INTERNATIONAL MONETARY FUND

Structural Reforms and Economic Performance in Advanced and Developing Countries

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Executive Summary

Economic policy agendas in member countries—even as they have been dominated over the past year by the response to the global financial crisis—will, going forward, increasingly need to refocus on core issues related to strengthening medium-run economic performance, including both average growth and resilience to shocks. This paper examines the contribution of structural policies—that is, policies that increase the role of market forces and competition in the economy, while maintaining appropriate regulatory frameworks to deal with market failures—to economic performance. The results are based on a new dataset covering reforms of domestic product markets, international trade, the domestic financial sector, and the external capital account, in 91 developed and developing countries. The key results are:

- There has been a broad tendency to pursue structural reforms across all segments of the Fund's membership over the past three decades. Reforms have been driven by a number of factors, including the quality of broad political institutions in advanced economies early in the sample, and a catch-up effect spurring reform in developing countries subsequently, as sizeable cross-country reform gaps—with respect either to reform "leaders" or reformist "neighbors"—emerged. There is also evidence that IMF-supported programs and, in the case of some sectors, economic crises, have helped to catalyze structural reforms.
- Real and financial sector reforms have boosted per capita income growth in all segments of the Fund's membership, with domestic financial sector liberalization, trade liberalization, and farm sector liberalization exerting particularly large effects.
- Financial sector reforms have raised growth through a number of channels, including a reduction in domestic credit constraints and larger inflows of foreign direct investment. Structural reforms have exerted (statistically and economically) meaningful effects on allocative efficiency, as firms across different sectors react to the shifts in comparative advantage brought about by deregulation. The growth effects of financial and real sector reforms also reflect a more favorable assessment of the future profitability and solvency of domestic firms as embodied in their credit ratings.
- Growth effects differ significantly across alternative reform sequencing strategies. A trade-before-capital-account strategy achieves better outcomes than the reverse sequence, or even than a "big bang" where reforms are pursued together. Liberalizing the domestic financial sector together with the external capital account is also growth-enhancing provided the economy is relatively open to international trade. While the data do not speak loudly on the relative growth benefits of pursuing domestic financial reform versus external capital account liberalization early in the reform process, the stability benefits of early domestic financial sector liberalization dominate those of early capital account liberalization.
- The stability benefits flowing from domestic financial sector reform are also evident in the way in which economies respond to real and financial shocks, with relatively liberalized domestic financial sectors reducing the output costs from adverse terms-of-trade and interest-rate shocks. A variety of mechanisms—especially improvements in credit availability—play a key role in enhancing the economy's resilience to shocks.

I. INTRODUCTION

1. The economic policy agenda in both developed and developing countries—even as it has been dominated for much of the past year by the response to the global financial crisis—will, going forward, increasingly need to refocus on issues related to strengthening medium-term economic performance, including economic growth and resilience. The Fund has a key role to play, through its surveillance activities, in advising country authorities on these issues, including leveraging the lessons from cross-country experience for policy formulation at the national level, and drawing implications about the kind of policies that lead to more favorable "real-financial" linkages in response to country and global shocks. The Fund's role is tied to its responsibilities under Article IV of the Articles of Agreement to ensure that members' economic policies foster sound medium-term economic growth and stability.

2. The stability-cum-growth objective, while very broad, is linked to policies geared to: strengthening market incentives and raising economic efficiency; boosting the sustainable rate of potential growth; and enhancing the economy's ability to absorb shocks. This, of course, is the traditional purview of structural policies, that is, policies that increase the role of market forces and competition in the economy, including by fostering both domestic and international trade and financial flows, while maintaining appropriate regulatory frameworks in the case of market failures or identified externalities. While progress has been made in understanding the role of such policies, empirical evidence based on a consistent global dataset is lacking, with previous studies focused mainly either on the experience of industrial countries or of the transition economies. The paucity of comparable data on indicators of structural reform across the full gamut of different income groups and regions has undoubtedly been a factor behind the lack of global reach of past empirical studies.

3. This paper examines the effects of structural reforms on two aspects of economic performance—medium-run growth and macroeconomic stability/resilience—from a global standpoint, and in so doing improves the analytical basis of Fund policy advice by drawing on the lessons from broad cross-country experience. Underpinning the results is a significant data collection effort, involving the compilation of indicators of structural reform for a large sample of 91 developing and developed countries over the past three decades. Not only is the resulting dataset unique in its country and time coverage, it also is much broader in terms of the sectoral coverage of reforms—including indicators of liberalization in domestic product markets; international trade; several indicators of liberalization of the domestic financial sector; and measures of the external capital account liberalization. The dataset's breadth along the sectoral dimension is essential to address issues of reform sequencing, an area that has generated much thought from a theoretical standpoint, but where systematic cross-country evidence—as opposed to smaller-scale case studies—is sorely lacking.

4. The analysis in the paper yields a number of significant results:

- There has been a broad tendency to pursue structural reforms across all segments of the Fund's membership over the past three decades. Low- and middle-income countries have on average reached the degree of liberalization achieved by the industrial countries in the early 1990s in the areas of product market and domestic financial sector liberalization, with larger, but shrinking, reform gaps in trade and external capital account liberalization.

- Reforms across the Fund's membership appear to have been driven by a number of factors, including the quality of broad political institutions in advanced economies early in the sample, and a significant catch-up effect spurring reform in developing countries subsequently, as sizeable cross-country reform gaps—with respect either to reform "leaders" or reformist "neighbors"—emerged. There is also evidence that IMF-supported programs and, for some sectors, economic crises, have helped to catalyze structural reforms.

- Real and financial sector reforms have exerted an economically significant impact on per capita income growth in all segments of the Fund's membership, with domestic financial sector liberalization, trade liberalization, and liberalization of the agricultural sector exerting particularly favorable effects. A number of channels are in evidence, including a reduction in credit constraints to, and borrowing costs for, capital accumulation, and larger inflows of foreign direct investment (FDI) that seem to result from external capital account liberalization. There is also evidence that structural reforms help to raise allocative efficiency, as firms across different sectors react to the shifts in comparative advantage brought about by deregulation. Firms that are highly dependent on imported intermediate inputs in production, for example, see large growth benefits from trade liberalization, while firms with a high dependence on external finance for their investments see particular growth benefits from financial sector liberalization. The impact of financial and real sector reform on economic growth also seems to reflect a more favorable assessment of the future profitability and solvency of domestic firms as embodied in their credit ratings.

- Growth effects differ significantly across alternative structural reform sequencing strategies. There is strong evidence supporting the view that economies that liberalize trade before the external capital account grow more rapidly than those that follow the reverse sequence. There is also evidence that a parallel pursuit of both domestic financial sector reform and external capital account liberalization—provided that the trade regime is relatively open—is a growth-friendly reform strategy. While the data do not speak loudly on the relative growth benefits of pursuing domestic financial sector reform versus external capital account liberalization early in the reform process, the stability benefits—both in terms of macroeconomic volatility and crisis

propensity—are found to be more favorable when the domestic financial sector is liberalized ahead of the external capital account.

- The stability benefits flowing from domestic financial sector reform are also evident in the way in which economies respond to various real and financial shocks, with resilience—the bounce-back of the economy following a shock—enhanced in economies with relatively liberalized domestic financial sectors. Financial reforms tend to reduce the output costs from adverse terms of trade and foreign interest rate shocks, with a variety of mechanisms—especially improvements in credit availability—playing a key role. The greater resilience to real shocks in economies with more liberalized financial sectors is evidence of how such reforms can strengthen economy-wide real-financial linkages.

5. The remainder of the paper is organized as follows. Section II presents the main features of the dataset and key trends in structural reform over the past three decades. Section III examines a range of factors that may serve to spur, or retard, the process of structural reform. The subsequent sections present empirical evidence on the impact of reforms, including their effects on economic growth (Section IV), related sequencing issues (Section V), and macroeconomic volatility and resilience (Section VI). Section VII concludes.

II. Structural Reforms: Measurement and Trends

6. Structural reforms are a more elusive concept to measure than, say, the tenor of standard macroeconomic policies, where gauges—interest rates, liquidity measures, or the budgetary balance—are typically readily available for most countries. In the realm of structural policies, by contrast, researchers generally need to peruse legal statutes and rule books and devise classification criteria to create indicators that measure reform in different sectors of the economy, and that can serve as inputs for empirical analysis.

7. Structural reforms are usually held to include policy measures that reduce or remove impediments to the efficient allocation of resources. In many cases, the efficient allocation may correspond to "laissez-faire" or the "free market" outcome and, as such, structural reforms would imply reduced government intervention, including the removal of state-imposed price controls, the abolition of state monopolies, and fewer restrictions on trade and domestic/international financial transactions. But structural reforms may also encompass measures to address market failures not due to government intervention, including natural monopolies, dominant market positions, or distortions in the financial sector arising, for example, from asymmetric information and moral hazard. Following this broader view, the indices of structural reform described below include measures of "effective regulation" to address potential market failures in product and financial markets. To take an example, countries with well-supervised banking systems will score highly on the banking liberalization index described below, even though banking regulation/supervision is a departure from laissez-faire.

A. Measuring Structural Reforms

8. This paper draws on an extensive dataset, compiled by the Research Department, that brings together information on a variety of structural reforms in different sectors over roughly the past thirty years, and which covers a cross-section of both industrial and developing countries. The new dataset thus has significant advantages over existing data sources which cover a narrower set of reforms and countries, and is likely to be useful not only for the analysis carried out below, but also more broadly for Fund surveillance activities (see Box and Appendix Tables 1 and 2 for further details).

9. Reform indicators cover both the realm of the "financial sector" and the "real sector," though, as will be evident in subsequent sections, financial sector reforms have important effects on real sector outcomes, and vice-versa, given the significance of macro-financial linkages inherent in economic performance. Financial sector reform indicators include reforms pertaining to domestic financial markets, including banking and securities markets, as well as the external capital account, while real sector structural reform indicators include measures of product market and trade reforms.[1]

10. All indicators are scaled to vary between zero and unity, with higher values representing greater liberalization. Differences in the values of each index across countries and over time provide information on the variation in the absolute degree of economic reform within each sector. However, indices are not strictly comparable across sectors, so a higher value of, say, the trade reform index than the banking reform index does not imply that an economy is "more liberal" with respect to international trade than domestic finance.

11. Turning first to financial reforms, the *domestic financial sector liberalization* indicator includes measures of securities markets and banking sector reform. The *securities markets* subindex assesses the quality of the market framework, including the existence of an independent regulator and the extent of legal restrictions on the development of domestic bond and equity markets. The *banking* subindex captures reductions or removal of interest rate controls (floors or ceilings), credit controls (directed credit and subsidized lending), competition restrictions (limits on branches and entry barriers in the banking market, including licensing requirements or limits on foreign banks), and public ownership of banks. As foreshadowed above, the banking index also captures a measure of the quality of banking supervision and regulation, including the power and independence of bank supervisors, the adoption of Basel capital standards, and the presence of a framework for bank inspections.

12. Regarding the extent of *external capital account liberalization*, the data collected cover a broad set of restrictions including, for example, controls on external borrowing

[1] Data on labor market and fiscal reforms is being gathered, but cross-country coverage, especially for emerging market and developing countries, remains insufficient for inclusion in the analysis.

Box: Structural Reform Dataset

The main features of the dataset used in this paper are described below, with further technical details provided in Appendix Tables 1 and 2.

Domestic financial sector reforms. This indicator extends the country and time coverage of the domestic financial sector components in Abiad and Mody (2005) and also adds a component on credit controls: see Abiad, Detragiache, and Tressel (2008). The index thus covers six broad areas: interest rate controls; entry barriers; privatization; supervision and regulation; securities markets; and credit controls. Other relevant work includes Williamson, and Mahar (1998), who record financial reforms in 34 countries over 1973–96 along the same dimensions as Abiad and Mody (2005); Bekaert, Harvey and Lundblad (2005), who date equity market liberalizations in 95 countries during 1980–95; and the EBRD's dataset of transition indicators for 29 non-industrialized countries over 1989-2007 (published annually in the EBRD's *Transition Report*), which includes variables that measure banking and securities market reform gaps with industrialized market economies .

Capital account reforms. The data collected cover controls on external borrowing and lending as well as other restrictions on financial transactions between residents and non-residents, including approval requirements for foreign direct investment (FDI). The sources are Abiad and others (2008) and Quinn (1997), extended to include additional countries and years. Other relevant work includes Schindler (2008), who constructs a disaggregated capital controls index for 91 countries over 1995–2005 and also reviews other related indices.

Product market reforms. The product market reform index covers the agricultural sector and the telecommunications and electricity sectors, and comprises simplified versions of existing indices produced by the OECD, extended to include non-OECD countries. Relevant data by the OECD include an index of regulatory reform in the telecommunications, electricity, gas, post, rail, air passenger transport, and road freight sectors (Conway and Nicoletti, 2006), and the OECD's Producer and Consumer Support Estimates of agricultural policies during 1986–2006 (published as a complement to the OECD report *Agricultural Policies in OECD Countries : Monitoring and Evaluation 2007*). Other relevant work includes the World Bank Doing Business database (http://www.doingbusiness.org/), which provides measures of business regulations for a large number of countries during 2004–07; and the EBRD's transition indicators database, containing variables pertaining to telecommunications and electricity liberalization in transition countries.

Trade reforms. There are two indices: the first is an extension of the database on average tariff rates in IMF (2004) to include non-OECD countries and a broader time coverage; the second is based on Quinn (1997), and captures the degree to which proceeds from international trade in goods and services are free from restrictions as defined under Article VIII, extended to include additional countries and years. Other relevant work includes Sachs and Warner (1995), who provide a binary measure of trade liberalization based on a mix of regulatory and outcomes-based information; and the EBRD's transition indicators database, which contains variables pertaining to liberalization of trade and the foreign exchange system in transition economies.

between residents and non-residents, as well as approval requirements for foreign direct investment (FDI).

13. Turning to structural reforms in the real sector, the first indicator measures reductions in public intervention in the *agricultural sector*, including removal of export marketing boards and reductions in the incidence of administered prices. The second indicator covers the degree of liberalization in the *telecommunications and electricity markets,* including the extent of competition in the provision of these services and the presence of an independent regulator. The third index captures liberalization of *international trade* along two dimensions: *tariff liberalization*, which measures average tariff rates; and a broader indicator of *current account liberalization*, which captures surrender requirements for export proceeds, and other items under Article VIII of the Articles of Agreement.

