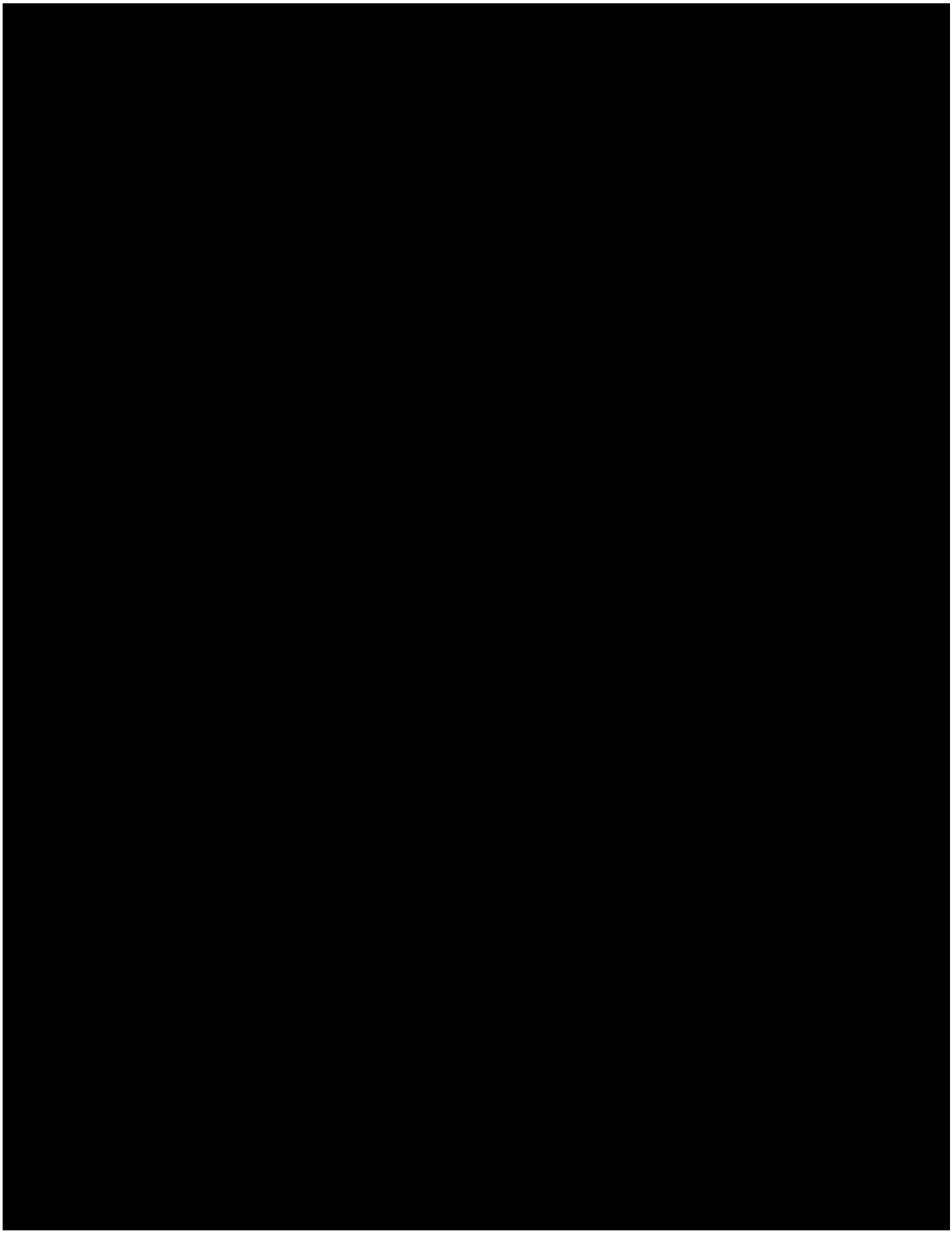

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Structural Reforms and Productivity Growth in Emerging Market and Developing Economies*

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Abstract

This paper empirically assesses the role of structural and institutional reforms in driving productivity growth across countries at different stages of development, using a distance-to-frontier framework. It gauges whether particular policies and reforms matter more for increasing productivity growth at the aggregate and sectoral levels for some emerging market and developing economies (EMDEs) than others. Recognizing the possibility of time lags between reform implementation and reform payoffs, the paper also examines how productivity gains from various reforms evolve over the the short- and medium-term.

JEL Classification Numbers: D24, O16, O24, O43, O47

Keywords: Total factor productivity; Labor productivity; Economic Growth; Structural Reforms; Institutions; Emerging Market and Developing Countries; Agriculture; Industry; Services

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I. INTRODUCTION

Emerging market and developing economies (EMDEs) as a group have experienced a remarkable period of growth over the last two decades. Actual and potential growth in many EMDEs is now slowing and the tailwinds of strong external demand, buoyant commodity prices, and ample global liquidity are fading. There is a growing consensus that structural reforms are needed to achieve robust, sustainable growth and to foster convergence to higher income levels. Reforms to lift productivity growth—a key driver of long-term growth prospects and improvements in living standards—are central in this regard.

Assessing the impact of reforms on productivity growth is a challenging endeavor as the benefits are often difficult to gauge. This paper explores two dimensions of the structural reform debate. The first is the question of how the productivity payoffs of structural reforms vary as countries develop and move closer to the global technological frontier. The second is how reform payoffs evolve over time, recognizing that productivity gains from reforms can take time to materialize. This paper addresses these questions by examining the empirical association between a range of structural reforms and productivity growth for a sample of countries.

A large body of empirical evidence finds that structural reforms can improve resource allocation and boost productive capacity. Potential sources of productivity growth in EMDEs arise from catch-up growth by absorbing technology and ideas from advanced economies, structural change into higher-productivity sectors and new activities, and improved resource allocation within sectors (Dabla-Norris and others, 2013). Higher quality and quantity of infrastructure and human capital, trade openness, efficient and well-developed financial systems, and economic institutions that promote competition, facilitate entry and exit, and encourage entrepreneurship and innovation have been variously found to increase productivity growth at the cross-country, industry, and firm levels (see for e.g., Nicoletti and Scarpetta, 2003; Syverson, 2011; Christiansen and others, 2013; OECD, 2013; Prati and others, 2013; Restuccia and Rogerson, 2013; Bourles and others, 2013).

There is also theoretical support for the hypothesis that the drivers of productivity growth vary along the development path. Neo-Schumpeterian growth theory suggests that the process of economic development is influenced by a country's income gap with countries that define the global technological frontier (Aghion and Howitt, 2006, 2009). The main growth driver for economies farther away from the technological frontier is the adoption of existing technologies. This process can also be more broadly defined as the implementation of more efficient production techniques. The closer a country gets to the global technological frontier the higher is the relative importance of innovation instead of imitation for sustaining productivity and output growth (Acemoglu and others, 2006). An important implication of this framework is that that the set of policies aimed at sustaining productivity growth and fostering convergence at earlier stages of development can be different from those that may be required as economies develop. Therefore, a proper empirical assessment of the relevance

of different productivity-enhancing policies requires taking into account the possibility of non-linear effects arising from a country's distance to the global technological frontier.

Gains from reforms depend on the types of reforms being implemented, the outcome examined (output, productivity, or employment), initial macroeconomic and political conditions, and the time period over which impacts are assessed. The impact also depends on how reforms shift aggregate demand and supply. In the short-run, some structural reforms can impact demand through improved confidence and wealth effects stemming from the expectation of positive future income (Kerdrain et al, 2010). Supply side gains from reforms largely accrue over the medium- to long-term as they can involve adjustment costs arising from costly reallocation of labor and capital and firm restructuring.[1]

This paper makes a twofold contribution to the literature. First, it assesses if the productivity impact of reforms differs based on a country's distance to the global technology frontier. In this sense, the paper is similar to Prati and others (2013) who examine the impact of reforms on economic growth. In contrast to their paper, we focus on the productivity impacts for a larger sample of countries and reforms. Second, we examine the dynamic (short- vs. medium-term) impact of reforms. By focusing on productivity rather than total output growth, it fills an important gap in the paper literature as it sheds light on the channels through which reforms increase output. In particular, we examine the impact of a range of reforms on both aggregate productivity (both total factor productivity (TFP) and average labor productivity) as well as sector-level productivity (i.e., agriculture, manufacturing, and services) separately. The sectoral perspective can help shed further light on the mechanisms underlying aggregate productivity dynamics.

The analysis covers more than a hundred countries at various stages of economic development. In contrast to most of the existing literature which focuses on advanced economies, we focus primarily on EMDEs. The reform and institutional measures chosen for inclusion in the analysis reflect recent theoretical and empirical findings on productivity and growth determinants as well as data availability. In particular, the analysis makes use of recent indices compiled by the IMF of de jure reforms and liberalization in the real and financial sectors. These encompass reforms in domestic financial systems, liberalization of agriculture, trade, and FDI. These measures are supplemented with variables capturing institutional quality (e.g., the strength of property rights protection and legal frameworks)

[1] Theoretical results of DSGE models (e.g., Cacciatore et al., 2012) find that reforms payoffs accrue over time. This is partly because benefits materialize through firm entry and increased hiring, both of which are gradual processes, while any reform-driven layoffs are immediate. Empirically, the dynamic impact of product and labor market reforms has largely been studied for advanced countries. For example, empirical work by Bouis and others (2012) and Dabla-Norris and others (2015) finds that reform benefits typically increase over time.

and regulatory restrictiveness (e.g., the extent of business and labor regulations) that have been found to influence economic outcomes in previous studies.[2]

We find that the importance of different reforms depends on the distance to the technology frontier. Thus, we find support for both the commonality of productivity drivers and the dissimilarity of their potency across country groups. For example, while lower income countries benefit most from reforms that alleviate constraints on trade and foreign investment, and removal of agricultural price controls and subsidies, emerging market economies (EMEs) experience relatively larger productivity gains from enhancing the efficiency of the banking systems, capital market development, and improving the business environment. Second, our analysis suggests that not all reforms generate immediate productivity payoffs. For instance, productivity gains from banking system reforms can take a few years to materialize. Moreover, consistent with previous evidence for advanced economies (Dabla-Norris and others, 2015), we find that the payoffs from most reforms increase over time.

An important caveat to our results is that we do not explicitly control for the potential endogeneity of reforms.[3] There are many reasons why reforms are implemented in the first place, which could be correlated with productivity growth. As such, our results should be viewed as highlighting correlations rather than identifying causality. However, our results qualitatively hold across different dependent variables and empirical specifications. Further, we look at sectoral productivity dynamics, which allow for an examination of the key channels through which reforms improve aggregate productivity. Second, we estimate the impact of large structural reform shocks on productivity, which partially attenuates the endogeneity problem. Finally, we provide robustness check of the results estimated using the Arellano-Bond Generalized Method of Moments (GMM).

