

# Which Reforms Work and under What Institutional Environment: Evidence from a New Dataset on Structural Reforms\*

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## Abstract

Are structural reforms growth enhancing? Is the effectiveness of reforms constrained by a country's institutional environment or by its distance from the technological frontier? This paper takes a new and comprehensive look at these questions by employing a novel dataset that includes several kinds of real (trade, agriculture and networks) and financial (domestic finance, banking, securities, and capital account) reforms for an extensive list of developed and developing countries, going back as far as the 1960s. The main finding of the paper is twofold. First pass evidence based on growth acceleration episodes and on growth regressions suggest that both real- and financial-sector reforms are positively associated with growth. Second, the positive reform-growth relationship is heterogeneous and influenced by a country's constraints on the authority of the executive power and by its distance from the technological frontier.

**JEL Classification:** O16, O24, O38, O43.

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# 1 Introduction

Over the last few decades many countries have experienced remarkable, and in many cases surprising, progress in their economic performance. This coincided with an unprecedented wave of structural reforms including trade and financial liberalization. Although there are many possible driving forces underlying the recent global economic upsurge,<sup>1</sup> the apparent co-movement between growth and a broad range of structural reforms deserves renewed attention.

Do reforms promote growth? Which reforms really work? Do institutions supersede policies to explain economic performance? Or does the institutional environment play a role on how effective reforms may be? These questions have been fiercely debated among academics and policy makers for a long time with no much progress in arriving to a satisfactory answer.<sup>2</sup> Testimony to how contentious and divisive discussions have been about the success and failure of certain reforms or packages of reforms is a voluminous literature that emerged by advocates and critiques of the “Washington Consensus”, a list of policies originally proposed by John Williamson in 1990.<sup>3</sup>

In this paper we take a comprehensive look at the debate on the reform – growth nexus. We first ask and empirically test whether structural reforms matter for economic growth. We then investigate to what extent “*key variables*” like a country institutional environment or its distance from the technological frontier influence the association between structural reforms and economic growth. In carrying out our empirical analysis we employ a newly constructed dataset that includes information about several kinds of structural reforms in both the real and financial sectors of the economy for both industrialized and developing countries over roughly the past thirty years. Three indices of structural reforms in the real sector of the economy measure, respectively, the reduction of public intervention in the *agricultural market*; the degree of liberalization in the *telecommunication and electricity markets* and the extent of openness to the

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<sup>1</sup>A reasonable concern is that the observed recent growth in resource-rich developing countries is primarily due to hikes in oil and other commodities prices. However, it is still remarkable that growth has been so spectacular in most regions – including sub-Saharan Africa - and countries of the world including non resource-rich countries.

<sup>2</sup>Easterly (2005), for instance, focuses on the association between a large set of economic policies (price distortions, financial development, trade openness and macroeconomic policies) and growth. His baseline growth regression suggests that improvements in these policy dimensions lead to a substantial increase in income per capita growth. However, once the sample is restricted to exclude big outliers any association between policy variables and growth disappears. Rodrik (2005) discusses how policies aimed at promoting economic growth can be highly context specific. Recent literature investigates whether institutions are more relevant than policies to explain country-wide differences in economic performance. Easterly and Levine (2003) ask whether policies such as openness to international trade, inflation and impediments to international transactions matter to explain current differences in income levels. The evidence they provide suggests that macroeconomic policies do not have a big relevance to explain current level of economic development once the impact of the institutions on economic development is taken into account. They argue that bad policies might be “symptoms” of deeper institutional failures. Acemoglu, Johnson, Robinson, and Thaicharoen (2003) reach a similar conclusion. Once the historically determined component of institutions is controlled for, economic policies play a small role to explain economic volatility, crises, and growth. Distortionary policies are likely to be mirroring the existence of weak institutions.

<sup>3</sup>Williamson (2000) originally coined the phrase in 1990 “...to refer to the lowest common denominator of policy advice being addressed by the Washington-based institutions to Latin American countries as of 1989”

*international trade*. The indicators of structural reforms in the financial sector encompass a broader measure of liberalization in the *domestic financial sector* and two more specific sub-indices that refer to the *banking* and *security* markets. A last set of indicators captures the extent of *external capital account* liberalization. The richness of our data - in terms of the sectors of the economy they refer to and of their time and country coverage - is essential to empirically investigate the different hypotheses about the relationship between reforms and growth that have been suggested by recent literature.

Economic theory suggests that structural reforms should remove obstacles to an efficient allocation of resources, thereby increasing average income levels. At the same time, a perennial challenge for policymakers is finding ways to improve economic performance. This is a difficult and complex task, but there is a general agreement that structural reforms - such as reducing rigidities in product and factor markets, liberalizing capital flows, and freeing international trade - are an important part of an overall strategy for raising incomes and sustaining economic growth. Despite the importance of the issue, the analysis of the effects of reforms has been limited because of the lack of consistent historical data on reforms in many non-OECD economies.

While much is still to be learned about the connection between structural reforms and economic performance, several insights emerge from existing research. First, a wide body of empirical evidence documents that trade liberalization raises the level of real income in an economy, as a result of improvements in efficiency.<sup>4</sup> Furthermore, there seems to be a presumption that trade liberalization also raises an economy's long-run growth rate. Sachs and Warner (1995), for instance, construct a composite index of openness to international trade and find that in the period from 1970 to 1989 open economies experienced an average growth 2.45 percentage points higher than closed economies.<sup>5</sup> Dollar and Kraay (2004) use decade – over – decade variations in volume of trade as a proxy for change in trade policy. Openness to international trade appears to sustain higher income growth rates. Nevertheless, empirical research has not established a conclusive relationship between trade liberalization and economic performance (see Berg and Krueger, 2003, for a survey).<sup>6</sup>

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<sup>4</sup>Frankel and Romer (1999) use country geographical characteristics as instruments for trade shares. Their results suggest that a rise of one percentage point in the ratio of trade to GDP increases per capita income by one-half percent. Anderson, Martin, and van Mensbrugghe (2006) estimate that the removal of all trade barriers would raise real income of the world by about US\$ 287 billion in 2015. However, Tokarick (2008) points out that all countries may not benefit as some may face adverse movements in their terms of trade as a result of trade liberalization.

<sup>5</sup>Sachs and Warner (1995) define a country open to international trade if none of the following conditions hold: a) nontariff barriers covering 40% or more of trade; b) average tariff rates of 40% or more; c) a black market exchange rate depreciated by 20% or more relative to the official exchange rate; d) a socialist economic system and e) a state monopoly on major exports. Rodriguez and Rodrik (2000) discuss in depth whether the Sach and Warner' index provide an appropriate measure of openness to international trade.

<sup>6</sup>Rodrik, Subramanian, and Trebbi (2004), for instance, follow Frankel and Romer (1999) and instrument actual trade/GDP shares by using estimated trade/GDP shares constructed on the basis of gravity equations for bilateral trade flows. Settlers' mortality rates from Acemoglu, Johnson and Robinson (2001) are used as an instrument for the quality of institutions. Their core results suggest that institutions are the main determinants of current differences in economic development, while geography and trade do not have relevant explicative power.

A large body of literature suggests that a well-developed financial sector promotes economic growth (Levine, 1997, 2005). However, relatively few studies try to assess the impact of financial sector reforms on economic growth. Bekaert, Harvey, and Lundblad's (2005) main measure of financial liberalization is a dummy variable equal to one for the years when foreign investors can own equities of a particular market. Equity market liberalization increases annual real per capita GDP growth by almost 1 percent. Quinn and Toyoda (2008) provide detailed *de jure* measures of capital account and financial current account openness and document that capital account liberalization is positively associated with growth. Finally, recent empirical work provides evidence that structural reforms improve economic performance in advanced economies. Nicoletti and Scarpetta (2003) use an original dataset on product market regulation in eighteen OECD countries. They find that product market reforms that promote private corporate governance, competition, and privatization raise productivity growth. Evidence on the impact of these kinds of structural reforms in emerging market economies does not exist.

Motivated by this literature, we take a broad look at the association between a wide range of structural reforms and economic growth by relying on two empirical approaches. First, we investigate the relationship between reforms and growth spells, meant as long periods of remarkably sustained or slow growth. Second, we discuss first – pass associations between these novel indicators of structural reforms and economic growth based on panel data analysis that controls for country and time fixed effects.

We then move to an empirical assessment of the extent to which country – wide “*key variables*” - like the broad institutional environment or the distance from the technological frontier –influence the impact of structural reforms on economic performance. Acemoglu, Johnson, Querubin, and Robinson (2008) suggest that the degree politicians are accountable for and constrained in their behaviour might affect the impact of reforms on economic outcomes and might help to explain the heterogeneity of their effects. More specifically, their theoretical analysis predicts that reforms have a less relevant impact on economic outcomes in countries with a high or a low level of constraints on the executive power. In countries that place high constraints on the executive power politicians are highly accountable for and constrained in their action, therefore *de facto* distortionary policies are less likely to be implemented to start with. In such environments *de jure* reforms should have a less relevant impact on economic outcomes. On the other hand, in contexts characterized by weak mechanisms to check politicians' behavior, reforms can be easily *de facto* undermined. Reforms consequently could have a limited and poor impact on economic performance. It is in countries with intermediate levels of constraints on politicians that reforms are more likely to be effective. The institutional environment is not sound enough to make bad economic policies rare, but at the same time is not so weak that *de jure* reforms can be easily undermined by groups detaining political power.

A second line of research builds upon the Schumpeterian growth paradigm (see, for instance, Aghion and Howitt, 2006). It emphasizes that the design and effectiveness of structural policies aimed at fostering economic growth are context – specific and depend on a country’s distance to the technological frontier. To properly assess the impact of structural policies on growth is, therefore, necessary to take into account the existence of non – linear effects that derive from the interactions between policies and a country’s distance from the technological frontier.

The broad coverage of our dataset allows us to shed new light on the hypotheses recently developed in the literature that the relevance of structural reforms for growth might be context – specific and highly heterogeneous.

Our main findings are as follows: First-pass estimations provide evidence that both real and financial sector reforms are positively associated with growth. Among real sector reforms, openness to international trade has a significant positive effect on growth, while the impact of agriculture and networks reforms is not significant. Among financial sector reforms, both domestic financial reform and capital account liberalization significantly raise growth with the effect of the former being larger than the latter. We also show that the positive association we find is heterogeneous across different kinds of reforms and is influenced by the level of a country’s constraint on the executive power and by its distance from the technological frontier.

The paper is organized as follows. Section 2 provides a description of the data used in the empirical analysis with special emphasis on the newly constructed structural reform indices. This section also presents some preliminary evidence on the relationships between the key variables of interest. Section 3 reports and discusses our main results, whereas Section 4 presents extensive robustness checks. Section 5 summarizes our main findings and concludes.

## **2 A First Look at the Data**

This section describes the new measures of structural reforms that we use throughout the paper. Section 2.1 provides an introduction to the indicators of the large variety of structural reforms we consider in our analysis and describes their time patterns both at aggregate and regional level. Section 2.2 takes a first look at the relationship between reforms and different levels of constraints on the executive index as from the POLITY IV dataset.

## 2.1 New data on structural reforms

In our empirical analysis we use novel indicators of structural reforms regarding both the real and the financial sector of the economy. Many indices cover about 30 years and over 90 countries.<sup>7</sup> The key advantage of these measures over those used in previous work is that they have a long time series dimension and comprise a large number of countries, including advanced and developing economies. Appendix 1 and 2 provide, respectively, the complete list of the countries included in the sample and detailed information about the methodology used to construct the different indicators and about their time and country coverage.

The indicators of reforms in the real sector of the economy regard *product market* liberalization and openness to the *international trade*. Two different indices capture the degree of structural reforms undertaken in the product markets. The first one refers to the *agricultural sector*. It measures the extent of public intervention in the market of each country main agricultural export commodity. It includes the presence of export marketing boards and the incidence of administered prices. The second one measures the degree of liberalization in the *telecommunications and electricity* markets, including the extent of competition in the provision of these services and the existence of an independent regulator. Openness to *international trade* is captured along two dimensions. The first one measures average tariff rates; the second one covers restrictions on current account transactions, including payments and receipts on exports and imports of goods and services.<sup>8</sup>

Among the indicators of financial-sector reforms, the index of *domestic financial liberalization* is derived from the database of Abiad, Detragiache and Tressel (2008). It is an average of six sub – indices. Five of them refer to the *banking system* and cover: (i) credit controls, such as subsidized lending and directed credit; (ii) interest rate controls, such as floors or ceilings; (iii) competition restrictions, such as entry barriers and limits on branches; (iv) the degree of state ownership; and (v) the quality of banking supervision and regulation. The sixth dimension relates to the *security markets* and captures the degree of legal restrictions on the development of domestic bonds and equity markets as well as the existence of independent regulators. When investigating the association between reforms in the domestic financial sector and economic growth, we use both the overall index of domestic financial liberalization and the two different sub-indices that relate to the banking and securities sectors.

The extent of *external capital account liberalization* measures a broad set of restrictions on financial transactions for residents and non residents, as well as the use of multiple exchange rates. In the empirical

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<sup>7</sup>For a few reforms (i.e. trade, current account, and agriculture) our data go back to 1960 and cover more than 100 countries.

<sup>8</sup>This index—measuring how compliant a country is with its obligations under the IMF’s Article VIII to free from restrictions the proceeds from international trade in goods and services—captures only some non-tariff barriers to trade. For other non-tariff barriers—such as quotas and subsidies—there is not a sufficiently long time series to be used in the analysis.

analysis we use both this aggregate measure and the two separate indicators of external capital account openness for *resident* and *non resident*. The last two sub indices measure, respectively, the intensity of legal restrictions on residents' versus non residents' ability to move capital in and out the country.

All indicators are rescaled to range between zero and one, with higher values corresponding to greater degree of liberalization. Differences in values of each index across countries and over time provide useful information on the variation in the absolute degree of economic liberalization within each sector. Instead, differences in the value of the indices across sectors do not provide a precise quantitative measure of whether one sector is more liberalized than another because of the different methodology used to construct each index. For instance, a positive difference between the trade index and the financial index does not necessarily mean that trade is more liberalized than the financial sector.

All indices trend upwards over time towards a high degree of liberalization (Figure 1). At a sectorial level, the global liberalization of international trade, capital movements, and the domestic financial sector has been fairly steady and gradual over the last three decades, whereas product market liberalization started only around 1990. There have been no global setbacks in the average degree of liberalization in any sector. Structural reform indicators display significant differences across regions (Figure 2), pointing to imitation and “catch-up” effects.

## 2.2 Structural reforms at different levels of constraints to executive power

Acemoglu, Johnson, Querubin, and Robinson (2008) develop a political economy model where the effectiveness of *de jure* policy reforms crucially depends on the state of existing political institutions. The main theoretical insight is that policy reforms can be expected to have the most relevant effect on distortionary policies in societies characterized by intermediate levels of constraints on the executive. Actually, *de facto* distortionary policies are more likely to be implemented in places with weak institutions where politicians are less constrained in their action and less accountable to voters. On the contrary, whenever checks on politicians' activity are sufficiently strong, there is less room for *de facto* distortionary policies to be produced. Therefore, *de jure* reforms can be expected to have little effect on policies in places where constraints on politicians are so weak that they can be easily undermined or where constraints on politicians are already so strong that policies are unlikely to be distortionary to start with. The evidence relative to the central bank independence they provide in the paper is consistent with this theoretical framework. Central Bank independence appears to be more effective in reducing inflation in countries with an intermediate level of constraints on the executive, while it generates no or smaller effect in countries with low or high constraints.

In line with this framework, in the empirical section of this paper we investigate whether other kinds of

reforms have heterogeneous impacts on economic outcomes - namely per capita income growth - depending on country-wide differences in institutional environments. Specifically, we check whether the positive relationship between structural reforms and growth is stronger in countries with intermediate levels of institutional quality.

As in Acemoglu, Johnson, Querubin, and Robinson (2008), we use the index of constraints on the executive from the POLITY IV dataset to measure the degree of political accountability in different countries. This variable measures to what extent institutional constraints limit the executive's decision-making power. It takes values between 1 - to denote contexts with no regular limitations on the executive's power - and 7 - to describe countries where political bodies such as legislatures have equal or even larger authority than the executive. We then compute the sample mean of our variable of interest. Countries above, within and below one-standard deviation from the sample mean are assigned, respectively, to the categories of high, middle, and low constraints on the executive.