B. Trends in Structural Reform Since the 1970s

14. Figures 1 and 2 portray the broad global trend toward greater structural reform and liberalization over the past three decades across different segments of the Fund's membership. Some key points follow from the figures:

- *Domestic financial sector reforms and the opening of the capital account accelerated sharply in the early 1990s*, reflecting inter alia the expansion of the European Union (which involved harmonization of financial legislation and regulation across member countries), the accession of a number of emerging market countries to the OECD, and the economic transition of Central and Eastern Europe.

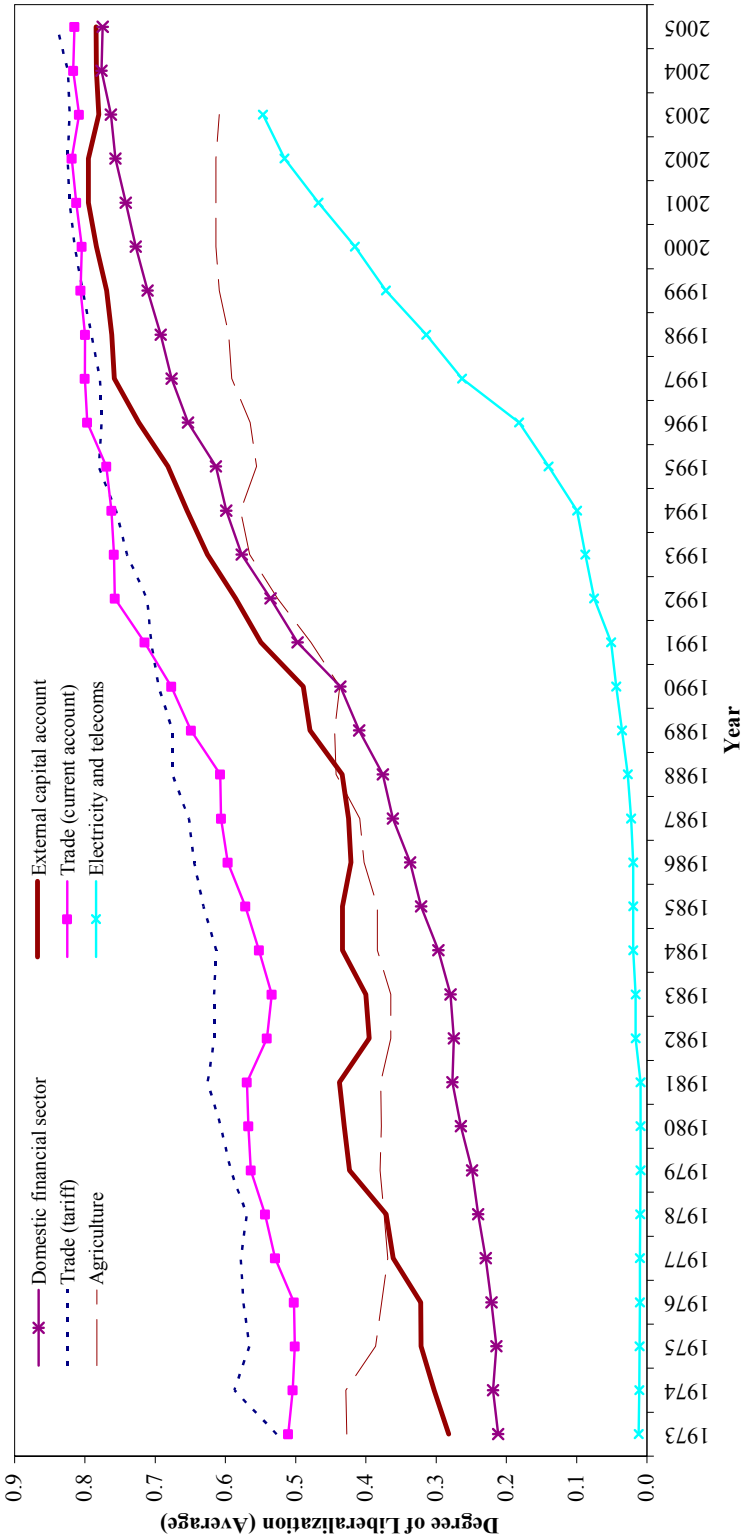
- *Both measures of trade liberalization follow a gradual upward trend with a noticeable pickup since the late 1980s*, reflecting the pursuit by developing countries of greater trade liberalization in the aftermath of the debt crisis, and more generally the demise of import substitution policies pursued earlier. The global context of several rounds of multilateral and regional trade negotiations also contributed.

- *Liberalization of the agricultural sector gathered speed during the 1990s*, with the adoption of more market-friendly policies in the developing world. This partly reflected an emphasis on such policies in World Bank structural adjustment lending, as well as falling agricultural prices which made marketing boards less sustainable.

- *In the telecommunications and electricity sectors, deregulation began in earnest in the second half of the 1990s*, reflecting to a large degree innovations in communications technology—such as cellular phones and the diffusion of the internet—which exposed public telecommunications monopolies to competition.

Figure 1. Economic Liberalization Indices

From a global perspective, economies have liberalized significantly over time

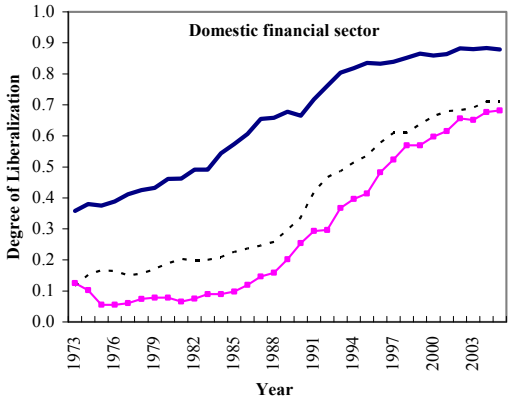


Source: Staff estimates.

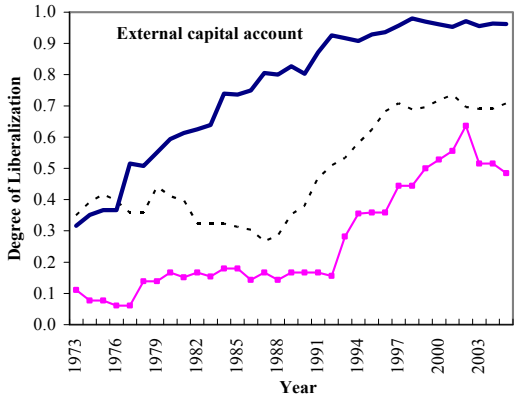
Note. Higher values of the liberalization indices represent greater liberalization. Each index is standardized to lie between zero and unity. The plotted index average is measured as the mean of the index across countries for each year. The "Domestic financial sector" liberalization index captures restrictions 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. The "External capital account" liberalization index measures restrictions on international financial transactions between residents and nonresidents. The "Trade (tariff)" liberalization index measures average tariff rates. The "Trade (current account)" liberalization index captures government restrictions on the proceeds from international trade in goods and services. The "Agriculture" liberalization index captures intervention in the market for each country's main agricultural export commodity. The "Electricity and telecoms" liberalization index captures the degree of competition and liberalization, and the quality of regulation, in these sectors. See Appendix Table 2 for more details.

Figure 2. Economic Liberalization Indices by Income Group

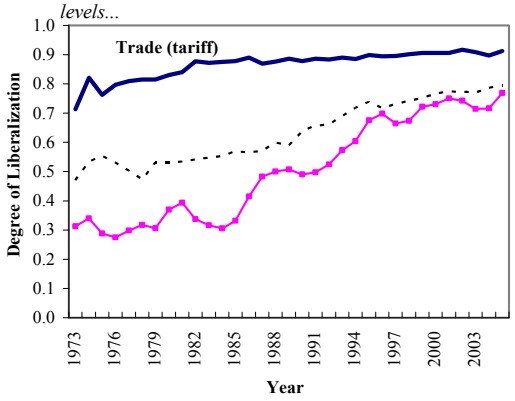
In low- and middle-income countries, the domestic financial sector is now as liberalized as it was in high-income countries in the early 1990s.



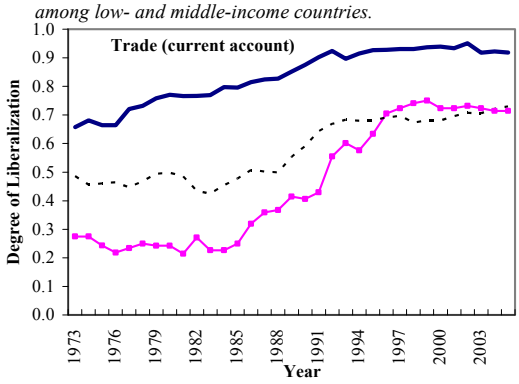
Still, there remains significant variation in external capital account liberalization across income groups.



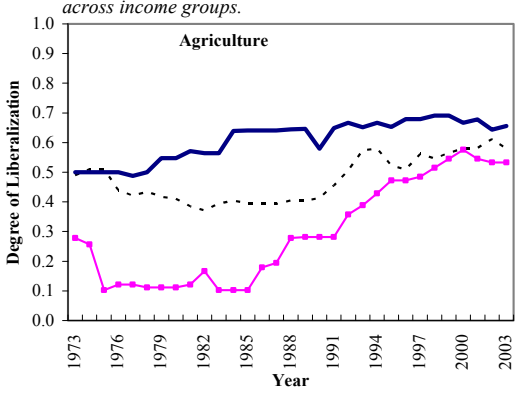
Trade liberalization, as measured by either tariff levels...



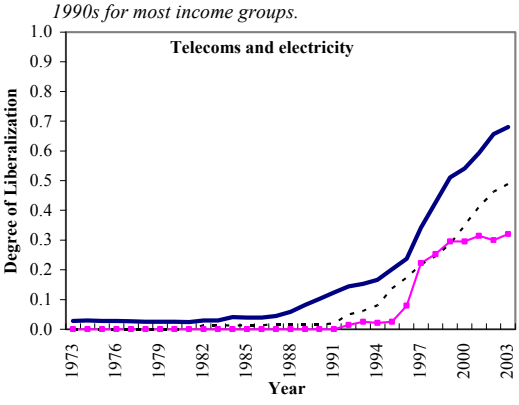
...or current account restrictions, has increased steadily among low- and middle-income countries.

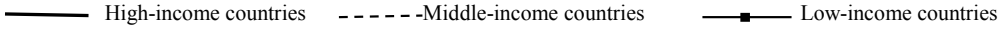


Agricultural liberalization is converging rapidly across income groups.



Liberalization of telecoms and electricity started in the 1990s for most income groups.





Source: Staff estimates.
Note: Each index is standardized to lie between zero and unity. Higher values of the liberalization indices represent greater liberalization. This figure shows the evolution of liberalization indices over time. See Appendix Table 2 for more details.

- Regarding trends in structural reform across different income groups, *advanced economies began implementing reforms relatively early*, and these "first movers" have also progressed the farthest with structural reform. This being said, *emerging-market and developing countries are catching up with advanced economies in the level of liberalization achieved*, with a substantial narrowing of the reform gap in evidence for all sectors since the mid-1980s. To take an example, the average level of domestic financial sector reform in low- and middle-income countries is now comparable to that of high-income countries in the early 1990s.

III. Determinants of Structural Reforms

15. The political-economy literature has tended to emphasize that special interests, motivated by a desire to protect rents, may act to block the introduction of reforms that are beneficial for society at large. Previous work, including for example IMF (2004) and Høj and others (2006), has highlighted a number of factors that can affect the balance of power between pro- and anti-reform groups. Such factors include: the quality of broad political institutions, which may favor an early adoption of reforms; international factors, including the size of "reform gaps" vis-à-vis either countries at the "frontier" of the reform process or geographical neighbors that may spur reform through "peer pressure" channels; the presence of an IMF-supported program, which may serve to underpin the reform process; and the occurrence of economic crisis, which is often argued to be a catalyst of reform. This section presents evidence on the role of these factors in both developed and developing countries.

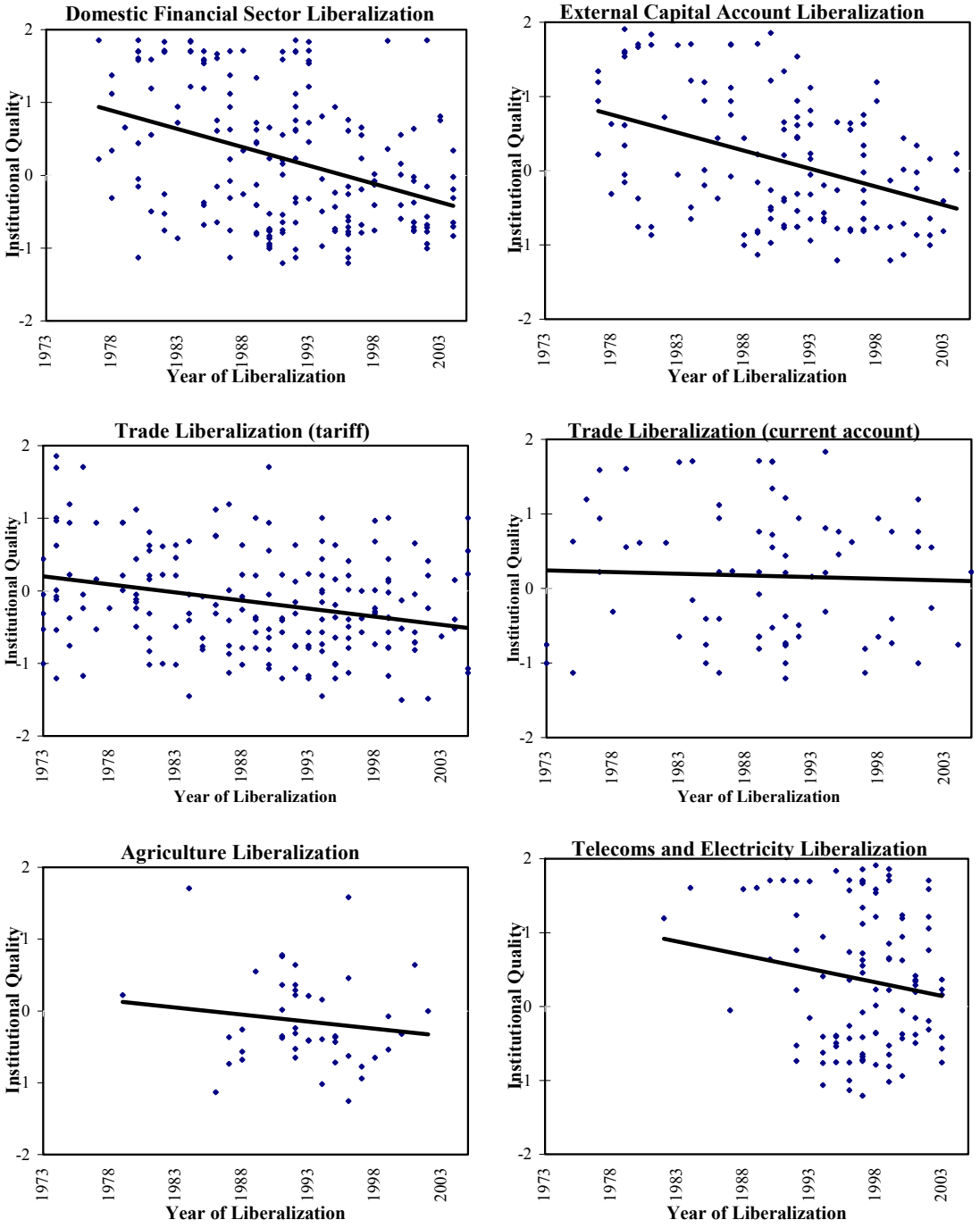
Institutional quality

16. Institutions define the broad rules of the game within which economic agents influence the outcome of the reform process. How does the quality of broad political institutions affect progress with implementing structural reforms? Figure 3 sheds light on the issue by portraying the relationship between the timing of major reforms and the level of the institutional quality index. It shows that, on average for most sectors, countries with stronger institutions (proxied by the strength of property rights and the rule of law as measured by Kaufman and others, 2002) have introduced major reforms earlier, i.e., there is a negative relationship between the year of major liberalizations and institutional quality. The results appear to be strongest for trade liberalization (as measured by the tariff-based indicator), and for the domestic financial sector and external capital account liberalization indicators.

