

Determinants of economic growth in Africa: An econometric assessment in the framework of the sustainable development goals

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Abstract---The race for inclusive development has led researchers to rethink the drivers of growth to achieve the Sustainable Development Goals (SDGs). This research note aims to explore the determinants of growth in Africa after analyzing the reference literature to select the explanatory variables. We examined growth in a panel of 54 countries belonging of the African continent using the generalized method of moment system estimators (GMM-sys) enter 2012 and 2022, controlling for idiosyncratic individual effects of countries with fixed-effects models. The use of GMM-sys to estimate growth patterns is not new, and many previous studies have used this appropriate approach for growth analyses. Based on the time series data collected and the estimation methodology used, the results show the determinants of African growth, and our results can have an implication for managers and policymakers interested in African emerging markets. Real GDP per capita with an order of delay is the most important variable in all models and we are expected to. In addition, we emphasize the importance of a strong governance and business environment in African countries to achieve the SDGs.

Keywords---development, per capita growth, Africa, SDGs, globalization, panel.

1- Introduction

The African Development Bank notes that North African countries are expected to see a slight increase in economic growth to 4.6% in 2023 and 4.4% in 2024 and are expected to make green

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growth an emergency. Thursday, July 27, in Tunis, the African Foundation released its annual report on the economic outlook for the North Africa region to 2023, under the overall theme “Mobilizing Private Sector Financing for Climate and Green Growth in Africa”. According to the World Bank Group, growth in the region is mainly driven by the services sector, especially trade and tourism. In 2022, growth in the region was moderate, at 4.1% compared to 5.4% in 2021. However, there are large variations between countries in the increase in the level of growth.

The “rise of Africa” has led academics and analysts to reconsider the issue of African economic growth. This affects the strategies of companies, and those of developed countries seeking to enter these emerging markets (Ferrucci et al., 2018; Scalomonti, 2022; Abdu et al., 2022). African countries that became independent from colonial rule in the 1960s experimented with their own model of cultural, social and economic development. According to development theory, all societies progress through similar stages of development, meaning that underdeveloped countries today are under the same conditions as developed countries in the past (Marini, 2004; Schwab, 2014, 2015). This means that underdeveloped countries are not simply a primitive version of developed countries but are unique in their characteristics and structures (De Jong, 2009; Hofstede et al., 2010).

Underdeveloped countries can accelerate their development, for example by implementing structural reforms, attracting capital flows and improving technology transfers, and they have increased integration along global value chains.

Although the political and macroeconomic framework of African countries may be unstable, these emerging markets are often seen as an opportunity, despite a given operational risk. In other words, labor markets may be poorly regulated, the rule of law may be deficient, and corruption may be high, logistical difficulties may depend on weak infrastructure or trade may be difficult due to the lack of codes of conduct and good practices.

Can African markets grow and break with their colonial trade past? On the other hand, can Africa successfully integrate into the global economy as it has done in other regions of the world?

Despite the difficulties, many African countries encourage the development of action programs and the implementation of structural reforms (Nafziger, 2012; Kuada, 2014; Mazrui and Wiafe-Amoako, 2015; Mol et al., 2017; Heshmati, 2017, 2018; Oluwatayo and Ojo, 2018; Wiafe-Amoako, 2021).

Over the past decade, Africa has experienced high levels of growth, but governance weaknesses remain. This means that the debate on the determinants of African growth is central for economists and academics. Economies in transition, such as emerging and developing economies, are experiencing clear socio-economic dynamism and, in the near future, will face the challenge of change, as will developed countries (Dallago and Casagrande, 2023). Globalization has shattered established production paradigms and new business opportunities have emerged around the world.

This has increased competition between companies to enter global value chains and pressure on emerging markets. These African trade exchanges with developed countries are mainly raw materials and commodities, whereas, if they are traded with developing countries, they are mandatory.

The state of crisis that began in 2008 never stopped. Previously, the sovereign debt crisis in the eurozone, then the uprisings in the Middle East and North Africa, and now the global pandemic caused by Covid-19, imbalances in US-China relations, and the war between Russia and Ukraine are severely hurting the global economy. Advanced economies are experiencing slow growth, or are at risk of a new recession, as they have begun to suffer from growing internal imbalances and income disparities that risk undermining long-term economic and social stability (IMF, 2020, 2021, 2022).

Interest in African emerging markets is increasing for at least three reasons: (i) governance in developed and developing countries, particularly in East and South Asia, is concerned with ensuring the supply of strategic raw materials to manufacturing industries; (ii) the so-called “African lions” –

Ethiopia, Ghana, Kenya, Mozambique, Nigeria and South Africa – have grown rapidly (IMF, 2019); (iii) he hopes that the Africa-AfCFTA Continental Free Trade Area Agreement will increase incomes in countries by at least 9% by 2035 (World Bank, 2020, 2022). Multilateral and free trade agreements will be important for the success of African countries, due to the economic and geopolitical processes that affect the globalized world.