Panels in Figure 3 depict the evolution over time of our main reform indices for countries grouped according to the three categories of high, medium, and low constraints on the executive. The six measures of liberalization we consider (trade, current account, network, agriculture, capital account, and domestic finance) show an overall upward trend over time in countries characterized by high, medium, and low constraints on executive. This suggests a general tendency toward greater liberalization, the only less clear-cut cases being current and capital account liberalization in countries with low constraints on the executive. Moreover, countries with better institutions generally have more liberalized economies than countries with low and intermediate constraints on the executive. These figures, nevertheless, suggest a sort of catching-up or imitation effect toward greater liberalization for countries with poorer institutions.

### **3 Estimation and Results**

Our empirical analysis is organized around three related parts. First, we present a graphical and econometric analysis that investigates correlations between our reform indexes and growth spurts, motivated by the recent literature on growth accelerations (e.g., Hausmann, Pritchett, and Rodrik, 2005). Second, we present first-pass associations between reforms and growth obtained from OLS estimations that control for country and time fixed effects. Third, we examine the hypotheses that the reforms-growth relationship is influenced - albeit in a heterogeneous way - by a country's institutional environment and by its distance from the technological frontier. To test the relevance of the institutional framework for the relationship between structural policies and economic performance we include in the growth regressions an interaction term between the real and financial reform variables and the constraints on the executive index from the Polity

IV dataset. To assess the presence of non – linearity in the association between reforms and growth that depends on a country’s distance from the technological frontier, we estimate econometric specifications where the structural reforms indicators are interacted with the ratio of each country’s GDP per capita with the United States’ GDP per capita.

In the next section, we provide extensive robustness checks of our results to different estimation methods, to the inclusion of additional control variables and to the use of lower frequency data.

### 3.1 Reforms and growth breaks

In this subsection we present preliminary evidence from graphical and econometric analysis about the association between different types of real and financial structural reforms and growth spells. Growth spells, broadly defined as extended periods of very rapid or markedly slow growth, are a striking feature of the development process in many countries. Recent work by Hausmann, Pritchett, and Rodrik (2005), Berg, Ostry, and Zettelmeyer (2008), and Jones and Olken (2008) use this new approach to the data analysis to understand the differential growth experiences of rich and poor countries.<sup>9</sup> This subsection uses a set of growth spells—identified by using the econometric methodology of Antoshin, Berg, and Souto (2008)<sup>10</sup>—to examine whether structural reforms accompany growth accelerations and whether reform reversals or absence of reforms are associated with growth decelerations. In the Appendix 3 we list all the episodes of up and down breaks in economic growth since 1960 that we are able to detect by using the aforementioned statistical methodology.

Figures 4-5 plot the average level of the residuals of a panel regression of each index on country and year fixed effects for a period starting five years before the break (0 on the horizontal axis) and ending five years after the break. All plotted averages are based on the set of countries for which the index is available three years before the break so that each line shows how the average index has evolved around the break for the same group of countries. Given that panel regressions remove country and year specific averages of each index, a movement of the plotted average residual from below to above the zero reference line on the vertical axis prior to an up-break (for example, in the case of the current account index, solid line of the middle panel in Figure 4) indicates that the reform index has gone from below the country-average to above the country-average prior to an up-break.

The year-specific fixed effects effectively remove also the global trend in each index so that, in practice, the country-specific averages relative to which the plotted residuals are measured are trend-corrected. This

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<sup>9</sup>Two early precursors of the current work on growth spells are Ben-David and Papell (1998), and Pritchett (2000), both of which employed novel econometric methods to identify shifts in growth performance.

<sup>10</sup>These authors identify “growth spells” by modifying the procedure pioneered by Bai and Perron (1998) to determine sample-specific critical values as it is appropriate when the time dimension is 30 years or less.

means that the decline of the plotted residual lines around down-breaks (for example, in the case of the agriculture index, dashed line of bottom panel in Figure 4) can indicate either reform reversals or lack of reform in a period where most other countries are reforming.<sup>11</sup>

Among real-sector reforms (Figure 4), liberalization of the current account and of the agriculture sector are clearly associated with growth accelerations with the indices improving about three years before the up-break and continuing on an upward trend afterwards. Conversely, growth decelerations are associated with a tariff-based trade liberalization index below the country average (the zero reference line for the vertical axis) and with deteriorating indices of current account liberalization and agriculture.

Among financial-sector reforms (Figure 5), liberalization of the domestic financial sector and of the capital account are both associated with growth accelerations. The banking component of the domestic financial sector index starts improving about two years before an up-break. As in the case of most real-sector indices, growth decelerations are associated with a downward trend of all financial indices, which tends to begin around the time of occurrence of the down-break and markedly continues afterwards.

We then turn to simple econometric analysis to test whether improvements (reversals) in the structural reform indicators help to predict growth accelerations (decelerations). The dependent variable UP3 is meant to capture the timing of growth accelerations. It takes value equal to 1 for the 3 years centered on the first year of the growth acceleration episode and 0 otherwise. The dependent variable DOWN3 refers to growth decelerations and is a dummy equal to 1 for the 3 years centered on the first year of the growth deceleration episode and 0 otherwise. We choose to use a 3 – year time window around a growth acceleration (deceleration) episode as dependent variable for two main reasons. First, it makes less likely that we are missing a growth acceleration (deceleration) episode because of measurement error in the GDP data. Second, we prefer to use a quite narrow time window around the year of the break in the GDP per capita growth to reduce the possibility that we are capturing the effect of unobserved medium – term economic or institutional changes that might affect the realization of a growth acceleration (deceleration) episode.

The explanatory variable of main interest is the change over the previous year in each of our structural reforms indicators. Taking the first difference of each of the indices of structural reforms helps to capture movement toward a larger (lower) degree of liberalization in the different real and financial sectors of the economy. In all the specifications we include as additional controls the first lag of the polity2 index (POLITY21) from the POLITY IV database to measure the quality of each country democratic institutions and the yearly growth rate of the country specific terms of trade (TOT\_Gr).<sup>12</sup> The basic and most

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<sup>11</sup>In Figure 4, there is no chart for networks reform because of the few spells available after 1990.

<sup>12</sup>We include as control the lagged value of each country index of democracy since a recent work by Giuliano, Mishra and Spilimbergo (2009) documents a positive association between democracy and the adoption of structural reforms. Moreover, we could expect that improvement in democratic institutions might lead to a better economic performance. The inclusion of the

parsimonious specification includes also a full set of year fixed effects.

Given the binary nature of the dependent variable our main estimation method is maximum likelihood probit. To check the robustness of the results to different estimation methods we also report estimates from a linear probability model.

Results reported in Table 1A and 1B refer to specifications – estimated respectively by maximum likelihood probit and linear probability model - where UP3 is the dependent variable. The estimates from the two models tell a consistent story. With the only exception of *Networks*, the coefficients of the variables of main interest (the change over the previous year in each of our structural reform indicators) have the same (expected) positive sign across the two models. Moreover, the same variables, namely the change over the previous year in the indices of structural reforms for the *domestic financial sector* (DF\_ch), for the *banking system* (BK\_ch), for the *external capital account*, as measured by both its aggregate indicator (CAP100\_ch) and by the sub-indices related to resident (CAPRES\_ch) and non resident (CAPNONRES\_ch), are statistically significant at conventional levels in both the models.

Consistently with the graphical analysis of Figure 5, these results suggest that reforms in the domestic and external financial sectors are associated to an increase in probability of occurrence of growth accelerations. According to our probit estimates, at the average values of the independent variables, a one-time jump from 0 to the maximum of 1 in the yearly change of the *domestic financial* index increases the probability of growth acceleration by 0.138; of the *banking system* index by 0.125; of the *external capital account* index by 0.105; of the *external capital account index for resident* by 0.086 and of the external capital account index for *non resident* by 0.069. These results are in line with those reported by Hausmann, Pritchett, and Rodrik (2005). They find that their measure of financial liberalization is a good predictor of the probability of the occurrence of growth accelerations. Depending on the different specifications they use, financial liberalization increases the probability of experiencing growth accelerations by 7 to almost 11 percentage points.

Tables 2A and 2B report respectively estimates from probit and linear probability models for the specifications where DOWN3 is the dependent variable. Though almost all the coefficients of interest have the expected negative sign in both the models, only the reduction in the intensity of the legal restrictions on the residents' ability to move capital in and out the country (as captured by the variable CAPRES\_ch) is associated at statistical significant level to a decrease in the probability of growth deceleration across the two models. According to our probit estimates, at the average values of the independent variables, a sudden and full liberalization in the external capital account for resident decreases the probability of growth deceleration

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yearly growth rate of the terms of trade is in line with the analysis of growth accelerations by Hausmann, Pritchett, and Rodrik (2005).

by 0.080.<sup>13</sup>

The specifications so far discussed pool together all the countries and years. We, therefore, check whether our results still hold once we control for country specific unobserved heterogeneity. A simple and natural starting point is a linear probability model with additive unobserved country effects. Table 3A and 4A report estimates from this model respectively for growth acceleration and deceleration episodes. Linear probability model imposes, nevertheless, strong restrictions on the unobserved effects.<sup>14</sup> We, therefore, also report estimates from a random effects probit model and from a fixed effect logit model. Estimates from the random effects probit model are reported in Tables 3B and 4B respectively for growth acceleration and deceleration episodes. The results we obtain by using the fixed effect logit estimator are shown in the Tables 3C and 4C respectively for growth acceleration and deceleration episodes. The estimates we obtain from the linear probability, the random effects probit and the fixed effects logit models are consistent each others and in line with those discussed above. In particular, they confirm a positive and statistical significant association between reforms in the domestic financial sector, in the banking system and in the external capital account and the probability of experiencing growth acceleration.

In summary, the graphical and econometric analysis of the reform process around growth spells provides suggestive evidence of a positive association between a broad range of structural reforms – in particular in the domestic and external financial sectors - and economic growth.

### 3.2 Reforms and growth: simple associations

In this section we provide additional econometric evidence based on more conventional growth regressions about the relationship between structural reforms and economic growth. We estimate through ordinary least-squares (OLS) the following specification:

$$\ln GDP_{i,t} - \ln GDP_{i,t-1} = a_0 + a_1 \ln GDP_{i,t-1} + a_2 Reform_{i,t-1} + \eta_i + \delta_t + \varepsilon_{it}, \quad (1)$$

where the dependent variable is the growth rate of the GDP per capita in country  $i$  at period  $t$ , regressed on one year lag of (the log of) GDP per capita and on year lag of each of our reform indicators. The terms  $\eta_i$ 's and  $\delta_t$ 's represent respectively a full set of country and year fixed effects, and  $\varepsilon_{it}$  captures all the omitted factors. By including country fixed effects, we control for any country time – invariant characteristic (such as colonial legacies, legal origins, ethnic fragmentation, etc.) that could affect both the adoption of structural reforms and per capita income growth. While this specification does not rule out all possible sources of bias

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<sup>13</sup>We also estimate the same specifications both for growth accelerations and decelerations by using maximum likelihood logit models. The results are very consistent with those reported in the paper and are available upon request from the authors.

<sup>14</sup>See Wooldridge (2002) chapter 15.

in our estimations, like omitted time-varying factors or reverse causation, it, nevertheless, allows to deal with a potentially relevant case of omitted variable bias.

In our baseline specifications we use annual data to better date the effects of reforms and capture growth accelerations immediately after reforms take place. Acknowledging the warning in Johnson et al. (2009) of the large measurement error associated with high frequency Penn World Tables PPP-adjusted GDP data, we re-estimate all the regressions by using 3 and 5 year interval data. The structural reform indicators are lagged one period to mitigate the most obvious form of reverse causation. Robust standard errors are clustered at country level.

Table 5 presents results from these regressions. Standard growth regressions confirm the positive association between structural reforms and growth suggested by the analysis of growth spells. With the exception of the liberalization in the product markets (agriculture, electricity and telecommunications), all the real and financial sector structural reform indices show a positive and statistically significant association with growth.<sup>15</sup>

The magnitude of the estimated effect of structural reforms on per capita income growth is substantial. To gauge it, it is better to focus on long-term multipliers which take into account the different dynamics of each reform and make the growth effects comparable across reforms. For example, complete trade liberalization with the average tariff falling from the maximum to the minimum level in the sample (the trade index going from zero to one) is estimated to increase output per capita in the long run by 44 percent. The largest estimated effect is that of domestic financial liberalization, which would approximately double output per capita in the long run.<sup>16</sup>

### 3.3 The role of constraints on the executive power

In this section we examine whether the institutional environment - as measured by a country's constraints on the power of the executive authority - affects the way in which reforms promote growth. Following Acemoglu, Johnson, Querubin, and Robinson (2008), we classify countries into three categories according to their level of constraints on executive authority as measured by the Constraints on the Executive index from the Polity IV dataset. In specific, countries above, within, and below one-standard deviation from the sample mean of the Constraints on the Executive index are respectively assigned to high, middle, and low-constraints on the executive categories.

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<sup>15</sup>Our baseline regressions do not include other control variables. Results including other typical growth covariates, such as education, terms of trade, and democracy are presented in the Section 4.

<sup>16</sup>The inverse of the coefficient on lagged GDP per capita is the factor by which each impact coefficient needs to be multiplied to obtain the long-run growth effect of a change of an index from zero to one (full liberalization). When reforms are compared on the basis of one standard deviation shock or an improvement from the 25<sup>th</sup> to the 75<sup>th</sup> percentile of each index, the ranking of their long-run growth effects remains broadly unchanged.

Table 6 provides an unconditional analysis of how a country’s level of constraints on the executive power affects the impact of reforms on growth. For example, countries with low constraints on the executive which have implemented aggressive trade and current account reforms have benefited substantially more in terms of growth than countries with middle and high levels of constraints. This seems to be the case also for the capital account index and for its residents and nonresidents sub - indices. Alternatively, as a consequence of the improvement in the domestic finance index and in its banking and securities sub - indices, growth increased significantly regardless of a country’s constraints on the executive power.

Moving on to the regression analysis, our estimating equation is:

$$\begin{aligned} \ln GDP_{i,t} - \ln GDP_{i,t-1} = & a_0 + a_1 \ln GDP_{i,t-1} + a_2(LowCE_i * Reform_{i,t-1}) + \\ & a_3(MiddleCE_i * Reform_{i,t-1}) + \\ & a_4(HighCE_i * Reform_{i,t-1}) + \eta_i + \delta_t + \varepsilon_{it}, \end{aligned} \quad (2)$$

where  $LowCE_i$ ,  $MiddleCE_i$ , and  $HighCE_i$  represent three sets of dummies respectively for low, middle, and high constraints on the executive categories.

We report in Tables 7 and 8 OLS estimates of the specification (2), respectively, for the real and financial sectors’ structural reform indicators. The most interesting insight from these results is the heterogeneity of the reforms-growth relationship that depends on a country’s constraints on the authority of the executive power. A closer look at the result reveals a series of intriguing results.

The broader index of reform of the capital account and of its sub index for *non resident* display a statistically significant positive association with economic growth only for countries with medium or medium and low level of constraints on the executive. On the other hand, structural reforms in the domestic financial sector show a significant and positive association with economic growth regardless of the level of constraints on the executive. This result suggests that financial and more specifically banking reforms may have a broader use for the economy as they can positively affect many sectors. In Acemoglu, Johnson, Querubin, and Robinson (2008) model this result could be generated if financial reforms exert a very high cost to the authorities to impose distortionary policies – even under an authoritarian regime.

### 3.4 Distance from the frontier

An alternative to the neoclassical specification considered in Table 5 is the Schumpeterian specification reported in Table 9. This specification derives from the Schumpeterian growth theory which is based on the process of creative destruction.<sup>17</sup> A key implication of the Schumpeterian theory is that economic

<sup>17</sup>The process of creative destruction was pioneered in the writings of Joseph Schumpeter (1928, 1942) and refers to the endogenous introduction of new products and processes that inevitably eliminates some of the existing products and processes. Schumpeterian growth theory has been revived and formally modeled by Aghion and Howitt (1992).

development can be evaluated by the distance of a country’s GDP per capita to that of frontier countries. One of the most relevant question in the Schumpeterian growth literature is, therefore, how fast low-income countries can close their income gap with countries at the technological frontier.