17. As foreshadowed earlier, a range of other factors may also play a role in determining the pace of structural reform. A regression framework is useful to disentangle the various

Figure 3. Institutional Quality and Timing of Major Reforms

Stronger broad institutions encourage earlier liberalization



Source: Staff estimates based on Kaufmann, Kraay, and Zoido-Lobaton (2002).

Notes. The year of liberalization portrayed on the x-axis is the year of major reform—as measured by a one standard deviation or higher increase in the liberalization index over the preceding three years. The y-axis measures institutional quality, which is taken from Kaufmann, Kraay, and Zoido-Lobaton (2002), and captures the protection afforded to property rights as well as the strength of the rule of law, *circa* mid-1990s. This figure shows that major reforms occur earlier in countries where the quality of broad political institutions is higher, i.e., the relationship between institutional quality and the year of liberalization is negative.

effects, recognizing of course that a number of possible determinants—including, for example, the level of per capita income or educational attainment—are, like the quality of broad institutions, highly persistent, and therefore likely to be captured by the "fixed" or country-effects in the regression framework.[2]

International factors

18. Table 1 considers first the effect of the "reform gap," defined as the (lagged) difference between the level of liberalization in a particular country and the reform level achieved in a country near the reform "frontier" (proxied here by the United States). The results suggest that a larger reform gap is associated with faster reforms in all sectors, as indicated by the positive and statistically significant coefficient in the first line of Table 1. Beyond liberalization gaps with respect to reform *leaders*, the proximity of reformist *neighbors* may also provide a stimulus for liberalization. Table 1 indicates that such "neighborhood effects" operate unevenly across sectors, with statistically significant effects in evidence only in the cases of the domestic financial sector and the telecommunications and electricity sectors (second line of the Table).

IMF-supported programs

19. Previous studies (e.g., Ghosh and others, 2005) have suggested that structural conditionality in IMF-supported programs may play a role in spurring structural reform. The regression framework in Table 1 investigates this issue by including an indicator variable for the presence of an IMF-supported program. The results suggest that programs do seem to play a catalytic role in accelerating reforms across most of the sectors. The finding that IMF-supported programs accelerate the pace of liberalization of the external capital account, however, should be interpreted alongside the evidence presented in IEO (2005), which stresses the role of domestic ownership of capital account liberalization policies rather than IMF conditionality *per se* in the pursuit of such policies.

Economic crises

20. While there is considerable anecdotal evidence to suggest a catalytic role of economic/financial crises in driving the reform process, whether this constitutes an empirical regularity is an issue that needs to be decided by recourse to the data. What, then, is the evidence on the role of economic crises in the reform process? The results in Table 1 indicate

[2] In practice, given the inclusion of fixed effects, the results in Table 1 focus on variables with a sufficient variability over time. The model without fixed effects (not reported) shows a statistically significant impact on the pace of structural reform of a number of the persistent factors mentioned in the text, including a positive effect of institutional quality on trade, domestic financial sector, and external capital account reforms, consistent with the evidence in Figure 3.

Table 1. Determinants of Reforms

Dependent variable: Change in liberalization index (t)	(1) Domestic financial sector liberalization	(2) External capital account liberalization	(3) Trade liberalization (tariff)	(4) Trade liberalization (current account)	(5) Agriculture liberalization	(6) Telecoms and electricity liberalization
International factors						
Reform gap (t-1)	0.041***	0.155***	0.195***	0.074***	0.105***	0.055***
	(0.010)	(0.014)	(0.016)	(0.012)	(0.013)	(0.016)
Reform in neighbors (t-1)	0.179***	0.143	0.108	0.114	0.063	0.327***
	(0.061)	(0.094)	(0.067)	(0.092)	(0.059)	(0.074)
IMF-supported program (t-1)	0.049***	0.091**	0.092*	0.060*	0.002	0.082***
	(0.015)	(0.039)	(0.052)	(0.031)	(0.03)	(0.027)
Economic crisis (t-1)	0.024***	-0.02	-0.022***	0.004	0.008	-0.005
	(0.005)	(0.013)	(0.007)	(0.009)	(0.009)	(0.007)
Observations	1565	1565	2100	1130	1676	1678
Number of countries	64	64	102	38	75	76

Sources: Staff estimates based on International Financial Statistics.

Notes: The table shows regressions of the annual change in each liberalization index on a number of covariates. These include international factors (a measure of reform gaps vis-à-vis the United States and a measure of the level of liberalization in neighboring countries where the neighborhood is based on geographical distance); the presence of an IMF-supported program; and a measure of economic crisis defined as episodes of high inflation. The measure of reform gaps is defined as the difference between the reform level achieved in a country near the reform "frontier" (proxied by the United States) and the level of liberalization in a particular country. The measure of reform in neighbors is calculated for each country as the weighted average of all other countries' liberalization indices, with the weights proportional to the inverse of their distance to the country under consideration. The variable "IMF-supported program" takes a value of unity in country-years when such a program is in place. The variable "Economic crisis" is an indicator variable that takes a value of unity in country-years when inflation is above 40 percent; the results are robust to alternative measures of crisis used in the literature, including sharp drops in output, large terms-of-trade shocks, and sizeable real devaluations. Robust standard errors are provided in parentheses. ***, ** and * denote statistical significance at the 1, 5 and 10 percent level, respectively.

Robustness: To address possible endogeneity, the indicator variable for an IMF-supported program is instrumented using a measure of political proximity to, and trade intensity with, the United States and Europe, as in Barro and Lee, 2005. All specifications are estimated by panel instrumental variable regressions with country fixed effects, using annual data over 1973-2004. The country fixed effects capture the impact on the reform process of all time-invariant country-specific factors, including persistent differences in income per capita across countries. The results are robust to using five-year changes in each liberalization index as the dependent variable (instead of the annual changes reported in the table). The estimates are broadly similar when additional international factors are included. For example, adding indicator variables for WTO and OECD memberships—which affect positively trade and financial sector reforms—leaves key results unchanged.

that the effect of crises on the pace of reform is mixed, with the data suggesting that crises play little systematic role in a preponderance of the sectors. Crises do appear to spur domestic financial sector reform, but actually seem to delay opening to international trade—possibly reflecting the need to secure additional sources of fiscal revenue in crises periods, including by recourse to higher tariffs.

21. Overall, the results in Table 1 and Figure 3 suggest that, while institutional quality served to underpin structural reforms among the industrial countries in the early years of the sample, the emergence of sizeable cross-country reform gaps contributed to an acceleration of reform among the developing countries in the sample, especially since the early 1990s. Peer pressure effects associated with neighboring reformers supported the reform process in some areas, including domestic financial sector liberalization. Among the other factors driving reform, the presence of an IMF-supported program appears to have played a role in accelerating reforms in a number of sectors, while the occurrence of crises has tended to spur domestic financial sector reform while retarding trade reform.

IV. Structural Reforms and Economic Growth

22. There is a broad consensus in the literature that structural reforms, and in particular measures aimed at promoting domestic financial development and trade liberalization, can be important components of a strategy to invigorate economic growth.[3] Structural reforms may serve to boost aggregate income by promoting both faster capital accumulation and a more efficient allocation of resources. These benefits are typically spread over time, but forward-looking financial markets may anticipate the future benefits of reform, which would then be reflected in such forward-looking variables as credit ratings and borrowing costs.

23. While existing empirical studies generally support this line of reasoning, in a number of respects they fall short of providing a firm basis for policy. First, a global perspective based on a consistent data source spanning different segments of the Fund's membership has thus far been lacking. Second, existing studies have not tackled empirically key issues related to the interactions among reforms and sequencing, which have a critical bearing on growth. Third, previous studies have paid insufficient attention to the *channels* through which reforms affect growth. Evidence on such channels is needed to underpin confidence in the robustness of the observed empirical linkages. The remainder of this section considers, in turn, the impact of financial- (subsection A) and real sector (subsection B) reforms on growth, focusing both on the aggregate effects and some key channels through which they may operate. The analysis focuses on the *ceteris-paribus* effects of one reform at a time, with sequencing issues taken up in Section V.

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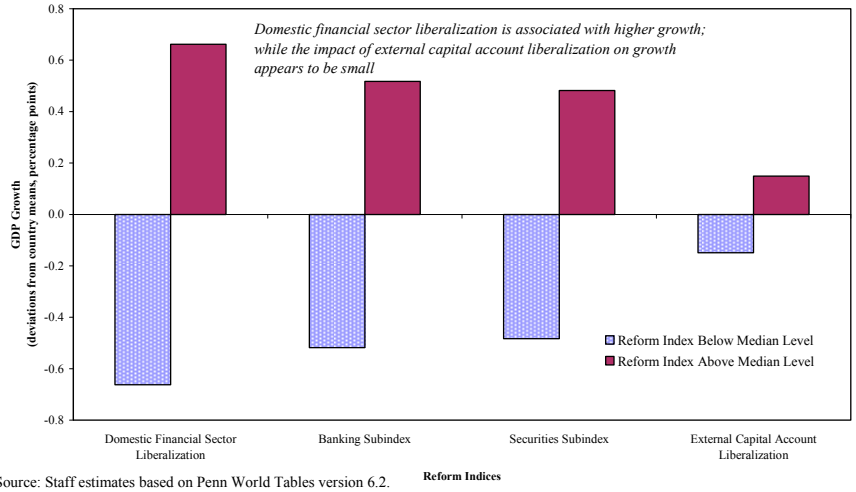
[3] McKinnon (1973), Krueger (1997), and Henry (2007) are among the seminal studies supporting this view. The literature is not, of course, all to one side on the role of reforms in the growth process: see, for example, Easterly (2005) and Rodrik (2006) for an alternative viewpoint.

A. Financial Sector Reforms

24. Financial sector reforms may raise growth by helping to mobilize savings and thereby expanding the availability of credit, as well as by improving the allocation of capital in the economy. Prima facie, the data—across both developed and developing countries—do suggest that more financially liberalized economies enjoy faster growth, on average, over the sample (Figure 4). An economy with a domestic financial sector reform index above the median grows on average 1.3 percentage points faster than an economy below the median, with a higher score in each of the component (banking and securities market) reform subindices contributing to higher growth. The differential growth performance in favor of countries with relatively open, versus relatively closed, external capital accounts is positive but small (last two columns of Figure 4).

Figure 4. Financial Sector Reform and Growth

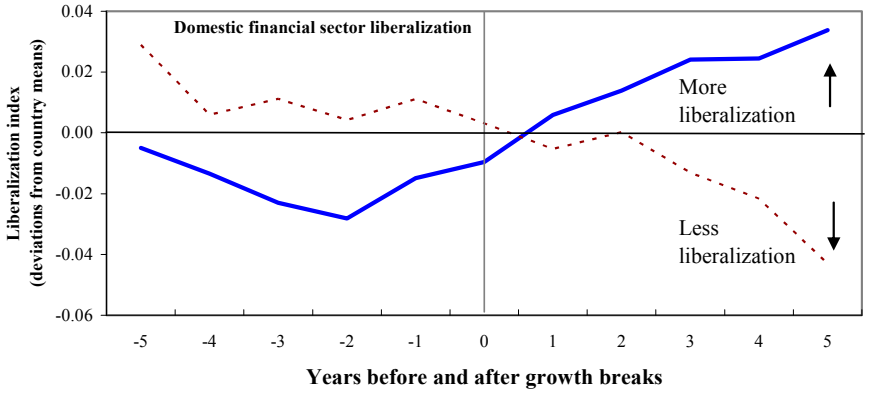


Source: Staff estimates based on Penn World Tables version 6.2.
Notes: The per capita growth rates portrayed on the y-axis are measured as deviations from country means over the sample period net of the trend in global growth; i.e., the chart plots the residuals from a panel regression of annual per capita GDP growth on country fixed effects (to remove country averages) and year fixed effects (to remove global trends). This figure shows the difference in per capita growth rates between low-reform years (below median) and high-reform years (above median).

