelner, Stan Nollen, Pietra Rivoli, and Jeromin Zettlemeyer for comments and suggestions. Able research and editorial assistance was provided by Laura McCall, Naphat Kijsamrej, Eric Stemer, Sarah Zhu, and Alberto Ciganda. Alberto and Sarah provided indispensable data management work. The funding has been provided by the Georgetown University McDonough School of Business, the Graduate School of Arts and Science at Georgetown University, and the National Science Foundation (SBR-9729766, SBR-9810410). Address correspondence to Dennis P. Quinn, McDonough School of Business, Georgetown University, Washington DC 20057; telephone: +202-687-1027; fax: +202-687-4031; e-mail: quinnd@georgetown.edu.

doi:10.1093/rfs/hhn034 Advance Access publication May 7, 2008

data include numerous incidences of reversals in financial liberalization, allowing for greater identifying variance in estimations. These improvements in our indicator allow for more consistent econometric estimates of capital account openness's influence on growth.

- We show that researchers confront an overlapping information and intercorrelation problem. Our factor and cluster analyses show that many of the regressors used as independent variables in growth regressions are related facets of several underlying variables that correspond, though incompletely, to political institutions and endowments. While other regressors show high intercorrelation, our capital account and financial current account indicators provide information that is substantially independent from these two underlying variables.
- We reexamine some prior studies on the effects of capital account liberalization on growth, and show that the inconsistent results derive from measurement error or the time periods studied (or both). In contrast, the choice of methods, the use of purchasing power parity adjusted versus real growth data, and the divergent conditioning information in models at most account for modest differences in the estimations.
- We report results showing that capital account liberalization has a direct and robust effect on subsequent economic growth in most countries, including emerging market nations. This confirms and extends prior findings in Quinn (1997) and Bekaert, Harvey, and Lundblad (henceforth BHL) (2005). We also find that another dimension of international financial regulation, a measure of equity market liberalization developed by and used in BHL (2005), also influenced growth.
- We do not find, contrary to some of the prior literature, robust effects on economic growth from interaction terms between capital account liberalization and other finance and political economy variables. Some interaction effects are found in subperiods, but they are not robust across the full sample and time periods of this investigation.

Our paper is organized as follows. The first section locates the question of the effects of capital account openness in the literature in finance, economics, and political economy. The second section describes problems of defining, measuring, and operationalizing capital account indicators. In the third section, we outline our research design, and define our variables and data. In the fourth section, we then replicate the results of six prominent studies in the field and reconcile the conflicting results. We next report the results of our central model, and undertake several robustness checks to gain confidence in our results. The final section offers some concluding remarks.

1. Prior Studies on the Effects of Capital Account Liberalization

Capital account openness has been an important topic in modern finance and economics at least since Robert Mundell famously proposed that a country's

policy stance on capital account openness affected either its choice of exchange rate regime or its domestic monetary stance (or both). See, e.g., Obstfeld, Shambaugh, and Taylor (2005) for a current statement.

The consequences of capital account openness on other aspects of national economic performance have emerged in the past decade as a topic of interest, partly because of strong claims made about its supposedly beneficial or harmful effects. See, e.g., Stiglitz (2003). Comprehensive reviews include Eichengreen (2001), KPRW, and Levine (1997).

Perhaps no topic regarding capital account liberalization has drawn more attention than the relationship between financial openness and economic growth, spurred in part by the East Asian crisis and the experiences of other reforming economies such as Argentina. (See, e.g., BHL, 2005; Edison et al., 2004; Eichengreen, 2001; and KPRW.) The focus in this paper is on this relationship, during the period 1955–2004.

1.1 Capital account openness, model specification, and economic growth

In reviewing the literature on capital account liberalization and growth, Eichengreen (2001) noted that various theoretical models imply inconsistent or weak effects from capital account liberalization. (See, e.g., Gourinchas and Jeanne, 2006.) Given this divergence in theory, scholars undertook empirical tests.

The first wave of "large n" empirical studies of the direct effects of capital account liberalization produced indecisive results that did little to narrow the theoretical discourse. Alesina, Grilli, and Milesi-Ferretti (1994) find no association between the levels of capital account openness and growth for advanced industrial nations. Grilli and Milesi-Ferretti (1995; henceforth GMF) determine no effects in emerging market nations, a finding that Rodrik (1998) replicates and extends. Quinn (1997), however, shows that changes in capital account openness are associated with higher long-run growth. BHL (2001, 2005) also find that incidences of both capital account liberalization and equity market liberalization are associated with subsequent economic growth. Henry (2000) and Bekaert and Harvey (2000) find that stock market liberalizations decrease the cost of capital, which leads to greater investment and increased per-worker output, at least in the immediate aftermath of liberalization. (See also Henry, 2003.) The authors of other recent studies report generally positive coefficient estimates of capital account openness on growth, but the standard errors have been large relative to the point estimates. (See International Monetary Fund (IMF), 2001, especially, p. 153; and Edison et al., 2004.)

In light of these divergent findings, scholars considered the possibility that the effects of liberalization are contingent on the presence or absence of other variables. Kraay (1998), in one of the first such studies, discovers little evidence that capital account openness' effects are contingent on various economic preconditions. Klein and Olivei (1999) show that capital account openness leads to financial "deepening," but only for advanced industrial nations, leading them

to propose that emerging market nations lack some key political economic institutions through which openness might act beneficially. Edwards (2001) finds that capital account liberalization leads to growth in higher income countries. Arteta, Eichengreen, and Wyplosz. (2001; AEW hereafter) revisit Edwards's study, and while they reject his findings on methodological grounds, they confirm his point that liberalization has a contingent relationship with growth. They find that macroeconomic imbalances—as exemplified by black market premiums—do matter. Chanda (2005), investigating sociological contingencies, finds that while countries with higher levels of ethnic heterogeneity benefited from openness, more homogenous societies did not (cf. Satyanath and Berger, 2006). IMF (2001) tests four institutional preconditions, but finds no statistically significant effects. Eichengreen and Leblang (2003) advance two important propositions: capital controls might serve to insulate economies from international crises, and the relationships might differ by time. They find support for the first proposition in particular. Glick, Guo, and Hutchison (2006), by controlling for sample selection bias, come to the opposite conclusion: capital account openness reduces the likelihood of currency crises. Klein (2003, 2007) shows evidence that middle-income countries benefited from capital account openness. Edison et al. (2004) also find evidence of regional heterogeneity and confirm the "middle-income" country results. KPRW's survey of the recent literature concludes that regressions with interaction terms that account for "supportive conditions" (e.g., good institutions) are more likely to result in positive effects on growth. For instance, BHL (2005, pp. 38–40) find that the growth effects of equity market liberalization (EQUITY) are enhanced by higher levels of financial development, good institutions, and investor protection.

2. Measurement Error, Clustering, and Collinearity

Another possibility is that measurement error in capital account openness indicators, joined with clustering and collinearity among other independent variables, accounts in part for the inconsistent results and might contribute to inflated standard errors and biased coefficient estimates. As AEW note, differences in the time period studied might also give rise to these inconsistent results.

2.1 Limitations in measurement of capital account openness

2.1.1 *De jure* measures. Studies of capital account liberalization and growth suffer from data limitations. The first study of the subject (by Alesina, Grilli, and Milesi-Ferretti, 1994) and most following studies used the best data available at the time, which was a binary *de jure* 0, 1 indicator of the presence or absence of capital controls. The most common binary measure was found in a table at the back of the IMF's annual publication, *Annual Report on Exchange*

Arrangements and Exchange Restrictions (henceforth *AREAER*), from 1966 to 1995.[1]

It is of limited use, however, as it contains too little information to capture most instances of change. Since the 0, 1 indicator (hereafter, IMF_BINARY) groups countries that are partly to substantially open, with countries that are completely closed, it introduces systematic measurement error in growth regressions when used as an independent variable and possibly leads to bias in coefficient estimates. IMF_BINARY also reports restrictions on residents only; hence, it does not contain information about nonresident capital account restrictions on, e.g., inward foreign direct investment. Another limiting consideration is its temporal availability. It is unavailable before 1966, so the studies using the indicator necessarily omit the experiences of the 1950s to mid-1960s, a period during which many emerging market economies were relatively open. IMF_BINARY ceases in 1995, replaced by a subcategory, "Capital Transactions" that highlights 13 separate aspects of capital account transactions. Studies using IMF_BINARY necessarily omit recent experiences.

The problems with using IMF_BINARY indicator are well known. For example, Voth (2003, p. 271) writes, "Along with other authors. . ., we find that the inability of earlier studies to find a significant effect of capital controls on most economic control variables was caused by the use of simple dichotomous variables as indicators for capital controls."

Efforts to adapt IMF_BINARY include Edison et al. (2004) and Klein (2003). These studies use SHARE, which cumulates IMF_BINARY for capital account restrictions on residents by year for a given period. Nigeria, for example, had a "1" for the value of IMF_BINARY for each of the 15 years from 1970 to 1984, so its SHARE score for that period is "15." The United States had no IMF_BINARY restrictions on capital accounts during the same 15-year period, so the U.S. SHARE score is 0. Uruguay had 8 years in which IMF_BINARY took the value of 1, and 7 where it took the value of 0; hence, its 1970–1984 score is "8."

Other scholars have created *de jure* indices based on the IMF *AREAER* tables by taking the extra step of disaggregating the categories in various sections of the table. Building on the work of Johnstone and Tamirisa (1998) and the new data tables from the IMF, Miniane (2004) averages the scores in 13 categories included in the "Capital Transactions" section of the IMF table, providing data for 34 countries for 17 years. The categories predominantly relate to portfolio transactions in securities, derivatives, and money markets. Brune et al. (2001) have created related disaggregated measures across five separate categories, making a distinction between inward and outward flows, though these data are not publicly available. Chinn and Ito (2006) created a measure (KAOPEN) based on principle component analysis of three financial current

[1] The first scholars (to our knowledge) to use the IMF volume to create an indicator of capital controls were Epstein and Schor (1992), who created a 0, 1, 2 indicator for advanced industrial nations.

binary indicators in *AREAER* ("multiple exchange rates," "current account," and "surrender of export proceeds") and a 5-year average of IMF_BINARY. KAOPEN is available from 1970 to 2005 for up to 181 countries. (See also the measure of financial reform used in Abiad and Mody, 2005.)[2]

These studies have all made contributions by offering measures that contain finer grained information than the original 0, 1 dummy. These indicators, however, retain the dummy variable features of the original IMF measure in that they measure simply the presence or absence of controls in a given category.

2.1.2 *De facto* and blended *de facto*/*de jure* measures. Even with increasingly detailed information, *de jure* indices of financial globalization show just one facet of financial globalization. For example, as Edwards (2005) notes, for some countries, observed capital flows often exceed the extent of mobility legally allowed.

To measure a country's integration into global finance markets, scholars often turn to nonindex, *de facto* or "blended" measurements. These indices exploit observable phenomena resulting from increased capital mobility, such as the magnitude of gross capital flows (IMF, 2001), share of domestic equities that are available for foreign purchase (Bekaert, 1995; Edison and Warnock, 2003), decreasing correlations between savings and investment (Feldstein and Horioka, 1980), or convergence between external and domestic interest rates (Dooley, Mathieson, and Rojas-Suarez, 1997; Quinn and Jacobson, 1989). Lane and Milesi-Ferretti (2006; henceforth, LMF) offer what many scholars regard as the most useful *de facto* measure of a country's exposure to international finance, TOTAL. (See the discussion in KPRW.) TOTAL is the country's aggregate assets plus liabilities over its gross domestic product. Because TOTAL sums a nation's FDI and portfolio data together, TOTAL is not bedeviled by changing and inconsistent treatment in the definitions of FDI and portfolio flows over time and for different countries.[3]

A standard question, however, regarding the use of *de facto* measures of globalization is whether they are a valid measure of a government's policy stance, or whether the *de facto* measures are even much influenced by a government's policy stance. Fully financially open countries might still have only modest capital flows if their prices closely match world prices. Correspondingly, scholars in

[2] The Abiad and Mody index contains information on the intensity of regulations in six areas of financial reform, five of which are domestic financial indicators. The sixth indicator is based on international capital account and current account restrictions. Data for 35 countries 1973–1996 are available.

[3] The 1993 IMF Balance of Payments Manual (BoPM), 5th edition, revised the definition of FDI as constituting the purchase by nonresidents of 10% or more of the ordinary shares (or voting equity stake) of a company. The 4th edition (IMF, 1977, p. 137) gave a range of 10–25% to distinguish FDI from portfolio investment. The 3rd edition (IMF, 1961, p. 120) gave a range of 25–75%, depending on the circumstances. The data reported for FDI and portfolio flows are not adjusted back in time, with the result that some of the increases in FDI flows in the 1990s in particular derive from changes in definition. Countries used and continue to use inconsistent definitions, albeit with IMF permission. See IMF (1996) and IMF (1993, p. 87). The discussion group for the 6th edition of the BoPM, scheduled for release in 2008, has proposed 20% as the new threshold for distinguishing FDI flows from Portfolio flows.

the international business field have long known that many firms invest in some countries *because* of capital account restrictions (e.g., to gain privileged access to otherwise blocked markets), which suggests that flow measures of financial globalization might partly be caused by *de jure* restrictions. Finally, capital flows in and out of a country will respond to many different, nongovernmental considerations. France, Germany, and the Netherlands, among many other advanced industrial nations, saw their values of TOTAL increase from 100% to 300% from 1994 to 2004 without any significant changes in their capital account openness policies.

2.2 Measures used in this study

We operationalize international financial regulation through two indicators of change in international financial openness or closure, which are described in Quinn (1997). *CAPITAL* and *FINANCIAL_CURRENT* (*FIN_CURRENT* hereafter) are the main components of openness created from the text published in the annual *AREAER* volume that reports on the laws used to govern international financial transactions. These indicators take a different approach in creating an index for a government's policy stance toward capital account liberalization and financial current account liberalization by offering a measurement not only of the existence (absence) of restrictions, but the severity or magnitude of those restrictions.

We chose nations for coding based primarily on how early their information appeared in *AREAER*. For example, descriptions of the financial arrangements as of 1949 for 47 nations appeared in the first volume (1950), and all these nations (save three whose data were subsequently interrupted) appear in the dataset. Up through the 1960s, as other nations entered *AREAER*, we added them to the dataset, which currently contains information for 94 nations. Our aim has been the "longest t," rather than the "broadest N."

CAPITAL is scored 0–4, in half integer units, with 4 representing an economy fully open to capital flows. *FIN_CURRENT* is an indicator of how compliant a government is with its obligations under the IMF's Article VIII to free from government restriction the proceeds from international trade of goods and services. It is scored 0–8 in half integer units, with 8 indicating full compliance, and represents the sum of the two components of current account scores: trade (exports and imports) and invisibles (payments and receipts for financial and other services). We transformed each measure into a 0–100 scale taking 100*(*CAPITAL*/4) and 100*(*FIN_CURRENT*/8).

CAPITAL distinguishes between restrictions on residents and nonresidents, which correspond to restrictions on capital outflows and inflows, respectively. See IMF (1993), pp. 80–81, for a discussion. *FIN_CURRENT* distinguishes also between restrictions on residents and nonresidents (e.g., receipts for exports and payments for imports, respectively).

When using *CAPITAL* and *FIN_CURRENT* as independent variables, we need to model the potential influences of these variables over many years.