Key economic state variables, such as a country’s distance from the technological frontier, should, therefore, affect the design of appropriate policies aimed at fostering economic growth. As stressed in Acemoglu, Aghion and Zilibotti (2006), when a country is far from the world technology frontier, the most relevant source of growth is the adoption of already well established technologies. The closer a country gets to the technological frontier, the more innovation matters for economic growth. In other words, the closer a country is to the world technological frontier, the higher is the relative importance of innovation versus imitation to sustain productivity growth. Consequently, the set of possible policies aimed at sustaining growth, what the authors define as “*appropriate institutions*”, can vary for countries at different stages of economic development.

Building on these theoretical insights, Aghion and Howitt (2006) analyze in depth the case of education.<sup>18</sup> The authors argue that primary and secondary education matters more for a country’s ability to imitate the frontier technology, while tertiary education has a larger impact on a country’s possibility of innovating. As a country catches up with the technology frontier, tertiary education should be more relevant for growth than primary/secondary education.<sup>19</sup> Vandenbussche, Aghion and Meghir (2006) provide evidence relative to a panel of 19 OECD countries for the period 1960-2000 consistent with the idea that higher education matters more as a country catches up with the technological frontier.

The Schumpeterian approach calls for an econometric specification as follows:

$$\begin{aligned} \ln GDP_{i,t} - \ln GDP_{i,t-1} &= a_0 + a_1 \frac{GDP_{i,t-1}}{GDP_{US,t-1}} + a_2 Reform_{i,t-1} + \\ & a_3 \left[ Reform_{i,t-1} * \frac{GDP_{i,t-1}}{GDP_{US,t-1}} \right] + \eta_i + \delta_t + \varepsilon_{it}. \end{aligned} \quad (3)$$

There are two main differences between this econometric model and the neoclassical specification of the equation (1). First, convergence is now captured by the “income-gap” usually proxied by the ratio of GDP per capita in country  $i$  to the GDP per capita of the United States (the country with the higher per capita GDP in our sample). Second, the interaction term between reform and “income-gap” is included in the

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<sup>18</sup>The analysis of education policies in Aghion and Howitt (2005, 2006) is based also on works by Vandenbussche, Aghion and Meghir (2006) and Aghion, Boustan, Hoxby and Vandenbussche (2005).

<sup>19</sup>Aghion and Howitt (2006) combine insights from Nelson and Phelps (1966) and Acemoglu, Aghion, Zilibotti (2006). Nelson and Phelps model an economy where the productivity growth is a function of domestic human capital and the distance from the frontier technology growing over time at an exogenous rate. A higher stock of human capital fosters growth by facilitating the catching up with the technological frontier. Similarly to Acemoglu, Aghion, Zilibotti (2006), in Aghion and Howitt (2006) productivity growth can be generated or by imitating the frontier technology or by innovating on past technologies. The relative importance of innovation increases as a country gets closer to the technological frontier. Moreover, investing in higher education should produce a bigger effect on a country’s ability of making leading-edge innovation, while investing in primary and secondary education should exert a larger impact on a country’s ability of implementing frontier technology.

model to assess the effect of reforms in closing the gap to the level of output in the United States. If the interaction term is negative and statistically significant, the growth returns from reforming that sector will be larger the further a country is from the technological frontier.

Results based on OLS estimations of equation (3) are reported in the Table 9. Openness to the international trade and liberalization in the agricultural and financial sectors (with the only exception of the external capital account for non – resident) show a positive association with economic growth. Moreover – as suggested by the negative and statistical significant sign of the interaction term - structural reforms in the international trade and in the domestic financial sector (with the exception of the security markets) are more relevant for economic growth for countries further from the technological frontier. In particular, the finding that reforming the domestic financial sector sustains the convergence to the world technological frontier is in line with the relevance of financial development for convergence stressed by Aghion, Howitt and Mayer-Foulkes (2005).

## 4 Robustness

In this section we examine the robustness of our findings to alternative estimation methods and to the inclusion of additional control variables. We also check whether changing the frequency of the data from annual to three - year intervals alters our results.

### 4.1 Arellano-Bond GMM estimations

Through a simple manipulation we can write equation (1) as:

$$\ln GDP_{i,t} = a_0 + \bar{a}_1 \ln GDP_{i,t-1} + a_2 Reform_{i,t-1} + \eta_i + \delta_t + \varepsilon_{it}, \quad (4)$$

where  $\bar{a}_1 = 1 + a_1$ . From this expression we can see that estimating equation (1) is equivalent to estimate a dynamic model with lagged – dependent variable on the right side.<sup>20</sup> The presence of the lagged – dependent variable makes the fixed effect OLS estimator no longer consistent due to the correlation of the lagged regressor with the error term. For fixed  $N$ , OLS estimates are consistent only for  $T \rightarrow \infty$  (see Cameron and Trivedi, 2005, Chapter 22). To deal with this issue, we use the GMM estimator proposed by Arellano and Bond (1991). This procedure amounts to first differencing equation (4) in order to remove country fixed effects and to use two and more lags of the dependent variable as instruments. Consistency of the estimators requires, moreover, lack of second order serial correlation in the first differenced error term which can be tested.

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<sup>20</sup>See for instance Caselli, Esquivel and Lefort (1996).

In Table 10 we report the results we obtain by estimating equation (4) using yearly data. Overall they confirm the positive association between reforms in the real<sup>21</sup> and domestic financial sectors and economic growth. The coefficients of the variables *Capital Account* and *Capital Account (non-resident)* are instead no longer statistically significant. Finally, the *p-values* reported in the bottom row of the Table show that there is no statistically significant second order autocorrelation among the first-differenced error terms.

In Tables 11 and 12 we report the results we obtain by repeating the GMM estimation exercise for equation (2). Therefore, we investigate whether reforms have an heterogeneous impact on income growth depending on different levels of constraints on the executive. Liberalization of real sectors shows a more heterogeneous effect on growth which is influenced by the different levels of constraints on the executive. It is worth noticing that the evidence about the effect of reforms in the financial sector is in line with the results we obtain from OLS regressions. The effectiveness of reforms in the domestic finance, banking and security sectors does not seem to depend on the broader institutional framework. Reforms in these sectors have a significant and positive impact on per capita income growth for the three levels of constraints on the executive we consider. Among the remaining indicators of structural reforms in the financial sector of the economy, only liberalization of capital account for residents in countries with medium level of constraints on the executive has a significant and positive association with growth. The *p-values* reported in the bottom row suggest that we cannot reject the null hypothesis of no second order serial correlation among the differenced error terms.

Results discussed in this section should, nevertheless, be taken with a word of caution given that in all the specification reported in Tables 10 – 12 the Sargan test rejects the null hypothesis that the over-identifying restrictions are valid.

## 4.2 Additional control variables and lower frequency data

We check the robustness of our baseline results to the inclusion in the growth regressions of a set of control variables. Tables 13-16 reproduce results of Tables 5, 7, 8 and 9 by adding three additional control variables: political institutions, tertiary educational attainment, and terms of trade. Our results are fairly robust to the inclusion of this and alternative sets of control variables.<sup>22</sup>

Johnson et al. (2009) warn about the serious implications from using in growth regressions annual PPP-corrected GDP data from Penn World Tables due to the presence of measurement error. We take this

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<sup>21</sup>Among the reforms in the real sector of the economy only the liberalization of electricity and telecommunication market shows no association with economic growth.

<sup>22</sup>Results with alternative sets of control variables have not been reported to save space but they are available upon request from the authors. These controls include, among the others, macro policy variables (i.e. inflation), alternative measures of educational attainment (primary and secondary education), alternative measures of political institutions (from the Polity IV database), and alternative definitions of terms of trade (growth of terms of trade).

warning seriously and, although we believe that for the question at hand using reform data at the annual frequency is conceptually the preferred choice, we have re-estimated our baseline results using 3-year and 5-year data intervals.<sup>23</sup> As shown in Tables 17–20 our main results are fairly robust to lower frequency data.

In summary, we show that the positive and heterogeneous association between a large variety of structural reforms and growth holds fairly when we include in our specifications additional control variables and when we use data at lower frequencies.

## 5 Conclusion

This paper examines whether real and financial reforms over the last three decades have been associated with higher growth, and whether there has been a differential growth response due to a country’s institutional environment. Underpinning the empirical analysis is a significant data collection effort that involves the compilation of indicators of structural reforms for a large sample of developing and developed countries over the past three decades. Not only is the resulting dataset unique in its country and time coverage, it is also much broader in terms of the sectoral coverage of reforms—as long as it includes indicators of liberalization in domestic product markets; international trade; several indicators of liberalization of the domestic financial sector; and measures of the capital account liberalization.

Our main findings are:

1. There exists evidence of a broad positive association between several types of reforms and growth.
2. This association, however, is remarkably heterogeneous and crucially depends on the level of a country’s constraints on the executive power and on its distance from the technological frontier. A notable exception to the strong heterogeneity found for the rest of structural reforms is domestic financial liberalization and in particular the sub-index on banking liberalization. These reforms are shown to consistently be positively associated with growth regardless of the institutional environment.

A word of caution is in place here. Our results should be taken as evidence of strong associations rather than causation. It is certainly the case that reforms are at least partially determined by the political process, but appropriate instrumental variables that could resolve this and other sources of endogeneity are particularly difficult to find in our context. Having said this, we do not view this as a drawback of this paper but rather a constraint inherently embedded in the complex composition of structural reforms. The heterogeneous effects that “*key variables*” - like the broad institutional environment or the distance from the

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<sup>23</sup>To save space we do not report the results with 5-year intervals but are available upon request from the authors.

technological frontier - have on the reform-growth relationship are remarkable and we hope that together with the novel dataset on reforms this will stimulate further research on this important issue.

## References

- Abiad, Abdul, Enrica Detragiache, and Thierry Tressel (2008)** “A New Database of Financial Reforms,” *IMF Working Paper 08/266*, Washington: International Monetary Fund.
- Acemoglu, Daron, Philippe Aghion, and Fabrizio Zilibotti (2006)** “Distance to frontier, selection, and Economic Growth,” *Journal of the European Economic Association*, 4, 37–74.
- Acemoglu, Daron, Simon Johnson, Pablo Querubin, and James A. Robinson (2008)** “When Does Policy Reform Work? The Case of Central Bank Independence,” *Brookings Papers on Economic Activity*, 351–430.
- Acemoglu, Daron, Simon Johnson, and James A. Robinson (2001)** “The Colonial Origins of Comparative Development,” *American Economic Review*, 91, 1369–1401.
- Acemoglu, Daron, Simon Johnson, James A. Robinson, and Yunyong Thaicharoen (2003)** “Institutional causes, macroeconomic symptoms: volatility, crises and growth,” *Journal of Monetary Economics*, 50, 49–123.
- Aghion, Philippe, Leah Boustan, Caroline Hoxby, and Jerome Vandenbussche (2005)** “Exploiting States’ Mistake to Evaluate the Impact of Higher Education on Growth”, Manuscript, Harvard University.
- Aghion, Philippe, and Peter Howitt (1992)** “A Model of Growth Through Creative Destruction,” *Econometrica*, 60, 323–351.
- Aghion, Philippe, and Peter Howitt (2005)** “Growth with Quality-Improving Innovations: An Integrated Framework”. In *Handbook of Economic Growth*, Vol. 1, 67–110, edited by Philippe Aghion and Steven N. Durlauf, The Netherlands: Elsevier Science.
- Aghion, Philippe, and Peter Howitt (2006)** “Appropriate Growth Policy: A Unifying Framework,” *Journal of the European Economic Association*, 4, 269–314.
- Aghion, Philippe, Peter Howitt, and David Mayer - Foulkes (2005)** “The Effect of Financial Development on Convergence: Theory and Evidence,” *The Quarterly Journal of Economics*, 120, 173–222.
- Anderson, Kym, Dominique van der Mensbrugghe, and Will Martin, (2006)** “Impact of Global Trade and Subsidy Policies on Developing Country Trade,” *Journal of World Trade*, 40, 945-968.
- Antoshin, Sergei, Andrew Berg, and Marcos Souto (2008)** “Testing for Structural Breaks in Small Samples,” *IMF Working Papers 08/75*, StateplaceWashington: International Monetary Fund.
- Arellano, Manuel, and Stephen R. Bond (1991)** “Some Tests of Specification for Panel Data: place-Monte Carlo Evidence and an Application to Employment Equations,” *The Review of Economic Studies*, 58, 277–297.
- Bai, Jushan, and Pierre Perron (1998)** “Estimating and Testing Linear Models with Multiple Structural Changes,” *Econometrica*, 66, 47–78.
- Bekaert, Geert, Campbell R. Harvey, and Christian Lundblad (2005)** “Does financial liberalization spur growth?,” *Journal of Financial Economics*, 77, 3–55.
- Ben-David, Dan, and David H. Papell (1998)** “Slowdowns and Meltdowns: Postwar Growth Evidence from 74 Countries,” *Review of Economics and Statistics*, 80, 561–571.
- Berg, Andrew, and Anne O. Krueger (2003)** “Trade, Growth, and Poverty: A Selective Survey,” *IMF Working Paper 03/30*, Washington: International Monetary Fund.
- Berg, Andy, Jonathan D. Ostry, and Jeromin Zettelmeyer (2008)** “What Makes Growth Sustained,” *IMF Working Paper 08/59*, Washington: International Monetary Fund.
- Cameron A. Colin, and Pravin K. Trivedi (2005)** *Microeconometrics. Methods And Applications*, StateNew York: PlaceNameplaceCambridge PlaceTypeUniversity Press.
- Caselli, Francesco, Gerardo Esquivel, and Fernando Lefort (1996)** “Reopening the Convergence Debate: A New Look at Cross – Country Growth Empirics”, *Journal of Economic Growth*, 1, 363–389.
- Dollar, David, and Aart Kraay (2004)** “Trade, Growth, And Poverty,” *The Economic Journal*, 114, 22–49.
- Easterly, William (2005)** “National Policies and Economic Growth: A Reappraisal.” In *Handbook of Economic Growth*, Vol.1, 1015 – 1059, edited by Philippe. Aghion and Steven. N. Durlauf, The Netherlands:

Elsevier Science.

**Easterly, William and Ross Levine (2003)** “Tropics, germs, and crops: how endowments influence economic development,” *Journal of Monetary Economics*, 50, 3–39.

**Frankel, Jeffrey A., and David Romer (1999)** “Does Trade Cause Growth?,” *American Economic Review*, 89, 379–399.

**Giuliano, Paola, Prachi Mishra, and Antonio Spilimbergo (2009)** “Democracy and Reforms,” *IZA Discussion Paper N. 4032*.

**Hausmann, Ricardo, Lant Pritchett, and Dani Rodrik (2005)** “Growth Accelerations,” *Journal of Economic Growth*, 10, 303–329.

**Johnson, Simon, William Larson, Chris Papageorgiou, Arvind Subramanian (2009)** “Is Newer Better? Penn World Table Revisions and Their Impact on Growth Estimates,” NBER Working Paper no 15455.

**Jones, Benjamin F., and Benjamin A. Olken (2008)** “The Anatomy of Start-Stop Growth,” *Review of Economics and Statistics*, 90, 582–587.

**Levine, Ross (1997)** “Financial Development and Economic Growth: Views and Agenda,” *Journal of Economic Literature*, 35, 688–726.

**Levine, Ross (2005)** “Finance and Growth: Theory and Evidence,” In *Handbook of Economic Growth*, Vol. 1, 865–934, edited by Philippe. Aghion and Steven. N. Durlauf, The Netherlands: Elsevier Science.

**Nelson, Richard, and Edmund Phelps (1966)** “Investment in Humans, Technological Diffusion, and Economic Growth,” *American Economic Review, Papers and Proceedings*, 61, 69–75.