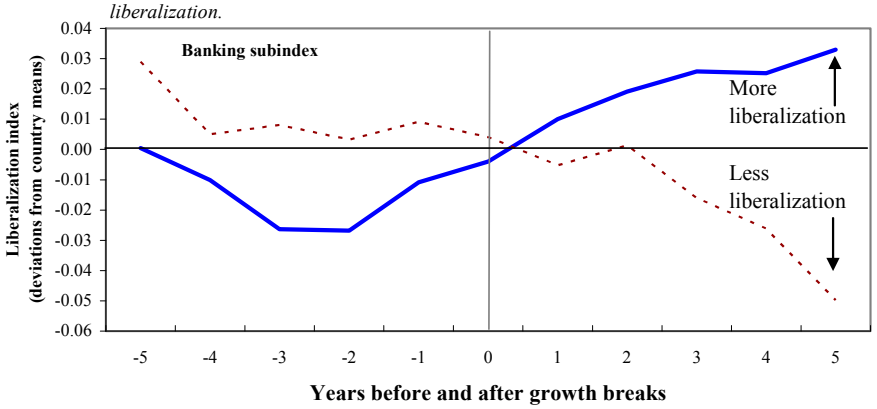
25. What lies behind the finding that economies with more liberalized domestic financial sectors enjoy faster growth? From an empirical standpoint, an answer to this question should take into account the very different features of the growth experience of developed and developing countries. While output paths in the former tend to resemble reasonably steady "hills," in developing countries output paths are often characterized by "mountains, cliffs, and plains" (Pritchett, 2000), which suggests that focusing on determinants of a country's *average* growth rate, as portrayed in Figure 4, may miss important elements of the transmission channels from liberalization to growth. From this standpoint, across a broad sample of developing and advanced economies, an approach based on linking structural reform to growth accelerations and decelerations ("mountains and cliffs"), rather than average growth, may be more revealing. Such an approach is portrayed in Figure 5, which

Figure 5. Growth Breaks and Financial Sector Reforms

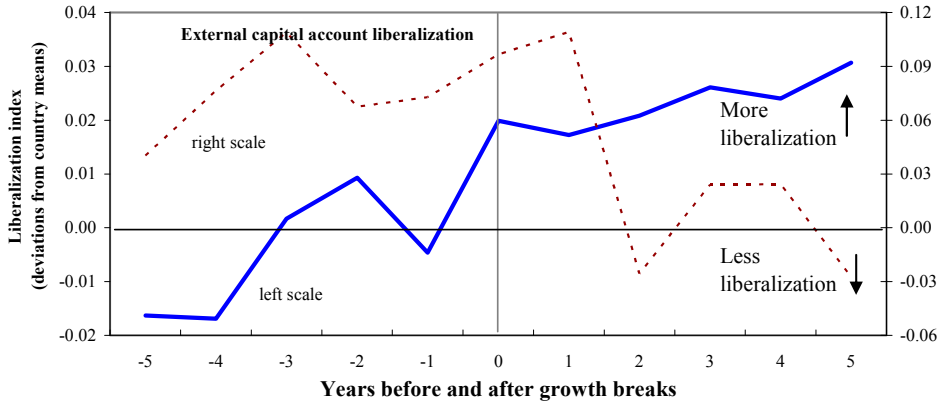
Reform of the domestic financial sector begins before growth upbreaks and reform reversals seem to follow growth downbreaks.



The pattern for domestic financial sector liberalization is in line with that of banking sector liberalization.



Liberalization of the external capital account starts before upbreaks and is reversed after downbreaks.



Source: Staff 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.

plots the behavior of financial reforms in the period leading up to, and following, growth upbreaks and downbreaks.[4]

26. Two patterns emerge from Figure 5. First, both domestic financial/banking sector liberalization, as well as external capital account liberalization, increase in the run-up to growth accelerations. Second, the data suggest that growth downbreaks are associated with a high initial degree of external capital account liberalization; this result, however, needs to be interpreted with caution because, as discussed in the next subsection, external capital account liberalization appears to be detrimental for growth only if such liberalization precedes the opening of the trade account. The data do not suggest a strong effect of trends in domestic financial sector liberalization ahead of growth downbreaks.

27. Econometric evidence presented in Table 2 corroborates the finding of a favorable impact of financial reforms on growth accelerations. Controlling for a set of standard growth determinants, including lagged income per capita, educational attainment, a terms of trade index, and a measure of political institutions (democracy), an increase in the (lagged value) of each of the four main financial sector reform indicators has a positive, and statistically significant, effect on growth.[5] There are, however, important differences in the magnitude of the effects of each reform. Specifically, domestic financial sector reforms have a long-run impact on income per capita which is three to four times larger than that of external capital account liberalization. For example, an increase in the indices from the 25th to the 75th percentile of the distribution is associated with a rise in long-run per capita income of about 50 percent in the case of domestic financial sector reform compared to 15 percent for external capital account liberalization.[6] While liberalizations of such a magnitude are large, they have occurred in the sample, including, for example, during New Zealand's domestic financial sector reforms over 1983–86 and Chile's external capital account liberalization over 1997–2000. Finally, the second panel in Table 2 investigates whether there are significant differences in the impact of financial sector reforms across income groups. While the general tenor of the full-sample results holds across different income groups, the impact of banking sector reform on growth is much larger for the developing country group, possibly reflecting the greater importance of bank intermediation at lower income levels.

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[4] See Berg, Ostry, and Zettelmeyer (2008) and Antoshin, Berg, and Souto (2008) for a discussion of the statistical procedures used to identify upbreaks and downbreaks.

[5] The presence of a convergence term (lagged income per capita) in the regressions implies that a change in the level of reforms has a transitional effect on growth and a permanent effect on income. During the transition to the new post-reform steady state, growth rates will be higher than before, but will eventually return to their steady-state level (see, relatedly, Henry, 2007). This is in line with the graphical event study presented in Figure 5, which links reform to growth accelerations and decelerations. In practice, transitions across steady states last for many years, resulting in persistent increases in growth rates during the transition.

[6] About two- thirds of these effects occur within a two-decade horizon of the policy shock, while the impact (one-year) effects are about 5 percent of the long-run impact.

Table 2. Growth Regression Results: Financial Sector Reforms

Dependent variable: logGDP(t) - logGDP(t-1)	(1) Domestic financial sector liberalization	(2) Banking subindex	(3) Securities subindex	(4) External capital account liberalization
Entire sample:				
Liberalization index (t-1)	0.060**	0.046***	0.035***	0.015***
	(0.012)	(0.011)	(0.007)	(0.005)
Long-run income effect: 25-75 percentile improvement	0.507***	0.364***	0.354***	0.154***
	(0.102)	(0.088)	(0.066)	(0.057)
Observations	2114	2114	2114	2114
Number of countries	88	88	88	88
Adjusted R-squared	0.13	0.13	0.13	0.12
Low-Middle Income group:				
Liberalization index (t-1)	0.084***	0.066***	0.039***	0.018**
	(0.019)	(0.017)	(0.039)	(0.008)
Long-run income effect: 25-75 percentile improvement	0.557***	0.394***	0.171***	0.160***
	(0.130)	(0.105)	(0.046)	(0.071)
Observations	1398	1398	1398	1398
Number of countries	68	68	68	68
Adjusted R-squared	0.13	0.12	0.12	0.12

Sources: Staff estimates based on International Financial Statistics, Penn World Tables version 6.2, and World Development Indicators.

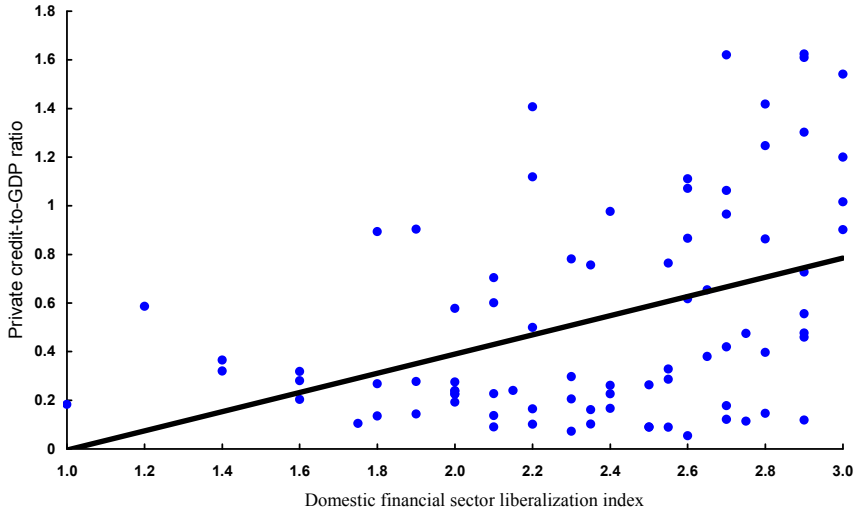
Notes: The table shows regressions of annual growth in real GDP per capita on financial sector liberalization indicators. The regressions are estimated for the entire country sample and for the group of lower-middle income countries (see Appendix Table 1). Each regression includes as controls the lagged level of real GDP per capita, an indicator variable for democratic regimes, the level of terms of trade, and the level of tertiary school enrollment. The long-run income effect captures the estimated change in the steady-state level of GDP per capita resulting from an improvement in the liberalization index from the 25th to the 75th percentile. All specifications were estimated by panel OLS with country- and year-fixed effects, using annual data over 1960-2005. Robust standard errors are in parentheses. The standard errors on the long-run effects are calculated with the delta method. ***, **, and * denote statistical significance at 1, 5, and 10 percent level, respectively.

Robustness: To address possible endogeneity, all specifications were also estimated by panel 2SLS with country fixed effects and five-year lags of the liberalization index as instrument. The results are robust to this alternative specification. Most results hold also in regressions estimated on five-year non-overlapping intervals with growth rates over a five-year period regressed on five-year lags of each liberalization index.

28. What are the key channels through which domestic and external financial liberalization contribute to an acceleration in growth? One established channel is the positive association between domestic financial sector liberalization and financial depth (the latter is strongly correlated with growth: see, e.g., Levine, 2005), as portrayed in Figure 6. Regression analysis (Table 3) corroborates the favorable impact of domestic financial sector/banking reform on the credit-to-GDP ratio. However, not all subcomponents of the financial liberalization index serve to boost credit growth: specifically, as foreshadowed earlier, improvements in the supervisory and regulatory practices subindex tend to reduce the credit-to-GDP ratio (column 3), likely reflecting the role of such policies in improving credit allocation and reducing risks of excessive credit growth/booms. Turning to the role of external capital account liberalization, econometric results highlight a positive relationship between opening to external capital flows and the credit-to-GDP ratio (penultimate row of Table 3). In addition, fewer restrictions on capital movements seem to be associated with significantly higher FDI inflows (Table 4) which, as argued in IMF (2007), tend to be growth enhancing.

Figure 6. Financial Depth and Domestic Financial Sector Liberalization

More domestic financial sector liberalization is associated with greater financial depth.



Source: Staff estimates based on Abiad, Detragiache and Tressel (2007) and World Bank Database on Financial Development and Structure, 2007.
Notes: This figure plots the ratio of private credit to GDP against the index of domestic financial sector liberalization in 2005. The solid line shows the regression line of the ratio of private credit to GDP on the index of domestic financial sector liberalization.

29. To gain further perspective on the channels through which domestic financial sector reform underpins growth, Table 5 considers the nature of possible allocative effects across different manufacturing industries. The results suggest that banking sector liberalization has particularly favorable effects on those sectors that rely relatively heavily on external finance for their investment and growth, as argued in Rajan and Zingales (1998). The estimated effects, moreover, are large: a one standard deviation increase in the banking liberalization subindex raises the annual growth rate of sectors with a high dependence on external finance (top 75th percentile of the distribution), relative to the growth rate of sectors with a low dependence on external finance (bottom 25th percentile of the distribution), by nearly 1 percentage point.

Table 3. Effects of Financial Sector Reforms on Financial Depth

Dependent variable: Change in log of private credit to GDP (t)	(1)	(2)	(3)
Change in domestic financial sector liberalization index(t-1)	0.272***		
	[0.063]		
Change in banking subindex (t-1)		0.233***	
		[0.058]	
Change in banking subindex excluding supervision (t-1)			0.240***
			[0.052]
Change in banking supervision subindex (t-1)			-0.046*
			[0.026]
Change in securities subindex (t-1)		0.036	0.032
		[0.032]	[0.032]
Change in external capital account liberalization index (t-1)	0.030*	0.031*	0.028
	[0.018]	[0.018]	[0.018]
Change in log of private credit to GDP (t-1)	0.463***	0.463***	0.461***
	[0.039]	[0.039]	[0.039]
Observations	2102	2102	2102
R-squared	0.34	0.34	0.34

Sources: Staff estimates and Abiad, Detragiache, and Tressel (2008); International Financial Statistics; and World Development Indicators.

Notes: The table shows regressions of the change in financial depth, measured as the change in the private-credit-to-GDP ratio, on changes of financial sector liberalization indicators. The banking subindex excluding supervision is a simple average of the credit control, interest rate control, privatization and competition subindices. All specifications were estimated by panel OLS with year fixed effects, using annual data over 1975-2006. Robust standard errors are in parentheses. ***, **, and * denote statistical significance at 1, 5, and 10 percent level, respectively.

Robustness: Results are robust to the inclusion of the rate of inflation, GDP per capita, real GDP growth, and a dummy for hyperinflation as control variables.The results hold also when the regressions are estimated on the sub-sample of developing countries.

Table 4. FDI Inflows and Financial Sector Reforms

Dependent variable: log FDI/GDP (t)	(1) Domestic financial sector liberalization	(2) Banking subindex	(3) Securities subindex	(4) External capital account liberalization
Liberalization index (t-1)	0.462	0.261	0.471*	0.534***
	(0.432)	(0.379)	(0.254)	(0.144)
Observations	1844	1844	1844	1844
Number of countries	81	81	81	81
Adjusted R-squared	0.63	0.63	0.63	0.64

Sources: Staff estimates based on International Financial Statistics, Penn World Tables version 6.2, and World Development Indicators.

Notes: The table shows regressions of inward FDI, measured as the log of FDI to GDP, on financial sector liberalization indicators. Each regression includes controls for the growth of real per-capita GDP, the level of development (proxied by the lagged level of real GDP per capita), market size (proxied by the lagged level of real GDP), and inflation. All regressions were estimated by panel OLS and include country and year fixed effects, using annual data over 1961-2006. Robust standard errors, clustered at the country-year level, are in parentheses. ***, **, and * denote significance at the 1, 5, and 10 percent level, respectively.

Table 5. The Differential Effects of Financial Reforms in Manufacturing Industries

Dependent variable: Growth of sectoral output (t)	(1)	(2)	(3)
Banking subindex interacted with external financial dependence (t-1)	0.009***	0.005*	0.009***
	(0.002)	(0.003)	(0.002)
GDP per capita interacted with external financial dependence (t-1)		6.50E-07**	
		(3.03E-07)	
Log days to enforce contracts interacted with external financial dependence			-0.012
			(-0.005)
Log output share (t-1)	0.001	0.001	0.002
	(0.001)	(0.001)	(0.001)
Observations	35619	34878	35619
Number of countries	62	62	62

Sources: Staff estimates based on Abiad, Detragiache and Tressel (2008), UNIDO (2006), and World Development Indicators. The sectoral measure of dependence on external finance is from Kroszner, Laeven, and Klingebiel (2007).