The paper is organized as follows. Section II reviews the reform literature. Section III presents the distance to frontier analysis, and Section IV looks at the dynamic impact of reforms. Section V concludes.

II. WHAT REFORMS: A SELECTED LITERATURE REVIEW

A large existing literature has shown that economic reforms that reduce barriers to efficient factor reallocation, technology adoption, and innovation are associated with higher productivity growth. In this section we provide a select review of aggregate, sector- and firm-level evidence, focusing on the variables of interest in our empirical analysis.

[2] Structural reforms may also involve actions to address market failures or fiscal policies that affect productivity more directly. The choice of reform variables considered in this paper was restricted by data availability across a large sample of countries.

[3] See Bordon and others (2015) for an attempt to deal with reform endogeneity.

Financial sector reforms

Theoretical and empirical studies find that efficient financial systems can help increase investment and spur innovation (Levine, 2005), and allow countries to take advantage of technology transfer. Developed financial systems can also lead to a more efficient allocation of capital across firms and industries (Rajan and Zingales, 2001; Tressel, 2008). Reducing financial repression and restrictions on the price or quantity of credit can also facilitate the movement of resources to more productive uses, both across and within sectors. For instance, firm-level evidence from 10 Eastern European countries finds that reforms to reduce financial repression raised manufacturing productivity by 17 percent through improvements in the within-industry allocation of resources across firms (Larrain and Stumpner, 2013).

Beyond policies to remove financial distortions, previous studies have found that capital market development is associated with higher productivity growth. Reforms that encourage the formation and development of equity, bonds (particularly local currency bond markets), and securities markets can be effective in increasing productivity by lowering the cost of capital and facilitating the financing of new capital and innovation. Studies, however, find that the availability of financial instruments useful for financing the innovation process can be more relevant for countries closer to the technology frontier (Aghion and others, 2005).

Trade and FDI liberalization

Barriers to international trade and foreign investment can impede efficient resource allocation and technology transfer, thereby reducing productivity growth. An extensive literature shows that more open economies with lower trade barriers grew faster (Wacziarg and Welch, 2008). In many low-income countries, especially in Sub-Saharan Africa (SSA), tariffs are high and non-tariff barriers stymie regional integration and can be a source of low agricultural productivity growth (Tombe, 2012). Services barriers in developing countries, especially EMEs, on average, are substantially higher than in Organization for Economic Cooperation and Development countries (Borchert and others, 2010). An expanding body of research has documented the positive association between open services markets, FDI in services, and the performance of domestic firms, including on exports. Evidence suggests that the dismantling of entry barriers and the easing of regulatory restrictions for FDI in the services sector is associated with higher productivity in downstream manufacturing sectors (see for e.g., Arnold and others, 2012, for India; and Fernandes and Paunov, 2012, for Chile).

Labor markets

In many emerging market economies, the combination of rigid hiring and firing practices, employment protection regulations, and weak income protection systems encourage informality, rendering it costly for labor to move to more productive sectors. Recent evidence finds a significant correlation between low TFP growth and high levels of informality in Latin America and the Caribbean (LAC)—a 1 percentage point decrease in the informality

rate is associated with about a 0.5 percentage point decline in the gap between TFP in LAC versus the United States (IDB, 2013). Moreover, microeconomic evidence finds that labor productivity and TFP growth tend to be weaker in industries with more stringent employment protection (Bassanini and Duval, 2009). Evidence also suggests that mandatory dismissal regulations have a depressing impact on productivity growth in industries where layoff restrictions are more binding (Bassanini and others, 2000). Firm-level evidence also suggests that less stringent labor market institutions facilitate the movement of labor to more productive firms, and foster firm entry and exit (Henrekson and Johansson, 2010). Country-specific studies find that excessive regulation can slow down job creation in global value chains, causing countries to miss out on jobs-supporting agglomeration effects and knowledge spillovers (World Bank, 2012).

Product market reforms

Regulations limiting entry into product markets can hinder the adoption of technologies by reducing competition, constraining technology spillovers, and discouraging the entry of new high technology firms. These are found to be more of a detriment to productivity growth for countries closer to the global technology frontier (Aghion and others, 2009). Indeed, evidence from OECD countries suggests that countries with lighter direct and indirect regulatory burdens have experienced higher productivity growth rates (Dall'Olio and others, 2013). Low product market competition is also found to impair productivity growth, inhibit new firm creation and business investment, and reduce the speed of diffusion of new technologies and production techniques (Conway and others, 2006). Liberalizing product markets can facilitate firm monitoring and encourage managers or state-owned firms to improve efficiency. This impact may be sizable in some EMDEs given large state-owned sectors, which create implicit barriers to entry. The impact of product markets on productivity has also been extensively analyzed at the sector level. In manufacturing, gains from lowering entry barriers are higher the farther a country is from the frontier because strict regulatory settings can curb incentives to adopt new technologies (Nicoletti and Scarpetta, 2003; Dabla-Norris and others, 2015; Bourles and others, 2013).

Agricultural sector reforms, including efforts to scale back excessive government intervention (e.g., export monopolies or administered prices) and boost within-sector productivity (e.g., through appropriate land reforms, tenancy restrictions, and improvements in physical infrastructure and crop yields) can generate economy-wide productivity gains (Adamopoulos and Restuccia, 2011). Agricultural reforms can also facilitate structural transformation, particularly in economies with large shares of agricultural employment (Dabla-Norris et al., 2013).

Institutions

Property rights and the ability to enforce contracts are two critical elements of a country's institutional and legal framework. Such institutions can promote private investment and

entrepreneurship, foster financial sector development, and improve the efficiency of resource allocation, thereby boosting productivity growth. Indeed, evidence suggests that secure property rights and sound legal systems have a first-order effect on long-term economic growth (Acemoglu, Johnson, and Robinson, 2005).

Human capital and innovation.

Human capital facilitates the development of a skills-intensive industries and new technologies, and can also influence a country's productivity by encouraging technological diffusion between firms. Evidence suggests that primary and secondary education matters more for a country's ability to imitate the frontier technology, while tertiary education has a larger impact on a country's capability of innovating (Aghion and Howitt, 2009). In particular, as a country catches up to the global technology frontier, tertiary education becomes more relevant for growth rather than primary and secondary education (Vandenbussche and others, 2006).

Investment in research and development can increase growth by facilitating innovation in countries near the technology frontier and increasing the absorptive capacity of countries not yet there (Acemoglu and others, 2006). As countries move up value chains, technology transfer tends to be more skill intensive, requiring sufficient research and development in the recipient country to adapt new technologies to local conditions.

III. Reforms and Distance to Frontier Analysis

A. Empirical approach

Empirical model

Cross-country analysis can shed light on the extent to which the short-term productivity payoffs of structural reforms differ across countries at different development levels. We grouped countries into income quartiles according to their distance to the global technology frontier, as approximated by a country's real per capita GDP gap with the United States (a proxy for the technological frontier).[4] In any given year, countries are classified into quartiles (denoted by Q1 through Q4, with Q4 being those countries that are closest to the frontier). Low-income countries mostly comprise the first quartile, and most EMEs in the latest year fall into the second (e.g., China, India) or third quartiles (e.g., Chile, Poland). The set of countries belonging to each quartile varies from year to year. The model is estimated using a sample of 108 countries for the period 1970–2011, depending upon available data for the reform indicators.

[4] Using productivity gap instead of the income gap makes no material differences to the identified quartiles.

For each country group Q1-Q4, we estimate the following specification using panel fixed-effect estimator, similar to Prati and others (2013):

$$\Delta y_{i,t} = \beta_0 + \beta_1 y_{i,US,t-1} + \beta_2 X_{i,t-1} + \mu_t + \nu_i + \varepsilon_{i,t}$$

$\Delta y_{i,t}$ is the annual productivity growth rate in country *i* at year *t*. We use several measures of productivity: aggregate TFP measured as the residual from a standard aggregate Cobb-Douglas production, aggregate labor productivity (output per worker), and average labor productivity in the three broad sectors (agriculture, manufacturing and services).[5] We focus on productivity rather than growth, because despite the broad-based up-tick in growth across most countries in the 2000s, catch up growth in EMDEs was driven mainly by labor productivity, reflecting the contribution of technology and efficiency gains (TFP), greater capital intensity, or both (Dabla-Norris and others, 2013). A one year lag of the productivity levels gap with the United States is included to capture convergence effects. $X_{i,t-1}$ is a one year lag of the reform indicator or institutional variable, entered separately (one-by-one) in each regression.[6] The model tests for the short-term effect of reforms on productivity growth, and the focus is on how the size and statistical significance of the β_2 coefficient differs across the different income groups. The equation controls for time effects μ_t to capture common time trends (e.g. oil price shocks and other global shocks) and time-invariant country effects ν_i (e.g., geographical location, historical legacies and legal origins). We use robust standard errors clustered at the country level to allow for correlation among observations within the same country over time.

Data

The data is taken from several sources. TFP and aggregate labor productivity growth are from the Penn World Tables (PWT, version 8.0). Average labor productivity in agriculture, manufacturing and services sectors is calculated as real value added per worker, using sector-level value-added data from the UN National Accounts database and sector-level employment from a combination of sources: the International Labor Organization, the World Bank's World Development Indicators, and the Groningen Growth and Development Center

[5] As TFP growth is measured as a residual, any measurement errors in the labor and capital series will be captured in the estimate.TFP growth depends on advances in technology and also captures the efficiency with which labor and capital are combined to generate output. This depends not only on businesses' ability to innovate, but also on the extent to which they operate in an environment that fosters competition, imposes less onerous administrative burdens, provides modern and efficient infrastructure, and allows easy access to finance (Svyerson 2011).

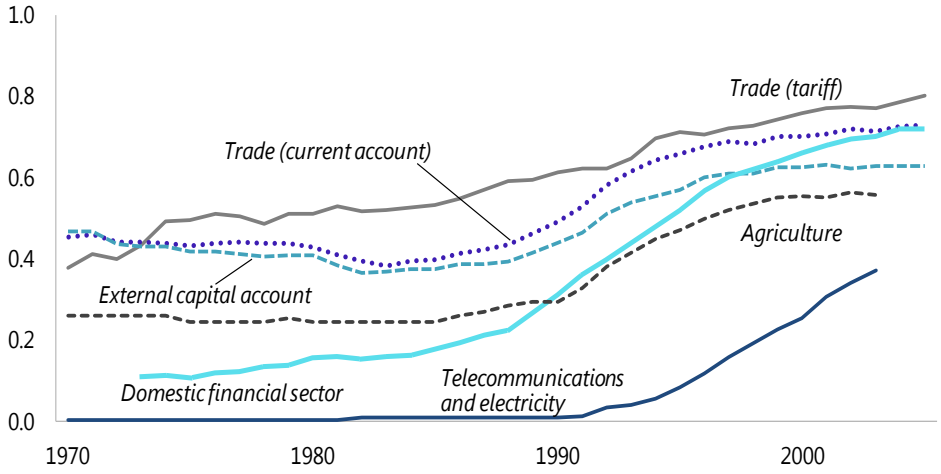
[6] Some reforms can have complementary effects and are often implemented as a package (e.g., product and labor market reforms), so that the correlation in reform indices renders it challenging to include all types of reforms together in aggregate cross-country panel regressions. The estimated effect of each reform included one by one should be viewed as the upper-bound impact.

