

# Does financial liberalization spur growth?<sup>☆</sup>

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## Abstract

We show that equity market liberalizations, on average, lead to a 1% increase in annual real economic growth. The effect is robust to alternative definitions of liberalization and does not reflect variation in the world business cycle. The effect also remains intact when an exogenous measure of growth opportunities is included in the regression. We find that capital account liberalization also plays a role in future economic growth, but, importantly, it does not subsume the contribution of equity market liberalizations. Other simultaneous reforms only

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partially account for the equity market liberalization effect. Finally, the largest growth response occurs in countries with high-quality institutions.

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## 1. Introduction

The last 25 years have witnessed the financial liberalization of equity markets across the world. Equity market liberalizations give foreign investors the opportunity to invest in domestic equity securities and domestic investors the right to transact in foreign equity securities. We find that equity market liberalizations increase subsequent average annual real economic growth by about 1%, even after controlling for other variables that are commonly used in the economic growth literature.

From a neoclassical perspective, our results are to be expected. Improved risk sharing post-liberalization should decrease the cost of equity capital (see, for example, [Bekaert and Harvey, 2000](#)) and increase investment. When markets are imperfect, equity market liberalization could have strong effects as well. Financing constraints (see, e.g., [Hubbard, 1997](#), and [Gilchrist and Himmelberg, 1999](#)), make external finance more costly than internal finance and cause investment to be sensitive to cash flows. Equity market liberalization directly reduces financing constraints in the sense that more foreign capital becomes available, and foreign investors could insist on better corporate governance, which indirectly reduces the cost of internal and external finance. Hence, the cost of capital could go down because of improved risk sharing or because of the reduction in financing constraints or both. Moreover, better corporate governance and investor protection should promote financial development ([La Porta et al., 1997](#)) and hence growth ([King and Levine, 1993](#), for example).

From at least two alternative perspectives, our results may be more surprising. First, alternative theories do not imply positive growth effects after financial liberalization, for example, because of reduced precautionary savings ([Devereux and Smith, 1994](#)) or because informational asymmetries prevent foreign capital to be profitably invested ([Stiglitz, 2000](#)). Second, a rapidly growing literature on the growth effects of capital account liberalization finds mixed results (see [Eichengreen, 2002](#), for a survey).

We conduct a number of empirical exercises that instill confidence in our results.

- Our results survive an extensive number of econometric robustness experiments, including controlling for world business cycle variation.

- Our results are robust to alternative measurements of the liberalization variable. The use of a homogeneous measure of international openness, focusing on equity markets, could explain why our results are so different from the capital account openness literature. We confirm that the standard International Monetary Fund (IMF) measure of whether the capital account is free of restrictions (see [Rodrik, 1998](#), and [Kraay, 1998](#)) does not give rise to a robust growth effect. When capital account restrictions are more finely measured, as in [Quinn \(1997\)](#) and [Edwards \(2001\)](#), there is a significant growth effect. However, the growth effect from equity market liberalization remains important even after controlling for a more finely measured capital account liberalization indicator.
- We take seriously the possibility that liberalization could be a strategic decision correlated with growth opportunities. However, when we control for growth opportunities, the liberalization effect remains intact.
- Our growth effect is large which likely cannot be fully ascribed to equity market liberalization. Most importantly, equity market liberalization could coincide with other reforms that improve the growth prospects of the country. We closely investigate several possibilities such as macro reforms, financial reforms, legal reforms (including reforms regarding insider trading), and the coincidence of equity market liberalizations with post-banking crisis reforms.
- It is unlikely that the liberalization effect is the same in all liberalizing countries. We relate the heterogeneity of the growth effect to the comprehensiveness of reforms, the legal environment, the quality of institutions, the investment conditions, and the degree of financial development.

The paper is organized as follows. Section 2 describes our data, the summary statistics and the econometric framework. Section 3 examines the role of equity market liberalization as a determinant of economic growth. Section 4 explores whether the equity market liberalization effect can be accounted for by macroeconomic and other regulatory reforms. Section 5 sheds light on why the growth response to financial liberalization differs across countries. Some concluding remarks are offered in Section 6.

## 2. Data and preliminary analysis

This section introduces the key data that we use throughout the paper. Section 2.1 introduces our measures of equity market liberalization. Section 2.2 provides an unconditional analysis, i.e., not controlling for other factors, of how equity market liberalization impacts the key variables in our research.

### 2.1. Equity market liberalizations

Our tests involve regressions of real per capita gross domestic product (GDP) growth on an equity market liberalization indicator using panel data. [Table 1](#) contains the descriptions and sources of all the variables used in the paper.

Table 1  
 Description of the variables  
 All data are employed at the annual frequency.

Variable	Description
	<i>Dating equity market liberalization</i>
Official equity market liberalization indicator (Official Liberalization)	Corresponding to a date of formal regulatory change after which foreign investors officially have the opportunity to invest in domestic equity securities. Official Liberalization dates, presented in Table 2, are based on Bekaert and Harvey (2002) <i>A Chronology of Important Financial, Economic and Political Events in Emerging Markets</i> , <a href="http://www.duke.edu/~charvey/chronology.htm">http://www.duke.edu/~charvey/chronology.htm</a> . This chronology is based on over 50 different source materials. A condensed version of the chronology, along with the selection of dates for a number of countries appears in Bekaert and Harvey (2000). We have extended their official liberalization dates to include Japan, New Zealand, and Spain. For the liberalizing countries, the associated Official Liberalization indicator takes a value of one when the equity market is officially liberalized and thereafter, and zero otherwise. For the remaining countries, fully segmented countries are assumed to have an indicator value of zero, and fully liberalized countries are assumed to have an indicator value of one. These dates appear in Appendix A.
First sign equity market liberalization indicator (First Sign)	“First Sign” equity market liberalization dates denote the year associated with the earliest of three dates: Official Liberalization, first American Depository Receipt (ADR) announcement and first country fund launch. The First Sign indicator takes a value of one on and after the First Sign year, and zero otherwise. As with the Official Liberalization indicator, fully segmented countries are assumed to have an indicator value of zero, and fully liberalized countries are assumed to have an indicator value of one. These dates are reported in Appendix A.
Intensity equity market liberalization indicator (Liberalization Intensity)	Following Bekaert (1995) and Edison and Warnock (2003), the Liberalization Intensity measure is based on the ratio of the market capitalization of the constituent firms comprising the IFC Investable index to those that comprise the IFC Global index for each country. The IFC Global index, subject to some exclusion restrictions, is designed to represent the overall market portfolio for each country, whereas the IFC Investable index is designed to represent a portfolio of domestic equities that are available to foreign investors. A ratio of one means that all of the stocks are available to foreign investors. We denote this measure: <i>Liberalization Intensity</i> . We also explore a related measure, <i>Alternative Intensity</i> , by calculating the ratio of the number of firms in the investable and global indices for each country. In both cases, fully segmented countries have an intensity measure of zero, and fully liberalized countries have an intensity measure of one.
	<i>Other important dates</i>
IMF capital account openness indicator	We measure capital account openness by employing the IMF’s <i>Annual Report on Exchange Arrangements and Exchange Restrictions</i> (AREAER). This publication reports six categories of information. The

Table 1 (continued)

Variable	Description
	capital account openness indicator takes on value of zero if the country has at least one restriction in the “restrictions on payments for the capital account transaction” category. These dates are reported in Appendix A.
Quinn Capital account openness indicator	Quinn’s (1997) capital account openness measure is also created from the text of the annual volume published by the International Monetary Fund (IMF), <i>Exchange Arrangements and Exchange Restrictions</i> . Rather than the indicator constructed by the IMF that takes a 1 if any restriction is in place, Quinn’s openness measure is scored 0–4, in half integer units, with 4 representing a fully open economy. The measure hence facilitates a more nuanced view of capital account openness, and is available for 76 countries in our study. We transform each measure into a 0 to 1 scale.
Banking sector crisis indicator	Caprio and Klingebiel (2001) document systemic and borderline banking sector crises. We construct banking crisis indicators that take a value of one when (a) a country is undergoing a systemic banking sector crisis or (b) when a country is undergoing either a systemic or borderline banking sector crisis. We also construct post-banking crisis indicators that take a value of one in the last year and each subsequent year following (a) a systemic banking sector crisis or (b) either a systemic or borderline banking sector crisis.
Insider trading law indicator	Bhattacharya and Daouk (2002) document the enactment of insider trading laws and the first prosecution of these laws. We construct two indicator variables. The first takes the value of one following the introduction of an insider trading law. The second takes the value of one after the law’s first prosecution.
<i>Macroeconomic and demographic measures</i>	
Gross domestic product (GDP) growth	Growth of real per capita gross domestic product. Available for all countries from 1980 through 1997. Source: <i>World Bank Development Indicators</i> CD-ROM.
Initial GDP	Logarithm of real per capita gross domestic product in 1980. Available for all countries. Source: <i>World Bank Development Indicators</i> CD-ROM.
Government consumption/GDP	Government consumption divided by gross domestic product. General government final consumption expenditure includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation. Available for all countries from 1980 through 1997. Source: <i>World Bank Development Indicators</i> CD-ROM.
Secondary school enrollment	Secondary school enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the secondary level of education. Accordingly, the reported value can exceed (or average) more than 100%. Available for all

Table 1 (continued)

Variable	Description
	countries from 1980 through 1997. Source: <i>World Bank Development Indicators</i> CD-ROM.
Population growth	Growth rate of total population which counts all residents regardless of legal status or citizenship. Available for all countries from 1980 through 1997. Source: <i>World Bank Development Indicators</i> CD-ROM.
Log life expectancy	Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. Available for all countries from 1980 through 1997. Source: <i>World Bank Development Indicators</i> CD-ROM.
OECD GDP growth	Growth of real per capita gross domestic product for high-income OECD members. High-income economies are those in which 1998 GNP per capita was \$9,361 or more. Source: <i>World Bank Development Indicators</i> CD-ROM.
World real interest rate	Constructed from each country's real interest rates. The GDP weighted real interest rate for the G-7 countries, where the real rate for each country is the lending interest rate adjusted for inflation as measured by the GDP deflator. Source: <i>World Bank Development Indicators</i> CD-ROM.
	<i>Macroeconomic reforms</i>
Trade/GDP	The trade dependency ratio is the sum of exports and imports of goods and services measured as a share of gross domestic product. Available for all countries from 1980 through 1997. Source: <i>World Bank Development Indicators</i> CD-ROM.
Inflation	Inflation as measured by the log annual growth rate of the gross domestic product implicit deflator. We use the CPI if the GDP-deflator is not available. Available for all countries from 1980 through 1997. Source: <i>World Bank Development Indicators</i> CD-ROM.
Black market premium	The black market premium is defined as $(\text{parallel FXrate}/\text{officialFXrate} - 1) * 100$ , where parallel FXrate is the black market rate. The variable measures the premium market participants must pay, relative to the official exchange rate, to exchange the domestic currency for dollars in the black market. Available for all countries from 1980 through 1997. Source: Easterly (2001).
Fiscal deficit	The overall budget deficit is total expenditure and lending minus repayments less current and capital revenue and official grants received; shown as a percentage of GDP. Data are available for central governments only. Available for 28 countries from 1980 through 1997. Source: <i>World Bank Development Indicators</i> CD-ROM.
Growth Opportunities	An implied measure of country-specific growth opportunities that reflects the growth prospects for each industry (at the global level) weighted by

Table 1 (continued)

Variable	Description
	<p>the industrial composition for each country. We construct an annual measure of the 3-digit SIC industry composition for each country by their output shares according to UNIDO Industrial Statistics Database. For each SIC code, we also measure price-earnings (PE) ratios for that industry at the global level, from which we construct an implied measure of growth opportunities for each country by weighting each global industry PE ratio by its relative share for that country. We subtract from this measure the overall world market PE ratio to remove the world discount rate effect (and we remove a 5-year moving average), and call the difference “growth opportunities” (GO). Available for 92 countries from 1980 through 1997. Source: Bekaert et al. (2004b).</p> <p><i>Financial development</i></p>
Private credit/GDP	<p>Private credit divided by gross domestic product. Credit to private sector refers to financial resources provided to the private sector, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable that establish a claim for repayment. Available for all countries from 1980 through 1997. Source: <i>World Bank Development Indicators</i> CD-ROM.</p>
Equity market turnover	<p>The ratio of equity market value traded to the market capitalization. The data are available for 50 countries from 1980 through 1997. Source: Standard and Poor’s/International Finance Corporation’s <i>Emerging Stock Markets Factbook</i>.</p> <p><i>Legal environment</i></p>
Legal origin	<p>Identifies the legal origin of the company law or commercial code of each country (English, French, Socialist, German, Scandinavian). We construct three indicators that take the value of one when the legal origin is Anglo-Saxon (English Law), French (French Law), or other (Law Other), and zero otherwise; legal origin is available for all countries. This variable is purely cross-sectional, and available for all countries. Source: La Porta et al. (1999) .</p>
Judicial Efficiency	<p>Assessment of the “efficiency and integrity of the legal environment as it affects business, particularly foreign firms” produced by the country risk rating agency Business International Corp. It may be taken to “represent investors’ assessments of conditions in the country in question.” Average between 1980 and 1983. Scale from 0 to 10, with lower scores, lower efficiency levels. This variable is purely cross-sectional, and available for 47 countries. Source: La Porta et al. (1998).</p>
Speed of Judicial Process	<p>The total estimated speed in calendar days of the procedure (to evict a tenant for nonpayment of rent or to collect a bounced check) under the factual and procedural assumptions provided. It equals the sum of (i) duration until completion of service of process, (ii) duration of trial, and (iii) duration of enforcement. This variable is purely cross-sectional, and available for 69 countries. Source: Djankov et al. (2003).</p>

Table 1 (continued)

Variable	Description
	<i>Quality of Institutions</i>
Quality of Institutions	The sum of the International Country Risk Guide (ICRG) Political Risk (ICRGP) subcomponents: Corruption, Law and Order, and Bureaucratic Quality.
Corruption	ICRGP quality of institutions sub-component. This is a measure of corruption within the political system. Such corruption: distorts the economic and financial environment, reduces the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability, and introduces an inherent instability into the political process. The most common form of corruption met directly by business is financial corruption in the form of demands for special payments and bribes connected with import and export licenses, exchange controls, tax assessments, police protection, or loans. Although the PRS measure takes such corruption into account, it is more concerned with actual or potential corruption in the form of excessive patronage, nepotism, job reservations, "favor-for-favors," secret party funding, and suspiciously close ties between politics and business. In PRS's view these sorts of corruption create risk to foreign business, potentially leading to popular discontent, unrealistic and inefficient controls on the state economy, and encourage the development of the black market.
Law and Order	ICRGP quality of institutions sub-component. PRS assesses Law and Order separately, with each sub-component comprising zero to three points. The Law sub-component is an assessment of the strength and impartiality of the legal system, while the Order sub-component is an assessment of popular observance of the law. Thus, a country can enjoy a high rating (3.0) in terms of its judicial system, but a low rating (1.0) if the law is ignored for a political aim.
Bureaucratic Quality	ICRGP quality of institutions sub-component. The institutional strength and quality of the bureaucracy can act as a shock absorber that tends to minimize revisions of policy when governments change. Therefore, high points are given to countries where the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services. In these low-risk countries, the bureaucracy tends to be somewhat autonomous from political pressure and to have an established mechanism for recruitment and training. Countries that lack the cushioning effect of a strong bureaucracy receive low points because a change in government tends to be traumatic in terms of policy formulation and day-to-day administrative functions.
	<i>Investment environment</i>
Economic risk rating	ICRG Economic Risk indicator (which ranges between 0 and 50). The risk rating is a combination of 5 subcomponents: GDP levels and growth, respectively, inflation, balanced budgets, and the current account. The minimum number of points for each component is zero, while the