Notes: The table shows regressions of sectoral output growth of manufacturing industries on the banking liberalization subindex interacted with a measure of industries' dependence on external finance. Following Rajan and Zingales (1998), this interaction captures the differential effects across industries of banking liberalization. The first column shows the baseline regression, the second and third columns show that results are robust to controlling for interactions of the measure of dependence on external finance with, respectively, the overall level of development (real GDP per capita), and the quality of contract enforcement. All regressions were estimated using panel OLS and include industry dummies and country-year dummies, using annual data over 1974-2003. Robust standard errors, clustered at the country-year level, are in parentheses. ***, ** and * indicate statistical significance at the 1, 5 and 10 percent level, respectively.

Robustness: The results hold when using the index of domestic financial sector liberalization instead of the banking subindex, and when estimated for developing countries only. Other robustness tests include controlling for interaction terms with (i) the private credit-to-GDP ratio; (ii) indicators of property rights; (iii) the type of legal system (common law or civil law); and (iv) an indicator of creditor rights. The results hold also when the regression is estimated as a first difference equation over a five-year horizon. Finally, to address potential endogeneity bias, the liberalization index was instrumented by the level of liberalization in politically "close" countries as defined in Tressel, T., 2008. "Unbundling the Effects of Reforms", mimeo IMF (paper available at: http://www.imf.org/External/NP/seminars/eng/2008/strureform/index.htm)

30. As argued above, the effects of structural reforms on per-capita incomes are spread out through time, as growth accelerates for a number of years in response to liberalization. Is this longer-run growth impact internalized in forward-looking variables that should in principle anticipate such effects? To assess this issue, the analysis now focuses on credit ratings, which should improve if reforms elicit persistent changes in the solvency of corporations and banks, beyond contemporaneous effects on determinants of repayment probability—such as the ratio of earnings to total assets and debt-equity ratios.[7] The

[7] Equity prices should also incorporate relevant information about the impact of structural reforms on the solvency/health/profitability of domestic firms. The empirical association of equity prices with structural reform indices is weak, however, likely reflecting the very different volatility properties of the two sets of variables.

empirical results are very much in line with the hypothesis that credit ratings anticipate the persistent beneficial effects of structural reforms on the corporate sector (Table 6). Specifically, an improvement in the domestic financial sector reform index from the 25th to the 75th percentile of the distribution raises corporate credit ratings by almost 1½ points and banks' credit ratings by almost 4 points—equivalent to 40–80 percent of the sample difference in credit ratings between the average corporation/bank in high-income and middle-income countries. The impact of capital account liberalization on credit ratings is almost as large, reflecting also its positive effect on sovereign ratings, which lifts the sovereign ceiling on private ratings. Given that credit ratings are highly correlated with bond spreads, this evidence suggests that financial sector reforms reduce the cost of credit of banks and corporations, and improve their access to international credit markets.

B. Real Sector Reforms

31. This section examines how real sector reforms—those relating to international trade, agriculture, and the telecommunications and electricity sectors—affect growth. The conventional wisdom (based, for instance, on the studies by Krueger and others, 1992; Sachs and Warner, 1995; and Dollar and Kraay, 2004) is that there is a positive association between real sector reforms—especially trade liberalization—and income growth, but a broad examination of the cross-country evidence is still missing to underpin this conclusion.

32. The event study analysis based on growth accelerations/decelerations discussed in the previous subsection generally supports the view that real sector reforms anticipate growth spurts, while reversals foreshadow decelerations (Figure 7). Specifically, in the run-up to growth upbreaks, economies have already reduced tariff rates—with the tariff-based trade liberalization index above the country-specific average in the top panel of Figure 7. In addition, reductions in trade-related current account restrictions and in the pervasiveness of agricultural sector restrictions (e.g., export marketing boards) are in evidence about three years before a growth upbreak, and continue thereafter (middle and bottom panels of Figure 7). Conversely, growth downbreaks seem to be anticipated by an illiberal tariff regime and reversals of current account liberalization, but no significant change in agricultural liberalization (although reversals are apparent once the downturn is in train).

33. Econometric evidence corroborates the event-study analysis, with panel growth regressions indicating a statistically significant impact of real sector reforms on economic growth, after controlling for a standard set of growth covariates (Table 7). Agricultural liberalization and reductions in restrictions on trade-related current account transactions yield the largest growth benefits. An improvement in the corresponding indices from the 25th to the 75th percentile—consistent, for example, with the changes in agricultural liberalization achieved in Poland in the late 1980s and current account liberalization achieved in Peru

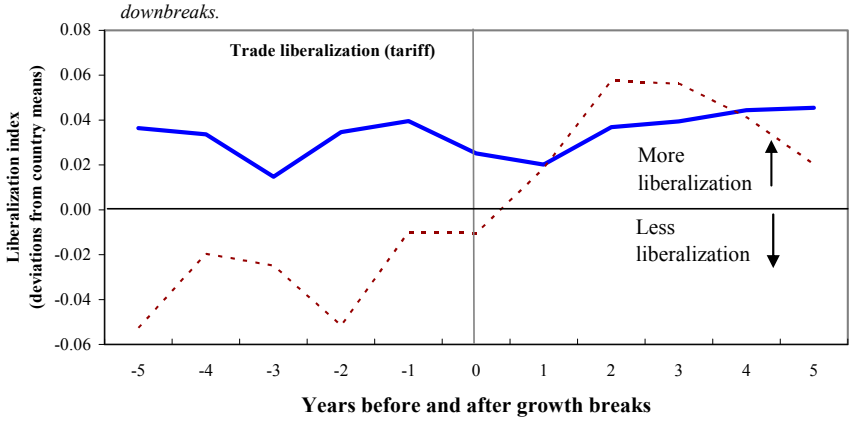
Table 6. Financial Sector Reforms and Foreign-Currency Bond Ratings

Dependent variable: Foreign-Currency Bond Ratings (t)	(1) Domestic financial sector liberalization	(2) Securities subindex	(3) Banking subindex	(4) External capital account liberalization
		Corporate Ratings		
Liberalization index (t)	13.370***	9.878***	11.817***	4.535***
	(2.215)	(2.929)	(2.022)	(1.187)
Sovereign Rating (t)	1.286***	1.123***	1.179***	0.754***
	(0.132)	(0.217)	(0.112)	(0.078)
Liberalization index interacted with	-0.943***	-0.683***	-0.833***	-0.330***
Sovereign Rating (t)	(0.149)	(0.226)	(0.129)	(0.089)
Observations	2032	2032	2032	2032
R-squared	0.69	0.68	0.69	0.67
		Bank Ratings		
Liberalization index (t)	12.027***	8.209**	9.809***	6.705***
	(3.392)	(3.235)	(3.109)	(1.292)
Sovereign Rating (t)	0.950***	0.942***	0.886***	0.896***
	(0.134)	(0.224)	(0.119)	(0.088)
Liberalization index interacted with	-0.403**	-0.225	-0.325**	-0.261**
Sovereign Rating (t)	(0.176)	(0.236)	(0.163)	(0.110)
Observations	694	694	694	694
R-squared	0.86	0.85	0.85	0.85
		Sovereign Ratings		
Reform (t-1)	-0.193	-1.007***	0.130	0.851***
	(0.308)	(0.288)	(0.269)	(0.178)
Observations	887	887	887	887
R-squared	0.97	0.98	0.97	0.98

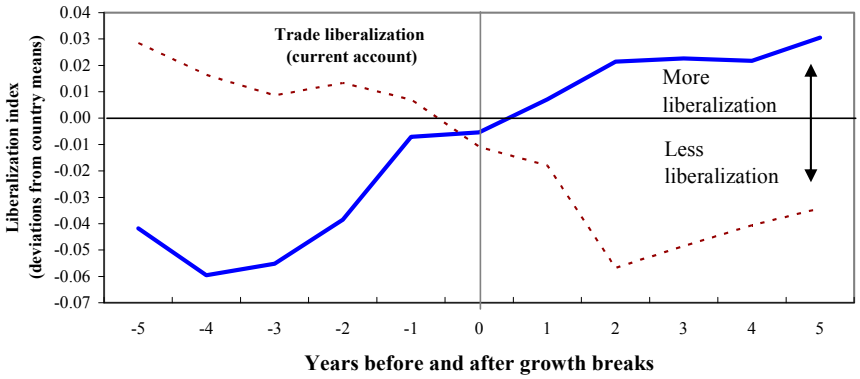
Sources: Staff estimates based on International Financial Statistics, World Development Indicators, and Standard & Poor's.
Notes: The table shows regressions of foreign currency bond ratings on financial sector liberalization indicators. Bond ratings were mapped into numerical values ranging from 1 to 21, with 21 representing the highest (AAA) rating. Each regression also includes as control variables: time fixed effects, inflation, real per-capita GDP, and real per-capita GDP growth averaged over the previous 5 years. For corporate ratings, additional controls include sector fixed effects, current account balance, GDP growth volatility, and the ratios of Earnings before Interest and Taxes (EBIT) to Assets and to Interest Expense, Retained Earnings/Assets, Working Capital/Assets, Total Assets, and Equity/(Equity+Debt). For bank ratings, additional controls include sector fixed effects, current account balance, GDP growth volatility, Equity/Assets, Loan Growth, Operation Expenses/Assets, Net Interest Margin, Deposits/Assets, and Total Assets. For sovereign ratings, additional controls include country dummies, external balance, fiscal balance, default history, and external debt. All regressions were estimated by panel OLS, using annual data over 1995-2005. Robust standard errors, clustered by country-year in the corporate and bank rating regressions, are in parentheses. ***, ** and * denote statistical significance at the 1, 5 and 10 percent level, respectively.
Robustness: The regressions in the table are estimated with contemporaneous control variables (except for the sovereign ratings regressions); results are broadly similar when controls are lagged one period. The results also hold when the sample is restricted to industrial countries or emerging markets, and, in the corporate ratings regressions, when liberalization firms in the tradable and nontradable sectors are considered separately. Results are also robust to using alternative external capital account liberalization indices, including those accounting for differences between restrictions on residents and nonresidents (Quinn, 1997) and those accounting for different asset categories and inflow versus outflow controls (Schindler, 2008).

Figure 7. Growth Breaks and Real Sector Reforms

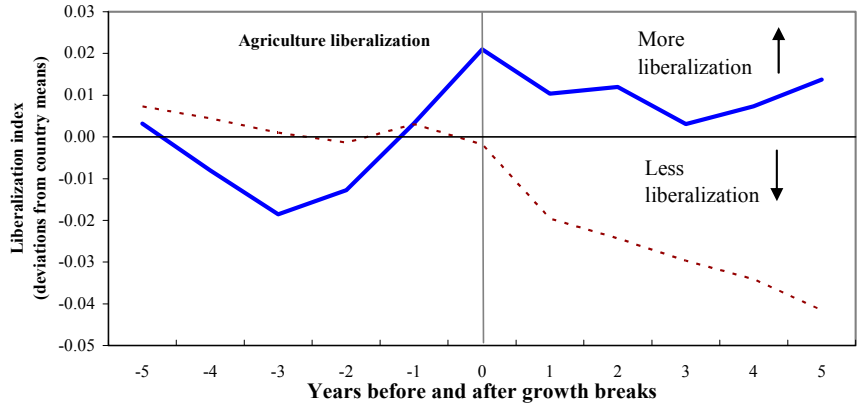
Tariffs are relatively low before upbreaks, while an illiberal tariff regime precedes downbreaks.



Trade-related current account transactions are being liberalized before upbreaks and restricted during downbreaks.



Agricultural reforms precede upbreaks and reform reversals accompany downbreaks.



Average liberalization index around upbreaks — Average liberalization index around downbreaks

Source: Staff 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 and is in line with data availability. No chart is shown for the case of telecommunications and electricity reform, because there are not enough growth breaks after 1990, the year that liberalizations in this sector generally begin.

Table 7. Growth Regression Results: Real Sector Reforms

Dependent variable: logGDP(t) - logGDP(t-1)	(1) Trade liberalization (tariff)	(2) Trade liberalization (current account)	(3) Agricultural liberalization	(4) Telecoms and electricity liberalization
Entire sample:				
Liberalization index (t-1)	0.022***	0.034***	0.028***	-0.001
	(0.009)	(0.007)	(0.007)	(0.008)
Long-run income effect: 25-75 percentile improvement	0.135***	0.425***	0.519***	-0.001
	(0.054)	(0.094)	(0.132)	(0.019)
Observations	2616	1719	2310	2411
Number of countries	118	58	94	92
Adjusted R-squared	0.13	0.16	0.13	0.13
Low-Middle Income group:				
Liberalization index (t-1)	0.024***	0.042***	0.034***	-0.009
	(0.010)	(0.010)	(0.008)	(0.013)
Long-run income effect: 25-75 percentile improvement	0.131***	0.438***	0.581***	0.000
	(0.055)	(0.107)	(0.139)	(0.000)
Observations	1802	1026	1653	1618
Number of countries	97	41	72	72
Adjusted R-squared	0.11	0.14	0.13	0.12

Sources: Staff estimates based on International Financial Statistics, Penn World Tables version 6.2, and World Development Indicators.

Notes: The table shows regressions of annual growth in real GDP per capita on real sector liberalization indicators. The regressions are estimated for the entire country sample and for the group of lower-middle income countries (see Appendix Table 1). Each regression includes as controls the lagged level of real GDP per capita, an indicator variable for democratic regimes, the level of terms of trade, and the level of tertiary school enrollment. The long-run income effect captures the estimated change in the steady-state level of GDP per capita resulting from an improvement in the liberalization index from the 25th to the 75th percentile. All specifications were estimated by panel OLS with country- and year-fixed effects, using annual data over 1960-2005. Robust standard errors are in parentheses. The standard errors on the long-run effects are calculated with the delta method. ***, **, and * denote statistical significance at 1, 5, and 10 percent level, respectively.

Robustness: To address possible endogeneity, all specifications were also estimated by panel 2SLS with country fixed effects and five-year lags of the liberalization index as instrument. The results are robust to this alternative specification. Most results hold also in regressions estimated on five-year non-overlapping intervals with growth rates over a five-year period regressed on five-year lags of each liberalization index.

at roughly the same time—is estimated to increase long-run income per capita by about 40-50 percent.[8] The effects are somewhat stronger over the sample of low- and middle-income countries, in line with the greater weight of the farm sector in such economies, and the role of exports in the development strategies of a number of non-industrial countries. Finally, with respect to telecommunications and electricity deregulation, while previous studies for industrial countries have found significant effects on productivity growth (Nicoletti and Scarpetta, 2003), the broad cross-country evidence fails to uncover much impact, likely reflecting the late adoption of these reforms in developing countries.

