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Post-Covid-19 Recovery and Resilience: Leveraging Reforms for Growth and Inclusion in Sub-Saharan Africa

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Post-Covid-19 Recovery and Resilience: Leveraging Reforms for Growth and Inclusion in Sub-Saharan Africa[1]

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Abstract

Covid-19 has exacerbated economic and social vulnerabilities across Sub-Saharan Africa (SSA). There is a risk that growth could be lower for longer, with a setback to development. Post-pandemic reforms thus become even more important, especially with constrained scope for fiscal and monetary stimuli. Reforms could boost per capita growth by an additional 0.3-1.3 percentage points, relative to the 1.9 percent average since 2010. Such growth would reduce per capita income doubling time from 37 years to about 22 years. Low-income countries stand to gain the most from reforms. The largest gains come from governance, products markets, and factor accumulation. Importantly, these reforms can be implemented in the post-pandemic environment characterized by weaker social and distributional outcomes.

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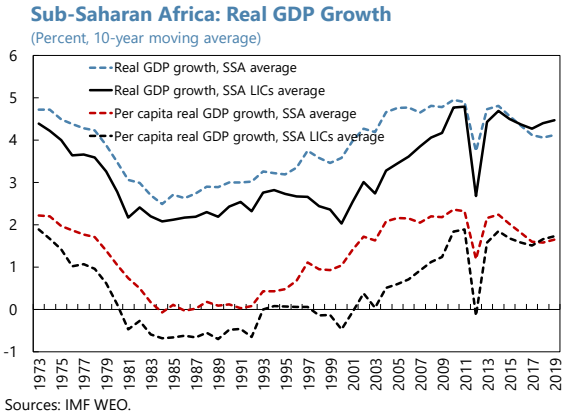
I. INTRODUCTION

Advancing structural reforms, a cornerstone of the "Africa Rising" narrative, has become even more urgent to support economic recovery and reverse the socio-economic decline associated with Covid-19.[2] Since the 1970s, Sub-Saharan Africa's (SSA) 3.8 percent annual growth has only translated in per capita income gains of 1.2 percent. Such growth levels—whereby per capita income doubles every 58 years—are not consistent with the region's economic aspirations and potential. There was some optimism from per capita growth averaging 1.9 percent since 2010. The pandemic has, however, led to an economic contraction in the region, averaging 3 percent, with significant uncertainty surrounding the recovery (Georgieva and Gopinath, 2020).

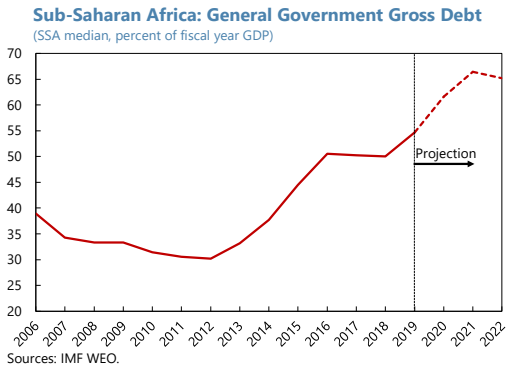


Sources: IMF WEO.

In this paper, we investigate how post-pandemic reforms can support SSA's economic recovery and foster resilience. We have three main objectives. First, detail some of the channels through which the pandemic is exacerbating structural rigidities and how reforms could support economic recovery and inclusion. Second, investigate the main structural rigidities in SSA countries and quantify the potential gains from reforms. Third, discuss implementation considerations based on the experience of countries that have undertaken similar reforms.

Covid-19 has created new headwinds, with the economic and social deterioration being accompanied by an exacerbation of structural weaknesses. On the upside, the pandemic has forced some countries to accelerate the adoption of innovative policies on digitalization and green finance, thus forcing the adaptation to megatrends. The duration and depth of the pandemic's economic impact will depend on various factors: the pre-crisis social and economic conditions, the severity and impact of the unfolding crisis, countries' technical and financial capacities to rollout policies supporting the recovery, and access to vaccines. The economic impact of the unfolding pandemic is expected to last longer than the health impact (Jordà et al, 2020), with low-income countries set to be disproportionately impacted, with longer scarring effects (IMF, 2020; World Bank, 2020).

Given the uncertainty going forward, demand management policies will continue to play an important, albeit increasingly constrained, role in complementing pandemic-related support. Policy space to roll-out robust demand management policies is shrinking, reflecting the fiscal and debt effects of the pandemic. Room for further monetary easing is constrained. Additionally, the efficacy of demand management tools can be blunted when supply-side side constraints start to bind.



Sources: IMF WEO.

[2] A term denoting the rapid growth in SSA after 2000 and the improved prospects for continued growth, rising incomes, and an emerging middle class. Growth was aided by improved domestic policies and a favorable external environment characterized by strong demand and prices for primary exports.

Supply-side reforms can thus play a big role in aiding the recovery and boosting growth, including by alleviating pandemic-exacerbated structural rigidities for firms, households, and the public sector. How entrenched the deterioration becomes will likely determine what shape—L, U, V, or W—the recovery takes. A V-shaped recovery is more likely when markets are flexible and economic agents can adapt quickly to dislocations. A W-shaped is more likely in an uncertain environment. The prospects for a V-shaped recovery are diminishing fast as the uncertainty lingers. When economic agents fail to adjust, the recovery is more likely to be protracted (U-shaped) with increased risks of permanent output losses (L- (Cerra and Saxena, 2008) or "incomplete" v-shaped (Tenreyro, 2020)).

At the same time, it is important to recognize that structural reforms are wide ranging, and take time to implement and bear fruit. Hence, there remain perennial questions regarding what reforms countries should consider and how to go about implementation, bearing in mind the pace—big bang or gradual—as well as the political economy. Deteriorated social conditions—higher unemployment, and increased poverty and inequality—put a premium on reform design and sequencing. The political economy dimensions, with social dislocations affecting the poorest and most vulnerable the hardest, increase the latent difficulties in implementing reforms.

Alleviating structural rigidities can improve both economic efficiency and inclusion over time.[3] While reforms can provide limited support to near-term growth, as gains accrue gradually, they can improve medium-term growth and resource allocation. Over the medium-term, alleviating structural rigidities can enhance economies' resilience to shocks by facilitating resource (re)allocation and increasing the efficacy of demand management tools. Improved resource allocation facilitates economic diversification by facilitating the transition from sunset to emerging sectors. Put together, reforms can also support inclusion as competitiveness and investment improve, thereby creating more job opportunities, although the distributional effects can vary across groups.

This paper is closely related to the literature on structural reforms in developing countries and its effects on growth (Ostry, Prati and Spilimbergo (2009), Egert (2018), IMF (2019), David et al (2020)). This paper extends the methodology (using a wider dataset and more reform areas) in Prati, Onorato, and Papageorgiou (2013) to study the associated potential growth gains from reforms in SSA countries. In addition, it adds to the burgeoning COVID-19 literature by providing an overview of the channels through which economies are being impacted and many pre-existing structural rigidities exacerbated.

We use panel data for 133 low- and middle-income countries (LICs/MICS) to estimate the association between structural reforms and GDP per capita growth during 1996-2017. The main structural indicators relate to products markets, labor markets, governance, innovation, and complementary factors.[4] We use both structural indicators and sub-indicators and calculate a country's distance to frontier—the difference between the country's score and the top performer among upper-MICs. We also adjust the frontier to

[3] We do not explicitly discuss fiscal and financial sector reforms, which we consider as pre-conditions for macro stability. See the IMF's Special Series on Covid-19 for granular fiscal as well as monetary and financial sector reforms discussions. Link: https://www.imf.org/en/Publications/SPROLLs/covid19-special-notes#MSI

[4] Complementary factors relate to education, health, life expectancy, and infrastructure. We use complementary factors and factor accumulation interchangeably in the paper.

allow for less ambitious reform scenarios. We control for income level, region, resource intensity (oil, non-oil), and fragility. The regressions include year fixed effects to capture common trends and country fixed effects for individual time invariant characteristics.

The baseline results show that governance, product market, and complementary factor reforms yield the largest per capita growth gains (between 1.1-1.3 percentage points, p.p.), followed by innovation (0.9 p.p.), and labor markets (0.3 p.p.) over a 5–year period (10 years for governance). LICs stand to gain the most from reforms. Growth could be higher by up to 1.8 p.p. for SSA oil exporters, driven by governance gains. These results, while robust across income groups, should be taken in context of a key assumption—the distance to the frontier largely determines the growth gains. Hence, by definition, countries with weaker structural indicators stand to gain more. The results are aligned with IMF (2019) and David et al. (2020). The findings on governance are consistent with Hammadi et al. (2019) who estimate a potential governance dividend of up to 2 percent for SSA. These results remain robust to different specifications.

Our main finding suggests that reforms could boost per capita growth by 0.3–1.3 p.p., with up to 1.8 p.p. possible in oil exporters. Put simply, delivering on these reforms will increase average per capita growth from 1.9 percent in the 2010s to between 2.2 and 3.2 percent. Per capita income would double roughly every 22 years under the reform scenario, relative to the current 37 years. The proposed reform prioritization is also aligned with the post-pandemic political economy constraints facing countries, with less politically sensitive reforms that aid job creation offering the highest growth gains.

The rest of the paper is organized as follows. Section II discusses how the pandemic could worsen existing rigidities and how reforms could support the recovery and resilience. Section III presents some stylized facts regarding growth and structural constraints in SSA. Section IV details the estimation methodology and growth gains SSA countries could achieve from reforms and presents the results in the context of the literature. Section V discusses implementation considerations and country experiences. Section VI concludes.

II. COVID-19, STRUCTURAL RIGIDITIES, AND REFORMS

What are structural reforms? Structural reforms encompass various policies designed to improve both the flexibility and the efficiency with which an economy combines the various factor inputs going into production, as well as the institutional and regulatory set-up governing the interactions of stakeholders—often encapsulated within governance. Structural reforms can alleviate rigidities arising from the behavior of government/public entities (through regulations, or the public sector footprint, including natural monopolies), or the private sector (through rent-seeking, uncompetitive behaviors, or unionization), or institutions (through lack of independence, capacity, or state capture).