Table 1 (continued)

Variable	Description
	maximum number of points depends on the fixed weight that component is given in the overall economics risk assessment.
Anti-director rights	An index aggregating different shareholder rights. The index is formed by adding 1 when: (1) the country allows shareholders to mail their proxy vote to the firm; (2) shareholders are not required to deposit their shares prior to the General Shareholders' Meeting; (3) cumulative voting or proportional representation of minorities in the board of directors is allowed; (4) an oppressed minorities mechanism is in place; (5) the minimum percentage of share capital that entitles a shareholder to call for an Extraordinary Shareholders' Meeting is less than or equal to 10 percent (the sample median); or (6) shareholders have preemptive rights that can only be waived by a shareholders' vote. The index ranges from 0 to 6. This variable is purely cross-sectional, and available for 47 countries. Source: La Porta et al. (1998).
Investment Profile	ICRG Political Risk (ICRGP) sub-component (12% weight in overall ICRGP index). This is a measure of the government's attitude to inward investment. The investment profile is determined by PRS's assessment of three sub-components: (i) risk of expropriation or contract viability; (ii) payment delays; and (iii) repatriation of profits. Each sub-component is scored on a scale from zero [very high risk] to four [very low risk].
Creditor rights	An index aggregating different creditor rights. The index is formed by adding 1 when (1) the country imposes restrictions, such as creditors' consent or minimum dividends to file for reorganizations; (2) secured creditors are able to gain possession of their security once the reorganization petition has been approved (no automatic stay); (3) secured creditors are ranked first in the distribution of the proceeds that results from the disposition of the assets of a bankrupt firm; and (4) the debtor does not retain the administration of its property pending the resolution of the reorganization. The index ranges from 0 to 4. This variable is purely cross-sectional, and available for 45 countries. Source: La Porta et al. (1998).
Accounting Standards	Index created by examining and rating companies' 1990 annual reports on their inclusion or omission of 90 items. These items fall into seven categories (general information, income statements, balance sheets, funds flow statements, accounting standards, stock data, and special items). A minimum of three companies in each country were studied. The companies represent a cross section of various industry groups; industrial companies represented 70 percent, and financial companies represented the remaining 30 percent. This variable is purely cross-sectional, and available for 39 countries. Source: La Porta et al. (1998).

Perhaps the most important variable in our paper is the indicator variable, Official Liberalization. This variable is based on the [Bekaert and Harvey \(2002\)](#) detailed chronology of important financial, economic, and political events in many

developing countries. The variable takes the value of one when foreign portfolio investors can own the equity of a particular market and zero otherwise. We augment this analysis with liberalization dates for five developed countries: Iceland, Japan, Malta, New Zealand, and Spain (see Appendix A).

We investigate the robustness of the liberalization effect to an alternative measure of financial liberalization: First Sign. This measure is based on the earliest of three possibilities: a launching of a country fund, an American Depositary Receipt (ADR) announcement, and an Official Liberalization. It might be possible for a foreign investor to access the market through a country fund well before foreigners are allowed to directly transact in the local equity market. For example, consider the case of Thailand. [Bekaert and Harvey \(2002\)](#) date the Official Liberalization in September 1987. This was the first month of operation of the Thai Alien Board, which allowed foreigners to directly transact in Thai securities. However, foreigners could indirectly access the Thai market earlier. In July 1985, the Bangkok Fund Ltd. was launched on the London Stock Exchange, and in December 1986, Morgan Stanley launched the Thailand Fund. Thailand announced its first ADR in January 1991. So, for our analysis, the Official Liberalization is dated in 1987, and the First Sign date is 1985.

We also consider an alternative continuous measure of liberalization. [Bekaert \(1995\)](#) and [Edison and Warnock \(2003\)](#) propose a measure of equity market openness based on the ratio of the capitalization of the International Finance Corporation (IFC) investable to the global stocks in each country. The IFC's global stock index seeks to represent the local stock market, and the investable index corrects market capitalization for foreign ownership restrictions. A ratio of one means that all of the stocks are available to foreign investors. In [Table 3](#), we call this measure Liberalization Intensity.<sup>1</sup> [Table 1](#) has more details on the construction of this variable.

Finally, we contrast equity market liberalization with capital account liberalization and two measures of capital account openness; one based on IMF information and the other proposed by [Quinn \(1997\)](#) and [Quinn and Toyoda \(2003\)](#). The various liberalization measures are presented in Appendix A. All other data are discussed when they are introduced in the analysis.

Our regression analysis uses four different country samples, which are determined by data availability. Economic growth rates, the basic control variables, and the Official Liberalization indicator are available for all samples. Our largest samples cover 95 and 75 countries, respectively, and employ primarily macroeconomic and demographic data. Our smallest samples, cover 50 and 28 countries, respectively, and employ, in addition to the macroeconomic and demographic information, data describing the state of banking and equity market development in each country. We report results based on the largest overall sample (95 countries, Sample I) and the largest sample that includes financial information (50 countries, Sample II). We sometimes refer to the results for the two alternative samples which are available on request.

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<sup>1</sup>We also explore a related measure by calculating the ratio of the number of firms in the investable and global indices for each country (Alternative Intensity). Given the high volatility of emerging market equity returns, this measure could be less noisy. These results are similar and are available on request.

2.2. Unconditional effects of liberalization

Tables 2 and 3 present a summary analysis of some of the main variables in our study. We analyze the data from two perspectives. First, in Table 2, we consider means of the variables five years before and after equity market liberalizations. However, for real GDP growth, we also examine three- and seven-year intervals. We

Table 2

Summary statistics. We explore the three, five, and seven-year averages of the growth rate of real per capita gross domestic product (GDP) and the five-year averages of the other variables employed in the paper (and summarized in Table 1) before and after the equity market liberalization (including the liberalization year in the after period). For some countries, we do not have a full three, five, or seven years available given the timing of the liberalization, so we simply take the available years in the average. For all variables, unless otherwise stated, the summary statistics reflect data for 95 countries from 1980 to 1997. Official Liberalization means that the equity market is liberalized. Fully liberalized denotes countries that are fully liberalized throughout our sample. Never liberalized denotes countries that never undergo financial liberalization. ICRG is the International Country Risk Guide. Statistical significance is denoted by \* for 10%, \*\* for 5%, and \*\*\* for 1%. NA denotes variables for which the test is not available.

Variable	Pre-liberalization	Post-liberalization	Never liberalized	Fully liberalized
Real GDP growth (three-year)	0.0160	0.0265**	-0.0016	0.0201***
Real GDP growth (five-year)	0.0159	0.0276***		
Real GDP growth (seven-year)	0.0153	0.0264***		
Government/GDP	0.1379	0.1328	0.1581	0.1885***
Enrollment	0.5573	0.6115**	0.3439	0.9974***
Population growth	0.0203	0.0169**	0.0255	0.0060***
Life expectancy	65.7	67.7**	56.9	75.7***
Growth opportunity	-0.0301	0.0076***	-0.0012	-0.0016
Trade/GDP	0.6229	0.6383	0.6970	0.8429***
Log(1 + inflation) (Latin)	0.1890	0.1411	0.0596	NA
Log(1 + inflation) (not Latin)	0.0993	0.0857	0.0934	0.0411***
Log(1 + black market premium)	0.1499	0.0724***	0.2211	0.0007***
Fiscal Deficit (28 countries)	0.0606	0.0333***	NA	0.0307
Private credit/GDP	0.3831	0.4263	0.2286	0.8095***
Turnover (50 countries)	0.1814	0.2664	NA	0.4938
Banking crisis (systematic)	0.3243	0.2941	0.3300	0.1131***
Banking crisis (systematic and borderline)	0.5243	0.5784	0.4190	0.3891
Law and order (75 countries)	0.4875	0.6065***	0.4472	0.9510***
Insider trading law	0.4205	0.7241***	0.0836	0.6540***
Insider trading prosecution	0.0667	0.1149*	NA	0.4325
Judicial efficiency (47 countries)			NA	0.9456
Speed of process (checks + eviction) (69 countries)			363.4	408.3
Quality of institutions (75 countries)	0.5273	0.6033***	0.4158	0.9333***
ICRG economic index (75 countries)	0.5895	0.6765***	0.5909	0.7845
Investment profile (75 countries)	0.4660	0.5312***	0.4680	0.6494***
Anti-director rights (47 countries)			NA	0.4902
Creditor rights (45 countries)			NA	0.4853
Accounting standards (39 countries)			NA	0.6950

Table 3

Preliminary analysis of the impact of liberalization. For all estimates, the dependent variable is the one-year average growth rate of real per capita gross domestic product (GDP). Regressions include time effects, fixed effects, or both, as indicated (not reported in the interest of space); no other controls are included. In Panel A, we focus on equity market liberalization across the 40 countries that liberalize in our sample. The Official Liberalization variable takes a value of one when the equity market is liberalized, and zero otherwise. We consider an additional regression that includes China (41 countries). The First Sign liberalization indicator takes the value of one after the first of the following events: the Official Liberalization date, the introduction of American Depository Receipts, or the introduction of a country fund. The Liberalization Intensity measure is the ratio of the market capitalizations for the International Finance Corporation's investables to global indices.

In Panel B, we consider more general measures of capital account openness. The International Monetary Fund capital account openness indicator takes on value of zero if the country has at least one reported capital account restriction. The Quinn capital account liberalization indicator takes a value between one and zero depending upon the intensity of the reported capital account liberalization or openness; these regressions include 76 countries. For both measures, we perform regressions for the same 40 liberalizing countries for comparison, as well as for the full set of countries for which the measures are available.

	Estimate	Standard Error	Adjusted $R^2$
<i>Panel A: Equity market liberalization</i>			
Official Liberalization indicator (40 countries)			
Fixed effects	0.0124	0.0032	0.208
Time effects	0.0202	0.0048	0.052
Fixed and time effects	0.0105	0.0053	0.229
Official Liberalization indicator plus China (41)			
Fixed effects	0.0128	0.0031	0.251
Time effects	0.0210	0.0049	0.048
Fixed and time effects	0.0117	0.0053	0.270
First Sign indicator (40)			
Fixed effects	0.0129	0.0033	0.208
Time effects	0.0185	0.0041	0.055
Fixed and time effects	0.0080	0.0050	0.228
Liberalization Intensity (40)			
Fixed effects	0.0205	0.0051	0.209
Time effects	0.0137	0.0064	0.033
Fixed and time effects	0.0151	0.0064	0.231
<i>Panel B: Capital account liberalization</i>			
IMF capital account openness indicator (40)			
Fixed effects	0.0036	0.0065	0.190
Time effects	0.0057	0.0043	0.029
Fixed and time effects	0.0017	0.0065	0.224
IMF capital account openness indicator (95)			
Fixed effects	0.0041	0.0051	0.110
Time effects	0.0071	0.0029	0.024
Fixed and time effects	-0.0017	0.0053	0.133
Quinn capital account openness indicator (37)			
Fixed effects	0.0154	0.0192	0.169
Time effects	0.0218	0.0086	0.030
Fixed and time effects	-0.0016	0.0203	0.196

Table 3 (continued)

	Estimate	Standard Error	Adjusted $R^2$
Quinn capital account openness indicator (76)			
Fixed effects	0.0122	0.0123	0.143
Time effects	0.0193	0.0047	0.033
Fixed and time effects	0.0019	0.0129	0.167

look at the difference in means between countries that are fully liberalized and countries that were never liberalized (segmented countries). Second, in Table 3, we conduct regression analysis.

Using a sample of liberalizing countries, Table 2 shows that the real annual GDP growth rate is more than 1% higher in the post-liberalization period for all intervals. A much sharper difference in growth exists between fully liberalized countries and those that did not experience a liberalization, of approximately 2.2%.

The next group of variables serves as control variables in the growth regressions. In the neoclassical growth model, they can be viewed as determinants of steady-state GDP. The control variables experience changes after liberalization that would typically indicate a higher steady state GDP. The most striking and statistically significant differences occur for the fully liberalized and segmented countries. The never-liberalized countries have: lower secondary school enrollment, lower life expectancy, and higher population growth.

Table 3 presents a complementary analysis to Table 2. Here we estimate an ordinary least squares (OLS) regression of one-year GDP growth rates on the different measures of liberalization. We estimate these regressions with fixed effects, time effects, and both fixed and time effects and, therefore, focus only on liberalizing countries. Essentially, the regression identifies average GDP growth post- versus pre-liberalization controlling for country-specific time-invariant growth circumstances and global business cycle effects. Panel A focuses on our measures of equity market liberalization, and Panel B considers various measures of capital account liberalization. We discuss Panel B in Section 3.3.

The first and third parts of Panel A consider the impact of the Official Liberalization indicator and the First Sign indicator. Even with both fixed and time effects, the impact of the equity market liberalization variables is positive and around 1%. The second subpanel adds China to the analysis with a liberalization date of 1991. Unfortunately, we do not have enough data coverage to add China to the analysis in the other tables. The addition of this country in the analysis here increases both the size and the significance of the liberalization coefficient. In the fourth part of this table, we consider a measure of liberalization intensity. This variable provides the strongest and most significant impact, about 1.5% per year, but this number must be interpreted as the effect of a full, comprehensive liberalization.

The differences in means reported in Table 2 and the fixed effects regressions in Table 3 suggest liberalization is associated with increased growth.

### 3. Liberalization and economic growth

This section contains the main results. We start by outlining the econometric framework we employ in Section 3.1, and report the main results in Section 3.2. Section 3.3 contrasts capital account with equity market liberalization, and Section 3.4 considers several robustness exercises. Section 3.5 explicitly discusses the possibility of endogeneity bias.

#### 3.1. Econometric framework

Define the logarithmic growth in real GDP per capita for country  $i$  between  $t$  and  $t + k$  as:

$$y_{i,t+k,k} = \frac{1}{k} \sum_{j=1}^k y_{i,t+j} \quad i = 1, \dots, N, \quad (1)$$

where

$$y_{i,t} = \ln \left( \frac{\text{GDP}_{i,t}}{\text{POP}_{i,t}} \bigg/ \frac{\text{GDP}_{i,t-1}}{\text{POP}_{i,t-1}} \right)$$

and  $N$  is the number of countries in our sample. Denote the initial level of log GDP per capita as  $Q_{it}$  and the country's long-run (steady state) per capita GDP as  $Q_i^*$ . Taking a first-order approximation to the neoclassical growth model (see, e.g., Mankiw, 1995), we can derive  $y_{i,t+k,k} = -\lambda[Q_{it} - Q_i^*]$ , where  $\lambda$  is a positive conditional convergence parameter. The literature often implicitly models  $Q_i^*$  as a linear function of a number of structural variables such as the initial level of human capital. Hence a prototypical growth regression can be specified as

$$y_{i,t+k,k} = -\lambda Q_{i,t} + \gamma' \mathbf{X}_{i,t} + \varepsilon_{i,t+k,k}, \quad (2)$$

where  $\mathbf{X}_{i,t}$  are the variables controlling for different levels of long-run per capita GDP across countries. Our main addition to the literature is to examine the effect of adding an equity market liberalization variable,  $\text{Lib}_{i,t}$ , to the growth regression

$$y_{i,t+k,t} = \beta Q_{i,1980} + \gamma' \mathbf{X}_{i,t} + \alpha \text{Lib}_{i,t} + \varepsilon_{i,t+k,k}, \quad (3)$$

where  $Q_{i,1980}$  represents the logarithm of per capita real GDP in 1980 and serves as an initial GDP proxy. Because it is critical to capture the temporal dimension of the liberalization process, we combine time-series with cross-sectional information.

