Working Paper

Regional Growth Spillovers in Sub-Saharan Africa[1]

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Abstract

This paper documents the steady increase in intraregional trade in sub-Saharan Africa since 1980, links this rise to important growth spillovers in the region, and identifies the main source countries and those most vulnerable to the economic conditions of others. Estimates show that in the short run, positive idiosyncratic shocks to trading partners' growth significantly increase growth in the average sub-Saharan African country, while in the long-run the annual impact of growth in regional trading partner's is smaller in magnitude but longer lived. Policy implications of increased integration, including the need to support further continent-wide integration, and the associated growth spillovers are discussed. Actions policymakers in sub-Saharan Africa can take to capture the benefits of these spillovers, while limiting exposure to the associated risks, are also proposed.

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I. INTRODUCTION

After close to two decades of strong economic activity, growth in sub-Saharan Africa decelerated markedly from 2015–16, to its lowest level in more than 20 years at 1.4 percent in 2016. Nonetheless, this average mask substantial heterogeneity across the region. While the largest economies (i.e., Nigeria and South Africa) experienced negative or flat growth, a third of countries in the region continued to grow at 5 percent or more during the period. While these trends have been well documented, little is known about how they are interlinked.

This paper attempts to shed light on this question and fill a gap in the literature that has largely overlooked integration and its implications *within* sub-Saharan Africa. Namely, we ask how has intraregional integration evolved in sub-Saharan Africa in recent decades and how has this affected growth spillovers on the continent? We focus on trade linkages, which are the strongest in the region (Arizala et al., 2018). We first present a novel set of stylized facts that document that intraregional integration in sub-Saharan Africa is significantly greater than is widely believed and is indeed inline or greater than in developing and emerging economics in other regions. With this, we identify the countries in sub-Saharan Africa that are more likely to generate regional growth spillovers through trade, as well as the countries that are more likely to suffer from growth spillovers from their regional trading partners. We then estimate and quantify growth spillovers between trading partners in sub-Saharan Africa, in both the short run and in the long run.

The growth spillover literature is broadly based on the idea that domestic growth in any country is determined by three main drivers: domestic shocks, global shocks, and shocks to a foreign country or region(s) that are transmitted through various channels to the domestic country (Furceri, Jalles, and Zdzienicka (2016), Doyle and Faust (2005)). While evidence on the comparative importance of each driver varies, it is widely accepted that growth co-moves across countries in the long term in countries who have large bi-lateral trade flows or coordinated fiscal policy, and especially in advanced economies (Frankel and Rose (1998); Doyle and Faust (2005); Sly and Weber (2013); Arora and Vamvakidies (2005a); Dabla-Norris, Espinoza, and Jahan (2015)). The presence of growth spillovers in the shorter-term within and between low income and emerging market countries has also been documented (Samake and Yang (2011); Barrot, Calderón, and Servén (2018), and Almansour and others (2015)). And Blongigen, Piger, and Sly (2014) bridge the gap between these literatures and show that shocks to long-term growth (trend growth) have larger cross-country spillovers than shocks to short-term growth (cyclical growth).

Yet, whether longer term growth spillovers exist within groups of low-income countries, particularly in sub-Saharan Africa, is less evident. Indeed, it could be argued, *a priori,* that given the nature of their trade relationships and the structure of their economies, these countries may experience growth spillovers differently than advanced or emerging countries. Structural barriers to spillovers in these countries may include their position in global value chains, the absence of widespread multinationals, their reliance on imports for most consumption goods and their historically limited regional integration.

Indeed, much of the literature on growth spillover in sub-Saharan Africa has focused on spillovers emanating from outside the region, and found mixed results. Raddatz (2007), looking at levels, found little impact of any foreign shock on GDP per capita in sub-Saharan Africa. His findings have been linked to the absence of interregional infrastructure and to the presence of resource-poor landlocked countries, among other factors (Roberts and Deichmann, 2011, Bonfatti and Poelhekk, 2017, and Collier and O'Connel, 2007). Others find that the region is highly vulnerable to external shock spillovers (Drummond and Ramirez, 2009) and that external shocks are important for stability (Raddatz, 2008). With the advent of Chinese foreign investment on the continent in recent decades, there is also evidence of large growth spillovers specifically between China and sub-Saharan African countries (Mullings and Mahabir, 2018, Chen and Nord, 2017).

Our work instead focuses on intraregional spillovers, which have received limited attention in the literature. Existing studies have found that intraregional growth spillovers are relatively large, but may operate mainly through their ability to connect sub-Saharan Africa countries to international markets, and thus increase demand for their exports and lower domestic prices (Easterly and Levine, 1998; Moore, 2018). Evidence of spillover within sub-regions of sub-Saharan Africa is similarly mixed – Canales-Kriljenko, Gwenhamo, and Thomas (2013) find that growth spillovers are particularly strong from South Africa to smaller countries in the SACU, while Basdevant and others (2015) do not find evidence of growth spillovers from South Africa to the rest of the continent.

In the first part of our analysis, we estimate short-term growth spillovers using the local projections model developed by Jorda (2005) and adapting an identification method proposed by Furceri, Jalles, and Zdzienicka (2016). Next, we build on a line of work that estimates long-term growth spillovers in a panel fixed-effect model, based on the degree of interconnectedness between countries or regions (Arora and Vamvakidies (2005a), Dabla-Norris, Espinoza, and Jahan (2015)).

Our main finding is that growth spillovers in sub-Saharan African countries are important: In the short-run, idiosyncratic shocks to individual sub-Saharan African countries are found to have statistically significant an economically large impact on other sub-Saharan African countries growth. Quantitatively, we find that a 1 percent shock in average growth of trading partners is associated with an increase of about 0.4 percent in output of the average sub-Saharan Africa country 2 years after the shock. In the long-run, we find that a 1 percentage point increase in the export-weighted growth rate of intra-regional partners is associated with about 0.12 percent increase in the average sub-Saharan African country growth. This result is robust to accounting for extra-regional factors that have been shown to drive growth in sub-Saharan Africa, such as global growth and demand from large trading partners including China, whose increased importance for sub-Saharan African exports has been shown to be an important driver of growth in the region (Chen and Nord, 2017), and to various alternative model specifications. Consistent with having comparable shares of intra-regional trade to emerging and developing economies in other regions, we then show that long-run growth spillovers in sub-Saharan Africa are of similar magnitude to those in other emerging and developing economies.

Our results stress the growing importance for policymakers to factor in spillovers from within the region when planning for the medium term, and to design growth-friendly policies that addresses increasing transmission risks. In addition, it highlights the need in sub-Saharan Africa for an emphasis on regional surveillance and spillover analysis alongside traditional bilateral surveillance.

The rest of the paper is organized as follows. The next section presents new facts on intraregional integration in sub-Saharan Africa. Section III discusses the data and the empirical strategy used in our analysis. Section IV presents the results from investigating the size of intraregional growth spillovers. Section V concludes.

II. Stylized Facts

A. Intraregional Trade Linkages are Steadily Gaining Strength

Though often thought of as silos that are linked to the rest of the world but not each other, sub-Saharan African economies have become much more intertwined in the last 35 years. This trend is particularly well illustrated by the increase in regional trade as a share of total trade, which represented 6 percent in 1980 before taking-off in the early 1990s, and eventually reaching 20 percent in 2016 (Figure 1). This increase in regional trade was significant relative to the size of sub-Saharan African economies, and it was faster for small countries in the region, as reflected by the faster growth in the simple average level of trade integration (Figure 2).

Tighter regional trade integration, which coincided with a rise in global integration, is the result of both global developments and of a strengthening of institutional and macroeconomic conditions in the region. The rise in trade globally was driven in part by a two-fold increase in the relative price of commodity exports over the period 1995–2013 and in part by a rise of two and a half times in volume of exported commodities (Allard and others, 2016). In addition to these supporting conditions, countries in sub-Saharan Africa substantially strengthened their macroeconomic policies and political and economic institutions over the last 20 years, and (perhaps because of stronger institutions) experienced abating of internal and external conflicts. These elements all contributed to improving the business environment, which lead to faster growth than in the rest of the World and thereby supported the deepening of regional trade (IMF, 2015). Furthermore, the establishment of regional trade agreements in different sub-regions also contributed to regional and bilateral reductions in tariffs which further supported regional trade integration (ODI, 2010).

