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Reigniting labour productivity growth in developing countries

Do structural reforms matter?

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Abstract: While the negative effects of the 2008 global financial crisis on labour productivity are still fresh in people's minds, the COVID-19 pandemic raises concerns that productivity will continue to decline. To boost labour productivity and regain economic performance, there is an empirical consensus on the role of structural reforms that allows an efficient reallocation of resources such as labour by reducing rigidities in markets. This study analyses the role of certain structural reforms in improving labour productivity in 35 developing countries over the period of 1990–2014. From the local projection method, our results show that structural reforms have a positive impact on productivity growth in the short and medium terms. The results also illustrate that reforms induce an efficient reallocation of resources within but not between sectors. Taking the business cycle into account in estimates shows that structural reforms stimulate labour productivity growth better in periods of low economic growth.

Key words: labour productivity, structural reform, local projection method, business

JEL classification: D24, O16, O24, O43

Note: As the research is part of the author's PhD thesis, they will hold copyright to facilitate its publication.

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1   Introduction

Since the global financial crisis, there has been weak economic growth in most economies due to deceleration in productivity growth (IMF 2015). Recent empirical work has raised concerns that the current COVID-19 crisis will exacerbate this negative trend and further reduce total factor productivity growth (Mauro and Syverson 2020; Baldwin and Weder di Mauro 2020). Developing countries face a development emergency. While the 2008 financial crisis is still fresh in the minds of many, the COVID-19 pandemic crisis is further exacerbating their situation by exposing systemic inequalities in current social, political, and economic systems.

Several studies have looked at the sources of labour productivity growth in developing countries (McMillan and Harttgen 2014; Padilla-Perez and Villarreal 2017; Nguyen 2018; Abdoul'Ganiou and Conde 2020). These studies decompose productivity growth into two main components: the within effect and the between effect. The within effect represents an improvement of labour productivity within the sectors of an economy. This improvement results from the efficient allocation of resources among firms within a sector (reduction of resource misallocation within sectors). Thus, the growth of the within-effect component can be explained by the long-term determinants of economic growth, notably the accumulation of physical and human capital, the adoption of new production techniques, and innovation. The between-effects component of productivity growth, also called structural change, measures the movement of labour between economic sectors in a country. In other words, it measures a reallocation of resources from sectors with low productivity levels to sectors with high productivity levels (Dieppe 2021; Konté et al. 2021). For example, most East Asian countries have benefited from large structural transformation bonuses that have boosted labour productivity growth. However, many African and Latin American economies, often endowed with rich natural resources, have benefited negligibly from this process (McMillan and Harttgen 2014).

For developing countries to converge on higher living standards and escape poverty, productivity-led growth recovery is particularly important (Kouamé and Tapsoba 2019). Indeed, the economic literature attributes differences in living standards between countries to differences in productivity. Thus, a recent study by Foster-McGregor and Verspagen (2016) suggests that labour productivity is the most important source of gross domestic product (GDP) in developing countries. In this context, structural reforms have been identified as a key means to enhance potential growth in the medium term by increasing labour productivity through an efficient reallocation of resources such as labour by reducing rigidities that exist in markets (Bourlès et al. 2013; Prati et al. 2013; de Almeida and Balasundharam 2018).

In recent decades, a series of structural reforms have been implemented in developing countries. These structural reforms aim to introduce major changes to the structures of economic and social institutions in an economy. This has caused researchers to study the effects of structural reforms on macroeconomic variables such as growth rates, employment rates, and productivity growth. Although such studies are numerous in developed countries, empirical studies of the effects of structural reforms are still rare in developing countries (Dabla-Norris et al. 2016; Kouamé and Tapsoba 2019).

Therefore, the extent to which structural reforms have an impact on labour productivity growth is an important empirical question for developing countries. This study provides new empirical evidence on the impact of structural reforms on labour productivity growth while taking into account inter- and intrasectoral labour productivity growth. Thus, we contribute to the literature on structural reforms in three ways: first, we focus on how productivity gains from structural reforms may depend on the time horizon. Second, we explore the roles of intra- and intersectoral productivity. Finally, we look at how productivity gains from the implementation of structural reforms can depend on the business cycle.

Our analysis is conducted in three steps. First, we use structural reform indicators constructed by Alesina et al. (2020). We consider reforms in the financial, commercial, market, and product sectors. Following Giuliano et al. (2013), we aggregate the three sub-indicators by their sum, normalizing it between zero and one. Second, we combine the Alesina et al. (2020) database with the GGDC/UNU-WIDER[1] economic transformation database. The latter provides comprehensive, long-term, and internationally comparable sectoral data on employment in different regions (Africa, Asia, and Latin America). Based on these sectoral data, we use the method proposed by McMillan and Harttgen (2014), while decomposing labour productivity growth into two components: intersectoral and intrasectoral components. Finally, we assess the impact of reforms on labour productivity growth using the local projections (LP) method by Jordà (2005). This approach is robust to specification errors, allows for nonlinearities and cross-sectional dependence, and removes uncertainties about the possible interactions between the reforms under consideration and the macroeconomic environment.

Empirical results show that structural reforms (financial, trade, and product market reforms) have a positive effect on labour productivity growth. Robustness analyses were performed and show that the positive impact of reforms persists after taking into account the endogeneity of structural reforms. However, when we take the business cycle into account, we find that reforms implemented during recessions stimulate labour productivity better than those implemented during periods of economic growth. From the different components of productivity growth, we find that structural reforms affect the intra- and intersectoral components of productivity differently. While structural reforms positively affect the within-sector component, they do not have a significant effect on the between-sector components.

The rest of the study is structured as follows: Section 2 reviews the empirical literature on the relationship between structural reforms and labour productivity growth, Section 3 describes the data used, Section 4 presents the estimation strategies, Section 5 presents the basic results, Section 6 produces robustness analyses, and Section 7 concludes.

2   Literature review

In the aftermath of the 2008 global financial crisis, there is weak growth in most economies due to slower productivity growth (IMF 2015). This productivity decline has triggered a growing interest in analysing structural reforms at the sectoral [see, e.g., Dabla-Norris et al. (2015, 2016); Bouis et al. (2016)] and firm levels (Bertrand and Kramarz 2002; Fabrizio et al. 2007; Goolsbee and Syverson 2008; Schivardi and Viviano 2011; Gal and Hijzen 2016; Arnold et al. 2016; Lanau and Topalova 2016). These studies show that reforms have positive effects on productivity. Reforms are an important means of securing macroeconomic performance through increased employment, productivity, and growth (Nicoletti and Scarpetta 2003; Bordon et al. 2018).

The benefits resulting from structural reforms depend on the reforms implemented, the initial macroeconomic and policy conditions, and the periods over which effects and economic outcomes are assessed (employment, output, innovation, or productivity).

Empirical studies on samples of developed countries clearly show that the effects of labour market reforms depend on business cycle conditions. Reducing tax wedges on labour and increasing public spending on active labour market policies have greater effects during periods of low economic growth, while the effects of lower employment protection and benefits are procyclical (Duval et al. 2018). Em-

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[1] GGDC/UNU-WIDER: Groningen Growth and Development Centre/United Nations University World Institute for Development Economics Research.

pirical work by IMF (2016) shows that product market reforms lead to higher output and employment growth independent of the business cycle.

Combining data on Italian firm-level product market reforms for a period from 2003 to 2013, Lanau and Topalova (2016) find, on one hand, that deregulation in network sectors has had a positive impact on the value added and productivity of firms in these sectors, as well as on firms using intermediate inputs in their production process. On the other hand, the authors find that these effects are stronger in Italian provinces with more efficient public administration, highlighting the need for complementary policies to increase the benefits of structural reforms.

Gal and Hijzen (2016) analyse the short- and medium-term impacts of product market reforms on employment, capital, and business entry using data from 10 regulated sectors and 18 OECD countries for 1998–2013. The authors find that product market reforms have positive effects on capital, output, and employment and that their effects increase over time. Moreover, they find that the positive effects are weakened for credit-constrained firms, large firms in network industries, and small firms in retail trade.