**Nicoletti, Giuseppe, and Stefano Scarpetta (2003)** “Regulation, productivity and growth. OECD evidence,” *Economic Policy*, 36, 9–72.

**Pritchett, Lant (2000)** “Understanding Patterns of Economic Growth: Searching for Hills among Plateaus, Mountains, and Plains,” *World Bank Economic Review*, 14, 221–225.

**Quinn, Dennis P. (1997)** “The Correlates of Change in International Financial Regulation,” *American Political Science Review*, 91, 531–551.

**Quinn, Dennis P., and A. Maria Toyoda (2007)** “Ideology and Voter Preferences as Determinants of Financial Globalization,” *American Journal of Political Science*, 51, 344–363.

**Quinn, Dennis P., and A. Maria Toyoda (2008)** “Does Capital Account Liberalization Lead to Growth?,” *The Review of Financial Studies*, 21, 1403–1449.

**Rodriguez, Francisco and Dani Rodrik (2000)** “Trade policy and economic growth: a skeptic’s guide to the cross-national evidence,” In *Macroeconomics Annual 2000*, edited by B. Bernanke and K. Rogoff, MIT Press for NBER.

**Rodrik, Dani (2005)** “Growth Strategies,” In *Handbook of Economic Growth*, Vol. 1, 967–1014, edited by Philippe. Aghion and Steven. N. Durlauf, The Netherlands: Elsevier Science.

**Rodrik, Dani, Arvind Subramanian, and Francesco Trebbi (2004)** “Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development,” *Journal of Economic Growth*, 9, 131–165.

**Sachs, Jeffrey D., and Andrew Warner (1995)** “Economic Reform and the Process of Global Integration,” *Brookings Papers on Economic Activity*, 1, 1–95.

**Schumpeter, Joseph (1928)** “The Instability of Capitalism,” *The Economic Journal*, 38, 361–386.

**Schumpeter, Joseph (1948)** *Capitalism, Socialism and Democracy*. New York: Harper and Brothers. 5th ed. London: George Allen and Unwin, 1976.

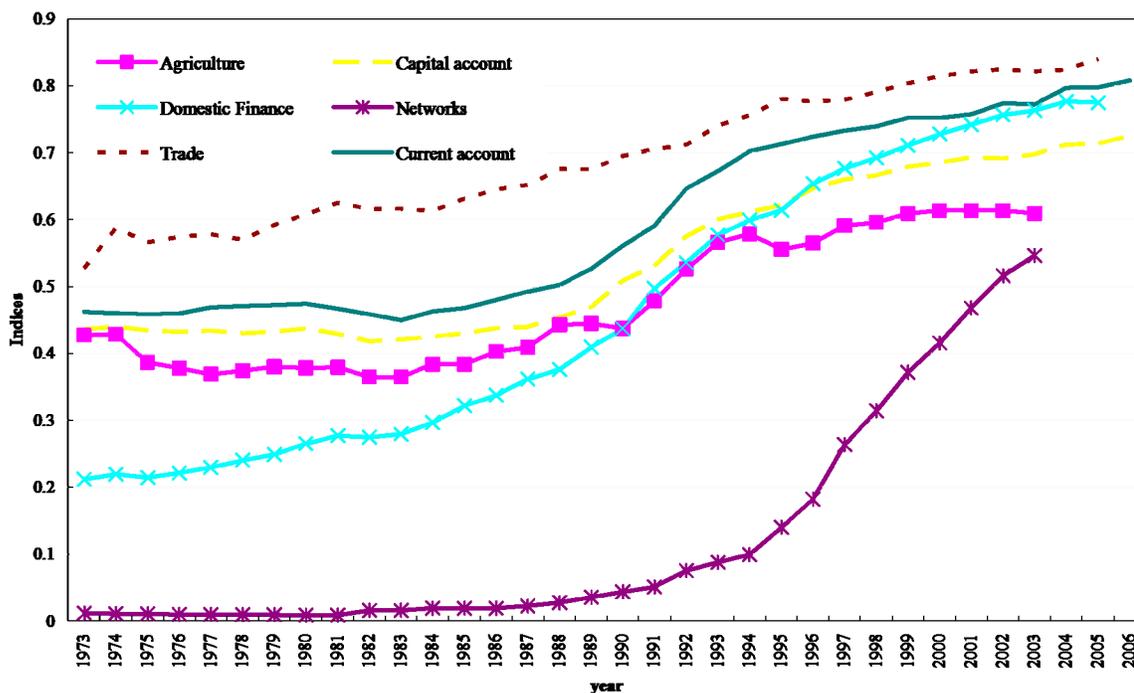
**Tokarick, Stephen (2008)** “Dispelling Some Misconceptions about Agricultural Trade Liberalization,” *Journal of Economic Perspectives*, 22, 199–216.

**Williamson, John (2000)** “What Should the World Bank Think About the Washington Consensus?” *World Bank Research Observer*, 15, 251–264.

**Wooldridge, Jeffrey M. (2002)** *Econometric Analysis of Cross – Section and Panel Data*, Cambridge, MA: The MIT Press.

**Vandenbussche, Jerome, Philippe Aghion, and Costas Meghir (2006)** “Growth, distance to frontier and composition of human capital,” *Journal of Economic Growth*, 11, 97–127.

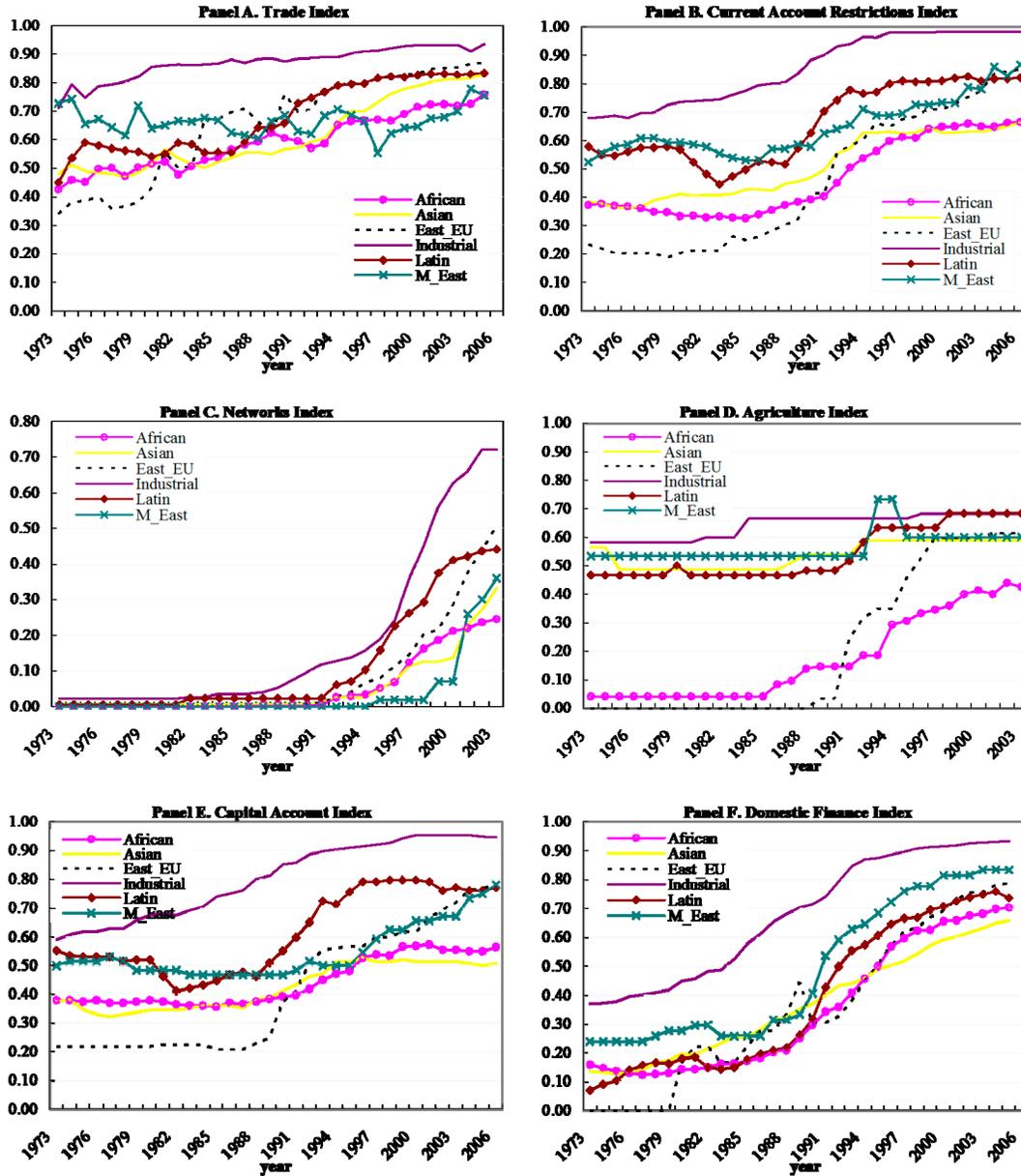
**Figure 1. Structural Reforms Indices**  
(All countries)



Source: IMF estimates.

Notes: Higher values of the reform indices represent greater liberalization. Each index is standardized to lie between zero and unity. The average is measured as the mean of the index across countries for each year. "Domestic Finance" captures restrictions on interest rate determination and competition, credit controls, and the quality of supervision in the banking sector, as well as the degree of liberalization of securities markets. "Capital Flows" measures restrictions on international financial transactions between residents and nonresidents. "Trade" denotes average tariff rates. "CA Restrictions" denotes current account restrictions on the proceeds from international trade in goods and services. "Agriculture" captures intervention in the market for each country's main agricultural export commodity. "Networks" captures the degree of competition and liberalization, and the quality of regulation, in these sectors. See Appendix 2 for more details.

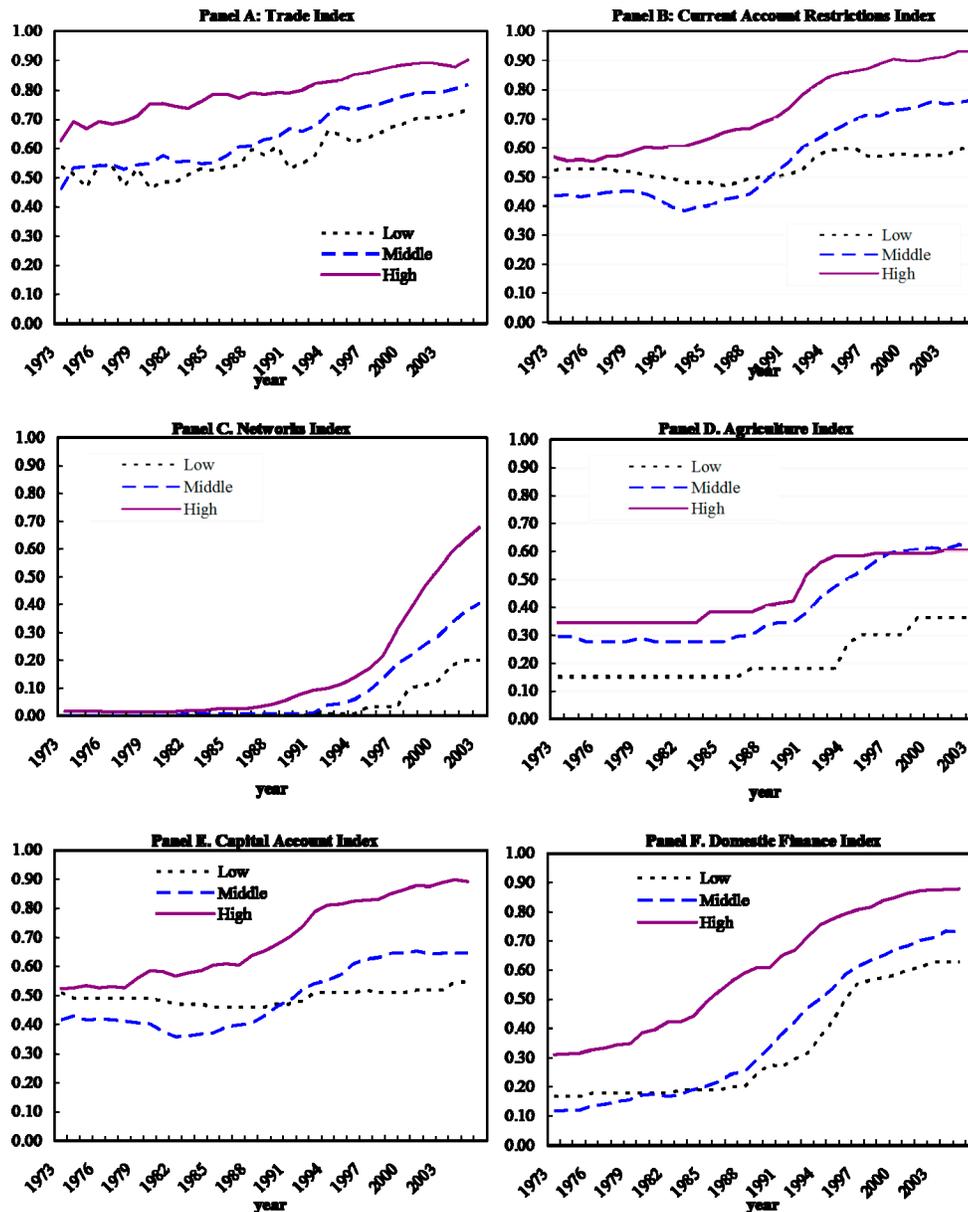
**Figure 2. Structural Reforms Indices by Region**



Source: IMF estimates.

Notes: Higher values of the reform indices represent greater liberalization. Each index is standardized to lie between zero and unity. The average is measured as the mean of the index across countries for each year. "Domestic Finance" captures restrictions on interest rate determination and competition, credit controls, and the quality of supervision in the banking sector, as well as the degree of liberalization of securities markets. "Capital Flows" measures restrictions on international financial transactions between residents and nonresidents. "Trade" denotes average tariff rates. "CA Restrictions" denotes current account restrictions on the proceeds from international trade in goods and services. "Agriculture" captures intervention in the market for each country's main agricultural export commodity. "Networks" captures the degree of competition and liberalization, and the quality of regulation, in these sectors. See Appendix Table A2 for more details.