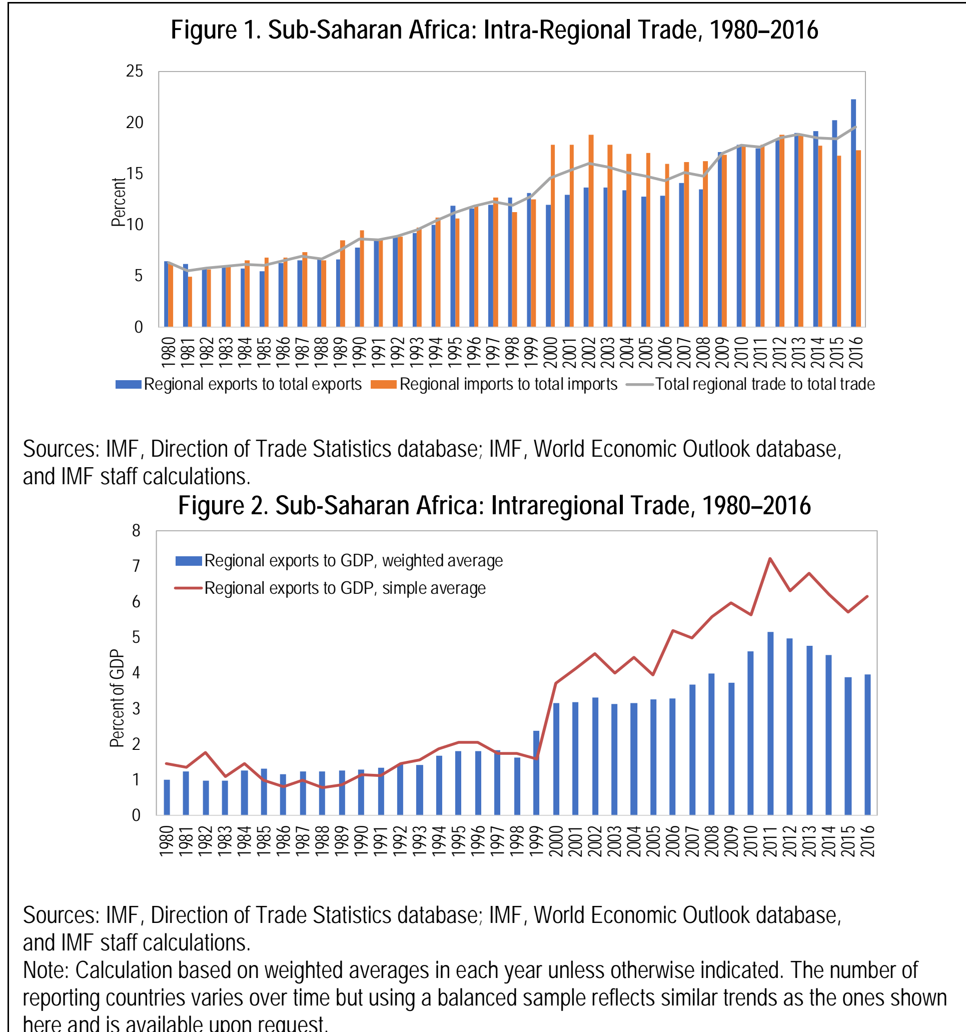


Figure 1. Sub-Saharan Africa: Intra-Regional Trade, 1980–2016

Sources: IMF, Direction of Trade Statistics database; IMF, World Economic Outlook database, and IMF staff calculations.

Figure 2. Sub-Saharan Africa: Intraregional Trade, 1980–2016

Sources: IMF, Direction of Trade Statistics database; IMF, World Economic Outlook database, and IMF staff calculations.
Note: Calculation based on weighted averages in each year unless otherwise indicated. The number of reporting countries varies over time but using a balanced sample reflects similar trends as the ones shown here and is available upon request.

The average level of regional trade integration in sub-Saharan Africa, and hence the potential for regional spillovers, is broadly in line with other developing and emerging market economies is other regions (Figure 3). Measured as a share of total exports, sub-Saharan Africa exhibits the highest share of intra-regional trade integration among emerging and developing economics, followed by Middle-East and North Africa and emerging and developing Asia. Relative to the size of the economy, sub-Saharan Africa is in the middle of the pack.

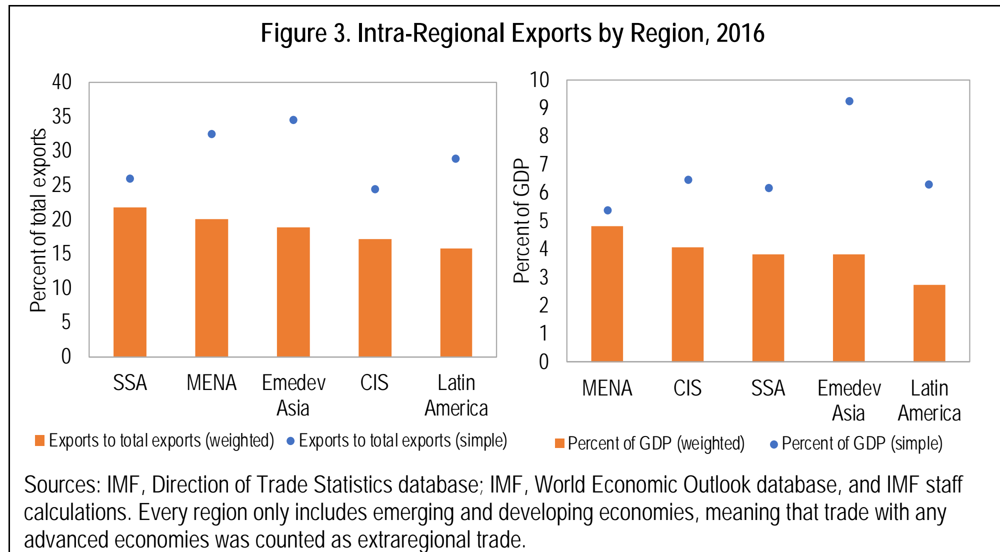


Figure 3. Intra-Regional Exports by Region, 2016

Sources: IMF, Direction of Trade Statistics database; IMF, World Economic Outlook database, and IMF staff calculations. Every region only includes emerging and developing economies, meaning that trade with any advanced economies was counted as extraregional trade.

Many sub-Saharan Africa countries are highly integrated to other countries in the region, as measured by intra-regional trade, and integration is particularly strong within sub-regions. For example, in small and very open economies in the SACU and the Economic Community of West African States (ECOWAS), like Swaziland, Lesotho, Togo and The Gambia, intra-regional exports represent more than 65 percent of these countries' total global exports (IMF, 2012) (Figure 4 and 5). In many countries intra-regional exports are also large relative to the size of the economy. This is the case for certain countries in the South African Development Community (SADC) (Zimbabwe, Botswana, Lesotho, and Namibia) where intra-regional exports represent about 20 percent of GDP, and some Western Africa Economic and Monetary Union (WAEMU) countries (Côte d'Ivoire, Guinea, Senegal), where they constitute close to 10 percent of GDP.