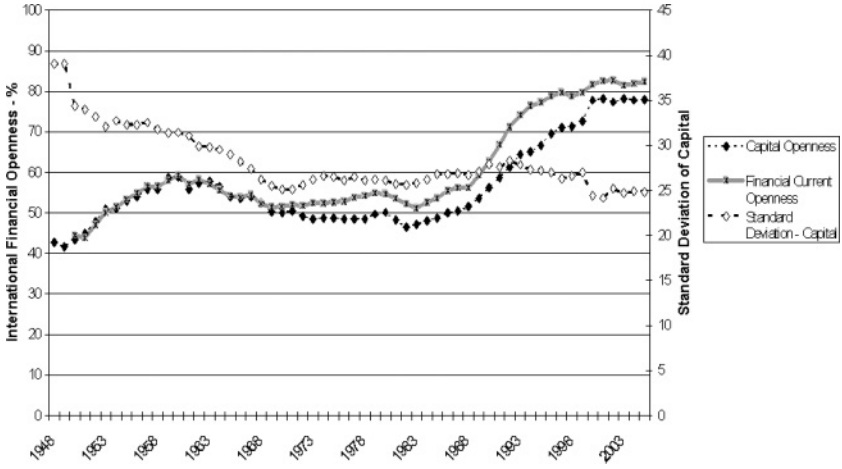


Figure 1
International Financial Openness, 1948–2005

Therefore, we use 5-year averages, calculated as

$$CAPITAL(_s) = (X_t + X_{t+1} + X_{t+2} + X_{t+3} + X_{t+4})/5, \qquad (1)$$

where $X_t = 100^*(CAPITAL/4)$. The subscript s represents a 5-year period: $s =$ 1960–1964, 1965–1969, . . . , and the subscript t identifies the first year in the 5-year period: $t = 1960, 1961, \ldots$ Corresponding variables for *FIN_CURRENT* are defined similarly. In cases of missing values, the averages are obtained over the number of observations available.

Figure 1 provides a visual overview of the global average and standard deviation of *CAPITAL*, 1948–2005,[4] and the global average of *FIN_CURRENT* 1950–1999. A number of waves of liberalization and closure are evident in *CAPITAL*. The late 1940s through 1960 was a period of liberalization, with some of the largest postwar increases in the annual global mean occurring in the early to mid-1950s. The 1960s through the early 1980s, in contrast, were characterized by a retreat from international financial openness. The closure from 1961 to the early 1980s was accompanied by decreases in the annual standard deviation of *CAPITAL*: during this period, it was financial closure, not openness, that spread worldwide. The mid-1980s through the 1990s was a period of liberalization. Preliminary evidence suggests, following a postwar peak in 2002, that the trend in the regulation of capital accounts is more restrictive. (Where the data are available, *FIN_CURRENT* follows a very similar pattern.)

[4] The data used in the regression analysis are from 1950 to 1999. The data used in Figure 1 for 2000–2005 comprise the global average of an initial coding of *CAPITAL* for the 94 countries.

2.2.1 Comparison to other measures of financial globalization. See Appendix A, where we argue that *CAPITAL* has advantages relative to other indicators in exploring the effects of financial globalization. Many indicators of financial globalization show few to no reversals in financial openness, whereas *CAPITAL* reveals that reversal of financial openness was a common feature of government policies, particularly from the mid-1960s until the late 1980s. Other indicators also omit the experiences of the 1950s and through the mid-1960s, which contain important periods of liberalization and postindependence closures. *CAPITAL* also measures the intensity of *de jure* restrictions on both resident (outward) and nonresident (inward) transactions, whereas most *de jure* indicators report restrictions on resident (outward) flows only. Because of the information on both reversals and the earlier periods (including information regarding the aftermath of independence in Africa and Asia), *CAPITAL* contains greater identifying variance than some other measures.

Studies that do report positive results for capital account openness on growth, such as Quinn (1997), AEW, Edwards (2001), and BHL (2005), were based generally on *CAPITAL*. In these studies, however, the capital account openness data were available for only 4 years and 64 countries. Here, the data are extended from the late 1940s (or independence) to 1999.

We also use data from BHL (2005). BHL show that equity market liberalization, measured by a variable they call EQUITY, was associated with subsequent growth. Consistent with other studies, they find no direct effects of capital account liberalization when it is measured by IMF_BINARY. They report strong and robust effects for *CAPITAL* on growth, with or without EQUITY.

2.3 Clustering and collinearity of measures of policies, institutions, and geography in the growth literature

The work on international financial liberalization and growth needs to be situated in the broader literature on determinants of economic growth. Scholarly work has increasingly focused on institutions, culture and geography as explanatory variables, channels, or mechanisms to explain the slower growth of emerging market nations. (See, e.g., Beck, Demirgüç-Kunt, and Levine, 2002; Rodrik, Subramanian, and Trebbi, 2002; Barro and McCleary, 2003; Stulz and Williamson, 2003; Acemoglu, Johnson, and Robinson, 2004; and Rigobon and Rodrik, 2004.) The work of these scholars, however, shows a wide variety of empirical results, some of which suggest that policy reform is of little importance to growth. Others, in contrast, suggest that reforms are central.

Distinguishing among these hypotheses constitutes a central problem of empirical political economic scholarship: nations at similar levels of political, social, and economic development also share "clusters" of endowments, institutions, and policies. Capital account policies might be part of a broader cluster of policies and institutions, and could be collinear with many other variables. Other scholars have noted this problem, though none has directly addressed the implications for capital account liberalization and growth. (See Rodríguez and

Rodrik, 2000, pp. 28–34; AEW, p. 11; BHL, 2001, pp. 14–16; and Eichengreen, 2001.)

We present some evidence about the clustering of institutions, endowments, and policies in Table 1. We look at the correlations in levels among 20 standard regressors of growth. We report the pairwise Pearson correlations between variables, 1955–1999 (using 5-year averaged data, which will be described below).

Among the 20 variables, 3 (colonial heritage, ethnolinguistic fractionalization, and OECD membership) are statistically significantly correlated with each other and ALL the other regressors. Eleven are similarly correlated with all but one variable, and five are correlated with all but two. Of the 190 pairwise correlations, all but 18 are statistically significant, with nearly one-third of the correlation coefficients at 0.5 or beyond, and the majority of the coefficients are above 0.3. When OECD member nations are omitted, the strong relationships among the variables remain: all but 18 of 171 correlations are statistically significant.

The clustering among variables has direct implications for this and other growth papers. To take one relevant example, Rodrik (1998); Edison et al. (2004); and Klein (2003) have suggested that capital account openness might proxy for quality of government or other political institutional variables. When Edison et al. and Klein added governance indicators in a cross-sectional regression, the statistically significant effects of SHARE vanished, while the good governance indicator was positive and highly statistically significantly correlated with growth. Hence, perhaps some measures of capital account openness are proxies in a cross section for good governance, among other things?

2.4 Factor and cluster analyses of *CAPITAL* and *FIN_CURRENT* with other variables

Given our supposition of a clustering of variables, we use two techniques to classify plausible growth regressors. We are particularly interested in discovering whether financial policy reform variables form a separate dimension from political, institutional, and endowment variables. Factor analysis identifies underlying components or factors that explain the pattern of correlations in a dataset, such as those we observe in Table 1. (See Kim and Mueller, 1978, for a discussion of factor analysis.) Once the number of components or factors is established, factor analysis allows us to identify which variables in a dataset are correlated with which factors, and how strongly. We supplement factor analysis with hierarchical cluster analysis, which groups variables into related "clusters."[5] If the joint results of these techniques show that *CAPITAL* is joined

[5] When variables are hierarchically clustered, we can identify the key variables explaining the principal dimensions in a dataset. Factor analysis should be considered more robust in identifying the underlying structure of a dataset, as it can recognize intercorrelations among data. The interpretation of factor analysis is more open-ended, however, compared to cluster analysis because cluster analysis uses the actual variables, rather than abstract factors. We use both approaches to ascertain the probable structure of the data.

Table 1
Correlations among plausible growth regressors

	Income	*CAPITAL*	*CURRENT*	Corruption	Bureaucratic quality	Law and Order	Freedom	Investment	Trade	Educational attainment	SWOPEN	Liquidity	Democracy	ISLAM	ELF60	ETHFRAC	*BMP*	MORT	Common law	OECD
Per capita income (PWT 6.1, PPP)	1																			
CAPITAL	0.483***	1																		
CURRENT	0.531***	0.859***	1																	
Corruption	0.734***	0.394***	0.387***	1																
Bureaucratic quality	0.789***	0.369***	0.395***	0.796***	1															
Law and Order	0.777***	0.473***	0.499***	0.787***	0.818***	1														
Freedom House civil liberties	0.701***	0.496***	0.468***	0.611***	0.675***	0.603***	1													
Investment (PWT 6.1)	0.502***	0.271***	0.274***	0.502***	0.549***	0.528***	0.312***	1												
Trade openness (PWT 6.1)	0.043	0.145***	0.138***	0.062	0.076	0.106**	−0.013	0.23***	1											
Educational attainment (25-year olds)	0.816***	0.384***	0.445***	0.711***	0.693***	0.741***	0.55***	0.487***	0.002	1										
Sachs/Warner openness	0.585***	0.496***	0.561***	0.605***	0.606***	0.654***	0.542***	0.496***	−0.008	0.569***	1									
Financial sector liquidity (Levine)	0.637***	0.289***	0.357***	0.459***	0.526***	0.519***	0.395***	0.522***	0.171***	0.515***	0.515***	1								
Democracy (polity IV)	0.589***	0.338***	0.337***	0.606***	0.603***	0.559***	0.914***	0.314***	−0.04	0.566***	0.428***	0.356***	1							
ISLAM (% of population)	−0.331***	−0.296***	−0.302***	−0.358***	−0.345***	−0.349***	−0.442***	−0.255***	0.066*	−0.451***	−0.238***	−0.041	−0.44***	1						
Ethno-Liguistic fractionalization (Mauro)	−0.318***	−0.14***	−0.193***	−0.33***	−0.277***	−0.308***	−0.355***	−0.283***	0.08**	−0.31***	−0.238***	−0.272***	−0.275***	0.216***	1					
Ethic fractionalization	−0.43***	−0.121***	−0.201***	−0.374***	−0.355***	−0.411***	−0.337***	−0.305***	0.15***	−0.383***	−0.358***	−0.388***	−0.235***	0.054	0.821***	1				
Black market premium	−0.556***	−0.531***	−0.564***	−0.51***	−0.613***	−0.518***	−0.517***	−0.357***	−0.085**	−0.409***	−0.575***	−0.366***	−0.435***	0.313***	0.205***	0.219***	1			
Settler mortality	−0.256***	−0.177***	−0.122**	−0.246***	−0.177***	−0.221***	−0.263***	−0.247***	0.098**	−0.381***	−0.193***	−0.233***	−0.238***	0.131***	0.335***	0.318***	0.207***	1		
Common law	−0.029	−0.054	−0.046	−0.038	0.09*	−0.003	0.102**	−0.024	0.222***	−0.063*	−0.016	0.005	0.162***	−0.024	0.434***	0.302***	−0.015	0.115**	1	
OECD membership	0.75***	0.293***	0.342***	0.685***	0.699***	0.697***	0.635***	0.452***	−0.198***	0.572***	0.576***	0.504***	0.566***	−0.318***	−0.332***	−0.467***	−0.542***	−0.147***	−0.071**	1

Data for 83 Nations, 1955–1999, 5-year averages—pairwise. $^{**}p < 0.05$; $^{***}p < 0.01$. These data correlations are cross-sectional, and then averaged over time. The level of significance is given as t-statistic $= r^* \sqrt{(n-2/1-r^2)}$.

within a factor or cluster by many variables, it might not be possible to estimate its effects on growth with any degree of confidence. If, however, *CAPITAL* does not enter into the other factors or clusters, it offers us important advantages in addressing our research question and confirms its utility in measuring an aspect of the determinants of growth not captured by other regressors.

Table 2 reports the results of our factor analyses of a dataset of standard growth regressors with the broadest range of political, social, and economic data possible from Table 1, 1985–1999, though this comes at the expense of time. It shows that five well-identified underlying variables or factors account for 71.1% of the variance in the data, which we describe as political institutional development (36.8%), socioeconomic endowments (10.8%), international financial policy reform (9.6%), quality of government institutions (8.7%), and domestic and international risk (5.3%). *CAPITAL* and *FIN_CURRENT* dominate Factor 3. SHARE also enters Factor 3. TOTAL from LMF enters into factor 5. When we include settler mortality from Acemoglu, Johnson, and Robinson (2001), it enters the second factor, but the results are otherwise identical.

Column 5 reports the results of hierarchical cluster analysis. Given the results of the factor analysis, we constrain the number of clusters to 5. In Table 2, the cluster analysis indicates that *CAPITAL* and *FIN_CURRENT* are the sole members of a unique cluster. Most other variables, including SHARE and TOTAL, are clustered into one broad group. Variables measuring the quality of government institutions comprise a separate cluster, as does the ethnic fractionalization variable. These results confirm that most regressors of growth contain extensive overlapping information.

As an experiment, we add BHL's EQUITY measure to the factor analyses.[6] We find that EQUITY, when entered into the analysis in Table 2, forms a separate 6th dimension, of which it is the only statistically significant member.

Because the factor and cluster analyses generate data across 5-year time periods, we cannot use the underlying factors in our time-series regressions as this would involve using information from one period to adjust data from prior periods earlier. Nevertheless, an important lesson is that much of the variance in a dataset of standard level regressors of growth can be explained by either two underlying factors or one underlying cluster. Another lesson is that *CAPITAL* and *FIN_CURRENT* are not subsumed in other factors or clusters, but are part of a separate international financial policy reform dimension. EQUITY also appears to offer unique information. This evidence gives us confidence that *CAPITAL* and *FIN_CURRENT* are not simply facets of good institutions or governance.

The various analyses show *CAPITAL* and *FIN_CURRENT* to be closely connected, and their independent effects are unlikely to be disentangled easily from each other. To maintain as much information as possible in the

[6] Strictly speaking, a dichotomous variable such as EQUITY cannot be validly entered into factor or cluster analyses. We use 5-year panel data in which EQUITY takes a range of values between 0 and 1 in 0.2 increments.

Table 2
Factor and cluster analyses of plausible growth regressors (main factors on which a variable loads with corresponding coefficient, 1980–1999)

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Clusters
Freedom House	0.848					1
Democracy (Polity IV)	0.827					1
Educational attainment (25)	0.709					1
Corruption	0.678					1
Income per capita (PPP)	0.645					1
Population growth	−0.607					1
Islamic %	−0.702					2
Black Market Premium	−0.553					1
Distance from equator (latitude)		0.757				1
Financial sector liquidity		0.702				1
Ethnic fractionalization		−0.680				5
Investment		0.628				1
CAPITAL			0.833			3
FIN_CURRENT			0.834			3
SHARE			−0.793			1
Government quality				0.993		4
Law and Order				0.993		4
Revolutions and Coups					−0.731	1
Trade openness					0.722	1
TOTAL					0.546	1
Total sums of squared loadings	7.35	2.16	1.91	1.74	1.05	
% of total variance	36.8	10.8	9.6	8.7	5.3	
Cumulative % of variance	36.8	47.6	57.1	65.8	71.1	
Descriptive content of factor	Political-Inst. development	Socio-economic development	Financial reform	Government quality	Domestic and international risk	

We use the "factor analysis" option in SPSS 13 with the varimax option, employing eigen values greater than 1 as the criterion for inclusion. Factor analysis cannot be validly undertaken on 0, 1 variables or variables with an arbitrary zero point, and variables with these characteristics are excluded. For cluster analysis, we put the data in a common scale (*Z* scores) and use Euclidian squared distances with Ward's method of amalgamation to estimate the clusters. Other cluster approaches generally show similar or higher degrees of separation between *CAPITAL* and *CURRENT* and other variables.

investigation, we add to some models *FIN_CURRENT − CAPITAL*. This variable has a substantive policy interpretation regarding the sequencing of reforms: is greater openness of international financial current transactions relative to capital transaction associated with growth?

3. Design, Models, Methods, and Data

3.1 Design

The research design challenge for our project is to estimate the direct and indirect or contingent effects of *CAPITAL* on growth, given this political economic clustering. An important aspect of the challenge will be to assess whether the various possible independent variables, including *CAPITAL*, distill into one or several factors. In our analyses, we also look at the impact on growth of equity market liberalization, which could be considered a specific dimension of capital account liberalization.

Our research design is threefold. First, to examine our supposition that measurement error contributes to the conflicting results in prior studies, we use the new data in *CAPITAL* to replicate key studies in the literature. We use exactly the same methods and models as other scholars, adding *CAPITAL* to their investigations.[7]

Second, we estimate growth models in which we test for the effects of *CAPITAL* on growth. In addition to examining *CAPITAL,* we compare its effects to the estimated effects of other plausible growth regressors.