(GGDC) database. Per capita GDP data (to calculate distance to the frontier) are from PWT (purchasing-power-parity-adjusted constant U.S. dollars).

The reform and institutional measures chosen for inclusion in the analysis reflect theoretical and empirical findings on productivity and growth determinants described in previous sections as well as data availability. In particular, the analysis makes use of recent indices compiled by the IMF of de jure reforms and liberalization in the real and financial sectors. These measures are supplemented with variables capturing institutional quality (e.g., the strength of property rights protection and legal frameworks) and regulatory restrictiveness (e.g., the extent of business and labor regulations). Given the paucity of data on education quality and research and development, these variables were not explicitly accounted for in the regression analysis.

Structural reform indices are compiled by the IMF (2008).[7] These are annual indicators of enacted reforms in international trade, FDI, the financial sector (banking system and capital market), and liberalization of agriculture. All reform indices are normalized to range between 0 and 1, with higher values indicating a greater degree of liberalization. By these metrics, EMDEs on average have significantly liberalized their economy on all fronts since the early 1990s or so, although some reform areas recorded more progress than others (Figure 1). Institutional variables include the quality of labor market institutions and business regulations as captured by the Fraser index, with higher values denoting less restrictive regulations. To check the robustness of the results, alternative data sources for institutional quality and business regulations were also considered.

Figure 1. Economic Liberalization in Emerging and Developing Economies
(indices, normalized between 0 and 1, represent means across countries;
higher values mean greater liberalization)



Sources: IMF (2008) and IMF staff estimates.

[7] See Appendix I for the definition of reforms.

Country experiences also suggest that economies face evolving growth challenges at different stages of development, and that these require different sets of reform priorities. Countries that have successfully kick-started and maintained high productivity growth rates were able to do so by adapting reforms over time. Korea's case stands out as an illuminating example in this regard (Box 1).

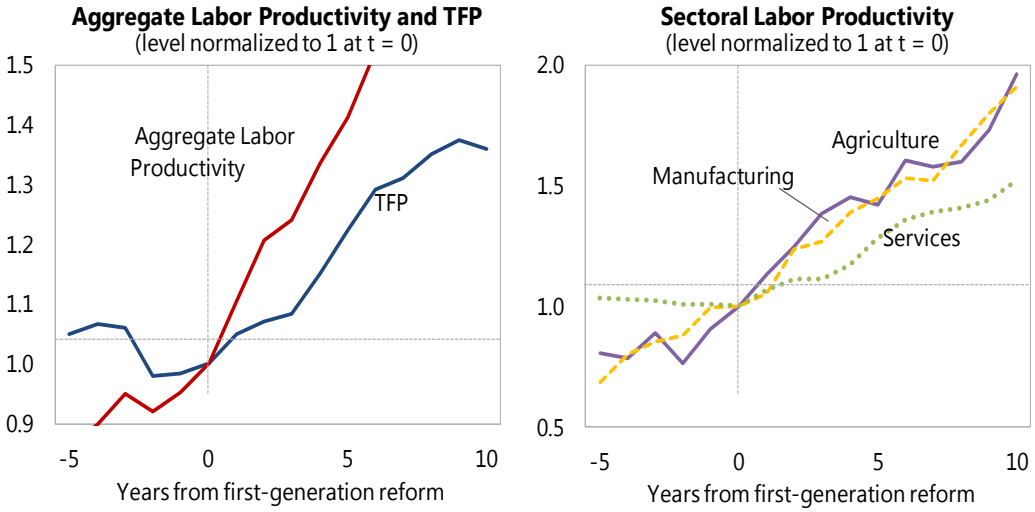
Box 1. The Case of Korea

Korea's reform experience illustrates that countries face evolving growth challenges at different stages of development, and that these require different sets of reform priorities. Considered a star of economic development, Korea experienced a transition to advanced economy status, with per capita real GDP (in PPP 2005 US$) increasing from around $2,000 in 1960 to $28,000 by 2008. Its growth trajectory was not free of recessions and crises, but often these were turned into opportunities to implement economic reforms that bore subsequent productivity and growth payoffs.

First-generation reforms

Korea grew fast between 1960 and 1980. This episode was characterized by high investment rates, exports, improved human capital (helped by education reforms), and a stable macroeconomic environment. In the second half of the 1970s, the government embarked on a large-scale program subsidizing industry. The large-scale government-directed investment projects increased the current account deficit, exacerbated by the oil shocks of the 1970s, combined with an agricultural disaster, political turmoil and previous policy mistakes, culminated in the crisis of 1979–80, triggering the "first generation" economic reforms in the early 1980s (Figure 2).

Figure 2. Korea Productivity Growth in First Generation Reform



Sources: The Conference Board Total Economic Database™, January 2013; World Bank and IMF staff calculations.

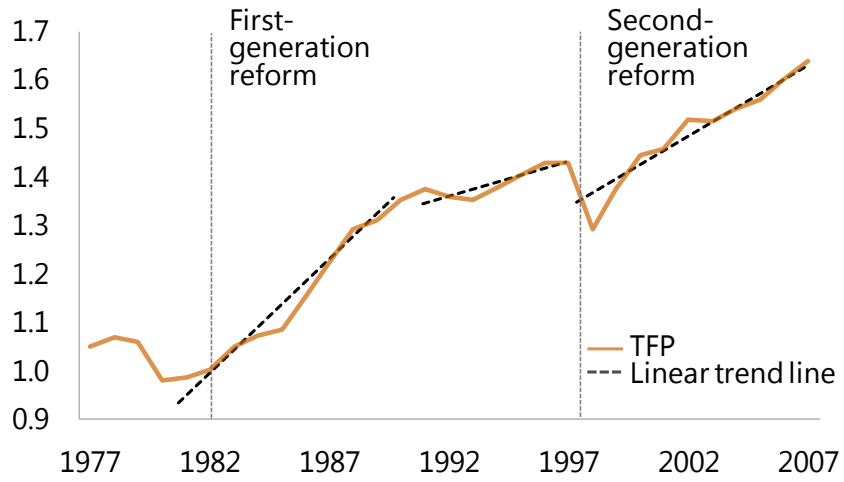
First generation reforms aimed to revitalize market functioning through economic liberalization and market opening, including withdrawal of the state from ownership and from intervention in market entry, market exit, and pricing. The failed industrial policy led the government to delegate the role of investment planning to the private sector to better align desired investment with household savings. The entry of small and medium-sized firms was deregulated from the early 1980s. Industry-specific taxes were replaced by flat-rate value added taxes in the late 1970s. Controls on capital flows were eased first in 1979 (inward), then in 1982 (inward), and then again in 1985 (inward and outward). The reform episode was associated with acceleration in aggregate TFP

growth (average 3.6 percent per annum in the following decade), as well as in agricultural and services sector labor productivity growth. The 1980–90 period saw rapid increases in real per capita income, investment, and exports.

Second-generation reforms

The sizable productivity gains accrued from first generation reforms tapered off by the early 1990s. Distortions in the financial markets remained, with directed lending and highly regulated interest rates, much of which were a legacy from the industrial policies of the 1970s. Korea's industrial sector (e.g. manufacturing, trading, heavy industry) was still dominated by the *chaebol* (business conglomerates) which drained away capital from the rest of the economy because they were for many years considered "too big to fail" and hence shielded from market discipline. It was not until the 1997 Asian financial crisis that the weaknesses of the system were widely understood, and reform measures were invigorated to restructure the business sector, banking, the public sector, and the labor market (i.e., "second generation" reforms). Measures included, for example, creation of agencies in charge of financial regulation and oversight, increased reserve requirements, requirements to improve management transparency and accountability in the business sector, and increased flexibility in the labor market. Economic reforms combined with aggressive counter-cyclical monetary and fiscal policies, significant growth in the export sector, and high FDI inflows enable a swift recovery from the crisis. TFP growth was once again boosted (Figure 3), and the economy grew at an annual rate of 5.3 percent during 2000–08, with exports increasing their share of GDP from 32 percent in 1997 to 53 percent in 2008.

Figure 3. Korea: Total Factor Productivity
(normalized to 1 in 1982)



Sources: Penn World Table 8.0; and IMF staff calculations.

B. Results

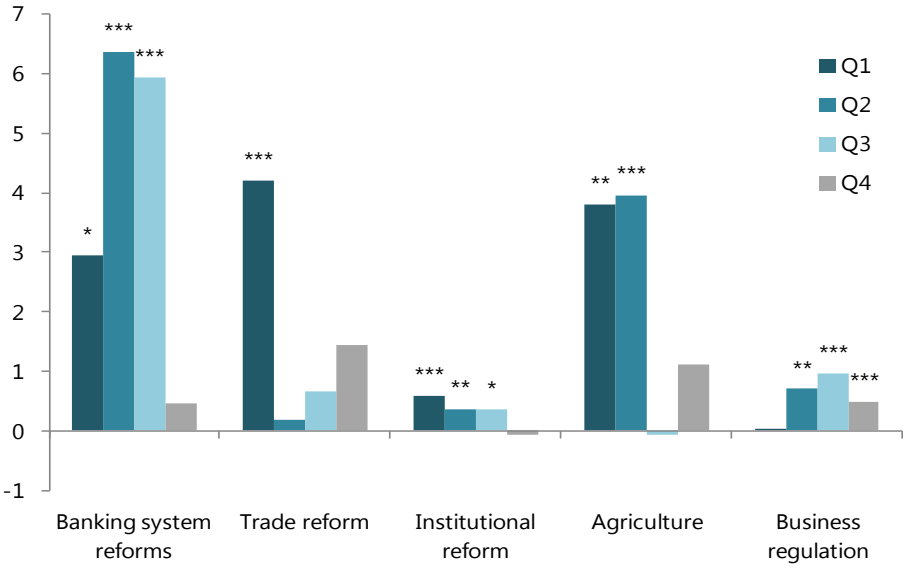
Baseline results

Table 1 shows results of the impact of reforms on economy-wide productivity growth (TFP and average labor productivity), while Table 2 present results on labor productivity growth in the services, manufacturing and agricultural sectors. Estimates are reported for the full sample (column 1) and each income quartile (columns 2–5). Column 6 presents the *p*-value of the test for the equality of the coefficient estimates across the different quartiles. In general, although the various reform and institutional variables broadly behave directionally

the same way across country groups, the size and significance of coefficients differ across the quartiles.