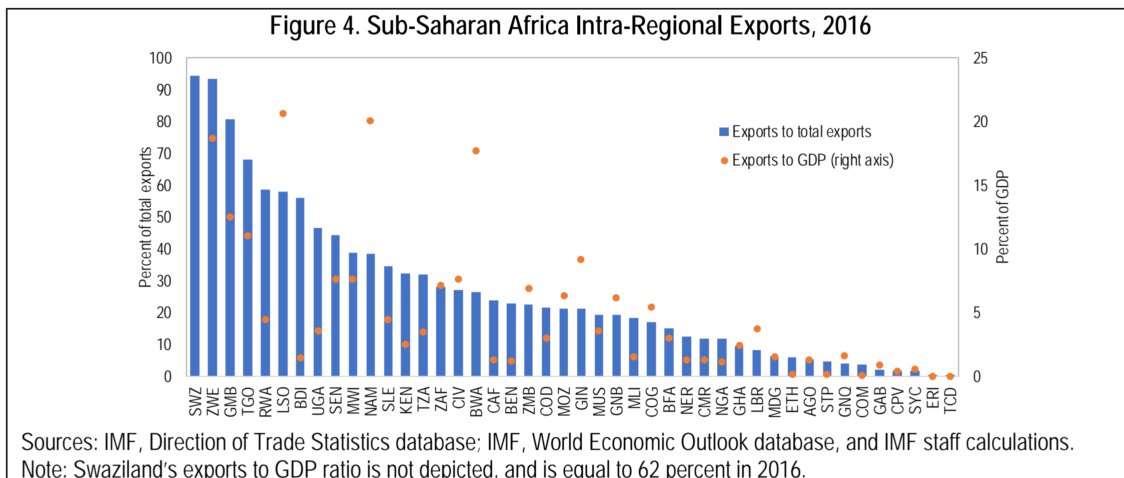
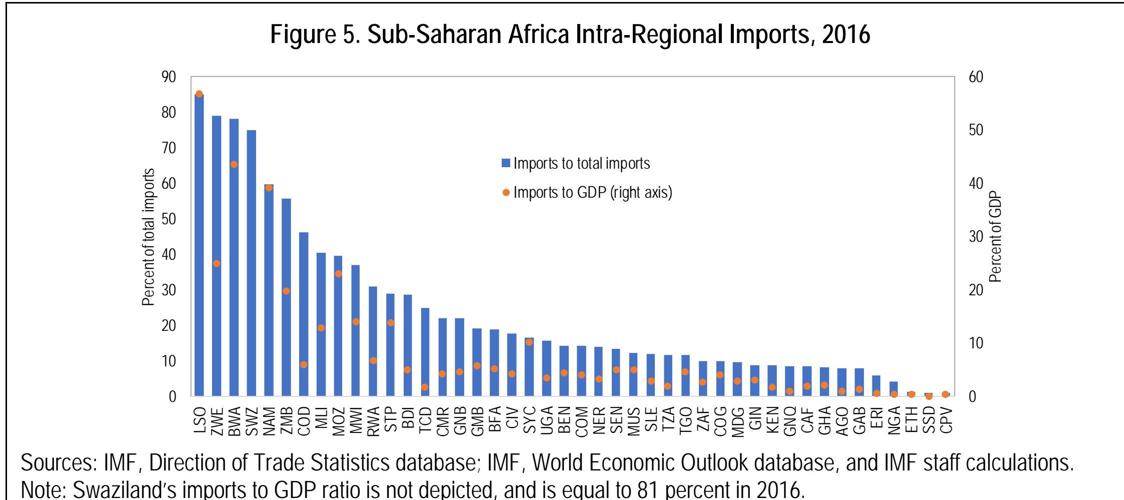


Figure 4. Sub-Saharan Africa Intra-Regional Exports, 2016

Sources: IMF, Direction of Trade Statistics database; IMF, World Economic Outlook database, and IMF staff calculations.
Note: Swaziland's exports to GDP ratio is not depicted, and is equal to 62 percent in 2016.

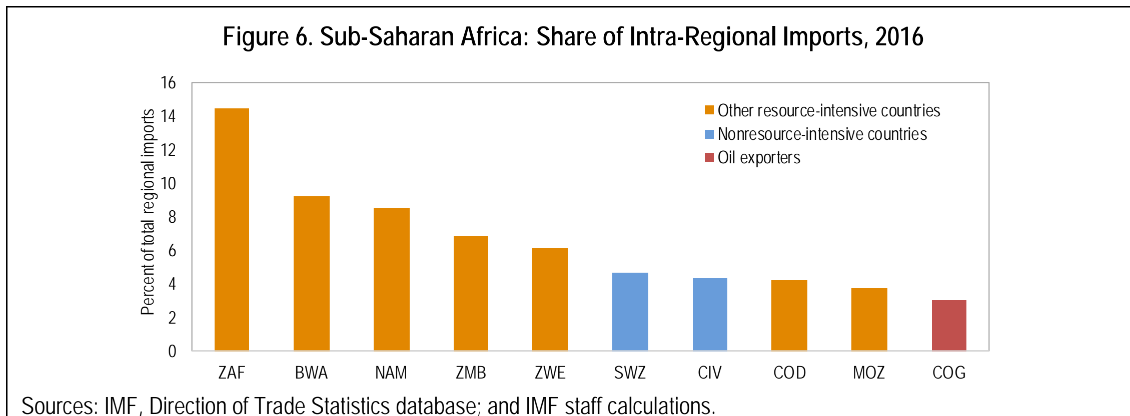
Figure 5. Sub-Saharan Africa Intra-Regional Imports, 2016



Sources: IMF, Direction of Trade Statistics database; IMF, World Economic Outlook database, and IMF staff calculations.
Note: Swaziland's imports to GDP ratio is not depicted, and is equal to 81 percent in 2016.

On can also see a concentration of integration from the opposite perspective: demand for regional exports is concentrated in very few countries. Ten sub-Saharan countries represent 65 percent of total regional demand for intra-regional exports, with South Africa, Botswana and Namibia accounting for the largest shares of total regional demand, and South Africa alone importing 15 percent of total regional exports (Figure 6). These SACU-member countries trade significantly among themselves, and so an economic deceleration in any one country has the potential to weaken demand for intra-regional exports and may constitute a source of wider negative spillovers.

Figure 6. Sub-Saharan Africa: Share of Intra-Regional Imports, 2016

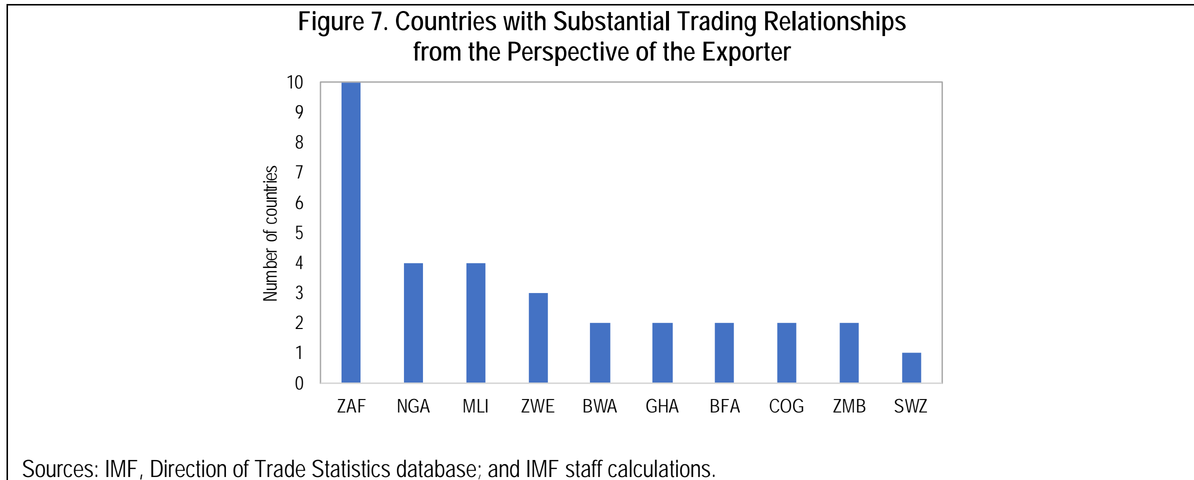


Sources: IMF, Direction of Trade Statistics database; and IMF staff calculations.

The value of the regional imports purchased by the top 10 regional importers (*i.e.* those listed in Figure 6) represents significant shares of the economies of the exporting countries, setting the stage for potentially large spillovers. For instance, South African imports from Swaziland, Lesotho, Zimbabwe and Mozambique represent between 4 and 11 percent of these economies' GDP. Zimbabwe's total demand for goods from Zambia, Malawi and Botswana constitutes between 1 and 4 percent of these countries' GDP. Other countries also import in amounts that are non-negligible shares of their neighbors' GDP, even though they do not constitute substantial shares of total sub-Saharan African intra-regional imports. This is the case of Nigeria, Mali, Ghana, and Burkina Faso, who's imports amount to more than 1

percent of GDP of their sub-regional trading partners (Figure 7). In these cases, any reduction in import demand, which typically follows an economic downturn in the importing country, could have significant consequences for GDP growth in their trading partners.