Third, to test the hypothesis that capital account liberalization's effects are dependent on the presence of other variables, we estimate models including the interaction between *CAPITAL* and various independent variables. For example, when studying the effect of Black Market Premium we include in the model (where '*s*' indicates a 5-year average):

$$\text{Capital Account Openness } (CAPITAL)_{s-1} + \text{Black Market Premium } (\text{BMP})_{s-1} + CAPITAL_{s-1} \times \text{BMP}_{s-1}. \quad (2)$$

Let us note some design problems. The first is possible endogeneity in the relationships between growth and various independent variables. Bartolini and Drazen (1997) and Rodrik (1998) note that governments are most likely to liberalize their capital accounts when officials expect that the nation's growth prospects are brightest. A second problem is that data limitations for many of the proposed interaction effects lead to large reductions in the sample. A third problem, to which we earlier referred, is the extensive collinearity among variables. A fourth consideration involves whether or not to include investment as a growth regressor. Most studies of capital account liberalization and growth do include it. (See AEW; Edison et al., 2004; Edwards, 2001; Eichengreen

[7] We thank an anonymous referee for this suggestion.

and Leblang, 2003; GMF; Klein, 2003; Quinn, 1997.) BHL, however, note that investment is an important channel through which capital account openness might influence growth (because the lower costs of capital from liberalization might temporarily raise the investment to GDP ratio). Hence, they do not include it in their models.

We address these design problems as follows. Concerning endogeneity, we focus on 5-year lags in *CAPITAL*, which should attenuate endogeneity bias. We also use a GMM system estimator described below, similar to that used in Eichengreen and Leblang (2003) and Quinn and Toyoda (2007). We also estimate models using "unexpected growth" as a dependent variable. Regarding sample reduction and collinearity among variables, we note that the effect of these problems is to diminish the likelihood that we will discover consistent estimates of the effect of *CAPITAL* on growth. The problems of collinearity and sample size reduction, therefore, bias the investigation against our hypotheses. As for whether to include or not include investment in the base models, we estimate models including investment as a regressor as well as other models excluding it. We report both sets of results.

3.2 Models and methods

The dependent variable in this investigation is per capita purchasing power parity (PPP) adjusted economic growth, which is available from 1950 to 2004. We supplement this analysis with a real growth per capita dependent variable (as in BHL, 2005) from the World Bank 2006; these data are available from 1965 to 2004. Pooled, cross-section, time-series (PCSTS) models are useful in evaluating the question of why, over time, some nations grow quickly and others do not. That is, the variation in the dependent variables comes from both the time series and the cross sections, and some pooling of data is necessary to address the questions.

As noted, we estimate the models using 5-year averaged data. When we use ordinary least squares, we use panel corrected standard errors, as suggested by Beck and Katz (1995).[8] We estimate fixed effects where possible because the Hausman tests invariably reject the use of random effects models. Fixed effects models are particularly appropriate in cases such as this, where unobservable, country-specific characteristics might affect the dependent variable and might be correlated with the independent variables. Moreover, because these data are not from a random sample, but are the universe of data that are available, fixed effects models are generally appropriate. (For a discussion, see Hsiao, 1986.) However, some of the key hypotheses in the literature involve the effects of relatively time invariant variables that need to be examined through random effects models. To compare our results to the prior literature, we will therefore estimate and report the results of several random effects models.

[8] All OLS PCSTS estimations use the POOL command with HETCOV option in Shazam 9.0. All dynamic panel modeling is done using PCGive 10.

The base model includes log of per capita income, change in investment, log of levels of investment (as a share of GDP), annual population growth, log of levels of trade openness (imports + exports as a percentage of gross domestic product), and change in trade openness, all lagged one period.[9] We add to this model various indicators of oil price shocks. As with Barro (1991), we add indicators of political instability (revolutions, coups, assassinations, guerrilla wars, and crises from Banks, 2001), lagged one period. In order to use the widest range of countries, we omit educational attainment from the base model. (Our results are highly robust to the inclusion or exclusion of educational attainment measures.)

These are 5-year nonoverlapping models, with $i = 1,2, \ldots, 85$ and the index s representing 5-year intervals, starting at 1955–1959 and continuing to 2000–2004. This means, e.g., that $\Delta GDP_{i,s}$ for the $s =$ 1985–1989 period is examined using data from the $s-1 =$ 1980–1984 period.

The base OLS model is

$$\begin{aligned}\Delta GDP_{i,s} = {} & \beta_0 + \beta_1(Income_{i,s-1}) + \beta_2(\Delta Investment_{i,s-1}) \\ & + \beta_3(Investment_{i,s-1}) + \beta_4(Population\ Growth_{i,s-1}) \\ & + \beta_5(\Delta Trade\ Openness_{i,s-1}) + \beta_6(Trade\ Openness_{i,s-1}) \\ & + \beta_7(Revolutions\ Coups_{i,s-1}) + \beta_8(\Delta Oil\ Price_{s-1}) \\ & + \beta_9(Oil\ Price_{s-1}) + \beta_{10}(CAPITAL_{S-1}) \\ & + \beta_{11,12\ldots}(Country\ Dummy\ Variables) + \varepsilon_{i,s}, \quad i = 1, 2, \ldots, 85. \end{aligned} \tag{3}$$

An alternative investigation strategy is to estimate standard instrumental variable (IV) regressions. Standard IV regressions have possible disadvantages in this investigation, however. The validity of IV procedures depends on the investigator finding good instruments for the endogenous explanatory variables. Bound, Jaeger, and Baker (1995) show that in the presence of weak correlation between an instrument and explanatory variables, OLS outperforms IV (e.g., 3SLS) estimations. (See also Angrist and Krueger, 2001.)

To allow the explanatory variables to be endogenous, we use the Generalized Method of Moments system estimator proposed in Arellano and Bover (1995) and Blundell and Bond (1998), or GMM-SYS. (See Eichengreen and Leblang, 2003, and Quinn and Toyoda, 2007, for applications.) This method jointly estimates the equation in levels and differences, with the levels equation estimated with the first difference of the regressors and the differences equation estimated with lags of the levels of regressors and dependent variables. The GMM-SYS estimator uses lags of the original variables, and so preserves some of the precision of *CAPITAL*, thereby reducing possible measurement error. We

[9] Unit roots tests (Augmented Dickey-Fuller and Phillips-Perron, available from the authors) reject the null hypotheses of a unit root in these economic data.

also use some standard instruments found in the growth literature (described below).

The GMM-SYS model employed here explicitly treats the independent variables as endogenous, and uses internal instruments and fixed effects to account for these endogenous relationships. The GMM-SYS estimation combines transformed and level equations. The instruments for the transformed equation are lags 2 through 5 of the right-hand side variables plus some instruments/regressors standard to the growth literature: a nation's latitude, the presence of an English common law tradition, ethnic fractionalization, and the percentage of a nation's citizens adhering to Islam. The instruments for the levels equations are lag one of the right-hand side variables and the country fixed effects. (No serial correlation is indicated in GMM-SYS models when the AR test for second-order serial correlation is not significant, and the AR1 test shows evidence of significant negative serial correlation in the differenced residuals.)

The dependent variable, $\Delta GDP_{i,s}$ for the $s = 1985$–1989 period, e.g., is examined using data from the $s = 1985$–1989 period, with data from prior periods serving as instruments. The main base GMM-system model is

$$\begin{aligned}\Delta GDP_{i,s} = {} & \beta_0 + \beta_1(Income_{i,s-1}) + \beta_2(\Delta Investment_{i,s}) \\ & + \beta_3(\Delta Population\ Growth_{i,s}) + \Delta\beta_4(\Delta Trade\ Openness_{i,s}) \\ & + \beta_5(\Delta Revolutions\ Coups_{i,s}) + \beta_6(\Delta Oil\ Price_s) \\ & + \beta_7(\Delta CAPITAL_{i,s}) + \varepsilon_{i,s}, \quad i = 1, 2, \ldots, 83. \end{aligned} \tag{4}$$

3.3 Data

Our focus in this investigation is international capital account variables. The other variables in the study are treated as control variables. The data are described in Appendix B. Table A2 in Appendix A lists the countries and years used. Table A3 in Appendix A provides an overview of the variables used.

4. Results

4.1 Replication of prior studies

In Table 3, we replicate GMF, the very first study of linkage between capital account openness and growth in emerging market nations. (Please see GMF for a description of data and methods.) We replicate models 1 and 2 from their Table 6 and find nearly identical results. IMF_BINARY (1 = closed) has a positive coefficient in model 1, implying that closure enhanced growth, which is also their finding. GMF were the first (and to our knowledge, only) exploration of the direct effects of a 0, 1 version of *FIN_CURRENT* on growth (with "1" indicating restrictions). As with GMF, we find that the 0, 1 *FIN_CURRENT* variable has a negative and statistically significant coefficient, suggesting that restrictions on financial current account proceeds harmed growth. We also find,

Table 3
Replication of Grilli and Milesi-Ferretti (1995), Table 6, models 1 and 2

Model	Model 1	Model 2	Model 1 with *CAPITAL* (no IMF_BINARY)	Model 2 with *CAPITAL* (no IMF_BINARY)	Model 2 with *CAPITAL* ± IMF_BINARY	Model 1 with *CAPITAL*, IV procedures
Income ($s-1$) (per capita, PPP-adjusted)	−1.378***(0.480)	−0.763 (0.465)	−1.299***(0.475)	−0.688 (0.459)	−0.705 (0.459)	−0.615 (0.794)
Trade openness ($s-1$)	0.053 (0.349)	−0.005 (0.370)	0.024 (0.341)	0.007 (0.352)	0.020 (0.361)	−0.083 (0.35)
Central Bank independence	−1.730 (1.290)	−1.298 (1.279)	−1.181 (1.294)	−0.890 (1.263)	−0.896 (1.265)	−0.426 (1.898)
Initial education (1975)	0.257*(0.138)	0.198 (0.142)	0.211 (0.141)	0.169 (0.141)	0.170 (0.141)	0.087 (0.157)
Government expenditure	−0.040 (0.030)	−0.029 (0.033)	−0.035 (0.029)	−0.030 (0.032)	−0.032 (0.032)	−0.043 (0.037)
Democracy	0.015 (0.037)	−0.010 (0.038)	0.025 (0.036)	−0.002 (0.037)	−0.002 (0.037)	0.065 (0.049)
Black Market Premium	−0.338***(0.101)	−0.214**(0.105)	−0.285***(0.097)	−0.169 (0.104)	−0.171*(0.103)	−0.031 (0.367)
Current financial account dummy, 1 = closed	−0.709 (0.445)	−0.805**(0.403)	−0.239 (0.362)	−0.763**(0.381)	−0.827**(0.400)	−1.536 (1.279)
Δ*CAPITAL* ($s-1$)			0.155***(0.055)	0.120**(0.055)	0.120**(0.056)	0.409**(0.193)
IMF_BINARY 1 = closed	1.015**(0.457)	0.161 (0.494)			0.161 (0.485)	
Africa		−0.299 (0.734)		−0.384 (0.712)	−0.407 (0.717)	−0.534 (0.902)
OECD		−0.576 (0.589)		−0.710 (0.588)	−0.704 (0.587)	−1.454 (1.161)
Western hemisphere		−1.789***(0.531)		−1.702***(0.460)	−1.631***(0.531)	−1.456 (0.905)
R^2	19.62%	23.80%	21.08%	25.60%	25.63%	...

Please see GMF for a description of data and variables. The dependent variable is growth in 5-year panels, 1976–1995. The number of observations is 196, and the number of countries is 51. Matching data for Central Bank Independence used in GMF are not available. The R^2 is not reported for IV procedures as it is not valid because the actual values of the variables, and not the instruments, are used to determine the model sum of squares. Panel-correct standard errors are listed below the coefficients:
*p-value < 0.10; **p-value < 0.05; ***p-value < 0.01.

The Review of Financial Studies / v 21 n 3 2008

Table 4
Replication of Quinn (1997), Table 1

Variable	Model 1	Model 2	Model 3	Model 4
	OLS estimations			IV estimation
	Change variables Change variables	IMF_BINARY added to Model 1	Both change and level measures of *CAPITAL*	Both change and level measures of *CAPITAL*
Log of income ($t-1$)	−1.312***(0.210)	−1.325***(0.228)	−1.431***(0.238)	−1.474***(0.397)
Education	0.122 (0.082)	0.118 (0.080)	0.112 (0.078)	0.004***(0.217)
Investment	0.171***(0.017)	0.171***(0.017)	0.160***(0.016)	0.195**(0.078)
Population growth	−0.172 (0.168)	−0.302*(0.160)	−0.167 (0.167)	0.334 (0.379)
IMF_BINARY		−0.181 (0.436)		
Change in *CAPITAL*	0.253*(0.127)		0.434**(0.196)	1.255**(0.610)
CAPITAL ($t-1$)			0.008 (0.006)	0.026**(0.012)
Constant	9.992***(1.580)	10.285***(1.869)	10.492***(1.650)	8.729***(3.022)
Adjusted R^2	67.1%	65.9%	67.7%	
No. of observations/ cross sections	71	70	71	71

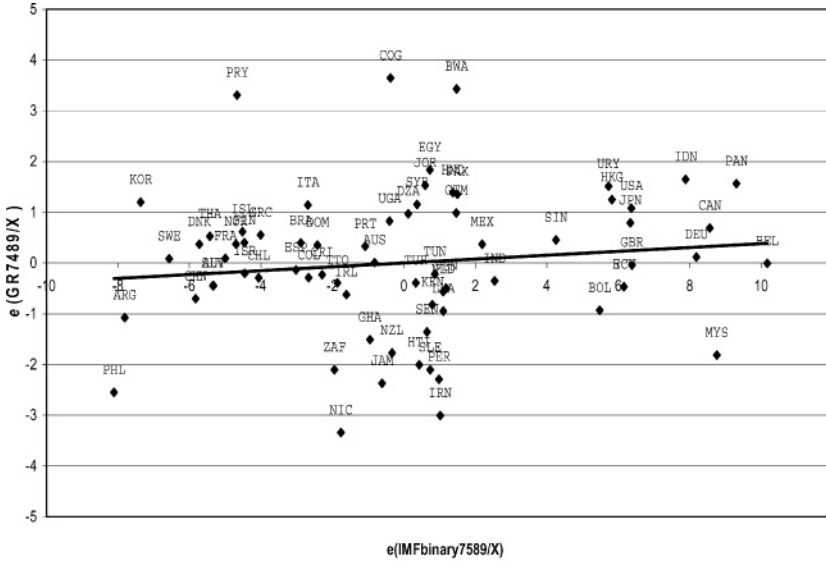
Please see Quinn (1997) for a discussion of the original methods and data. The dependent variable is average per capita economic growth, PPP-adjusted, 1960–1989. Instruments for model 4 include regional dummies for Sub-Saharan Africa, the Middle East and North Africa, East Asia, South Asia and Latin America. Additional instruments include Latitude, the presence or absence of English Common Law traditions, the percentage of nation's population adhering to Islam, and ethnic fractionalization. The R^2 is not reported for IV procedures as it is not valid because the actual values of the variables, and not the instruments, are used to determine the model sum of squares. Standard errors are listed below the coefficients.
*p-value < 0.10; **p-value < 0.05; ***p-value < 0.01.

as did GMF, that the positive IMF_BINARY coefficient is no longer statistically significant once their regional dummy variables are added.

When we replace IMF_BINARY with change in *CAPITAL*, we find it has a positive and statistically significant coefficient (i.e., liberalization is associated with growth). The result holds when dummy variables are added, when dummy variables and IMF_BINARY are added, and when IV methods are used. As with GMF, we find that *FIN_CURRENT* does not have a consistently statistically significant effect.

Table 4 replicates Quinn (1997), Table 1, which reports that capital account liberalization was associated with growth. With updated data and new countries added to the old analysis, change in *CAPITAL* (as in Quinn, 1997) continues to have a positive and statistically significant association with growth (model 1), even when levels of *CAPITAL* are entered (model 3). IMF_BINARY, entered in model 2, has a coefficient far from statistical significance. A common criticism of the Quinn (1997) study was that it did not allow for the endogeneity of capital account liberalization to growth (e.g., Eichengreen and Leblang, 2003). Model 4 uses IV methods, and both change in *CAPITAL* and the initial levels of *CAPITAL* are positive and highly statistically significantly associated with growth.