The effects of trade reform on productivity have also been extensively studied in the literature. A number of studies have exploited episodes of trade liberalization to examine whether lower trade tariffs have an impact on productivity (Fernandes 2003; Topalova and Khandelwal 2011). For these studies, one of the main potential benefits of trade liberalization is the resulting increase in the productivity of domestic firms.

Several channels can explain the productivity effects of trade liberalization. First, trade liberalization leads to strong competitive pressure resulting from increased imports. Competitive pressure induces firms to eliminate slack and use factors of production more efficiently[2] (Holmes and Schmitz Jr 2001). Second, as predicted by the endogenous growth models of Grossman and Helpman (1991) and Rivera-Batiz and Romer (1991), liberalization can boost intrafactory productivity by allowing for the international diffusion of technology. This occurs because technological knowledge is incorporated into goods, and improved access to imported intermediate inputs of better quality and greater variety improves firm productivity. Greater exposure to export markets can promote technological spillovers and thus improve productivity. Finally, liberalization may induce firms to invest in productivity-enhancing technologies. For Goh (2000), liberalization increases incentives to invest and reduces the opportunity costs of technological effort and profits lost due to the resulting delay in the commercialization of output liberalization. Thus, the increase in a firm's exposure to trade leads to the exit of less productive plants and the reallocation of production to more productive plants, contributing to firm productivity growth (Melitz 2003).

Some empirical studies have also looked at the effects of financial sector reforms on productivity growth (Rajan and Zingales 1998; Galindo et al. 2007). For these studies, financial sector reforms improve firm-level productivity through a more efficient allocation of resources and easier access to external finance. Reforms aimed at removing financial restrictions and financial repression have the potential to reduce the cost of capital and thus stimulate firm-level productivity growth. Studies point to the allocation of financial resources to more productive firms, which helps boost firm-level productivity (Larrain and Stumpner 2017).

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[2] However, infant industry arguments hold that protection can lead to productivity gains when learning by doing is important.

3 Data sources and description

3.1 Structural reform indicator

In this section, we describe the structural reform indices used in this study. Our study uses the structural reform indices developed by Alesina et al. (2020). This database has the advantage of covering a large number of countries (90 countries with different levels of development) over a long period of time (1973–2014). The structural reform indices are classified into two sectors: real sector and financial sector reforms.

The data on financial reforms relate to the liberalization of domestic markets. The degree of domestic financial liberalization is an average of six sub-indices. The first five sub-indices cover the banking system and include (i) credit controls with consideration of subsidized loans and directed credits, (ii) interest rate controls such as floors and ceilings, (iii) restrictions on competition related to barriers to entry and limits on the number of bank branches, (iv) the extent of state ownership, and (v) the quality of banking supervision and regulation. The last dimension concerns securities markets and captures the degree of legal restrictions on the development of domestic bond and stock markets and the existence of independent regulators.

Real sector reforms include reforms related to the opening of international trade and the liberalization of product markets. Trade openness reforms are measured on two dimensions: (i) the average tariff rate and (ii) restrictions on current account transactions including payments and receipts on exports and imports of goods and services. Product market reforms cover agricultural sector reforms as well as the degree of the liberalization of telecommunications and electricity markets (network sector reforms). Agricultural sector reforms measure the extent of government intervention in the market for a country's main export product. This includes the presence of export marketing boards and the administered price index. The reforms in the telecommunications and electricity markets capture the existence of an independent regulator and the degree of competition in the provision of services.

We follow Giuliano et al. (2013) by assuming that the reform process is a unique process common to all sectors. We construct a global reform variable by summing the indices of different structural reforms. The structural reform indicators are normalized between 0 and 1. A high value of the reform indicator corresponds to more liberalized economies. To visualize the distribution of reform indicators by income group, we calculate for each country the average of each indicator for 1990–2014 and present whisker box plots in Figure 1. We notice strong heterogeneity in the liberalization indices between emerging market economies (EMs) and low-income countries (LICs). For example, trade reforms have been more pronounced in EMs than in LICs. Overall, the different whisker boxes indicate that the liberalization indices do not exceed 0.8, which suggests that there is still room for improvement in terms of market liberalization in developing countries.

Figure 1: Box plots of structural reform indices

(a) Total reform
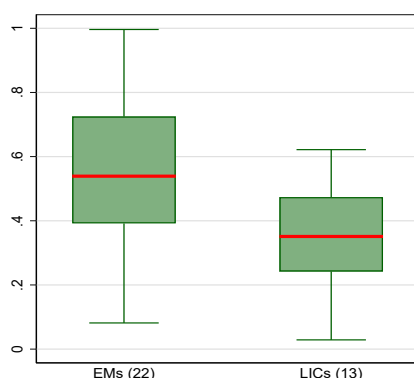
(b) Financial reform
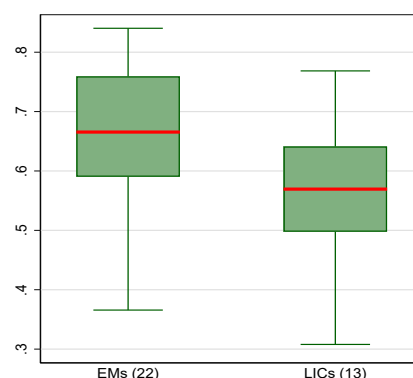
(c) Product market reform

(d) Trade reform

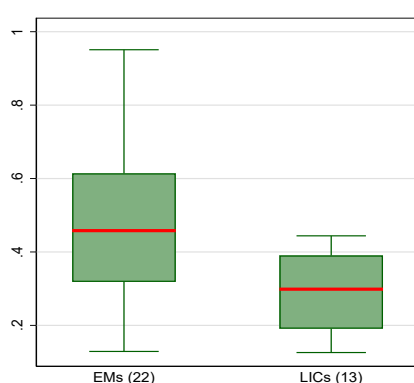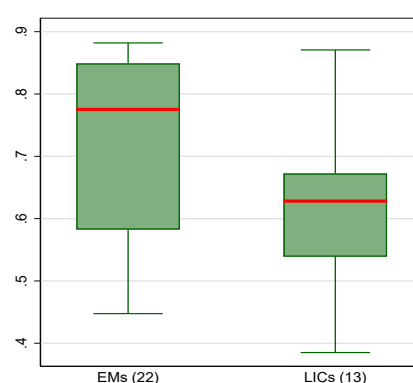Note: on the x-axis, the number of countries for which data are available for each income group is shown in brackets. The values of the liberalization indices are between 0 and 1 and are represented on the y-axis. The description of each liberalization index is described in Section 3.1.

Source: authors' illustration based on data from Alesina et al. (2020).

3.2   Labour productivity growth

Our data set comes from the new GGDC/UNU-WIDER[3] Economic Transformation Database. This data set provides time series of employment, real, and nominal value added for 12 sectors (see Appendix) for a full description)[4] in 51 developing countries annually for 1990–2018. The database is then limited to 35 countries and a period of 1990–2014 because of the availability of data on structural reforms.[5]

The economic literature on labour productivity growth (McMillan and Rodrik 2011; Gumata and Ndou 2019) explains productivity growth based on the growth of two components. The first is productivity growth within a sector (called the within effect) due to innovation, accumulation, and a more efficient allocation of resources between plants. The second component results from the migration of labour from low to high productivity sectors, called the between effect.

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[3] Groningen Growth and Development Centre/United Nations University World Institute for Development Economics Research.

[4] Data are available for 12 sectors: agriculture, mining, manufacturing, utilities, construction, trade services, transport services, business services, financial services, real estate, government services, and other services.

[5] Four regions are considered in this study: 11 economies from sub-Saharan Africa, 4 from the Middle East and North Africa (MENA), 9 from Latin America, and 11 from Asia. See Appendix Table A5 for the list of sample countries.