Why structural rigidities matter? Rigidities inhibit economies' ability to adjust efficiently and contribute to resource misallocation. In some cases, these rigidities can be dynamic and mutually reinforcing. Product market rigidities worsen the business environment, inflate production costs, and inhibit competition by undermining firm entry and innovation. Labor market rigidities inhibit job creation by maintaining unemployment and wages above desirable levels, with adverse effects on competitiveness. Credit constraints are also detrimental to firm entry and competition. Similarly, policy weaknesses that undermine property rights or factor accumulation can contribute to

exclusion and unemployment and slow down the pace of digitalization and innovation. Some common rigidities and their macroeconomic effects, as well as the potential impact of COVID-19, are highlighted in Table 1.

Table 1: Selected structural rigidities and their macroeconomic effects

	Common constraints	Conventional effects	Possible COVID-effects
Product markets	- Limited competition - Inefficient SOEs - Over-regulation - Price controls	- Weak business environment - High markups and poor service delivery undermine firm entry, innovation, and competitiveness - Distortive subsidies	- Increased concentration due to SMEs being disproportionately hit - Weaker financial situation of SOEs - Zombie firms
Labor markets	- Dualization - High unionization - Bargaining-mechanisms - Skills mismatches - Regulations on workforce management	- Distortive taxes foster inequality - Rigid wages and inability of firms to adjust to changing economic conditions inhibit efficiency and job creation in formal sector	- Increased informalization - Inability of firms to review business models due to unionization and regulations - Permanent job losses
Financial markets	- Access, cost, efficiency - Weak regulations	- Credit constraints for households and firms, particularly the poor and SMEs - Weak banking sector with risks (NPLs, failures)	- Increased indebtedness, particularly the poor and SMEs, with reliance on informal debt markets - Corporate debt overhang
Public sector	- Elevated public sector wages - Budget rigidity and composition - Large footprint and crowding out of private sector	- Wage premium and labor incentives to join public sector - Weak efficiency of government spending relative to needs - Spillovers from macroeconomic policies - Crowding out of private sector through reduced business space or higher cost of borrowing	- Increased pressures on government due to weakened social conditions, and failure to roll-back COVID policies - Governance slippages arising from emergency procurement - Spillovers from increased financing needs and indebtedness, and recourse to unconventional policies
Complement -ary policies	- Health - Housing - Education - Infrastructure	- Inhibit human capital accumulation, create entrepreneurship barriers, and limit opportunities - Exclusion from job markets	- Deskilling and reduced investment in education and health due to lost income

How COVID-19 could exacerbate structural rigidities? The pandemic is expected to worsen rigidities through three main channels.

- **Households.** Job and income losses will pressure households, in many cases leading to increased food insecurity and poverty. Absent effective social safety nets, human capital accumulation is adversely impacted, including through lower health and education spending, thereby affecting longer-term income prospects. Additionally, financial market segmentation can result in households having no access to banks, with increased recourse to informal lenders and higher indebtedness going forward. Reduced incomes can also impair households' capacity to service their debt and

translate into increased non-performing loans. Vulnerable households subject to recurring shocks are more likely to be entrenched in a vicious circle of poverty (IMF, 2016b; World Bank, 2020).

- **Firms.** The pandemic has fragilized corporate balance sheets. Many firms have closed, while others are relying on government support through direct financing or regulatory forbearance. Given the access to cheap loans and government bailouts, including for SOEs, firms may have reduced incentives to restructure their operations and financing. Some firms, with business models already jeopardized before the pandemic, will continue to plod. This raises the prospect of more "zombie firms", which rely on credit to survive, with implications for efficiency and innovation, as well as broader corporate risks as impaired firms transact.
- **Public sector.** Notwithstanding the macroeconomic deterioration, governments face the dual challenge of rolling-back Covid-19-related support policies and, in some cases, addressing the service delivery and governance weaknesses brought to the fore by the pandemic. On the fiscal side, it will be about phasing out the one-off policies, which if not reverted will create a permanent fiscal drag, as well as rolling back support to SOEs, particularly those with outdated business models. Weakened corporate and social environments increase the pressures for longer-than-desirable government support. Absent reforms, financing pressures will remain, particularly in cases where government financing needs remain elevated and access to finance remains constrained. Continued recourse to central bank financing is not without risks. Countries in debt distress will be even more stretched.

How structural reforms could help? Structural reforms can allow firms to better modernize their production through restructuring and encourage dynamism by facilitating firm entry and exit. Churning facilitates the movement of factors towards the more productive entities/sectors and avoid laggards from exerting a drag on productivity. Such factor reallocations also reduce fiscal and financial risks by reducing the need to support unviable entities and avert a fiscal drag. These risks can be magnified when uncompetitive firms/sectors are big enough to exert institutional pressure for support, resulting in good money being thrown after bad money and entrenching path dependency.

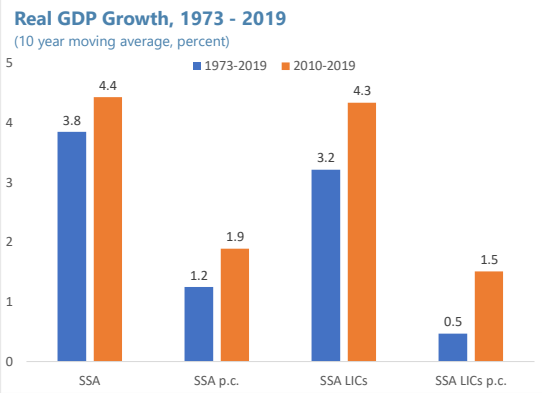
What is the link between structural reforms and inclusion? Reforms can create trade-offs between efficiency and equity.[5] The distributional effects create winners and losers, who are likely to resist reforms. The overall distributional effects are often more complex. Rising trade union bargaining power can raise wages but at the cost of reducing employment and output. Product markets rigidities often impact the poor disproportionately more through lower entrepreneurial opportunities and job creation, and higher overall prices. The skewed nature of the distributional effects of labor and product market reforms often translate in greater polarization. On the other hand, institutional reforms can generate a broader dissemination of the gains, although the materialization thereof can accrue at different times for various groups. More generally, complementary policies—education, health, and access to job centers (through transportation or housing)—are more favorable to those excluded from the formal system. Of note, while these measures can reduce poverty, the inequality dimension is not clear-cut.

[5] See Causa, Hermansen, and Ruiz (2016), Ostry, Berg, and Kothari (2018), and Fabrizio et al. (2017) for the distributional impact of reforms.

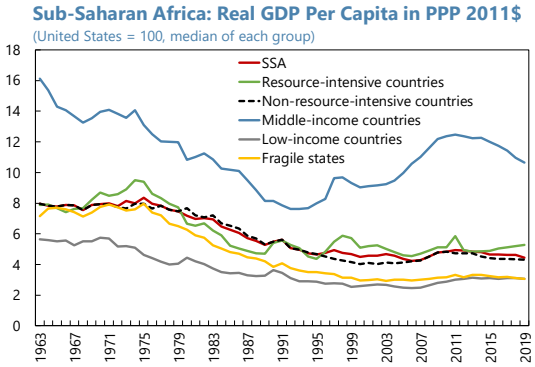
III. Stylized Facts

Pre-COVID growth

Sub-Saharan Africa's growth upturn this century has not yet translated into meaningful per capita income growth. While growth has averaged 3.8 percent since the 1970s—GDP doubling roughly every 19 years—per capita growth has averaged 1.2 percent—therefore, doubling roughly every 58 years.[6] Per capita growth in low-income countries has only averaged 0.5 percent since the 1970s—doubling every 140 years—although it has been somewhat stronger at around 1.5 percent in the 2000s. Such growth levels are inadequate for the region to realize the demographic dividend that its youthful population potentially allows it to aspire.[7]

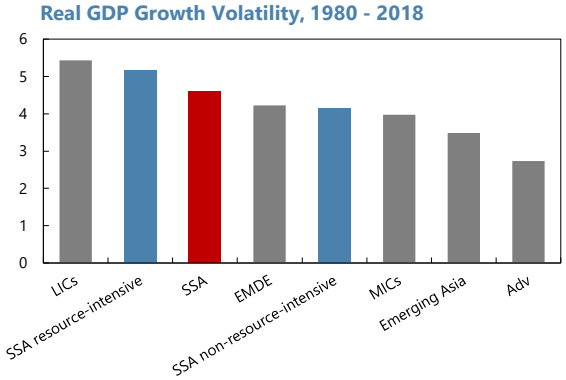


Real GDP per capita has remained largely stagnant relative to the US in PPP terms across all income groups. Real GDP per capita in the median SSA country stood at around 5 percent of the US levels in 2019, with a high of about 10 percent of middle-income countries and under 4 percent for LICs and fragile states. All income groups have seen a decline in the share relative to the US relative to the early 1970s, with MICs experiencing a reversal of upwards trends in the 1990s and early 2000s.



Sources: IMF WEO.

SSA economies also experience higher levels of growth volatility relative to other regions. Volatility is higher for LICs and resource intensive economies, about twice the levels of advanced economies. On the other hand, SSA non-resource intensive economies have volatility levels similar to other EMDEs and middle-income countries, although somewhat higher than emerging Asia.



Note: Volatility is defined as the standard deviation of growth between 1980 - 2018.
Sources: IMF WEO.