Figure 7. Countries with Substantial Trading Relationships from the Perspective of the Exporter



Sources: IMF, Direction of Trade Statistics database; and IMF staff calculations.

III. Data and Empirical Methodology

The basis of our empirical work – both the short and long run analysis – is a weighting scheme we construct to capture the relative importance of each country's trading partner within the region. We use annual bilateral data from the IMF's Direction of Trade Statistics to build the index, which covers 45 countries in sub-Saharan Africa over the period 1980-2016. Specifically, we construct the country-pair specific weight as:

$$W_{ijt} = \frac{X_{jit}}{\sum_{j}^{J} X_{ijt}} \qquad (1)$$

where W_{ijt} is the share of country *j* exports to country *i* (X_{jit}) in year *t* as a share of total regional (sub-Saharan African) exports of country *j* at time t ($\sum_{i}^{I} X_{jit}$). The logic in defining the weight in such a way is that a country's exports to the region are more important in terms of affecting their domestic economy than are their imports. We construct an analogous index for trading partners outside the region, which will be used to build a control variable in our analysis.

A. Short-Term Growth Spillovers

We first study growth spillover in sub-Saharan Africa in the short run. The approach we take modifies the method proposed by Furceri, Jalles, and Zdzienicak (2017) to a panel framework. Specifically, we first identify country-specific idiosyncratic shocks to growth for sub-Saharan Africa countries and then estimate the impact of these shocks on growth in other sub-Saharan Africa countries using the local projections method (Jorda, 2005).

We define idiosyncratic growth shocks for each country in each year as deviations from world average growth over the period for that country and for all countries in the sample, following IMF (2013) and Morgan and others (2004):

$$g_{it} = \alpha_t + \gamma_i + \epsilon_{it} \qquad (2)$$

Where g_{it} is the annual rate of growth of real GDP in country i for year *t,* γ_i are country fixed effects, and α_t are time fixed effects. The residual ϵ_{it} is the idiosyncratic shock to growth for country *i* in year *t.* Identifying shocks this way allows us to isolate spillovers from country-specific shocks to those that affect all countries, in contrast to the more common GVAR analysis which cannot do this. As noted by Furceri, Jalles and Zdzienicak (2017) though, the cost of this method is an inability to identify shocks that are purely domestic idiosyncratic shocks from those that are domestic and immediately transmitted to other countries. While a shortcoming of this method, the benefit is that the results will be a lower bound estimate of the impact of the shocks.

We then take these idiosyncratic and estimate their impact on growth over *K* horizons :

$$y_{i,t+k} - y_{i,t-1} = a_i + \rho^k \varepsilon_{it} + \delta(L) g_{it} + u_{it} \qquad (3)$$

Where $y_{i,t}$ is the log of real GDP (and thus $\Delta y_{i,t} = g_{it}$) and we define $\varepsilon_{it} = \sum_{j \neq i}^{J} W_{ijt-1} \epsilon_{jt}$ for all $j \neq i \in SSA$, where W_{ijt} is the bilateral weight of exports from country j to country *i* as a share of total country *j* exports to sub-Saharan Africa, as defined in (1), and we use its first lag to control for endogeneity. That is, ε_{it} is the export-weighted average growth shock of all of country *i*''s trading partners in sub-Saharan Africa. We estimate alternative models to confirm the robustness of this initial result and to examine country-specific shocks. First, we aggregate the idiosyncratic shocks by defining the weighted average instead as country *i*'s imports as a share of total sub-Saharan Africa trade,[2] and second we look at the impact of a growth shock to South Africa (the largest single importer of regional exports and likely to generate the largest regional spillovers) on individual sub-Saharan African countries. The coefficient ρ_i^k , which is the estimated impact of a one percent change in the (weighted-average) idiosyncratic shock at each time horizon *k=0,..,4,* is our coefficient of interest. Two lags of GDP growth are included to capture persistence in growth dynamics, and control for other factors that influencing growth in the short run.

B. Long-Term Growth Spillovers

In the second part of our analysis we estimate a panel fixed effect model to study the elasticity of GDP growth in sub-Saharan African countries to the growth of the trading partners in the region. Our method follows Arora and Vamvakidies (2005a) and Dabla-Norris, Espinoza, and Jahan (2015), and is specified as follows:

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[2] That is, the weight is no longer bilateral and defined as: $W_{it} = \frac{IM_{it}}{\sum_i^I IM_{it}}$.

$$g_{it} = \alpha + \gamma_i + \sum_{l=1}^{L} \beta_j g_{i,t-l} + \beta_3 TPG_{it}^{SSA} + \beta_4 TPG_{it}^{RoW} + \boldsymbol{\beta_5 X_{it}} + \varepsilon_{it} \qquad (4)$$

Where the dependent variable is the annual rate of growth of real GDP (g_{it}) and the main independent variable of interest is the weighted average growth of trading partners in sub-Saharan Africa (TPG_{it}^{SSA}), which we define as:

$$TPG_{it} = \sum_{j \neq i}^{J} W_{ijt-1} \times g_{jt} \qquad (5)$$

where W_{ijt} is the bilateral export weight we defined in (1) and g_{jt} is the trading partner's real GDP growth. As before, we use the lagged bi-later export weight to control for endogeneity. We also control for the weighted average growth of trading partners outside sub-Saharan Africa, motivated by the literature discussed in section I that has shown external growth to be important for sub-Saharan Africa countries (TPG_{it}^{RoW}).

The vector of controls ($\boldsymbol{X_{it}}$) includes various macroeconomic variables that have been shown in the literature to be associated with GDP growth, including investment to GDP, the change in the consumer price index, terms of trade, and trade openness (defined as the sum of exports and imports in percent of GDP), all of which are from the World Economic Outlook database. Additional controls are from various other sources including: bilateral exchange rates vis a vis the US dollar from the IMF's International Financial Statistics; occurrence of conflicts and war from the Uppsala Conflict Data Program database; and the Fed funds rate from the Federal Reserve's FRED database.

Lastly, we include average growth in sub-Saharan Africa, average global growth, and *L* lags of the dependent variable (with *L=2),* to ensure we are not confounding the effects of trading partner's growth with global or regional trends or persistence. All control variables are included in their first difference, with the exception of the trading partners' growth rates and the conflict dummy variable. Country fixed effects, γ_i, are included to control for time-invariant country-specific heterogeneity, and standard errors are clustered at the country level to control for possible unobserved correlation within countries.

We conduct several robustness checks to our baseline specification: excluding the top decile of economies by GDP (Angola, Ghana, Kenya, Nigeria, South Africa), estimating the model using the panel Arellano-Bond GMM estimator, and finally estimating the panel Arellano-Bond GMM estimator using five-year averages. This last robustness exercise allows us to minimize serial correlation, which is likely to be present in annual data. In this specification, we also include the initial level of GDP per capita to capture growth convergence.