To decompose productivity growth into these two components, we employ the shift-share methodology. More precisely, we follow the method developed by McMillan and Rodrik (2011) and decompose the cumulative changes in labour productivity growth between time t and time $t+k$ as follows:

$$LPG_{i,t+k} - LPG_{i,t-1} = \sum_{j=1}^{12}(LPG_{i,t+k}^{j} - LPG_{i,t-1}^{j}) * s_{i,t-1}^{j} + \sum_{j=1}^{12}(s_{i,t+k}^{j} - s_{i,t-1}^{j}) * LPG_{i,t+k}^{j} \qquad (1)$$

where $LPG_{i,t}$ is the aggregate labour productivity in country i at time t, and $LPG_{i,t}^{j}$ is the labor productivity of sector j in country i at time t.

The first component of equation (1) on the right describes the average intrasector productivity growth caused by not only the adoption of new production technology but also innovation and improvements in allocative efficiency within the same sector and in productive efficiency (within effect). The second component of equation (1) describes productivity growth caused by the movement of labour from low to high productivity sectors, i.e. structural change (between effect).

In the Table 1, we present the average growth in labour productivity and these two components from the decomposition exercise using the method of McMillan and Rodrik (2011) for 1990–2014. The average productivity over the period studied for the whole sample is 2.44 per cent. At the income group level, there is homogeneity in the growth of average productivity. However, there is strong heterogeneity in the average intra- and intersectoral components.

Table 1: Summary statistics (in percentage)

	Full sample	EMs	LICs
Within	1.62	1.96	1.04
	(5.588)	(3.893)	(7.618)
Structural change	0.83	0.38	1.58
	(4.118)	(2.253)	(6.020)
Labour productivity growth	2.44	2.35	2.59
	(3.771)	(3.784)	(3.751)
N	840	528	312

Note: standard deviations in parentheses. EMs: emerging market economies, LICs: low-income countries.
Source: authors' calculation based on data from De Vries et al. (2021).

To understand how labour productivity growth rates and their decompositions have evolved over time, we plot the average evolution of productivity growth and its components across the different income group levels over the period of 1990–2014 in Figure 2. It is found that the growth trajectory of labour productivity and its different components across the different income groups are not the same. In the emerging market economies compared to low-income economies, the structural change remained almost constant between 1990 and 2014. The growth of labour productivity is mainly due to the growth of the intrasectoral component.

Figure 2: Trends in labour productivity growth and its components by income group, 1990–2014

(a) Emerging market economies (EMs)

(b) Low-income countries (LICs)
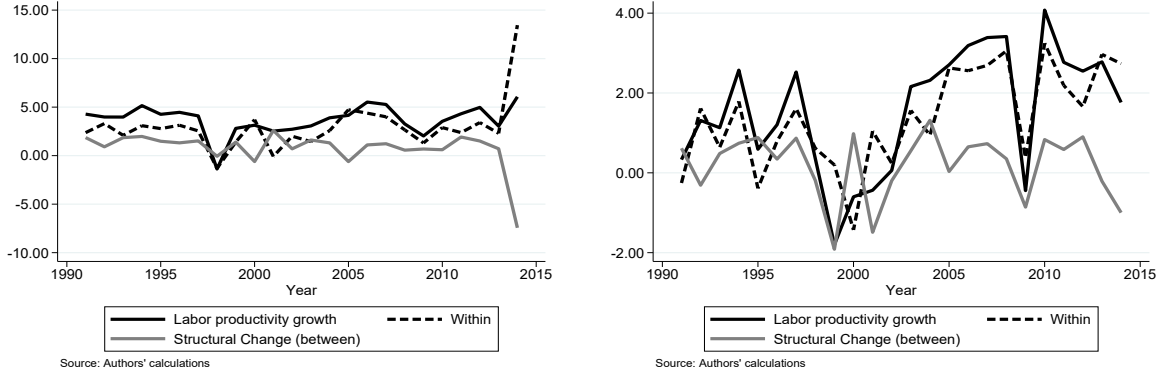
Source: authors' illustration based on data from De Vries et al. (2021).

4   Empirical model

The objective of this study is to analyse the relationship between productivity growth (and its components) and structural reforms. Our econometric approach is based on recent work on the estimation of fiscal multipliers (Jordà 2005; Auerbach and Gorodnichenko 2013; Owyang et al. 2013; Jordà and Taylor 2016). To take into account the dynamic effects of the reforms, our estimation method is based on a local projection approach developed by Jordà (2005). Our unit of analysis is a country-year observation (35 countries (i) and 24 years (t)). The baseline specification takes the following form:

$$y_{i,t+k} - y_{i,t-1} = \alpha_i^k + \gamma_t^k + \beta^k SR_{i,t-1} + \theta X_{i,t} + \varepsilon_{i,t+k} \tag{2}$$

where $y_{i,t}$ is the aggregate labour productivity growth (or within and between component) between time $t-1$ and t, and $k \in [0,5]$ denotes the time horizon. $SR_{i,t-1}$ denotes one lag of the structural reforms defined as the change in the structural reform indicators (aggregate, product market, financial, and trade reforms) described above. α_i and γ_t are country and year fixed effects, respectively. While country fixed effects are included to control for unobserved heterogeneity across countries, time effects aim to control for exogenous shocks such as changes in oil prices or economic crises. We also control (variables $X_{i,t}$) for the effects of reforms on productivity growth by introducing lagged values of the dependent variable, one lag of unemployment, and GDP per capita growth. $\varepsilon_{i,t+k}$ is a residual term assumed to be uncorrelated with the regressors. Table A3 in the Appendix provides definitions and sources for the main variables used in the study.

5   Baseline results

Table 2 reports estimates based on equation (1). The estimated impacts on labour productivity growth for each time horizon are shown in columns 1–6. We first analyse the aggregate impact of reforms on labour productivity and then analyse the disaggregated effect of reforms by looking at the typology of structural reforms (from lines 2–4).[6] Driscoll and Kraay (1998) standard errors are computed to account for correlations in the error terms.

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[6] We also present the results of Table 2 graphically in the Appendix (see Figure A1).

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The results show that aggregate reforms have a positive and statistically significant effect on productivity growth from the first year of their implementation with a cumulative effect over a period of five years of 19.1 per cent. These results are in line with empirical evidence, notably that of David et al. (2020).

Table 2: Effect of reform on labour productivity growth (baseline results)

	(1) Year 0	(2) Year 1	(3) Year 2	(4) Year 3	(5) Year 4	(6) Year 5
Aggregate reforms (1 lag)	4.523***	7.887***	10.306***	13.335***	15.621***	19.597***
	(0.908)	(1.378)	(2.034)	(2.852)	(3.614)	(4.463)
Observations	755	755	755	755	755	721
Dom. financial reform (1 lag)	4.595***	8.270***	11.228***	14.802***	17.587***	23.014***
	(0.753)	(1.039)	(1.732)	(2.456)	(3.251)	(3.433)
Observations	765	765	765	765	765	731
Product market reform (1 lag)	2.144***	4.242***	6.244***	8.446***	10.677***	14.034***
	(0.421)	(0.700)	(1.111)	(1.479)	(1.994)	(2.323)
Observations	765	765	765	765	765	731
Trade reform (1 lag)	3.417***	6.271***	8.352***	10.808***	11.958***	14.572***
	(0.922)	(1.289)	(2.017)	(2.806)	(3.950)	(4.670)
Observations	755	755	755	755	755	721

Note: Driscoll-Kraay standard errors in parentheses. *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$. Additional controls: lagged values of the dependent variable, one lag of GDP growth and unemployment.

Source: authors' calculation based on study data.

We then consider the estimated effects of the reforms according to their specific areas. The results show that liberalization reforms, trade reforms, and product market reforms have positive and statistically significant effects on the growth rate of labour productivity over the time horizon considered. It should be noted that not only are the effects of the different reforms immediate and long lasting, but also the strength of the estimated coefficients increases over time. For example, if the estimated cumulative effect of product market reforms is 2.14 per cent at the beginning of the period, it is 14.03 per cent at the end of the period considered.