Perhaps the best-known study in economics of the capital account openness and growth question is Rodrik (1998). We use Rodrik's methods (partial residual



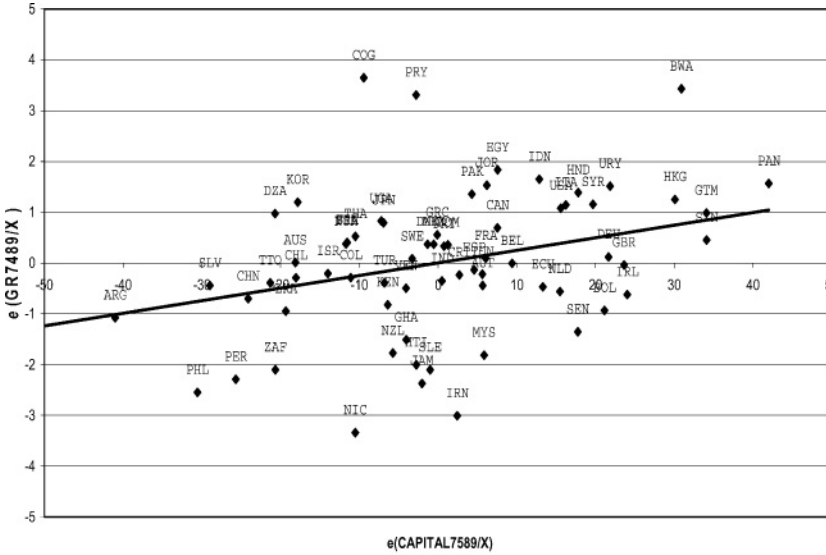
Notes: The figure is based on partial residual plots, as in Rodrik (1998, p. 14). Please see Rodrik (1998) for discussion of models and methods. The data for 71 countries are used, 1974–1989.

Figure 2
Partial scatter plot as in Rodrik (1998) (economic growth on IMF_BINARY controlling for income, secondary education, quality of governmental institutions, and regional dummies for East Asia, Latin America, and Africa)

plots), models, and time period. Using IMF_BINARY variable in Figure 2, we get very similar results to Rodrik (1998), which is that IMF_BINARY has no statistically significant relationship to growth, 1975–1989. When *CAPITAL* is used instead (in Figure 3), we find a very different result. *CAPITAL* has a statistically significant and positive relationship to growth.

In Table 5, we revisit the debate between Edwards (2001) and AEW, both of which use *CAPITAL*. Edwards posits that capital account liberalization has interactive effects with income such that liberalization benefits wealthier countries. We replicate Edwards's analyses and confirm that, whether using OLS or IV methods, the updated version of change in *CAPITAL* has a positive correlation with economic growth in the 1980s. We also confirm that richer countries appear to have grown faster postliberalization (model 3 and other results that are available from the authors). We also confirm AEW's suggestion that this effect was specific to the 1980s. In model 4, we extend the data analyses to a 30-year period for 75 countries. However, the interaction term between capital account liberalization and income then is far from statistical significance. The time period examined does influence the estimated relationships, by this evidence.

In Table 6, we reexamine the Edison et al. (2004) study, which uses Edwards' (2001) specifications of nonlinear relationships among growth, income, and



Notes: The figure is based on partial residual plots, as in Rodrik (1998, p. 14). Please see Rodrik (1998) for discussion of models and methods. The data for 71 countries are used, 1974–1989. *CAPITAL* is substituted for IMF_BINARY in Figure 3.

Figure 3
Partial scatter plot as in Rodrik (1998) (economic growth on *CAPITAL* controlling for income, secondary education, quality of governmental institutions, and regional dummies for East Asia, L. America, and Africa)

Table 5
Replication of Edwards (2001) Tables 9a, 9b, and 10d

Variable	Model 1	Model 2	Model 3	Model 4
	OLS, 1980s (Model 9a)	IV, 1980s (Model 9b)	OLS, 1980s (Model 10d)	IV, 1960–89 (AEW)
Income $(t-1)$	-1.501^{***}(0.486)	-1.490^{***}(0.466)	-1.942^{***}(0.599)	-1.442^{***}(0.391)
Education	0.318^{**}(0.151)	0.185 (0.157)	0.100 (0.188)	−0.072 (0.199)
Investment	1.043 (0.662)	1.748^{***}(0.624)	2.332^{***}(0.796)	0.214^{***}(0.071)
CAPITAL $(t-1)$				0.022^{**}(0.011)
Change in *CAPITAL*	0.050^{***}(0.014)	0.073^{***}(0.025)	−0.678 (0.447)	0.636 (2.123)
Change in *CAPITAL** income			0.089^{*}(0.053)	0.04 (0.2714)
Constant	9.793^{***}(3.237)	8.488^{***}(2.936)	10.823^{***}(3.647)	9.363^{***}(2.853)
Adjusted R^2	21. 8%		29.5%	
Number of observations/ cross–sections	75	75	75	75

Please see Edwards (2001) and AEW for a discussion of data and methods. Models 1, 2, and 3 use information for the 1980s only. Model 4 uses information from the 1960–1989 period. Growth is expressed on per capita basis. Instruments for models 2 and 4 include regional dummies for Sub-Saharan Africa, the Middle East and North Africa, East Asia, South Asia and Latin America. Additional instruments include Latitude, the presence or absence of English Common Law traditions, the percentage of nation's population adhering to Islam, and ethnic fractionalization. The R^2 is not reported for IV procedures as it is not valid because the actual values of the variables, and not the instruments, are used to determine the model sum of squares. Standard errors are listed below the coefficients.
$^{*}p$-value < 0.10; $^{**}p$-value < 0.05; $^{***}p$-value < 0.01.

Table 6
Replication of Edison et al. (2004), model 9.1, p. 250, "Resolution" model

Variable	Basic model without interactions	Edison et al. model replicated 9.1	With Income and Income^2 included	Model 9.1 replicated with Income^2	Model 9.1 with regions and institutions included
Income	−0.358***(0.091)	−0.475***(0.165)	1.714***(0.492)	0.420 (1.394)	1.685***(0.594)
Income^2			−0.149***(0.035)	−0.066 (0.102)	−0.138***(0.041)
Initial education (1975)	0.051 (0.038)	0.085**(0.039)	0.086**(0.038)	0.087**(0.039)	0.048 (0.038)
Investment ($s-1$) (share of GDP, 1975–1979)	0.434***(0.114)	0.342***(0.091)	0.348***(0.094)	0.343***(0.091)	0.216**(0.089)
Population growth (s − 1) 1975–1994	−0.269***(0.070)	−0.286***(0.062)	−0.323***(0.066)	−0.299***(0.072)	−0.225***(0.070)
SS Africa	−0.164 (0.151)	−0.122 (0.121)	−0.099 (0.127)	−0.122 (0.124)	−0.197 (0.239)
CAPITAL (1976–1995)	0.006**(0.003)	−0.170***(0.053)	0.005 (0.003)	−0.125 (0.088)	0.004**(0.002)
*CAPITAL**Income		0.047***(0.013)		0.034 (0.024)	
*CAPITAL**Income^2		−0.003***(0.001)		−0.002 (0.002)	
Government reputation (investor protection)	0.086**(0.033)	0.123***(0.029)	0.123***(0.030)	0.122***(0.029)	0.098***(0.028)
Latin America					−0.277 (0.209)
Middle East/North Africa					−0.038 (0.343)
East Asia					0.308*(0.177)
Latitude					−0.002 (0.002)
Ethnic fractionalization					−0.005***(0.002)
Islam					−0.003 (0.003)
English common law					−0.050 (0.117)
Intercept	1.718***(0.541)	2.555**(1.106)	−5.291***(1.676)	−0.398 (4.610)	−4.734**(2.050)
Adjusted R^2	60.1%	66.9%	66.6%	66.6%	70.8%
Number of observations/cross sections	68	68	68	68	68

Please see Edison et al. (2004) for a description of data and methods. We thank Michael Klein for providing data. The dependent variable is growth in a 20-year panel, 1976–1995. OLS procedures with panel correct standard errors used. Standard errors are listed below the coefficients.
*p-value < 0.10; **p-value < 0.05; ***p-value < 0.01.

capital account openness. They theorize, however, that it is middle-income countries, not wealthier countries, which most benefit from liberalization. We replicate their "Resolution" analysis (their Table 9). In model 1, we confirm that capital account openness has a positive relationship with growth, even accounting for the presence of an indicator of good governance. In model 2, we also find the quadratic relationship posited in Edison et al. (2004), that middle-income countries grew faster after capital account liberalization than either richer or poorer countries.

It is possible, however, that middle-income countries grew faster during this period, with or without capital account openness, and we assess that possibility in model 3.[10] The quadratic term for income squared has a negative and statistically significant coefficient, and the base income coefficient is positive and statistically significant. Middle-income countries, by this evidence, grew faster with or without capital account openness during 1976–1995. When the interaction terms are entered also, none of the coefficients is statistically significant, though all have signs predicted by Edison et al. and each coefficient is as large as or larger than its standard error. When the interaction terms are dropped and plausible growth regressors are entered, *CAPITAL* enters with a statistically significant and positive coefficient. By this evidence, we find that *CAPITAL* has a direct, positive effect, but the evidence for quadratic effects is inconclusive.

In Table 7, we replicate BHL (2005). We use BHL's models, methods, and data, and examine their Table 4, panel C (OLS analyses), and Table 5, panel B (GMM analyses). We confirm their findings that EQUITY is always positive and statistically significant, and that the coefficients of EQUITY are sometimes very large. The coefficient for *CAPITAL*, when entered either alone or with EQUITY, is always positive and statistically significant.

4.1.1 Summary. We replicate six prior studies in the literature on capital account openness and economic growth that in aggregate show conflicting results. When *CAPITAL* is entered into the six different analyses, however, it has a positive and statistically significant coefficient.

We draw several preliminary conclusions. First, with *CAPITAL* as an independent variable, the apparently conflicting results are reconciled. Second, interactive and other nonlinear effects need to be tested for in the analyses. Third, EQUITY is a complement to *CAPITAL* in these analyses. Fourth, the different periods examined and countries included by different investigators appear to account for some of the differences in reported results. In contrast,

[10] It is in any event necessary to include all the base terms of the interaction variables in the analyses. See Friedrichs (1982) for a discussion. In a recent paper, Klein (2007) uses squared and cubic income terms as regressors along with higher order interaction terms between capital account liberalization and the income terms. Klein finds that middle-income countries, in long-run growth regressions 1976–1995, experienced an economically significant effect from capital account liberalization.

Table 7
Replication of BHL (2005). Table 4, panel C (models 1–3) and Table 5, panel B (models 4–6)

Variable	Model 1 OLS	Model 2 OLS	Model 3 OLS	Model 4 GMM	Model 5 GMM	Model 6 GMM
Growth ($s-1$)				−0.432***(0.053)	−0.438***(0.051)	−0.444***(0.056)
Income	−6.293***(0.964)	−6.284***(0.96)	−6.623***(0.974)	−9.195***(1.284)	−8.36***(1.267)	−8.635***(1.359)
Education	−1.273 (1.523)	−0.908 (1.52)	−1.001 (1.507)	−0.338 (0.445)	−0.338 (0.445)	−0.237 (0.339)
Population growth	−0.347*(0.196)	−0.375*(0.196)	−0.334*(0.197)	0.7*(0.348)	0.624**(0.322)	0.673**(0.339)
Log(life expectancy)	19.739***(6.857)	20.548***(6.545)	17.989***(6.821)	10.071***(3.988)	9.907**(4.508)	11.777***(4.66)
Government expenditures	−0.1***(0.367)	−0.806**(0.036)	−0.869**(0.036)	−0.029 (0.028)	−0.011 (0.034)	−0.001 (0.034)
CAPITAL		0.023**(0.01)	0.02**(0.01)		0.041***(0.009)	0.032***(0.01)
EQUITY	0.882**(0.403)		0.727*(0.409)	1.737***(0.588)		1.202**(0.589)
Constant	−15.442 (28.35)	−21.59 (26.67)	−7.269 (28.4)	−0.937**(0.41)	−0.059 (0.43)	−0.937**(0.41)
R^2	43.8%	44%	44.3%	44.66%	45.34%	46.03%
Countries	69	69	69	71	71	71

Please see BHL (2005) for a description of data and models. The models used here are nonoverlapping 5-year data models, using as the dependent variable real growth, per capita, 1980–1999. In the OLS estimations, country-fixed effects and period dummies used but not reported. In the GMM estimations, persistent serial correlation required the use of a lagged endogenous variable. Because of the presence of the lagged endogenous variable, country-fixed effects are omitted. In the GMM estimations, the R^2 is defined as 1−RSS/TSS. In the OLS regressions, the R^2 is the adjusted R^2, and the standard errors are panel corrected standard errors from Beck and Katz (1995). In the OLS models, all independent variables are lagged one period, except EQUITY, which is not lagged in BHL (2005). Standard errors are listed below the coefficients.
*p-value < 0.10; **p-value < 0.05; ***p-value < 0.01.

differences in sample, methods, models, and sources of economic data used do not appear to be a significant source of the conflicting results.

4.2 Results from base models

In Table 8, we report our main results for the OLS fixed effects analysis. Models 1, 3, and 5 use PPP-adjusted growth data from 1955–2004, a span of 50 years. Models 2, 4, and 6 use real growth per capita, but the time frame is shorter: 1970–2004. Models 3 and 4 omit investment as a regressor, consistent with the approach in BHL (2005). Models 5 and 6 focus only on emerging and developing nations, omitting the 22 "traditional" member countries of the OECD. The models show no signs of serial correlation, the residuals are well behaved, and the explanatory power of the models is good.

CAPITAL in all six models has a positive and highly statistically significant coefficient, which suggests that liberalization is associated with subsequent growth. *FIN_CURRENT−CAPITAL* also has a positive and statistically significant coefficient in all six models, suggesting that an earlier liberalization of current accounts relative to capital accounts is beneficial.

When we constrain models 1 and 2 to the same countries for the same years (82 countries from 1970–2004), we find that the choice of whether PPP-adjusted growth or real growth is used as the dependent variable hardly influences the analysis. The estimated coefficient of *CAPITAL* using PPP-adjusted growth is slightly smaller (0.03) and the standard error is slightly larger (0.0074), compared to the real growth model (0.035 and 0.0071, respectively). The data differences in growth measures are therefore immaterial to the results.

The control variables have signs and levels of statistical significance broadly consistent with theory and prior studies. Higher income and population growth have negative, statistically significant coefficients at the 0.05 level and beyond in all models. The coefficient estimates of the other variables are less well defined. (We treat the other variables as control variables, and limit our discussion and reporting of them hereafter.) To check for individual country outliers, we use standard OLS regressions with model 8, column 1, and drop each country in turn. We find no outliers.

In Table 9, we employ GMM-SYS estimators. As with Table 8, models 1, 3, and 5 use PPP-adjusted growth as a dependent variable, and models 2, 4, and 6 use real growth as the dependent variable. Models 3 and 4 omit investment, and models 5 and 6 focus only on emerging and developing countries. The diagnostic statistics are good: the disturbances show no sign of serial correlation. The joint Wald test and R^2 indicate that the model explains much of the variance in growth.

CAPITAL has a positive and statistically significant coefficient at beyond the 0.01 level in all six models. *FIN_CURRENT−CAPITAL*, in contrast to the OLS models, never has a statistically significant coefficient in these six models. (We henceforth limit our discussion of this variable, given its inconsistent effects between OLS and GMM-SYS.)