34. What can be said about the channels through which real sector reforms affect growth? A starting point, given the established linkage between growth and trade (e.g., Frankel and Romer, 1999), is to examine the association between trade liberalization and *de facto* trade openness (import- and export-to-GDP shares), which indeed is robustly positive (Table 8). In line with the results in Table 7, the index based on current account liberalization has a larger effect on trade flows than the index based on tariffs, with an increase in the current account reform index from the 25th to the 75th percentile of the sample distribution yielding an increase in trade shares of 10–15 percentage points of GDP (last row of Table 8).

35. Apart from the trade channel, resource reallocation in response to a move to a more market-based relative price structure is likely to be a key driver of growth following real sector reforms. As an example, trade liberalization—which lowers the cost of imported inputs faced by domestic firms—is likely to benefit sectors relying relatively more on such imports in production; as shown in Table 9, this effect is statistically significant. The coefficient capturing the differential effect across sectors of tariff reductions (first row in the table) implies that a one standard deviation improvement in the index (i.e., a reduction in average tariff rates of about 15 percentage points) raises relative annual growth in sectors using imported inputs intensively by about 0.1 percentage point.

36. Like financial sector reforms, real sector reforms also have persistent effects which are anticipated in such forward-looking variables as credit ratings. Results reported in Table 10 suggest that both measures of trade liberalization significantly improve the credit ratings of domestic firms, controlling for other potential determinants of repayment probability. A reform, for example, that increases the index of current account liberalization from the 25th to the 75th percentile of the sample distribution is associated with an increase in average corporate credit ratings equivalent to about 20 percent of the sample difference in credit ratings between high- and middle-income countries. Moreover, the total effect approximately doubles if one takes into account that corporate ratings are capped by sovereign ratings, and that the latter are also improved by current account liberalization.

[8] About half the long-run effects are achieved within twenty years, and 20 percent in the first five years.

Table 8. Trade Reforms and Export- and Import-to-GDP Share

Dependent variable:	Exports/GDP		Imports/GDP	
Annual ratio of exports (imports) to GDP (t)	(1) Trade liberalization (tariff)	(2) Trade liberalization (current account)	(3) Trade liberalization (tariff)	(4) Trade liberalization (current account)
Trade liberalization index (t-1)	1.754***	2.349***	1.397***	2.659***
	(0.556)	(0.452)	(0.487)	(0.423)
Exports/GDP (t-1)	0.835***	0.881***		
	(0.022)	(0.016)		
Imports/GDP (t-1)			0.855***	0.897***
			(0.014)	(0.014)
Trading partners' income growth (t-1)	0.104**	0.193***		
	(0.049)	(0.057)		
Domestic income growth (t-1)			0.068**	0.078***
			(0.028)	(0.025)
Long-run effect: 25-75 percentile improvement in the trade liberalization index	2.911***	11.106***	2.637***	14.510***
	(0.741)	(2.043)	(0.905)	(2.321)
Observations	3618	2091	3777	2290
Number of countries	140	58	140	58
Adjusted R-squared	0.70	0.80	0.74	0.83

Sources: Staff estimates based on International Financial Statistics and World Development Indicators.
Notes: The table shows regressions of the share of exports and imports of goods and services in GDP on indices of trade reform, separately for the index based on tariffs and the index based on current account restrictions. The control variables include domestic GDP growth (for imports) and trading partners' GDP growth (for exports); all variables are lagged one year to avoid potential problems of endogeneity. In addition, all regressions include the lagged dependent variable to control for persistence in export- and import-to-GDP shares. The long-run effect is the long-term change in terms of GDP shares resulting from an increase in the openness index from the 25th to the 75th percentile of the in-sample distribution. All specifications are estimated by ordinary least squared regression with country fixed effects, using annual data over 1968-2006. Robust standard errors are in parentheses. The standard errors on the long term effects are calculated with the delta method. ***, ** and * denote statistical significance at the 1, 5 and 10 percent level, respectively.
Robustness: The results are robust to additional controls used in the related literature, including terms-of-trade shocks and fiscal balance as a share of GDP; however, the inclusion of these variables reduces considerably the sample size.

Table 9. The Differential Effects of Trade Liberalization in Manufacturing Industries

Dependent variable: Growth of sectoral output (t)	(1) Trade liberalization (tariff)	(2) Trade liberalization (current account)
Trade liberalization index interacted with a measure of imported input intensity (t-1)	0.033***	0.027***
	(0.006)	(0.005)
Banking liberalization subindex interacted with a measure of external financial dependence (t-1)	0.013***	0.008***
	(0.003)	(0.0023)
Log output share (t-1)	0.001	-0.00004
	(0.001)	(0.0014)
Observations	32770	30715
Number of countries	60	52

Sources: Staff estimates based on the GTAP database, and Abiad, Detragiache and Tressel (2008), UNIDO 2006, and World Development Indicators. The sectoral measure of dependence on external finance is from Kroszner, Laeven, and Klingebiel (2007).

Notes: The table shows regressions of sectoral output growth of manufacturing industries on trade liberalization indicators interacted with a measure of intensity of use of imported inputs in export sectors. This interaction captures differential effects across industries arising from trade liberalization. The first and second columns consider, respectively, the average tariff and current account based measures of trade liberalization. All regressions were estimated using panel OLS and include industry dummies and country-year dummies, using annual data over 1974-2003. Robust standard errors, clustered at the country-level, are in parentheses. ***, ** and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.

Robustness: The results are broadly similar when estimated for developing countries only, and when estimated using other measures of trade liberalization such as Wacziarg and Welsh's (2008) index and a dummy variable for WTO membership. Other robustness tests include controlling for interaction terms with (i) the private credit to GDP ratio; (ii) indicators of property rights; (iii) an indicator variable for the type of legal system (common law or civil law); (iv) an indicator of creditor rights. Similar results are obtained when the regression is estimated in first differences over a five-year horizon. To address potential endogeneity bias, the liberalization index was instrumented using liberalization levels of politically "close" countries as defined in Tressel, T., 2008. "Unbundling the Effects of Reforms", mimeo IMF (paper available at: http://www.imf.org/External/NP/seminars/eng/2008/strureform/index.htm)

Table 10. Real Sector Reforms and Foreign-Currency Bond Ratings

Dependent variable: Foreign-Currency Bond Ratings (t)	(1) Trade liberalization (tariff)	(2) Trade liberalization (current account)
	Corporate Ratings	
Liberalization index (t)	9.017*	8.874***
	(5.426)	(1.468)
Sovereign Rating (t)	1.463***	1.044***
	(0.377)	(0.100)
Liberalization index interacted with Sovereign Rating (t)	-1.087**	-0.678***
	(0.443)	(0.112)
Observations	2032	2010
R-squared	0.68	0.68
	Bank Ratings	
Liberalization index (t)	32.004***	2.442
	(6.611)	(1.503)
Sovereign Rating (t)	2.647***	0.588***
	(0.458)	(0.105)
Liberalization index interacted with Sovereign Rating (t)	-2.227***	0.129
	(0.521)	(0.127)
Observations	707	674
R-squared	0.84	0.86
	Sovereign Ratings	
Reform (t-1)	-2.339***	1.336***
	(0.830)	(0.367)
Observations	963	736
R-squared	0.98	0.98

Sources: Staff estimates based on International Financial Statistics, World Development Indicators, and Standard & Poor's.
Notes: The table shows regressions of foreign currency bond ratings on trade liberalization indicators. Bond ratings were mapped into numerical values ranging from 1 to 21, with 21 representing the highest (AAA) rating. Each regression also includes as control variables: time fixed effects, inflation, real per-capita GDP, and real per-capita GDP growth averaged over the previous 5 years. For corporate ratings, additional controls include sector fixed effects, current account balance, GDP growth volatility, and the ratios of Earnings before Interest and Taxes (EBIT) to Assets and to Interest Expense, Retained Earnings/Assets, Working Capital/Assets, Total Assets, and Equity/(Equity+Debt). For bank ratings, additional controls include sector fixed effects, current account balance, GDP growth volatility, Equity/Assets, Loan Growth, Operation Expenses/Assets, Net Interest Margin, Deposits/Assets, and Total Assets. For sovereign ratings, additional controls include country dummies, external balance, fiscal balance, default history, and external debt. All regressions were estimated by panel OLS, using annual data over 1995-2005. Robust standard errors, clustered by country-year in the corporate and bank rating regressions, are in parentheses. ***, ** and * denote statistical significance at the 1, 5 and 10 percent level, respectively.
Robustness: The regressions in the table are estimated with contemporaneous control variables (except for the sovereign ratings regressions); results are broadly similar when controls are lagged one period. The results also hold when the sample is restricted to industrial or emerging markets, and, in the corporate ratings regressions, when firms in the tradable and nontradable sectors are considered separately.

37. The positive impact of trade reforms on credit ratings is an important example of a favorable real-financial linkage following structural reform, with the increased efficiency brought about by real sector reforms fostering improved access to credit/investment financing for domestic firms. Such favorable real-financial linkages are also apparent from the impact of current account reform on financial depth (Table 11, second row/second column), and the effects of telecommunications and electricity reforms on FDI (Table 12, fourth column).

Table 11. Effects of Trade Reforms on Financial Depth

Dependent variable: Change in log private credit to GDP (t)	(1)	(2)
Change in index of average tariff (t-1)	-0.087	
	[0.077]	
Change in index of current account restrictions (t-1)		0.154**
		[0.072]
Change in domestic financial sector liberalization (t-1)	0.211***	0.172***
	[0.061]	[0.056]
Change in external capital account liberalization (t-1)	0.037*	0.020
	[0.021]	[0.021]
Change in log of private credit to GDP (t-1)	0.460***	0.470***
	[0.044]	[0.032]
Observations	1671	1622
R-squared	0.36	0.37

Sources: Staff estimates based on Abiad, Detragiache and Tressel (2008); International Financial Statistics; and World Development Indicators.
Notes: The table shows regressions of the change in financial depth, measured as the change in the private credit to GDP ratio, on lagged changes in financial, trade, and external capital account liberalization indices. All specifications were estimated by panel OLS with year fixed effects, using annual data over 1975-2006. Robust standard errors in parentheses. ***, **, and * denote statistical significance at 1, 5, and 10 percent level, respectively.
Robustness: Results are robust to the inclusion of the rate of inflation, GDP per capita, real GDP growth, and a dummy for hyperinflation as control variables. The effect of reforms is also robust when estimated on the sub-sample of developing countries.

Table 12. FDI Inflows and Real Sector Reforms

Dependent variable: log FDI/GDP (t)	(1) Trade liberalization (tariff)	(2) Trade liberalization (current account)	(3) Agricultural liberalization	(4) Telecoms and electricity liberalization
Liberalization index (t-1)	0.406	0.094	0.231	0.636**
	(0.357)	(0.411)	(0.369)	(0.295)
Observations	2418	1550	1810	1956
Number of countries	119	59	92	94
Adjusted R-squared	0.62	0.61	0.59	0.58

Sources: Staff estimates based on International Financial Statistics, Penn World Tables version 6.2, and World Development Indicators.
Notes: The table shows regressions of inward FDI, measured as the log of FDI to GDP, on real sector liberalization indices. Each regression includes controls for the growth of real per-capita GDP, the level of development (proxied by the lagged level of real GDP per capita), market size (proxied by the lagged level of real GDP), and inflation. All regressions were estimated by panel OLS and include country and year fixed effects, using annual data over 1961-2006. Robust standard errors, clustered at the country-year level, are in parentheses. ***, **, and * denote significance at the 1, 5, and 10 percent level, respectively.

V. Sequencing Real and Financial Sector Reforms

38. The analysis so far has considered the impact of individual reforms, rather than packages of multiple reforms, on economic growth. In practice, policy makers will wish to act on the basis of a reform strategy that takes into account sequencing issues as well as possible complementarities among reforms on expected growth outcomes. While political

constraints may often be paramount in determining what can be achieved and when, policy makers will opt for reform strategies that are likely to have the most favorable impact on economic welfare or growth subject to the other constraints. Although there is a large literature on the design and sequencing of reform packages, including, for example, whether "big bang" or piecemeal approaches to reform yield greater economic returns, the *empirical* evidence on the growth benefits of alternative sequencing strategies, and indeed, as a prior matter, the "stylized facts" of reform sequencing strategies—what countries have actually pursued in practice—is relatively scarce.[9] This section examines the cross-country evidence on sequencing strategies and their growth effects, linking it where appropriate to the existing theoretical/normative work on these issues, which holds that:

- *International trade should be liberalized before the external capital account.* McKinnon (1973) argued that liberalizing capital *inflows* before trade was likely to amplify the distortions caused by tariffs and reduce the competitiveness of domestic firms through real appreciation. Liberalizing capital *outflows* before trade would be equally undesirable if trade restrictions misallocate resources and depress domestic returns to the point that domestic capital would leave the economy. For both reasons, McKinnon, and others following him, have advocated a "trade reform first" strategy, contending that the growth benefits of reform would be higher under such a strategy than under alternative sequencing strategies.

- *The domestic financial sector should be liberalized before the external capital account.* In the presence of regulated interest rates and other financial system distortions, capital mobility is likely to be destabilizing: capital *inflows* could lead to overborrowing in foreign currency, which a dysfunctional domestic financial sector would misallocate, and capital *outflows* could erode the domestic deposit base (McKinnon, 1973). There is some evidence that capital account liberalization may increase volatility and crisis risk in the absence of a sufficiently reformed domestic financial sector (IMF, 2007). If such volatility leads to an inefficient allocation of resources, growth should be higher when the domestic financial sector is reformed before the external capital account than under the reverse sequencing strategy.

- *Trade should be liberalized before the domestic financial sector.* Opening the economy to international trade first has been argued to make subsequent reform of the domestic financial sector more likely because greater competition in product markets (through trade) is likely to weaken the influence of monopolistic incumbents who

[9] Bhattacharya (1997) provides a review of the theoretical literature. Previous empirical work has focused on the sequencing of product and labor market reforms for OECD countries (Fiori and others, 2007), but has generally ignored the broader sequencing issues among the different sectors covered in this paper. A related issue, well outside the remit of this paper, concerns the appropriate sequencing between macroeconomic stabilization and structural reforms: see Zalduendo (2005) for an analysis.

may oppose financial development (Rajan and Zingales, 2003). While this argument may explain why trade reform is more likely to precede domestic financial sector reform than vice-versa, it does not necessarily imply that growth should be higher under the first sequence than the second.