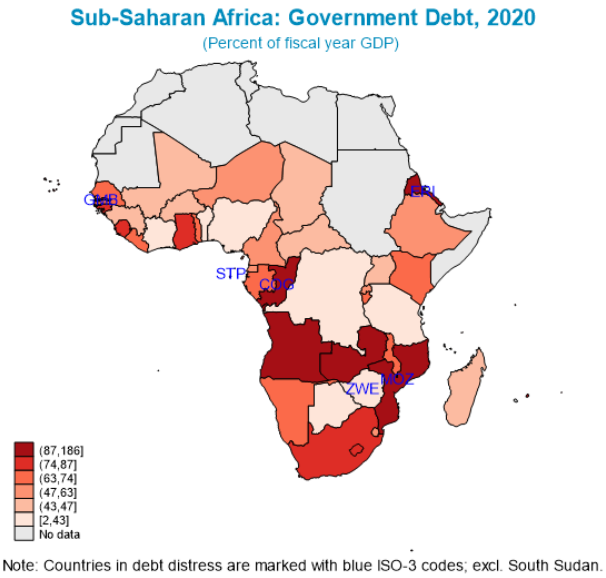
[6] GDP doubles every 70 years (at 1 pct); 34 years (at 2 pct); 23 years (at 3 pct) and 18 years (at 4 pct).

[7] See Drummond, Thakoor, and Yu (2014); IMF (2015a).

Post-COVID context

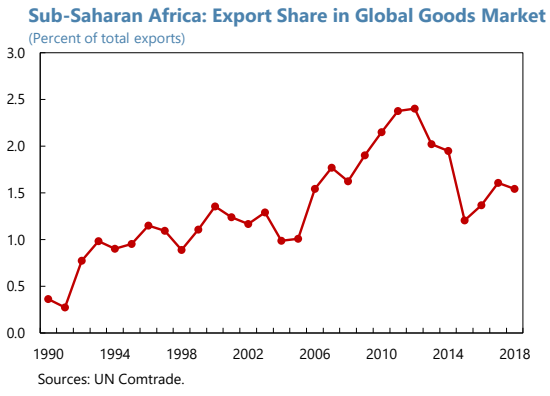
As countries seek to boost growth post-COVID, their scope is constrained both from the demand and supply sides. The scope to boost demand through fiscal and monetary policies is constrained, and supply-side constraints create headwinds to growth.

Many countries have seen their debt deteriorate significantly due to the pandemic, with an increasing number moving to debt distress. The rising debt level and increased reliance on external financing pose economic risks and limits the scope for fiscal policy to boost demand. It also increases countries' vulnerabilities by reducing the space to respond to future shocks. The debt acceleration over the past decade has largely eroded the gains achieved after HIPC. The scope for monetary policy is limited following the easing in response to the pandemic and the move of interest rates to record lows. In other cases, countries do not have, or have limited control, over monetary policy, either because they are part of monetary unions or highly dollarized. Weaknesses in the transmission of monetary policy can be exacerbated by deteriorating structural rigidities.

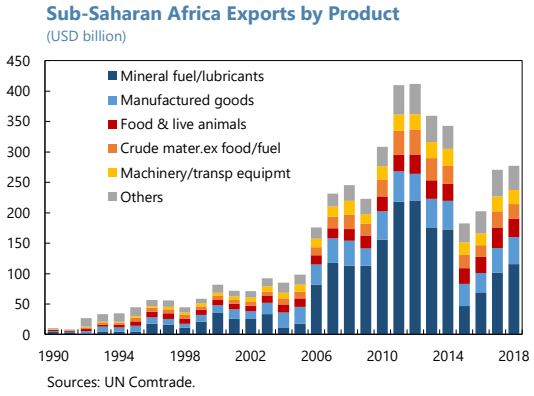


Note: Countries in debt distress are marked with blue ISO-3 codes; excl. South Sudan.

SSA's limited integration in global markets and export composition also constrains growth and increases the region's vulnerabilities due to limited diversification. Openness indicators declined during the 2010s. The share of SSA countries in global exports has hovered around 1.5 percent, with the increase in the run-up to 2010 largely driven by an increase in share of mineral fuel. The muted commodity prices projected in the near-term also creates headwinds.



Sources: UN Comtrade.

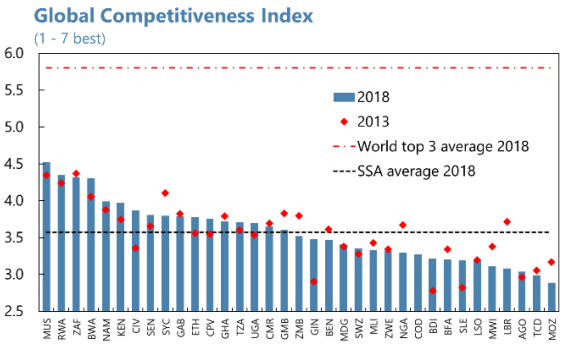


Sources: UN Comtrade.

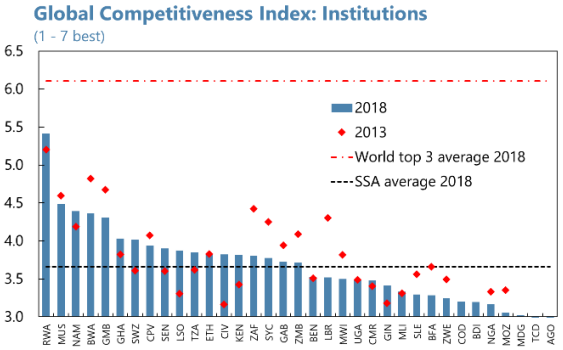
Main structural rigidities

Alleviating structural bottlenecks can contribute to improved economic flexibility and competitiveness. The Global Competitiveness Index (GCI) shows that SSA countries' performance is mixed, both overall and across sub-components.

- The GCI score[8] shows that SSA's average of 3.5 is significantly lower than the frontier of worldwide top performers. While strong performers generally improved their 2013 scores in 2018, some weak performers have fallen further behind.
- Governance remains a challenge. Most countries have seen deteriorations relative to 2013. A few experienced improvements, in some cases from low levels.
- Both product and labor market indices show limited changes relative to 2013, with an average score of 4 on both components. Product market constraints often manifest themselves in the form of limited competition, including due to SOEs presence in network industries, regulations that exacerbate insider-outsider dynamics, as well as tariff and non-tariff barriers. Labor market indicators consider the flexibility of wages, labor force hiring and firing, and how taxes affect incentives to work.



Note: For countries whose 2018 values are missing, latest values available (up to 2015) are used; for countries whose 2013 values are missing, 2012 or 2014 values are used.
Sources: World Economic Forum, Global Competitiveness Report.



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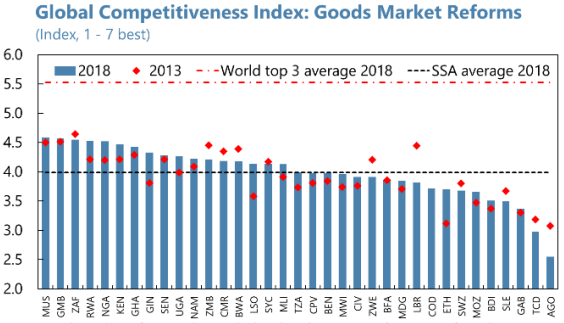
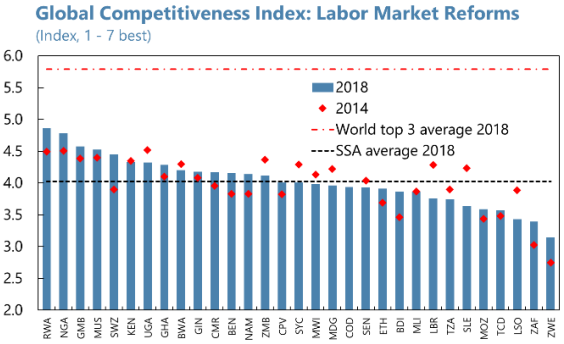


Note: Goods market reforms index is calculated as the average of Intensity of Local Competition, Extent of Market Dominance, and Prevalence of Non-Tariff Barriers. For countries whose 2018 values are missing, lastest values available (up to 2015) are used; for countries with 2013 values missing, 2012 or 2014 values are used.
Sources: World Economic Forum, Global Competitiveness Report.



Note: Labor market reforms index is calculated as the average of Flexibility of Wage Determination, Hiring and Firing Practices, Effect of Taxation on Incentives to Work, and Pay and Productivity. Sources: World Economic Forum, Global Competitiveness Report.

[8] The GCI score provides a map of factors that drive TFP, growth, and human development. The highest possible score represents the 'frontier', an ideal state where an issue ceases to be a constraint.

IV. Empirical Approach

A. Methodology

The factors holding back growth, and hence the appropriate reform mix, vary from country to country and need to be assessed individually.[9] This section discusses the main reforms that could generate the highest growth gains for SSA countries. The approach combines the distance to the frontier in each reform category with the estimated general gains from reforms among LICs and MICs.

B. Estimation and Baseline Results

Estimating the impact of structural reforms on growth is a challenging exercise given the difficulty to disentangle the effects of shocks, growth drivers, and economic policies. In this section, we assess the association between structural reforms and GDP per capita growth given the identification challenges. The approach follows Prati, Onorato, and Papageorgiou (2013). We use an unbalanced panel of 133 MICs and LICs over the period 1996-2017. The data on structural indicators vary across indicators and countries (see Appendix I for definitions and coverage). We estimate the following growth equation:

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

Where *GDP* is real GDP per capita in country *i* in period *t*, and *Reform* reflects each structural reform indicator with a lag. Various reform indicators are considered one at a time.[10] The regression controls for year fixed effects to capture common trends and country fixed effects to capture individual time invariant characteristics.[11] A possible concern could be that of reverse causality, whereby structural reforms are influenced by current developments or expected future growth. The specification with the lagged reform variable and lagged GDP per capita mitigate these concerns as current growth cannot determine the reforms already adopted in the past, and information about future growth is largely embedded in past economic activity.

The reform controls in the regression are as follows:[12]

- *Governance reform.* This index is the average of the WGI indices in five areas: (i) voice and accountability; (ii) political stability; (iii) government effectiveness; (iv) control of corruption; and (v) rule of law. Each sub-index has equal weight.

- *Product market reform.* This index is the average of the regulatory quality indicator from the WGI, and two indicators from GCI: goods market efficiency pillar and agricultural policy. Product market efficiency captures aspects of healthy competition and whether conditions exist to ensure goods can be most effectively traded in the

[9] Hausmann et al. (2008) provide a methodology for assessing the most binding constraints to growth.