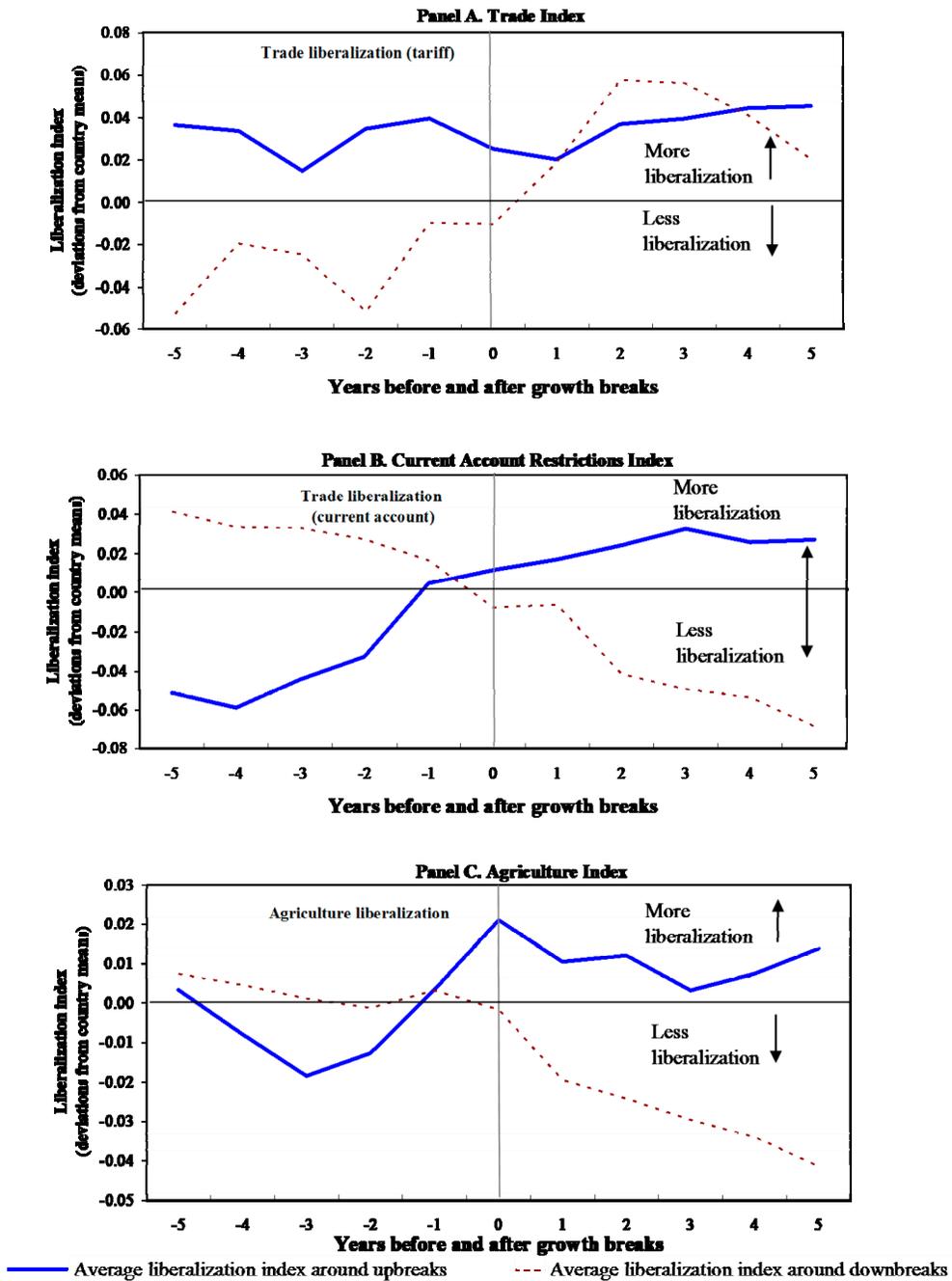
**Figure 3. Structural Reforms Indices by Constraint to the Executive Level**



Source: IMF estimates.

Notes: Higher values of the reform indices represent greater liberalization. Each index is standardized to lie between zero and unity. The average is measured as the mean of the index across countries for each year. "Domestic Finance" captures restrictions on interest rate determination and competition, credit controls, and the quality of supervision in the banking sector, as well as the degree of liberalization of securities markets. "Capital Flows" measures restrictions on international financial transactions between residents and nonresidents. "Trade" denotes average tariff rates. "CA Restrictions" denotes current account restrictions on the proceeds from international trade in goods and services. "Agriculture" captures intervention in the market for each country's main agricultural export commodity. "Networks" captures the degree of competition and liberalization, and the quality of regulation, in these sectors. See Appendix Table A2 for more details. High, middle, and low constraints on executives categories represent countries above, within and below one-standard deviation from our sample mean, respectively.

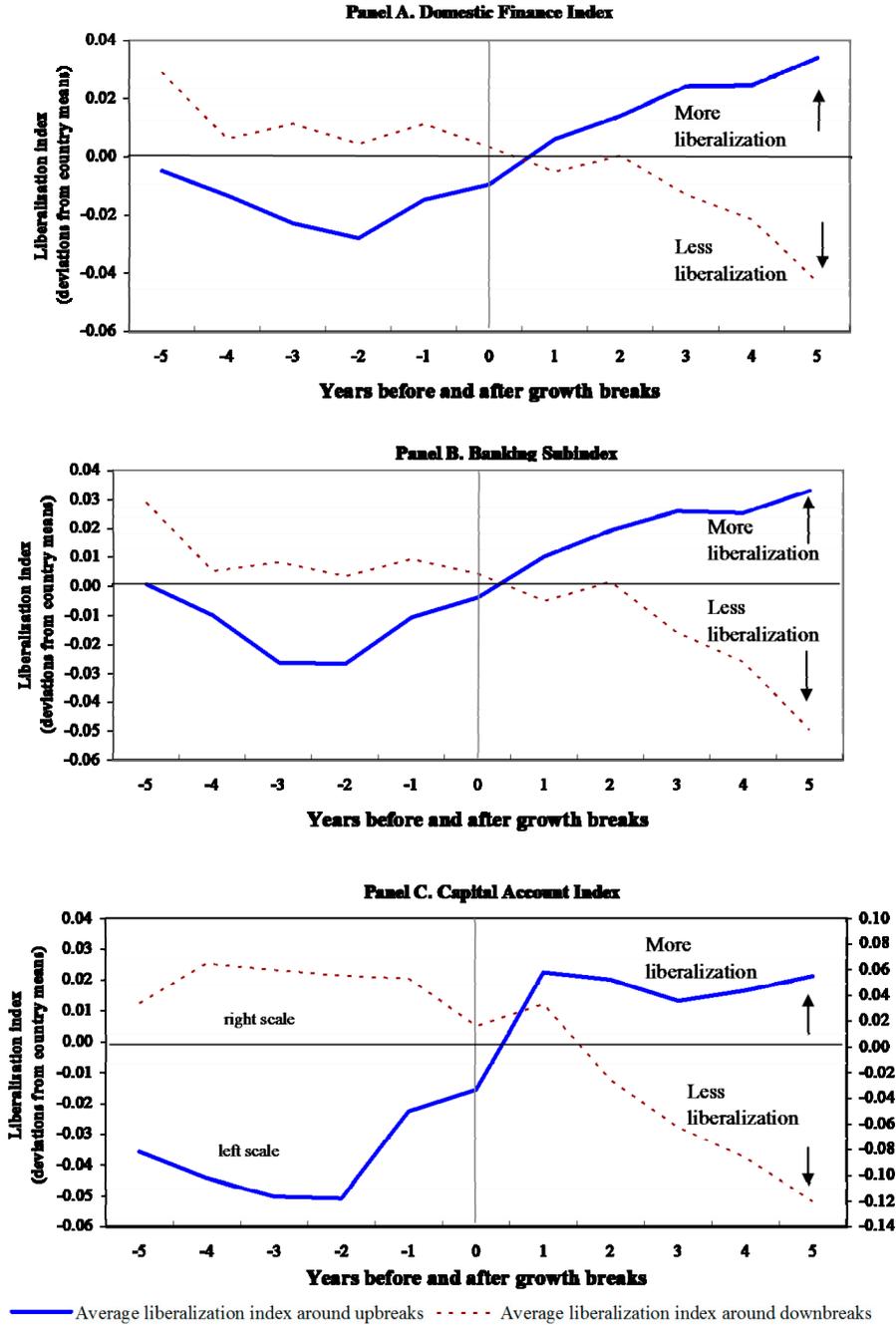
**Figure 4. Growth Breaks and Real Sector Reforms**



Source: Authors estimates based on Penn World Tables version 6.2.

Notes: The figures plot average liberalization indices for the period beginning five years before a growth break (year 0 on the horizontal axis) and ending five years after the growth break. The plots capture the within-country evolution of the liberalization indices obtained from a panel regression of each index on country fixed effects (to remove country averages) and year fixed effects (to remove global trends). As a result, the zero value on the vertical axis corresponds to the sample average of the liberalization indices for the countries considered. The number of countries used to compute each average varies across indices in line with data availability.

**Figure 5. Growth Breaks and Financial Sector Reforms**



Source: Authors estimates based on Penn World Tables version 6.2.

Notes: The figures plot average liberalization indices for the period beginning five years before a growth break (year 0 on the horizontal axis) and ending five years after the growth break. The plots capture the within-country evolution of the liberalization indices obtained from a panel regression of each index on country fixed effects (to remove country averages) and year fixed effects (to remove global trends). As a result, the zero value on the vertical axis corresponds to the sample average of the liberalization indices for the countries considered. The number of countries used to compute each average varies across indices in line with data availability.

**Table 1 A. Structural reforms and Up-breaks in Growth**

	(1) up3	(2) up3	(3) up3	(4) up3	(5) up3	(6) up3	(7) up3	(8) up3	(9) up3	(10) up3
TR_ch	0.296 (0.529)									
CUR100_ch		0.813 (0.599)								
AG_ch			0.368 (0.352)							
NW_ch				-0.245 (0.927)						
DF_ch					1.738** (0.874)					
BK_ch						1.575** (0.799)				
SM_ch							0.201 (0.450)			
CAP100_ch								1.474*** (0.478)		
CAPRES_ch									1.212*** (0.340)	
CAPNONRES_ch										0.957* (0.491)
polity21	-0.025*** (0.006)	-0.019*** (0.005)	-0.002 (0.005)	-0.005 (0.005)	-0.023*** (0.007)	-0.023*** (0.007)	-0.023*** (0.007)	-0.020*** (0.005)	-0.020*** (0.005)	-0.020*** (0.005)
TOT_Gr	-0.460 (0.324)	-0.250 (0.288)	-0.267 (0.292)	-0.235 (0.285)	-0.727* (0.392)	-0.718* (0.392)	-0.712* (0.391)	-0.253 (0.291)	-0.248 (0.291)	-0.260 (0.292)
Observations	2728	3472	3964	4200	1980	1980	1980	3472	3472	3472
Pseudo R-squared	0.0644	0.0524	0.0416	0.0414	0.0690	0.0692	0.0645	0.0589	0.0593	0.0541

Estimation method: Maximum Likelihood Probit. Robust standard errors in parentheses. All the specifications include year fixed effects. Annual data over 1960-2005 when available. Significance levels: \*\*\* 0.01, \*\* 0.05, \* 0.1.

**Table 1 B. Structural reforms and Up-breaks in Growth**

	(1) up3	(2) up3	(3) up3	(4) up3	(5) up3	(6) up3	(7) up3	(8) up3	(9) up3	(10) up3
TR_ch	0.034 (0.057)									
CUR100_ch		0.075 (0.059)								
AG_ch			0.038 (0.045)							
NW_ch				-0.019 (0.057)						
DF_ch					0.157* (0.091)					
BK_ch						0.139* (0.084)				
SM_ch							0.025 (0.044)			
CAP100_ch								0.126*** (0.048)		
CAPRES_ch									0.101*** (0.036)	
CAPNONRES_ch										0.076* (0.042)
polity21	-0.002*** (0.000)	-0.001*** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.002*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
TOT_Gr	-0.038 (0.028)	-0.025 (0.026)	-0.022 (0.022)	-0.019 (0.022)	-0.071* (0.036)	-0.070* (0.036)	-0.070* (0.036)	-0.026 (0.026)	-0.026 (0.026)	-0.026 (0.026)
Observations	3474	3996	4507	4758	2424	2424	2424	3996	4001	3996
Adjusted R-squared	0.020	0.011	0.007	0.007	0.021	0.021	0.019	0.013	0.013	0.012

Estimation method: Linear Probability Model – OLS. All the specifications include year fixed effects. Robust standard errors in parentheses. Annual data over 1960-2005 when available. Significance levels: \*\*\* 0.01, \*\* 0.05, \* 0.1

**Table 2 A. Structural reforms and Down-breaks in Growth**

	(1) down3	(2) down3	(3) down3	(4) down3	(5) down3	(6) down3	(7) down3	(8) down3	(9) down3	(10) down3
TR_ch	0.631 (0.492)									
CUR100_ch		-0.776* (0.461)								
AG_ch			-0.585 (0.485)							
NW_ch				-1.480 (1.321)						
DF_ch					-1.092 (1.141)					
BK_ch						-0.913 (1.016)				
SM_ch							-0.341 (0.649)			
CAP100_ch								-0.832* (0.490)		
CAPRES_ch									-0.899** (0.433)	
CAPNONRES_ch										-0.006 (0.310)
polity21	-0.031*** (0.005)	-0.022*** (0.005)	-0.002 (0.005)	-0.007 (0.005)	-0.038*** (0.007)	-0.038*** (0.007)	-0.038*** (0.007)	-0.022*** (0.005)	-0.022*** (0.005)	-0.022*** (0.005)
TOT_Gr	-0.094 (0.247)	-0.188 (0.203)	-0.165 (0.212)	-0.180 (0.206)	-0.262 (0.269)	-0.265 (0.269)	-0.267 (0.268)	-0.185 (0.204)	-0.188 (0.205)	-0.183 (0.204)
Observations	2610	3141	3358	3794	1714	1714	1714	3141	3141	3141
Pseudo R-squared	0.1012	0.0850	0.0569	0.0644	0.1064	0.1062	0.1054	0.0853	0.0872	0.0836

Estimation method: Maximum Likelihood Probit. Robust standard errors in parentheses. All the specifications include year fixed effects. Annual data over 1960-2005 when available. Significance levels: \*\*\* 0.01, \*\* 0.05, \* 0.1

**Table 2 B. Structural reforms and Down-breaks in Growth**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	down3	down3	down3	down3	down3	down3	down3	down3	down3	down3
TR_ch	0.063 (0.058)									
CUR100_ch		-0.058 (0.039)								
AG_ch			-0.026 (0.021)							
NW_ch				-0.030 (0.022)						
DF_ch					-0.080 (0.081)					
BK_ch						-0.066 (0.072)				
SM_ch							-0.022 (0.036)			
CAP100_ch								-0.056 (0.037)		
CAPRES_ch									-0.072* (0.038)	
CAPNONRES_ch										0.003 (0.022)
polity21	-0.003*** (0.001)	-0.002*** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
TOT_Gr	-0.017 (0.030)	-0.022 (0.025)	-0.019 (0.022)	-0.021 (0.022)	-0.038 (0.033)	-0.039 (0.033)	-0.038 (0.033)	-0.022 (0.025)	-0.022 (0.025)	-0.022 (0.025)
Observations	3474	3996	4507	4758	2424	2424	2424	3996	4001	3996
Adjusted R-squared	0.045	0.037	0.026	0.025	0.047	0.047	0.046	0.037	0.038	0.036

Estimation method: Linear Probability Model – OLS. All the specifications include year fixed effects. Robust standard errors in parentheses. Annual data over 1960-2005 when available. Significance levels: \*\*\* 0.01, \*\* 0.05, \* 0.1

**Table 3 A. Structural reforms and Up-breaks in Growth**

	(1) up3	(2) up3	(3) up3	(4) up3	(5) up3	(6) up3	(7) up3	(8) up3	(9) up3	(10) up3
TR_ch	0.023 (0.054)									
CUR100_ch		0.071 (0.057)								
AG_ch			0.050 (0.041)							
NW_ch				-0.000 (0.053)						
DF_ch					0.177** (0.089)					
BK_ch						0.155* (0.082)				
SM_ch							0.029 (0.042)			
CAP100_ch								0.124** (0.048)		
CAPRES_ch									0.098*** (0.036)	
CAPNONRES_ch										0.076* (0.042)
polity21	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
TOT_Gr	-0.036 (0.028)	-0.021 (0.025)	-0.019 (0.021)	-0.017 (0.021)	-0.061* (0.037)	-0.060 (0.037)	-0.060 (0.037)	-0.022 (0.025)	-0.022 (0.025)	-0.022 (0.025)
Observations	3474	3996	4507	4758	2424	2424	2424	3996	4001	3996
Adjusted R-squared	0.061	0.051	0.060	0.058	0.062	0.062	0.060	0.053	0.053	0.052

Estimation method: Linear Probability Model – OLS. All the specifications include country and year fixed effects. Robust standard errors in parentheses. Annual data over 1960-2005 when available. Significance levels: \*\*\* 0.01, \*\* 0.05, \* 0.1

**Table 3 B. Structural reforms and Up-breaks in Growth**

	(1) up3	(2) up3	(3) up3	(4) up3	(5) up3	(6) up3	(7) up3	(8) up3	(9) up3	(10) up3
TR_ch	0.284 (0.545)									
CUR100_ch		0.939* (0.549)								
AG_ch			0.674 (0.460)							
NW_ch				-0.365 (1.049)						
DF_ch					2.222** (1.100)					
BK_ch						2.070** (0.991)				
SM_ch							0.200 (0.612)			
CAP100_ch								1.515*** (0.493)		
CAPRES_ch									1.240*** (0.394)	
CAPNONRES_ch										1.067** (0.497)
polity21	-0.018* (0.011)	-0.015 (0.010)	0.000 (0.011)	-0.003 (0.010)	-0.014 (0.013)	-0.014 (0.013)	-0.014 (0.013)	-0.016 (0.010)	-0.015 (0.010)	-0.015 (0.010)
TOT_Gr	-0.531 (0.367)	-0.308 (0.314)	-0.308 (0.333)	-0.302 (0.316)	-0.839** (0.394)	-0.831** (0.394)	-0.808** (0.393)	-0.310 (0.315)	-0.310 (0.315)	-0.320 (0.315)
Observations	3474	3996	4507	4758	2424	2424	2424	3996	4001	3996

Estimation method: Random Effects Probit. All the specifications include year fixed effects. Standard errors in parentheses. Annual data over 1960-2005 when available. Significance levels: \*\*\* 0.01, \*\* 0.05, \* 0.1.