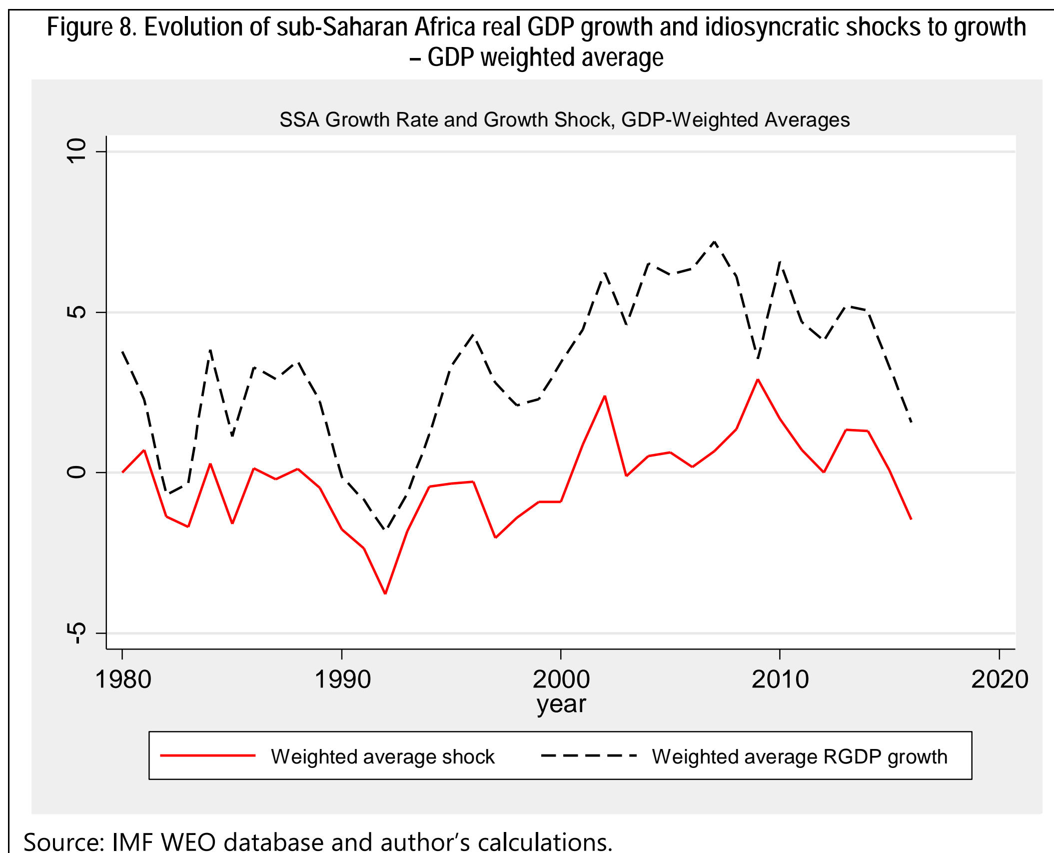
IV. Results

A. Short-Term Spillovers

The first step in analyzing short term spillovers is identifying idiosyncratic shocks to real GDP growth in sub-Saharan African countries by estimating equation (2). We take these

estimated country-specific shocks (ε_{it}) and plot them along with their respective GDP growth rate in Annex I. In Figure 8 we plot the GDP-weighted average of these country-specific shocks and real GDP growth. Both figure shows that the idiosyncratic shocks are highly correlated with GDP growth throughout the period, apart from 2008-2010 – the period of the global financial crisis.[3] This suggests that shocks to growth within sub-Saharan Africa, in addition to growth shocks coming from the rest of the world, are relevant factors in determining growth dynamics in sub-Saharan Africa. It further highlights the importance of identifying shocks to sub-Saharan Africa growth, which will allow us to distinguish between global shocks to growth in these countries versus shocks originating from within the region.

Figure 8. Evolution of sub-Saharan Africa real GDP growth and idiosyncratic shocks to growth – GDP weighted average



Source: IMF WEO database and author's calculations.

We take these idiosyncratic shocks, weight them by bi-lateral exports (as defined in equation (1)), and estimate their impact on real-GDP growth in sub-Saharan African countries using the panel-based local projections specification defined in equation (3). The estimated impulse response function is reported in Figure 9, and represents the impact of a 1 percent shock to export-weighted real GDP growth on output in the average sub-Saharan Africa country. We find that, on average, this shock increases real-GDP growth by about 0.2 percent on impact.

[3] Appendix I report country-specific idiosyncratic shocks with real GDP growth, and notably the correlation is much higher at the individual level for many countries (particularly the less open countries, as would be expected).

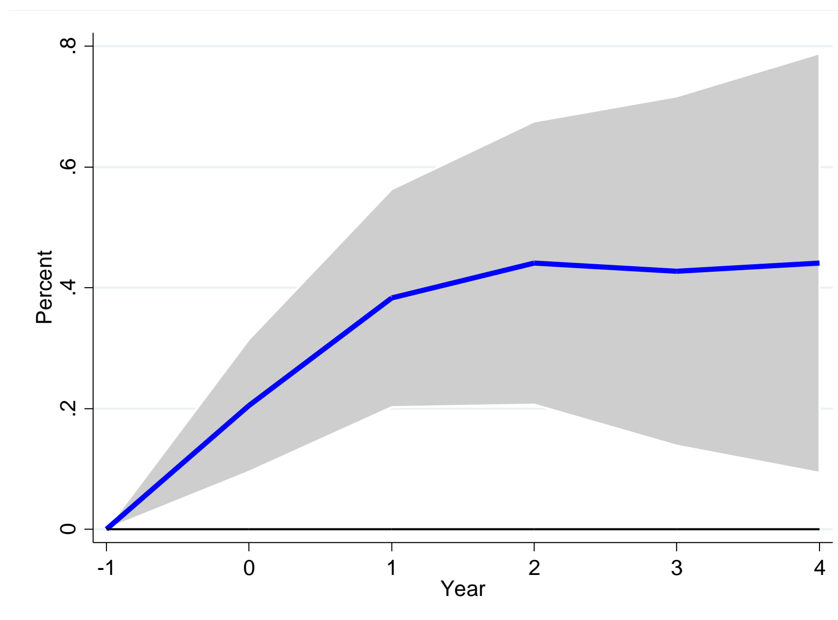
(continued…)

The maximum impact occurs after two years and is equal to about a 0.45 percent increase in real GDP growth of the average sub-Saharan Africa country.[4]

Figure 10 plots the impulse response function using our alternative weighting scheme for the shocks – the share of country *i*'s imports from the region in total sub-Saharan Africa trade. The estimated impact on average real GDP growth is of similar magnitude to our baseline specification, peaking in year 2 at about 0.5 percent (and well within the confidence bands of our baseline estimate).

Figure 11 plots our final specification, where we look at the effect of a one percent positive idiosyncratic shock in South African to average output growth in other sub-Saharan Africa countries. In this case, the estimate impact is about 0.45 percent after two years. That the average response to the South African shock is similar in magnitude and persistence to our weighted average of all sub-Saharan Africa shocks is not surprising, given the important weight of South Africa in regional trade we documented in Section II, and reinforces the importance of South Africa in the continent's economic performance.

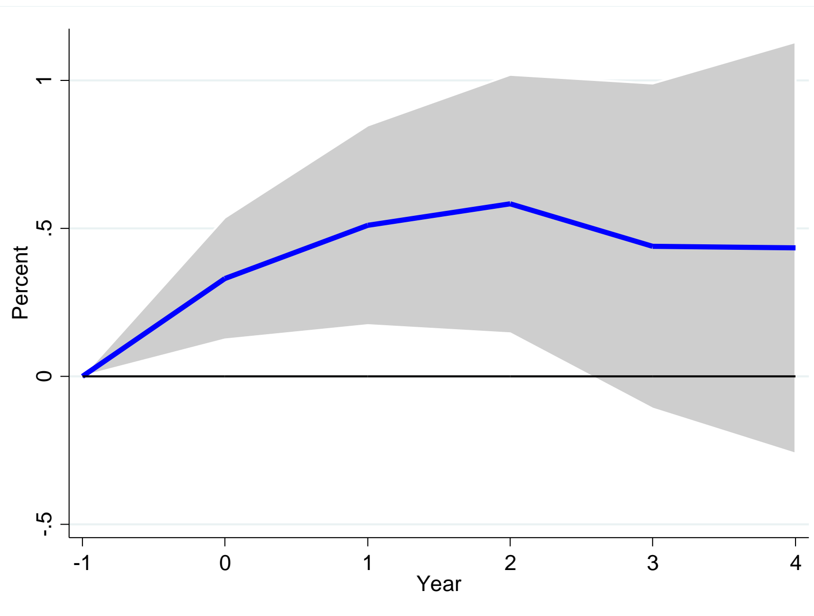
Figure 9. Effect of a one percent weighted average shock to output growth in sub-Saharan Africa countries (weighted by bi-lateral trade)



Source: Author's calculations.
Note: Shock occurs at t=0. The weighted average shock is calculated for each country pair *i* and *j* as the share of country's *i*'s imports from *j* in country *i*'s total imports from sub-Saharan Africa, as defined in equation (1).

[4] We also estimate the model (defined in (3)) on a country-by-country basis, rather than in a panel, which allows us to examine the impact of the weighted-average shock on each country in sub-Saharan Africa. Results are consistent with the average impact and available upon request.