[10] This approach could lead to biased estimates in cases where a package of reforms is undertaken at the same time. It also does not allow to estimate complementarities from reforms.

[11] A specification with region-time varying fixed effects yields similar results as in the baseline. All regressions include clustered standard errors at the country level.

[12] All indicators were rescaled to 1-10, where 1 indicates the lowest score and 10 the highest.

economy. Agricultural policy captures the perception of whether agricultural policy is excessively burdensome for producers. Each sub-indicator has equal weight.

- *Innovation*. This index from GCI reflects the availability of resources in the economy to develop cutting-edge products, the capacity of firms to innovate, and whether the environment is conducive to innovative activity, such as R&D.

- *Labor market reform*. The index is the average of two reform areas from GCI indicators: (i) flexibility of wage determination, capturing the extent to which wages are set individually versus a centralized bargaining process; and (ii) cooperation of labor-employer relations, reflecting the nature of work relations ranging from confrontational to cooperative. Each sub-indicator is aggregated with equal weight.

- *Complementary factors*. This index captures human capital and infrastructure using: (i) life expectancy from WDI; (ii) primary education enrollment rate; and (iii) quality of infrastructure from GCI. Each sub-indicator has equal weight.

Summary statistics of the baseline sample data are reported in Table 2. The sample of MICs and LICs used in the baseline presents similarities with the SSA sample and greater variation. The index with most availability over time is the complementary factor index. The time dimension is more constrained for Innovation and Labor Market indices. DRC and South Sudan are dropped from the SSA sample due to data limitations.

Table 2: Sample size and summary statistics

	LICs and MICs: 133					SSA: 43				
	(1) N	(2) max	(3) min	(4) mean	(5) sd	(1) N	(2) max	(3) min	(4) mean	(5) sd
Growth (log difference)	7,126	0.796	-1.108	0.0178	0.0618	2,456	0.312	-0.467	0.0117	0.0547
Per capita income (log)	7,259	11.35	5.711	8.387	0.942	2,499	10.55	5.825	7.803	0.859
WGI index	2,464	7.759	1.929	4.745	1.121	814	7.370	2.334	4.510	1.069
Product Market index	2,476	8.277	0.774	4.731	1.165	814	7.051	1.461	4.459	1.055
Innovation index	1,044	7.791	1	3.857	0.946	344	5.693	1.814	3.718	0.788
Labor Market index	1,044	8.408	1.571	5.912	1.104	344	8.142	1.571	5.687	1.097
Complementary factor in	6,037	9.411	2.198	6.684	1.437	2,128	8.944	2.198	5.550	1.231

Note: Kosovo, Congo Democratic Republic, and South Sudan do not have data available.

Estimates from the baseline specification are reported in Table 3. Except for labor market reforms, all reform areas have the expected sign and are statistically significant. The largest estimated coefficient relates to governance reforms, followed by innovation, product markets, and complementary factors. In these estimations, we include one structural reform at a time to capture the individual association of growth with each reform. No additional controls are included in the baseline, which partly explains the relatively low fit.[13] Our estimates suggest that a one standard deviation improvement (equivalent to moving from the 25th quartile to above the median of the distribution) in product markets in the baseline sample would be associated with higher growth by 1 percentage point. Specification 6 in Table 3 includes all reforms in the same regression, with only governance remaining significant. While the reforms are assessed individually, undertaking several reforms simultaneously could generate complementarities.

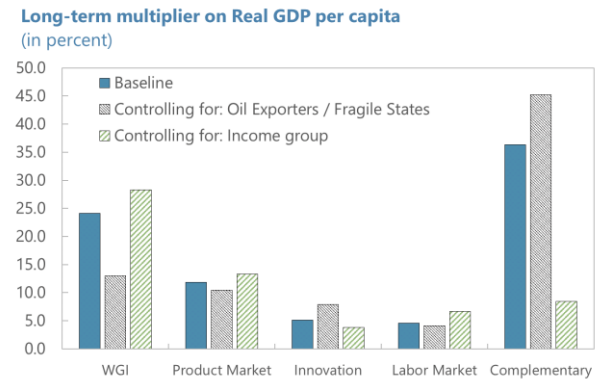
[13] Splitting the sample into oil importers and oil exporters to account for different commodity shocks, yields similar results for oil importers as those obtained the baseline with slightly improved R-squared. For oil exporters the sign of the coefficient is maintained but the sample size drops significantly.

Table 3: Structural reforms and per capita GDP growth in MICs and LICs

	(1)	(2)	(3)	(4)	(5)	(6)
L.GDPpc (log)	-0.0778***	-0.0725***	-0.1696***	-0.1616***	-0.0190***	-0.1947***
	(0.0139)	(0.0119)	(0.0539)	(0.0487)	(0.0047)	(0.0590)
L.Worldwide Governance Indicator index	0.0188***					0.0270**
	(0.0049)					(0.0104)
L.Product Market index		0.0086***				0.0036
		(0.0030)				(0.0069)
L.Innovation index			0.0087*			0.0047
			(0.0052)			(0.0044)
L.Labor Market index				0.0028		0.0004
				(0.0042)		(0.0046)
L.Complementary factors index					0.0069***	0.0027
					(0.0023)	(0.0051)
Constant	0.5735***	0.5798***	1.4681***	1.4129***	0.1381***	1.5337***
	(0.1078)	(0.1003)	(0.4540)	(0.4069)	(0.0373)	(0.4505)
Observations	2,463	2,475	1,043	1,043	6,036	1,021
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Adjusted R2	0.0856	0.0813	0.141	0.138	0.0475	0.147
No. countries	131	133	104	104	133	102

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: IMF staff estimates

The methodology used also accounts for the long-run associated gains from reforms. The coefficient of the lagged per capita GDP variable in Table 3 captures the multiplier effects of reforms over time. For instance, improving governance reforms by one point (on an index re-scaled from 1 to 10) is associated with an estimated increase in per capita output of about 24 percent in the long run.[14] Among the range of reforms considered, including governance and various market reforms, the largest long-run gains in the baseline specification stem from complementary factors, with per capita output increasing by about 40 percent.



Source: IMF staff estimates.
Note: Long-term multiplier obtained by multiplying the coefficient of the reform by the inverse (of the negative) of the coefficent of lagged per capita GDP.

C. Robustness Checks

We estimated our baseline specification for all countries interacted by income group to check for heterogeneous results (Table 4). All reform areas remain equally important across income groups, except for complementary reforms, which seem to be more important for LMICs. We also estimated whether the association between reforms and growth was heterogeneous across oil exporters or fragile states (Table 5). We find that governance reforms are particularly important for fragile states.

We also tried to unpack which sub-indicators within the defined reform areas are more sizable (Table 6). Government effectiveness (reflecting the perception of the quality of public services, policy formulation and implementation, and government's commitment

[14] The estimation is done by multiplying the coefficient of the reform by the inverse of the (negative of) the coefficient of the lagged per capita GDP.

to such policies) and political stability are the most important areas in governance reforms. Regulatory quality, measuring the perception of the ability of the government to implement sound policies for private sector development, is the most important product market reform. Quality of infrastructure is an important complementary factor, although life expectancy as a sole factor yields significant results as well.

We report estimates of the baseline specification for sub-samples of MICs and LICs (Tables 7 and 8). The results are in line with the baseline specification. Interestingly, results suggest innovation is more important for MICs, while governance and product market reforms have larger positive coefficients for LICs.

For additional robustness checks, we run the baseline with three-year lag intervals (Table 9). Our results are robust to this lower frequency specification and coefficients from reforms display a larger magnitude as compared to Table 3. Product market reforms maintain the expected sign but are no longer significant.

We also report results from estimating the baseline specification using a robust two-step system GMM (Table 10) [15]. The system includes the level and difference versions of equation (1) and treat the reform variables as endogenous. This specification is adequate for our panel data, with a large country dimension (*N*) and a small (*T*) for certain reform areas. Results are similar to the baseline, with some reforms having larger coefficients. All specifications pass the test for absence of second order serial correlation and the Hansen test indicates all instruments are valid.

D. Dividends from Reforms

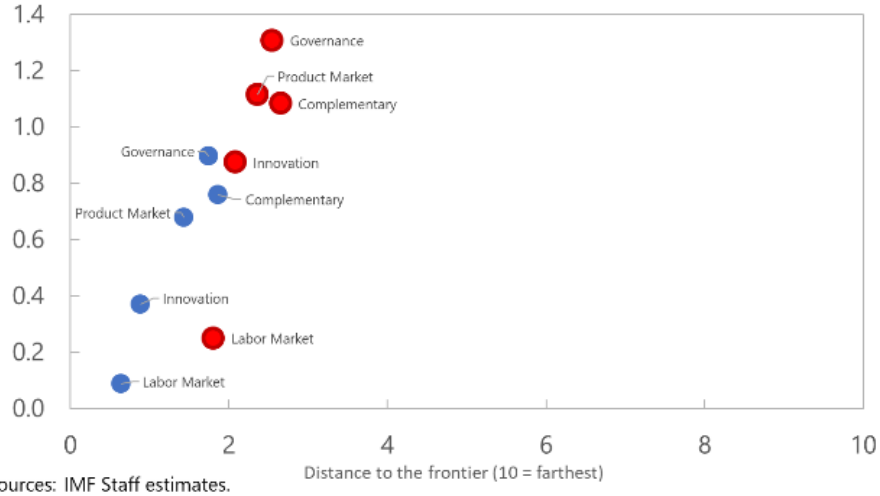
For most of the indicators, SSA countries (especially, oil exporters) rank below the top performers in the sample. Improving these indicators can boost growth. We obtain the total distance to the frontier in a given country by calculating the difference between the current level of each reform indicator in the country and the top performer's level in that reform indicator among upper-MICs. [16] We assume that the distance to the frontier that is advanced each year in any given country is the total distance divided by the number of years it would take to reach the frontier country. We assume it would take five years to close the gap for all reforms, except governance, which we assume takes 10 years given the complexity surrounding its implementation. Although we estimate correlations rather than causal effects, a practical exercise can be carried out to estimate potential dividends from reforms. We estimate the per capita income path under a reform scenario and compare it to a baseline scenario. This follows a 'bottom-up' approach in that the estimation is done for each country, and then the results are aggregated for different country groups. We obtain the dividends by multiplying the coefficient estimates of each reform obtained in the baseline specification with the distance to the frontier that is advanced in that reform category in that year. The baseline specification allows for multiplier effects to be accounted for in subsequent periods (see Appendix II).