Overall, our results indicate that the productivity payoffs of reforms differ as countries close their gap to the global technological frontier. For example, while trade liberalization and agricultural reforms are associated with higher productivity growth in lower-income countries, banking system reforms and lower business regulations are particularly important for EMEs (Figure 4). The magnitude of the impact of some reforms is economically significant. For example, a full liberalization of credit controls in the banking sector (i.e. reform index goes from 0 to 1) is associated with a higher short-term TFP growth of about 2.9 percentage points on average for countries in the second quartile (typically lower-middle income countries), whereas this effect is insignificant for other income groups. More detailed results for each type of reform are discussed below.

Figure 4. Estimated Reform Coefficients by Distance to Frontier
(TFP growth specification, * represents level of significance)



Source: IMF staff calculations. *, **, and *** indicate significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

The importance of financial sector reforms for increasing productivity growth varies across the development path.

- *Banking sector reforms.* Our results suggest that aggregate productivity payoffs from undertaking banking system reforms, including for the various subcomponents of banking sector reforms (privatization and the strengthening of supervision) accrue for all countries. However, significant cross-country differences exist. Lower-middle-income countries (second quartile), which tend to have more bank-based financial systems, benefit most from banking system reforms. In particular, the coefficient estimates for the various subcomponents of banking sector reforms are statistically different from each

other across the different quartiles, with the coefficients on the reform variables highest for countries in the second quartile. Underlying the increase in aggregate productivity is the higher productivity gains that accrue across all sectors. For instance, banking sector reforms increase manufacturing sector productivity in lower middle-income countries (those in the second quartile). They also are associated with a statistically significant positive effect on services and agricultural sector productivity growth, mostly in upper-middle income countries (third quartile).

- *Capital market development.* The magnitude of the coefficient on capital market development is statistically significant and highest for upper-middle-income countries (third quartile), suggesting that these countries can reap significant productivity gains by further developing their capital markets. These results are consistent with the evidence from Aghion and others (2005) for a smaller sample of countries. The largest productivity gains accrue in manufacturing and agricultural sectors for countries closer to the frontier (third and fourth quartiles).

Trade reforms and liberalization of FDI boost productivity growth, especially in EMDEs.

- *Reducing trade barriers*. The empirical results suggest that reducing trade barriers can raise average labor productivity growth in low-income countries (column 2, Table 1). Reducing such barriers could help to open up new markets, facilitate export diversification, including through better market access, cheaper imported inputs, and greater competition. This could be especially relevant for low-income countries in Sub-Saharan Africa, where nontariff barriers stymie regional integration and agricultural productivity gaps remain wide.
- *Liberalizing FDI.* The empirical results suggest that liberalization of FDI can boost productivity growth in manufacturing and services sectors in middle-income countries and foster economy-wide productivity gains (columns 3–4, Tables 1–2). Given the growing role of the services sector in EMs, further liberalization of FDI could confer important growth benefits.

Institutional reform is productivity enhancing, particularly in low-income countries. The analysis suggests that all EMDEs can reap productivity gains from improving the quality of their institutional frameworks that protect property rights and facilitate private contracting. The magnitude of the coefficient estimates, however, is highest for low-income countries, suggesting that productivity and growth benefits from strengthening institutions are most pronounced for this group. Across sectors, improved legal systems and property rights

increase productivity in agriculture and services—a result that is significant for low-income countries (first quartile).[8]

Productivity dividends from product market and regulatory reforms are important across all country groups, but, with the exception of agricultural sector reforms, tend to be largest for countries closer to the technology frontier (higher income quartiles).

- *Business regulations.* The results suggest that reforms focused on reducing administrative burdens and improving the investment climate are positively associated with higher aggregate productivity growth for middle-income countries, and for manufacturing productivity growth in low-income countries. In manufacturing, the gains from lowering entry barriers are higher the farther a given country is from the technology leader, in part because strict regulatory settings can curb incentives to adopt new technologies.
- *Agricultural sector reforms*. The results suggest that agricultural sector reforms are associated with higher productivity growth in low- and lower-middle-income countries, where agriculture is a more dominant share of economic activity and employment. Moreover, agricultural sector reforms are associated with both higher agricultural sector productivity but also higher manufacturing sector productivity in low-income and lower-middle income countries, suggesting the existence of significant spillovers and linkages among the sectors.
- *Labor market regulations.* The empirical results suggest that removing excessive labor market rigidities can boost aggregate and sectoral productivity growth in middle-income countries (in the second and third quartiles) closer to the technology frontier, but the reform payoffs are likely to be more limited in low-income countries. Interestingly, the productivity payoffs from labor market reforms tend to be most significant for manufacturing and services sectors for lower-middle income countries (in the second quartile).

Robustness

In order to assess the robustness of our results, we undertook two separate analyses. First, we re-estimated all the specifications using three-year averages for productivity growth as well as the independent variable (Table A.1). This attempts to remove cyclical variations in the productivity growth series and gives greater confidence to the persistence of the reform impact. Most results are robust, including across income groups. Institutional reforms, while associated with higher TFP and aggregate labor productivity for the full sample, are no longer significant across income groups. Weaker results are explained by fewer observations for each income group.

[8] Private institutions—sound accounting and reporting standards, transparency, and maintaining investor and consumer confidence—can be just as important for growth. The paucity of cross-country data on these issues, however, precludes an empirical analysis of the role of strong private institutions in boosting productivity.

Second, for the full-country sample, we re-estimate the baseline specification using system-GMM, instrumenting for each of the reform variables using 2 of its own lags.[9] The results are reported in Table A.2. Most results hold, including for capital market development, trade reforms and some domestic financial sector reforms, such as loosening of credit controls. Banking system reforms, labor and business regulations, however, loose significance in this specification.

IV. THE DYNAMIC IMPACT OF REFORMS

A. Empirical approach

Reforms can generate productivity payoffs with a lag, and possibly entail short-term costs. To test this hypothesis for our sample of countries, we focus on reform shocks identified by large changes in the reform indices.[10] Thus, our approach implies that it is not the *level* of liberalization, but a (large) *change* in the degree of liberalization, that has significant productivity impacts. This approach is also less likely to be plagued by endogeneity concerns since large reform changes are less likely to be systematically correlated with other variables that could affect productivity growth.

We identify two large reform shocks. These are identified using reform variables from the previous section. The first shock *"sd-shock"* captures changes in reforms that are larger than two standard deviations. It takes the value 1, if the calculated as the year-on-year change in the reform index is larger than two standard deviations and zero otherwise.[11] As a robustness test, a second shock, an *"up-break"* in reform is constructed using the Berg et al. (2008) structural break algorithm. This procedure identifies statistical structural breaks in the data, requiring that the change in the series is both large as well as long-lasting. The year of the up-break denotes the year before an abrupt and persistent statistically significant increase in the reform indicator. As before, the variable takes the value 1 if there is an "up-break"

There are on average 106 *"sd-shocks"* across all reform indicators and 166 average *"up-breaks"* identified across the full sample of countries and time periods. The two sets of reform shocks overlap, despite being identified using different criteria (available from authors upon request).

We use these shock variables to examine the dynamic impact of reforms on productivity growth. The approach, following work by Ahrend and others (2011), Bouis and others (2012), and Dabla-Norris and others (2015), estimates a set of five independent equations to

[9] We do not do this analysis by income quartile, as using instruments absorbs too many degrees of freedom to allow a sufficiently robust analysis of system GMM.

[10] We do not do this in the distance to frontier analysis, as this limits the number of reform episodes that would meet the criteria.

[11] The standard deviation is calculated across the entire cross-country reform distribution.

identify the impact of reforms up to five years after they were implemented. The estimated coefficient β_{3k} gives the impact at horizon *k* (*k* =1, …,5). Impulse responses to reform shocks can be calculated from these coefficients over a 5 year horizon to capture short- and medium-term impacts. Data limitation on the number of reform shocks dictate that we run the specification across a joint total sample instead of dividing the sample into income quartiles.

$$y_{i,t+k} - y_{i,t} = \beta_{0k} + \beta_1 y_{i,US,t-1} + \sum_{j=0}^{j=5} \beta_{2k} \Delta y_{i,t-j} + \beta_{3k} X_{i,t} + \mu_{t,k} + \nu_{i,k} + \varepsilon_{i,t,k}$$

As in the distance-to-frontier specification, a one year lag of the productivity gap with the United States is included to capture convergence effects. $y_{i,t}$ is the log level of TFP; agricultural; manufacturing and service productivity. The dependent variable is thus, productivity growth, the difference in the log-level of productivity between year t and t-1. The regression includes lags of the dependent variable as explanatory variables. $X_{i,t-1}$ is a reform shock (*"up-break"* and *"sd-shock"*) across each reform indicator or institutional variable. Following OECD (2012), the equation includes crises episodes to control for the possibility that economic crises facilitate large reform episodes and are also likely to affect productivity growth. Five lags of crisis indicators, taking the value one if the country in that year experienced a banking, currency, or debt crisis, are included (from Laeven and Valencia's (2008) crisis database). The equation also controls for time μ_{tk} and country fixed effects ν_{ik}.

B. Results

Tables 3 and 4 report the estimated dynamic impact of reforms on aggregate and sectoral productivity growth, respectively, using "*sd-shock*" as the relevant reform measure.[12] The impacts are cumulative and reported for one to five-year horizons.

Short-term impact of reforms

We find no evidence of costs to reforms in terms of growth in the short run (i.e., the year immediately after a large reform is implemented) and across a number of reforms even a positive payoff. Though results are not directly comparable across specification, encouragingly, short-term results in the dynamic specification using a large reform shock variable are—for the majority of reforms—robust to results using the level of reform indices in the previous section for the full sample (column 1, Table 1 and 2).

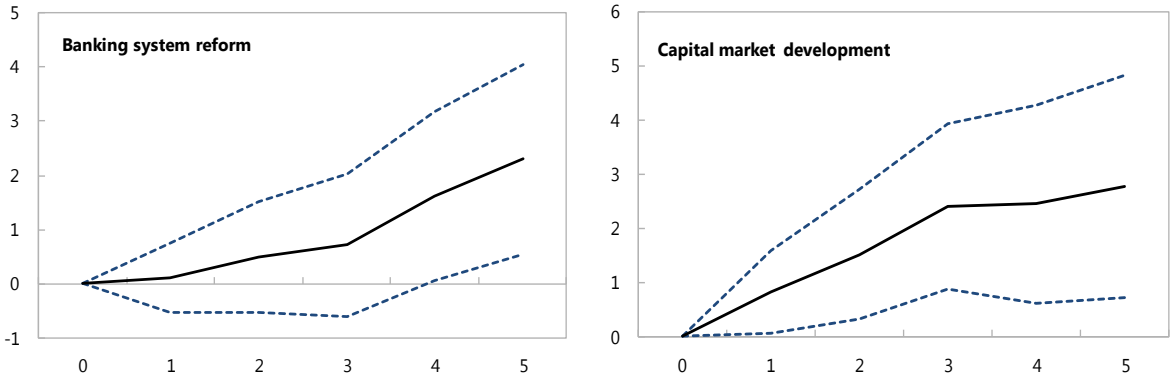
[12] We had to drop business regulations from the set of reforms included in the dynamic specification due to insufficient observations of reform shocks.