These results are very important for developing countries and are consistent with empirical studies. Trade liberalization, by allowing firms in developing countries to increase their exports, exposes them to competition from foreign producers. Firms that export in these countries can therefore make productivity gains by learning from foreign customers and producers. Furthermore, in terms of imports of goods and services, trade liberalization increases the volume of imports, which has a direct influence on domestic firms. The latter can reallocate factors of production to more productive sectors because they benefit from good quality and large quantities of inputs. The positive effect of financial liberalization on labour productivity growth confirms the need for developing countries to work towards reducing or removing financial constraints such as credit and interest rate controls, barriers to bank entry, and bank supervision. The results are consistent with the predictions of financial liberalization theories that suggest an improvement in labour productivity through efficiency in resource allocation and production as well as a reduction in transaction costs [see Schumpeter (1934)]. The liberalization of product markets plays an important role in improving productivity in developing countries. Product market reforms make it possible to eliminate obstacles to the proper functioning of markets, leading to an increase in competition between producers of goods and services.

Having analysed the impact of market liberalization through structural reforms on productivity growth, we now turn to the potential effects of market liberalization indices on intra- and intersectoral growth.

5.1 Decomposition into within and between components

The economic literature on productivity growth explains productivity growth in terms of two components: between and within sector growth. Recent work by Furceri et al. (2021) on 18 OECD countries shows that productivity growth is driven by movements in both the within and between components. What then is the effect of structural reforms on the between and within components of labour productivity growth in developing countries? In other words, do structural reforms affect labour productivity growth by inducing a more efficient reallocation of resources across sectors, within sectors, or both?

To answer this question, we study the impact of structural reforms on the two channels of labour productivity growth using the baseline methodology. In Table 3, we present the aggregate and disaggregate effects of the structural reforms index on the intra- and intersectoral components. The aggregate effects of structural reforms on the intrasectoral component (within) are positive and statistically significant from the first year to the fifth year of the defined time horizon. We find no significant aggregate effects of reforms on productivity across sectors (structural change).

Analysing the impact of aggregate reforms, we find that the impact of reforms on productivity growth is through an increase in dynamic, productive, and allocative efficiency by inducing a more efficient allocation of resources within sectors of the economy (positive effect of aggregate reforms on the within-effect component). However, the aggregate reforms analysis suggests that structural reforms do not induce structural change in the developing countries studied and over the study period.

Aggregate analysis could disguise heterogeneous effects of structural reforms in their specific domain. Thus, we are now interested in the effects of reforms according to their specific domain (considering Table 3). All reforms have a positive and statistically significant effect on the within-sector component. However, a disaggregated analysis of the impact of specific reforms on the intersectoral components suggests that product market, trade, and financial reforms do not induce structural change in developing countries. These results are consistent with those recently found by Konté et al. (2021).

Table 3: Effect of reform on the labour productivity components

	(1) Year 0	(2) Year 1	(3) Year 2	(4) Year 3	(5) Year 4	(6) Year 5
Within						
Aggregate reforms (1 lag)	6.107*	8.876***	10.493***	12.634***	15.023***	12.638*
	(3.018)	(2.871)	(3.016)	(2.976)	(3.475)	(6.941)
Observations	755	755	755	755	755	755
Dom. financial reform (1 lag)	6.445**	9.937***	11.958***	14.251***	16.055***	15.120***
	(2.418)	(2.491)	(2.076)	(1.714)	(2.170)	(4.878)
Observations	765	765	765	765	765	765
Product market reform (1 lag)	2.013**	3.587***	4.994***	7.019***	9.055***	8.327***
	(0.755)	(0.827)	(0.933)	(0.967)	(0.998)	(2.433)
Observations	765	765	765	765	765	765
Trade reform (1 lag)	5.315**	8.253***	9.499***	11.597***	12.523***	8.054
	(2.231)	(1.836)	(2.299)	(2.994)	(4.158)	(8.814)
Observations	755	755	755	755	755	755
Structural change						
Aggregate reforms (1 lag)	-1.395	-0.757	0.147	0.948	1.166	-1.567
	(2.571)	(2.740)	(2.545)	(2.202)	(2.003)	(2.995)
Observations	755	755	755	755	755	755
Dom. financial reform (1 lag)	-1.625	-1.425	-0.453	0.704	1.769	0.449
	(2.168)	(2.461)	(1.837)	(1.944)	(2.621)	(3.490)
Observations	765	765	765	765	765	765
Product market reform (1 lag)	0.308	0.883	1.586	1.783	2.163	2.408
	(0.713)	(1.043)	(1.352)	(1.700)	(1.974)	(2.364)
Observations	765	765	765	765	765	765
Trade reform (1 lag)	-1.700	-1.769	-0.865	-0.653	-0.259	-1.595
	(1.901)	(1.895)	(2.059)	(1.742)	(1.472)	(1.778)
Observations	755	755	755	755	755	755

Note: Driscoll-Kraay standard errors in parentheses. *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$. Additional controls: lagged values of the dependent variable, one lag of GDP growth and unemployment.

Source: authors' calculation based on study data.

Regarding the results in Table 3, the reforms of the financial sector, especially the liberalization of the banking sector, domestic finance, and market supervision, have a positive and statistically significant effect on intrasectoral productivity growth. These results are consistent with theoretical and empirical predictions (Larrain and Stumpner 2017; Galindo et al. 2007). According to Galindo et al. (2007), financial liberalization improves the efficiency of allocation by allowing investment funds to go to companies with a higher marginal return on capital. Removing financing constraints through financial reforms allows companies to access the capital needed to finance their activities. In other words, through reduced borrowing costs, companies finance new machinery and adopt new production technologies, which stimulates productivity growth.

As for product market reforms, in this case the liberalization of the agricultural sector and of electricity and telecommunications has positive and statistically significant effects on intrasectoral productivity growth. Finally, the positive relationship between trade reforms and labor productivity growth can be explained by the fact that the removal of constraints related to international trade provides access to new

knowledge or ideas, international competition encourages companies to innovate, and there are gains in economies of scale.

The results show through the disaggregated analysis that the reforms mainly stimulate the growth of labor productivity through the within component. Thus, to increase dynamic, productive, and allocative efficiency, developing countries must implement market-oriented economic reforms to make markets competitive while removing restrictions related to the entry of new firms. Our results do not show enough evidence as to the impact of the reforms on the between component.

6   Robustness

In this section, we perform robustness analyses of our results by adding additional control variables, taking into account the business cycle, causality concerns, and the role of the International Monetary Fund.

6.1   Potential omitted variables

In our baseline results, the estimated effects may be sensitive to the addition of variables. Indeed, the literature on the determinants of productivity makes use of additional variables other than what is taken into account in the basic results. We control for the impact of structural reforms on productivity growth by adding four groups of variables: macroeconomic variables (inflation and government size), external openness variables (international trade and foreign direct investment), institutional factors (institutional quality), and variables such as the sectoral composition of output and female labour participation.

The new results are presented in Table 4.[7] The overall results obtained are consistent with the baseline estimates, indicating that our results are not sensitive to the inclusion of additional variables. However, it should be noted that the strength of the estimated effects is greater when additional variables are taken into account.

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[7] We present only the results for labour productivity growth (the graphical result is presented in the Appendix, Figure A3). Results for intra- and intersectoral productivity are available from the authors on request.

Table 4: Effect of reform on the labour productivity growth: additional controls

	(1) Year 0	(2) Year 1	(3) Year 2	(4) Year 3	(5) Year 4	(6) Year 5
Aggregate reforms (1 lag)	4.806***	8.904***	12.104***	16.225***	18.923***	20.281***
	(1.286)	(1.982)	(2.914)	(3.915)	(4.624)	(5.296)
Observations	689	689	689	689	689	657
Dom. financial reform (1 lag)	5.980***	11.025***	15.363***	20.924***	25.714***	31.500***
	(1.295)	(2.379)	(3.318)	(4.164)	(4.610)	(5.079)
Observations	689	689	689	689	689	657
Product market reform (1 lag)	2.446**	5.223***	7.968***	10.769***	13.725***	16.145***
	(0.907)	(1.763)	(2.283)	(2.652)	(2.730)	(2.922)
Observations	689	689	689	689	689	657
Trade reform (1 lag)	3.309***	6.831***	9.707***	13.922***	15.240***	14.891***
	(1.173)	(1.527)	(2.094)	(2.488)	(3.707)	(4.668)
Observations	689	689	689	689	689	657

Note: Driscoll-Kraay standard errors in parentheses. *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$. Additional controls: lagged values of the dependent variable; GDP growth; unemployment; institutional quality; trade, foreign direct investment; inflation; labour force, female; agriculture, forestry and fishing, value added; size of government and GDP per capita.