39. To what extent do countries actually follow the sequencing prescriptions advocated in the normative literature? Table 13 presents evidence on actual sequencing practices, by testing whether some reform indicators are leading indicators of—i.e., generally precede—changes in other reform indicators. Specifically, five-year changes in the indicators of domestic financial sector liberalization (column 1), external capital account liberalization (column 2), and the tariff-based trade liberalization index (column 3) are regressed on five-year lags of all other reform indicators, controlling for a variety of other determinants of liberalization. The results suggest that trade liberalization does indeed help to predict future reform of both the domestic financial sector and the external capital account (first row), while it is not itself predicted by either of the other reforms (last column), consistent with the "trade-first" strategy advocated in the normative literature. The data, however, do not speak loudly on whether domestic financial sector liberalization leads or lags external capital account liberalization. The estimated coefficient on domestic financial sector liberalization in the external capital account reform regression (second column/second row) is borderline significant, providing only weak evidence that countries tend to reform the domestic financial sector before opening up to foreign capital.

Table 13. Sequencing of Structural Reforms

Dependent variable: Reform index (t) - Reform index (t-5)	(1) Domestic financial sector liberalization	(2) External capital account liberalization	(3) Trade liberalization (tariff)
Trade liberalization (tariff) (t-5)	0.107***	0.235**	-0.578***
	[0.04]	[0.10]	[0.08]
Domestic financial sector liberalization (t-5)	-0.694***	0.189	-0.030
	[0.07]	[0.13]	[0.06]
External capital account liberalization (t-5)	-0.031	-0.839***	0.034
	[0.03]	[0.08]	[0.03]
Observations	353	353	352
Number of countries	74	74	74
Adj. R-squared	0.44	0.43	0.32

Sources: Staff estimates.

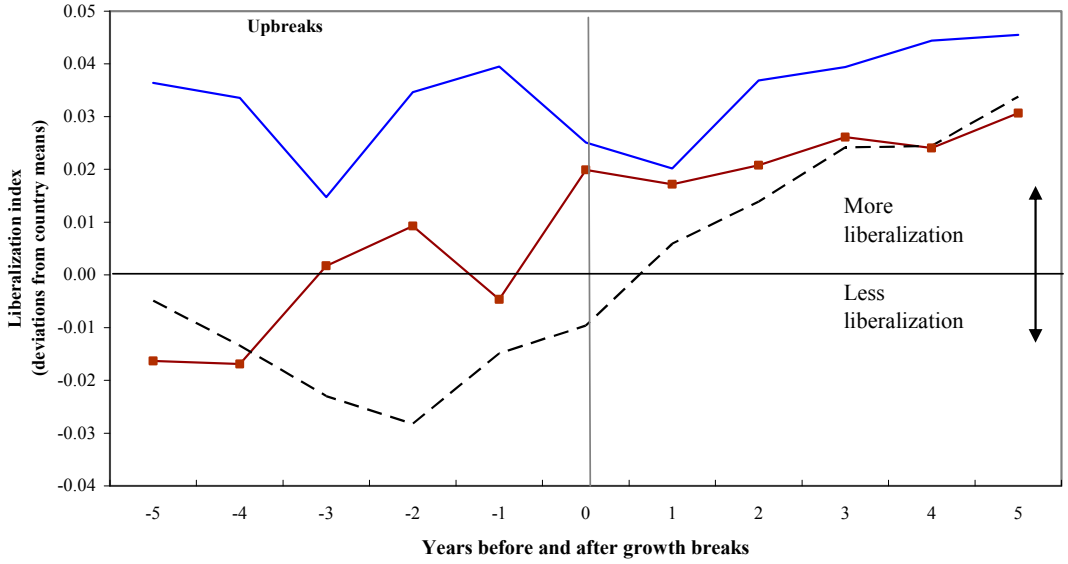
Notes: The table shows regressions of five-year changes in the indicators of domestic financial sector liberalization (column 1), external capital account liberalization (column 2) and trade (tariff) liberalization (column 3) on five-year lags of all other liberalization indices. Explanatory variables include indices of liberalization in agriculture and in the telecommunications and electricity industries, the own lagged levels of the index considered, country and year fixed effects, and a measure of the level of liberalization in neighboring countries. All specifications were estimated by panel OLS on non-overlapping five-year intervals over the period 1975-2000. Robust standard errors are reported in parentheses. ***, **, and * denote statistical significance at 1, 5, and 10 percent levels, respectively.

Robustness: The trade liberalization index based on current account restrictions has leading indicator properties similar to those of the reported tariff-based index. Broadly similar results are obtained including, as additional controls, five-year lags of GDP per capita, a terms-of-trade index, and an indicator variable for democratic regimes.

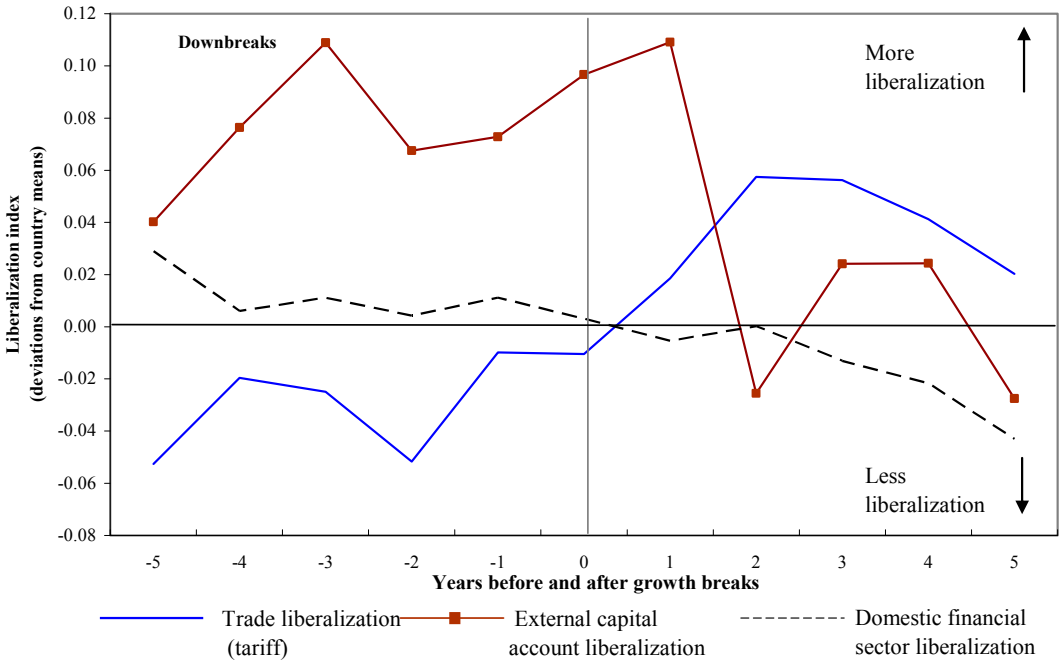
40. What about the growth effects of alternative sequencing strategies? Figure 8 illustrates the evolution of the indices of domestic financial sector and external capital account liberalization, as well as the tariff-based index of trade liberalization, before and

Figure 8. Growth Breaks and Sequencing of Reforms

Upbreaks are associated with relatively high levels of trade liberalization and rising trends in both external capital account liberalization and domestic financial sector liberalization.



Downbreaks are associated with relatively low levels of trade liberalization and high levels of external capital account liberalization, with domestic financial sector liberalization about equal to country averages.



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

Notes: These figures plot average liberalization indices for the period starting 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 is the same across the three indices.

after growth breaks. Overall, the trade-first sequence seems to be associated with growth upbreaks, while a trade-last sequence seems to characterize growth downbreaks. Specifically:

- In the run-up to growth upbreaks, economies have generally already introduced trade reforms, with the trade liberalization index above the country average (top panel of Figure 8). In contrast, in the run-up to downbreaks, economies have yet to open to trade (bottom panel). This suggests that a liberal trade regime is involved both in igniting growth and in sustaining it—the latter result is also strongly supported by the analysis of growth duration in Berg, Ostry, and Zettelmeyer (2008).

- During acceleration episodes, the top panel of Figure 8 shows that the index of domestic financial sector liberalization and that of external capital account liberalization are on a rising trend three to four years before the upbreak. Thus, an open trade regime, together with a process of increasingly liberalized domestic financial sector and external capital account, appear to be an integral part of acceleration episodes, with the latter two reforms mostly progressing together. In contrast, a relatively open external capital account, combined with a relatively closed trade account and domestic financial sector reform about equal to country averages, seems to be a common feature of growth decelerations.

41. Econometric evidence corroborates the main results from Figure 8 on the growth effects of alternative sequencing strategies. Controlling for standard growth determinants and the direct effects of reforms, Table 14 presents results on the growth effects of alternative reform sequencing strategies. The positive and statistically significant coefficient on the trade-before-external-capital-account liberalization sequencing term (first row/second column) indicates that liberalizing trade before the capital account yields a more favorable growth outcome than the reverse sequence.[10] By contrast, no clear ranking—in terms of growth outcomes—emerges between domestic financial sector liberalization and the opening of the external capital account (column 3), or between trade and domestic financial sector liberalization (the sequence with trade first is only borderline significant in column 1). The results in Table 14 can be used to simulate the cumulative growth effects of alternative reform sequencing strategies: not surprisingly, the results indicate larger cumulative growth benefits (about ⅓ percent per year over 15 years) of a trade-before-external-capital-account reform strategy than the reverse strategy; a big bang approach where both reforms are pursued simultaneously is also less favorable in terms of cumulative growth performance.

[10] To make the level of liberalization comparable across sectors, the indices were transformed into percentiles of the distribution of each index. Estimating the regressions with the raw indices yields similar results.

Table 14. Growth Effects of Alternative Reform Sequencing Strategies

Dependent variable: Annual per-capita GDP growth (t)	(1) Trade liberalization (tariff) vs. Domestic financial sector liberalization	(2) Trade liberalization (tariff) vs. External capital account liberalization	(3) Dom. financial sector lib. vs. External capital account liberalization
Reform sequence (first reform before second) (t-1)	0.03	0.043**	0.052
	(0.019)	(0.018)	(0.046)
Direct effect (first reform) (t-1)	0.019*	0.026**	0.071***
	(0.010)	(0.011)	(0.016)
Direct effect (second reform) (t-1)	0.062***	0.058***	0.034**
	(0.023)	(0.017)	(0.014)
Reform complementarity (t-1)	-0.018	-0.051**	-0.054**
	(0.024)	(0.020)	(0.021)
Observations	1991	1991	2114
Number of countries	88	88	88
Adjusted R-squared	0.06	0.06	0.08

Sources: Staff estimates based on International Financial Statistics, Penn World Tables version 6.2, and World Development Indicators.

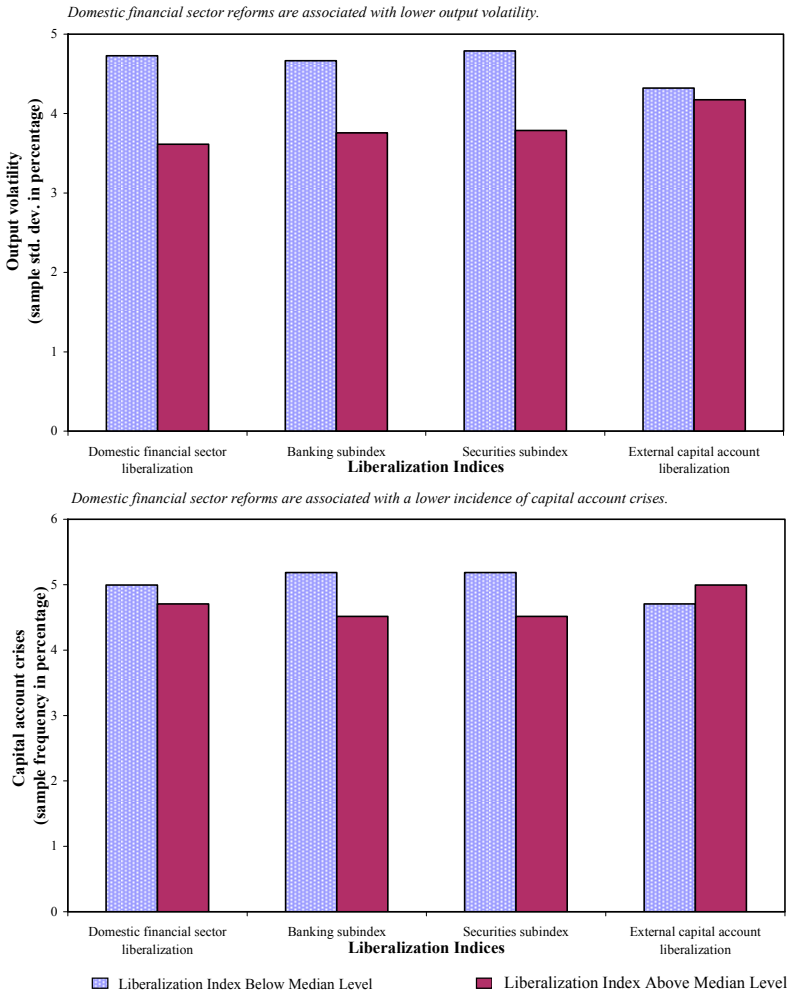
Notes: This table shows regressions of annual per-capita GDP growth on various (pairwise) combinations of reform. The effects of reforms are disaggregated into a direct effect; a reform complementarity effect captured by a multiplicative interaction of the two liberalization indices; and a sequencing effect. The latter is constructed by first calculating, for each reform, the percentile of a country's liberalization index in a given year (based on the respective regression sample), and then interacting the difference in the percentiles with the complementarity term. The sequencing term thus captures the difference between the extent of liberalization across the two sectors. Control variables include: the level of GDP per-capita (in logs), the level of terms of trade, an indicator variable for democratic regimes, the level of tertiary education, all lagged one year. All regressions were estimated by panel OLS including country and time fixed effects. Robust standard errors are provided in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10 percent level, respectively.

Robustness: Results are robust to measuring the reform sequence term using actual liberalization indices rather than their percentiles.