For example, capital market development, and institutional and agricultural sector reforms are associated with higher TFP and aggregate labor productivity growth in the short term. However, trade liberalization and labor market reform only have productivity payoffs over the longer term, possibly reflecting costs associated with resource re-allocation.

Medium-term impact of reforms

Looking over longer horizons, some reforms are associated with increases in productivity growth that are long-lasting. For example, productivity payoffs accruing from capital market development (e.g., development of securities markets) can be sizable—about 2.8 percentage point by the fifth year (or over 0.5 percentage point per year on average). As expected, capital market development improves aggregate productivity growth by boosting productivity in the sector most reliant on credit, which is manufacturing. Not surprisingly, improvements in the legal system and property rights are associated with continuous increases in productivity over 5 years. While some reforms generate immediate productivity gains, others take more time for the associated benefits to materialize. For example, productivity gains from banking sector reforms (lifting interest rates and credit controls, bank privatization, and removing entry barrier) are reaped around four years after the reforms are put in place (Figure 5). Moreover, our results indicate that higher agricultural and manufacturing productivity growth drive aggregate productivity developments.

Figure 5. Estimated Dynamic Reform Impact on Aggregate Labor Productivity Growth
(percentage point; average impact with 90 percent CI)



Source: IMF Staff calculations.

Robustness

Results using the alternative measure of reform shock (*up-break*) for aggregate and sectoral productivity growth are presented in Tables A.3 and A.4 respectively. The estimated dynamic impacts of banking system and trade reforms using this alternative reform measure are qualitatively in line with the two standard deviation (*"sd-shock"*) results. However, the magnitude of the coefficient estimates is larger, possibly reflecting the more stringent criteria used in identifying a reform *up-break*—that is, changes in reform indicators are not only large but also persistent. Results for other reforms are less consistent. For example,

productivity gains from improving the legal system and property rights are weaker (and only significant for aggregate productivity) and less long-lasting.

V. Concluding Remarks

This paper assesses the short- and medium-term impact of structural reforms on aggregate and sectoral productivity growth. Our results indicate that the productivity dividends depend on where a country is in the development process, highlighting the need for calibrating reforms to the stage of economic development. Although the empirical results are not intended to suggest that the specific reforms discussed in the note should be implemented by all countries in the income group, they emphasize the need for taking this into account. Moreover, the analysis suggests that reforms need to be continually adapted as income gaps close.

Despite progress in recent decades, the scope for structural reforms remains considerable in most EMDEs, and recommendations tailored to the country's position along the development path can help focus attention to areas in which potential productivity payoffs are likely to be larger. We find that lower income countries can benefit from reforms that remove constraints to the free movement of goods and factors of production, such as trade and foreign investment liberalization, which would facilitate the adoption and transfer of technology from more advanced trading partners. Strengthening economic institutions needed for market-based economic activity can also spur productivity growth. Moreover, given the often dominant size of the agricultural sector at early stages of development, removal of inefficient state control and subsidies in agriculture can help boost productivity growth. This can also facilitate structural transformation by facilitating resource reallocation and boosting productivity in manufacturing sectors.

As economies and the financial structures develop and become more sophisticated, reform payoffs and priorities shift. EMs, in particular, can reap significant gains by advancing the second generation reform agenda to boost productivity and foster innovation by upgrading institutions and markets. The required mix of reforms will vary across countries, but productivity gains depend on deepening financial markets and moving to market-driven allocation of finance, adopting more competitive product and labor market regulations, and reducing barriers to FDI for a more vibrant services sector.

Looking over longer horizons, our empirical analysis finds that the productivity payoffs vary across reforms and over time. For instance, productivity payoffs from capital market development and improving legal systems and property rights can be sizable and persistent over time. At the same time, productivity payoffs from banking system reforms can take time to materialize. This is to be expected, as a reallocation of resources is not an automatic process. Indeed, country experiences suggest that attaining a more efficient resource allocation necessarily involves a gradual adjustment process.

Several caveats are needed in interpreting the results and extrapolating into policy conclusions. First, it is difficult to fully account for complementarities in the determinants of productivity growth. The focus of this paper is on the individual effect of reforms rather than how reforms in different areas interact in their effects on productivity growth. Given that many of these reforms are often implemented as a policy package, this approach could under- or overstate their individual measured impact on productivity growth. The regression results also do not account for reform complementarities because the high correlation in the reform indices requires them to enter the regressions one at a time. Second, issues of reform sequencing that could be critical for reform benefits to materialize are not addressed. Third, policy reforms may have nonlinear effects that can be contingent on the quality of political and economic institutions (Acemoglu and others, 2005). This empirical analysis instead considers the impact of reforms by countries' distance from the frontier. To the extent that income levels are correlated with institutional quality, the analysis implicitly accounts for this complementarity.

Appendix I. Definition of Structural Reforms

Financial sector

The dataset, from Abiad and others (2010), contains two measures of financial sector reforms: domestic financial sector and the extent of capital account liberalization. The domestic financial sector liberalization indicator includes measures of securities markets and banking sector reforms. 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 i) reductions or removal of interest rate controls (floors or ceilings), ii) credit controls (directed credit and subsidized lending), iii) competition restrictions (limits on branches and entry barriers in the banking market, including licensing requirements or limits on foreign banks), iv) the degree of public ownership of banks and v) 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 inspection.

Labor Market

Labor market reforms are made up of two sub-indices: *Hiring and firing regulations:* This index is based on an Executive Opinion Survey conducted by the World Economic Forum, which asks whether the hiring and firing of workers in a country is impeded by regulations (=1) or flexibly determined by employers (=7). *Collective bargaining:* This index assesses whether wages in a country are generally set by a centralized bargaining process (=1) or up to each individual company (=7). Data is from the world Economic Forum, Global Competitiveness Report.

Product market

The product market reforms cover i) the degree of liberalization in the telecommunication and ii) electricity markets, including the extent of competition in the provision of these services, the presence of an independent regulatory authority, and privatization.

Agricultural sector

The agricultural sector indicator captures intervention in the market for the main agricultural export commodity in each country. It measures the extent of i) public intervention in the market going from total monopoly or monopsony in production, transportation or marketing (i.e., the presence of marketing boards), ii) the presence of administered prices, iii) public ownership of relevant producers or concession requirement to free market. Data is from Prati et al. 2012 "Which reforms work and under what institutional environment? Evidence from a new dataset on structural reform"; IMF Index of Agricultural regulation.

Trade liberalization

Trade reforms are captured using two indicators: one tariff-based measure (measured on a scale of 0 to 1, where zero means tariff rates are 60 percent or higher and 1 means tariff rates are zero). Data is from Prati and others. 2013 "Which reforms work and under what institutional environment? Evidence from a new dataset on structural reform."

Capital account liberalization

We use two measures of capital account liberalization from Chin-Ito (2006). The first measures the extent to which a government is compliant with its obligations under the IMF's Article VIII to free from government restriction the proceeds from international trade in goods and services. The second index gives information on a broad set of restrictions including, for example, controls on external borrowing between residents and non-residents, as well as approval requirements for foreign direct investment (FDI).

Institutional reforms

The index of legal system and property rights gauges the legal protections afforded individuals and property, and thus a legal system consistent with economic freedom in terms of the rule of law, security of property rights, an independent and unbiased judiciary, and an impartial court system. The index is compiled by EFW-Fraser Institute from three primary sources: the PRS Group's *International Country Risk Guide*, the World Economic Forum's *Global Competitiveness Report*, and the World Bank's *Doing Business* project and Worldwide Governance Indicators. Data is from EFW-Fraser Institute Database, 1975–2012.

Table 1. Reforms and Distance to Frontier: Aggregate Productivity Growth

	Dependent variable: Total factor productivity growth						Dependent variable: Aggregate labor productivity growth					
	Full sample	Q1	Q2	Q3	Q4	Test for coef. equality (*P*-value)	Full sample	Q1	Q2	Q3	Q4	Test for coef. equality (*P*-value)
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Financial Sector Reforms												
Banking system reforms	3.27	2.94	6.37	5.93	0.46	0.001	4.32	4.54	7.07	7.57	0.36	0.000
	[0.66]***	[1.74]*	[1.55]***	[1.87]***	[0.64]		[0.72]***	[1.90]**	[1.78]***	[2.03]***	[0.67]	
Interest rate controls	1.03	1.24	1.59	1.43	0.36	0.052	1.16	2.23	1.35	1.66	-0.03	0.066
	[0.31]***	[0.96]	[0.74]**	[0.85]*	[0.30]		[0.34]***	[1.05]**	[0.85]	[0.92]*	[0.32]	
Credit controls	1.18	0.85	2.91	1.00	0.49	0.053	1.45	0.89	3.45	1.34	0.57	0.036
	[0.34]***	[0.99]	[0.82]***	[0.82]	[0.34]		[0.38]***	[1.08]	[0.94]***	[0.89]	[0.36]	
Privatization	1.40	1.05	2.48	3.06	-0.14	0.002	2.01	1.66	2.97	3.66	-0.13	0.000
	[0.36]***	[1.01]	[0.86]***	[0.88]***	[0.37]		[0.40]***	[1.11]	[0.99]***	[0.96]***	[0.39]	
Supervision	2.21	4.01	4.08	4.93	0.63	0.001	2.29	5.21	4.96	4.60	0.91	0.000
	[0.47]***	[1.96]**	[1.25]***	[1.55]***	[0.44]		[0.52]***	[2.15]**	[1.44]***	[1.69]***	[0.46]**	
Capital market development	2.36	2.58	2.08	6.43	0.86	0.001	2.29	3.09	2.15	6.60	0.02	0.000
	[0.45]***	[1.84]	[1.22]*	[1.00]***	[0.43]**		[0.49]***	[2.02]	[1.41]	[1.10]***	[0.45]	
Trade and FDI Liberalization												
Trade (tariff and current account restrictions)	0.50	4.20	0.19	0.67	1.43	0.015	1.52	5.05	0.52	1.33	2.78	0.001
	[0.54]	[1.49]***	[1.03]	[1.10]	[0.87]		[0.59]***	[1.57]***	[1.20]	[1.18]	[0.81]***	
FDI liberalization	1.47	1.51	2.80	1.67	0.25	0.017	1.94	2.52	2.89	2.25	0.20	0.005
	[0.34]***	[1.30]	[0.76]***	[0.76]**	[0.35]		[0.37]***	[1.43]*	[0.88]***	[0.83]***	[0.37]	
Institutional Reforms												
Legal system and property rights	0.15	0.60	0.37	0.36	-0.06	0.045	0.35	0.94	0.35	0.44	-0.03	0.007
	[0.08]*	[0.22]***	[0.18]**	[0.19]*	[0.10]		[0.09]***	[0.23]***	[0.21]*	[0.21]**	[0.11]	
Product Market and Regulatory Reforms												
Agriculture	1.98	3.81	3.96	-0.07	1.12	0.008	2.43	0.58	4.64	-0.24	1.63	0.004
	[0.46]***	[1.62]**	[0.88]***	[0.94]	[0.83]		[0.50]***	[1.13]	[0.99]***	[1.08]	[0.83]**	
Business regulation	0.49	0.04	0.70	0.97	0.49	0.024	0.59	0.39	1.08	0.67	0.29	0.227
	[0.12]***	[0.36]	[0.28]**	[0.21]***	[0.13]***		[0.13]***	[0.38]	[0.32]***	[0.23]***	[0.14]**	
Labor market regulations	0.24	-0.87	0.76	0.49	-0.15	0.051	0.29	-0.93	1.59	0.57	-0.08	0.079
	[0.11]**	[0.58]	[0.46]*	[0.12]***	[0.11]		[0.13]**	[0.69]	[0.34]***	[0.28]**	[0.12]	