[15] We use "collapsed" instruments to limit instrument proliferation. The GMM estimator (Arellano and Bond, 1991), provides results similar to the baseline, but the Sargan test rejects the null hypothesis on instrument validity.

[16] Top performer is defined as the indicator of reform at the 95th percentile of the distribution in the latest year available (2017) for upper MICs. Top performers at the 95th percentile across the reform areas considered include countries such as Chile and Mauritius. The 75th percentile includes Thailand (product markets), Mauritius (labor markets), and Seychelles. Countries around the 50th percentile include Colombia (innovation), and Thailand (complementary factors).

We first present the cross-country average growth over the reform period for SSA countries as well as the distance to the frontier. Our baseline results look at countries reaching 95th percentile of the frontier (Red dots). On average, the distance to frontier across indicators is between 2 and 3 points. Governance, product market, and complementary factor reforms yield the largest dividends of 1.1-1.3 percentage points in per capita growth per year, followed by innovation (0.9 p.p.) and labor markets (0.3 p.p.).[17] These estimates are indicative of areas of reforms with the largest potential gains. They should be interpreted in the context of the assumptions made rather than as precise estimates. A less ambitious set of reforms—reaching the 75th percentile (Blue dots)—yields overall gains of between 0.1-0.9 percentage points, with smaller overall gains across the reform areas.

Per capita GDP Growth Gains and Distance to the Frontier
(Sub-Saharan African Countries, in percent)



Sources: IMF Staff estimates.
Note: The chart shows the distance from the frontier and the estimated increase in annual growth rate of real GDP if the gap is closed in five years (except for Governance reforms, where it is closed in ten years). The red (blue) dots are those where the frontier is the 95th (75th) percentile value for each indicator in a sample of Upper middle income countries.

We then undertake the same analysis for SSA non-resource intensive countries, oil exporters, and countries dependent on resources other than oil (Annex Figure 1). We consider both the 95th and 75th percentiles. The areas of reform with highest gains remain the same, but the magnitude is larger for oil exporters, where growth gains up to 1.8 p.p. from governance reforms. This is explained by the greater distance to the frontier in all areas, which puts a premium on structural reforms. For additional robustness checks, we estimate the distribution of dividends from reforms across all groups, including LICs and MICs more broadly (Annex Figure 2). The results remain consistent with our earlier findings, although the gains for LICs are more prominent than MICs, particularly upper MICs. The finding that LICs benefit more from reforms is aligned with our distance to frontier approach.

E. Discussions of Results

The magnitude of the growth gains is largely aligned with the literature. IMF (2019a) estimates reform growth gains of 1 percentage point per year, with more ambitious reforms and stronger governance delivering higher gains. IMF (2019b) find that SSA

[17] Limited data hamper the ability to properly estimate dividends from labor market reforms in SSA.

countries display low levels of domestic and foreign competition, likely related to high market dominance, the absence or weak enforcement of competition policies, structural and regulatory barriers to entry, and distortive effects of tax regimes. Improving competition could increase real per capita GDP growth by 1 percentage point, in line with our findings.

Loayza, Fajnzylber and Calderon (2005) find that macroeconomic stabilization and reforms in Latin America during the 1990s yielded 2.5–3 percent higher growth per year. Some papers however argue that adjusting for the temporary gains from achieving macroeconomic stabilization after the volatility experienced in the 1980s, results in reform gains of 1 percentage point per year (see Zettelmeyer, 2006). More recent work on Latin America and the Caribbean finds growth increasing by 2 percentage points 5 years after the reforms (David et al., 2020).

Designing the composition of the reform package is highly challenging. The results suggest that governance, product markets, complementary policies, and innovation are likely to yield the highest gains. In the post-Covid-19 environment with deteriorated social situations, these reforms are somewhat less politically difficult to implement (relative to labor market reforms). They can create an environment enabling private investment and job creation, thus mitigating the contractionary impact of consolidation that fiscally-constrained governments undertake after the pandemic. For stronger growth gains, the complementarities across reforms need to be leveraged. Hausmann, Rodrik, and Velasco (2005) suggest that policymakers should not focus on one single reform to address rigidities, but rather tackle the specific binding constraints to growth. A strand of the literature argues that Latin American reforms driven by privatization and trade liberalization were not deep enough. Hence, growth did not take off as there remained internal issues from weak competition, labor market rigidities, and shallow financial markets (see Zettelmeyer, 2006).

Prati, Onorato, and Papageorgiou (2013) find that countries with lower quality institutions are more likely to experience growth failures after undertaking reforms. This emphasizes the importance of governance reforms to improve institutions. Egert (2018) finds that the quality of institutions and more competition-friendly regulations improve economic outcomes (leading to an increase in per capita income by 20 percent) and lower state-control of businesses boosts capital and employment. On average, labor market reforms yield much smaller gains than product market and institutional reforms.

The lags in implementation of structural reforms is also an important consideration. In most cases, the crystallization of the gains can be subject to various lags. These relate to recognition and decision lags—time it takes to identify a bottleneck and decide to act on it, as well as delegating the appropriate institution to implement the reform; legislative lags—which relate to the time it takes for laws and regulations to be adopted; and effectiveness lags—time it takes for policies to have the desired effect after implementation. All these lags determine the time it takes for countries to reach the frontier and fully achieve the gains. Duval and Furceri (2018) find that product market reforms gains tend to peak after 5 years, while labor market reforms and innovation can take long on account of the lags between implementation and realization of the gains.

V. Implementation Considerations

Reforms have clear overall benefits, yet the political costs and the distributional effects often generate headwinds. Hence, reform implementation depends on a combination of factors relating to the state of the economy, the socio-political environment, the political cycle, and the overall capacity, both technical and political, to advance a coherent package. There are also additional factors regarding the design and sequencing of the reforms that can improve the chances of successful implementation. Reform design gains even more prominence given the Covid-19-induced socio-economic deterioration.

Political economy considerations

The economic and socio-political environment can either act as enabler or generate headwinds. For instance, a good economic environment with strong private sector investment and job creation can provide the government with a cushion to implement reforms. Alternatively, a crisis can create the incentives to implement reforms (Drazen and Grilli (1993); Rodrik (1996)), particularly in cases where access to external financing creates market discipline. Empirical evidence on crisis-induced reforms however remains mixed, with some reforms being implemented (see Duval, Furceri, and Miethe (2020) for a review). Da Silva et al. (2017) find that labor market reforms are more likely among OECD and EU countries during deep recessions. Prati, Onorato, and Papageorgiou (2013) find some evidence that crises are associated with reform upticks.

The socio-political environment can affect the government's ability to create a coalition for reforms, particularly when crises lead to increased political polarization and fractionalization (Alesina and Drazen, 1991; Mian, Suffi, and Trebbi, 2014). Generally, the gains from reforms can be dissipated across the economy and can only materialize with a lag, while the cost is more immediate and concentrated on specific groups, which can more easily coordinate opposition against implementation. Appropriate sequencing of reforms, for example, starting with product markets before proceeding with labor markets (Blanchard and Giavazzi (2003)) can increase the likelihood of success. Successful initial reforms can create a demonstration effect and spur other reforms.

Absent the right environment, countries can favor a piecemeal approach as they navigate the various tradeoffs. Alternatives to reforms might also be sought in less-enabling environments, with prevailing structural factors left largely unaddressed or allowed to deteriorate further. Under such circumstances, reforms are only undertaken when the economic situation has hit rock bottom. In the interim, the economic and structural deterioration increases the challenge of implementing reforms, with possibly deeper measures needed to restore stability and competitiveness.

What are the factors that can affect reform implementation? Various factors can contain contestation and increase the likelihood of successful implementation. These relate to:

- *Political ownership*: There must be full ownership of the reforms within the government to ensure political commitment across all members. This would reduce the chances of contestation and reform reversal, particularly when reforms need to be phased over a long time. In politically contested environments, strong and independent institutions could mitigate reversal risks following political transitions.
- *Sequencing*: There is a general debate on whether reforms should be implemented in a piecemeal or big bang approach. To a large extent, this is a second order issue.

What matters in the end is that the reforms address the binding structural constraints inhibiting the economy across the spectrum. Hence, the reform composition could span across the products, labor and government—hence being broad-based—while focusing on the binding constraints within each area. For instance, addressing only the regulatory component would generate a marginal gain if high factor inputs inflating the cost of doing business are the binding constraints and remain unaddressed. Sequencing must also be calibrated to implementation capacity.

- *Composition*: While reforms might need to be broad based, the starting point could be informed by political economy constraints to mitigate contestation risks and create buy-in. The focus should be on reforms that have the biggest immediate gains for the population and concretely demonstrate the possible gains. For instance, starting with network industries can reduce prices through efficiency and improve service delivery with improvements in competitiveness. This can spur private sector activity, which can create job opportunities. Reduction in the prices of goods such as banking and telecommunications can increase the purchasing power of households and mitigate the drop in purchasing power arising from ensuing labor market reforms.
- *Synergies*: To the extent there is policy space, supply side policies can benefit from demand side reforms. In cases where policy space is limited and supply side constraints are binding, the effectiveness of demand side policies is blunted. Some supply side policies can benefit from targeted demand side action. For instance, the opposition to labor reforms from a sub-group can be averted by providing for temporary packages in the form of time-bound payments and training through the budget. Similarly, labor market reforms might require complementary financial sector policies that mitigate the impact of retrenchment or reduced wages on households' ability to meet their debt obligations.
- *Complementarities*: Tailored reform packages are unlikely to succeed without three other ingredients: good macroeconomic policies and governance; reliable infrastructure; and strong human capital. The timeframe to implement these elements varies, with faster turnaround possible for macroeconomic policies relative to governance and infrastructure. For the latter, crowding-in the private sector can support scaling-up efforts with the right investment framework. Building-up human capital, particularly education, is usually a timely process—and should be viewed as part of a longer-term strategy. The complementarities also support the creation of a virtuous circle whereby higher growth and improved job opportunities increase the return to education, thereby incentivizing further investment in human capital.