VI. FINANCIAL SECTOR REFORMS AND RESILIENCE

42. How do structural reforms—and, in particular, financial sector reforms, which should in principle help to buffer economies against the effects of adverse shocks and thereby foster greater risk sharing at the economy-wide level—affect macroeconomic volatility and resilience? To address what is in essence an empirical issue, Figure 9 shows how output volatility (top panel) and the frequency of "sudden stops" (bottom panel) vary with the level of financial liberalization.[11] The results suggest that countries with a relatively liberalized domestic financial sector seem to enjoy lower macroeconomic volatility and experience a lower incidence of sudden stops, while the association between external capital account liberalization and macroeconomic volatility/crisis propensity appears to be weak. Of course, just as the growth effects of structural reforms depend critically on the sequencing strategy pursued, so too the above volatility/crisis risk results also reflect reform

Figure 9. Financial Sector Reforms, Output Volatility, and Capital Account Crises



Source: Staff estimates based on Penn World Tables version 6.2 and World Economic Outlook Database.
Notes: *Upper panel.* The output volatilty portrayed on the y-axis is the standard deviation of within-country growth rates measured as deviations from country means over the sample period net of a global growth trend. These growth rates have been obtained from a panel regression of annual GDP growth on country fixed effects (to remove country averages) and year fixed effects (to remove global trends). The panel shows the difference in output volatility between low-reform (below median) years and high-reform (above median) years within countries.

Lower panel. The panel shows the difference in the frequency of capital account crises (i.e., sudden stops in capital flows) between low-reform (below median) years and high-reform (above median) years within countries. The crises episodes were selected following the methodology in Chamon, Manasse, and Prati (2007).

[11] In principle, while there may be a connection between real sector reforms and output volatility, the data do not speak loudly on such a linkage, hence the focus in this section on the association between financial sector liberalization and resilience to shocks.

sequencing. Specifically, as shown in Table 15, volatility and crisis risk are low when the domestic financial sector and the external capital account are *both* relatively liberalized, while volatility and crisis risk are high when the external capital account is relatively liberalized but domestic financial sector liberalization is low. The results in Figure 9 thus would seem to aggregate very different macro-volatility profiles from domestic financial reform and external capital account liberalization, which depend critically on the sequencing strategy pursued.

Table 15. Financial Sector Reforms, Output Volatility, and Capital Account Crises

Output Volatility

	External Capital Account Liberalization		
	High	Intermediate	Low
	(percentage points)		
Domestic Financial Sector Liberalization:			
High	**2.8**	4.6	3.1
Intermediate	3.6	5.0	4.2
Low	*8.1*	6.4	4.6

Frequency of Sudden Stops

	External Capital Account Liberalization		
	High	Intermediate	Low
	(percentage points, annual basis)		
Domestic Financial Sector Liberalization:			
High	**4.0**	3.9	5.6
Intermediate	6.2	3.8	5.5
Low	*6.7*	6.5	4.7

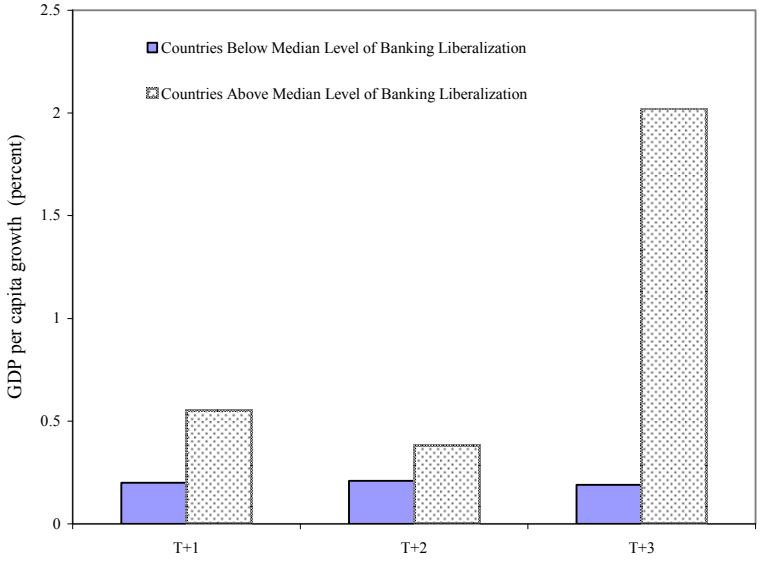
Sources: IMF Staff Calculations.

Note: The terms "High", "Intermediate", and "Low" indicate that the value of the relevant index falls into, respectively, the top 25 percent, the intermediate 50 percent, and the bottom 25 percent of the overall distribution. In the top panel, the values in each cell indicate the average standard deviation of annual GDP growth under different degrees of external capital account and domestic financial sector liberalization, controlling for country and year fixed effects. In the bottom panel, the values in each cell indicate the sample frequency of sudden stops (see Chamon, Manasse, and Prati (2007) for the definition).

43. Figure 10 comes to the volatility issue from a different angle, by examining whether liberalization of the domestic financial sector helps to buffer economies against terms of trade shocks, a key source of volatility in low- and middle-income countries. Results suggest that, in countries with more liberalized domestic financial sectors, growth rebounds faster after a negative terms-of-trade shock (Figure 10). Results reported in Ramcharan (2008) suggest that the magnitude of the benefit from reform is substantial: after a decline in the terms of trade of 10 percentage points, a one standard deviation difference in the domestic financial sector liberalization index is associated with a cumulative income per capita growth that is 1.3 percentage points higher over a five year period. Sectoral evidence also suggests that, in countries with more liberalized domestic financial sectors, industries more exposed to terms of trade shocks—specifically those that use relatively more imported intermediate inputs in production—experience relatively smaller growth decelerations after a negative shock (Table 16). The enhanced resilience provided by domestic financial sector liberalization extends to a variety of other real shocks—such as windstorms, floods, and earthquakes (Ramcharan, 2007)—where greater credit availability provides a key channel buffering the aggregate output effects from such shocks. Domestic financial sector liberalization also enhances the resilience of the economy to financial shocks: after a 1 percentage point increase in foreign interest rates, economies that score at the 75th percentile on the banking sector competition subindex have a cumulative income per capita growth that is 3 percentage points higher over a five year period than economies at the median level of banking competition (Ramcharan, 2008). This buffering role of banking sector competition is likely to reflect risk diversification benefits from fewer restrictions on the number and geographical location of bank branches.

Figure 10. Terms-of-Trade Shocks and the Financial Sector

With a more liberalized domestic financial system, adverse terms of trade shocks are less costly in terms of foregone output.



Source: IMF staff calculations.

Notes: This figure plots median growth rates in the three years following a negative terms-of-trade shock. A negative terms-of-trade shock for each country is defined as a decline of one or more standard deviations in the growth in the terms of trade. The figure shows separately the growth rates for country-year pairs above and below the median level of banking sector liberalization. These growth rates have been obtained from a panel regression of annual GDP growth on country fixed effects (to remove country averages) and year fixed effects (to remove global trends).

Table 16. Financial Sector Reforms and Resilience to Terms-of-Trade Shocks

Dependent variable: change in sectoral output growth in the three years following a terms-of-trade shock	(1)	(2)	(3)
Domestic financial lib. index interacted with a measure of imported input intensity (t-3)	0.181***	0.229***	0.183***
	(0.056)	(0.052)	(0.059)
Private credit/GDP interacted with a measure of imported input intensity (t-3)		-0.068	
		(0.044)	
Growth rate of terms of trade interacted with a measure of imported input intensity (t)			-0.185
			(0.56)
Log output share (t-3)	-0.006	-0.006	-0.006
	(0.009)	(0.009)	(0.009)
Observations	995	978	995
R-squared	0.13	0.14	0.13

Sources: Staff estimates based on the GTAP database, and Abiad, Detragiache and Tressel (2008); 2006 UNIDO Industrial Statistics Database; and World Development Indicators.

Notes: The table shows regressions of the change in sectoral output growth of manufacturing industries in the three years following a terms-of-trade shock on the domestic financial sector liberalization index interacted with a measure of imported input intensity and a number of controls. The interaction term captures the differential effect of domestic financial sector liberalization on the resilience of industries that are relatively more exposed to shocks. Terms-of-trade shock episodes are defined as years with a 10 percentage point or greater annual drop in the terms of trade. The first column shows the baseline regression, the second and third columns show that results are robust when controlling for interactions of the measure of imported input intensity with, respectively, the private credit-to-GDP ratio and the intensity of the terms-of-trade shock. All regressions were estimated using OLS and include country, industry, and year dummies. Robust standard errors, clustered at the country-year level, are in parentheses. ***, ** and * indicate statistical significance at the 1, 5, and 10 percent level, respectively.

Robustness: Robustness checks included controlling for an interaction term between the measure of imported input intensity and (i) indicators of trade liberalization; (ii) the overall level of development (real GDP per capita); (iii) an indicator variable for the type of legal system (common law or civil law); (iv) an indicator of contract enforcement; and (v) indicators of property rights. A complete set of results is reported in Tressel, T., 2008. "Unbundling the Effects of Reforms", mimeo IMF (paper available at: http://www.imf.org/External/NP/seminars/eng/2008/strureform/index.htm)

VII. Conclusions

44. Maintaining sound economic growth, together with broad financial stability, is a perennial challenge for policymakers in developed and developing countries alike, and understanding the role that structural reforms may play in meeting this challenge remains a central element of surveillance for all segments of the Fund's membership. This paper has sought to draw lessons from the cross-country experience on structural reform, so as to strengthen the underpinnings of Fund policy advice and surveillance across the membership.

45. Past analyses of structural reforms have mainly focused on industrial countries, for which indicators of structural reform liberalization are readily available, or on selected groups of countries or regions of the world. In contrast, the present study rests on a new dataset, which includes comparable indicators of structural reforms for 91 developing, emerging-market, and advanced economies over the past three decades, as well as an extensive coverage of different economic sectors. The broad cross-country and cross-sectoral approach is essential for drawing policy lessons across different segments of the Fund's membership, and for addressing empirically issues related to policy sequencing.

46. With respect to the causes of structural reform, the empirical analysis suggests that the quality of broad institutions initially spurred liberalization among advanced economies, but that, as cross-country reform gaps—either with respect to reform "leaders" or with respect to reformist "neighbors"— emerged, a catch-up effect led to subsequent reform in developing countries. There is also evidence that IMF-supported programs and, for some sectors, economic crises, have been a catalyst for reform.

47. Real and financial sector reforms have helped to boost economic growth in both developed and developing countries, with domestic financial sector liberalization, trade liberalization, and liberalization of the agricultural sector exerting particularly favorable effects. The channels through which growth effects operate include greater availability of credit and FDI inflows; and improvements in allocative efficiency, which have acted to boost growth particularly in firms and sectors heavily dependent on imported intermediate inputs and external sources of financing. The implementation of structural reforms has also tended to enhance the assessment of the future profitability and solvency of domestic firms, as reflected in credit ratings, with a corresponding reduction in borrowing costs for domestic firms and banks following liberalization.

48. The nature of the reform sequencing strategy pursued affects the size of the ensuing growth benefits. The cross-country evidence strongly suggests that economies that liberalize trade before the external capital account grow more rapidly than those that follow the reverse sequence, and that a "trade-first" strategy yields better growth results than a "big bang" approach under which liberalization is pursued simultaneously across all sectors. While there is no evidence that the sequencing of domestic financial sector and external capital account liberalization has a significant impact on growth outcomes, the stability benefits—both in

terms of macroeconomic volatility and crisis propensity—are more favorable when the domestic financial sector is liberalized before the external capital account.

49. Domestic financial sector reforms also enhance the way in which economies respond to various real and financial shocks, as financial reforms reduce the output costs from adverse terms of trade and foreign interest rate shocks, with a variety of mechanisms—especially improvements in credit availability—playing a key role. The greater resilience to real shocks in economies with more liberalized financial sectors is evidence of how such reforms can strengthen economy-wide real-financial linkages.

50. The evidence presented in this paper—given its broad country, time, and sectoral coverage—should help to strengthen the cross-country perspective in bilateral surveillance on the role of structural policies in fostering sound medium-run growth-cum-stability in member countries. The results highlight the growth benefits of a reform strategy that relies on early trade liberalization and, in the context of a relatively open trade regime, accelerates the process of liberalizing both the domestic financial sector and the external capital account. The paper also highlights that, as long as the domestic financial sector is reformed before opening the capital account, structural reform can enhance growth opportunities without raising macroeconomic volatility or crisis risks. Appropriately sequenced structural reforms, thus, seem to improve the growth-volatility frontier for the economy, rather than simply engendering a move along the existing frontier.

Appendix Table 1: List of Economies 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 Table 2: Description of Reform Indices						
			Coverage			
Reform Indices	**Description**	**Source**	**Start Year**	**End Year**	**MIN # of Countries in any Year**	**MAX # of Countries in any Year**
Financial Sector						
Domestic Financial Sector Liberalization	The index of domestic financial liberalization is an average of six subindices. Five of them relate to *banking*: (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 Basel capital standards, and a framework for bank inspections. The sixth subindex relates to *securities markets* and covers policies to develop domestic bond and equity markets, including (i) the creation of basic frameworks such as the auctioning of T-bills, or the establishment of a security commission; (ii) policies to further establish securities markets such as tax exemptions, introduction of medium and long-term government bonds to establish a benchmark for the yield curve, or the introduction of a primary dealer system; (iii) policies to develop derivative markets or to create an institutional investor's base; and (d) policies to permit access to the domestic stock market by nonresidents. The subindices are aggregated with equal weights. Each subindex is coded from zero (fully repressed) to three (fully liberalized).	Abiad and others (2008), following the methodology in Abiad and Mody (2005), based on various IMF reports and working papers, central bank websites, and others.	1973	2005	72	91
External Capital Account Liberalization: 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), following the methodology in Abiad and Mody (2005), based on various IMF reports and working papers, central bank websites, and others.	1973	2005	72	91
External Capital Account Liberalization: Residents vs. Nonresidents	Indicators measuring the intensity of legal restrictions on residents' respectively nonresidents' ability to move capital into and out of a country. Index originally coded from zero (fully repressed) to 50 (fully liberalized).	Based on the methodology in Quinn (1997) and Quinn and Toyoda (2007), drawing on information contained in the Fund's AREAER.	1960	2005	50	65

Appendix Table 2 (concluded): 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
Real Sector						
Trade Liberalization						
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 Willamson, 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.	Based on the methodology in Quinn (1997) and Quinn and Toyoda (2007), drawing on information contained in the Fund's AREAER.	1960	2005	50	65
Product Markets						
Telecoms 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 various existing studies and datasets as well as national legislation and other official documents.	1960	2003	106	108
Agriculture	The index captures 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. Each country-year pair can take four values: (i) zero (public monopoly or monopsony in production, transportation, or marketing, e.g., export marketing boards); (ii) one-third (administered prices); (iii) two-thirds (public ownership of relevant producers or concession requirements); and (iv) one (no public intervention).	Based on IMF commodities data, various existing studies and datasets, and national legislation and other official documents.	1960	2003	96	104

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