Table 8
Economic growth, 1955–2004 or 1970–2004, OLS

Variable	Model 1 Full model; PPP-adjusted growth 1955–2004	Model 2 Full model; real growth 1970–2004	Model 3 Investment omitted; PPP-adjusted growth 1955–2004	Model 4 Investment omitted; real growth 1970–2004	Model 5 Emerging market only; PPP-adjusted growth 1955–2004	Model 6 Emerging market only; real growth 1970–2004
Income ($s-1$)	−3.449***(0.364)	−4.122***(0.459)	−3.4***(0.367)	−3.978***(0.464)	−3.265***(0.528)	−4.028***(0.512)
Change in investment ($s-1$)	−0.016 (0.015)	−0.311***(0.091)			−0.167 (0.120)	−0.253**(0.105)
Investment ($s-1$) (share of GDP)	1.008**(0.399)	−0.826*(0.435)			0.883**(0.436)	−0.764 (0.481)
Population growth ($s-1$)	−0.542**(0.2)	−0.366**(0.178)	−0.429**(0.196)	−0.507***(0.180)	−0.546**(0.278)	−0.568**(0.266)
Change in trade openness ($s-1$) (imports + exports)/GDP	0.055***(0.023)	0.032 (0.037)	0.046**(0.023)	−0.006 (0.038)	0.107**(0.047)	0.013 (0.039)
Level of trade openness ($s-1$)	0.287 (0.378)	0.377 (0.419)	0.756**(0.383)	0.100 (0.432)	0.152 (0.540)	0.233 (0.476)
Revolutions and Coups ($s-1$)	0.032 (0.063)	−0.005 (0.071)	0.033 (0.063)	0.002 (0.070)	0.080 (0.090)	0.003 (0.078)
Change in oil prices ($s-1$)	−0.012 (0.01)	0.002 (0.009)	−0.007 (0.010)	−0.001 (0.009)	0.004 (0.014)	−0.005 (0.012)
Oil prices ($s-1$)	0.001 (0.013)	−0.020*(0.012)	0.001 (0.013)	−0.015 (0.012)	−0.025 (0.013)	−0.024 (0.016)
CAPITAL ($s-1$)	0.022***(0.006)	0.036***(0.007)	0.02***(0.006)	0.037***(0.007)	0.022***(0.007)	0.036***(0.009)
FIN_CURRENT−CAPITAL ($s-1$)	0.022***(0.009)	0.033***(0.009)	0.022**(0.009)	0.028***(0.009)	0.024**(0.011)	0.034***(0.011)
Adjusted R^2	33.2%	42%	32.4%	40.3%	30.8%	42.9%
Number of countries	85	82	85	82	63	60
Number of observations	713	534	713	534	501	381

The dependent variable is per capita economic growth: PPP-adjusted, 1955–2004 for models 1, 3, and 5; it is real growth per capita, 1970–2004, for models 2, 4, and 6. Investment is omitted in models 3 and 4. Data for industrial nations are omitted in models 5 and 6. The models are unbalanced panels estimated using OLS with panel correct standard errors in Fixed Effects Models. Panel-corrected standard errors are listed below the coefficients.
*p-value < 0.10; **p-value < 0.05; ***p-value < 0.01.

The Review of Financial Studies / v 21 n 3 2008

Table 9
Economic growth, 1955–1999 or 1970–1999, GMM-system models

Variable: all are change variables	Model 1 Full; PPP-adjusted growth 1955–1999	Model 2 Full; real growth 1970–1999	Model 3 Investment omitted; PPP-adjusted 1955–1999	Model 4 Investment omitted; real 1970–1999	Model 5 Emerging market; PPP-adjusted 1955–1999	Model 6 Emerging market; real growth 1970–1999
Income ($s-1$)	−3.118***(1.108)	−3.688***(0.687)	−3.896***(1.187)	−3.258***(0.828)	−2.745**(1.249)	−3.519***(0.720)
Revolutions and Coups (s)	−0.241 ∗ (0.236)	−0.287**(0.140)	−0.250 (0.243)	−0.325**(0.147)	−0.271 (0.226)	−0.273*(0.144)
Trade openness (s) (imports + exports)/GDP	0.268 (0.618)	0.764 (0.916)	0.469 (0.632)	2.191***(0.660)	0.649 (0.745)	0.216 (1.133)
Population growth (s)	0.244 (0.648)	0.481 (0.555)	0.364 (0.627)	0.554 (0.525)	0.509 (0.835)	0.729 (0.806)
Investment (s)	0.894 (0.948)	3.335***(0.721)			0.478 (1.073)	3.125***(0.851)
Oil prices (s)	0.320**(0.250)	0.211*(0.122)	0.449***(0.152)	0.183 (0.127)	0.247*(0.148)	0.207 (0.173)
CAPITAL (s)	0.036***(0.013)	0.050***(0.013)	0.036***(0.013)	0.044***(0.013)	0.048***(0.017)	0.051***(0.015)
FIN_CURRENT−CAPITAL	0.004 (0.022)	0.004 (0.020)	0.002 (0.022)	0.009 (0.020)	0.000 (0.026)	0.014 (0.020)
Islam	−0.040 (0.025)	0.038 (0.141)	−0.054**(0.023)	0.025 (0.140)	−0.022 (0.020)	0.051 (0.112)
Ethnic fractionalization	0.006 (0.076)	−0.385 (0.555)	0.004 (0.078)	−0.210 (0.549)	−0.008 (0.093)	−0.396 (0.565)
Sub-Saharan Africa	−3.249 (3.237)	9.978 (20.550)	−4.755 (3.127)	1.237 (20.460)	−1.029 (2.875)	10.926 (16.650)
East Asia/Pacific	0.120 (1.236)	3.528 (7.293)	−0.152 (1.235)	1.866 (7.320)	2.178 (1.572)	5.544 (4.971)
South Asia	−3.125 (2.213)	3.187 (12.210)	−4.502**(2.085)	−0.431 (12.190)	−0.349 (1.707)	5.069 (9.559)
Middle East and North Africa	0.996 (2.451)	−8.423 (15.070)	0.124 (2.324)	−5.258 (14.890)	2.363 (3.079)	−7.169 (18.120)
Latin America and the Caribbean	−1.526 (1.942)	6.732 (13.500)	−2.026 (1.937)	1.576 (13.390)	0.754 (2.047)	7.450 (8.793)
English	0.767 (1.139)	5.621 (7.515)	1.117 (1.198)	3.235 (7.470)	0.878 (1.250)	5.487 (6.943)
Latitude	0.033**(0.014)	0.025 (0.025)	0.045***(0.013)	0.031 (0.025)	0.007 (0.011)	−0.033 (0.033)
R^2	42.29%	59.55%	40.57%	57.11%	38.75%	61.41%
Wald (time)	56.67***	12.70**	107.4***	24.40***	31.88***	4.856
Sargan	51.14 [1.00]	60.22 [1.000]	49.85 [1.00]	87.82 [1.000]	21.60 [1.000]	40.19 [1.000]
AR1	−4.472***	−4.280***	−4.587	−3.967***	−3.708***	−2.380**
AR2	0.3249	−0.6640	−0.2506	−0.4972	0.4225	−0.2946
Observation	682	467	682	467	483	335

The dependent variable is per capita economic growth: PPP-adjusted, 1955–2004 for models 1, 3, and 5; it is real growth per capita, 1970–2004, for models 2, 4, and 6. Investment is omitted in models 3 and 4. Data for industrial nations are omitted in models 5 and 6. The R^2 is defined as 1−RSS/TSS. No serial correlation is indicated in GMM-SYS models when, in second-stage analysis, the Arellano-Bond test for second-order serial correlation is not significant, and the AR1 test shows evidence of significant negative serial correlation in the differenced residuals. For a discussion, see Doornik and Hendry (2001, 69). Time and fixed effects dummies are used. The instruments for the transformed equations include Islam, Ethnic Fractionalization, regional dummies, Latitude, English Common Law, and GMM lags 2 through 5 of the endogenous variables. The Instruments for the level equations include country dummies, and GMM level (lag 1) for the endogenous variables. Standard errors are listed below the coefficients.
*p-value < 0.10; **p-value < 0.05; ***p-value < 0.01.

Table 10
Random effects models using two growth measures OLS and GMM-SYS

	OLS		GMM-SYS	
All countries	Table 8, model 1	Table 8, model 2	Table 9, model 1	Table 9, model 2
CAPITAL	0.011**(0.004)	0.016***(0.006)	0.020**(0.009)	0.034***(0.012)
FIN_CURRENT – CAPITAL	0.008 (0.008)	0.006 (0.009)	0.019*(0.010)	−0.005 (0.014)
Emerging market countries only	Table 8, model 5	Table 8, model 6	Table 9, model 5	Table 9, model 6
CAPITAL	0.017**(0.006)	0.02***(0.008)	0.035***(0.013)	0.038***(0.013)
FIN_CURRENT – CAPITAL	0.015 (0.009)	0.005***(0.011)	0.018 (0.012)	−0.003 (0.016)

Though the Hausman test strongly rejects random effects models, they are used here to compare results with the numerous prior studies using random effects models. We report only limited results to conserve space. Full results are available from the authors. Regional dummies plus indicators for latitude, ethnic fractionalization, % of Islamic populations, and English Common Law traditions are included with the base variables from Tables 8 and 9. Standard errors are listed below the coefficients.
*p-value < 0.10; **p-value < 0.05; ***p-value < 0.01.

Across the 12 models, the coefficient estimates of *CAPITAL* range from a low of 0.02 to a high of 0.051, with a mean of 0.035. Translating this into relative magnitude effects, the estimated effect on yearly subsequent growth from a 25% increase (decrease) in *CAPITAL* is slightly less than a 1% annual increase (decrease) in growth. Increases or decreases of this magnitude are relatively common in the data. Examples of a 25% increase in *CAPITAL* include Spain in 1985 and Colombia in 1996, and an example of a 25% decrease is Tanzania in 1965. For a 35% increase (decrease), the effects translate into 1.25% annual increase (decrease). Examples of a 35% decrease include the Republic of Congo in 1969 and again in 1972, and the Philippines in 1968. An example of a 35% increase in *CAPITAL* is the United Kingdom in 1979.

4.3 Robustness

In Table 10, we estimate random effects models, which correspond to Table 8, models 1, 2, 5, and 6, and Table 9, models 1, 2, 5, and 6. *CAPITAL* always enters with a positive and highly statistically significant coefficient.

In Table 11, we examine the possibility, raised by BHL and others, that GMM procedures do not fully address the endogeneity question. As many scholars have noted, a government might liberalize capital accounts when government officials expect future growth to be higher. Insofar as the future growth government officials expect is correlated with both the observed subsequent growth and capital account liberalization, the expectations about future growth could give rise to an endogeneity problem. BHL (2005, pp. 25–28) addressed the endogeneity question by identifying "growth opportunities" and showed impressive evidence that the effects they estimate for EQUITY are highly robust to their exogenous measure of implied growth opportunities.

We employ a model in which the "expected" component of growth is excluded from the dependent variable, which becomes "unexpected" growth. In doing so, we assume that government officials use current growth to forecast future growth, and define unexpected growth as growth(s) minus growth($s-1$).

Table 11
Unexpected growth effects OLS and GMM-SYS

	OLS		GMM-SYS	
All countries	Table 8, model 1	Table 8, model 2	Table 9, model 1	Table 9, model 2
CAPITAL	0.028**(0.09)	0.026***(0.009)	0.042***(0.016)	0.051***(0.017)
FIN_CURRENT – CAPITAL	0.022**(0.011)	0.034***(0.012)	0.023 (0.024)	0.032 (0.021)
Emerging market countries only	Table 8, model 5	Table 8, model 6	Table 9, model 5	Table 9, model 6
CAPITAL	0.022**(0.011)	0.024**(0.011)	0.039**(0.018)	0.049**(0.021)
FIN_CURRENT – CAPITAL	0.018 (0.013)	0.028*(0.015)	0.031 (0.028)	0.032 (0.021)

To address concerns about possible endogeneity, we estimate models with unexpected growth as the dependent variable. It is defined, following Iversen and Cusack (2000) and Roubini and Sachs (1989), as growth(s) minus growth $(s-1)$. The OLS models using PPP-adjusted growth employ a lagged endogenous variable because of persistent serial correlation. We report only limited results to conserve space. Standard errors are listed below the coefficients.
*p-value < 0.10; **p-value < 0.05; ***p-value < 0.01.

Table 12
Spatial correlation—World growth rates included OLS and GMM-SYS

	OLS		GMM-SYS	
All countries	Table 8, model 1	Table 8, model 2	Table 9, model 1	Table 9, model 2
CAPITAL	0.016***(0.06)	0.023***(0.007)	0.019*(0.01)	0.004***(0.0003)
FIN_CURRENT – CAPITAL	0.019**(0.008)	0.024***(0.008)	−0.023 (0.021)	0.002 (0.002)
Emerging market countries only	Table 8, model 5	Table 8, model 6	Table 9, model 5	Table 9, model 6
CAPITAL	0.017**(0.007)	0.026***(0.009)	0.022*(0.013)	0.004**(0.002)
FIN_CURRENT – CAPITAL	0.023**(0.01)	0.027***(0.01)	−0.027 (0.025)	0.001 (0.002)

We estimate a spatial correlation model by including contemporaneous world growth rates as an exogenous regressor. See Franzese and Hays (2007) for a discussion of spatial correlation models. The home country growth rated is extracted from the world growth rate. We report only limited results to conserve space. Standard errors are listed below the coefficients.
*p-value < 0.10; **p-value < 0.05; ***p-value < 0.01.

This is in keeping with procedures in Iversen and Cusack (2000) and Roubini and Sachs (1989). When we examine "unexpected growth" as a dependent variable, we use again Table 8, models 1, 2, 5, and 6, and Table 9, models 1, 2, 5, and 6. *CAPITAL* enters all models with a positive and statistically significant coefficient.

Recent studies of political economic process suggest that the possibility of spatial interdependency in time-series, cross-sectional data should also be examined. (See Franzese and Hays, 2007, for a review and discussion.) In Table 12, we reestimate our models, adding a contemporaneous term for world growth rates (with each country's contribution netted out of the average). *CAPITAL* retains its positive and statistically significant coefficient in all models.

In Table 13, we estimate models entering EQUITY from BHL (2005) into all the models in Tables 8 and 9. EQUITY has positive coefficient estimates in all models, and it is usually statistically significant. The inclusion of investment as an independent variable appears to influence the coefficient estimates of EQUITY. BHL suggest that equity liberalization works through an investment channel, and the evidence of information overlap between investment and

Table 13
EQUITY and *CAPITAL* compared

	OLS		GMM-SYS	
Variables	Table 8, model 1	Table 8, model 2	Table 9, model 1	Table 9, model 2
Investment included				
CAPITAL	0.034***(0.001)	0.032***(0.010)	0.048**(0.01929)	0.033***(0.013)
EQUITY	0.789*(0.41)	0.685*(0.382)	0.781 (0.792)	0.823 (0.554)
Investment omitted				
CAPITAL	0.024*(0.014)	0.045***(0.01)	0.042*(0.022)	0.028*(0.014)
EQUITY	0.735*(0.41)	0.776**(0.396)	1.241 (0.877)	1.199**(0.544)
Investment and *CAPITAL* omitted				
EQUITY	1.125**(0.4)	1.224***(0.381)	1.715**(0.792)	1.500**(0.599)
Emerging market countries	Table 8, model 5	Table 8, model 6	Table 9, model 5	Table 9, model 6
CAPITAL	0.029**(0.013)	0.028**(0.013)	0.036 (0.022)	0.029**(0.015)
EQUITY	0.856*(0.515)	0.793*(0.472)	0.506 (1.287)	1.656**(0.819)

EQUITY is contemporaneous (as in BHL, 2005) in all models. *CAPITAL* is lagged one period in OLS estimations. Standard errors are listed below the coefficients.
*p-value < 0.10; **p-value < 0.05; ***p-value < 0.01.