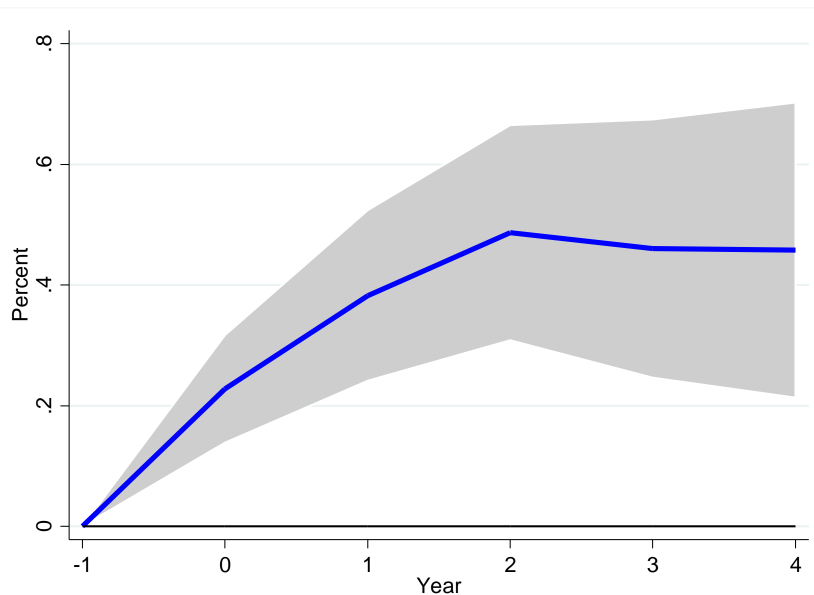
Figure 10. Effect of a one percent weighted average shock to output growth in sub-Saharan Africa countries (weighted by total sub-Saharan Africa trade)



Source: Author's calculations.

Note: Shock occurs at t=0. The weighted average shock is calculated for each country i as the share of country's i's imports from all sub-Saharan Africa in total sub-Saharan Africa trade.

Figure 11. Effect of a one percent shock in South Africa to output growth in sub-Saharan Africa countries



Source: Author's calculations.

Note: Shock occurs at t=0. The shock is derived for South Africa in equation (2).

B. Long-Term Spillovers

Sub-Saharan Africa Spillovers

We estimate the long-run growth spillovers in sub-Saharan Africa from equation (4), and report results in column 1 of Table 1. The results show a 1 percentage point increase in the export-weighted growth rate of intraregional partners is associated with a 0.12 percent increase in growth for the average sub-Saharan African country – suggesting that in the long run, there are significant growth spillovers between trading partners in the region. We also find that a 1 percentage point increase in the growth rate of the trading partners outside of the region is associated with an increase of 0.25 percent in the growth rate of the average sub-Saharan Africa country, though not statistically significant.

In columns (2) we exclude the largest economies in sub-Saharan Africa, to ensure our results are not being driven by large countries alone, and we see little change in the coefficient estimate. Finally, in columns (3) and (4), we estimate our model using panel GMM and panel GMM with 5-year averages, both to account for endogeneity in the dynamic-panel context and to capture medium-term determinants of growth. Our GMM estimates are broadly unchanged from the baseline, while the 5-year average estimated coefficient is slightly lower than the baseline, suggesting regional trading partners are still important, albeit slightly less so, in the medium term.

International Comparisons

In order to compare our estimated growth spillovers for sub-Saharan Africa with those in other emerging and developing economies regions, we re-estimate equation (4) for countries in Middle-East and North Africa, Latin America, Emerging and Developing Asia, and emerging and developing Europe. We use the GMM estimator as it is most robust to endogeneity concerns. Results are reported in Table 2 (with column 1 reproducing results from column 3 of Table 1). Relative to their peers in Latin America and Emerging and Developing Asia, sub-Saharan African countries have a lower intra-regional elasticity of growth, but it is higher than the estimated elasticity for countries in Middle-East and North Africa and in emerging and developing Europe. The results for Middle-East and North Africa countries may be explained by the high importance of developments in oil markets.

V. CONCLUSION

There has long been evidence of growth spillovers or co-movement across advanced countries, and between advance or emerging countries and low-income countries. Yet little evidence has been show of growth spillovers among neighboring low-income countries, and particularly in sub-Saharan Africa. Our results fill this gap in the literature, showing that growth of countries in sub-Saharan Africa has an effect on each country's domestic growth rate, and the more so the greater is bilateral trade between countries. We find that shocks to growth in sub-Saharan African countries have short-term growth spillovers to other countries in the region that are statistically significant an economically large. A 1 percent shock in the

weighted average trading partners' growth is associated with an increase of about 0.4 percent on average in output of other sub-Saharan African countries 2 years after the shock. We also find that South Africa, the largest economy in the region and with the largest share of regional trade, is likely the driving force behind much of these spillovers. In the long-run a 1 percentage point increase in the export-weighted growth rate of intra-regional partners is associated with about 0.11 percent increase in the average sub-Saharan African country growth.

Motivating our econometric analysis is the increasing trend towards regional integration in sub-Saharan Africa that we've documented, a novel result that is contrary to the common perception of countries in the continent as silos who are integrated with the rest of the world but not with each other. Indeed, trade integration in sub-Saharan Africa is now at comparable levels with developing and emerging market economies in other regions. In this vein, we've identified the countries that are potentially the main sources and destinations for growth spillovers via trade linkages, based on their intraregional trade networks. The at which these countries will continue to growth in the future will therefore have implications for their major trading partners, as our econometric analysis implies.

Supported by appropriate policies, the steady increase in trade integration experienced in sub-Saharan Africa has the potential to be further deepened. As integration continues in the region, it is likely to have positive effects on growth . But our results nonetheless stress that spillovers can go both ways, and the growing importance for policymakers to factor in spillovers from within the region and to design policies that addresses increasing transmission risks.

In particular, structural transformation strategies are needed to promote diversification and guard against spillovers from overreliance on too few products and partners. Deeper trade networks, as promoted by the African Continental Free Trade Agreement, are a welcome development, because they can help countries trade more products with more diverse partners. Governments should build precautionary cushions and monitor and regulate cross-border links to set the stage for growth and stability. Also, there is room to reduce tariff and non-tariff barriers, improving the ease of doing business, and favoring infrastructure development to facilitate trade between countries and between sub-regions.

Table 1. GDP Growth Elasticities of Growth of Trading Partners

Dependent Variable: Real GDP growth	(1)	(2)	(3)	(4)
	Baseline	Excluding Largest	GMM	5-year average GMM
SSA trade partners' growth	0.120*	0.112*	0.133*	0.0761***
	(0.0605)	(0.0650)	(0.0792)	(0.0270)
non-SSA trade partners' growth	0.252	0.238	0.334*	0.0118
	(0.164)	(0.166)	(0.192)	(0.0512)
Real GDP growth (t-1)	0.284***	0.277***	0.264***	0.410***
	(0.0789)	(0.0856)	(0.0277)	(0.0796)
Real GDP growth (t-2)	-0.0551**	-0.0534*	-0.0770***	
	(0.0260)	(0.0293)	(0.0271)	
SSA average growth	0.0739	0.0321	0.0526	-0.117
	(0.214)	(0.229)	(0.122)	(0.214)
World average growth	0.221	0.202	0.108	4.943***
	(0.233)	(0.262)	(0.231)	(1.371)
Terms of Trade	0.0936*	0.0997*	0.0881	-0.0361
	(0.0470)	(0.0565)	(0.0638)	(0.258)
Trade Openness	0.0522*	0.0542	0.0844***	0.0915***
	(0.0296)	(0.0360)	(0.0159)	(0.0242)
Share of regional exports in total exports (t-1)	3.426*	3.886*	1.561	-0.311
	(1.961)	(2.292)	(1.826)	(3.261)
Investment, percent of GDP (t-1)	0.0483	0.0506	0.0608***	0.0877***
	(0.0393)	(0.0413)	(0.0195)	(0.0274)
Population Growth	0.394	0.391	0.489	0.440***
	(0.443)	(0.480)	(0.326)	(0.156)
Conflict	-3.810***	-3.470**	-3.913***	-4.267*
	(1.081)	(1.294)	(1.234)	(2.439)
US Federal Funds Rate	-0.000131	-0.000132	-0.000256	
	(0.000555)	(0.000628)	(0.000943)	
Inflation	-0.00362***	-0.00605**	-0.00311	
	(0.00118)	(0.00231)	(0.00209)	
Inflation (t-1)	-0.00103	-0.000497	-0.000293	
	(0.000748)	(0.00275)	(0.00212)	
Exchange rate (USD)	0.180***	0.298***	0.155	
	(0.0584)	(0.109)	(0.104)	
Exchange rate (USD) (t-1)	0.0619	0.0356	0.0226	
	(0.0373)	(0.135)	(0.107)	
GDP per capita at the beginning of the 5y periods				-4.95e-06***
				(4.46e-07)
Constant	-4.781*	-4.883	-6.869***	-19.31***
	(2.513)	(3.027)	(1.483)	(4.400)
Observations	1,301	1,160	1,252	159
R-squared	0.187	0.173		
Number of countries in sample	45	39	45	43

Clustered standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Source: IMF, staff calculations.