We estimate Eq. (3) with two approaches. First, we consider an OLS regression on non-overlapping five-year intervals. We consider both a homoskedastic, diagonal

and a seemingly unrelated regression (SUR) error structure for these regressions. While this approach does not capture all of the information in the data, it has the advantage of being transparent and providing a baseline estimate for our more general procedure. Second, we identify the parameters using a generalized method of moments (GMM) estimator described and analyzed in [Bekaert et al. \(2001\)](#). The estimator maximizes the time-series content in our regression by making use of overlapping data. We adjust the standard errors for the resulting moving average component in the residuals using a cross-sectional extension to [Hansen and Hodrick \(1980\)](#). Our regressors are all predetermined. While the GMM estimator looks like an instrumental variable estimator, it reduces to pooled OLS under simplifying assumptions on the weighting matrix.

Our GMM framework raises four issues: the construction of the weighting matrix, the choice of  $k$ , the specification of the control variables, and the construction of the liberalization indicator.

First, growth regressions have been criticized for being contaminated by multicollinearity (see [Mankiw, 1995](#)). In a pure cross-sectional regression, the regressors could be highly correlated (highly developed countries score well on all proxies for long-run growth), the data could be measured with error, and every country's observation is implicitly viewed as an independent draw. Therefore, standard errors likely underestimate the true sampling error. In our panel approach, we can accommodate heteroskedasticity both across countries and across time and correlation between country residuals by choosing the appropriate weighting matrix. In the tables, we report results using the method that accommodates overlapping observations and groupwise heteroskedasticity but does not allow for temporal heteroskedasticity or SUR effects. We report robustness checks later. Also, the growth effect survives the inclusion of fixed effects (see [Table 3](#)).

Second, because our sample is relatively short, starting only in 1980, and because many liberalizations only occurred in the 1990s, we use  $k = 5$ , instead of  $k = 10$ , which is typical in the literature. However, [Islam \(1995\)](#) and [Caselli et al. \(1996\)](#) find similar results using  $k = 5$  versus  $k = 10$ , and we check the robustness to the alternative  $k$ 's and the introduction of variables controlling for the world business cycle.

Third, [Levine and Renelt \(1992\)](#) find that most of the independent variables in standard growth regressions are, in a particular sense, fragile. We are primarily interested in the robustness of any effect the liberalization dummy could have on growth. We minimize the data mining biases for the other regressors by closely mimicking the regression in [Barro \(1997b\)](#). In addition, given the documented fragility of some of these variables, our initial analysis adds the control variables one by one to the growth regression.

Fourth, perhaps the main methodological issue regarding our sample is the construction of the equity market liberalization indicator variable. Although timing capital market reforms is prone to errors, the use of annual data reduces the impact of small timing errors. Nevertheless, we conduct several robustness experiments with respect to the definition of the liberalization variable.

### 3.2. *The liberalization effect in a standard growth regression*

Panel A of Table 4 describes the results of the standard growth regression for our largest sample (95 countries). Panels B and C are discussed in Section 3.3. The regression uses nonoverlapping five-year growth rates.<sup>2</sup> The coefficients are OLS estimates, and we report OLS standard errors with the exception of the very last line, which reports restricted SUR standard errors. We restrict the off-diagonal elements of the weighting matrix to be identical. It is not feasible to do a full SUR estimation because the number of countries is much larger than the number of time-series observations. The SUR estimates are close to the OLS estimates.

The explanatory variables in Table 4 include a constant, initial GDP (1980), government consumption to GDP, secondary school enrollment, population growth, and life expectancy. In contrast to Table 3, this regression contains control variables and, as a result, we do not include the fixed or time effects. We add the variables one by one and eventually all together. When initial GDP is the only regressor, it enters with a positive coefficient. When paired with the other control variables, which can now proxy for the steady state level of GDP, it enters with a negative sign, as expected given the standard results on conditional convergence.

The results for the full regression [see Eq. (2)] are broadly consistent with the previous literature (see Barro, 1997a, b and Barro and Sala-i-Martin, 1995). Initial GDP enters with a significant negative coefficient suggesting that low initial GDP levels imply higher growth rates, conditional on the other variables. Life expectancy has a significant positive coefficient suggesting that long life expectancy is associated with higher economic growth. Population growth has a significantly negative coefficient in the regression with the SUR standard errors but is insignificant in the regression with the OLS standard errors. However, secondary school enrollment has the wrong sign and the government size variable is insignificant. The SUR standard errors are generally smaller than the OLS standard errors, because of the heteroskedasticity adjustment.

Most important, the liberalization coefficient is positive and at least 1.85 standard errors above zero in all the regressions. For example, in the full regression, the liberalization coefficient is 0.0120 and approximately three standard errors from zero with the OLS standard errors and close to five standard errors from zero using the SUR standard errors. This suggests that, on average, a liberalization is associated with a 1.20% increase in the real per capita growth rate in GDP. The effect ranges from 0.74% to 1.82% across all specifications.

Table 5 presents results from our GMM estimation with overlapping observations. In addition, this table assesses sensitivity of our results to the specification of the equity market liberalization variable. We also consider both the largest sample (95 countries) and a smaller sample (76 countries) that closely resembles the sample in Quinn (1997) and Quinn and Toyoda (2003).

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<sup>2</sup>We have three different sample choices for the nonoverlapping regression, 1981–1995, 1982–1996, and 1983–1997. We report the averages of the coefficients and standard errors from three separate nonoverlapping estimations.



Table 4

The impact of liberalization in pooled ordinary least squares (OLS) growth regressions. For all estimates, the dependent variable is the five-year nonoverlapping average growth rate of real per capita gross domestic product (GDP).  $\text{Log}(\text{GDP})$  is the log real per capita GDP level in 1980.  $\text{Govt}/\text{GDP}$  is the ratio of government consumption to GDP; enrollment is the secondary school enrollment ratio; population growth is the growth rate of total population;  $\text{Log}(\text{life})$  is the log life expectancy of the total population. In Panel A, the Official Liberalization variable takes a value of one when the equity market is liberalized, and zero otherwise; these regressions cover 95 countries.

In Panel B, the International Monetary Fund (IMF) capital account openness indicator takes on value of zero if the country has at least one reported capital account restriction; these regressions cover 95 countries. In Panel C, the Quinn capital account liberalization indicator takes a value between one and zero depending upon the intensity of the reported capital account liberalization or openness; these regressions include 76 countries. We first consider each control variable separately, then all together. For each case, we report the simple average of three coefficients (with standard errors and adjusted  $R^2$ 's) associated with separate pooled OLS regressions (over 1981–1995, 1982–1996, and 1983–1997) for which the dependent variable is three nonoverlapping five-year GDP average growth rates. That is, each pooled OLS regression has three time-series observations with no overlap; we conduct each regression separately and then average the resulting coefficients. OLS standard errors are below each estimate in parentheses; for the last entry of each panel, we also include restricted seemingly unrelated regression (SUR) standard errors (all off-diagonal elements are assumed to be equal) as a robustness check.

Constant	Initial log(GDP)	Gov/GDP	Secondary school enrollment	Population growth	Log(life)	Official Liberalization indicator	IMF capital account openness	Quinn capital account openness	Adjusted $R^2$
<i>Panel A: Official Liberalization (95 countries)</i>									
0.0048 (0.0021)						0.0181 (0.0029)			0.082
0.0020 (0.0104)	0.0004 (0.0015)					0.0173 (0.0048)			0.079
0.0072 (0.0052)		-0.0152 (0.0332)				0.0182 (0.0030)			0.081
-0.0011 (0.0035)			0.0145 (0.0073)			0.0119 (0.0048)			0.094
0.0135 (0.0041)				-0.3568 (0.1479)		0.0127 (0.0038)			0.106

Table 4  
(continued)

Constant	Initial log(GDP)	Gov/GDP	Secondary school enrollment	Population growth	Log(life)	Official Liberalization indicator	IMF capital account openness	Quinn capital account openness	Adjusted $R^2$
-0.1939 (0.0415)					0.0488 (0.0103)	0.0074 (0.0039)			0.149
-0.3093 OLS standard errors (0.0606)	-0.0084 (0.0024)	-0.0007 (0.0318)	-0.0029 (0.0138)	-0.2616 (0.1947)	0.0935 (0.0159)	0.0120 (0.0044)			0.217
Restricted SUR standard errors (0.0337)	(0.0012)	(0.0159)	(0.0061)	(0.1129)	(0.0089)	(0.0025)			
<i>Panel B: IMF capital account liberalization (95 countries)</i>									
-0.3081 (0.0585)	-0.0079 (0.0021)	-0.0060 (0.0252)	0.0023 (0.0109)	-0.3540 (0.1447)	0.0929 (0.0159)		0.0033 (0.0042)		0.197
-0.3085 OLS standard errors (0.0606)	-0.0085 (0.0025)	-0.0004 (0.0321)	-0.0028 (0.0138)	-0.2667 (0.2020)	0.0935 (0.0159)	0.0117 (0.0043)	0.0010 (0.0044)		0.214
Restricted SUR standard errors (0.0339)	(0.0012)	(0.0163)	(0.0062)	(0.1165)	(0.0090)	(0.0026)	(0.0020)		
<i>Panel C: Quinn sample (76 countries)</i>									
-0.2875 (0.0645)	-0.0121 (0.0023)	-0.0267 (0.0332)	0.0107 (0.0122)	-0.4709 (0.2366)	0.0929 (0.0171)			0.0247 (0.0078)	0.266
-0.2805 OLS standard errors (0.0643)	-0.0121 (0.0023)	-0.0248 (0.0332)	0.0065 (0.0127)	-0.3759 (0.2311)	0.0913 (0.0171)	0.0102 (0.0047)		0.0185 (0.0081)	0.279
Restricted SUR standard errors (0.0395)	(0.0013)	(0.0192)	(0.0066)	(0.1467)	(0.0102)	(0.0028)		(0.0048)	

Table 5

Equity market and capital account liberalization. The dependent variable is the overlapping five-year average growth rate of real per capita gross domestic product (GDP). In addition to the control variables, we report the coefficient on the official Liberalization Indicator that takes a value of one when the equity market is liberalized, and zero otherwise. The First Sign liberalization indicator takes the value of one after the first of the following events: the Official Liberalization date, the introduction of an American Depository Receipt, or the introduction of a country fund. The Liberalization Intensity is the ratio of the market capitalizations for the International Finance Corporation's investables and global indices. The International Monetary Fund (IMF) capital account liberalization indicator takes on a value of zero if the country has at least one reported capital account restriction; these regressions cover 95 countries. In Panel B, the Quinn capital account liberalization indicator takes a value between one and zero depending upon the intensity of the reported capital account liberalization or openness; these regressions cover 76 countries. All standard errors (in parentheses) provide a correction for cross-sectional heteroskedasticity and account for the overlapping nature of the data.

	(1)	(2)	(3)	(4)	(5)
<i>Panel A: Full sample (95 countries)</i>					
Constant	-0.3277 (0.0286)	-0.3240 (0.0278)	-0.3370 (0.0288)	-0.3267 (0.0287)	
Initial log(GDP)	-0.0082 (0.0010)	-0.0082 (0.0010)	-0.0086 (0.0011)	-0.0083 (0.0011)	
Gov/GDP	-0.0144 (0.0131)	-0.0102 (0.0122)	-0.0135 (0.0131)	-0.0142 (0.0133)	
Secondary school enrollment	0.0004 (0.0048)	-0.0019 (0.0048)	-0.0003 (0.0049)	0.0006 (0.0049)	
Population growth	-0.1911 (0.0774)	-0.1874 (0.0753)	-0.1923 (0.0776)	-0.1935 (0.0783)	
Log(life)	0.0975 (0.0076)	0.0966 (0.0074)	0.1007 (0.0078)	0.0974 (0.0077)	
Official Liberalization indicator	0.0097 (0.0020)			0.0094 (0.0021)	
First Sign liberalization indicator		0.0122 (0.0020)			
Liberalization Intensity			0.0107 (0.0023)		
IMF capital account openness indicator					0.0010 (0.0017)
Adjusted $R^2$	0.207	0.215	0.206	0.207	
<i>Panel B: Quinn sample (76 countries)</i>					
Constant	-0.2962 (0.0350)	-0.2908 (0.0341)	-0.3072 (0.0344)	-0.2947 (0.0349)	-0.2997 (0.0334)
Initial log(GDP)	-0.0101 (0.0011)	-0.0101 (0.0011)	-0.0110 (0.0011)	-0.0104 (0.0012)	-0.0117 (0.0011)

Table 5 (continued)

	(1)	(2)	(3)	(4)	(5)
Gov/GDP	-0.0352 (0.0162)	-0.0305 (0.0155)	-0.0320 (0.0160)	-0.0334 (0.0165)	-0.0377 (0.0161)
Secondary school enrollment	0.0026 (0.0050)	-0.0007 (0.0049)	0.0008 (0.0050)	0.0024 (0.0052)	0.0037 (0.0054)
Population growth	-0.4241 (0.1056)	-0.4241 (0.1036)	-0.4313 (0.1053)	-0.4424 (0.1088)	-0.4530 (0.1107)
Log(life)	0.0947 (0.0089)	0.0933 (0.0087)	0.0991 (0.0088)	0.0948 (0.0089)	0.0966 (0.0085)
Official Liberalization indicator	0.0120 (0.0022)			0.0115 (0.0022)	0.0077 (0.0023)
First Sign liberalization indicator		0.0149 (0.0021)			
Liberalization Intensity			0.0147 (0.0025)		
IMF capital account openness indicator				0.0020 (0.0017)	
Quinn capital account openness indicator					0.0179 (0.0040)
Adjusted R <sup>2</sup>	0.270	0.286	0.271	0.270	0.284

The first two sets of estimates in Panels A and B in Table 5 show the results for the Official Liberalization and the First Sign indicator variables, respectively. The OLS results in Table 3 were suggestive that these two specifications of the liberalization variable would produce similar results. This is confirmed in Table 5. In the sample of 95 countries, the coefficient on the First Sign indicator is 1.22% compared with 0.97% for the Official Liberalization indicator. In the smaller sample (76 countries), the First Sign coefficient is 1.49% compared with 1.20% for the Official Liberalization coefficient. The third set of estimates shows the results for the Liberalization Intensity variable. The magnitude and significance of this variable is similar to the other two liberalization proxies. Indeed, in all six regressions, the liberalization coefficients are always significant with T-ratios exceeding 4.5. With the exception of the insignificant secondary school enrollment coefficient, the signs and magnitudes of the coefficients on the control variables are stable across these three definitions of equity market liberalization.