Panel regressions consist of relative income gap with US (convergence effects), reform index or institutional variable (lagged one period) entering one at a time, and country- and year-fixed effects. Q1-Q4 denote income group quartiles (based on GDP per capita relative to the United States). Dependent variable is annual growth rate of TFP (left panel) or of aggregate labor productivity (right panel). The full sample consists of over 100 countries for the period 1970–2010. Reform indices are normalized between 0 and 1. *,**, and *** indicate significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Table 2. Reforms and Distance to Frontier: Sectoral Productivity Growth

	Dependent variable: Productivity growth in Services						Dependent variable: Productivity growth in Manufacturing						Dependent variable: Productivity growth in Agriculture					
	Full sample	Q1	Q2	Q3	Q4	Test for coef. equality (*P*-value)	Full sample	Q1	Q2	Q3	Q4	Test for coef. equality (*P*-value)	Full sample	Q1	Q2	Q3	Q4	Test for coef. equality (*P*-value)
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Financial Sector Reforms																		
Banking system reforms	0.65	0.43	0.71	0.48	-0.26	0.03	0.41	0.25	1.25	0.29	-0.08	0.08	0.79	0.63	2.04	0.12	-0.27	0.02
	[0.13]***	[0.32]	[0.45]	[0.17]***	[0.21]		[0.18]**	[0.65]	[0.40]***	[0.32]	[0.30]		[0.30]***	[0.66]	[0.75]***	[0.61]	[0.49]	
Capital market development	1.98	3.25	2.71	2.23	-0.30	0.51	4.69	-5.07	-0.28	8.20	-0.48	0.03	-6.02	-3.81	12.85	6.27	4.91	0.05
	[1.20]*	[3.69]	[3.58]	[1.81]	[1.27]		[1.72]***	[8.46]	[4.68]	[2.54]***	[1.95]		[4.25]	[8.04]	[6.06]**	[3.62]*	[2.60]*	
Trade and FDI Liberalization																		
Trade (tariff and current account restrictions)	0.29	0.21	2.21	0.99	-3.86	0.31	0.24	4.67	-0.58	3.34	-3.86	0.38	2.42	-2.51	11.13	-2.16	-9.45	0.17
	[1.45]	[3.67]	[4.36]	[2.03]	[2.22]*		[1.93]	[8.91]	[4.25]	[3.38]	[3.53]		[3.21]	[6.95]	[7.83]	[7.82]	[5.76]	
FDI liberalization	2.81	3.16	4.59	4.17	-0.33	0.00	2.55	1.12	12.03	4.13	-1.44	0.01	2.16	-2.92	3.23	3.17	0.41	0.55
	[0.80]***	[2.09]	[2.65]*	[1.47]***	[0.70]		[1.11]**	[3.02]	[5.80]**	[1.88]**	[1.09]		[1.73]	[6.12]	[4.58]	[2.07]	[2.17]	
Institutional Reforms																		
Legal system and property rights	-0.03	1.78	-0.16	-0.04	-0.23	0.01	0.18	-0.80	-0.68	0.89	0.35	0.05	0.69	2.91	1.32	0.42	-0.05	0.33
	[0.23]	[0.59]***	[0.78]	[0.36]	[0.21]		[0.31]	[1.42]	[0.91]	[0.46]*	[0.35]		[0.51]	[1.55]*	[1.19]	[0.67]	[0.91]	
Product Market and Regulatory Reforms																		
Agriculture	2.39	0.73	3.44	-1.32	3.72	0.07	3.15	9.04	-0.52	-2.87	13.23	0.02	3.34	11.37	13.17	12.99	7.65	0.08
	[1.12]**	[3.34]	[3.21]	[1.64]	[3.41]		[1.43]**	[5.20]*	[3.77]	[2.36]	[5.79]**		[2.34]	[5.37]**	[6.83]*	[9.47]	[4.14]*	
Business regulation	-0.08	-1.50	-3.45	-0.03	-0.94	0.20	0.76	5.26	1.04	0.34	-1.11	0.01	1.38	0.92	3.74	0.56	-2.96	0.05
	[0.52]	[1.06]	[2.88]	[0.57]	[0.44]**		[0.50]	[2.43]**	[1.16]	[0.94]	[0.62]*		[1.18]	[3.19]	[2.86]	[1.15]	[1.67]*	
Labor market regulations	-0.10	1.83	2.71	0.64	-0.05	0.07	0.50	0.94	4.01	0.59	0.86	0.00	-0.35	4.02	-0.47	0.36	2.50	0.19
	[0.30]	[1.48]	[1.31]**	[0.45]	[0.24]		[0.34]	[4.28]	[1.05]***	[0.75]	[0.38]**		[0.68]	[2.61]	[1.76]	[0.65]	[1.99]	

Panel regressions consist of sectoral productivity gap relative to the United States (convergence effects), reform index or institutional variable (lagged one period) entering one at a time, and country- and year-fixed effects. Q1-Q4 denote income group quartiles (based on GDP per capita relative to the United States). Dependent variable is annual growth rate of manufacturing productivity (left panel) or of services productivity (right panel). The full sample consists of more than 90 countries for the period 1970–2010. Reform indices are normalized between 0 and 1. *,**, and *** indicate significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Table 3. Short and Medium-term Impacts: Aggregate Productivity Growth

	Total factor productivity growth					Aggregate labor productivity growth				
	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
Financial Sector Reform										
Banking system reforms	0.21	0.63	0.93	1.61	2.12	0.11	0.49	0.71	1.62	2.30
	[0.37]	[0.58]	[0.74]	[0.87]*	[0.98]**	[0.39]	[0.62]	[0.79]	[0.95]*	[1.06]**
Interest rate controls	-0.50	-0.35	-0.76	-0.23	0.38	-0.58	-0.45	-0.93	-0.13	0.53
	[0.43]	[0.68]	[0.87]	[1.03]	[1.15]	[0.46]	[0.73]	[0.94]	[1.12]	[1.25]
Credit controls	0.66	0.92	1.28	1.65	1.76	0.47	0.61	0.96	1.15	1.27
	[0.42]	[0.66]	[0.84]	[0.99]*	[1.11]	[0.44]	[0.70]	[0.90]	[1.08]	[1.21]
Privatization	0.54	1.13	1.41	2.04	2.13	0.36	1.01	1.31	2.12	2.35
	[0.47]	[0.75]	[0.95]	[1.13]*	[1.26]*	[0.50]	[0.80]	[1.03]	[1.22]*	[1.37]*
Supervision	0.41	1.05	1.44	2.16	2.93	0.52	1.23	1.59	2.47	3.30
	[0.41]	[0.64]	[0.82]*	[0.97]**	[1.08]***	[0.43]	[0.69]*	[0.88]*	[1.05]**	[1.18]***
Capital market development	0.82	1.45	2.23	2.26	2.49	0.83	1.52	2.41	2.45	2.78
	[0.43]*	[0.68]**	[0.86]***	[1.02]**	[1.14]**	[0.46]*	[0.73]**	[0.93]***	[1.11]**	[1.25]**
Trade reform	-0.25	0.03	0.10	0.09	-0.17	-0.52	-0.34	-0.09	-0.18	-0.41
Trade	[0.45]	[0.72]	[0.91]	[1.08]	[1.21]	[0.48]	[0.77]	[0.99]	[1.18]	[1.32]
Institutional Reforms	0.91	2.02	2.56	1.91	2.61	0.94	2.13	2.72	2.26	2.81
Legal system and property rights	[0.42]**	[0.66]***	[0.85]***	[1.02]*	[1.16]**	[0.45]**	[0.71]***	[0.92]***	[1.11]**	[1.26]**
Product Market and Regulatory Reforms	-0.44	0.60	0.13	0.65	0.73	-0.55	0.79	0.17	0.67	0.94
Agricultural reform	[0.86]	[1.36]	[1.73]	[2.06]	[2.30]	[0.92]	[1.46]	[1.87]	[2.23]	[2.51]
Labor market regulations	1.13	1.90	3.05	3.89	4.51	0.88	1.35	2.56	3.59	4.44
	[0.58]**	[0.91]**	[1.18]***	[1.40]***	[1.60]***	[0.62]	[0.98]	[1.27]**	[1.52]**	[1.75]**

Panel regressions consist of relative income gap with US (convergence effects), a reform shock dummy (reforms larger than 2 stds) entering one at a time, crisis dummies and country fixed effects. Dependent variable is annual growth rate of TFP (left panel) or of aggregate labor productivity (right panel). Reform indices are normalized between 0 and 1. The sample consists of over 100 countries for the period 1970–2010. *,**, and *** indicate significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Table 4. Short and Medium-term Impacts: Sector Productivity Growth