Source: authors' calculation based on study data.

6.2 State of the economy: does business cycle matter?

The economic effects of structural reforms may depend on the economic conditions prevailing at the time of their implementation (Bordon et al. 2018; David et al. 2020). An interesting question is whether the impact of structural reforms depends on the state of the business cycle. To answer this question, we used the filter approach by Hamilton (2018) by distinguishing between two states of the business cycle: boom and slump periods. While boom periods correspond to years where the cyclical component of logarithm real GDP is greater than zero, slump periods correspond to years where the cyclical component is less than or equal to zero.

We take into account the state of the economy by modifying equation (2) as follows:

$$y_{i,t+k} - y_{i,t-1} = \alpha_i^k + \gamma_t^k + \beta_b^k F_{i,t} SR_{i,t-1} + \beta_s^k [1 - F_{i,t}] SR_{i,t-1} + \theta X_{i,t} + \varepsilon_{i,t+k} \tag{3}$$

where $F_{i,t}$ is a variable indicating the state of the economy with respect to the business cycle. The business cycle is a dummy variable identified using the Hamilton (2018) filter and takes the value one in periods of economic expansion (boom) and zero during periods of recession (slump).

The estimates from the local projection approach are presented in Figure 3 (we present the table of results in the Appendix, see Table A1).[8] Overall, the results show that structural reforms implemented during periods of economic slowdown contribute more significantly to the improvement of labour productivity than those implemented during periods of economic growth. This result can be explained by the scarcity of resources in periods of low economic growth leading firms to reallocate labour efficiently and thus stimulate productivity growth.

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[8] For layout reasons, we have not presented the results for the within and between components. The authors are available to provide them on request.

We define an alternative measure of the state of the economy following the work of IMF (2019). Then, we examine whether responses vary with the occurrence of crises by replacing $F_{i,t}$ in equation (3) with a dichotomous variable taking the value one if a crisis occurred in year t in country i and zero otherwise. The dichotomous crisis variable covers the systemic, banking, foreign exchange, and sovereign debt crises identified in Laeven and Valencia (2020).

Contrary to the IMF (2019) results, our results confirm a positive, statistically significant effect of structural reforms depending on the occurrence of a financial crisis or not, but the intensity of the estimated effect is larger in the absence of a financial crisis. This result is of crucial importance for developing countries in terms of economic policy. In the event of a financial crisis, the initiation of structural reforms would mitigate the negative effects of the crisis on economic performance, especially on labour productivity growth.[9]

Figure 3: Effects of structural reforms on labour productivity: business cycle
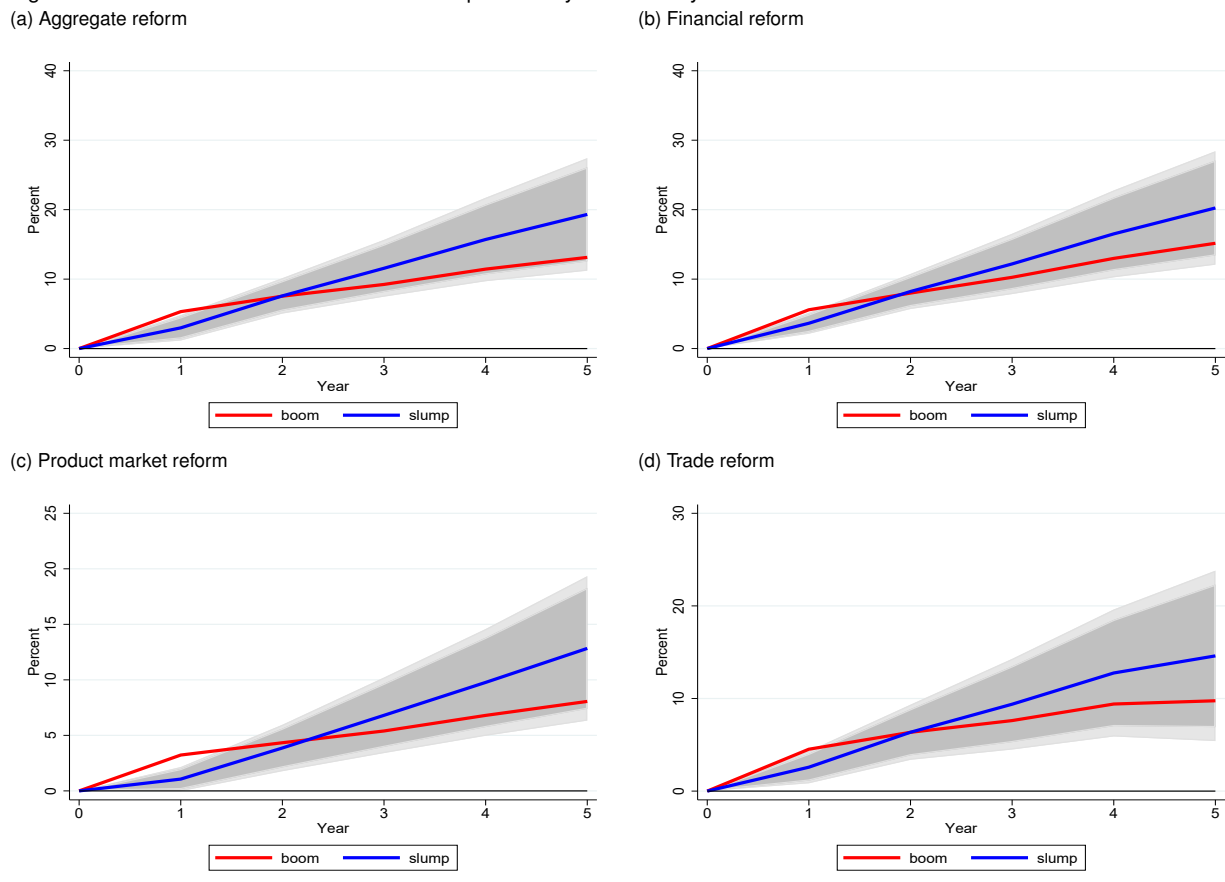
(a) Aggregate reform

(b) Financial reform

(c) Product market reform

(d) Trade reform

Note: shaded areas: 95% and 90% confidence intervals constructed with robust standard errors.

Source: authors' illustration based on study data.

6.3   The role of IMF programmes

The International Monetary Fund (IMF) plays a leading role in the implementation of structural reforms in developing countries through structural adjustment loans (conditionality). These conditionalities focus on market liberalization. For example, IMF programmes aim to remove systemic repression and restrictions on the price and quantity of credit, thereby aiming to stimulate productivity growth (Dabla-Norris et al. 2016).

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[9] The results of this estimate are not presented in the article but are available on request from the authors.

To test the sensitivity of our results, we include participation in IMF programmes as a dummy in our estimates. Figure 4 clearly shows that participation in IMF programmes allows developing countries to achieve greater productivity gains than countries not benefiting from IMF programmes. Indeed, all estimated effects are positive and statistically significant for all reforms (see Table A2 in the Appendix). However, the intensity of the estimated effects is greater for countries that receive IMF support.