**Table 3 C. Structural reforms and Up-breaks in Growth**

	(1) up3	(2) up3	(3) up3	(4) up3	(5) up3	(6) up3	(7) up3	(8) up3	(9) up3	(10) up3
TR_ch	0.431 (1.113)									
CUR100_ch		1.845* (1.115)								
AG_ch			1.714* (0.970)							
NW_ch				-0.714 (1.995)						
DF_ch					4.806** (2.237)					
BK_ch						4.527** (2.055)				
SM_ch							0.629 (1.199)			
CAP100_ch								2.614*** (0.939)		
CAPRES_ch									2.105*** (0.732)	
CAPNONRES_ch										1.993** (0.979)
polity21	0.002 (0.026)	0.008 (0.024)	0.013 (0.025)	0.011 (0.023)	0.023 (0.033)	0.023 (0.033)	0.021 (0.033)	0.007 (0.024)	0.008 (0.024)	0.008 (0.024)
TOT_Gr	-0.984 (0.728)	-0.605 (0.639)	-0.484 (0.677)	-0.563 (0.644)	-1.677** (0.786)	-1.669** (0.787)	-1.571** (0.778)	-0.607 (0.639)	-0.625 (0.636)	-0.616 (0.643)
Observations	1298	1602	1559	1639	879	879	879	1602	1602	1602

Estimation method: Fixed Effects Logit. All the specifications include year fixed effects. Standard errors in parentheses. Annual data over 1960-2005 when available. Significance levels: \*\*\* 0.01, \*\* 0.05, \* 0.1.

**Table 4 A. Structural reforms and Down-breaks in Growth**

	(1) down3	(2) down3	(3) down3	(4) down3	(5) down3	(6) down3	(7) down3	(8) down3	(9) down3	(10) down3
TR_ch	0.063 (0.058)									
CUR100_ch		-0.063 (0.039)								
AG_ch			-0.017 (0.022)							
NW_ch				-0.026 (0.027)						
DF_ch					-0.073 (0.081)					
BK_ch						-0.059 (0.072)				
SM_ch							-0.021 (0.037)			
CAP100_ch								-0.060 (0.038)		
CAPRES_ch									-0.075** (0.038)	
CAPNONRES_ch										-0.001 (0.024)
polity21	-0.004*** (0.001)	-0.004*** (0.001)	-0.001 (0.001)	-0.001* (0.001)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
TOT_Gr	-0.016 (0.030)	-0.023 (0.025)	-0.019 (0.021)	-0.022 (0.021)	-0.037 (0.032)	-0.038 (0.032)	-0.037 (0.033)	-0.023 (0.025)	-0.023 (0.025)	-0.023 (0.025)
Observations	3474	3996	4507	4758	2424	2424	2424	3996	4001	3996
Adjusted R-squared	0.066	0.062	0.064	0.062	0.069	0.069	0.069	0.062	0.062	0.061

Estimation method: Linear Probability Model – OLS. All the specifications include country and year fixed effects. Robust standard errors in parentheses. Annual data over 1960-2005 when available. Significance levels: \*\*\* 0.01, \*\* 0.05, \* 0.1

**Table 4 B. Structural reforms and Down-breaks in Growth**

	(1) down3	(2) down3	(3) down3	(4) down3	(5) down3	(6) down3	(7) down3	(8) down3	(9) down3	(10) down3
TR_ch	0.743 (0.490)									
CUR100_ch		-0.921 (0.620)								
AG_ch			-0.563 (0.672)							
NW_ch				-1.719 (1.799)						
DF_ch					-1.087 (1.203)					
BK_ch						-0.893 (1.091)				
SM_ch							-0.379 (0.712)			
CAP100_ch								-0.884 (0.583)		
CAPRES_ch									-0.993** (0.442)	
CAPNONRES_ch										0.050 (0.560)
polity21	-0.037*** (0.009)	-0.031*** (0.008)	-0.008 (0.010)	-0.014 (0.009)	-0.047*** (0.011)	-0.047*** (0.011)	-0.047*** (0.011)	-0.031*** (0.008)	-0.031*** (0.008)	-0.031*** (0.008)
TOT_Gr	-0.142 (0.310)	-0.228 (0.269)	-0.189 (0.291)	-0.229 (0.278)	-0.327 (0.366)	-0.330 (0.366)	-0.336 (0.366)	-0.223 (0.269)	-0.228 (0.270)	-0.218 (0.268)
Observations	3474	3996	4507	4758	2424	2424	2424	3996	4001	3996

Estimation method: Random Effects Probit. All the specifications include year fixed effects. Standard errors in parentheses. Annual data over 1960-2005 when available. Significance levels: \*\*\* 0.01, \*\* 0.05, \* 0.1.

**Table 4 C. Structural reforms and Down-breaks in Growth**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	down3	down3	down3	down3	down3	down3	down3	down3	down3	down3
TR_ch	1.356 (0.980)									
CUR100_ch		-1.832 (1.233)								
AG_ch			-0.788 (1.198)							
NW_ch				-4.230 (4.102)						
DF_ch					-1.386 (2.502)					
BK_ch						-1.354 (2.304)				
SM_ch							-0.103 (1.411)			
CAP100_ch								-1.769 (1.137)		
CAPRES_ch									-1.984** (0.874)	
CAPNONRES_ch										0.110 (1.105)
polity21	-0.086*** (0.026)	-0.085*** (0.025)	-0.037 (0.026)	-0.052** (0.025)	-0.117*** (0.033)	-0.118*** (0.033)	-0.118*** (0.034)	-0.084*** (0.025)	-0.085*** (0.025)	-0.086*** (0.025)
TOT_Gr	-0.274 (0.616)	-0.463 (0.535)	-0.383 (0.572)	-0.510 (0.551)	-0.854 (0.767)	-0.856 (0.766)	-0.887 (0.764)	-0.464 (0.535)	-0.486 (0.538)	-0.449 (0.533)
Observations	1644	2164	1941	2172	1085	1085	1085	2164	2169	2164

Estimation method: Fixed Effects Logit. All the specifications include year fixed effects. Standard errors in parentheses. Annual data over 1960-2005 when available. Significance levels: \*\*\* 0.01, \*\* 0.05, \* 0.1.

**Table 5. Baseline Growth Regressions**

Dependent Variable: lnGDP (t)- lnGDP (t-1)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>Real Reforms</b>										
Trade (t-1)		0.022** (0.009)								
Current Account (t-1)			0.028*** (0.007)							
Agriculture (t-1)				0.010 (0.007)						
Networks (t-1)					-0.001 (0.009)					
<b>Financial Reforms</b>										
Domestic Finance (t-1)					0.064*** (0.014)					
Banking (t-1)						0.050*** (0.012)				
Securities (t-1)							0.037*** (0.008)			
Capital (t-1)								0.019*** (0.007)		
Capital (residents) (t-1)									0.015** (0.006)	
Capital (non-residents) (t-1)										0.013** (0.006)
lnGDP (t-1)	-0.040*** (0.009)	-0.038*** (0.009)	-0.026*** (0.008)	-0.032*** (0.008)	-0.042*** (0.008)	-0.041*** (0.008)	-0.047*** (0.008)	-0.037*** (0.008)	-0.036*** (0.009)	-0.037*** (0.008)
Observations	4049	4573	4402	4918	2653	2653	2653	4573	4599	4573
Adjusted R-squared	0.130	0.093	0.098	0.091	0.160	0.155	0.156	0.091	0.090	0.091

Source: International Financial Statistics, Penn World Tables version 6.2, World Development Indicators, and IMF staff estimates.

Notes: Robust standard errors, clustered at country level, in parentheses. \*\*\*, \*\*, and \* denote statistical significance at 1, 5, and 10 percent levels, respectively. All specifications are estimated by OLS and include country and year fixed effects. Annual data over 1960-2005 when available. GDP in real terms and PPP adjusted.

**Table 6. Growth Residuals under Different Levels of Reform and Constraints on Executive Power**

<b>Constraints on Executive</b>	<b>Reforms</b>		
	<i>High</i>	<i>Low</i>	<i>Difference</i>
	<b>Trade Index</b>		
<i>High</i>	0.09435	-0.08597	0.18032
<i>Middle</i>	0.07771	-0.08166	0.15937
<i>Low</i>	0.48323	-0.51286	0.99608
	<b>Current Account Restrictions Index</b>		
<i>High</i>	0.09331	-0.08832	0.18163
<i>Middle</i>	0.46251	-0.45081	0.91332
<i>Low</i>	0.67101	-0.89676	1.56777
	<b>Agriculture Index</b>		
<i>High</i>	-0.05648	0.06476	-0.12124
<i>Middle</i>	0.20025	-0.18901	0.38926
<i>Low</i>	-0.47480	0.43955	-0.91435
	<b>Networks Index</b>		
<i>High</i>	-0.18681	0.11574	-0.30256
<i>Middle</i>	-0.15167	0.17352	-0.32519
<i>Low</i>	-0.02821	0.06062	-0.08883
	<b>Domestic Finance Index</b>		
<i>High</i>	0.21161	-0.22013	0.43174
<i>Middle</i>	0.90357	-0.87318	1.77676
<i>Low</i>	0.78748	-0.86073	1.64821
	<b>Banking Index</b>		
<i>High</i>	0.10388	-0.10118	0.20506
<i>Middle</i>	0.73217	-0.72641	1.45858
<i>Low</i>	0.65072	-0.79532	1.44604
	<b>Securities Index</b>		
<i>High</i>	0.45956	-0.44959	0.90916
<i>Middle</i>	0.44347	-0.45053	0.89401
<i>Low</i>	0.51990	-0.50847	1.02838
	<b>Capital Account Index</b>		
<i>High</i>	0.09012	-0.09048	0.18061
<i>Middle</i>	0.08838	-0.08191	0.17029
<i>Low</i>	0.79224	-1.14005	1.93228
	<b>Capital Account (Residents) Index</b>		
<i>High</i>	0.09036	-0.09000	0.18035
<i>Middle</i>	0.03323	-0.03145	0.06468
<i>Low</i>	0.50517	-0.66674	1.17191
	<b>Capital Account (Nonresidents) Index</b>		
<i>High</i>	0.09409	-0.09422	0.18831
<i>Middle</i>	0.05540	-0.05347	0.10887
<i>Low</i>	0.16962	-0.20073	0.37036

Source: International Financial Statistics, Penn World Tables version 6.2, Polity VI, World Development Indicators, and IMF staff estimates.

Notes: The table shows residual growth under different levels of reforms (high and low) and different levels of constraints on the executive (high, middle, low). High and low levels of reform are defined as above and below the median, respectively. High, middle, and low constraints on executives categories represent countries above, within, and below one-standard deviation from our sample mean, respectively. All growth residuals are calculated with country and year fixed effects, and annual data over 1960-2005 when available. GDP in real terms and PPP adjusted.

**Table 7. Growth Regressions with Constraint to the Executive Interactions  
(Real Sector Reforms)**

Dependent variable: lnGDP (t) – lnGDP (t-1)	(1)	(2)	(3)	(4)
<b>Real Reforms</b>				
Trade (t-1)*CE-High	0.017*			
	(0.009)			
*CE-Middle	0.027**			
	(0.011)			
*CE-Low	0.005			
	(0.035)			
Current Account (t-1)*CE-High		0.024**		
		(0.011)		
*CE-Middle		0.031***		
		(0.009)		
*CE-Low		0.038*		
		(0.022)		
Agriculture (t-1)*CE-High			0.020*	
			(0.012)	
*CE-Middle			0.014	
			(0.009)	
*CE-Low			-0.030	
			(0.024)	
Networks (t-1)*CE-High				-0.009
				(0.009)
*CE-Middle				-0.004
				(0.012)
*CE-Low				-0.068**
				(0.029)
lnGDP (t-1)	-0.040***	-0.036***	-0.026***	-0.032***
	(0.009)	(0.009)	(0.009)	(0.008)
Observations	3956	4390	4230	4663
Adjusted R-squared	0.129	0.090	0.104	0.099

Source: International Financial Statistics, Penn World Tables version 6.2, World Development Indicators, and IMF staff estimates.

Notes: Robust standard errors, clustered at country level, in parentheses. \*\*\*, \*\*, and \* denote statistical significance at 1, 5, and 10 percent levels, respectively. All specifications are estimated by OLS and include country and year fixed effects. Annual data over 1960-2005 when available. GDP in real terms and PPP adjusted. High, middle, and low constraints on executives categories represent countries above, within and below one-standard deviation from our sample mean, respectively.

**Table 8. Growth Regressions with Constraint to the Executive Interactions  
(Financial Sector Reforms)**

Dependent Variable: lnGDP (t) – lnGDP(t-1)	(1)	(2)	(3)	(4)	(5)	(6)
<b>Financial Reforms</b>						
Domestic Finance (t-1)*CE-High	0.062*** (0.015)					
*CE-Middle	0.064*** (0.014)					
*CE-Low	0.056*** (0.018)					
Banking (t-1)*CE-High		0.046*** (0.014)				
*CE-Middle		0.051*** (0.013)				
*CE-Low		0.040** (0.017)				
Securities (t-1)*CE-High			0.040*** (0.008)			
*CE-Middle			0.035*** (0.009)			
*CE-Low			0.033* (0.017)			
Capital (t-1)*CE-High				0.017 (0.011)		
*CE-Middle				0.020** (0.008)		
*CE-Low				0.041 (0.042)		
Capital (resident) (t-1)*CE-High					0.012 (0.009)	
*CE-Middle					0.014* (0.007)	
*CE-Low					0.072* (0.037)	
Capital (non-resident) (t-1)*CE-High						0.014 (0.010)
*CE-Middle						0.015* (0.008)
*CE-Low						-0.009 (0.022)
IGDP1	-0.042*** (0.008)	-0.041*** (0.008)	-0.048*** (0.008)	-0.035*** (0.009)	-0.034*** (0.009)	-0.035*** (0.009)
Observations	2620	2620	2620	4390	4416	4390
Adjusted R-squared	0.156	0.151	0.153	0.088	0.088	0.087

Source: International Financial Statistics, Penn World Tables version 6.2, World Development Indicators, and IMF staff estimates.

Notes: Robust standard errors, clustered at country level, in parentheses. \*\*\*, \*\*, and \* denote statistical significance at 1, 5, and 10 percent levels, respectively. All specifications are estimated by OLS and include country and year fixed effects. Annual data over 1960-2005 when available. GDP in real terms and PPP adjusted. High, middle, and low constraints on executives categories represent countries above, within and below one-standard deviation from our sample mean, respectively.

**Table 9. Schumpeterian Growth Regressions**

Dependent variable: lnGDP (t) – lnGDP (t-1)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>Real Reforms</b>										
Trade (t-1)	0.029*** (0.011)									
Current Account (t-1)		0.028*** (0.009)								
Agriculture (t-1)			0.016* (0.009)							
Networks (t-1)				0.012 (0.012)						
<b>Financial Reforms</b>										
Domestic Finance (t-1)					0.075*** (0.014)					
Banking (t-1)						0.064*** (0.013)				
Securities (t-1)							0.036*** (0.010)			
Capital (t-1)								0.017** (0.008)		
Capital (residents) (t-1)									0.017** (0.007)	
Capital (non-residents) (t-1)										0.008 (0.009)
[Reformj * (GDPj / GDPus) ] (t-1)	-0.049** (0.023)	-0.010 (0.023)	-0.010 (0.023)	-0.033** (0.014)	-0.038** (0.015)	-0.042*** (0.014)	-0.013 (0.015)	-0.004 (0.018)	-0.010 (0.015)	0.005 (0.018)
[GDPj / GDPus](t-1)	-0.065*** (0.023)	-0.074*** (0.021)	-0.057*** (0.019)	-0.064*** (0.018)	-0.080*** (0.021)	-0.079*** (0.020)	-0.103*** (0.021)	-0.076*** (0.022)	-0.071*** (0.020)	-0.081*** (0.023)
Observations	4049	4573	4402	4918	2653	2653	2653	4573	4599	4573
Adjusted R-squared	0.119	0.082	0.093	0.082	0.151	0.148	0.142	0.080	0.080	0.080

Source: International Financial Statistics, Penn World Tables version 6.2, World Development Indicators, and IMF staff estimates.