International experience

Countries can inform their reform agenda based on the experience of other countries that implemented reforms to boost competitiveness and growth, with varying success. Reforms were undertaken in varying contexts; in some cases, following years of stagnation or the onset of crises, in others to accelerate growth. The cases of Australia, New Zealand, Mauritius, Mexico, and Chile are summarized next.

- *Australia's* steady erosion in economic performance in the run-up to the 1980s provided the impetus for reforms (see Parkinson, 2014). A comprehensive structural reform program—complemented with strengthened macroeconomic management—spanning nearly two decades improved economic performance by opening markets, promoting competition, moving away from centralized wage bargaining, and setting up independent institutions like the competition commission and the productivity

commission. Trade liberalization was an essential element, reflecting the economy's position as a remote commodity producer and its history of high tariff barriers until the 1980s. Australia experienced a sustained period of high total factor productivity growth and rising per capita income in the 1990s and early 2000s. Australia has since continued to seek areas for further reforms. The 2015 Competition Policy Review set out recommendations for reforms, particularly in the services sector, including human services, transport, and retail. The government supported most of the recommendations and enacted reforms to the competition law.

- *New Zealand* implemented holistic reforms in the mid-1980s as the third richest country globally in 1951 fell to the bottom third of OECD countries and wide-ranging macroeconomic issues culminated in an exchange rate crisis. Reforms through the mid-1990s encompassed liberalizing the financial sector and floating the exchange rate; abolishing interest rate controls; removing limits on foreign ownership and privatizing SOEs; lifting state monopoly rights in some sectors; transitioning to a "light handed" regulatory structure; and implementing labor market reforms (Janssen, 2014). Strengthening the fiscal and monetary frameworks added credibility. Despite the progress, New Zealand's income and productivity have continued to lag OECD countries, with some questions regarding the overall benefits from reforms (Dalziel, 2002, Adhikari et al., 2018). Mitigating factors put forward include the country's remote location and small size, and a need to further deepen reforms (Janssen, 2014, and OECD, 2019).

- *Mauritius* reengineered its economic strategy from an import-substitution to export-led growth in the early 1980s. The approach hinged on economic diversification and integration in niche segments of the global value chain. The reform in a low-income country setting focused on alleviating the most binding constraints to growth and attracting foreign direct investment. Special economic zones focused on providing infrastructure, and firms producing for exports were exempt from the rigid labor regulations. Mauritius' growth strategy has recently been facing headwinds due to its weakening economic fundamentals and deteriorating structural constraints.

- *Mexico* launched a wide-ranging reform program in 2013–14 covering the areas of finances, energy, telecommunications, anti-trust, labor markets, and taxation (OECD, 2015). Various initiatives were taken to increase competition. Assuming full implementation, the reforms were initially estimated to give a substantial boost to growth. However, delays in implementation and, more recently, reversal of reforms in the energy sector, among other factors, have weighed on investment and growth relative to expectations (OECD, 2019).

- *Chile* undertook a wide range of "first-generation" reforms that had begun in the 1970s and were deepened in the 1990s by two successive administrations. Trade liberalization policies focused on integrating Chile into the global economy. During the 1990s, privatization efforts were deepened under a fresh approach that emphasized greater transparency, open competitive bidding, and fair pricing to ensure appropriate safeguards for government property. These reforms improved the effectiveness of Chile's economic and institutional infrastructure and allowed for significant improvements in income levels. The country now faces calls to implement reforms that foster greater inclusion by furthering economic diversification, improving product market regulations, addressing skills mismatches and accelerating innovation and R&D, and increasing opportunities for SMEs (Metodij Hadzi-Vaskov, 2018; OECD, 2019).

VI. CONCLUSIONS

Structural reforms were already critical to boost Sub-Saharan Africa's growth performance, and the pandemic has further increased the urgency. The pandemic is expected to lead to a broad-based deterioration in structural constraints, with households, firms and the public sector all seeing existing vulnerabilities amplified. With reduced scope for further fiscal and monetary stimulus to boost demand going forward, structural reforms will likely determine how quickly countries bounce back from the crisis, and boost income and growth levels going forward. Reforms will also enhance resilience and adaptability to future shocks. Absent reforms, countries will face a more protracted recovery and worsened social situations, as well as reduced policy buffers and unaddressed vulnerabilities.

Sub-Saharan Africa stands to gain the most from advancing reforms in the areas of product markets, governance, and innovation, with somewhat lower gains from labor markets. Given the deteriorated post-pandemic social conditions, a reform mix encompassing products and innovation is aligned with the political economy. Governance reforms can also be politically less costly when there is political buy-in and can foster greater inclusion, albeit with a longer time for the gains to materialize. There are various considerations countries need to factor in when designing their reform mix. Based on experience, alleviating key inhibiting constraints can provide an initial boost to growth and create the foundations for deepening reforms. Reform implementation can thus be seen as a journey: it must be deepened, otherwise the gains from the initial measures wear off over time.

Depending on its composition, structural reforms can boost SSA's per capita growth by an additional 0.3 to 1.3 percentage points over a 5-10-year period, with higher gains of up to 1.8 percentage points for oil exporters. This is non-trivial as the region's 4.4 percent annual average growth since the 2010s has only translated into per capita growth of 1.9 percent per year. A strong reform scenario could boost per capita growth to above 3 percent annually, reducing the time it takes to double per capita income from the current level of around 37 years to about 22 years. Such growth rates would also be more consistent with translating the "Africa Rising" narrative into reality.

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Appendix I: Data

I.1. Sample period

The baseline regressions are based on annual frequency data spanning 22 years (1996–2017), although the availability of indicators varies (Table A1). For instance, for WDI indicators, availability starts as early as 1960. It includes 5 types of structural reforms compiled from several commonly used macroeconomic databases including June 2020 WEO, World Development Indicators, Worldwide Governance Indicators, and Global Competitiveness Indicators. The reform areas covered include governance, product market reforms, innovation, labor market reforms, and complementary factor reforms. The selection of the reform indicators was focused on those indicators that cover a sufficiently long time series, have greater variability over time, and cover a large sample of countries to ensure a comprehensive coverage of Sub-Saharan African countries. Product market and labor market indicators such as ETCR and EPL, typically used in the structural reform literature for OECD countries, are not available for SSA countries.

I.2. Country coverage

The raw sample covers 133 countries, including middle-income and low-income countries (see Table A2). However, the regression samples are somewhat smaller depending on data availability and econometric specification.

Table A1: Summary of variables and data sources

Variable	Data description	Data sources	Sample period
Growth	GDP per capita growth rate, unit	WEO June 2020	1951-2025
GDP per capita	Measured at PPP, log	WEO June 2020	1951-2025
Governance reform	Average of political stability, government effectiveness, control of corruption, voice and accountability, and rule of law	WGI	1996-2017
Product market reform	Average of reguatory quality, goods market efficiency, and agricultural policy (rescaled from 1 to 10)	WGI, GCI	1996-2017
	Regulatory Quality	WGI	1996-2017
	Goods Market efficiency	GCI	2007-2017
	Agricultural Policy	GCI	2007-2017
Innovation	Innovation pillar	GCI	2007-2017
Labor market reform	Average of flexiblity of wage determination and cooperation of labor-employer relation	GCI	2007-2017
	Flexiblity of wage determination	GCI	2007-2017
	Cooperation of labor-employer relation	GCI	2007-2017
Complementary factors	Average of life expectancy, primary education enrollment and q	WDI, GCI	1960-2017
	Life expectancy, rescaled to a score	WDI	1960-2017
	Primary education enrollment	GCI	2007-2017
	Quality of infrastructure	GCI	1999-2017

Note: Each subindicator's sample period is included when it differs across subindicators. All indicators have been rescaled from 1 to 10 for consistency.

Table A2. Country list by income group

Low income	Lower middle income	Upper middle income
Afghanistan	Albania	Algeria
Bangladesh	Armenia	Angola
Benin	Belize	Antigua and Barbuda
Burkina Faso	Bhutan	Argentina
Burundi	Bolivia	Azerbaijan
Cambodia	Cameroon	Belarus
Central African Republic	Cape Verde	Bosnia and Herzegovina
Chad	Congo, Rep.	Botswana
Comoros	Côte d'voire	Brazil
Eritrea	Djibouti	Bulgaria
Ethiopia	Egypt, Arab Rep.	Chile
Gambia, The	El Salvador	China
Guinea	Eswatini	Colombia
Guinea-Bissau	Fiji	Costa Rica
Haiti	Georgia	Dominica
Kenya	Ghana	Dominican Republic
Kyrgyz Republic	Guatemala	Ecuador
Liberia	Guyana	Gabon
Madagascar	Honduras	Grenada
Malawi	India	Iran, Islamic Rep.
Mali	Indonesia	Jamaica
Mauritania	Iraq	Jordan
Mozambique	Kiribati	Kazakhstan
Myanmar	Lao PDR	Latvia
Nepal	Lesotho	Lebanon
Niger	Moldova	Libya
Rwanda	Mongolia	Lithuania
Sierra Leone	Morocco	Macedonia, FYR
Tajikistan	Nicaragua	Malaysia
Tanzania	Nigeria	Maldives
Togo	Pakistan	Mauritius
Uganda	Papua New Guinea	Mexico
Zimbabwe	Paraguay	Montenegro
	Philippines	Namibia
	Samoa	Panama
	Senegal	Peru
	Solomon Islands	Romania
	Sri Lanka	Russian Federation
	Sudan	Serbia
	Syrian Arab Republic	Seychelles
	São Tomé and Príncipe	South Africa
	Timor-Leste	St. Lucia
	Tonga	St. Vincent and the Grenadines
	Ukraine	Suriname
	Uzbekistan	Thailand
	Vanuatu	Tunisia
	Vietnam	Turkey
	Yemen, Rep.	Turkmenistan
	Zambia	Tuvalu
		Uruguay
		Venezuela

Appendix II. Estimations of Dividends from Reforms.