	Productivity growth in Services					Productivity growth in Manufacturing					Productivity growth in Agriculture				
	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
Financial Sector Reform															
Banking system reforms	0.57	-0.64	0.04	0.39	0.64	1.20	1.26	2.84	4.07	4.35	-0.63	0.96	1.55	3.81	6.80
	[0.65]	[0.86]	[1.04]	[1.16]	[1.27]	[0.89]	[1.18]	[1.38]**	[1.53]***	[1.62]***	[1.44]	[1.73]	[1.84]	[2.11]*	[2.20]***
Interest rate controls	0.44	-1.17	0.25	2.13	1.25	0.20	-1.88	0.57	3.54	3.26	-1.43	-0.77	-0.64	2.68	5.24
	[0.77]	[1.02]	[1.23]	[1.36]	[1.49]	[1.04]	[1.37]	[1.62]	[1.79]**	[1.89]*	[1.71]	[2.05]	[2.18]	[2.49]	[2.61]**
Credit controls	-1.63	-0.81	-0.87	0.42	0.39	0.06	0.52	1.24	2.44	1.10	-1.66	-0.20	1.56	0.07	1.75
	[0.73]**	[0.96]	[1.16]	[1.29]	[1.41]	[0.99]	[1.29]	[1.52]	[1.68]	[1.78]	[1.61]	[1.92]	[2.04]	[2.34]	[2.44]
Privatization	0.10	0.81	1.43	-0.34	-0.35	1.01	2.73	2.80	3.66	4.43	5.47	7.68	6.12	10.91	11.78
	[0.81]	[1.08]	[1.30]	[1.49]	[1.64]	[1.10]	[1.46]*	[1.72]	[1.97]*	[2.10]**	[1.79]***	[2.16]***	[2.29]***	[2.68]***	[2.80]***
Supervision	1.67	0.57	0.50	2.15	2.40	1.91	3.16	2.47	3.34	3.73	1.25	1.31	2.66	3.19	2.96
	[0.65]**	[0.86]	[1.04]	[1.17]*	[1.31]*	[0.89]**	[1.19]***	[1.40]*	[1.56]**	[1.69]**	[1.43]	[1.73]	[1.84]	[2.14]	[2.26]
Capital market development	-0.39	-0.24	0.63	0.59	1.69	0.89	2.50	4.40	4.84	4.47	1.19	1.20	0.74	0.77	2.01
	[0.76]	[1.01]	[1.21]	[1.36]	[1.49]	[1.03]	[1.36]*	[1.60]***	[1.78]***	[1.88]**	[1.68]	[2.02]	[2.14]	[2.46]	[2.57]
Trade reform	-1.92	-1.13	0.75	1.88	0.70	-1.23	-0.95	0.73	0.86	1.26	-2.09	-1.32	-1.07	1.66	3.61
Trade	[1.06]*	[1.41]	[1.73]	[1.95]	[2.16]	[1.38]	[1.83]	[2.18]	[2.43]	[2.59]	[2.31]	[2.79]	[3.01]	[3.52]	[3.70]
Institutional Reform	0.68	1.05	-0.33	-2.82	-6.19	0.09	2.43	0.30	1.26	2.27	2.12	4.35	10.15	12.85	16.00
Legal system and property rights	[0.83]	[1.16]	[1.50]	[1.87]	[2.29]***	[1.10]	[1.56]	[2.01]	[2.56]	[2.81]	[1.83]	[2.32]*	[2.61]***	[3.36]***	[3.89]***
Product Market and Regulatory Reform	-4.24	4.34	5.70	6.39	1.25	1.54	12.55	16.48	20.98	20.71	0.63	8.35	9.74	13.73	17.21
Agricultural reform	[1.48]***	[2.03]**	[2.45]**	[2.70]**	[2.93]	[2.09]	[2.78]***	[3.26]***	[3.55]***	[3.78]***	[3.27]	[4.07]**	[4.40]**	[5.00]***	[5.11]***
Labor market regulation	1.51	2.82	5.13	3.79	3.74	1.44	3.23	5.24	5.00	6.93	0.32	-0.61	-1.17	2.67	3.14
	[0.97]	[1.30]**	[1.71]***	[2.04]*	[2.39]	[1.34]	[1.81]*	[2.36]**	[2.84]*	[3.31]**	[2.13]	[2.61]	[3.03]	[3.71]	[4.12]

Panel regressions consist of sectoral productivity gap relative to the United States (convergence effects), a reform shock dummy (reforms larger than 2 stds) entering one at a time, crisis dummies and country fixed effects. Q1-Q4 denote income group quartiles (based on GDP per capita relative to the United States). Dependent variable is annual growth rate of services, manufacturing, and agricultural productivity. The sample consists of over 100 countries for the period 1970–2010. Reform indices are normalized between 0 and 1. *,**, and *** indicate significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Table A1. Reforms and Distance to Frontier: 3 Year Average Aggregate Productivity Growth

	Total factor productivity growth					Aggregate labor productivity growth				
	All	Q1	Q2	Q3	Q4	All	Q1	Q2	Q3	Q4
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Financial Sector Reforms										
Banking system reforms	4.81	3.00	6.74	12.15	0.05	5.68	4.88	7.62	12.41	0.2
	[0.88]***	[1.99]	[2.26]***	[2.57]***	[0.74]	[0.93]***	[2.26]**	[2.51]***	[2.64]***	[0.71]
Interest rate controls	1.35	1.83	1.96	2.9	-0.04	1.48	3.07	1.69	2.95	-0.26
	[0.42]***	[1.10]*	[1.10]*	[1.28]**	[0.36]	[0.45]***	[1.24]**	[1.23]	[1.32]**	[0.34]
Credit controls	1.55	0.39	2.5	2.7	0.32	1.77	0.5	3.09	2.73	0.39
	[0.47]***	[1.13]	[1.21]**	[1.22]**	[0.40]	[0.50]***	[1.30]	[1.34]**	[1.25]**	[0.38]
Privatization	2.91	0.93	3.99	6.09	0.34	3.29	1.47	4.57	6.16	0.34
	[0.48]***	[1.17]	[1.19]***	[1.22]***	[0.43]	[0.51]***	[1.33]	[1.32]***	[1.26]***	[0.41]
Supervision	2.43	3.27	3.5	8.67	0.24	2.67	4.66	4.22	8.65	0.7
	[0.65]***	[2.18]	[1.86]*	[2.31]***	[0.52]	[0.70]***	[2.48]*	[2.06]**	[2.39]***	[0.50]
Capital market development	3.07	2.68	1.96	7.1	1.09	3.15	4.16	1.98	7.71	0.28
	[0.61]***	[2.12]	[1.80]	[1.52]***	[0.51]**	[0.66]***	[2.41]*	[2.00]	[1.55]***	[0.49]
Trade and FDI Liberalization										
Trade (tariff and current account restrictions)	-0.40	2.09	-1.31	-1.63	-1.08	0.45	3.2	-0.89	-0.46	-2.36
	[0.72]	[2.19]	[1.45]	[1.42]	[0.85]	[0.77]	[2.32]	[1.61]	[1.46]	[0.88]***
FDI liberalization	1.85	1.39	2.54	2.46	0.13	2.28	2.4	2.8	3.25	-0.07
	[0.45]***	[1.48]	[1.06]**	[1.11]**	[0.40]	[0.48]***	[1.69]	[1.18]**	[1.13]***	[0.38]
Institutional Reforms										
Legal system and property rights	0.21	0.27	0.31	0.3	0.07	0.36	0.54	0.26	0.29	0.1
	[0.10]**	[0.26]	[0.23]	[0.24]	[0.12]	[0.11]***	[0.28]*	[0.25]	[0.26]	[0.13]
Product Market and Regulatory Reforms										
Agriculture	2.74	0.33	6.13	0.18	1.08	3.26	0.49	6.93	0.25	1.79
	[0.70]***	[1.33]	[1.44]***	[1.67]	[1.14]	[0.74]***	[1.46]	[1.52]***	[1.70]	[1.23]
Business regulation	0.35	-0.36	0.62	0.36	0.04	0.42	-0.01	0.66	0.44	-0.29
	[0.20]*	[0.33]	[0.62]	[0.36]	[0.20]	[0.21]**	[0.32]	[0.62]	[0.44]	[0.18]
Labor market regulations	-0.35	-0.93	-0.54	-0.08	-0.06	-0.38	-0.84	-0.59	-0.4	-0.04
	[0.15]**	[0.54]*	[0.78]	[0.36]	[0.13]	[0.16]**	[0.53]	[0.78]	[0.40]	[0.14]

Panel regressions consist of relative income gap with US (convergence effects), reform index or institutional variable (lagged one period) entering one at a time, and country- and year-fixed effects. Q1-Q4 denote income group quartiles (based on GDP per capita relative to the United States). Dependent variable is annual growth rate of TFP (left panel) or of aggregate labor productivity (right panel). The full sample consists of over 100 countries for the period 1970–2010. Reform indices are normalized between 0 and 1. *,**, and *** indicate significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Table A2. Reforms and Distance to Frontier: GMM Aggregate Productivity Growth

	Total factor productivity	Aggregate productivity
Financial Sector Reforms		
Banking system reform	0.84	0.31
	[0.59]	[0.91]
Interest rate controls	0.28	0.26
	[0.42]	[0.55]
Credit controls	0.96	0.94
	[0.38]**	[0.46]**
Entry	0.14	-0.37
	[0.32]	[0.48]
Privatization	-0.21	-0.19
	[0.27]	[0.40]
Supervision	1.31	1.31
	[0.53]**	[0.66]*
Capital market development	1.06	1.48
	[0.49]**	[0.59]**
Trade and FDI Liberalization		
Trade (tariff and current account restrictions)	2.07	2.09
	[0.82]**	[1.06]*
FDI liberalization	0.81	0.81
	[0.40]**	[0.47]*
Institutional Reforms		
Legal system and property rights	0.23	0.24
	[0.07]***	[0.10]**
Product Market and Regulatory Reforms		
Agriculture	0.65	1.08
	[0.39]*	[0.54]*
Labor market regulation	0.04	0.06
	[0.05]	[0.08]
Business regulation	0.08	0.04
	[0.10]	[0.13]

Panel regressions consist of relative income gap with US (convergence effects), reform index or institutional variable (lagged one period) entering one at a time, and country- and year- fixed effects. Q1-Q4 denote income group quartiles (based on GDP per capita relative to the United States). Dependent variable is annual growth rate of TFP (left panel) or of aggregate labor productivity (right panel). The full sample consists of over 100 countries for the period 1970–2010. Reform indices are normalized between 0 and 1. *,**, and *** indicate significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Table A3. Short and Medium-term Impacts of "Up-breaks": Aggregate Productivity Growth

	Total factor productivity growth					Aggregate productivity growth				
	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
Financial Sector Reform										
Banking system reforms	4.96	6.65	6.45	5.91	4.14	4.33	6.04	5.64	5.94	4.62
	[2.03]**	[3.31]**	[3.85]*	[4.29]	[4.50]	[2.40]*	[3.68]	[4.25]	[4.86]	[5.02]
Trade reform	0.69	1.33	1.48	1.23	1.03	1.48	2.79	3.48	3.17	2.99
Trade (tariff and current account restrictions)	[0.97]	[1.29]	[1.80]	[1.98]	[2.26]	[1.09]	[1.38]**	[1.82]*	[2.06]	[2.46]
Institutional Reform	0.79	1.28	1.05	0.21	0.47	0.89	1.75	1.89	1.43	1.77
Legal system and property rights	[0.56]	[0.81]	[1.50]	[1.20]	[1.24]	[0.54]	[0.84]**	[1.13]*	[1.27]	[1.27]