### 3.3. Capital account versus equity market liberalization

The effect of capital account openness on economic growth is the topic of considerable debate. Grilli and Milesi-Ferretti (1995), Kraay (1998), Rodrik (1998), and Edison et al. (2002a) claim that no correlation exists between capital account

liberalization and growth prospects. In contrast, Quinn (1997), Klein and Olivei (1999), and Quinn and Toyoda (2003) find a positive relation between capital account liberalization and growth. Many papers, such as Edison et al. (2002b), Chandra (2003), and Arteta et al. (2003) find that the effect is mixed or fragile. Edwards (2001) finds a positive effect that is driven by the higher income countries in his sample. Klein (2003) finds an inverted U-shaped effect: Capital account liberalization has no impact on the poorest and the richest countries but a substantial impact on the middle-income countries.

We consider two measures of capital account openness in Tables 3–5: one from IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER) (see also Grilli and Milesi-Ferretti, 1995) and one following Quinn (1997) and Quinn and Toyoda (2003). The IMF publication reports several categories of information, mostly on current account restrictions. The capital account openness dummy variable takes on a value of zero if the country has at least one restriction in the “restrictions on payments for the capital account transactions” category.<sup>3</sup>

The Quinn (1997) and Quinn and Toyoda (2003) capital account openness measure is also created from the annual volume published by the IMF's AREAER. In contrast to the IMF indicator that takes a value of zero if any restriction is in place, Quinn's openness measure is scored from 0 to 4, in half integer units, with 4 representing a fully open economy. The measure facilitates a more nuanced view of capital account openness and is available for 76 countries in our study. We transformed each measure into a 0 to 1 scale. [See Eichengreen (2002) for a review of this and other measures.] Some summary statistics for both the IMF and Quinn variables are presented in Appendix A.

We begin with the fixed and time effects regressions in Table 3. In Panel B of Table 3, we find the coefficient on IMF capital account liberalization measure to be insignificantly different from zero in the 40-country sample. The coefficient on the Quinn measure is large in both the fixed and time effects regressions (when estimated separately). However, in the regression that combines the fixed and time effects, the impact is diminished.

The last two parts of Table 3 consider larger samples. With our full set of 95 countries, capital account openness according to the IMF measure has no significant effect on growth. When measured using the Quinn measure (76 countries), the magnitude of the coefficients is large when fixed and time effects are considered separately, but small and insignificant when the effects are combined.<sup>4</sup> The evidence suggests that measuring capital account openness at a finer level as Quinn (1997) does leads to stronger growth effects than using the standard measure but the growth effect does not survive the inclusion of fixed and time effects. Clearly, the effects of equity market liberalization are less fragile.

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<sup>3</sup>The IMF changed the reporting procedures in 1996 and included subcategories for capital account restrictions (see the discussion in Miniane, 2004), but we follow the bulk of the literature in using the 0/1 variable.

<sup>4</sup>We also estimated a regression with the IMF capital account liberalization measure in the identical 76-country sample as the Quinn measure. The results for this sample are similar to the 95 country results.

Panels B and C of Table 4 present multivariate counterparts to the last part of Table 3. In this nonoverlapping five-year growth regression, we consider the capital account liberalization measures and the equity market liberalization both separately and together. Panel B considers the IMF measure for 95 countries. In each specification, the coefficient on this measure is indistinguishable from zero. Panel C considers the Quinn measure for 76 countries. The results suggest that the Quinn measure is correlated with growth. In the specification that includes all the control variables and both equity market and capital account liberalization, the coefficient on the Quinn variable is large and is more than two standard errors from zero. Importantly, while the coefficient on the Quinn variable is significant, this variable does not diminish the impact of the equity market liberalization. The coefficient on the equity market liberalization indicator is 1.02% and is more than 3.5 standard errors from zero even when competing directly against the capital account openness indicator.<sup>5</sup>

Finally, Table 5 provides the GMM estimation with overlapping observations. Consistent with the previous analysis, Panel A of Table 5 shows that the IMF measure of capital account liberalization does not significantly impact economic growth. However, the results in Panel B which focus on a sample of 76 countries, show that the Quinn variable is more successful. In the joint estimation, the coefficient on the Quinn variable is more than four standard errors above zero. The equity market liberalization variable, while diminished in magnitude, remains more than three standard errors from zero.

We draw three conclusions from our analysis of capital account openness. First, in our sample of 95 countries, the IMF capital account openness measure does not appear to be correlated with growth. However, consistent with Edwards (2001), the capital account measure does best in our smallest sample, which is more heavily weighted toward high-income countries (the 28-country sample results are available on request). Overall, our evidence supports the conclusion in Arteta et al. (2003) that the relation between the IMF measure and growth is fragile. Second, the Quinn measure, which scores the intensity of controls, is correlated with growth. Third, and most important for our research, the growth effect of the equity market liberalization indicator is robust to including measures of capital account openness. Further, all three sets of results appear to be consistent across varying degrees of econometric complexity with the proviso that the Quinn capital account openness measure is no longer significantly associated with growth when fixed and time effects are introduced.

### 3.4. Other robustness checks

We establish that equity market liberalization generates a significant growth effect, which is robust to alternative dating of the liberalization and distinct from the effects

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<sup>5</sup>The performance of the Quinn capital account openness indicator has one unusual aspect. The significance of this measure is dependent on including initial GDP in the regression. In contrast, the significance of the equity market liberalization variable is robust to inclusion or exclusion of initial GDP. These results are available on request.

of capital account liberalization. Here, we conduct seven additional robustness checks. First, we compare Latin American liberalizations to non-Latin American liberalizations. The results in Panel A of Table 6 suggest that the Latin American region is not driving the growth effect. Second, we control for variation in the world business cycle and interest rates. Panel B of Table 6 shows that, Organization for Economic Cooperation and Development (OECD) economic growth exerts a strong positive influence in our growth regression, but the liberalization effect is not diminished by the inclusion of the business cycle variables. In each of our samples, the growth effect from liberalization increases once we add these variables. Third, consistent with our analysis in Table 3, we include time effects variables in the main regression in Table 5, and no discernable impact is evident on the liberalization coefficients. Fourth, we estimate the regressions with three alternative growth horizons: three, seven, and ten years. While the liberalization effect is present at all horizons, this analysis suggests that most of the impact occurs in the first five years after liberalization which is consistent with the convergence literature. (The seven-year horizon regressions suggest that 88% of the growth impact of a liberalization takes place in the first five years.) Fifth, we test the sensitivity of our results to setting initial GDP at 1980 levels. As alternatives, we reset GDP to 1990 levels and also consider using the initial GDP at the time when a country liberalizes. Again, the inference did not change. Sixth, we alter our assumptions about the weighting matrix. In particular, we consider an estimation with restricted SUR effects and an estimation that imposed homoskedasticity with no SUR effects. The liberalization result is resilient to such changes.<sup>6</sup>

Finally, we conduct a Monte Carlo analysis of the liberalization effect. For each replication, we draw 95 uniform random numbers and randomly assign one of the existing liberalization dummies to each country. We re-run the growth regression with the same control variables but with purely random liberalization events. We repeat this experiment one thousand times. The 97.5th percentile of the distribution shows a coefficient of 0.0057 and a *T*-statistic of 3.25 as reported in Appendix B. This is well below our estimated coefficient of 0.0097 and *T*-statistic of 4.8 reported in Table 5. Hence, the empirical *P*-value is less than 0.001. The Monte Carlo evidence shows that the impact of the liberalization indicator is not a statistical artifact and not simply associated with the clustering of liberalizations in the late 1980s and early 1990s. It also shows that a standard *T*-test could slightly over-reject at asymptotic critical values, which we should take into account in our inference.

### 3.5. Endogeneity

As with the effect of financial development on growth, endogeneity issues loom large. Is the liberalization decision an exogenous political decision, or do countries liberalize when they expect improved growth opportunities? These concerns are highly relevant for countries that join a free market area, such as Spain and Portugal in the European Union, in which membership simultaneously requires relaxing

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<sup>6</sup>A full record of the results of the robustness checks is available on request.

Table 6

Analysis of the liberalization effect. Samples I and II refer to samples of 95 and 50 countries, respectively. The dependent variable is the overlapping five-year average growth rate of real per capita gross domestic product (GDP). In addition to the control variables, we report the coefficient on the Official Liberalization indicator that takes a value of one when the equity market is liberalized, and zero otherwise. In Panel A, Latin refers to an indicator that takes the value of one if the country is in Latin America. In Panel B, the world real interest rate is the contemporaneous GDP-weighted real interest rate for the G-7 countries. OECD GDP growth is the five-year average real GDP growth of Organization for Economic Cooperation and Development countries. In Panel C, we augment the control group to include a measure of implied growth opportunities detailed in Table 1. All standard errors (in parentheses) provide a correction for cross-sectional heteroskedasticity and account for the overlapping nature of the data.

	Panel A: regional influences		Panel B: world growth and real interest rates		Panel C: growth opportunities	
	Sample I	Sample II	Sample I	Sample II	Sample I	Sample II
Constant	-0.3293 (0.0291)	-0.2793 (0.0472)	-0.3323 (0.0279)	-0.2954 (0.0495)	-0.3252 (0.0288)	-0.2679 (0.0460)
Initial log(GDP)	-0.0082 (0.0010)	-0.0106 (0.0012)	-0.0085 (0.0010)	-0.0114 (0.0012)	-0.0084 (0.0010)	-0.0107 (0.0012)
Gov/GDP	-0.0150 (0.0132)	-0.0705 (0.0166)	-0.0154 (0.0126)	-0.0700 (0.0157)	-0.0115 (0.0128)	-0.0661 (0.0160)
Secondary school enrollment	0.0000 (0.0049)	0.0028 (0.0055)	-0.0001 (0.0045)	0.0060 (0.0050)	0.0010 (0.0048)	0.0047 (0.0053)
Population growth	-0.1905 (0.0777)	-0.4390 (0.1228)	-0.1885 (0.0729)	-0.3965 (0.1056)	-0.2053 (0.0768)	-0.4697 (0.1170)
Log(life)	0.0980 (0.0777)	0.0937 (0.0126)	0.0998 (0.0073)	0.0974 (0.0129)	0.0974 (0.0077)	0.0909 (0.0124)
Official Liberalization indicator			0.0108 (0.0019)	0.0112 (0.0021)	0.0092 (0.0020)	0.0087 (0.0021)



Official Liberalization indicator (Latin)	0.0065 (0.0041)	0.0052 (0.0051)				
Official Liberalization indicator (not Latin)	0.0100 (0.0022)	0.0098 (0.0022)				
OECD GDP growth (contemporaneous)			0.5049 (0.0846)	0.6552 (0.0942)		
World real interest rate (contemporaneous)			-0.2240 (0.0670)	-0.1734 (0.0735)		
Growth opportunities					0.0106 (0.0038)	0.0122 (0.0039)
Adjusted $R^2$	0.207	0.225	0.216	0.221	0.211	0.209

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capital controls and favorable growth conditions. However, such liberalizations are rare in our sample.

Addressing endogeneity concerns in this context is difficult because finding a suitable instrument for liberalization is nearly impossible. Instead, we try to directly control for growth opportunities. However, this is a formidable task. Any local variable that is correlated with growth opportunities could indicate an increase in growth opportunities because of the planned equity market liberalization. Hence, including the growth opportunity variable into the regression is not informative. Following [Bekaert et al. \(2004b\)](#), our approach is to look for exogenous growth opportunities.

More specifically, we view each country as composed of a set of industries with time-varying growth opportunities and assume that these growth prospects are reflected in the price to earnings (PE) ratios of global industry portfolios. We then create an implied measure of country-specific growth opportunities that reflects the growth prospects for each industry (at the global level) weighted by the industrial composition for each country. We construct an annual measure of the three-digit Standard Industrial Classification (SIC) industry composition for each country by its output shares according to the United National Industrial Development Organization (UNIDO) Industrial Statistics Database. For each SIC code, we also measure price-earnings ratios for that industry at the global level, from which we construct an implied measure of growth opportunities for each country by weighting each global industry PE ratio by its relative share for that country. We divide this measure by the overall world market PE ratio to remove the world discount rate effect, and we also measure this variable relative to its past five-year moving average. We call the difference “growth opportunities” (GO).

$$GO_{i,t} = \ln \left[ \frac{IPE_t \times w'_{i,t}}{WDPE_t} \right] - \frac{1}{60} \sum_{s=t-60}^{t-1} \ln \left[ \frac{IPE_s \times w'_{i,s}}{WDPE_s} \right], \quad (4)$$

where  $IPE_t$  is a vector of global industry price-earning ratios,<sup>7</sup>  $w_{i,t}$  is a vector of country-specific industry weights, and  $WDPE_t$  is the price-earning ratio of the world market.

When we introduce this variable into a growth regression, Panel C of [Table 6](#) shows that it predicts growth but does not drive out the liberalization effect. The fact that the GO measure is significant in the regressions indicates that it is a good measure of growth opportunities. Comparing the growth effect of liberalization in this regression (0.92%) with the original effect in [Table 5](#) (0.97%), both the coefficient and its statistical significance are essentially unchanged. Whereas this analysis perhaps does not completely resolve the endogeneity problem, it does give us more confidence that our results are not being driven by an endogeneity issue.

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<sup>7</sup>All price-earnings ratios are taken from Datastream. We use the December value for our annual measures. The Datastream world market is the value-weighted sum of the global industry portfolios.

#### 4. Accounting for the liberalization effect

Our growth effect is surprisingly large. One potential interpretation is that reforms are multifaceted. Countries could liberalize equity markets at the same time as they remove restrictions on foreign exchange, deregulate the banking system, and undertake steps to develop the equity market. In this section, we introduce proxies for other contemporaneous reforms into the main regressions.

We investigate three types of reforms: macro-reforms, financial reforms, and legal reforms. We do not have sufficient information to determine the exact time lines of reforms for all our countries in most instances. Consequently, we follow an indirect approach by inserting as control variables into our growth regression continuous variables that measure the direct effect of the reforms. An example would be the level of inflation for macro-reforms. The third bloc of variables examined in [Table 2](#) is made up of the variables used in this section. [Table 2](#) shows that, in most instances, these variables change in the required direction after an equity liberalization and that liberalized economies score better on measures of macroeconomic stability, financial development and rule of law. This is an indication of the potential simultaneity of reforms directly affecting these variables, on the one hand, and equity market liberalization, on the other hand, or perhaps equity market liberalization contributes to a better macroeconomic environment, promotes financial development, or instigates legal reforms that improve the legal environment. In fact, [Rajan and Zingales \(2003\)](#) point out that financial development may be blocked by groups (incumbents) interested in maintaining their monopoly position (in goods and capital markets). They argue that this is less likely to be the case if the country has open trade and free capital flows and hence financial openness may instigate other reforms.