Table 2. Sub-Saharan Africa and Other Developing Countries: GDP Growth Elasticities of Growth of Trading Partners

Dependent Variable: Real GDP growth

	(1) SSA	(2) Latin America	(3) MENA	(4) Asia	(5) Europe and CIS
Regional trade partners' growth	0.133*	0.157***	-0.00140	0.157*	0.204**
	(0.0792)	(0.0590)	(0.0640)	(0.0841)	(0.0833)
Non-Regional trade partners' growth	0.334*	-0.0482	-0.107	0.492***	0.335*
	(0.192)	(0.145)	(0.223)	(0.167)	(0.181)
Real GDP growth (t-1)	0.264***	0.197***	-0.000418	0.170***	0.325***
	(0.0277)	(0.0300)	(0.0387)	(0.0440)	(0.0414)
Real GDP growth (t-2)	-0.0770***	-0.00800	-0.196***	-0.0487	-0.0406
	(0.0271)	(0.0287)	(0.0346)	(0.0418)	(0.0377)
Regional average growth	0.0526	0.254***	0.476***	0.322***	0.429***
	(0.122)	(0.0655)	(0.134)	(0.118)	(0.0931)
World average growth	0.108	0.394**	0.192	-0.148	-0.0342
	(0.231)	(0.179)	(0.294)	(0.210)	(0.269)
Terms of Trade	1.561	-2.190	2.662	-0.988	2.864
	(1.826)	(1.482)	(2.604)	(1.220)	(2.556)
Trade Openness	0.0844***	0.0188**	0.0347*	0.00545	0.0229**
	(0.0159)	(0.00843)	(0.0178)	(0.00841)	(0.00986)
Share of regional exports in total exports (t-1)	0.0881	0.281***	0.0319	0.121*	0.0694
	(0.0638)	(0.0461)	(0.0731)	(0.0673)	(0.0833)
Investment, percent of GDP (t-1)	0.0608***	-0.161***	0.239***	0.0442**	-0.0103
	(0.0195)	(0.0219)	(0.0498)	(0.0213)	(0.0362)
Population Growth	0.489	0.223	-0.530***	0.108	0.162
	(0.326)	(0.316)	(0.157)	(0.409)	(0.535)
Conflict	-3.913***	-2.588**	-4.737***	-0.913	-0.674
	(1.234)	(1.113)	(1.163)	(0.727)	(1.142)
US Federal Funds Rate	-0.000256	0.00117**	0.000884	0.000218	-0.00111
	(0.000943)	(0.000598)	(0.00133)	(0.000791)	(0.000942)
Inflation	-0.00311	-0.00326	-0.0669**	-0.00808	-0.00327*
	(0.00209)	(0.00227)	(0.0280)	(0.0173)	(0.00192)
Inflation (t-1)	-0.000293	-7.14e-05	0.0836***	-0.00229	-6.71e-05
	(0.00212)	(0.000308)	(0.0267)	(0.0172)	(0.00108)
Exchange rate (USD)	0.155	0.314	-0.829	-1.672**	-0.140
	(0.104)	(0.244)	(0.517)	(0.672)	(0.141)
Exchange rate (USD) (t-1)	0.0226	-0.00983	0.757	0.661	-0.00828
	(0.107)	(0.0131)	(0.523)	(0.669)	(0.104)
Constant	-6.869***	2.959***	-3.668*	-1.005	-2.297*
	(1.483)	(1.030)	(1.982)	(1.552)	(1.324)
Observations	1,252	941	560	494	420
Number of countries in sample	45	30	20	18	18

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: IMF staff calculations.

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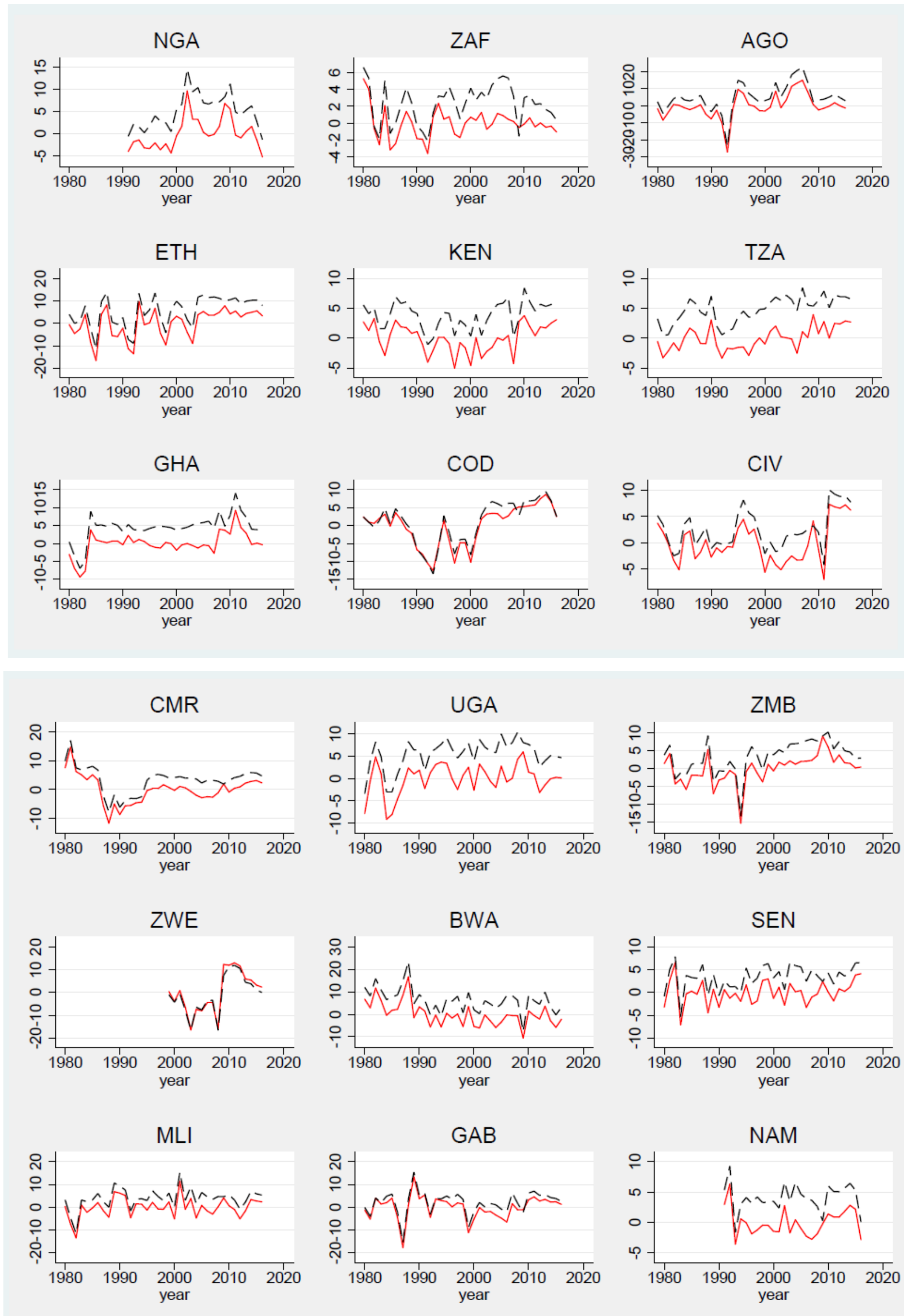
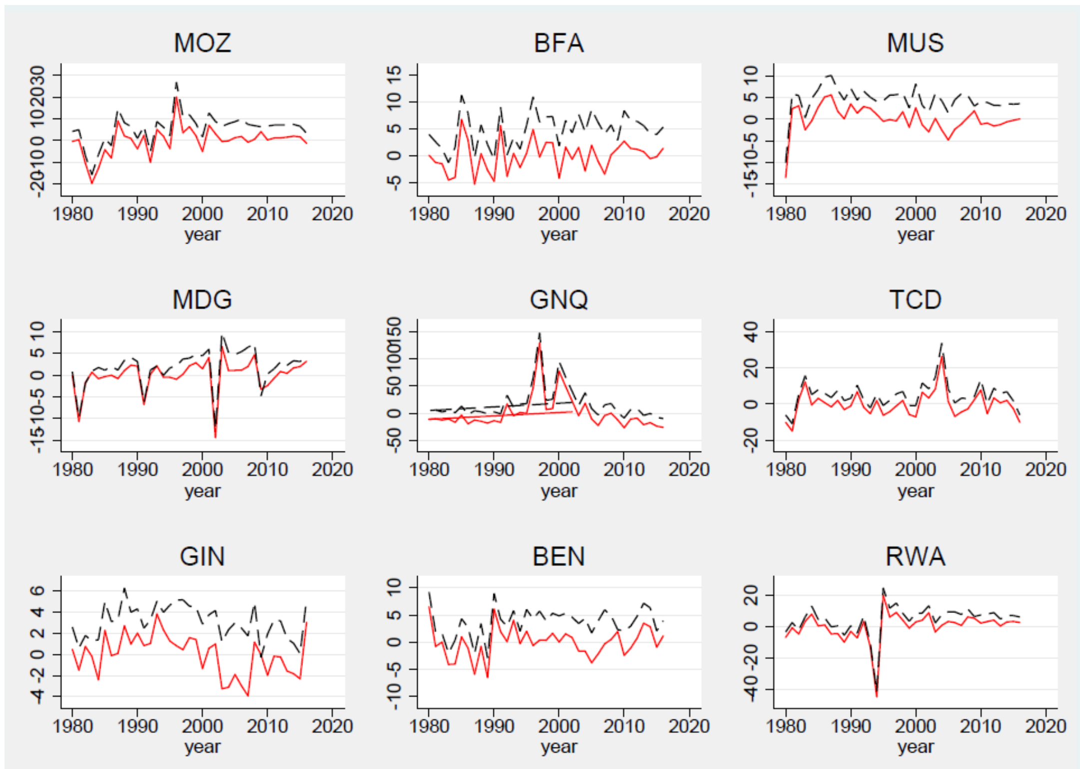
Annex I. Evolution of sub-Saharan Africa real GDP growth and idiosyncratic shocks to growth