This annex presents the underlying estimations of reform dividends showcased in the main text.

Renaming "*ln GDP*" to "*y*" and "*Reform*" to "*R*" from equation (1) in the main text, we could think of the reform scenario as follows:

$$y_{it}^{R} - y_{it-1}^{R} = \alpha_0 + \alpha_1 y_{it-1}^{R} + \alpha_2 R_{it-1}^{R} + \mu_i + \gamma_t + \varepsilon_{it} \quad (1)$$

Reordering the terms:

$$y_{it}^{R} = \alpha_0 + (1 + \alpha_1) y_{it-1}^{R} + \alpha_2 R_{it-1}^{R} + \mu_i + \gamma_t + \varepsilon_{it} \quad (2)$$

Similarly, the baseline scenario (without reforms) is represented by:

$$y_{it}^{B} = \alpha_0 + (1 + \alpha_1) y_{it-1}^{B} + \alpha_2 R_{it-1}^{B} + \mu_i + \gamma_t + \varepsilon_{it} \quad (3)$$

Subtracting (3) from (2):

$$y_{it}^{R} - y_{it}^{B} = (1 + \alpha_1)(y_{it-1}^{R} - y_{t-1}^{B}) + \alpha_2 (R_{it-1}^{R} - R_{it-1}^{B}) \quad (4)$$

Since reforms are assumed to occur in t-1 and do not affect income until the next period, lagged per capita income under the reform scenario is equal to lagged per capita income under the baseline scenario:

$$y_{it-1}^{R} = y_{it-1}^{B} \quad (5)$$

Let us rename:

$$R_{it-1}^{R} - R_{it-1}^{B} = \frac{d_{it-1}}{n} \quad (6)$$

to reflect distance to the frontier to be closed every year, where '*n*' represents the time it would take to close the gap between the country and the frontier.

Substituting (5) and (6) in (4):

$$y_{it}^{R} - y_{it}^{B} = \alpha_2 (d_{it-1}/n) \quad (7)$$

Eq. (4) in period *t+1*:

$$y_{it+1}^{R} - y_{it+1}^{B} = (1 + \alpha_1)(y_{it}^{R} - y_{t}^{B}) + \alpha_2 (R_{it}^{R} - R_{it}^{B}) \quad (8)$$

Replacing (7) in (8), and restating the second term in the LHS as in (6):

$$y_{it+1}^{R} - y_{it+1}^{B} = (1 + \alpha_1) \left(\frac{\alpha_2 d_{it-1}}{n} \right) + \frac{\alpha_2 d_{it}}{n} \quad (9)$$

Exponentiating both sides:

$$\exp\left(y_{it+1}^{R} - y_{it+1}^{B}\right) = \exp\left((1 + \alpha_1) \left(\frac{\alpha_2 d_{it-1}}{n} \right) + \alpha_2 d_{it}/n\right) \quad (10)$$

Reordering terms:

$$Y^R_{it+1}/\, Y^B_{it+1} = \exp\left((1+\alpha_1)\left(\frac{\alpha_2 d_{it}-1}{n}\right) + \alpha_2 d_{it}/n\right) \quad (11)$$

From eq. (11), we obtain the path of income per capita under the reform scenario, which is a function of the baseline scenario path, the estimated coefficients from the regressions and the reforms undertaken:

$$Y^R_{it+1} = Y^B_{it+1} * \left(\exp\left((1+\alpha_1)\left(\frac{\alpha_2 d_{it}-1}{n}\right) + \alpha_2 d_{it}/n\right)\right. \quad (12)$$

We perform this estimation for each of the 5 years of reforms (10 years for governance reforms).

Extending eq. (9) to period $t+n$, where n=5, 10 (depending on reforms):

$$y^R_{it+n} - y^B_{it+n} = (1+\alpha_1)^n\left(\frac{\alpha_2 d_{it-1}}{n}\right) + \frac{(1+\alpha_1)^{n-1}\alpha_2 d_{it}}{n} + \frac{(1+\alpha_1)^{n-2}\alpha_2 d_{it+1}}{n} + \cdots + \frac{\alpha_2 d_{it+n-1}}{n} \quad (13)$$

The right-hand side of eq. (13) reflects the persistent effect of past reforms on the per capita income level (with a declining effect over time).

Exponentiating both sides and reordering terms:

$$Y^R_{it+n} = Y^B_{it+n} * \exp\left((1+\alpha_1)^n\left(\frac{\alpha_2 d_{it-1}}{n}\right) + \frac{(1+\alpha_1)^{n-1}\alpha_2 d_{it}}{n} + \frac{(1+\alpha_1)^{n-2}\alpha_2 d_{it+1}}{n} + \cdots + \frac{\alpha_2 d_{it+n-1}}{n}\right) \quad (14)$$

Annex Tables

Table 4: Structural Reforms and per capita GDP growth, by income group

	(1) WGI	(2) Product Market	(3) Innovation	(4) Labor Market	(5) Complementary
L.GDPpc (log)	-0.0961***	-0.0938***	-0.1660***	-0.1604***	-0.0214***
	(0.0242)	(0.0232)	(0.0494)	(0.0407)	(0.0036)
L. Reform	0.0272**	0.0125***	0.0063	0.0107	0.0018
	(0.0111)	(0.0035)	(0.0066)	(0.0070)	(0.0048)
High Income (non-OECD) * L. Reform	0.0005	-0.0063	-0.0058	0.0086	0.0011
	(0.0217)	(0.0080)	(0.0146)	(0.0123)	(0.0065)
Low income * L. Reform	0.0003	0.0043	-0.0027	-0.0041	0.0042
	(0.0112)	(0.0053)	(0.0107)	(0.0086)	(0.0047)
Lower Middle Income * L. Reform	-0.0078	-0.0003	-0.0003	-0.0105	0.0072*
	(0.0135)	(0.0061)	(0.0090)	(0.0078)	(0.0043)
Upper Middle Income * L. Reform	-0.0132	-0.0094	0.0035	-0.0068	0.0050
	(0.0131)	(0.0062)	(0.0127)	(0.0115)	(0.0042)
Constant	0.7562***	0.8037***	1.5319***	1.4654***	0.1725***
	(0.1833)	(0.2016)	(0.4530)	(0.3692)	(0.0313)
Observations	3,375	3,388	1,539	1,539	8,440
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Adjusted R2	0.123	0.121	0.159	0.162	0.0562
No. countries	179	182	150	150	182

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: IMF staff estimates

Table 5: Structural Reforms and per capita GDP growth in MICs and LICs, with oil and fragile state interactions

	(1) WGI	(2) Product Market	(3) Innovation	(4) Labor Market	(5) Complementary
L.GDPpc (log)	-0.0802***	-0.0710***	-0.1718***	-0.1610***	-0.0219***
	(0.0141)	(0.0108)	(0.0566)	(0.0459)	(0.0050)
L.Reform	0.0104**	0.0074**	0.0136***	0.0025	0.0099***
	(0.0043)	(0.0029)	(0.0044)	(0.0029)	(0.0024)
Fragile * L. Reform	0.0217**	0.0105	-0.0214	-0.0007	-0.0094***
	(0.0088)	(0.0074)	(0.0153)	(0.0185)	(0.0030)
Oil exporter * L. Reform	0.0112	-0.0133	-0.0079	0.0023	-0.0048
	(0.0174)	(0.0146)	(0.0163)	(0.0177)	(0.0034)
Constant	0.6079***	0.5712***	1.4831***	1.4088***	0.1582***
	(0.1064)	(0.0892)	(0.4789)	(0.3867)	(0.0393)
Observations	2,463	2,475	1,043	1,043	6,036
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Adjusted R2	0.0890	0.0841	0.143	0.136	0.0507
No. countries	131	133	104	104	133

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: IMF staff estimates

Table 6: Structural Reforms and per capita GDP growth in MICs and LICs, by reform components

	(1) WGI	(2) Product Market	(3) Innovation	(4) Labor Market	(5) Complementary	(6) Complementary
L.GDPpc (log)	-0.0764***	-0.1851***	-0.1696***	-0.1655***	-0.0594	-0.0183***
	(0.0158)	(0.0559)	(0.0539)	(0.0499)	(0.0393)	(0.0046)
L.Rule of law	-0.0089					
	(0.0062)					
L.Control of corruption	0.0098					
	(0.0065)					
L.Government effectiveness	0.0070*					
	(0.0038)					
L. Voice and accountability	0.0054					
	(0.0055)					
L. Political Stability	0.0056**					
	(0.0024)					
L. Regulatory quality		0.0199*				
		(0.0108)				
L. Goods Market Pillar		0.0113				
		(0.0097)				
L. Agricultural policy		-0.0056				
		(0.0055)				
L. Innovation			0.0087*			
			(0.0052)			
L. Flexibility of wage determination				-0.0014		
				(0.0023)		
L. Cooperation				0.0046		
				(0.0034)		
L. Life expectancy score					-0.0043	0.0073**
					(0.0101)	(0.0029)
L. Quality of infrastructure					0.0037*	
					(0.0021)	
L. Primary Education enrollment score					0.0011	
					(0.0027)	
Constant	0.5612***	1.5160***	1.4681***	1.4491***	0.5534	0.1316***
	(0.1284)	(0.4409)	(0.4540)	(0.4179)	(0.3611)	(0.0379)
Observations	2,444	1,021	1,043	1,043	1,005	6,001
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Adjusted R2	0.0876	0.150	0.141	0.138	0.134	0.0461
No. countries	131	102	104	104	102	130