Figure 4: Effects of structural reforms on labour productivity: IMF vs no IMF programme
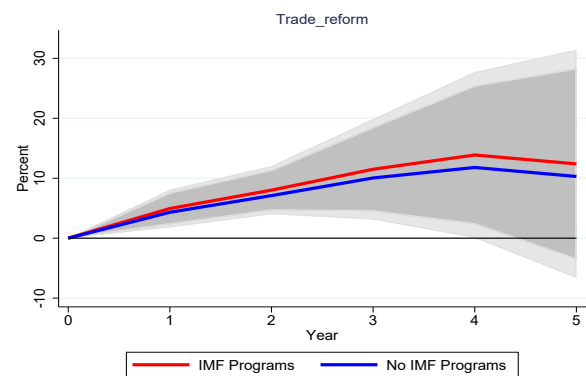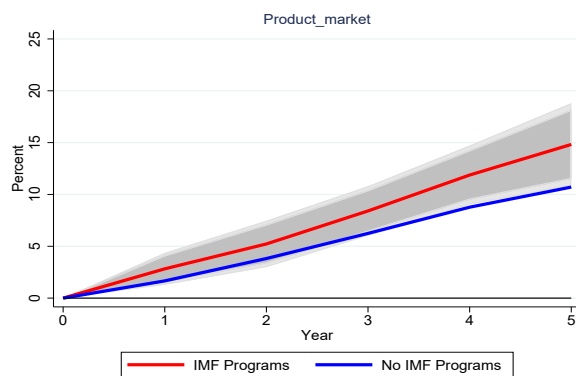(a) Aggregate reform (b) Financial reform
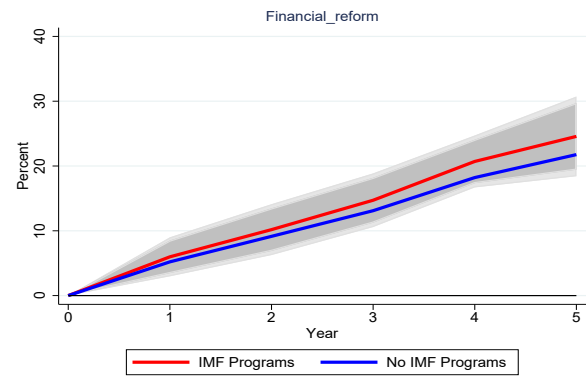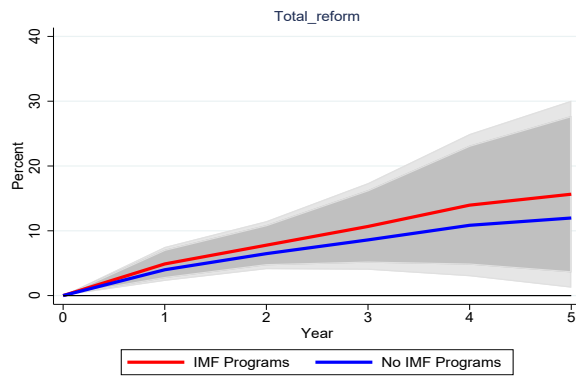
(c) Product market reform (d) Trade reform

Note: shaded areas: 95% and 90% confidence intervals constructed with robust standard errors.

Source: authors' illustration based on study data.

6.4 Causality concerns

Productivity growth and the macroeconomic environment can have an impact on structural reforms, thus posing an endogeneity concern (causality problems). To address this endogeneity problem, our study proposes to select large and discrete jumps in structural reform indicators, which are more likely to reflect reform pushes (or reversals). This approach is less likely to face an endogeneity problem. Reform pushes are less likely to be systematically correlated with other variables that could affect labour productivity growth.

To identify reform pushes, we define a dummy variable that captures the top 10 percentile of the greatest improvements in the structural reform indices. Thus, reform pushes represent pro-reform countries (vs anti-reform countries).

We present the results for labour productivity growth in Table 5. Overall, the results indicate that being a strong pro-reformer or not contributes to labour productivity growth. However, the intensity of the estimated impact is greater for the pro-reformers than for anti-reformers.

Table 5: Effect of reform on the labour productivity growth: pro-reformer vs anti-reformer

	(1) Year 0	(2) Year 1	(3) Year 2	(4) Year 3	(5) Year 4	(6) Year 5
Aggregate reforms (1 lag): pro-reformer	2.429*** (0.590)	5.300*** (0.932)	7.293*** (1.375)	10.535*** (1.453)	14.144*** (1.348)	16.883*** (1.489)
Aggregate reforms (1 lag): anti-reformer	1.930*** (0.301)	3.686*** (0.649)	6.050*** (0.880)	9.028*** (1.165)	12.217*** (1.590)	15.646*** (2.112)
Observations	765	765	765	765	765	731
Trade_reform (1 lag): pro-reformer	2.619*** (0.524)	4.976*** (0.649)	7.594*** (0.750)	10.441*** (0.774)	13.982*** (0.649)	17.732*** (0.938)
Trade_reform (1 lag): anti-reformer	1.909*** (0.314)	3.718*** (0.648)	6.016*** (0.905)	9.035*** (1.171)	12.230*** (1.553)	15.584*** (2.052)
Observations	765	765	765	765	765	731
Dom. Financial_reform (1 lag): pro-reformer	1.065 (1.115)	3.367** (1.554)	6.529*** (2.031)	9.784*** (2.914)	12.704*** (2.435)	13.297*** (1.640)
Dom. Financial_reform (1 lag): anti-reformer	1.998*** (0.320)	3.848*** (0.641)	6.158*** (0.867)	9.154*** (1.100)	12.390*** (1.444)	15.805*** (1.948)
Observations	765	765	765	765	765	731
Product_market (1 lag): pro-reformer	1.649*** (0.263)	2.977*** (0.555)	4.493*** (0.962)	7.489*** (1.214)	9.956*** (1.473)	20.783*** (1.175)
Product_market (1 lag): anti-reformer	1.980*** (0.305)	3.846*** (0.621)	6.183*** (0.846)	9.186*** (1.079)	12.421*** (1.417)	15.733*** (1.908)
Observations	765	765	765	765	765	731

Note: Driscoll-Kraay standard errors in parentheses. *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$. Additional controls: lagged values of the dependent variable; GDP growth; unemployment; institutional quality; trade, foreign direct investment; inflation; labour force, female; agriculture, forestry and fishing, value added; size of government and GDP per capita.

Source: authors' calculation based on study data.

7 Conclusion

Recent decades have been marked by deceleration in productivity growth in both developed and developing countries. While the decline in productivity growth fostered by the 2008 global financial crisis has not yet returned to its growth path, the COVID-19 crisis raises concerns that this decline will continue. There is an empirical consensus that productivity is an important determinant of countries' economic performance in the long run. It is therefore important to understand which policies increase productivity growth in these countries.

In recent years, many reforms have been implemented in developing countries through arrangements between the International Monetary Fund and its member countries. These reforms are intended to ensure a sound and undistorted macroeconomic environment. They help improve productivity while ensuring sustainable and inclusive growth and raising living standards in the long run.

This study investigates the effects of structural reforms on labour productivity growth in 35 developing countries over the period of 1990–2014. Using a sectoral database, we calculated the growth rate of labour productivity while decomposing it into within and between components through a decomposition method by McMillan and Rodrik (2011). We considered three types of structural reforms: financial, product market, and trade reforms.

To obtain dynamic effects and robust results, we use the local projection method by Jordà (2005). Our results show that structural reforms have a positive and significant impact on labour productivity growth. However, structural reforms affect the intra- and intercomponents of labour productivity growth and the business cycle differently. While reforms stimulate labour productivity growth through an efficient reallocation of resources within sectors, their effect on structural change appears to be ambiguous. This result is consistent with previous empirical studies. According to Page (2012), many developing countries have adopted structural adjustment programmes without achieving real structural change. With respect to the business cycle, reforms implemented during economic downturns are better at boosting labour productivity.

The results of this study have important policy implications. Policy-makers will need to increase the exposure of firms to international trade and foreign investment to achieve the benefits of technology transfer. Governments should also reduce state control and barriers to entry for new firms. Indeed, a higher degree of competition would stimulate investment in research and development and thus innovation, which could improve productivity through the automation of certain routine occupations. From the perspective of financial development, policy-makers should continue their efforts by further liberalizing the financial sector while facilitating access to finance through the development of digital technologies. Finally, countries working with the IMF should strengthen cooperation to liberalize key economic sectors that can lead to better sustainable and inclusive economic performance with higher living standards in the long term.