Notes: Robust standard errors, clustered at country level, in parentheses. \*\*\*, \*\*, and \* denote statistical significance at 1, 5, and 10 percent levels, respectively. All specifications are estimated by OLS and include country and year fixed effects. Annual data over 1960-2005 when available. GDP in real terms and PPP adjusted.

**Table 10. Baseline Growth Regressions  
GMM Arellano Bond**

Dependent variable: lnGDP (t)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>Real Reforms</b>										
Trade (t-1)	0.048*** (0.018)									
Current Account (t-1)		0.035** (0.016)								
Agriculture (t-1)			0.044** (0.018)							
Networks (t-1)				-0.008 (0.022)						
<b>Financial Reforms</b>										
Domestic Finance (t-1)					0.102*** (0.021)					
Banking (t-1)						0.084*** (0.019)				
Securities (t-1)							0.059*** (0.013)			
Capital (t-1)								0.020 (0.016)		
Capital (residents) (t-1)									0.021* (0.012)	
Capital (non-residents) (t-1)										0.009 (0.015)
lnGDP (t-1)	0.900*** (0.027)	0.914*** (0.019)	0.931*** (0.021)	0.912*** (0.020)	0.958*** (0.012)	0.959*** (0.011)	0.945*** (0.013)	0.915*** (0.019)	0.917*** (0.019)	0.915*** (0.019)
Test 2nd order ser. corr.(p-value)	0.4882	0.5843	0.3501	0.4178	0.7945	0.8109	0.7577	0.5801	0.5805	0.5832
Sargan Test	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Observations	3895	4454	4279	4787	2562	2562	2562	4454	4479	4454

Source: International Financial Statistics, Penn World Tables version 6.2, World Development Indicators, and IMF staff estimates.

Notes: Robust standard errors in parentheses. \*\*\*, \*\*, and \* denote statistical significance at 1, 5, and 10 percent levels, respectively. All specifications are estimated by GMM – Arellano Bond with year fixed effects. GMM – Arellano Bond estimator uses two lags and more of income as instrument. Annual data over 1960-2005 when available. GDP in real terms and PPP adjusted.

**Table 11. Growth Regressions with Constraint to the Executive Interactions  
GMM Arellano Bond  
(Real Sector Reforms)**

Dependent variable: lnGDP (t)	(1)	(2)	(3)	(4)
<b>Real Reforms</b>				
Trade (t-1) * CE-High	0.061*			
	(0.035)			
* CE-Middle	0.062***			
	(0.020)			
* CE-Low	-0.013			
	(0.076)			
Current Account (t-1) * CE-High		0.017		
		(0.038)		
* CE-Middle		0.038*		
		(0.022)		
* CE-Low		0.008		
		(0.054)		
Agriculture (t-1) * CE-High			0.059**	
			(0.027)	
* CE-Middle			0.053**	
			(0.021)	
* CE-Low			-0.052	
			(0.040)	
Networks (t-1) * CE-High				-0.035
				(0.029)
* CE-Middle				0.006
				(0.024)
* CE-Low				-0.196**
				(0.083)
lnGDP (t-1)	0.899***	0.915***	0.927***	0.907***
	(0.028)	(0.021)	(0.023)	(0.022)
Test 2nd order ser. corr.(p-value)	0.4922	0.6564	0.3521	0.3905
Sargan Test	0.0000	0.0000	0.0000	0.0000
Observations	3806	4276	4112	4540

Source: International Financial Statistics, Penn World Tables version 6.2, World Development Indicators, and IMF staff estimates.

Notes: Robust standard errors in brackets. \*\*\*, \*\*, and \* denote statistical significance at 1, 5, and 10 percent levels, respectively. All specifications are estimated by GMM – Arellano Bond with year fixed effects. GMM – Arellano Bond estimator uses two lags and more of income as instrument. Annual data over 1960-2005 when available. GDP in real terms and PPP adjusted.

**Table 12. Baseline Growth Regressions with Constraint to the Executive Interactions  
GMM Arellano Bond  
(Financial Sector Reforms)**

Dependent variable: lnGDP (t)	(1)	(2)	(3)	(4)	(5)	(6)
<b>Financial Reforms</b>						
Domestic Finance (t-1) * CE-High	0.086*** (0.025)					
* CE-Middle	0.106*** (0.023)					
* CE-Low	0.099*** (0.025)					
Banking (t-1) * CE-High		0.062*** (0.022)				
* CE-Middle		0.090*** (0.020)				
* CE-Low		0.077*** (0.022)				
Securities (t-1) * CE-High			0.064*** (0.019)			
* CE-Middle			0.059*** (0.014)			
* CE-Low			0.079** (0.031)			
Capital (t-1) * CE-High				0.011 (0.041)		
* CE-Middle				0.028 (0.019)		
* CE-Low				-0.060 (0.069)		
Capital (residents) (t-1) * CE-High					0.006 (0.032)	
* CE-Middle					0.027** (0.013)	
* CE-Low					-0.006 (0.057)	
Capital (non-residents) (t-1) * CE-High						0.022 (0.039)
* CE-Middle						0.016 (0.019)
* CE-Low						-0.080* (0.044)
lnGDP (t-1)	0.958*** (0.012)	0.961*** (0.012)	0.942*** (0.014)	0.912*** (0.022)	0.916*** (0.021)	0.912*** (0.021)
Test 2nd order ser. corr.(p-value)	0.8370	0.8472	0.7903	0.6594	0.6555	0.6557
Sargan Test	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Observations	2530	2530	2530	4276	4301	4276

Source: International Financial Statistics, Penn World Tables version 6.2, World Development Indicators, and IMF staff estimates.

Notes: Robust standard errors in brackets. \*\*\*, \*\*, and \* denote statistical significance at 1, 5, and 10 percent levels, respectively. All specifications are estimated by GMM – Arellano Bond with year fixed effects. Income instrumented by using two lags and more. Annual data over 1960-2005 when available. GDP in real terms and PPP adjusted.

**Table 13. Baseline Growth Regressions with Controls**

Dependent Variable: lnGDP (t)- lnGDP (t-1)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>Real Reforms</b>										
Trade (t-1)	0.022*									
	(0.012)									
Current Account (t-1)		0.033***								
		(0.008)								
Agriculture (t-1)			0.021**							
			(0.009)							
Networks (t-1)				-0.008						
				(0.012)						
<b>Financial Reforms</b>										
Domestic Finance (t-1)					0.060***					
					(0.015)					
Banking (t-1)						0.046***				
						(0.014)				
Securities (t-1)							0.035***			
							(0.009)			
Capital (t-1)								0.023**		
								(0.009)		
Capital (residents) (t-1)									0.016**	
									(0.007)	
Capital (non-residents) (t-1)										0.019**
										(0.009)
lnGDP (t-1)	-0.049***	-0.045***	-0.042***	-0.051***	-0.060***	-0.059***	-0.067***	-0.046***	-0.045***	-0.046***
	(0.010)	(0.013)	(0.013)	(0.015)	(0.012)	(0.012)	(0.013)	(0.012)	(0.013)	(0.012)
Democracy (t-1)	-0.001	-0.001*	-0.001	-0.001	-0.000	-0.000	-0.000	-0.001*	-0.001	-0.001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Terms of trade (t-1)	0.000	-0.000	-0.000	-0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Tertiary enroll (t-1)	0.029*	0.018	0.034	0.030	0.026	0.027	0.028	0.012	0.016	0.013
	(0.016)	(0.019)	(0.023)	(0.022)	(0.018)	(0.018)	(0.019)	(0.019)	(0.020)	(0.020)
Observations	2616	2807	2606	2807	2114	2114	2114	2807	2810	2807
Adjusted R-squared	0.128	0.117	0.139	0.129	0.135	0.130	0.133	0.114	0.112	0.113

Source: International Financial Statistics, Penn World Tables version 6.2, Polity IV, World Development Indicators, and IMF staff estimates.

Notes: Robust standard errors, clustered at country level, in parentheses. \*\*\*, \*\*, and \* denote statistical significance at 1, 5, and 10 percent levels, respectively. All specifications are estimated by OLS and include country and year fixed effects. Annual data over 1960-2005 when available. GDP in real terms and PPP adjusted.

**Table 14. Growth Regressions with Constraint to the Executive Interactions and Controls  
(Real Sector Reforms)**

Dependent Variable: lnGDP (t)- lnGDP (t-1)	(1)	(2)	(3)	(4)
<b>Real Reforms</b>				
Trade (t-1)*CE-High	0.016 (0.012)			
*CE-Middle	0.025* (0.013)			
*CE-Low	0.018 (0.046)			
Current Account (t-1)*CE-High		0.033*** (0.011)		
*CE-Middle		0.033*** (0.010)		
*CE-Low		0.027 (0.017)		
Agriculture (t-1)*CE-High			0.025 (0.018)	
*CE-Middle			0.022** (0.010)	
*CE-Low			0.003 (0.007)	
Networks (t-1)*CE-High				-0.010 (0.011)
*CE-Middle				-0.007 (0.016)
*CE-Low				-0.015 (0.036)
lnGDP (t-1)	-0.050*** (0.010)	-0.045*** (0.013)	-0.042*** (0.013)	-0.051*** (0.015)
Democracy (t-1)	-0.001* (0.000)	-0.001* (0.000)	-0.001 (0.000)	-0.001 (0.000)
Terms of trade (t-1)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Tertiary enroll (t-1)	0.030* (0.017)	0.018 (0.018)	0.032 (0.023)	0.032 (0.024)
Observations	2616	2807	2606	2807
Adjusted R-squared	0.128	0.117	0.139	0.128

Source: International Financial Statistics, Penn World Tables version 6.2, Polity IV, World Development Indicators, and IMF staff estimates.

Notes: Robust standard errors, clustered at country level, in parentheses. \*\*\*, \*\*, and \* denote statistical significance at 1, 5, and 10 percent levels, respectively. All specifications are estimated by OLS and include country and year fixed effects. Annual data over 1960-2005 when available. GDP in real terms and PPP adjusted. High, middle, and low constraints on executives categories represent countries above, within and below one-standard deviation from our sample mean, respectively.

**Table 15. Growth Regressions with Constraint to the Executive Interactions and Controls  
(Financial Sector Reforms)**

Dependent Variable: lnGDP (t) - lnGDP(t-1)	(1)	(2)	(3)	(4)	(5)	(6)
<b>Financial Reforms</b>						
Domestic Finance (t-1)*CE-High	0.057*** (0.017)					
*CE-Middle	0.061*** (0.017)					
*CE-Low	0.049** (0.019)					
Banking (t-1)*CE-High		0.040*** (0.015)				
*CE-Middle		0.048*** (0.016)				
*CE-Low		0.033* (0.018)				
Securities (t-1)*CE-High			0.038*** (0.009)			
*CE-Middle			0.034*** (0.012)			
*CE-Low			0.025 (0.023)			
Capital (t-1)*CE-High				0.024* (0.014)		
*CE-Middle				0.022** (0.011)		
*CE-Low				0.030 (0.018)		
Capital (resident) (t-1)*CE-High					0.016 (0.011)	
*CE-Middle					0.016* (0.008)	
*CE-Low					0.022 (0.016)	
Capital (non-resident) (t-1)*CE-High						0.023* (0.013)
*CE-Middle						0.017 (0.012)
*CE-Low						0.020 (0.025)
lnGDP (t-1)	-0.060*** (0.012)	-0.059*** (0.012)	-0.067*** (0.013)	-0.046*** (0.013)	-0.045*** (0.013)	-0.046*** (0.013)
Democracy (t-1)	-0.000 (0.001)	-0.000 (0.000)	-0.000 (0.001)	-0.001 (0.000)	-0.001 (0.000)	-0.001 (0.000)
Terms of trade (t-1)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Tertiary enroll (t-1)	0.027 (0.021)	0.030 (0.021)	0.026 (0.020)	0.011 (0.020)	0.016 (0.020)	0.011 (0.019)
Observations	2114	2114	2114	2807	2810	2807
Adjusted R-squared	0.134	0.130	0.132	0.113	0.112	0.113

Source: International Financial Statistics, Penn World Tables version 6.2, Polity IV, World Development Indicators, and IMF staff estimates.

Notes: Robust standard errors, clustered at country level, in parentheses. \*\*\*, \*\*, and \* denote statistical significance at 1, 5, and 10 percent levels, respectively. All specifications are estimated by OLS and include country and year fixed effects. Annual data over 1960-2005 when available. GDP in real terms and PPP adjusted. High, middle, and low constraints on executives categories represent countries above, within and below one-standard deviation from our sample mean, respectively.

**Table 16. Schumpeterian Growth Regressions with Controls**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable: lnGDP(t)-lnGDP(t-1)										
<b>Real Reforms</b>										
Trade(t-1)	0.022 (0.019)									
Current Account(t-1)		0.028** (0.012)								
Agriculture(t-1)			0.029** (0.012)							
Networks(t-1)				0.004 (0.017)						
<b>Financial Reforms</b>										
Domestic Finance (t-1)					0.084*** (0.018)					
Banking(t-1)						0.073*** (0.017)				
Securities(t-1)							0.034*** (0.012)			
Capital (t-1)								0.018 (0.011)		
Capital (resident) (t-1)									0.010 (0.009)	
Capital (non-resident) (t-1)										0.020 (0.012)
[Reform] <sup>*</sup> (GDPj/GDPus) (t-1)	-0.028 (0.051)	0.033 (0.037)	-0.016 (0.034)	-0.016 (0.020)	-0.060** (0.024)	-0.064*** (0.023)	-0.009 (0.018)	0.021 (0.025)	0.028 (0.023)	-0.002 (0.025)
[GDPj/GDPus](t-1)	-0.097** (0.042)	-0.110*** (0.031)	-0.062 (0.041)	-0.078* (0.042)	-0.103*** (0.038)	-0.103*** (0.037)	-0.134*** (0.038)	-0.093** (0.038)	-0.099*** (0.035)	-0.077* (0.040)
Democracy (t-1)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Terms of trade (t-1)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Tertiary enroll (t-1)	0.001 (0.015)	-0.021 (0.018)	0.007 (0.018)	-0.004 (0.018)	0.027 (0.020)	0.032 (0.020)	-0.001 (0.018)	-0.025 (0.017)	-0.023 (0.017)	-0.017 (0.016)
Observations	2616	2807	2606	2807	2114	2114	2114	2807	2810	2807
Adjusted R-squared	0.115	0.106	0.128	0.111	0.118	0.116	0.109	0.101	0.100	0.100

Source: International Financial Statistics, Penn World Tables version 6.2, Polity IV, World Development Indicators, and IMF staff estimates.

Notes: Robust standard errors, clustered at country level, in parentheses. \*\*\*, \*\*, and \* denote statistical significance at 1, 5, and 10 percent levels, respectively. All specifications are estimated by OLS and include country and year fixed effects. Annual data over 1960-2005 when available. GDP in real terms and PPP adjusted.