Panel regressions consist of sectoral productivity gap relative to the United States (convergence effects), a reform shock dummy (up-break using Berg et. al Algorithm) entering one at a time, crisis dummies and country fixed effects. Dependent variable is annual growth rate of services, manufacturing, and agricultural productivity. *,**, and *** indicate significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Table A4. Short and Medium-term Impacts of "Up-breaks": Sector Productivity Growth

	Productivity growth in Services					Productivity growth in Manufacturing					Productivity growth in Agriculture				
	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
Financial Sector Reform															
Banking system reforms	7.06	9.76	11.7	9.68	7.26	2.32	5.44	8.26	0.75	6.7	2.48	6.35	15.82	18.7	19.38
	[2.79]**	[4.81]**	[9.24]*	[9.81]	[9.43]	[5.55]	[5.71]	[5.49]	[7.53]	[7.89]	[6.25]	[10.51]	[11.85]	[11.78]	[11.76]
Trade reform	3.91	3.85	3.54	5.43	6.24	3.76	-3.90	-3.93	-8.55	-7.64	-0.52	3.31	5.63	1.09	7.05
Trade (tariff and current account restrictions)	[1.78]**	[2.17]*	[2.92]	[3.00]*	[3.66]*	[2.99]	[3.83]	[4.66]	[5.65]	[5.15]	[4.38]	[4.27]	[5.47]	[5.81]	[6.40]
Institutional Reform	0.21	0.10	1.51	2.29	-0.79	0.23	0.73	-0.94	-2.82	-2.44	-2.04	-2.39	3.74	5.48	5.72
Legal system and property rights	[1.03]	[1.94]	[1.99]	[2.26]	[2.84]	[1.41]	[2.07]	[2.59]	[2.84]	[2.56]	[2.58]	[3.40]	[3.66]	[4.66]	[4.51]

Panel regressions consist of sectoral productivity gap relative to the United States, reform shocks entering one at a time, and country- and crisis effects. Dependent variable is sectoral productivity growth. The full sample consists of over 100 countries for the period 1970–2010. Reform indices are normalized between 0 and 1. *,**, and *** indicate significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

References

Acemoglu, D., S. Johnson, and J Robinson. 2005. "Institutions as a Fundamental Cause of Long-Run Growth." *Handbook of Economic Growth,* Chapter 6.

_____, P. Aghion, and F. Zilibotti. 2006. "Distance to Frontier, Selection, and Economic Growth." *Journal of the European Economic Association,* Vol. 4(1), 37–74.

Abiad, A. G., Detragiache, E., & Tressel, T. 2010. A new database of financial reforms. IMF Staff Papers, 57(2), 281–302.

Adamopoulos, T., D. Restuccia. 2011. "The Size Distribution of Farms and International Productivity Differences." Manuscript, University of Toronto.

Aghion, P., P. Howitt, and D. Mayer-Foulkes. 2005. "The Effect of Financial Development on Convergence: Theory and Evidence." *The Quarterly Journal of Economics*, *120*(1), 173–222.

_____, and P. Howitt. 2006. "Joseph Schumpeter Lecture. Appropriate Growth Policy: A Unifying Framework." *Journal of European Economic Association*, Vol. 4(2–3), 269–314.

———, 2009, *The Economics of Growth* (Cambridge, Massachusetts: MIT Press).

Ahrend R., J. Arnold, and C. Moeser. 2011. "The Sharing of Macroeconomic Risk: Who Loses (and Gains) from Macroeconomic Shocks." OECD Economics Department Working Paper No. 877, Organization for Economic Cooperation and Development, Paris.

Arnold, J., B. Javorcik, M. Lipscomb, and A. Mattoo. 2012. "Services Reform and Manufacturing Performance: Evidence from India." WB Policy Research Working Paper 5948, World Bank, Washington.

Bah, E., and L. Fang. 2013. "Impact of the Business Environment on Output and Productivity in Africa." Manuscript, University of Auckland.

Bassassini, A., Scarpetta, S., & Visco, I. 2000. Knowledge, technology and economic growth: an OECD perspective.

Bassanini, A., and R. Duval. 2009. "Unemployment, Institutions, and Reform Complementarities: Re-assessing the Aggregate Evidence for OECD countries." *Oxford Review of Economic Policy*, *25*(1), 40–59.

Borchert, I., B. Gootiiz, and A. Mattoo. 2010. "Restrictions on Services Trade and FDI in Developing Countries." *World Bank, mimeo*.

Bordon, A., C. Ebeke, and K. Shirono. 2015. forthcoming, "When do Structural Reforms Work? On the Role of the Business Cycle and Macroeconomic Policies." IMF Working Paper. International Monetary Fund, Washington.

Bouis, R., and R. Duval. 2011. "Raining Potential Growth After the Crisis: A Quantitative Assessment of the Potential Gains from Various Structural Reforms in the OECD Area and Beyond." OECD Economics Department Working Papers, No. 835, OECD Publishing.

_____, O. Causa, L. Demmou, R. Duval, and A. Zdzienicka. 2012, "The Short-Term Effects of Structural Reforms: An Empirical Analysis." OECD Economics Department Working Papers, No. 949, OECD Publishing.

Cacciatore, M., R. Duval, and G. Fiori. 2012. "Short-Term Gain or Pain? A DSGE Model Based Analysis of the Short-Term Effects of Structural Reforms in Labor and Product Markets." OECD Economics Department Working Papers, No. 948, OECD Publishing.

Cao, K. H., and J.A. Birchenall. 2013. "Agricultural Productivity, Structural Change, and Economic Growth in Post-Reform China." *Journal of Development Economics*.

Chinn, Menzie D. and Hiro Ito (2006). "What Matters for Financial Development? Capital Controls, Institutions, and Interactions," *Journal of Development Economics*, Volume 81, Issue 1, Pages 163–192 (October).

Christiansen, L., M. Schindler, and T. Tressel. 2013. "Growth and Structural Reforms: A New Assessment." *Journal of International Economics*, 89, 347–56.

Conway, P., D. de Rosa, G. Nicoletti, and F. Steiner. 2006. "Product Market Regulation and Convergence." OECD Economic Studies No. 43, 2006/2, OECD, Paris.

Dabla-Norris, E., S. Guo, V. Haksar, M. Kim, K. Kochhar, K.Wiseman, and A. Zdzienicka. 2015. "The New Normal: A Sector-Level Perspective on Growth and Productivity Trends in Advanced Economies." *IMF Staff Discussion Note* 15/03 International Monetary Fund, Washington.

_____, G. Ho, K. Kochhar, A. Kyobe, and R. Tchaidze. 2013. "Anchoring Growth: The Importance of Productivity-Enhancing Reforms in Emerging Market and Developing Economies." *IMF Staff Discussion Note* 13/08, International Monetary Fund, Washington.

_____, A.Thomas, R. Garcia-Verdu, and Y. Chen. 2013. "Benchmarking Structural Transformation Across the World." IMF Working Paper 13/176, International Monetary Fund, Washington.

Dall'Olio, A., M. Iootty, N. Kanehira, and F. Saliola. 2013. "Productivity Growth in Europe." WB Policy Research Working Paper 6425, World Bank, Washington.

Duggan, V., S. Rahardja, and G. Varela. 2013. "Service Sector Reform and Manufacturing Productivity: Evidence from Indonesia." WB Policy Research Working Paper 6349, World Bank, Washington.

Fernandes, A.M., and C. Paunov. 2012. "Foreign Direct Investment in Services and Manufacturing Productivity: Evidence for Chile." *Journal of Development Economics*, vol. 97(2), 305–21.

Henrekson, M., & Johansson, D. (2010). Firm growth, institutions and structural transformation.

International Monetary Fund (IMF). 2008. "Structural Reforms and Economic Performance in Advanced and Developing Countries." IMF Policy Paper, Washington.

———. 2012. "Fiscal Policy and Employment in Advanced and Emerging Economies." IMF Policy Paper, Washington.

———. 2013. "Guidance Note on Jobs and Growth Issues in Surveillance and Program Work: Supplement on Country Case Studies." Washington.

Inter-American Development Bank (IDB), 2013. Rethinking Reforms, How Latin America and the Caribbean Can Escape Suppressed World Growth (Washington: Inter-American Development Bank).

Kerdrain, C., Koske, I., & Wanner, I. (2010). The impact of structural policies on saving, investment and current accounts.

Larrain, M., and S. Stumpner. 2013. "Financial Reforms and Aggregate Productivity: The Microeconomic Channel." Working Paper.

Levine, R. 2005. "Finance and Growth: Theory and Evidence." *Handbook of Economic Growth*, *1*, 865–934.

Nicoletti, G., and S. Scarpetta. 2003. "Regulation, Productivity and Growth: OECD Evidence." *Economic Policy*, *18*(36), 9–72.

Organisation for Economic Co-operation and Development (OECD). 2013. "Economic Policy Reforms 2013: Going for Growth." OECD Publishing. http://dx.doi.org/10.1787/growth-2013-en

Prati, A., M. G. Onorato, and C. Papageorgiou. 2013. "Which Reforms Work and under What Institutional Environment? Evidence from a New Data Set on Structural Reforms." *Review of Economics and Statistics*, 95(3), 946–68.

Rajan, R. G., and L. Zingales. 2001. "Financial systems, Industrial Structure, and Growth," *Oxford Review of Economic Policy*, *17*(4), 467–82.

Restuccia, D., and R. Rogerson. 2013. "Misallocation and Productivity, *Review of Economic Dynamics*." Vol. 16, 1–10.

Syverson, C. 2011. "What Determines Productivity?" *Journal of Economic Literature*, 49 (2), 326–65.

Tombe, T. 2012. "The Missing Good Problem: How Low Agricultural Imports Contribute to International Income and Productivity Differences." Manuscript, University of Calgary.

Tressel, T. 2008. "Unbundling the Effects of Reforms," *preliminary draft*, 28–29. http://www.imf.org/external/np/seminars/eng/2008/strureform/pdf/unbund.pdf.

Vandenbussche, J., P. Aghion, and C. Meghir. 2006. "Growth, Distance to Frontier and Composition of Human Capital." *Journal of Economic Growth*, 11(2), 97–127.

Wacziarg, R., and K. H. Welch. 2008. "Trade Liberalization and Growth: New Evidence." *The World Bank Economic Review*, *22*(2),187–231, Washington.

World Bank. 2012. *World Development Report 2013: Jobs* World Bank: Washington.