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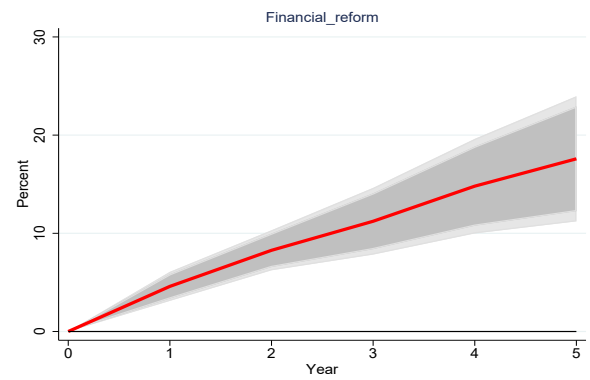
A1   Appendix

A1.1   Baseline estimations

Figure A1: Effects of structural reforms on labour productivity growth
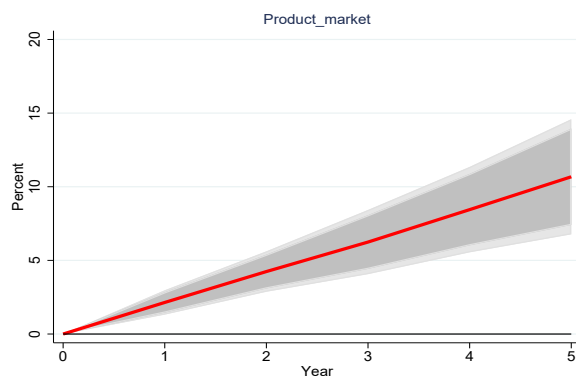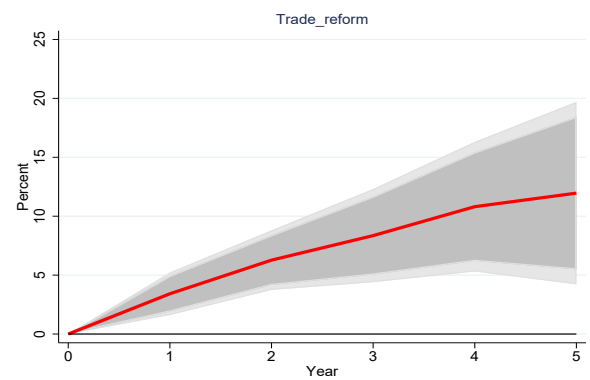
(a) Aggregate reform
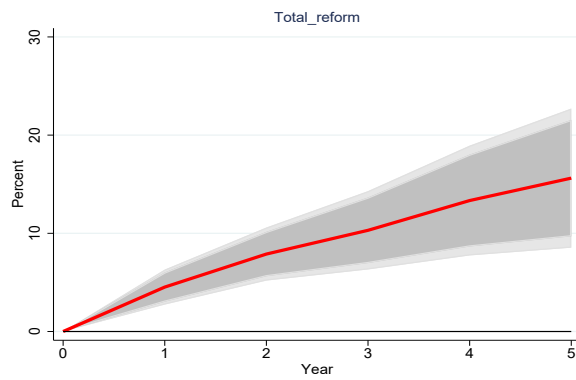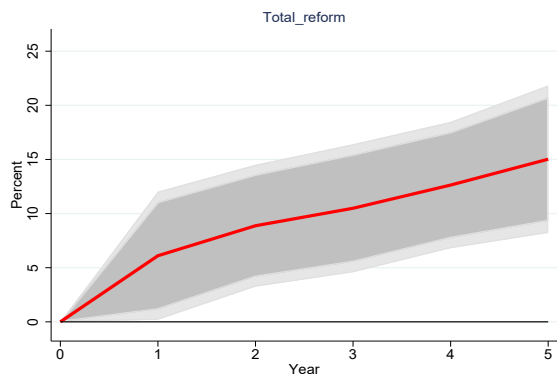
(b) Financial reform

(c) Product market reform

(d) Trade reform

Note: shaded areas: 95% and 90% confidence intervals constructed with robust standard errors.

Source: author's illustration based on study data.

Figure A2: Effects of structural reforms on within component
(a) Aggregate reform

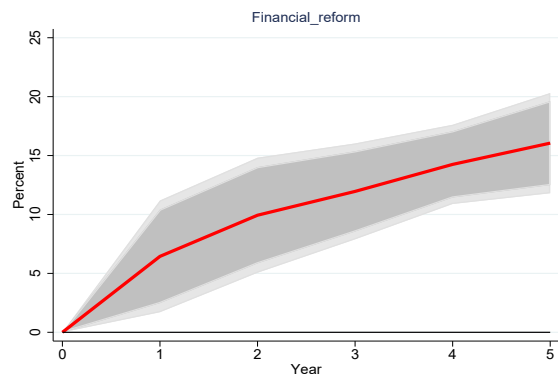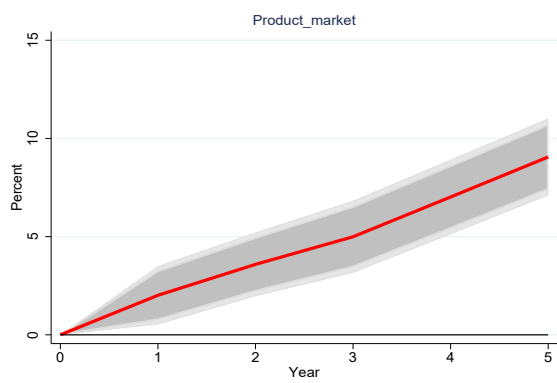(b) Financial reform

(c) Product market reform

(d) Trade reform

Note: shaded areas: 95% and 90% confidence intervals constructed with robust standard errors.

Source: authors' illustration based on study data.

A2   Robustness results

Figure A3: Effects of structural reforms on productivity growth: additional controls
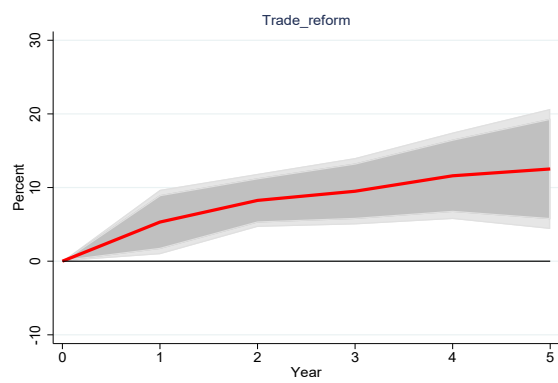
(a) Aggregate reform

(b) Financial reform

(c) Product market reform

(d) Trade reform

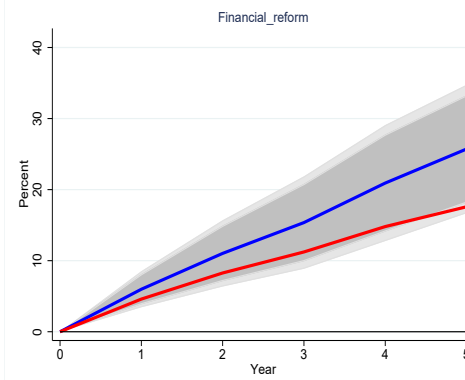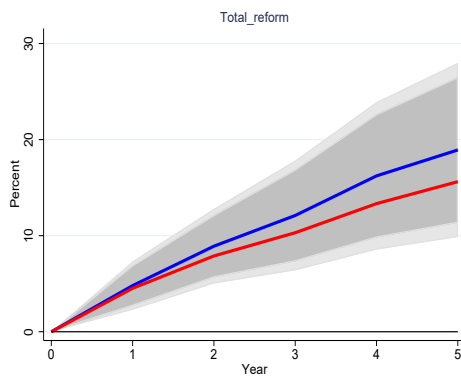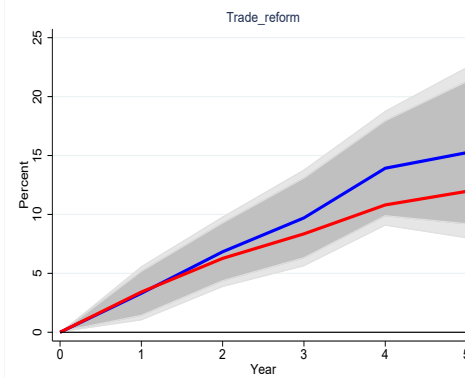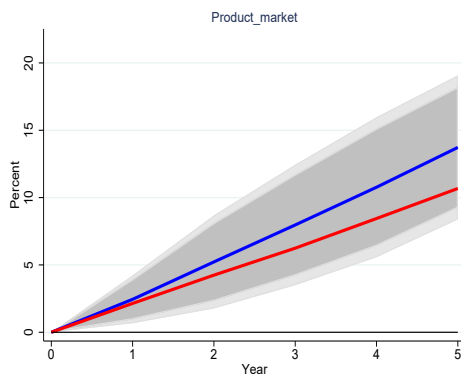Note: shaded areas: 95% and 90% confidence intervals constructed with robust standard errors. ——— baseline; ——— additional controls

Source: authors' illustration based on study data.