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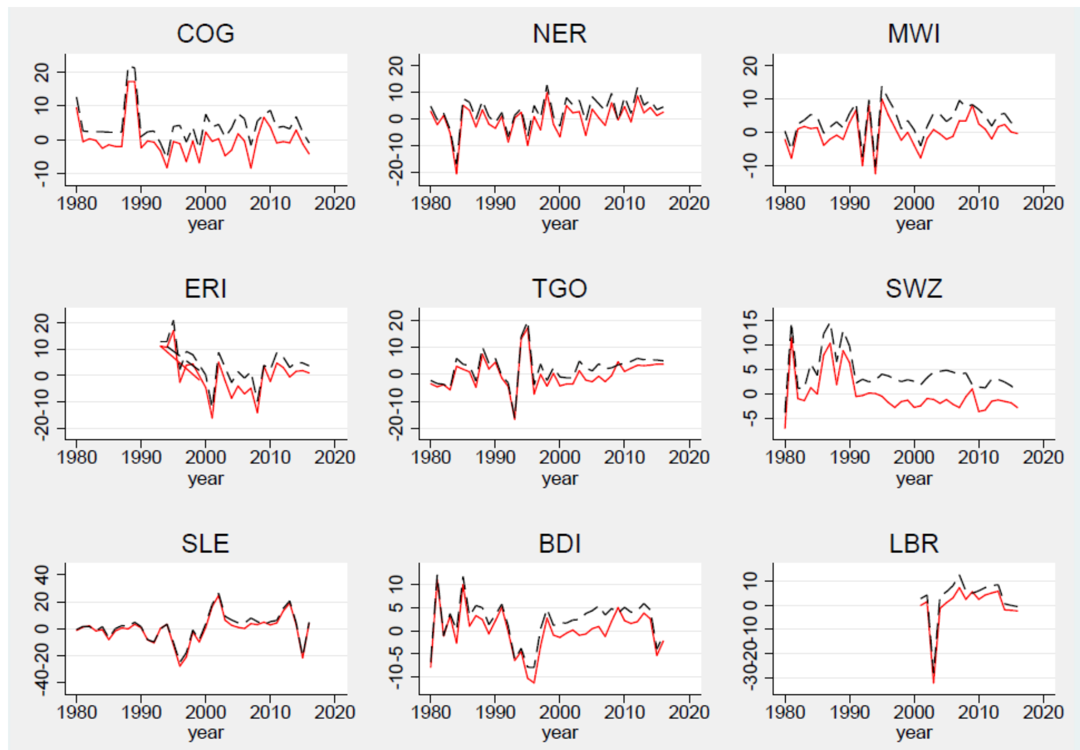
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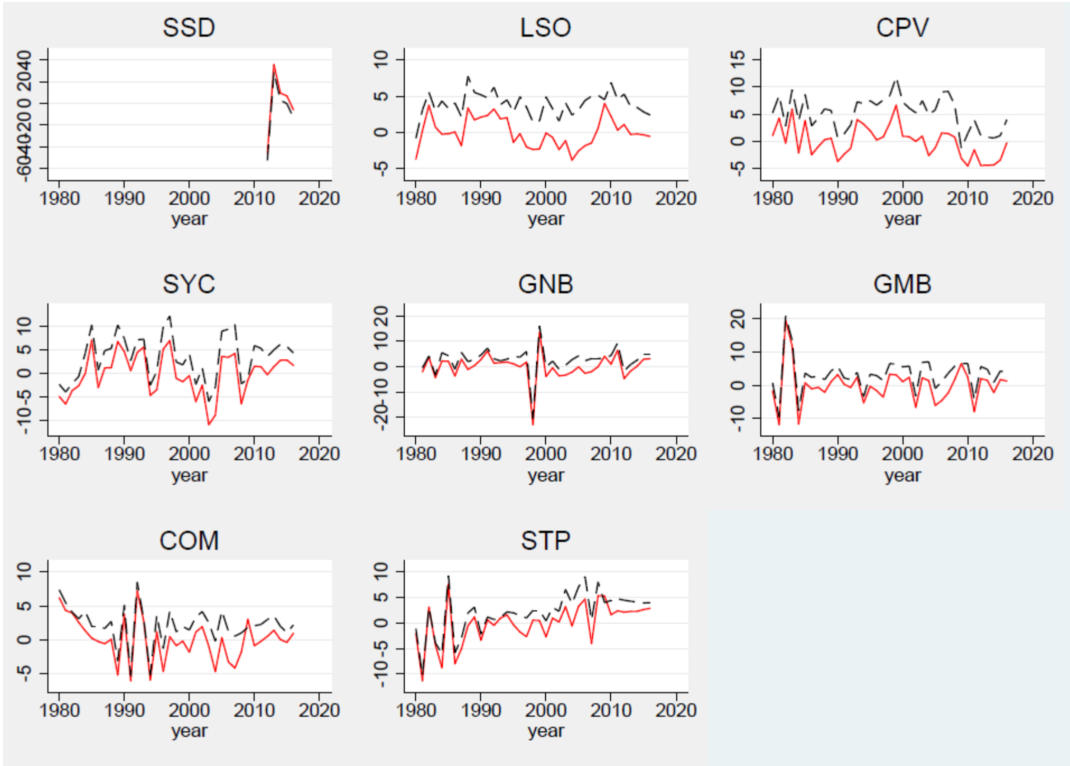

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