If there are simultaneous reforms, the introduction of these continuous variables into our regression is likely to drive out the liberalization effect, which is a coarse measurement of the extent and quality of the reforms. We do have detailed time-line information on one type of reform: the introduction of insider trading rules and their enforcement. We examine whether these reforms impact growth. Finally, we conjecture that a big reform package is likely after a major financial crisis, such as a banking crisis, and use information on the timing of banking crises to create another control for reform simultaneity effects.

##### 4.1. Macroeconomic reforms

[Mathieson and Rojz-Suarez \(1993\)](#) and [Henry \(2000\)](#) discuss how policy reforms, including equity market liberalization, in developing countries typically involve domestic macro-reforms. We consider three variables that proxy for macroeconomic reforms: trade openness, the level of inflation, and the black market foreign exchange premium.

Our measure of trade openness is the ratio of exports plus imports to GDP. The effect of trade integration and trade liberalization on growth is the subject of a large literature. [Dollar \(1992\)](#), [Lee \(1993\)](#), [Edwards \(1998\)](#), [Sachs and Warner \(1995\)](#), and

Wacziarg (2001) establish that lower barriers to trade induce higher growth. Rodriguez and Rodrik (2001) criticize these studies on many grounds. However, Rodriguez and Rodrik primarily question whether trade policy instead of trade volume has affected growth. In our study, we are interested in the effect of financial market liberalization not in testing the impact of trade policy. The results in Table 7, Panel A, show that, in both samples (95 and 50 countries, respectively), the coefficient on trade openness is highly significant and positive, suggesting countries that are open have higher growth than countries that are relatively closed.

Barro (1997a, b) finds a significant negative relation between inflation and economic growth and concludes that the result primarily stems from a strong negative relation between very high inflation rates (over 15%) and economic growth. We use the natural logarithm of one plus the inflation rate to diminish the impact of some outlier observations. Given that the extreme skewness in inflation primarily results from inflation in Latin American countries, we also introduce a dummy for Latin America.

The results in Table 7 for the inflation variable are mixed. We find that three of the four coefficients on inflation are not significantly different from zero. Inflation is never significant for the Latin American countries. In one of the non-Latin American samples, the sign is positive and significant for Sample I. We also estimate a regression without the Latin American indicator. The coefficient on the single inflation variable is not significantly different from zero. We also consider a regression with dummies for Brazil and Argentina only, the largest outliers in inflation data. Here, we find negative but insignificant coefficients, whereas the effect for Argentina and Brazil is negative and significant.<sup>8</sup>

We also examine the effect of introducing black market foreign exchange premiums. The black market premium is taken from Easterly (2001). This variable measures the premium market participants must pay, relative to the official exchange rate, to exchange the domestic currency for dollars in the parallel market. The black market premium is often used as an indicator of macroeconomic imbalances and would consequently be sensitive to macro-reforms. It is also a direct indicator of the existence of foreign exchange restrictions, and it should therefore not be surprising that it is closely correlated with market integration and equity market liberalization (see, for instance, Bekaert, 1995). Hence the black market premium could also be an inverse indicator of the quality and comprehensiveness of the equity market liberalization. Table 2 shows that the black market premium substantially decreases from a pre-liberalization level of 0.150 to a post-liberalization premium of 0.072. As with the inflation indicator, we use the natural logarithm of one plus the black market premium to dampen the influence of outliers. The results in Table 7 show that the premium has a strong negative relation to economic growth in our samples.

The regression reported in Panel A of Table 7 shows that the liberalization coefficient decreases by about 25 basis points but remains significantly different from zero. For example, in Sample I, the coefficient is reduced from 0.97% (Table 5) to 0.74% but remains significantly different from zero. Hence, our results indicate that

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<sup>8</sup>These results are available on request.

Table 7

The influence of the reform environment on liberalization. Samples I and II refer to samples of 95 and 50 countries, respectively. We report analysis from a regression that has the overlapping five-year average growth rate of real per capita gross domestic product (GDP) as the dependent variable. In addition to the control variables, we report the coefficients for the Official Liberalization indicator, which takes a value of one when the equity market is liberalized, and zero otherwise. In Panel A, we augment the control group to include the openness of the trade sector measured by the sum of exports plus imports divided by GDP, the log of one plus the level of inflation and the log of one plus the level of the black market premium for foreign exchange. In Panel B, we consider financial development variables: the ratio of private credit to GDP, which is a banking development indicator, and the value of trading scaled by market capitalization. In Panel C, we consider law and order (higher values denoting improvements, rescaled to fall between zero and one) taken from the International Country Risk Guide (ICRG), and in Panel D, insider trading law and insider trading prosecution, which are indicators representing either the introduction of laws prohibiting insider trading or actual prosecutions, respectively. For law and order, the \* by Sample I denotes that this variable is available for only 75 countries. In Panel E, we include two indicators of banking crises: systemic and systemic and borderline. In the first case, we introduce a dummy variable that is set to one during a banking crisis contemporaneously with the left-hand side variable. In the second case, we add a variable that takes on a value of one after a banking crisis. All standard errors (in parentheses) provide a correction for cross-sectional heteroskedasticity and account for the overlapping nature of the data.

	Panel A: macroeconomic reforms		Panel B: financial development		Panel C: law and order		Panel D: insider trading			
	Sample I	Sample II	Sample I	Sample II	Sample I*	Sample II	Sample I	Sample II	Sample I	Sample II
Constant	-0.3262 (0.0279)	-0.1957 (0.0504)	-0.3155 (0.0282)	-0.2273 (0.0426)	-0.3177 (0.0343)	-0.2714 (0.0413)	-0.3189 (0.0288)	-0.2524 (0.0453)	-0.3265 (0.0281)	-0.2594 (0.0461)
Initial log(GDP)	-0.0084 (0.0010)	-0.0104 (0.0013)	-0.0093 (0.0011)	-0.0120 (0.0011)	-0.0070 (0.0013)	-0.0124 (0.0013)	-0.0080 (0.0010)	-0.0104 (0.0013)	-0.0084 (0.0010)	-0.0112 (0.0012)
Gov/GDP	-0.0289 (0.0124)	-0.0801 (0.0176)	-0.0166 (0.0131)	-0.0559 (0.0157)	-0.0374 (0.0151)	-0.0679 (0.0161)	-0.0143 (0.0129)	-0.0636 (0.0165)	-0.0144 (0.0129)	-0.0656 (0.0163)
Secondary school enrollment	-0.0006 (0.0051)	0.0050 (0.0058)	-0.0005 (0.0049)	0.0007 (0.0051)	0.0019 (0.0051)	0.0055 (0.0056)	-0.0003 (0.0049)	0.0026 (0.0056)	0.0008 (0.0047)	0.0051 (0.0050)
Population growth	-0.1979 (0.0722)	-0.6259 (0.1194)	-0.1994 (0.0765)	-0.6066 (0.1246)	-0.2009 (0.0820)	-0.4611 (0.1193)	-0.1952 (0.0770)	-0.5118 (0.1250)	-0.1936 (0.0757)	-0.5149 (0.1217)

Table 7 (continued)

	Panel A: macroeconomic reforms		Panel B: financial development		Panel C: law and order		Panel D: insider trading			
	Sample I	Sample II	Sample I	Sample II	Sample I*	Sample II	Sample I	Sample II	Sample I	Sample II
Log(life)	0.0970 (0.0075)	0.0730 (0.0131)	0.0957 (0.0076)	0.0828 (0.0113)	0.0937 (0.0090)	0.0933 (0.0111)	0.0950 (0.0077)	0.0867 (0.0121)	0.0976 (0.0075)	0.0899 (0.0123)
Official Liberalization indicator	0.0074 (0.0019)	0.0066 (0.0021)	0.0077 (0.0020)	0.0069 (0.0019)	0.0090 (0.0022)	0.0070 (0.0020)	0.0087 (0.0020)	0.0080 (0.0021)	0.0088 (0.0020)	0.0077 (0.0021)
Trade	0.0106 (0.0014)	0.0100 (0.0017)								
Log(1 + inflation) (Latin)	-0.0006 (0.0023)	0.0008 (0.0027)								
Log(1 + inflation) (not Latin)	0.0092 (0.0042)	0.0127 (0.0078)								
Log(1 + black market premium)	-0.0092 (0.0018)	-0.0067 (0.0032)								
Private credit			0.0125 (0.0031)	0.0084 (0.0032)						
Turnover				0.0152 (0.0026)						
ICRG law and order					-0.0001 (0.0007)	0.0020 (0.0008)				
Insider trading law							0.0003 (0.0014)	-0.0003 (0.0015)		
Insidertrading prosecution									0.0032 (0.0024)	0.0033 (0.0024)
Adjusted $R^2$	0.265	0.276	0.207	0.262	0.209	0.228	0.209	0.231	0.209	0.235

Panel E: banking crises

	Sample I	Sample II	Sample I	Sample II	Sample I	Sample II	Sample I	Sample II
Constant	-0.3047 (0.0281)	-0.2602 (0.0444)	-0.3057 (0.0285)	-0.2852 (0.0495)	-0.3170 (0.0291)	-0.2621 (0.0470)	-0.3168 (0.0286)	-0.2471 (0.0455)
Initial log(GDP)	-0.0080 (0.0010)	-0.0105 (0.0010)	-0.0080 (0.0010)	-0.0107 (0.0011)	-0.0078 (0.0010)	-0.0104 (0.0012)	-0.0080 (0.0010)	-0.0107 (0.0012)
Gov/GDP	-0.0211 (0.0129)	-0.0745 (0.0150)	-0.0178 (0.0133)	-0.0652 (0.0161)	-0.0128 (0.0124)	-0.0648 (0.0160)	-0.0127 (0.0125)	-0.0611 (0.0156)
Secondary school enrollment	0.0010 (0.0049)	0.0022 (0.0054)	0.0012 (0.0049)	0.0011 (0.0057)	0.0007 (0.0047)	0.0041 (0.0053)	0.0010 (0.0046)	0.0040 (0.0050)
Population growth	-0.1896 (0.0774)	-0.4666 (0.1161)	-0.1854 (0.0754)	-0.4516 (0.1157)	-0.1855 (0.0747)	-0.4804 (0.1201)	-0.1926 (0.0743)	-0.5805 (0.1149)
Log(life)	0.0925 (0.0075)	0.0901 (0.0118)	0.0929 (0.0077)	0.0971 (0.0132)	0.0939 (0.0078)	0.0891 (0.0126)	0.0943 (0.0077)	0.0861 (0.0122)
Official Liberalization indicator	0.0094 (0.0021)	0.0084 (0.0020)	0.0101 (0.0019)	0.0081 (0.0021)	0.0097 (0.0020)	0.0087 (0.0021)	0.0091 (0.0020)	0.0076 (0.0021)
During systemic crisis	-0.0072 (0.0014)	-0.0085 (0.0015)						
During systemic and borderline crisis			-0.0081 (0.0011)	-0.0126 (0.0013)				
Post systemic crisis					0.0058 (0.0019)	0.0022 (0.0027)		
Post systemic and borderline crisis							0.0056 (0.0014)	0.0062 (0.0017)
Adjusted $R^2$	0.218	0.246	0.225	0.295	0.211	0.223	0.212	0.233

part of the equity market liberalization effect is accounted for by these four different proxies for macro-reforms.<sup>9</sup>

#### 4.2. *Financial reforms*

Regulatory changes furthering financial development could occur simultaneously with the equity market liberalization. A significant literature studies the relation between financial development and growth with contributions as early as McKinnon (1973) and Patrick (1966). Rousseau and Sylla (1999, 2003) show that early U.S. growth in the 1815–1840 period and early growth in other countries was finance led. We examine two financial development indicators: the size of the banking sector and stock exchange trading activity.

King and Levine (1993) study the impact of banking sector development on growth prospects.<sup>10</sup> Kaminsky and Schmukler (2002) study the timing and impact of equity market, capital account, and banking reforms. Panel B of Table 7 examines the role of the banking sector by adding private credit to GDP to the growth regression. Private credit to GDP enters significantly in both samples.

Atje and Jovanovic (1989), Demirgüç-Kunt and Levine (1996), Demirgüç-Kunt and Maksimovic (1996), and Levine and Zervos (1996, 1998a) examine the effect of stock market development on economic growth. In Panel B, we also add, as an independent variable, equity turnover (a measure of trading activity).<sup>11</sup> This financial variable is available only for the 50-country sample. The results in Panel B of Table 7 show that the coefficient on the turnover variable is positive and significant. This implies a positive relation between stock market development and economic growth, consistent with previous studies.

In both samples, the liberalization effect is somewhat diminished. However, the liberalization coefficient continues to be significantly different from zero. Clearly, equity market liberalization is more than just another aspect of more general financial development, not deserving of special attention.

#### 4.3. *Legal environment*

In a series of influential papers, La Porta et al. (1997, 1998, 1999, 2000) and Djankov et al. (2003) stress the cross-country differences in the legal environment

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<sup>9</sup>We also considered a fourth policy variable, the size of the country's fiscal deficit. Unfortunately, these data were available only for the smallest of our samples. Edwards (1987) argues that financial openness can be beneficial only when countries first have government finances under control. The coefficient on the deficit variable is significant and negatively influences growth prospects. The coefficient on the equity market liberalization remains significantly different from zero.

<sup>10</sup>Jayaratne and Strahan (1996) find that banking deregulation led to higher regional economic growth within the United States whereas Beck et al. (2000) and Levine et al. (2000) measure the growth effect of the exogenous component of banking development.

<sup>11</sup>We do not consider market capitalization to GDP because this variable is hard to interpret. Having a measure of overall equity values in the numerator, it could simply be a forward-looking indicator of future growth or it could be related to the cost of capital. In addition, Rousseau and Wachtel (2000) find market capitalization to GDP to have a weaker impact than value traded in their cross-country analysis of growth.



(either laws or their enforcement) in general and the legal environment regarding investor protection in particular. Reforms improving investor protection could promote financial development (see [La Porta et al. \(1997\)](#) for a direct test) and hence growth. The recent literature on financing constraints suggests a concrete channel through which this could occur. If capital markets are imperfect, external capital is likely to be more costly than internal capital and a shortage of internal capital would reduce investment below first-best levels. Recent empirical work shows that financial development (see [Rajan and Zingales, 1998](#); [Love, 2003](#)) and the liberalization of the banking sector ([Laeven, 2003](#)) could help relax these financing constraints and increase investment. Financial liberalization would make available more foreign capital, but this does not necessarily resolve the market imperfections that lead to a wedge between the internal and external finance cost of capital. Reforms improving corporate governance and reducing the ability of insiders to extract resources from the firm could directly affect the external cost of capital. More generally, a better legal environment could increase steady state GDP. While the presence of foreign investors could promote financial reforms that help reduce financing constraints and the external finance cost of capital premium, reforms improving the legal environment and investor protection perhaps are the real source of the improved growth prospects.

To examine this issue, we follow [La Porta et al. \(1997\)](#) and use a variable that measures the rule of law in general, which is the rule of law subcomponent of the International Country Risk Guide (ICRG) political risk rating. [Table 2](#) indicates that this variable significantly increases post-liberalization. When we add this measure to the growth regression (see Panel C of [Table 7](#)), the growth effect of equity market liberalization slightly increases for Sample I, but decreases 18 basis points in Sample II. In Sample II, law and order generates small but significant growth effects.