Table 14
SHARE and *CAPITAL* compared

	OLS		GMM-SYS	
Variables	Table 8, model 1	Table 8, model 2	Table 9, model 1	Table 9, model 2
Investment included				
CAPITAL	0.03***(0.011)	0.032***(0.008)	0.038*(0.02)	0.039**(0.016)
SHARE	−1.015**(0.434)	−0.448 (0.313)	−0.049 (0.711)	−0.576 (0.559)
Investment omitted				
CAPITAL	0.03***(0.011)	0.032***(0.008)	0.038**(0.018)	0.037**(0.015)
SHARE	−1.102**(0.442)	−0.434 (0.326)	−0.15 (0.699)	−0.246 (0.51)
Investment and *CAPITAL* omitted				
SHARE	−1.858***(0.38)	−1.188***(0.288)	−1.10**(0.470)	−1.025**(0.431)
Emerging market countries only	Table 8, model 5	Table 8, model 6	Table 9, model 5	Table 9, model 6
CAPITAL	0.027**(0.014)	0.03***(0.01)	0.044*(0.025)	0.055***(0.017)
SHARE	−1.4336**(0.69)	−0.752 (0.495)	−0.310 (0.759)	0.527 (0.814)

SHARE is defined in Klein (2003), and Edison et al. (2004) as the cumulated value of the 0,1 IMF_BINARY variable for the presence or absence of capital controls in a given period (here, 5 years). It reports restrictions on residents only. SHARE is available from 1966 to 1995. The OLS estimations are for 1970 to 1999. The GMM-SYS estimations are for 1970 to 1994. Standard errors are listed below the coefficients.
*p-value < 0.10; **p-value < 0.05; ***p-value < 0.01.

EQUITY is consistent with their supposition. *CAPITAL* has a positive and statistically significant coefficient in all but one model, and approaches statistical significance in the last.

In Table 14, 5-year average values of SHARE (as in Edison et al., 2004; and Klein, 2003) are entered into the models in Tables 8 and 9. When *CAPITAL* is also included as a regressor, SHARE rarely approaches statistical significance, though its coefficient is negative in most cases, suggesting that the presence of capital restrictions on residents is negatively associated with growth. Only in the models where both investment and *CAPITAL* are omitted does SHARE enter with statistical significance, consistent with the hypothesis that having fewer restrictions on resident capital account transactions is associated with

Table 15
QUADRATIC effects

	OLS		GMM-SYS	
All countries	Table 8, model 1	Table 8, model 2	Table 9, model 1	Table 9, model 2
A. Do richer countries grow faster after liberalization?				
CAPITAL	0.000 (0.048)	0.057*(0.031)	0.149 (0.129)	0.247***(0.051)
CAPITAL * Income	0.002 (0.006)	−0.003 (0.004)	−0.014 (0.015)	−0.029***(0.006)
Emerging market countries only	Table 8, model 5	Table 8, model 6	Table 9, model 5	Table 9, model 6
CAPITAL	0.011 (0.071)	0.109**(0.047)	0.135 (0.175)	0.073 (0.051)
CAPITAL * Income	0.001 (0.008)	−0.010 (0.006)	−0.012 (0.021)	−0.003 (0.007)
B. Do middle-income countries grow faster after liberalization?				
CAPITAL	0.494*(0.288)	0.554***(0.14)	0.026 (0.454)	0.754***(0.14)
CAPITAL * Income	−0.127**(0.066)	−0.136***(0.034)	0.009 (0.094)	−0.188***(0.034)
(*CAPITAL* * Income)* Income	0.008**(0.004)	0.009***(0.002)	−0.0009 (0.005)	0.018***(0.002)
CAPITAL	0.782**(0.399)	0.714***(0.182)	0.494 (0.634)	0.797***(0.164)
CAPITAL * Income	−0.207**(0.097)	−0.187***(0.050)	−0.106 (0.145)	−0.208***(0.044)
(*CAPITAL* * Income) * Income	0.014*(0.006)	0.013***(0.003)	0.006 (0.008)	0.014***(0.003)

For a discussion of the interpretation of interaction terms, see Friedrichs (1982). The models in panel B are estimated with both Income and Income*Income in the base models. The Income and Income*Income coefficient estimates are always statistically significant and are negative and positive, respectively, which means that growth rates were larger at higher and lower levels of income than at middle levels. We report only limited results to conserve space, but are available. Standard errors are listed below the coefficients.
*p-value < 0.10; **p-value < 0.05; ***p-value < 0.01.

subsequent growth. *CAPITAL*'s coefficient is always positive and statistically significant.

4.4 Quadratic and interactive effects

In Table 15, we assess whether the Edwards hypothesis that richer countries grow faster holds from this lengthy sample. We find no evidence that richer countries grew faster postliberalization. Indeed, in one model, the evidence suggests that poorer countries benefited more.

In Table 15, we also assess the question posed in Edison et al. (2004) and Klein (2003) of whether middle-income countries grew faster, postliberalization. We allow for the separate possibility that middle-income countries differed in growth rates from poorer and richer countries by entering income squared as a regressor. The general direction of the results suggests that poorer and richer countries, and not middle-income countries, grew faster postliberalization of *CAPITAL*. As an experiment, we estimate the models using random effects, but the size of the coefficients, signs, and levels of significance are little affected. Whether these results would hold for periods different from the 5-year averages used here is an avenue for future investigation.

KPRW note that many effects might be contingent, a theme also in Eichengreen and Leblang (2003). In Table 16, we estimate interaction effects using Table 8, model 1 (OLS, 1955–2004, 85 countries), and Table 9, model 1 (GMM-SYS, 1955–1999, 85 countries). We enter indicators from the literature on crises (financial crises, banking crises, international crises, black market premiums), government quality (bureaucratic quality and levels of corruption), financial development, and (following Chanda, 2005) ethnic fractionalization.

Table 16
Interaction effects

Ethnic fractionalization	OLS, Table 8, model 1	GMM-SYS, Table 9, model 1
CAPITAL	0.017 (0.012)	0.052**(0.021)
CAPITAL * Ethnic fractionalization	−0.000 (0.000)	−0.000 (0.000)
Ethnic fractionalization	−0.017 (0.013)	0.033 (0.080)
Black market premiums (BMP)	OLS, Table 8, model 1	GMM-SYS, Table 9, model 1
CAPITAL	0.004 (0.009)	0.003 (0.017)
Black market premiums	−0.48***(0.171)	−0.656***(0.236)
CAPITAL * BMP	0.003 (0.003)	0.016*(0.009)
Home bank and currency crises	OLS, Table 8, model 1	GMM-SYS, Table 9, model 1
CAPITAL	0.036***(0.007)	0.006 (0.013)
DBCC	0.025 (1.338)	−4.323**(1.767)
CAPITAL * DBCC	−0.007 (0.021)	0.027 (0.029)
International bank and currency crises	OLS, Table 8, model 1	GMM-SYS, Table 9, model 1
CAPITAL	0.038***(0.009)	0.035**(0.014)
IBCC	0.224**(0.087)	0.406 (1.094)
CAPITAL * IBCC	−0.000 (0.001)	−0.000 (0.001)
Bureaucratic quality	OLS, Table 8, model 1	GMM-SYS, Table 9, model 1
CAPITAL	0.030*(0.017)	0.045*(0.023)
Bureaucratic quality	−0.731**(0.368)	0.376 (0.623)
CAPITAL * Bureaucratic	0.006 (0.006)	−0.004 (0.006)
Levels of corruption	OLS, Table 8, model 1	GMM-SYS, Table 9, model 1
CAPITAL	0.015 (0.017)	0.080*(0.047)
Corruption	−0.115 (0.256)	0.683 (0.730)
CAPITAL * Corruption	0.004 (0.004)	−0.012 (0.011)
Financial development (liquidity)	OLS, Table 8, model 1	GMM-SYS, Table 9, model 1
CAPITAL	0.016 (0.013)	0.017 (0.016)
Financial development	0.611 (2.106)	0.87 (3.119)
CAPITAL * Financial development	0.008 (0.026)	−0.018 (0.027)

For a discussion of the interpretation of interaction terms, see Friedrichs (1982). Please see Table A3 for sources and descriptions of variables. Standard errors are listed below the coefficients.
*p-value < 0.10; **p-value < 0.05; ***p-value < 0.01.

None of the interaction effects are statistically significant, save the interaction effect in the GMM-SYS estimation for *CAPITAL*BMP*, which has the "wrong" sign. This presents a puzzle as many scholars have found interaction effects.

To reconcile this puzzling result with findings from prior studies, we conduct experiments with models based on various subperiods, and we do find some of the effects of the interaction terms reported by other scholars. These effects are, however, "canceled out" by contrary effects in other subperiods. (See the discussion on p. 20, which compares Edwards, 2001 and AEW.)

One interaction effect we are able to replicate is BHL's findings that EQUITY's influence on growth increases, e.g., with greater financial development.[11] Similar effects are not found for *CAPITAL*, however. This finding highlights the point that these two indicators measure different aspects of financial liberalization, and that these different aspects may produce varying results on growth. This is another avenue of future research.

[11] The estimated effects of EQUITY on growth in a model based on 8.1 increase with greater financial development and are measured here as financial sector liquidity from Beck, Levine, and Loayza (2000). The EQUITY coefficient estimate at a standard deviation below the mean of financial development is 0.5 (n.s.), the coefficient estimate at half a standard deviation below the mean is 0.762*, at the mean is 1.001**, at a standard deviation above the mean is 1.468***, and at two standard deviations above the mean, the estimate is 1.937***. No such effect can be found for *CAPITAL*.

Table 17
Resident versus nonresident restrictions

	OLS		GMM-SYS	
All countries	Table 8, model 1	Table 8, model 2	Table 9, model 1	Table 9, model 2
Capital nonresident	0.053***(0.012)	0.076***(0.015)	0.004 (0.041)	0.071**(0.028)
Capital resident	−0.003 (0.011)	0.005 (0.012)	0.059 (0.047)	0.031 (0.030)
Emerging market countries only	Table 8, model 5	Table 8, model 6	Table 9, model 5	Table 9, model 6
Capital nonresident	0.073***(0.015)	0.088***(0.017)	0.002 (0.045)	0.076***(0.028)
Capital resident	−0.02 (0.013)	−0.005 (0.014)	0.071 (0.047)	0.027 (0.036)
OECD countries only	Table 8, model 1	Table 8, model 2	Table 9, model 1	Table 9, model 2
Capital nonresident	0.012 (0.014)	0.003 (0.017)	0.019 (0.02)	0.044 (0.036)
Capital resident	0.054***(0.016)	0.056***(0.017)	0.008 (0.026)	0.006 (0.036)

Nonresident capital flows are inbound flows, and resident flows are outward flows. See IMF (1993) for a discussion of the principle of residency and the direction of flows. The OECD country models are based on models 8.1, 8.2, 9.1, and 9.2, with only the advanced industrial nations included. Full results are available on request. Standard errors are listed below the coefficients.
*p-value < 0.10; **p-value < 0.05; ***p-value < 0.01.

For the five decades of this study, capital account liberalization's effects are generally direct. Exploring the interactive effects in greater detail will be a direction for further research.

Klein (2003) and Edison et al. (2004) find some differences in effects by region, and we explore their results in these models and data. For variants of models 8.1 and 8.2, we enter an interaction term, *CAPITAL* * *R*, where *R* takes the value of 1 corresponding to a given region (as categorized by the World Bank), and 0 otherwise. We find no statistically significant interaction terms, except between *CAPITAL* and East Asia. This confirms a finding in Klein (2003) and Edison et al. (2004), who report a statistically significant term for East Asia and capital account openness. The base term for *CAPITAL* remains positive, highly statistically significant, and roughly the same magnitude as the coefficient in the original model. The East Asia interaction term coefficient is slightly larger than the base *CAPITAL* term, suggesting the capital account openness had twice the impact in East Asia as elsewhere in the sample. (Details are available on request.)

We also report results on the possible differential effects of resident versus nonresident restrictions on growth in Table 17. The prior studies using IMF_BINARY or SHARE were in reality estimating the effects of restrictions on resident capital account transactions, and not the effects of restrictions on nonresidents. The correlation between resident and nonresident restrictions in our sample is low enough (0.68) to examine liberalizing nonresident and resident restrictions separately.

We use again Tables 8 and 9, models 1, 2, 5, and 6. For six of the eight models (the OLS and the GMM-SYS models for real growth), the results are that liberalizing nonresident restrictions (e.g., inward foreign direct investment) is associated with subsequent growth in the overall sample and in emerging markets. The estimated effects of liberalizing resident restrictions are not different

from zero in all eight models. One hypothesis worthy of further investigation is that the inconsistent effects from using IMF_BINARY or SHARE are also due in part to the omission in the measures of information on nonresident restrictions.

Some recent theory suggests that capital exports by residents of rich countries to other R&D productive countries might enhance the capital exporting country's growth (see van Pottelsberghe and Lichtenberg, 2001). We assess, therefore, whether the effects of resident versus nonresident restrictions are similar between OECD nations and the rest of the sample. In the only example of parameter estimate differences between advance industrial and other nations, we find in the OLS models that easing restrictions on resident capital exports (e.g., outward foreign direct investment) is associated with higher growth in the advanced industrial nations. The GMM-SYS models, however, show ambiguous results. Exploring the differential effects on resident and nonresident restrictions is another area of future research.

5. Summary and Concluding Remarks

This paper contributes a new version of a fine grain *de jure* measure of capital account openness: *CAPITAL*. *CAPITAL* allows for an investigation of growth over a five-decade span. We use this indicator to replicate prior studies in the literature and show that part of the conflicting results appears to have been derived either from measurement error or from estimations done on differing periods. Our analyses show that capital account openness in a 5-year panel, 1955–2004 or for shorter periods, is associated with growth. The effects of capital account openness are not contingent on the presence or absence of other influences, and the relationship between openness and growth appears to be linear. We do find evidence of interactive effects in subsamples and subperiods, but they are "canceled out" by contrary or null effects in other periods. We are unable, however, to say whether the absence of interaction effects in the full sample is an artifact of extensive multicollinearity or the blending of various periods or whether (less likely) there are no such effects. We also confirm the BHL finding that equity market liberalizations appear to contribute positively to growth, independently of capital account liberalization.

Another contribution this paper makes is using (and making available to other scholars for replication purposes) these *de jure* measures of international capital account and financial current account regulations. The measures include longer sample periods than other measures, and include periods of substantial reversal in both capital account and financial current account openness. The long samples with frequent periods of reversals in openness allow for greater identifying variance when using these indicators in analyses. We show, moreover, that these measures of international financial regulation are not elements of other underlying variables used in standard growth regressions, but constitute a unique dimension.

We end with the observation that our results suggest that the change of course away from international financial openness associated with independence and postcolonial governments in many parts of the world in the 1960s had deleterious macroeconomic effects. Financial policy reform does appear to influence growth. Whatever the case for maintaining some prudential capital controls, we see no evidence for, and much evidence against, the case for strong capital controls.

Appendix A—Comparison of Financial Globalization Measures

We compare several *de jure* and *de facto* measures of financial globalization in this discussion: *CAPITAL*, KAOPEN from Chinn and Ito (2006), EQUITY, Miniane's measure (hereafter, NEWIMF), EW (from Edison and Warnock, 2003, based on Bekaert, 1995), and TOTAL. The overall correlations between and among the indicators are generally modest: for example, between *CAPITAL* and TOTAL 1970–1999, it is 0.4; for *CAPITAL* and EQUITY, it is 0.56; TOTAL and EQUITY have a low correlation, 0.12. The correlation between *CAPITAL* and KAOPEN, from 1970 to 1999, is larger at 0.74. KAOPEN's correlation with *FIN_CURRENT* is higher than its correlation with *CAPITAL*, perhaps because three of the four elements from which KAOPEN is drawn are financial current account indicators.

The NEWIMF measures from Miniane (2004) are available from 1983 to 2000 for 34 countries, one of which (Luxembourg) is not available for *CAPITAL*. The panel correlation for 33 countries and 17 years of availability between NEWIMF and *CAPITAL* is high: 0.9. NEWIMF's correlation with EQUITY is 0.4, and its correlation with TOTAL is 0.51. In this restricted sample, *CAPITAL* is correlated with EQUITY at 0.53 and with TOTAL at 0.47. EQUITY and TOTAL's correlation is −0.12 in the smaller sample.

The *de jure* measures of financial globalization are not highly correlated with trade openness (measured as exports + imports/GDP). In a sample containing data available for trade, *CAPITAL*, EQUITY, and TOTAL, trade openness's correlation with *CAPITAL* is 0.17 and with EQUITY, 0.05. TOTAL and trade openness, both *de facto* measures of globalization, are more highly correlated: 0.4.