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: IMF staff estimates

Table 7: Baseline specification in MICs

	(1)	(2)	(3)	(4)	(5)	(6)
L.GDPpc (log)	-0.0709***	-0.0656***	-0.1805***	-0.1710***	-0.0178***	-0.2132***
	(0.0165)	(0.0141)	(0.0564)	(0.0496)	(0.0055)	(0.0640)
L.Worldwide Governance Indicator index	0.0143**					0.0358**
	(0.0060)					(0.0168)
L.Product Market index		0.0054				0.0024
		(0.0038)				(0.0081)
L.Innovation index			0.0111*			0.0066
			(0.0064)			(0.0055)
L.Labor Market index				0.0010		-0.0027
				(0.0049)		(0.0056)
L.Complementary factors index					0.0067**	0.0049
					(0.0028)	(0.0060)
Constant	0.5630***	0.5631***	1.6259***	1.5765***	0.1394***	1.7353***
	(0.1374)	(0.1294)	(0.4932)	(0.4341)	(0.0458)	(0.5072)
Observations	1,843	1,855	787	787	4,532	765
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Adjusted R2	0.0996	0.0966	0.156	0.151	0.0482	0.162
No. countries	98	100	78	78	100	76

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: IMF staff estimates

Table 8: Baseline specification in LICs

	(1)	(2)	(3)	(4)	(5)	(6)
L.GDPpc (log)	-0.0963***	-0.0934***	-0.0820*	-0.0923*	-0.0271***	-0.1075*
	(0.0259)	(0.0250)	(0.0422)	(0.0469)	(0.0097)	(0.0615)
L.Worldwide Governance Indicator index	0.0285***					0.0183*
	(0.0071)					(0.0098)
L.Product Market index		0.0149***				0.0006
		(0.0048)				(0.0093)
L.Innovation index			-0.0029			-0.0031
			(0.0067)			(0.0086)
L.Labor Market index				0.0061		0.0074
				(0.0063)		(0.0064)
L.Complementary factors index					0.0055*	-0.0049
					(0.0031)	(0.0098)
Constant	0.5914***	0.6257***	0.6409*	0.6710*	0.1660**	0.7331*
	(0.1682)	(0.1689)	(0.3114)	(0.3296)	(0.0637)	(0.3912)
Observations	620	620	256	256	1,504	256
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Adjusted R2	0.0878	0.0743	0.0521	0.0566	0.0610	0.0546
No. countries	33	33	26	26	33	26

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: IMF staff estimates

Table 9: Baseline specification with three-year lags intervals

	(1)	(2)	(3)	(4)	(5)
Dependent variable: lngdp(t)-lngdp(t-3)					
L3.GDPpc (log)	-0.1970***	-0.1889***	-0.4259***	-0.4109***	-0.0649***
	(0.0277)	(0.0304)	(0.0803)	(0.0789)	(0.0156)
L3.Worldwide Governance Indicator index	0.0304***				
	(0.0104)				
L3.Product Market index		0.0128			
		(0.0090)			
L3.Innovation index			0.0176**		
			(0.0079)		
L3.Labor Market index				-0.0037	
				(0.0082)	
L3.Complementary factors index					0.0164***
					(0.0050)
Constant	1.5312***	1.5483***	3.6850***	3.6420***	0.5054***
	(0.2223)	(0.2355)	(0.6965)	(0.6925)	(0.1174)
Observations	2,460	2,472	1,040	1,040	6,033
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Adjusted R2	0.204	0.198	0.296	0.292	0.0967
No. countries	131	133	104	104	133

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: IMF staff estimates

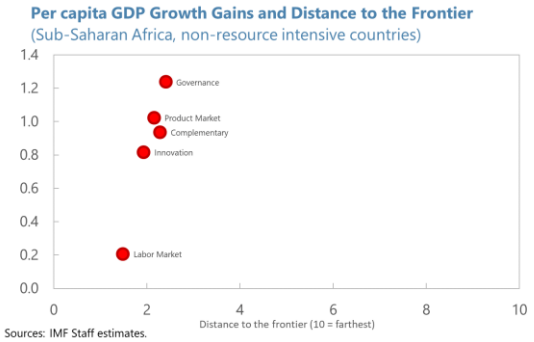
Table 10: System GMM estimator

	(1)	(2)	(3)	(4)	(5)
Dependent variable: Real per capita growth					
L.GDPpc (log)	-0.0137***	-0.0074**	-0.0176*	-0.0067	-0.0108**
	(0.0044)	(0.0037)	(0.0095)	(0.0101)	(0.0043)
L.Worldwide Governance Indicator index	0.0222***				
	(0.0077)				
L.Product Market index		0.0086*			
		(0.0048)			
L.Innovation index			0.0290*		
			(0.0154)		
L.Labor Market index				0.0156	
				(0.0180)	
L.Complementary factors index					0.0067*
					(0.0038)
Constant	0.0284	0.0409	0.0608	-0.0090	0.0596***
	(0.0299)	(0.0253)	(0.0373)	(0.0465)	(0.0151)
Observations	2,463	2,475	1,043	1,043	6,036
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
No. countries	131	133	104	104	133
No. of instruments	105	106	90	90	142
Serial correlation (p-value) for AR(1)	0.141	0.140	0.0320	0.0304	0.00237
Serial correlation (p-value) for AR(2)	0.725	0.636	0.420	0.335	0.0675
Hansen Test (p-value)	0.280	0.104	0.345	0.497	0.567

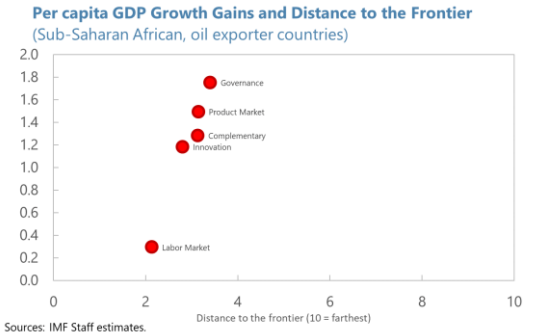
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: IMF Staff estimates.

Annex Figure 1
Per capita growth dividends and distance to the frontier

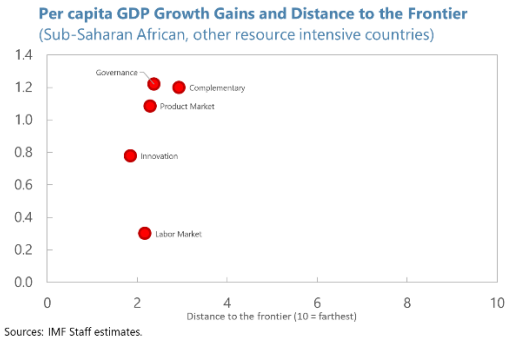
95th percentile



Sources: IMF Staff estimates.
Note: The chart shows the distance from the frontier and the estimated increase in annual growth rate of real GDP if the gap is closed in five years (except for Governance reforms, where it is closed in ten years). The frontier is the 95th percentile value for each indicator in a sample of Upper middle income countries.

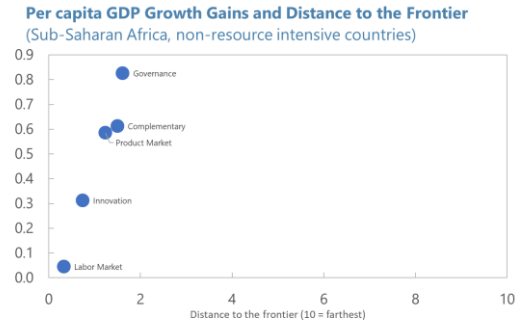


Sources: IMF Staff estimates.
Note: The chart shows the distance from the frontier and the estimated increase in annual growth rate of real GDP if the gap is closed in five years (except for Governance reforms, where it is closed in ten years). The frontier is the 95th percentile value for each indicator in a sample of Upper middle income countries.

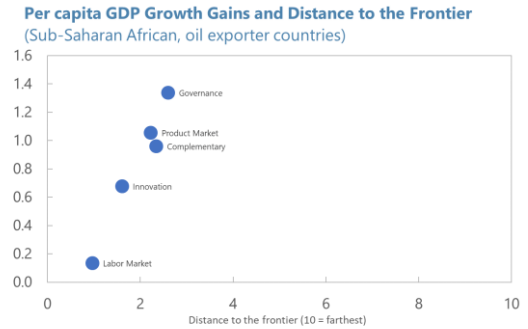


Sources: IMF Staff estimates.
Note: The chart shows the distance from the frontier and the estimated increase in annual growth rate of real GDP if the gap is closed in five years (except for Governance reforms, where it is closed in ten years). The frontier is the 95th percentile value for each indicator in a sample of Upper middle income countries.

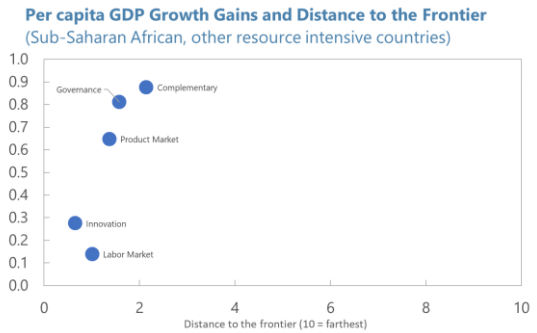
75th percentile



Sources: IMF Staff estimates.
Note: The chart shows the distance from the frontier and the estimated increase in annual growth rate of real GDP if the gap is closed in five years (except for Governance reforms, where it is closed in ten years). The frontier is the 75th percentile value for each indicator in a sample of Upper middle income countries.



Sources: IMF Staff estimates.
Note: The chart shows the distance from the frontier and the estimated increase in annual growth rate of real GDP if the gap is closed in five years (except for Governance reforms, where it is closed in ten years). The frontier is the 75th percentile value for each indicator in a sample of Upper middle income countries.



Sources: IMF Staff estimates.
Note: The chart shows the distance from the frontier and the estimated increase in annual growth rate of real GDP if the gap is closed in five years (except for Governance reforms, where it is closed in ten years). The frontier is the 75th percentile value for each indicator in a sample of Upper middle income countries.

Annex Figure 2.
Cross-country Distribution of Dividends from Structural Reforms
(in terms of per capita GDP growth)