Second, we use the insider trading law dummies created by [Bhattacharya and Daouk \(2002\)](#). They argue that the enforcement of insider trading laws makes developing markets more attractive to international investors. They present evidence that associates insider trading laws with a lower cost of capital in a sample of 95 countries. [Bhattacharya and Daouk](#) distinguish between the enactment of insider trading laws and the enforcement of these laws.

Insider trading laws, and especially their enforcement, could be closely related to the corporate governance problems that lead to the external finance premium. Enforcement of insider trading laws could be a good instrument for reduced external financing constraints. It is possible that the enactment of such rules are particularly valued and perhaps demanded by foreigners before they risk investing in emerging markets. The enforcement of insider trading laws could proxy for a more general state of law enforcement that could be correlated with policy reforms introducing equity market liberalization.

Panel D of [Table 7](#) examines the relation between the enactment and enforcement of insider trading laws and economic growth. The existence of these laws has no significant relation to economic growth, as evidenced in the first set of results. While the coefficients on insider trading prosecutions are also not significantly different from zero, the coefficients are positive in both samples. Importantly, the equity

market liberalization remains significantly different from zero in the presence of the insider trading variable and drops by at most 11 basis points.<sup>12</sup>

#### 4.4. *Banking crises*

A major crisis of an economic nature could induce a plethora of reforms, one of which being an equity market liberalization.<sup>13</sup> If this is the case, a crisis indicator could be a useful control for the policy simultaneity problem. [Caprio and Klingebiel \(2001\)](#) provide the necessary information to create such an indicator. They survey and date banking crises for about 90 countries, differentiating between systemic and nonsystemic banking crises. A banking crisis can bias our regressions in two distinct ways.

First, if policy reforms are clustered right after a crisis, the presence of a crisis negatively affects growth just before the reforms take place – biasing the growth effect upward. We use a contemporaneous banking crisis dummy to control for this effect. Panel E of [Table 7](#) shows that, in both samples and across the two definitions, growth is significantly lower during crisis times. However, the introduction of the crisis dummy does not affect the magnitude of the equity market liberalization effect.

Second, we control for policy simultaneity by adding a dummy variable for the post-crisis period. The variable takes the value of one in the last year of the crisis and each year afterward. In most samples, there is significantly higher economic growth in the post crisis period (either systemic or systemic/borderline). This is particularly true for the broader definition of crisis. The equity market liberalization effect, however, is largely unaffected by the inclusion of the post-banking crisis variable.

Intuition would suggest that some of the increment to economic growth resulting from an equity market liberalization could be attributed to simultaneous policy reforms. While the incremental growth resulting from a liberalization is smaller in the presence of proxies for reforms, they do not subsume the equity market liberalization effect.

### 5. Why do countries respond differently to liberalizations?

Equity market liberalization, or the more general reforms it could proxy for, likely does not have the same impact in every country. The growth effect should depend on two factors: how much additional investment the reforms generate (e.g., because the cost of capital goes down) and the efficiency of new investments. Countries with a relatively high physical and human capital stock, relatively efficient financial markets, good legal institutions, and so on, might see highly efficient investment and

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<sup>12</sup>[Bhattacharya and Daouk \(2002\)](#) examine the differential impact of insider trading laws and financial liberalizations on the cost of capital. While they find that both factors are important, the liberalization effect is more prominent.

<sup>13</sup>For example, [Drazen and Easterly \(2001\)](#) find that reforms are more likely to occur when inflation and black market premiums are at extreme values. [Kaminsky and Reinhart \(1999\)](#) examine the interrelation between banking and currency crises and financial liberalizations.

a large growth response. From a broad historical perspective, [Acemoglu et al. \(2003\)](#) argue that the quality of political institutions played an important role in how European countries took advantage of Atlantic trade and were propelled to higher growth. But one could also make the case that countries with relatively bad institutions, an inefficient legal system, and serious corporate governance problems could experience the largest drop in the cost of capital and generate larger investment increases. Overall, the signs of interaction effects between liberalization and domestic factors are *ex ante* unclear.

First, we provide an exploratory analysis of what differentiates the liberalization effects across countries. Next, we follow [La Porta et al. \(1997, 1998, 1999, 2000\)](#) and consider institutional factors that measure the quality of the legal environment both overall and specifically for equity investors.

### 5.1. Financial development

We explore the differences across countries in the equity market liberalization effect by breaking up the indicator variable into three pieces:

$$y_{i,t+k,t} = \beta Q_{i,1980} + \gamma' \mathbf{X}_{i,t} + \alpha \text{LibFull}_{i,t} + \alpha_L \text{LibLow}_{i,t} + \alpha_H \text{LibHigh}_{i,t} + \delta \text{Char}_{i,t} + \varepsilon_{i,t+k,k}, \quad (5)$$

where  $\text{LibFull}_{i,t}$  represents an indicator for countries that are fully liberalized throughout our sample;  $\text{LibLow}_{i,t}$  denotes the countries that liberalize but have a characteristic, such as financial development, that falls below the median of the liberalizing countries; and  $\text{LibHigh}_{i,t}$  is the analogous definition for countries with a higher than median value of the characteristic. The regression also includes the own-effect of the characteristic, which is denoted by  $\text{Char}_{i,t}$ . We report the coefficients on the high and low characteristic indicators as well as a Wald test of whether the coefficients are significantly different. We also report the coefficient on the own effect.<sup>14</sup>

[Table 2](#) suggests that financial development indicators substantially improve post equity market liberalizations. [Table 8](#) shows that countries with a higher than median private credit to GDP ratio experience significantly higher growth after liberalization (1.05% for higher than average private credit to GDP and 0.48% for low level of private credit to GDP). The results suggest that a strong banking system provides the foundation whereby a country can have a larger increment to growth following an equity market liberalization. [Table 8](#) shows similar results for our proxy for the development of equity markets: turnover. If a country has less than average turnover, then the effect of an equity market liberalization is a modest 0.17%. Countries with more than median turnover experience an average 0.94% boost in growth.

<sup>14</sup>We also estimate, but do not report, a more complex specification whereby the characteristics are interacted with the liberalization variables. Given that the results are similar, we elect to report the more intuitive analysis.

Table 8

Why does the growth effect from liberalizations differ across countries? For each interaction variable, we separately conduct regressions that have the five-year average growth rate of real per capita gross domestic product (GDP) as the dependent variable. We include in the regressions the same control variables as presented in Table 4. We also separate the liberalization effect for fully liberalized and liberalizing countries. For liberalizing countries, we estimate interaction effects with the financial development, legal, and investment condition variables. We report the associated impact on GDP growth for a liberalizing country for a low level (below the median of the associated interaction variable for liberalizing countries) and for a liberalizing country at a high level (above the median of the associated interaction variable for liberalizing countries).

We provide the significance of a Wald test, for which the null hypothesis is that the high-low effects are equivalent. We also report the statistical significance of the interaction coefficient; statistical significance is denoted by a \* for 10%, \*\* for 5%, and \*\*\* for 1%. Significance levels are based on standard errors that correct for cross-sectional heteroskedasticity and account for the overlapping nature of the data.

The financial development variables are the ratio of private credit to GDP and equity market turnover. The legal environment variables are legal origin (English, French, or other), judicial efficiency, and the combined speed of the process to resolve a bounced check or tenant eviction (longer duration implies a lower speed). The International Country Risk Guide (ICRG) political risk quality of institutions subcomponent is the sum of the following ICRG subcomponents: corruption, law and order, and bureaucratic quality, detailed in Table 1. For all interaction indices, larger values denote improvements. ICRGE is the ICRG economic risk indicator. The investment conditions variables are a measure of economic risk, the investment profile, anti-director (minority shareholders) rights, creditor rights, and accounting standards. The number of countries for which the interaction variable is available is also provided. Finally, some of the variables are available as time series, while others are only available in the cross section; we denote this in the time-series available column.

Impact on growth resulting from liberalization	Fully liberalized	From low level of variable	From high level of variable	Direct effect of interaction variable	Number of countries	Time-series available
Financial development						
Private credit	0.0084**	0.0048	0.0105***	0.0116**	95	Yes
Turnover	0.0134***	0.0017	0.0094***	0.0152***	50	Yes
Legal environment						
French versus English law	0.0072**	0.0068	0.0124**		95	No
Other versus English law	0.0072**	0.0097	0.0124		95	No
Judicial efficiency	0.0105**	0.0069	0.0099	0.0057	47	No
Speed of process (combined)	0.0065	0.0029	0.0084	-0.0002	69	No
Quality of institutions						
ICRGP quality of institutions	0.0098**	0.0045	0.0129**	-0.0003	75	Yes
Investment conditions or protection						
ICRGE	0.0049	0.0071	0.0075	0.0696***	75	Yes
Investment profile	0.0060	0.0019	0.0085***	0.0210***	75	Yes
Anti-director rights	0.0117**	0.0018	0.0089**	0.0084***	47	No
Creditor rights	0.0102**	0.0035	0.0089	0.0190***	45	No
Accounting standards	0.0094**	0.0004	0.0110***	0.0058	39	No

The financial development results provide the following two insights. First, equity market liberalization adds something over and above the impact of a change in a variable that proxies for financial development (Table 7). Second, the level of financial development matters. Liberalizations have a greater effect on economic growth if the country starts with above average financial development (Table 8).

### 5.2. *Legal, investment and institutional environment*

We look at a number of variables that proxy for the legal environment. We start with the classification of legal systems based on their origins, in La Porta et al. (1997): English, French, and other. They argue that the type of legal regime is a good proxy for the degree of investor protection. We use a measure of judicial efficiency from La Porta et al. (1998), which is based on Business International Corporation's assessment of the "efficiency and integrity of the legal environment as it affects business, particular foreign firms." We also consider the Djankov et al. (2003) measure of the duration of the legal process, both for collection of bad checks and tenant eviction. They argue that this measure is a good instrument for judicial formalism, which is inversely related to court quality. One disadvantage of these variables is that they are purely cross-sectional. Liberalization and the presence of foreign investors might affect the legal system. Alternatively, foreign investors could be reluctant to invest in countries with poorly developed legal systems. We find some evidence in favor of the latter interpretation in that all the interaction effects are positive.

For example, according to the results in Table 8 the growth impact of a liberalization is significantly greater for countries with English versus French legal origins (1.24% versus 0.68%). Although English legal origins are associated with higher growth than other legal origins, the difference is not statistically significant. A higher growth effect is associated with countries with a speedier judicial processes (0.84% for speedy and 0.29% for slow judicial processes), but the difference is not significant (the  $P$ -value is 0.14).

The legal environment is only one aspect of the quality of institutions. Acemoglu et al. (2002) argue that an institutional environment encouraging investment is more important than geographic factors in explaining economic development. To investigate the role of institutions, we construct a quality of institutions measure using three sub-components of the ICRG political risk rating (see Table 1). Our results support Acemoglu, Johnson, and Robinson's thesis. The growth prospects from a liberalization are almost three times higher for countries with a higher than median level of the quality of institutions index (1.29% versus 0.45%).

Finally, we examine the state of the investment environment. First, using the ICRG economic risk rating (which includes current level of GDP per capita, inflation, and current account and budget balances), we find that the current state of the economy has an insignificant impact on the heterogeneity of the growth effect. Second, we investigate the investment profile subcategory in the ICRG political risk ratings (which includes contract viability, profit repatriation, and payment delays). We find a highly significant difference when sorting by this characteristic. Countries

with better than average investment profiles experience a 0.85% increment in growth whereas a lower than average profile shows only a 0.19% increase.

We also use, following La Porta et al. (1997), direct proxies for investor protection: anti-director rights, creditor rights and accounting standards. Countries with better shareholder rights or creditor rights or accounting standards experience higher economic growth. However, the effect for creditor rights is not significant at conventional levels. Some of these effects are striking. For example, the growth increment for countries with higher than average-rated accounting standards is 1.1%; it is only 0.04% for countries with below average accounting standards.

Table 8 also includes information on the own effect of each characteristic. Both of the financial development indicators have a positive effect in the regression, which is not surprising given the results in Table 7. The own effect for the speed of the judicial process is not significant at conventional significance levels. The current state of the economy has a strongly significant own effect along with the investment profile. Finally, all three of the investor protection variables have positive own effects. However, the accounting standards effect is not significantly different from zero.

Our analysis of heterogeneity of the growth effect has a simple message. First, not all countries experience the same increment to growth after equity market liberalizations. Second, the countries that benefit the most in terms of growth are those with higher than average financial development, English instead of French or other legal origins, good institutions, a favorable investment profile for foreign direct and portfolio investors, and higher than average investor protection.

## 6. Conclusions

Although substantial research has been conducted on the relation between financial development and economic growth, both the finance and development literature lacks a comprehensive analysis of the effects of the equity market liberalization process on economic growth.

Our research demonstrates that equity market liberalization (allowing foreign investors to transact in local securities and vice versa) did increase economic growth. We augment the standard set of variables used in economic growth research with an indicator variable for equity market liberalization. We find that equity market liberalization leads to an approximate 1% increase in annual real per capita GDP growth and find this increase to be statistically significant. This result is robust to a wide variety of experiments, including an alternative set of liberalization dates, different groupings of countries, regional indicator variables, business cycle effects, different weighting matrices for the calculation of standard errors, and four different time-horizons for measuring economic growth.

The approximately 1% increment in real growth following an equity market liberalization is surprisingly large. It is reasonable to expect that equity market

liberalizations are intertwined with both macroeconomic reforms and financial development. Our evidence to some degree supports this point of view. Importantly, after controlling for either macro-reforms, financial development, banking crises, legal reforms, or the ability of a country to enforce its laws, we still find a statistically significant impact on economic growth from equity market liberalizations.

Most of our specifications, by construction, force a common coefficient relating liberalizations to growth in every country. It makes sense that there are country-specific deviations from the average. It is of great interest to investigate what might make a country have a greater (or lesser) response to a financial liberalization. In his book on trade openness, [Rodrik \(1999\)](#) argues that openness perhaps is not suitable for all countries. Likewise financial liberalization perhaps does not bring the anticipated benefits depending on the strength of the domestic institutions and other factors. Whereas, in recent work, [Edwards \(2001\)](#) and [Quinn and Toyoda \(2003\)](#) suggest that the benefits of capital account liberalization are restricted to more developed countries, we do not find the growth effect to depend positively on development levels. We do find that countries that are further along in terms of financial development experience a larger than average boost from equity market liberalization. In addition, countries with better legal systems, good institutions, favorable conditions for foreign investment, and investor protection generate larger growth effects.

Although our regressions are predictive, they reveal association not causality. While our analysis describes a number of plausible channels through which the liberalization effect could have occurred, the answer to the question “Does” (not “Did”) financial liberalization affect economic growth? remains difficult to answer definitively. Our broad cross-country growth results appear consistent with scattered micro-evidence and event studies. [Levine and Zervos \(1998b\)](#) find that stock markets become more liquid following stock market liberalizations in a study of 16 countries. [Karolyi \(1998\)](#) surveys a rich ADR literature, which shows that ADRs, which can be viewed as investment liberalizations, lead to reduced costs of capital. [Chari and Henry \(2004\)](#) show that individual firms experience reductions in the costs of capital post-equity market liberalization. [Lins et al. \(2005\)](#) show that firms from emerging markets listing in the United States are able to relax financing constraints. [Galindo et al. \(2001\)](#) show that financial liberalization improves the efficiency of capital allocation for firms in 12 developing countries. [Gupta and Yuan \(2003\)](#) show that industries depending more on external finance experience significantly higher growth following liberalization and grow faster through the creation of new plants (instead of investing in existing ones).