Table A1 summarizes these measures of capital account openness for five countries in 1999, highlighting some of their limitations and problems of comparability between them. *CAPITAL*, KAOPEN, NEWIMF, EW, and TOTAL all provide some comparable measure of magnitude of restrictions on financial transactions so that countries can be rank ordered, though EW's coverage is limited to 29 countries. EQUITY is a single binary indicator that indicates only the first date from which nonresidents are able to transact at all in a country's equity market.

The table notes vast disparities in how different measures rank a given country, and these arise from more than differences in case selection. Chile and India, for instance, rank in the lower 3rd quartile using *CAPITAL,* though Chile was more open than India by this measure. NEWIMF ranks both countries as tied for last place while TOTAL places these two countries far apart in their rankings (44th and 141st). KAOPEN has both countries tied near the median. EQUITY notes only that they are both open to nonresident transactions.

The United States' case highlights why several *de jure* measures give very different representations of financial globalization. *CAPITAL* ranks the United States as fully open, despite a few minor restrictions. This is because the scoring method for *CAPITAL* balances the severity of restrictions across all categories of financial transactions and judges the ease with which nonresidents and residents are able to move capital in and out of the country through various legal channels. The United States is by and large open to all types of transactions except a few very specific restrictions, such as those imposed on nonresident investment in sensitive areas such as nuclear energy, or on foreign mutual funds issued by nonresidents defined under the Investment Company Act of 1940. KAOPEN also ranks the United States as fully open, substantially because of the absence in the United States of either capital account or financial current account restrictions

Table A1
Comparison of six measures of capital account openness in five countries, 1999

Measure	UK	United States	Hong Kong	Chile	India	**Type of Measure.** Other comments.
CAPITAL (95 nations, 1948–1999)	100 (tied 1st)	100 (tied 1st)	100 (tied 1st)	62.5 (tied 54th)	50 (62nd)	***De jure*, Ordinal.** Based on coding of *AREAER* text from 1948 to 1999. Scoring includes information about restrictions on residents and nonresidents. Scoring takes into account severity of restrictions balancing across all categories of financial transactions.
KAOPEN (181 nations, 1970–2005)	2.603 (tied 1st)	2.603 (tied 1st)	2.603 (tied 1st)	−1.105 (tied 100th)	−1.105 (tied 100th)	***De jure*, Categorical.** Based on principle component analysis of binary indicators in *AREAER*, which are "multiple exchange rates," "current account," "surrender of export proceeds," and 5-year average of IMF_BINARY (called SHARE, as also in Klein (2003)).
EQUITY (1980–1999)	1	1	N/A	1 (from 5/1990)	1 (from 11/1992)	***De jure*, Categorical.** Binary measure of official equity market liberalization based on chronology of events compiled by Bekaert and Harvey (2004) and BHL (2005). A score of "1" indicates the date by which foreign investors may own equity in a market. That is, it establishes the first date on which a nonresident may transact in a country's equity markets.

EW (29 countries, 1989–2000)	N/A	N/A	N/A	0.05 (tied for 10th out of 29)	0.73 (28th out of 29)	**Blended *de facto*/*de jure*, Ordinal.** Utilizes Standard & Poor's/International Finance Corporation indices for 29 emerging markets. The ratio of country's market open to foreign investment ("Investable Index") compared to its total market capitalization ("Global Index") is the foundation of the measure. The "unsmoothed" capital restrictions = 1−(investable/global). Compare Bekaert (1995).
NEWIMF (34 countries, 1983–2000)	92.3 (tied 1st)	76.9 (tied, 10th)	76.9 (tied 10th)	7.7 (tied 33rd, last place)	7.7 (tied 33rd, last place)	***De jure*, Categorical.** Scores are presented here in reverse order for comparison purposes. Miniane sums 0/1 scores of 13 categories of the "Capital Transactions" section in *AREAER*, then divides by 13. Any restriction in any category merits a "0" without regard to severity. As a result, many financially open countries, e.g., the United States, are characterized by moderate levels of capital account restrictions.
TOTAL (145, 1970–2004)	542% (9th)	170% (52nd)	1200% (1st)	187% (44th)	41% (141st)	***De facto*.** An extensive and comprehensive measure of a country's aggregate assets and liabilities (summed) over its gross domestic product. Composition of positions includes FDI, equity investment, external debt, and official reserves controlling for valuation.

CAPITAL is based on Quinn (1997); KAOPEN is from Chinn and Ito (2006); EW is from Edison and Warnock (2003); EQUITY is from BHL (2005) (Appendix A); NEWIMF is from Miniane (2004); TOTAL is from LMF. See also Bekaert and Harvey (2004). SHARE, from Klein (2003) and Edison et al. (2004), cannot be included in the table as the IMF table reporting the IMF 0, 1 dummy was discontinued after 1996.

Table A2
Countries and initial year of the 5-year periods used in the analysis (The period starting in 1995 covers 1995–1999, e.g.)

Country	PWT 6.2	QT data coded
Algeria	1960–2004	1963–1999
Argentina	1950–2004	1947–1999
Australia	1950–2004	1950–1999
Austria	1950–2004	1947–1999
Bahamas	1975,2004	1972–1999
Bahrain		1971–1999
Barbados	1960–2004	1970–1999
Belgium	1950–2004	1950–1999
Bolivia	1950–2004	1947–1999
Botswana	1970–2004	1967–1999
Brazil	1950–2004	1947–1999
Burma		1947–1999
Canada	1950–2004	1950–1999
Chile	1950–2004	1947–1999
China	1952–2004	1970–1999
Colombia	1950–2004	1947–1999
Congo (Braz.)	1960–2004	1962–1999
Costa Rica	1950–2004	1947–1999
Denmark	1950–2004	1947–1999
Dominican Rep.	1950–2004	1947–1999
Ecuador	1950–2004	1947–1999
Egypt	1950–2004	1949–1999
Ethiopia	1950–2004	1950–1999
Fiji	1980–2004	1971–1999
Finland	1950–2004	1948–1999
France	1950–2004	1950–1999
Gabon	1970–2004	1963–1999
Gambia		1967–1999
Ghana	1965–2004	1957–1999
Germany	1950–2004	1947–1999
Great Britain	1950–2004	1950–1999
Greece	1950–2004	1947–1999
Guatemala	1950–2004	1947–1999
Haiti	1970–1990	1950–1999
Honduras	1950–2004	1947–1999
Hong Kong	1965–2004	1950–1999
Hungary	1950–2004	1984–1999
Iceland	1950–2004	1947–1999
India	1970–2004	1947–1999
Indonesia	1965–2004	1950–1999
Iran	1950–2004	1947–1999
Iraq		1950–1999
Ireland	1950–2004	1950–1999
Israel	1950–2004	1948–1999
Italy	1950–2004	1947–1999
Ivory Coast	1970–2004	1961–1999
Jamaica	1970–2004	1961–1999
Japan	1950–2004	1950–1999
Jordan	1950–2004	1950–1999
Kenya	1970–2004	1963–1999
Korea	1950–2004	1950–1999
Liberia		1954–1999
Libya		1958–1999
Malaysia	1970–2004	1957–1999
Mauritius	1975–2004	1968–1999
Mexico	1950–2004	1947–1999
Morocco	1965–2004	1958–1999
Nepal	1970–2004	1961–1999
Netherlands	1950–2004	1947–1999
Nicaragua	1950–2004	1947–1999

Table A2
(Continued)

Country	PWT 6.2	QT data coded
Nigeria	1970–2004	1960–1999
New Zealand	1950–2004	1950–1999
Norway	1950–2004	1950–1999
Pakistan	1950–2004	1947–1999
Panama	1950–2004	1947–1999
Paraguay	1950–2004	1947–1999
Peru	1950–2004	1950–1999
Philippines	1950–2004	1950–1999
Poland	1950–2004	1984–1999
Portugal	1950–2004	1950–1999
Qatar		1980–1999
Rwanda	1965–2004	1960–1999
El Salvador	1950–2004	1947–1999
Saudi Arabia		1956–1999
Senegal	1970–2004	1961–1999
Sierra Leone	1970–1990	1961–1999
Singapore	1975–2004	1957–1999
Spain	1950–2004	1947–1999
South Africa	1950–2004	1950–1999
Sri Lanka	1950–2004	1948–1999
Sudan	1965–2004	1955–1999
Suriname		1960–1999
Sweden	1950–2004	1947–1999
Switzerland	1950–2004	1950–1999
Syria	1950–2004	1950–1999
Tanzania	1970–2004	1961–1999
Thailand	1950–2004	1947–1999
Trinidad & Tobago	1970–2004	1962–1999
Tunisia	1970–2004	1956–1999
Turkey	1950–2004	1947–1999
Uganda	1970–2004	1962–1999
Uruguay	1950–2004	1947–1999
Venezuela	1950–2004	1947–1999
United States	1955–2004	1947–1999
Number of countries	85	94

(e.g., multiple currency practices and export proceeds "surrender" requirements). In contrast to *CAPITAL* and KAOPEN, NEWIMF ranks the United States at 10th. The *AREAER* table from which 1999 NEWIMF is constructed indicates restrictions on capital market securities, money market investments, and direct investments. The table does not indicate that the controls are minor, however, only that they exist.

TOTAL also ranks the United States lower in financial globalization than *CAPITAL*. In examining the way the measure is constructed, as aggregate assets plus liabilities divided by GDP, the United States can appear to be only modestly financially open, since its GDP is so large relative to its financial flows.

If we study how different measures are scored, we gain further insight on why these measures reveal different aspects of financial globalization. We focus on Colombia in 1999. *AREAER* explicitly reports treatment of equity instruments under the category of capital accounts, with summary tables noting restrictions on securities, derivatives, and collective securities, as well as the money market, commercial and financial credits and guarantees, direct investment, real estate, and personal capital movements.

For Colombia in 1999, Miniane in NEWIMF reports a score of 0.846 (1.0 indicates complete closure) in 1999. We, however, obtain a *CAPITAL* score of 87.5 out of 100 (the scale is reversed from Miniane's), and BHL reports a "1" for initial equity liberalization having already happened. KAOPEN reports a score of −1.105, the same as for Chile and India. As noted above, Miniane's

Table A3
Data and sources for variables used

Variable	Description	Source
Black Market Premium (BMP)	Difference between the official exchange rate and the black market rate; transformed using signLog	Beck, Levine, and Loayza (2000)
CAPITAL	Capital account openness (inward and outward flows)	Authors
Corruption	Survey of respondents	ICRG, PRS Group
DBCC, IBCC	Domestic banking and currency crises; international banking and currency crises	Bordo et al. (2001)
Democracy	Democracy + Autocracy	Polity IV (2004); Marshall, Jaggers, and Gurr. (2000)
Education	Educational attainment at age 25, compiled by Barro/Lee	World Bank sources
English common law	Dummy variable for countries with an English common law tradition	
EQUITY	See table A1 and Appendix A.	BHL (2005)
Ethnic fractionalization	Ethnic fractionalization index (ETHFRAC) over time	Krain (1997)
Ethno-linguistic fractionalization	Linguistic fractionalization (Elf60) index as of 1960	Mauro (1995)
FIN_CURRENT	Current account openness (imports, exports, invisibles)	Authors
Freedom	Civil liberties + political liberties	Freedom House (2005)
Government expenditure	Expenditures as a share of GDP	PWT 6.2
Government quality	The average of five series from the International Country Risk Guide, published by the PRS group, with higher values for each of the five series representing better institutional quality	PRS Group; data extend to 1982; we apply 1982 data to 1980 panels.
Economic growth	Growth per capita, PPP adjusted; real growth per capita	PWT 6.2; World Bank (2006)
IMF_BINARY	The 0,1 scoring of restrictions on resident capital transactions in the *AREAER* summary table	*AREAER*, 1967 through 1996

Income per capita	Per capita income, PPP-adjusted; real per capita income	PWT 6.2; World Bank (2006)
Investment	Levels of investment as a share of GDP; change in investment	PWT 6.2
Islam	Percentage of adherents of Islam in a country	Various sources, Adherents.com
Latitude		World Bank (2006) (with authors' corrections)
Law and Order	Index compiled by PRS	ICRG, PRS Group
Liquidity	Financial sector liquidity	Beck, Levine, and Loayza (2000)
NEWIMF	See Table A1 and Appendix A. Scores are presented here in reverse order for comparison purposes.	Miniane (2004)
OECD dummy—membership in OECD for the initial 22 member states	Australia, Austria, Belgium, Canada, Denmark, France, Finland, Germany, Greece, Iceland, Ireland, Italy, Japan, New Zealand, Norway, the Netherlands, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States.	OECD
Population growth	Annual population growth	Penn World Table, 6.2
Revolutions and coups	Incidences of revolutions, coups, guerrilla wars, crises	Banks (2001)
Settler mortality (life expectancy)	Rates of settler mortality in various colonies	Acemoglu, Johnson, and Robinson (2001)
SHARE	Sum of the IMF_BINARY for a given period (1 = closed)	Edison et al. (2004); Klein (2003)
Sub-Saharan Africa, Middle East/North Africa, Latin America, East-Asia/Pacific	Regional dummies; membership determined by World Bank regional codes	World Bank
TOTAL	*De facto* measure of a country's aggregate assets and liabilities (summed) over its gross domestic product	LMF
Trade	Trade openness as imports + exports as a percentage of GDP; change in trade openness	Penn World Table, 6.2

score is based on the 0, 1 treatment of 13 IMF categories under capital accounts. Equity restrictions feature explicitly in three of those categories, and more if the activity of hedge funds and private equity are taken into consideration. According to the *AREAER*, Colombia had quite a few restrictions in the equity categories but, in terms of other forms of capital account flows, was mostly free otherwise. The equity restrictions and financial current account restrictions (exchange surrender requirements, e.g.) account for Colombia's low openness score in KAOPEN. While summing dummy variables containing overlapping information on equity, as in NEWIMF, risks overstating equity as a component of the capital account, this does suggest that NEWIMF may have effects independent of other indices for capital account liberalization. BHL's consideration of EQUITY, in contrast to NEWIMF, shows Colombia to have undertaken first liberalization of equity markets in February of 1991 (BHL (2005)). In EQUITY, unlike NEWIMF, the emphasis is not on the presence of restrictions on equity, but rather on the initial liberalization of equity. NEWIMF, in contrast to EQUITY, might be thought of as a "last indicator" of restrictions since it reports the presence of even residual restrictions. The 0,1 dummy variable nature of the subcomponents of NEWIMF, in contrast, does not allow for a measurement of the first liberalizations if some restrictions remain in place. Hence, EQUITY and NEWIMF can be expected to reveal different aspects of equity market liberalization.

In 1999, TOTAL shows that Colombia has small financial liabilities and even smaller financial assets relative to its gross domestic product: its global rank was 125th out of 145 nations surveyed, despite its relatively liberal policies. Colombia has endured 30 years of civil war and endemic drug trafficking, which might have overwhelmed government liberalization policies in the minds of possible foreign investors and otherwise encouraged unrecorded capital flight by residents. As an indicator of financial globalization, TOTAL will reflect not just government financial openness policies, but a host of other economic realities, government policies, and economic actor's reactions to both.

By this evidence, EQUITY, KAOPEN, TOTAL, and *CAPITAL* measure different aspects of financial globalization. *CAPITAL* and NEWIMF, despite the high panel correlation, also measure different facets of *de jure* capital account openness, with NEWIMF measuring the persistence of many kinds of capital account restrictions and *CAPITAL* measuring the intensity of the restrictions.

Appendix B—Data and Data Sources

The economic data are from Penn World Tables Mark 6.2, by Heston, Summers, and Aten (2006; see Table A2) or from the 2006 World Bank Development Indicators. The educational attainment measures are Barro/Lee indicators from the World Bank (2001). (Please see Table A3.) For social fragmentation, we use the linguistic fractionalization (*Elf60*) index from Mauro (1995), which is used by Chanda (2005). The black market premium data and the liquidity measures are taken from Beck, Levine, and Loayza (2000). Because the black market data have an extremely skewed distribution, but also contain negative numbers, we transform the series using a signLog transformation.[12] The banking, domestic currency, and international currency crises are from Bordo et al. (2001), which are also used in Eichengreen and Leblang (2003). Bekeart and Harvey's "chronology of economic and political events in emerging markets" is useful and available at http://www.duke.edu/~charvey/Country_risk/couindex.htm.