Table A1: Business cycle

	(1) Year 0	(2) Year 1	(3) Year 2	(4) Year 3	(5) Year 4	(6) Year 5
Aggregate_reform (1 lag): boom	5.320***	7.545***	9.236***	11.442***	13.131***	16.470***
	(1.030)	(1.476)	(2.281)	(3.142)	(3.570)	(4.276)
Aggregate_reform (1 lag): slump	2.984***	7.587***	11.561***	15.707***	19.315***	25.040***
	(0.930)	(1.299)	(2.084)	(3.066)	(4.134)	(4.614)
Observations	750	750	750	750	750	716
Dom. Financial_reform (1 lag): boom	5.589***	7.993***	10.262***	12.986***	15.163***	19.697***
	(0.732)	(0.859)	(1.446)	(2.216)	(2.752)	(2.921)
Dom. Financial_reform (1 lag): slump	3.646***	8.219***	12.189***	16.514***	20.245***	26.641***
	(0.771)	(1.288)	(2.217)	(3.191)	(4.168)	(3.952)
Observations	760	760	760	760	760	726
Product_market (1 lag): boom	3.231***	4.338***	5.397***	6.800***	8.059***	10.265***
	(0.389)	(0.652)	(0.936)	(1.190)	(1.346)	(1.498)
Product_market (1 lag): slump	1.065*	3.865***	6.808***	9.771***	12.833***	17.281***
	(0.553)	(1.066)	(1.736)	(2.452)	(3.318)	(3.522)
Observations	760	760	760	760	760	726
Trade_reform (1 lag): boom	4.524***	6.352***	7.617***	9.404***	9.757**	11.946**
	(0.867)	(1.318)	(2.178)	(3.034)	(3.979)	(4.756)
Trade_reform (1 lag): slump	2.583***	6.356***	9.384***	12.756***	14.604***	18.604***
	(0.887)	(1.518)	(2.497)	(3.499)	(4.692)	(4.953)
Observations	750	750	750	750	750	716

Note: Driscoll-Kraay standard errors in parentheses. *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$. Additional controls: lagged values of the dependent variable, one lag of GDP growth and unemployment. The boom is for observations where the cyclical component (of logarithm of real GDP per capita) is greater than zero, the slump period is for observations where the cyclical component is less than or equal to zero.

Source: authors' calculation based on study data.

Table A2: IMF participation

	(1) Year 0	(2) Year 1	(3) Year 2	(4) Year 3	(5) Year 4	(6) Year 5
Aggregate_reform (1 lag): IMF programme	4.886***	7.781***	10.672***	13.960**	15.648**	17.614*
	(1.335)	(1.890)	(3.411)	(5.599)	(7.359)	(8.754)
Aggregate_reform (1 lag): No IMF programme	3.987**	6.475***	8.596**	10.848**	11.975*	13.992
	(1.513)	(1.794)	(3.061)	(5.117)	(6.903)	(8.523)
Observations	664	664	664	664	664	630
Dom. Financial_reform (1 lag): IMF programme	5.983***	10.181***	14.716***	20.703***	24.570***	29.809***
	(1.533)	(2.002)	(2.111)	(2.045)	(3.136)	(3.438)
Dom. Financial_reform (1 lag): No IMF programme	5.208***	9.143***	13.103***	18.214***	21.760***	26.981***
	(1.504)	(1.835)	(2.086)	(2.253)	(3.521)	(4.069)
Observations	665	665	665	665	665	631
Product_market (1 lag): IMF programme	2.826***	5.226***	8.409***	11.873***	14.822***	17.249***
	(0.788)	(1.142)	(1.217)	(1.452)	(2.035)	(2.847)
Product_market (1 lag): No IMF programme	1.664**	3.819***	6.241***	8.771***	10.712***	12.807***
	(0.778)	(0.903)	(1.072)	(1.392)	(2.312)	(3.435)
Observations	665	665	665	665	665	631
Trade_reform (1 lag): IMF programme	4.943***	8.013***	11.495**	13.877*	12.386	11.790
	(1.604)	(2.048)	(4.272)	(7.054)	(9.711)	(10.941)
Trade_reform (1 lag): No IMF programme	4.319**	7.103***	10.044**	11.796*	10.292	9.999
	(1.659)	(1.826)	(3.896)	(6.422)	(9.088)	(10.476)
Observations	664	664	664	664	664	630

Note: Driscoll-Kraay standard errors in parentheses. *** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$. Additional controls: lagged values of the dependent variable; one lag of GDP growth; one lag of unemployment.

Source: authors' calculation based on study data.

A3 Data set sources

Table A3: Definitions and sources for selected variables

Variables	Definition	Sources
Structural reforms index	See main text	Alesina et al. (2020) and author calculations
Labour productivity (and its components)	See main text	GGDC/UNU-WIDER (ETD), De Vries et al. (2021) and author calculations
Inflation	Inflation rate, average consumer prices (annual per cent change)	WEO
Unemployment rate	Unemployment rate (per cent of total labour force)	WEO
Growth rate	GDP growth (annual per cent)	WDI
IMF-supported programmes	Dummy equal to one for countries that signed an IMF-supported programme in the previous five-year period and zero otherwise	Balima and Sy (2019)
Institutional quality	Indicator of quality of government	ICRG
Trade	Sum of exports and imports of goods and services measured as a share of GDP	WDI
Government size	General government final consumption expenditure (per cent of GDP)	WDI
Female labour participation	Labour force, female (per cent of total labour force)	WDI
Sectoral composition of output	Agriculture, forestry, and fishing, value added (per cent of GDP)	WDI
Crises dummy	Dummy variable for year of banking, currency, or debt crisis	Laeven and Valencia (2020)
GDP per capita	GDP per capita, constant 2010 US dollar	WDI

Source: authors' compilation based on study data.

Table A4: Sector cover in the study

ISIC Rev. 4 code	ETD sector name	ISIC Rev. 4 description
A	Agriculture	Agriculture, forestry, fishing
B	Mining	Mining and quarrying
C	Manufacturing	Manufacturing
D+E	Utilities	Electricity, gas, steam, and air conditioning supply; water supply; sewerage, waste management, and remediation activities
F	Construction	Construction
G+I	Trade services	Wholesale and retail trade; repair of motor vehicles and motorcycles; accommodation and food service activities
H	Transport services	Transportation and storage
J+M+N	Business services	Information and communication; professional, scientific, and technical activities; administrative and support service activities
K	Financial services	Financial and insurance activities
L	Real estate	Real estate activities
O+P+Q	Government services	Public administration and defence; compulsory social security; education; human health and social work activities
R+S+T+U	Other services	Arts, entertainment, and recreation; other service activities; activities of households as employers; undifferentiated goods- and services-producing activities of households for own use; activities of extraterritorial organizations and bodies

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Table A5: List of sample countries

Argentina	Ecuador	Mozambique	Thailand
Bangladesh	Egypt	Nepal	Tunisia
Bolivia	Ethiopia	Nigeria	Turkey
Brazil	Ghana	Pakistan	Uganda
Burkina Faso	India	Peru	Vietnam
Cameroon	Indonesia	Philippines	
Chile	Kenya	Senegal	
China	Malaysia	South Africa	
Colombia	Mexico	Sri Lanka	
Costa Rica	Morocco	Tanzania	

Source: authors' compilation based on study data.