Finally, we measure an average growth effect. There are potential costs. For example, the distribution of the welfare gain is an important social issue. [Das and Mohapatra \(2003\)](#) show that the income share of the highest quintile rises at the cost of the middle income quintiles post liberalization. Many argue that the cost of financial liberalization is increased economic growth volatility. However, the empirical evidence in [Bekaert et al. \(2004a\)](#) casts doubt on this view.

## Appendix A

Dating financial liberalization. The Official Liberalization dates, date of the first American Depository Receipt (ADR) issuance, and first country fund are based on [Bekaert and Harvey \(2000\)](#), augmented to include ten additional emerging markets, plus Iceland, Japan, Malta, New Zealand, and Spain. The ADR announcement dates are from [Miller \(1999\)](#). For South Africa, the first ADR introduction date is associated with the post-apartheid period. We ignore many ADRs from the early 1980s. All other countries are considered fully liberalized (industrialized) with a \* or fully segmented (less developed) with no entry from 1980 to 1997. Liberalization Intensity is the ratio of International Finance Corporation (IFC) investable to global market capitalization. The numbers presented here are time-series averages for each country. International Monetary Fund (IMF) and Quinn capital account openness measures are discussed in [Table 1](#). The numbers presented here for the Quinn data are time-series averages for each country.

Country	Official Liberalization	First ADR	First country fund	Liberalization Intensity (average)	IMF capital account openness	Quinn capital account openness (average)	Reason for Official Liberalization dating
Algeria				0.000		0.132	
Argentina	1989	1991	1991	0.508	1993–	0.361	Free repatriation of capital and remittance of dividends and capital gains (November).
Australia	*			1.000	*	0.694	
Austria	*			1.000	1993–	0.813	
Bangladesh	1991			0.000			Purchases of Bangladesh shares and securities by nonresidents, including nonresident Bangladeshis, in stock exchange in Bangladesh were allowed, subject to meeting procedural requirements (June).
Belgium	*			1.000	*	0.847	
Barbados				0.000		0.306	
Benin				0.000			
Botswana	1990			0.000		0.632	
Brazil	1991	1992	1992	0.315		0.382	Foreign investment law changed. Resolution 1832 Annex IV stipulates that foreign institutions can now own up to 49 of voting stock and 100% of nonvoting stock. Economy ministers approved rules allowing direct foreign investments; 15% tax on distributed earnings and dividends but no tax on capital gains. Foreign investment capital must remain in country for six years as opposed to 12 years under previous law. Bank debt restructuring agreement (May).
Burkina Faso				0.000			
Cameroon				0.000			
Canada	*			1.000	*	0.910	



Central African Republic				0.000			
Chad				0.000			
Chile	1992	1990	1989	0.195		0.382	Liberalization of foreign investment, reducing the minimum holding period and tax on investment income(January).
Colombia	1991	1992	1992	0.306		0.403	Foreigners have the same rights as domestic investors (January).
Congo, Republic of				0.000		0.250	
Costa Rica				0.000	1980–1981, 1995–	0.514	
Cote d’Ivoire	1995			0.000		0.278	National Assembly approved a new Ivoirian Investment Code. For all practical purposes, there are no significant limits on foreign investment (or difference in the treatment of foreign and national investors) either in terms of levels of foreign ownership or sector of investment.
Denmark	*			1.000	1988–	0.889	
Dominican Republic				0.000		0.410	
Ecuador	1994	1994		0.000			1980–1985,1988–1992, 1995–
0.604	IFC frontier market as of 1995.						
Egypt	1992	1996		0.000		0.403	Capital Market Law 95 grants foreign investors full access to capital markets. No restrictions are placed on foreign investment in the stock exchange.
El Salvador				0.000	1996–	0.292	
Fiji				0.000		0.229	
Finland	*			1.000	1991–	0.715	
France	*			1.000	1990–	0.785	
Gabon				0.000		0.500	
Gambia				0.000	1991–	0.653	
Germany	*			1.000	*	0.993	
Ghana	1993	1995		0.000		0.361	Nonresidents were allowed to deal in securities listed on the Ghana Stock Exchange, subject to a 10% limit for an individual and 14% limit for total holdings by nonresidents in any one listed securities (June).

## Appendix A (continued)

Country	Official Liberalization	First ADR	First country fund	Liberalization Intensity (average)	IMF capital account openness	Quinn capital account openness (average)	Reason for Official Liberalization dating
Greece	1987	1988	1988	0.502	1986–	0.674	Liberalization of currency controls allowed foreigners to participate in the equity market and to repatriate their capital gains.
Guatemala				0.000	1989–	0.833	
Guyana				0.000			
Haiti				0.000		0.278	
Honduras				0.000	1993–1995	0.563	
Iceland	1991			0.389		0.285	First shares trade on the Iceland Stock Exchange.
India	1992	1992	1986	0.079		0.278	Government announces that foreign portfolio investors will be able to invest directly in listed Indian securities (September).
Indonesia	1989	1991	1989	0.228	1980–1995	0.632	Minister of finance allows foreigners to purchase up to 49% of all companies listing shares on the domestic exchange excluding financial firms (September).
Iran				0.000		0.375	
Ireland	*			1.000	1992–	0.813	
Israel	1993	1987	1992	0.000	1996–	0.438	Nonresidents allowed to deposit into nonresident accounts all incomes receive from Israeli securities and real estate even if these were purchased from sources other than nonresident accounts (November).
Italy	*			1.000	1990–	0.868	
Jamaica	1991	1993		0.000	1996–	0.396	All inward and outward capital transfers were permitted, except that financial institutions must match their Jamaica dollar liabilities to their clients with Jamaica dollar assets (September).
Japan	1983	*		0.944	*	0.667	Finance Ministry announces easing restrictions on investments by stocks by foreigners (September).
Jordan	1995	1997		0.051		0.382	Foreign investment bylaws passed allowing foreign investors to purchase shares without government approval (December).

Kenya	1995			0.000	1996–	0.278	Restrictions on investment by foreigners in shares and government securities were removed. The Capital Market Authority Act was amended to allow foreign equity participation of up to 40% of listed companies, while individuals are allowed to own up to 5% of listed companies (January).
Korea, Republic of	1992	1990	1984	0.067		0.479	Partial opening of the stock market to foreigners. Foreigners can now own up to 10% of domestically listed firms. Five hundred sixty-five foreign investors registered with the Securities Supervisory Board (January).
Kuwait				0.000			
Lesotho				0.000			
Madagascar				0.000			
Malawi				0.000			
Malaysia	1988	1992	1987	0.432	1980–1995	0.597	Budget calls for liberalization of foreign ownership policies to attract more foreign investors (October).
Mali				0.000			
Malta	1992	1998		0.333			Malta Stock Exchange was established by an act of Parliament in 1990.
Mauritius	1994			0.000	1996–	0.535	The stock market was opened to foreign investors following the lifting of exchange control. Foreign investors do not need approval to trade shares, unless investment is for the purpose of legal or management control of a Mauritian company or for the holding of more than 15% in a sugar company. Foreign investors benefit from numerous incentives such as revenue on sale of shares can be freely repatriated and dividends and capital gains are tax-free.
Mexico	1989	1989	1981	0.462	1980–1981	0.479	Restrictions on foreign capital participation in new direct foreign investments were liberalized substantially.
Morocco	1988	1996		0.000		0.132	The repatriation of capital and income from the investments into Morocco was granted (June).
Nepal				0.000		0.375	
Netherlands	*			1.000	*	0.958	
New Zealand	1987	1983		0.611	1983–	0.826	Major reforms initiated in 1986.
Nicaragua				0.000	1996–	0.382	
Niger				0.000	1995–		

## Appendix A (continued)

Country	Official Liberalization	First ADR	First country fund	Liberalization Intensity (average)	IMF capital account openness	Quinn capital account openness (average)	Reason for Official Liberalization dating
Nigeria	1995	1998		0.000		0.389	Nigerian market was open to foreign portfolio investment.
Norway Oman	1999			1.000 0.000	1995– *	0.778	A stand-alone global index for Oman was added to the Standard & Poor's Emerging Market Indices, which has a base date of December 31, 1998. S & P tracks both global and investable indices for Oman. No restriction on foreigners or nonresident Pakistanis purchasing shares of a listed company or subscribing to public offerings of shares subject to some approvals (November).
Pakistan	1991	1994	1991	0.206		0.319	
Paraguay				0.000	1982–1983, 1996–	0.438	
Peru	1992	1994		0.300	1980–1983, 1993–	0.271	A Decree on the Private Sector Investment Guarantee Regime was enacted, under which the rights and guarantees that are accorded to domestic investors would be extended to foreign investors (December). Foreign Investment Act is signed into law. The Act removes, over a period of three years, all restrictions on foreign investments (June). All restrictions on foreign investment removed except for arms sector investments (July).
Philippines	1991	1991	1987	0.292		0.278	
Portugal	1986	1990	1987	0.519	1993–	0.646	
Rwanda				0.000		0.271	
Saudi Arabia	1999		1997	0.000	*	0.750	The Ministry of Finance announced the groundbreaking decision to allow non-Saudi investors to own shares in the local market through mutual funds (October).
Senegal				0.000		0.507	
Sierra Leone				0.000		0.264	
Singapore	*			1.000	*	0.972	

South Africa	1996	1994	1994	0.333		0.354	Restrictions on foreign membership in the Johannesburg Stock Exchange lifted.
Spain	1985	1988		0.722	1994–	0.681	Joins the European Economic Community, which attracts an influx of foreign capital.
Sri Lanka	1991	1994		0.333		0.146	Companies incorporated abroad were permitted to invest in securities traded at the Colombo Stock Exchange, subject to the same terms and conditions as those applicable to such investments by approved national funds, approved regional funds, and nonresident individuals (May).
Swaziland				0.000			
Sweden	*			1.000	1993–	0.806	
Switzerland	*			1.000	*	1.000	
Syria				0.000		0.521	
Thailand	1987	1991	1985	0.180		0.375	Inauguration of the Alien Board on Thailand's Stock Exchange. The Alien Board allows foreigners to trade stocks of those companies that have reached their foreign investment limits (September).
Togo				0.000			
Trinidad and Tobago	1997			0.000	1994–	0.285	Under the Companies Ordinance and the Foreign Investment Act, a foreign investor could purchase shares in a local corporation. However, foreign investors currently must obtain a license before they can legally acquire more than 30% of a publicly held company (April).
Tunisia	1995	1998		0.000		0.382	Inward portfolio investment was partially liberalized (June).
Turkey	1989	1990	1989	0.675		0.333	Foreign investors were permitted to trade in listed securities with no restrictions at all and pay no withholding or capital gains tax provided they are registered with the Capital Markets Board and the Treasury (August).
United Kingdom	*			1.000	*	1.000	
United States	*			1.000	*	1.000	
Uruguay				0.000	1980–1992, 1996–	0.896	
Venezuela	1990	1991		0.297	1980–1983, 1996–	0.639	Decree 727 opened foreign direct investment for all stocks except bank stocks (January).
Zambia				0.000	1996–		
Zimbabwe	1993			0.058			Zimbabwe Stock Exchange was open to foreign portfolio investment subject to certain conditions (June).

**Appendix B**

Monte Carlo analysis of the liberalization effect. This table presents evidence from a Monte Carlo procedure (with one thousand replications) that mimics the generalized method of moments (GMM) estimation presented in Table 2, for our largest sample of 95 countries. The dependent variable is the five-year average growth rate of real per capita gross domestic product. The independent variables are the ones used in Table 2, but the liberalization variable is randomized using the procedure documented in the text. The weighting matrix we employ in our GMM estimation provides a correction for cross-sectional heteroskedasticity. We present the 2.5, 5.0, 50, 95, and 97.5 percentile for the estimated coefficients and *t*-statistics on the liberalization coefficient.

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	Randomized liberalization indicator	
	Coefficient	<i>t</i> -statistic
Mean	0.0000	0.03
Median	0.0002	0.16
2.50%	-0.0059	-3.23
5.00%	-0.0052	-2.95
95.00%	0.0048	2.94
97.50%	0.0057	3.25

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## Appendix C

Summary Statistics. All variables and data sources are in Table 1. Under the category legal origin, F denotes French, AS denotes Anglo-Saxon, and O denotes other.