**Table 17. Baseline Growth Regressions: 3-year intervals**

Dependent Variable: lnGDP (t)- lnGDP (t-1)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>Real Reforms</b>										
Trade (t-1)	0.033 (0.024)									
Current Account (t-1)		0.070*** (0.020)								
Agriculture (t-1)			0.014 (0.018)							
Networks (t-1)				0.004 (0.026)						
<b>Financial Reforms</b>										
Domestic Finance (t-1)					0.137*** (0.038)					
Banking (t-1)						0.110*** (0.038)				
Securities (t-1)							0.074*** (0.021)			
Capital (t-1)								0.060*** (0.021)		
Capital (residents) (t-1)									0.041** (0.021)	
Capital (non-residents) (t-1)										0.045** (0.019)
lnGDP (t-1)	-0.115*** (0.020)	-0.119*** (0.022)	-0.095*** (0.024)	-0.107*** (0.023)	-0.183*** (0.027)	-0.182*** (0.027)	-0.195*** (0.027)	-0.120*** (0.022)	-0.117*** (0.022)	-0.118*** (0.021)
Observations	1271	1466	1411	1581	802	802	802	1466	1472	1466
Adjusted R-squared	0.292	0.231	0.213	0.207	0.366	0.361	0.361	0.229	0.225	0.227

Source: International Financial Statistics, Penn World Tables version 6.2, World Development Indicators, and IMF staff estimates.

Notes: Robust standard errors, clustered at country level, in parentheses. \*\*\*, \*\*, and \* denote statistical significance at 1, 5, and 10 percent levels, respectively. All specifications are estimated by OLS and include country and year fixed effects. Three year interval data over 1960-2005. GDP in real terms and PPP adjusted.

**Table 18. Growth Regressions with Constraint to the Executive Interactions: 3-year intervals  
(Real Sector Reforms)**

Dependent variable: lnGDP (t) – lnGDP (t-1)	(1)	(2)	(3)	(4)
<b>Real Reforms</b>				
Trade (t-1)*CE-High	0.037 (0.026)			
*CE-Middle	0.046 (0.031)			
*CE-Low	-0.060 (0.069)			
Current Account (t-1)*CE-High		0.062* (0.032)		
*CE-Middle		0.073*** (0.026)		
*CE-Low		0.133** (0.053)		
Agriculture (t-1)*CE-High			0.075 (0.051)	
*CE-Middle			0.012 (0.020)	
*CE-Low			-0.079 (0.070)	
Networks (t-1)*CE-High				-0.019 (0.027)
*CE-Middle				-0.001 (0.035)
*CE-Low				-0.161 (0.111)
lnGDP (t-1)	-0.115*** (0.020)	-0.113*** (0.024)	-0.094*** (0.024)	-0.105*** (0.024)
Observations	1242	1409	1357	1501
Adjusted R-squared	0.293	0.221	0.226	0.221

Source: International Financial Statistics, Penn World Tables version 6.2, World Development Indicators, and IMF staff estimates.

Notes: Robust standard errors, clustered at country level, in parentheses. \*\*\*, \*\*, and \* denote statistical significance at 1, 5, and 10 percent levels, respectively. All specifications are estimated by OLS and include country and year fixed effects. Three year interval data over 1960-2005. GDP in real terms and PPP adjusted. High, middle, and low constraints on executives categories represent countries above, within and below one-standard deviation from our sample mean, respectively.

**Table 19. Growth Regressions with Constraint to the Executive Interactions: 3-year intervals  
(Financial Sector Reforms)**

Dependent Variable: lnGDP (t) – lnGDP(t-1)	(1)	(2)	(3)	(4)	(5)	(6)
<b>Financial Reforms</b>						
Domestic Finance (t-1)*CE-High	0.134*** (0.042)					
*CE-Middle	0.134*** (0.041)					
*CE-Low	0.110* (0.063)					
Banking (t-1)*CE-High		0.104** (0.041)				
*CE-Middle		0.110*** (0.041)				
*CE-Low		0.078 (0.061)				
Securities (t-1)*CE-High			0.082*** (0.021)			
*CE-Middle			0.066** (0.028)			
*CE-Low			0.070 (0.078)			
Capital (t-1)*CE-High				0.047 (0.033)		
*CE-Middle				0.057** (0.027)		
*CE-Low				0.278*** (0.105)		
Capital (resident) (t-1)*CE-High					0.032 (0.027)	
*CE-Middle					0.036 (0.025)	
*CE-Low					0.255** (0.112)	
Capital (non-resident) (t-1)*CE-High						0.037 (0.028)
*CE-Middle						0.043 (0.026)
*CE-Low						0.142** (0.059)
lnGDP (t-1)	-0.181*** (0.028)	-0.179*** (0.028)	-0.194*** (0.028)	-0.111*** (0.023)	-0.109*** (0.023)	-0.111*** (0.023)
Observations	792	792	792	1409	1415	1409
Adjusted R-squared	0.357	0.353	0.353	0.221	0.219	0.217

Source: International Financial Statistics, Penn World Tables version 6.2, World Development Indicators, and IMF staff estimates.

Notes: Robust standard errors, clustered at country level, in parentheses. \*\*\*, \*\*, and \* denote statistical significance at 1, 5, and 10 percent levels, respectively. All specifications are estimated by OLS and include country and year fixed effects. Three year interval data over 1960-2005. GDP in real terms and PPP adjusted. High, middle, and low constraints on executives categories represent countries above, within and below one-standard deviation from our sample mean, respectively.

**Table 20. Schumpeterian Growth Regressions: 3-year intervals**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	GDP Gr									
<b>Real Reforms</b>										
Trade(t-1)	0.041 (0.032)									
Current Account(t-1)		0.065** (0.030)								
Agriculture (t-1)			0.025 (0.024)							
Networks (t-1)				0.038 (0.038)						
<b>Financial Reforms</b>										
Domestic Finance (t-1)					0.174*** (0.044)					
Banking (t-1)						0.159*** (0.043)				
Securities (t-1)							0.061** (0.028)			
Capital (t-1)								0.048* (0.029)		
Capital( resident) (t-1)									0.039 (0.024)	
Capital( non residents)										0.028 (0.031)
[Reform] <sub>j</sub> * (GDP <sub>j</sub> /GDP <sub>us</sub> )] (t-1)	-0.078 (0.077)	-0.001 (0.071)	0.005 (0.082)	-0.089** (0.044)	-0.113** (0.053)	-0.125** (0.049)	-0.008 (0.052)	0.010 (0.060)	-0.005 (0.048)	0.031 (0.061)
[GDP] <sub>j</sub> /GDP <sub>us</sub> (t-1)	-0.304*** (0.084)	-0.298*** (0.074)	-0.263*** (0.072)	-0.251*** (0.059)	-0.447*** (0.090)	-0.443*** (0.090)	-0.532*** (0.088)	-0.303*** (0.071)	-0.288*** (0.067)	-0.312*** (0.071)
Observations	1271	1466	1411	1581	802	802	802	1466	1472	1466
Adjusted R-squared	0.276	0.207	0.200	0.185	0.334	0.333	0.317	0.204	0.202	0.203

Source: International Financial Statistics, Penn World Tables version 6.2, World Development Indicators, and IMF staff estimates.

Notes: Robust standard errors, clustered at country level, in parentheses. \*\*\*, \*\*, and \* denote statistical significance at 1, 5, and 10 percent levels, respectively. All specifications are estimated by OLS and include country and year fixed effects. Three year interval data over 1960-2005. GDP in real terms and PPP adjusted.

## Appendix 1. List of Countries in the Sample

Low Income	Middle Income	High Income
Bangladesh	Albania	Australia
Burkina Faso	Algeria	Austria
Côte d'Ivoire	Argentina	Belgium
Ethiopia	Azerbaijan	Canada
Ghana	Belarus	Czech Republic
India	Bolivia	Denmark
Kenya	Brazil	Estonia
Madagascar	Bulgaria	Finland
Mozambique	Cameroon	France
Nepal	Chile	Germany
Nigeria	China	Greece
Pakistan	Colombia	Hong Kong SAR
Senegal	Costa Rica	Ireland
Tanzania	Dominican Republic	Israel
Uganda	Ecuador	Italy
Uzbekistan	Egypt, Arab Rep.	Japan
Vietnam	El Salvador	Korea, Rep.
Zimbabwe	Georgia	Netherlands
	Guatemala	New Zealand
	Hungary	Norway
	Indonesia	Portugal
	Jamaica	Singapore
	Jordan	Spain
	Kazakhstan	Sweden
	Latvia	Switzerland
	Lithuania	Taiwan Province of China
	Malaysia	United Kingdom
	Mexico	United States
	Morocco	
	Nicaragua	
	Paraguay	
	Peru	
	Philippines	
	Poland	
	Romania	
	Russian Federation	
	South Africa	
	Sri Lanka	
	Thailand	
	Tunisia	
	Turkey	
	Ukraine	
	Uruguay	
	Venezuela, Rep. Bolivariana	

Source: World Bank

## Appendix 2. Description of Reform Indices

Reform Indices	Description	Source	Coverage			
			Start Year	End Year	MIN# of Countries in any Year	MAX# of Countries in any Year
<b>Real Indices</b>						
Trade Openness						
Tariff Rates	Average tariff rates, with missing values extrapolated using implicit weighted tariff rates. Index normalized to be between zero and unity: zero means the tariff rates are 60 percent or higher, while unity means the tariff rates are zero.	Various sources, including IMF, World Bank, WTO, UN, and the academic literature (particularly Clemens and Williamson, 2004)	1960	2005	47	142
Current-Account Restrictions	An indicator of how compliant a government is with its obligations under the IMF's Article VIII to free from government restriction the proceeds from international trade in goods and services. The index represents the sum of two sub-components, dealing with restrictions on trade in visibles, as well as in invisibles (financial and other services). It distinguishes between restrictions on residents (receipts for exports) and on non-residents (payments for imports). Although the index measures restrictions on the proceeds from transactions, rather than on the underlying transactions, many countries in practice use restrictions on trade proceeds as a type of trade restriction. The index is scored between zero and 8 in half-integer units, with 8 indicating full compliance.	Quinn (1997), and Quinn and Toyoda (2007; forthcoming).	1960	2005	50	65
<b>Product Markets</b>						
Telecom and Electricity Industries	Simple average of the electricity and telecom markets sub-indices, which are constructed, in turn, from scores along three dimensions. For electricity, they capture: (i) the degree of unbundling of generation, transmission, and distribution; (ii) whether a regulator other than government has been established; and (iii) whether the wholesale market has been liberalized. For telecom, they capture: (i) the degree of competition in local services; (ii) whether a regulator other than government has been established; and (iii) the degree of liberalization of interconnection changes. Indices are coded with values ranging from zero (not liberalized) to two (completely liberalized).	Based on legislation and other official documents.	1960	2003	106	108

## Appendix 2. Description of Reform Indices

Reform Indices	Description	Source	Coverage			
			Start Year	End Year	MIN # of Countries in any Year	MAX # of Countries in any Year
<b>Real Indices</b>						
<b>Real Indices</b>						
Agriculture	Given that developing countries constitute most of our sample, the degree of regulation in agriculture, which continues to account for a large part of many of these economies, is an essential aspect of product market competition. Index aims to capture intervention in the market for the main agricultural export commodity in each country. As data limitations preclude coding separate dimensions of intervention, the index provides a summary measure of intervention. Each country-year pair is assigned one of four degrees of intervention: (i) maximum (public monopoly or monopsony in production, transportation, or marketing); (ii) high (administered prices); (iii) moderate (public ownership in relevant producers, concession requirements); and (iv) no intervention.	Based on legislation and other official documents.	1960	2003	96	104
<b>Financial Indices</b>						
Capital Account Openness: Aggregate	Qualitative indicators of restrictions on financial credits and personal capital transactions of residents and financial credits to nonresidents, as well as the use of multiple exchange rates. Index coded from zero (fully repressed) to three (fully liberalized).	Abiad and others (2008), which follows the methodology in Abiad and Mody (2005). The original sources are mostly various IMF reports and working papers, but also central bank websites, etc.	1973	2005	72	91
Capital Account Openness: Residents (nonresidents) only	Measures the extent to which residents (nonresidents) are free from legal restrictions to move capital into and out of a country.	Resident/nonresident-specific indices are based on Quinn (1997), and Quinn and Toyoda (2007).				
Domestic Financial Liberalization	The index of domestic financial liberalization is an average of six sub-indices. Five of them relate to <i>banking</i> : (i) interest rate controls, such as floors or ceilings; (ii) credit controls, such as directed credit, and subsidized lending; (iii) competition restrictions, such as limits on branches and entry barriers in the banking sector, including licensing requirements or limits on foreign banks; (iv) the degree of state ownership; and (v) the quality of banking supervision and regulation, including power of independence of bank supervisors, adoption of a Basel I capital adequacy ratio, and framework for bank inspections. The sixth sub index refers to the regulation of <i>securities markets</i> , including policies to encourage the development of bond and equity markets, and to permit access of the domestic stock market to foreigners. The sub-indices are aggregated with equal weights. Each sub-index is coded from zero (fully repressed) to three (fully liberalized).					

### Appendix 3. Down and Up Breaks in Economic Growth

Down Breaks		Down Breaks		Up Breaks		Up Breaks	
country	year	country	year	country	year	country	year
Antigua Barb	1988	Liberia	1986	Antigua Barb	1978	Kuwait	1990
Austria	1973	Luxembourg	1991	Bangladesh	1995	Lao	1978
Barbados	1971	Madagascar	1971	Bolivia	1986	Liberia	1994
Belgium	1974	Malaysia	1972	Burkina Faso	1998	Luxembourg	1983
Belize	1980	Malaysia	1980	Cambodia	1987	Malaysia	1964
Bhutan	1987	Malaysia	1996	Cameroon	1978	Malaysia	1988
Bolivia	1977	Maldives	1990	Cameroon	1994	Mali	1969
Botswana	1989	Malta	1979	Chile	1983	Mauritius	1960
Brazil	1980	Mexico	1981	China	1977	Morocco	1960
Burundi	1992	Morocco	1968	Costa Rica	1991	Mozambique	1995
Cameroon	1986	Morocco	1982	Cuba	1980	Namibia	1998
Chile	1971	Nicaragua	1976	Cuba	1996	Nepal	1980
Comoros	1968	Niger	1981	Djibouti	1998	Nicaragua	1993
Comoros	1988	Nigeria	1960	Dominica	1980	Nigeria	1968
Congo	1982	Nigeria	1977	Ecuador	1971	Nigeria	1987
Costa Rica	1979	Pakistan	1970	Egypt	1975	Pakistan	1962
Cote D'Ivoire	1979	Pakistan	1988	Equat Guinea	1994	Pakistan	1978
Cuba	1988	Panama	1981	Ethiopia	1987	Paraguay	1973
Denmark	1969	Papua New G.	1978	Ghana	1965	Philippines	1998
Djibouti	1987	Paraguay	1981	Ghana	1981	Qatar	1996
Dominica	1988	Philippines	1981	Ghana	1997	Rwanda	1994
Ecuador	1979	Portugal	1973	Greece	1962	Samoa	1994
Egypt	1983	Romania	1979	Greece	1996	Sao Tome Pr	1987
El Salvador	1978	Rwanda	1986	Guatemala	1988	South Africa	1995
Equat Guinea	1977	Samoa	1978	Guinea	1994	St Lucia	1981
Ethiopia	1979	Samoa	1986	Haiti	1989	Suriname	1995
France	1973	Sao Tome Pr	1979	Haiti	1997	Syria	1990
Gabon	1976	Sierra Leone	1985	Hungary	1996	Taiwan	1962
Ghana	1973	South Africa	1983	India	1994	Tanzania	1996
Ghana	1989	Spain	1974	Indonesia	1968	Thailand	1987
Greece	1973	St Lucia	1989	Iran	1989	Togo	1987
Guatemala	1980	Swaziland	1979	Ireland	1993	Tonga	1979
Haiti	1980	Sweden	1970	Jamaica	1980	Trinidad Tob	1974
Hong Kong	1988	Switzerland	1973	Jordan	1975	Trinidad Tob	1990
Hungary	1979	Syria	1982	Korea	1962	Tunisia	1995
Hungary	1988	Syria	1998			Uganda	1988
Indonesia	1977	Taiwan	1996				
Iran	1976	Tanzania	1968				
Italy	1974	Thailand	1995				
Jamaica	1972	Togo	1969				
Japan	1973	Togo	1979				
Jordan	1967	Tonga	1987				
Jordan	1986	Trinidad Tob	1966				
Korea	1996	Trinidad Tob	1982				
		Tunisia	1972				
		Zimbabwe	1991				