The data on revolutions, coups, etc. are updated Cross-National Times Series data from Banks 2001. Other political and social variables are Democracy (Polity IV; Marshall, Jaggers, and Gurr, 2000); Freedom (Civil Liberties plus Political Liberties from Freedom House, 2002); Settler Mortality (Acemoglu, Johnson, and Robinson, 2001); Islamic percentage of the population (Hunter, 2003); a dummy variable for nations with English common law traditions; and a dummy variable

[12] Taking logarithms is a common practice when fitting linear regression models for several reasons. When a variable takes a negative or zero value, the logarithm is not defined. One alternative is to use the following transformation: $\text{sign}(x)\log(\text{abs}(x)+1)$. This is a monotonic transformation that achieves a symmetric distribution and is like the power transformation with offset discussed in Atkinson (1985).

for the 22 original members of the Organization for Economic Cooperation and Development. For indicators of good governance, we use Law and Order, Corruption, and Bureaucratic Quality from the International Country Risk Guide (PRS Group, 2002). These data are unavailable prior to 1982. Because the ICRG data start in 1982, we use the 1982 observation for the 1980 panel. Some ICRG variables change definition over time. We use those for which continuous data are available. We use the World Bank's regional codes in creating regional dummy variables.

References

Abiad, A., and A. Mody. 2005. Financial Reform: What Shakes It? What Shapes It? *American Economic Review* 95:66–88.

Acemoglu, D., S. Johnson, and J. A. Robinson. 2001. The Colonial Origins of Comparative Economic Development: An Empirical Investigation. *American Economic Review* 91:1369–401.

Acemoglu, D., S. Johnson, and J. A. Robinson. 2004. Institutions as the Fundamental Cause of Long-Run Growth. Working Paper No. 10481, National Bureau of Economic Research.

Alesina, A., V. Grilli, and G. M. Milesi-Ferretti. 1994. The Political Economy of Capital Controls, in L. Leiderman and A. Razin (eds.), *Capital Mobility: The Impact on Consumption, Investment, and Growth*. New York: Cambridge University Press.

Angrist, J. D., and A. B. Krueger. 2001. Instrumental Variables and the Search for Identification: From Supply and Demand to Natural Experiments. Working Paper No. 455, Princeton University Industrial Relations Section.

Arellano, M., and O. Bover. 1995. Another Look at the Instrumental Variables Estimation of Error-Components. *Review of Economic Studies* 68:277–97.

Arteta, C. O., B. J. Eichengreen, and C. Wyplosz. 2001. When Does Capital Account Liberalization Help more than It Hurts? Working Paper No. 8414, National Bureau of Economic Research.

Atkinson, A. C. 1985. Plots, Transformations, and Regression. *An Introduction to Graphical Methods of Diagnostic Regression Analysis*. Oxford Statistical Science Series. Oxford: Clarendon Press.

Baker, M., C. F. Foley, and J. Wurgler. 2004. The Stock Market and Investment: Evidence From FDI Flows. Working Paper No. 10559, National Bureau of Economic Research.

Banks, A. S. 2001. Cross-National, Time-Series Data Archive. Available at http://www.databanks.sitehosting.net/.

Barro, R. J. 1991. Economic Growth in a Cross-Section of Countries. *Quarterly Journal of Economics* 106: 407–43.

Barro, R. J., and R. M. McCleary. 2003. Religion and Economic Growth. Unpublished Manuscript. Harvard University, Cambridge, MA.

Bartolini, L., and A. Drazen. 1997. Capital-Account Liberalization as a Signal. *American Economic Review* 87:138–54.

Beck, N., and J. N. Katz. 1995. What to Do (and not to Do) with Time-Series-Cross-Section Data in Comparative Politics. *American Political Science Review* 89:634–47.

Beck, T., R. Levine, and N. Loayza. 2000. Finance and the Sources of Growth. *Journal of Financial Economics* 58:261–300.

Beck, T., A. Demirgüç-Kunt, and R. Levine. 2002. Law, Endowment and Finance. Working Paper No. 9089, National Bureau of Economic Research.

Bekaert, G. 1995. Market Integration and Investment Barriers in Emerging Equity Markets. *World Bank Economic Review* 9:75–107

Bekaert, G., and C. R. Harvey. 2000. Foreign Speculators and Emerging Equity Markets. *Journal of Finance* 55:565–613.

Bekaert, G., and C. R. Harvey. 2004. Chronology of Economic and Political Events in Emerging Markets. Available at: http://www.duke.edu/∼charvey/Country_risk/couindex.htm.

Bekaert, G., C. R. Harvey, and C. Lundblad. 2001. Emerging Equity Markets and Economic Development. *Journal of Development Economics* 66:465–504.

Bekaert, G., C. R. Harvey, and C. Lundblad. 2005. Does Financial Liberalization Spur Growth? *Journal of Financial Economics* 77:3–55.

Bekaert, G., C. R. Harvey, and C. Lundblad. 2006. Growth Volatility and Financial Liberalization. *Journal of International Money and Finance* 25:370–403.

Blundell, R. W., and S. R. Bond. 1998. Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics* 87:115–43.

Bordo, M. D., B. J. Eichengreen, D. Klingebiel, M. S. Martinez-Peria, and A. K. Rose. 2001. Is the Crisis Problem Growing more Severe? *Economic Policy* 32:51–82.

Bound, J., D. A. Jaeger, and R. M. Baker. 1995. Problems With Instrumental Variables Estimations When the Correlation between the Instruments and the Endogenous Explanatory Variable Is Weak. *Journal of the American Statistical Association* 90:443–50.

Brune, N., G. Garett, A. Guisinger, and J. Sorens. 2001. The Political Economy of Capital Account Liberalization. Unpublished Manuscript.

Chanda, A. 2005. The Influence of Capital Controls on Long Run Growth: Where and How much. *Journal of Development Economics* 77:441–66.

Chinn, M. D., and H. Ito. 2006. What Matters for Financial Development? *Journal of Development Economics* 81:163–92.

Desai, M. A., C. F. Foley, and J. R. Hines. 2006. Capital Controls, Liberalizations, and Foreign Direct Investment. *Review of Financial Studies* 19:1433–64.

Dooley, M. P., D. J. Mathieson, and L. Rojas-Suarez. 1997. Capital Mobility and Exchange Market Intervention in Developing Countries. Working Paper No. 6247, National Bureau of Economics Research.

Doornik, J., and D. F. Hendry. 2001. *Econometric Modeling Using PCGive 10: Volume III*. London: Timberlake Consultants.

Easterly, W., M. K. Pritchett, and L. Summers. 1993. Good Policy or Good Luck? Country Growth Performance and Temporary Shocks. *Journal of Monetary Economics* 32:459–83.

Edison, H. J., and F. Warnock. 2003. A Simple Measure of the Intensity of Capital Controls. *Journal of Empirical Finance* 10:81–103.

Edison, H. J., M. W. Klein, L. Ricci, and T. Sløk. 2004. Capital Account Liberalization and Economic Performance: Survey and Synthesis. International Monetary Staff Paper, 02/120.

Edwards, S. 2001. Capital Mobility and Economic Performance: Are Emerging Economies Different? Working Paper No. 8076, National Bureau of Economic Research.

Edwards, S. 2005. Capital Controls, Sudden Stops and Current Account Reversals. Working Paper No. 11170, National Bureau of Economic Research.

Eichengreen, B. J. 2001. Capital Account Liberalization: What Do the Cross-Country Studies Tell Us? *World Bank Economic Review* 15:341–66.

Eichengreen, B. J., and D. Leblang. 2003. Capital Account Liberalization and Growth: Was Mr. Mahathir Right? *International Journal of Finance and Economics* 8:205–24.

Epstein, G. A., and J. B. Schor. 1992. Structural Determinants and Economic Effects of Capital Controls in OECD Countries, in T. Banuri and J. B. Schor (eds.), *Financial Openness and National Autonomy*. Oxford: Clarendon Press.

Feldstein, M., and C. Horioka. 1980. Domestic Saving and International Capital Flows. *Economic Journal* 90:314–29.

Franzese, R. J., and J. C. Hays. 2007. Spatial Econometric Models for the Analysis of TSCS Data in Political Science. *Political Analysis* 15(2):140–64.

Freedom House. 2005. Freedom in the World: Political Rights and Civil Liberties 2004–2005. Freedom House, NY.

Friedrich, R. J. 1982. In Defense of Multiplicative Terms in Multiple Regression Equations. *American Journal of Political Science* 26:797–833.

Glick, R., X. Guo, and M. Hutchinson. 2006. Currency Crises, Capital Account Liberalization, and Selection Bias. *Review of Economics and Statistics* 88:698–714.

Gourinchas, P. O., and O. Jeanne. 2006. The Elusive Gains from International Financial Integration. *Review of Economics Studies* 73:715–41.

Grilli, V., G. M. Milesi-Ferretti. 1995. Economic Effects and Structural Determinants of Capital Controls. *International Monetary Fund Staff Papers* 42:517–51.

Henry, P. B. 2000. Do Stock Market Liberalizations Cause Investment Booms? *Journal of Financial Economics*. 58:301–34.

Henry, P. B. 2003. Capital-Account Liberalization, the Cost of Capital, and Economic Growth. *American Economic Review Papers and Proceedings* 93:91–6.

Heston, A., R. Summers, and B. Aten. 2006. The Penn World Table, Version 6.2. Center for International Comparisons of Production. Income and Prices at the University of Pennsylvania, September.

Hsiao, C. 1986. *Analysis of Panel Data: Econometric Society*. Monograph, No. 11. Cambridge: Cambridge University Press.

Hunter, P. 2003. Adherents.com. http://www.adherents.com/

International Monetary Fund. Annual Report on Exchange Restrictions. Various years, 1950 on International Monetary Fund. Continued by Annual Report on Exchange Arrangements and Exchange Restrictions after 1979 and Exchange Arrangements and Exchange Restrictions after 1989.

International Monetary Fund. 1961. *Balance of Payments Manual*, 3rd ed., Washington, DC: IMF.

International Monetary Fund. 1977. *Balance of Payments Manual*, 4th ed., Washington, DC: IMF.

International Monetary Fund. 1993. *Balance of Payments Manual*, 5th ed., Washington, DC: IMF.

International Monetary Fund. 1996. IMF/OECD Survey Shows Statistics on Direct Investment Improving. *Balance of Payments Statistics Newsletter* VI:12–15

International Monetary Fund. 2001. International Financial Integration and Developing Countries. *World Economic Outlook* 145–73.

Iversen, T., and T. R. Cusack. 2000. The Causes of Welfare State Expansion: Deindustrialization or Globalization? *World Politics* 52:313–49.

Johnstone, R. B., and N. T. Tamirisa. 1998. Why Do Countries Use Capital Controls? Working Paper (December) No. 98/181, IMF, Washington, DC.

Kim, J., and C. W. Mueller. 1978. *Introduction to Factor Analysis: What It Is and How to Do It*. Newbury Park, CA: Sage.

Klein, M. W., and G. Olivei. 1999. Capital Account Liberalization, Financial Depth, and Economic Growth. Working Paper No. 7384, National Bureau of Economic Research.

Klein, M. W. 2003. The Variety of Experience of the Effect of Capital Account Openness on Growth. Working Paper No. 9500, National Bureau of Economic Research.

Klein, M. W. 2007. Capital Account Liberalization and the Varieties of Growth Experiences. Tufts University Typescript Manuscript.

Kose, M. A., E. Prasad, K. Rogoff, and S. J. Wei. 2006. Financial Globalization: A Reappraisal. Working Paper No. 12484, National Bureau of Economic Research.

Kraay, A. 1998. In Search of the Macroeconomic Effects of Capital Account Liberalization. Unpublished Manuscript. World Bank, Washington, DC.

Krain, M. 1997. State Sponsored Mass Murder: The Onset and Severity of Genocides and Politicides. *Journal of Conflict Resolution* 41:331–60.

Lane, P.R., and G. M. Milesi-Ferretti. 2006. The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970–2004. Working Paper 06/69, IMF.

Levine, R. 1997. Financial Development and Economic Growth: Views and Agendas. *Journal of Economic Literature* 35:688–726.

Levine, R., and S. Zervos. 1998. Capital Account Liberalization and Stock Market Development. *World Development* 26:1169–83.

Marshall, M., K. Jaggers, and R. T. Gurr. 2000. Polity IV Project. Accessed at http://www.bsos.umd.edu/cidcm/polity/

Mauro, P. 1995. Corruption and Growth. *Quarterly Journal of Economics* 110:681–712.

Miniane, J. 2004. A New Set of Measures on Capital Account Restrictions. *IMF Staff Papers* 51:276–308.

Obstfeld, M., J. C. Shambaugh, and A. M. Taylor. 2005. The Trilemma in History: Tradeoffs among Exchange Rates, Monetary Policies, and Capital Mobility. *Review of Economics and Statistics* 87:423–38.

Polity IV. 2004. Research Note: Using Polity Data and Standardized Authority Codes, in *Time-Series Analyses*. Available at http://www.bsos.umd.edu/cidcm/polity/.

PRS Group. International Country Risk Guide: Historical Data. Available at http://www.prsgroup.com/icrg/icrg.html

Quinn, D. P. 2003. Capital Account Liberalization and Financial Globalization, 1890–1999: A Synoptic View. *International Journal of Finance and Economics* 8:189–204.

Quinn, D. 1997. The Correlates of Change in International Financial Regulation. *American Political Science Review* 91:531–51.

Quinn, D. P., and R. Jacobson. 1989. Industrial Policy Through the Restriction of Capital. *American Journal of Political Science* 33:700–36.

Quinn, D. P., and A. M. Toyoda. 2007. Ideology and Voter Sentiment as Determinants of Financial Globalization. *American Journal of Political Science* 51:344–63.

Razin, A., and Y. Rubinstein. 2004. Growth Effects of the Exchange-Rate Regime and the Capital Account Openness in a Crisis-Prone World Market: A Nuanced View. Working Paper No. 10555, National Bureau of Economic Research.

Rigobon, R., and D. Rodrik. 2004. Rule of Law, Democracy, Openness, and Income: Estimating the Interrelationships. Manuscript. MIT and Harvard University, Cambridge, MA.

Rodríguez, F., and D. Rodrik. 2000. Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Literature. Manuscript. University of Maryland, College Park, MD, and Harvard University, Cambridge, MA.

Rodrik, D. 1998. Who Needs Capital Account Convertibility? in P. Kennon (ed.), *Princeton Essays in International Finance*, No. 207. Princeton, NJ: Princeton University.

Rodrik, D. 2000. Participatory Politics, Social Cooperation, and Economic Stability. Paper Presented at the Annual Convention of the American Economic Association, Boston, MA.

Rodrik, D., A. Subramanian, and F. Trebbi. 2002. Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development. Working Paper No. 9305, National Bureau of Economic Research.

Roubini, N., and J. D. Sachs. 1989. Political and Economic Determinants of Budget Deficits in the Industrial Democracies. *European Economic Review* 33(5):903–38.

Satyanath, S., and D. Berger. 2006. Capital Controls, Political Institutions, and Economic Growth. New York University Typescript Manuscript.

Stiglitz, J. E. 2003. *Globalization and Its Discontents*. New York: W.W. Norton.

Stulz, R., and R. Williamson. 2003. Culture, Openness, Finance. *Journal of Financial Economics* 70:313–49.

Tornell, A., F. Westermann, and L. Martinez. 2003. Liberalization, Growth, and Financial Crises: Lessons from Mexico and the Developing World. UCLA Typescript Manuscript, November.

van Pottelsberghe de la Potterie, B., and F. Lichtenberg. 2001. Does Foreign Direct Investment Transfer Technology Across Borders? *Review of Economics and Statistics* 83(3):490–7.

Voth, H. J. 2003. Convertibility, Currency Controls and the Cost of Capital in Western Europe, 1950–99. *International Journal of Finance and Economics* 8:255–76.

World Bank. 2001. *The World Development Indicators*. Washington, DC: The World Bank.