Country	Real GDP growth	Initial GDP per capita	Gov/GDP	Secondary school enrollment	Population growth	Life expectancy	Growth opportunities	Trade/GDP	Inflation	Black market premium	Government deficit	Private credit/GDP	Equity turnover	ICRG law & order	Insider law	Insider prosecution	Legal origin	Judicial efficiency	Speed of process checks + eviction	Economic risk	Investment profile	Anti-director rights	Creditor rights	Accounting standards
Algeria	-0.87%	\$1,433	15.9%	53.9%	2.7%	64.7	0.00%	48.4%	17.1%	133.2%							F							
Argentina	0.44	8,132	6.58	67.82	1.41	71.1	0.00	15.60	437.08	21.93	2.35	22.03	29.07	59.3	1991	1995	F	60	740	44.4	42.6	66.7	25	45
Australia	1.65	14,074	17.72	92.88	1.36	76.4	0.06	35.71	5.29	0.00	1.13	71.49	28.88	100.0	1991	1996	AS	100	363	75.0	56.0	66.7	25	75
Austria	1.87	18,852	19.33	100.11	0.37	74.9	-0.72	75.86	3.26	0.00	4.75	87.24	46.50	100.0	1993		O	95	981	80.6	70.4	33.3	75	54
Bangladesh	2.35	210	3.33	18.51	2.11	52.8	-0.50	21.14	7.06	70.70		14.46	4.48	25.9	1995	1996	AS		660	59.2	39.4			
Belgium	1.65	19,093	15.80	112.80	0.20	75.2	-0.72	130.52	3.80	0.00	7.37	42.31	13.10	99.1	1987		F	95	240	76.6	66.7	0.0	50	61
Barbados	0.46	4,992	18.52	87.10	0.40	74.2	-1.06	110.02	4.81	8.14		43.31			1990	1994	AS		203					
Benin	0.75	355	11.79	16.11	3.02	50.9	-0.28	62.66	5.60	2.11		20.51					F							
Botswana	4.93	1,049	24.16	38.62	3.12	57.0	-0.44	99.36	11.68	14.68		11.65					AS		140					
Brazil	0.75	3,371	14.04	39.16	1.77	64.6	-0.28	17.66	635.50	29.48	7.19	48.29	50.73	61.1	1976	1978	F	58	300	46.7	44.9	50.0	25	54
Burkina Faso	0.98	193	14.05	5.88	2.40	45.0	0.28	40.51	5.01	2.18		13.58					F							
Cameroon	-1.08	569	10.41	24.75	2.80	53.0	-0.28	47.00	6.22	2.18		21.31		47.2			F			61.1	47.7			
Canada	1.15	14,485	22.28	99.43	1.23	76.7	-0.39	57.74	3.92	0.00	4.26	76.23	33.92	100.0	1966	1976	AS	93	464	78.3	66.2	83.3	25	74
Central African Republic	-1.58	476	14.82	12.64	2.30	47.0	-2.28	47.95	7.69	2.07		7.86					F							
Chad	0.81	236	10.81	7.38	2.74	45.0	-0.83	45.27	5.51	2.18		9.90					F							
Chile	3.99	2,112	11.44	66.85	1.59	72.5	1.11	55.60	16.68	13.44	-0.99	58.66	7.16	70.4	1981	1996	F	73	440	61.6	50.5	83.3	50	52
Colombia	1.59	1,396	11.55	49.62	2.02	68.2	-0.39	31.08	24.03	8.76		29.50	9.32	25.0	1990		F	73	1027	59.5	51.9	50.0	0	50
Congo, Republic of	1.03	676	17.42	64.26	2.85	49.7	-0.33	111.33	6.43	1.32		15.96		15.7			F			55.3	31.9			
Costa Rica	0.28	2,248	16.10	43.78	2.48	74.7	0.11	77.46	23.45	37.43		18.53		66.7	1990		F		510	57.7	48.6			
Cote d'Ivoire	-2.37	985	15.58	20.89	3.27	49.6	-0.39	70.04	6.02	2.18		33.07	2.39	58.3			F		280	61.9	53.7			
Denmark	1.84	23,610	26.29	109.74	0.18	74.7	-0.33	68.12	4.52	0.00	1.49	42.13	24.00	100.0	1991	1996	O	100	308	77.7	63.0	33.3	75	62
Dominican Republic	1.61	1,149	6.55	44.54	2.09	67.7	0.39	70.06	19.33	24.85		28.27		54.6			F		425	61.4	40.3			
Ecuador	0.25	1,269	11.18	54.76	2.41	66.7	-0.22	52.60	35.34	22.93		24.96		66.7	1993		F	63	441	50.7	40.7	33.3	100	
Egypt	2.68	475	13.72	66.50	2.30	60.5	-0.50	55.82	12.61	7.55		32.56	8.78	49.1	1992		F	65	434	61.0	46.8	33.3	100	24
El Salvador	-0.44	1,772	12.17	27.81	1.51	62.6	-0.56	52.09	13.43	46.10		29.14		28.7			F		210	58.7	37.5			
Fiji	0.06	2,117	17.66	57.05	1.51	70.3	0.50	105.12	5.71	2.56		30.37					AS							
Finland	1.94	17,482	20.92	110.33	0.42	74.8	-0.11	58.22	5.17	0.00		68.91	20.99	100.0	1989	1993	O	100	360	72.7	68.1	50.0	25	77
France	1.40	18,868	18.97	96.45	0.50	76.1	-0.28	44.52	4.87	0.00	3.13	92.67	36.42	88.0	1967	1975	F	80	407	77.0	63.0	50.0	0	69
Gabon	-0.61	5,622	16.40	42.23	3.02	50.7	-0.28	93.76	7.36	2.18		15.10		40.7			F			74.5	48.6			
Gambia	-0.25	327	19.74	17.95	3.56	46.2	1.17	115.35	10.85	8.70		15.34					AS							
Germany	1.60	28,566	19.64	100.31	0.28	74.5	-0.61	54.08	2.93	0.00	1.54	93.07	88.21	90.7	1994	1995	O	90	485	82.8	67.6	16.7	75	62
Ghana	-0.14	480	10.15	38.58	2.99	56.0	1.83	37.97	39.05	70.54		3.96			1993		AS		340					
Greece	1.18	7,684	13.95	91.12	0.54	76.2	-0.67	41.99	15.89	6.70	10.95	38.76	14.87	65.7	1988	1996	F	70	562	62.5	43.1	33.3	25	55

Guatemala	-0.30%	\$1,381	6.8%	21.8%	2.5%	60.2	0.06%	38.5%	14.4%	17.0%		16.8%		25.9	1996	F		500	60.7	42.6									
Guyana	0.07	800	20.22	75.79	0.66	62.2		155.21	32.84	104.17		30.30				AS													
Haiti	-2.51	521	8.82	19.14	1.96	52.4		39.09	14.68	54.60		13.49				F													
Honduras	-0.35	626	13.38	33.57	3.06	64.7	0.11	67.52	12.54	21.68		30.40		33.3	1988	F		300	55.2	45.8									
Iceland	1.53	17,574	18.92	95.89	1.02	77.7	0.72	69.34	23.10	2.43		42.18		100.0	1989	O		315	65.4	52.3									
India	3.61	192	10.86	40.99	2.00	58.2	-0.33	19.11	8.76	10.52	6.42	28.07	41.83	43.5	1992	1996	AS	80	318	60.9	52.3	83.3	100	57					
Indonesia	4.89	371	9.37	43.00	1.79	59.6	0.11	49.90	10.07	6.13		33.21	26.39	46.3	1991	1996	F	25	450	66.4	56.0	33.3	100						
Iran	-0.43	1,986	14.33	53.98	2.65	64.3	-0.56	30.93	23.41	189.55		30.93		45.4		F				56.8	42.1								
Ireland	4.25	8,245	16.47	102.06	0.46	74.3	0.17	115.84	5.50	0.00	6.01	51.77	51.86	78.7	1990		AS	88	251	76.8	62.5	66.7	25						
Israel	2.08	10,482	32.70	82.81	2.40	75.4	-0.50	87.18	77.25	5.82		64.61	60.22	50.9	1981	1989	AS	100	725	64.4	48.1	50.0	100	64					
Italy	1.73	12,305	16.71	80.47	0.12	76.1	-0.56	43.66	8.90	0.00	10.49	52.66	31.94	86.1	1991	1996	F	68	1275	72.9	60.2	16.7	50	62					
Jamaica	0.01	1,849	15.87	63.70	1.08	72.5	0.78	111.29	23.84	20.26		32.00	8.44	38.9	1993		AS		307	56.1	45.8								
Japan	2.52	22,962	9.53	96.54	0.47	78.3	-0.33	21.34	1.63	0.50	3.19	178.26	45.77	88.9	1988	1990	O	100	423	85.7	72.2	66.7	50	65					
Jordan	0.04	1,002	25.92	52.26	4.16	67.1	-0.83	124.47	5.10	3.77		67.57	14.84	48.1			F	87	284	70.1	49.5	16.7							
Kenya	0.05	310	17.32	23.12	3.25	56.2	0.44	58.89	11.64	18.46		31.42	2.49	58.3	1989		AS	58	510	55.3	50.0	50.0	100						
Korea, Republic of	6.22	2,578	10.54	90.64	1.13	69.3	-0.56	67.58	7.46	1.59	0.70	62.56	105.25	56.5			O	60	378	75.3	64.4	33.3	75	62					
Kuwait	0.60	25,246	29.91	74.49	1.85	73.9	-0.83	100.75	2.00	0.47		65.42		59.3			F		450	82.1	58.8								
Lesotho	2.50	261	21.73	24.68	2.38	56.1	0.61	149.49	11.92	6.54		17.64					AS												
Madagascar	-2.18	369	8.79	22.56	2.73	53.5	-0.78	39.88	19.20	17.65		16.63					F												
Malawi	-0.21	151	17.10	8.29	3.00	44.6	-0.11	57.51	21.69	35.03		13.40		40.7			AS		143	53.1	49.5								
Malaysia	4.15	1,777	14.53	55.11	2.65	69.6	0.72	140.04	3.24	1.04		91.46	33.13	74.1	1973	1996	AS	90	360	78.8	57.4	66.7	100	76					
Mali	-0.34	214	11.81	7.82	2.60	46.0		52.18	6.75	3.12		15.12					F												
Malta	4.06	2,564	18.56	82.04	0.22	75.0	-1.28	176.38	3.43	3.03		69.44			1990		F		1275										
Mauritius	3.52	1,539	12.36	53.38	1.04	68.5	0.83	119.04	9.37	5.22		33.04			1988		F												
Mexico	0.45	2,766	9.54	55.62	1.99	69.3	-0.33	36.56	46.92	8.95	4.54	20.21	52.06	54.6	1975		F	60	463	56.1	56.0	16.7	0	60					
Morocco	1.33	876	16.68	34.90	2.03	62.0	-1.17	55.01	5.95	4.41		31.20	8.26	51.9	1993		F		937	63.1	47.7								
Nepal	1.81	151	8.78	30.22	2.54	52.0	1.67	39.26	10.28	23.44		13.59					AS												
Netherlands	1.62	18,729	15.44	116.95	0.59	76.7	-0.11	103.27	2.20	0.00	3.90	89.93	40.75	100.0	1991		F	100	91	84.1	66.7	33.3	50	64					
New Zealand	1.06	14,487	16.27	91.85	1.06	74.8	0.33	58.85	7.13	0.00		50.51	17.49	100.0	1988		AS	100	140	72.0	65.3	66.7	75	70					
Nicaragua	-0.40	1,040	24.85	41.17	2.79	62.7	0.22	66.23	1615.88	145.55		35.69		36.1			F			28.4	33.8								
Niger	-2.92	315	13.19	5.95	3.31	44.3	-2.78	44.61	5.03	2.24		12.78					F												
Nigeria	-0.95	329	13.55	30.19	2.98	48.5	-0.61	58.79	26.38	80.40		12.34	0.93	28.7	1979		AS	73	607	54.5	44.4	50.0	100	59					
Norway	2.64	18,362	20.14	103.64	0.43	76.7	0.33	73.61	4.97	0.00	0.15	69.00	36.37	100.0	1985	1990	O	100	452	85.2	65.7	66.7	50	74					
Oman	2.73	2,945	30.21	39.09	4.28	66.6	-0.33	88.54	1.81	1.65		22.61		63.0	1989	1999	F			73.2	58.8								



Pakistan	2.86%	\$271	12.7%	20.3%	2.6%	58.0	-0.17%	35.0%	8.9%	11.0%	27.6%	21.7%	36.1	1995	AS	50	730	63.4	45.4	83.3	100			
Paraguay	0.54	1,254	7.56	32.86	2.90	67.8	0.00	48.31	20.63	30.41	19.09		44.4	1999	F		424	59.1	62.0					
Peru	-0.21	2,822	9.01	64.50	2.04	64.2	0.17	29.93	603.64	28.96	14.28		26.9	1991	1994	F	68	687	50.4	43.5	50.0	0	38	
Philippines	-0.05	947	9.53	70.94	2.45	64.1	0.28	62.22	12.47	6.23	34.60	24.47	32.4	1982		F	48	328	59.4	38.4	50.0	0	65	
Portugal	2.70	6,542	15.59	69.63	0.16	73.4	-0.67	68.49	13.49	5.10	63.99	18.25	86.1	1986		F	55	750	74.3	50.0	50.0	25	36	
Rwanda	-2.10	246	11.83	7.59	2.54	42.4	0.17	31.77	10.43	38.67	7.18					O								
Saudi Arabia	-3.01	9,180	31.02	43.28	4.54	66.3	-0.83	83.78	0.65	1.10	61.59		70.4	1990		AS			74.9	59.3				
Senegal	-0.23	584	15.48	14.60	2.72	48.3	-0.22	66.11	6.28	2.18	29.64		36.1			F		490	61.3	53.2				
Sierra Leone	-3.95	317	11.58	17.49	2.24	35.4	0.78	35.88	50.35	59.54	3.75		49.1			AS			48.0	30.1				
Singapore	5.63	9,045	10.32	65.29	1.86	73.7	0.44	370.31	3.40	1.22	-7.29	98.93	33.84	87.0	1973	1978	AS	100	106	82.2	66.7	66.7	100	78
South Africa	-0.57	3,967	18.19	71.13	2.28	60.5	-0.56	50.83	12.94	1.96	4.80	91.67	6.53	42.6	1989		AS	60	293	69.1	55.6	83.3	75	70
Spain	2.09	10,089	15.36	103.16	0.32	76.5	-0.39	40.97	7.80	2.73	4.79	75.57	38.36	76.9	1994	1998	F	63	330	73.3	66.7	66.7	50	64
Sri Lanka	3.21	365	9.52	67.72	1.38	70.5	-0.17	71.42	11.92	12.74	21.32	5.69	24.1			AS	70	1170	59.3	48.6	50.0	75		
Swaziland	2.11	970	20.53	44.16	3.11	55.2	0.78	160.41	11.40	11.35	21.31					AS		80						
Sweden	1.10	20,712	27.53	101.64	0.36	77.2	0.06	64.72	6.05	0.00	5.75	95.85	33.16	100.0	1971	1990	O	100	350	76.8	62.5	50.0	50	83
Switzerland	0.84	38,763	13.71	97.86	0.61	77.2	-0.22	69.96	3.01	0.00	0.63	150.62	50.59	100.0	1988	1995	O	100	490	86.2	75.5	33.3	25	68
Syria	0.99	784	17.28	51.00	3.17	65.0	-1.83	53.59	13.26	122.72	8.29		47.2			F			54.2	42.1				
Thailand	5.47	845	11.10	35.02	1.57	67.0	-1.00	67.11	5.10	0.23	0.60	82.00	55.42	64.8	1984	1993	AS	33	840	74.4	56.5	33.3	75	64
Togo	-0.93	411	15.20	24.80	2.98	50.2	-1.56	85.85	6.85	2.18	23.39					F								
Trinidad and Tobago	-0.08	3,154	16.12	77.87	1.14	70.2	-0.11	78.68	6.13	27.25	45.32	9.01	66.7	1981		AS		386	65.8	53.2				
Tunisia	1.89	1,309	16.39	43.41	2.19	65.4	-0.94	84.17	7.17	6.44	60.19	6.34	47.2	1994		F		40	64.8	48.1				
Turkey	2.32	1,798	10.25	45.71	2.12	64.7	-0.28	34.07	61.16	5.51	18.47	46.01	54.6	1981	1996	F	40	405	56.4	50.9	33.3	50	51	
United Kingdom	1.76	13,028	21.33	97.75	0.27	75.2	-0.56	53.23	5.86	0.00	3.02	84.54	33.64	85.2	1980	1981	AS	100	216	71.8	63.4	83.3	100	78
United States	1.57	19,688	17.18	96.04	0.96	75.0	-0.33	20.76	4.54	0.00	3.44	94.96	57.92	100.0	1934	1961	AS	100	103	76.8	71.8	83.3	25	71
Uruguay	1.16	4,066	13.61	75.55	0.67	72.0	-0.39	42.67	56.00	9.15	39.63		50.0	1996		F	65	690	62.3	53.7	33.3	50	31	
Venezuela	-1.08	4,225	9.58	30.82	2.46	70.3	-0.06	49.13	34.13	34.42	35.78	12.91	66.7	1998		F	65	720	63.2	44.9	16.7			40
Zambia	-1.73	682	20.40	22.08	2.95	49.5	-0.39	72.61	56.34	58.16	14.59		39.8	1993		AS		299	44.1	41.2				
Zimbabwe	0.98	721	19.09	40.17	2.91	55.7	-0.22	53.42	16.47	39.88	6.83	24.40	7.92	38.9		AS	75	394	51.7	43.1	50.0	100		

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