Our research note therefore aims to explore the determinants of African growth on a panel of 54 units after analysis of the reference literature to select the explanatory variables. The rest of the work was structured as follows: (i) the reference literature, (ii) the data analysis, (iii) the conclusions.

2- Littérature Review

We found the reference literature to select the variables explaining African growth from the online search engine discovered.ed.ac.uk developed by the University of Edinburgh, by inserting the following title key: growth of Africa; filter: gross domestic product; deadline: 2011-2022, type of articles: business and economy. Table A.1 in the Annex presents a compilation of the reference literature on Africa's growth.

Development economists have produced many empirical studies on the drivers of growth, but their results may change over time and depending on the countries considered. As a result, the authors may explain growth differently, depending on the specific research questions or analytical methods they adopt. It appears from the reference literature that differences in economic policy between countries can explain their differences in economic growth.

Neoclassical economic theory views capital accumulation as an engine of growth, but endogenous growth models have also highlighted the key role of employment, productivity, human capital formation and technology, so that unemployment and low knowledge capital lead to slow growth (Solow, 1956, 1957; Lucas, 1988; Romer, 1990; Grossman and Helpman, 1990, 1991; Barro and Sala-i-Martin, 1992,1997). In other words, development can depend on public and private investment, foreign direct investment and international aid. The latter, if granted on the basis of the level of development achieved by the beneficiary countries, proved to be better. In addition, in a globalized world, some trade takes place along global value chains. For example, African trade with China has intensified because of diplomatic actions in countries rich in natural resources.

Neoclassical economic models consist of a set of assumptions useful for analyzing market behavior with appropriate mathematical formalization. In their assumptions, the appropriate unit of analysis is the individual consumer or company that rationally chooses from the available alternatives based on preferences, maximizing utility function or profit. Therefore, preferences are exogenous to models, transaction costs are zero, and information is perfectly available as implied by Coase's theorem. However, this can be misleading, as every individual or company always knows the quality of the goods offered and their prices. However, the neoclassical framework is a foundation for economic analysis.

Alternatively, two main theories of economic development emerged in the second half of the twentieth century. On the one hand, there is the "theory of modernization" that captures cultural and technological differences between countries as the explanation for their underdevelopment (Sadik-Zada, 2021).

The capitalist path must be a solution for underdeveloped economies and technology is the most important factor in the analysis of development, while cultural differences and traditionalist behaviors can be an obstacle to progress and innovation.

On the other hand, there is the "theory of dependence", which suggests that underdevelopment can be partly explained by the exploitation of poor countries by the rich, due to globalization that privileges some countries at the expense of others (Sadik-Zada, 2023).

The resource-rich countries of the South remain underdeveloped to the benefit of developed countries that export cheap raw materials, which are then processed in developed countries and then sold in developing countries as higher value-added manufactured goods. In most ex-colonial countries, there is a dependence on trade with ex-colonial countries, which adequately goes back to this experience that shaped economic relations. In the past, import substitution policies with locally produced products and inter- and intra-regional trade agreements have been adopted as solutions to this order of issues.

In conclusion, from our grouping on the reference literature, the most contested variable in empirical studies is the climate of governance. The institutional level reached by countries affects their business environment. In other words, there is a positive link between the quality of the institutional and business environment and growth, but this requires strong governance (Acemoglu and Robinson, 2012; Acemoglu et al., 2019; Babajide et al., 2021; Festré, 2021; Glegg et al., 2021; Lin, 2021; Razin, 2022). In fact, studies suggest that productivity, innovation, and a stable macroeconomic framework can affect growth based on the quality of the country's institutional and business environment.

A clustering in the reference literature was useful in determining which explanatory variables to include in the econometric models. We develop our models from the macroeconomic determinants of growth most used in empirical studies, such as openness, inflation, unemployment, external debt, net ODA, FDI inflows, remittances received, natural resource income, urbanization, public spending, fixed and human capital formation, innovation, productivity and, finally, the governance climate. In addition, we want to examine how global interdependencies between markets can help explain African growth (Cooper and Barro, 1997). In other words, growth can create the conditions for a country to have a competitive advantage in trade with other countries. Therefore, trade and growth may be dependent or independent, otherwise, when there is a negative relationship between them, it may depend on whether imports are higher than exports.

Accordingly, it seems to us necessary to include in our framework of analysis indirect variables for trade in goods of African countries between groups of developed and developing countries as researchers at the Banking Group have classified them.

Moreover, the academic and political debate on the balance between efficiency in resource allocation and public interventionism in the economy has led us to consider separately in our models the variables related to public expenditure, fixed and human capital formation, innovation and productivity.

To properly carry out this work, we will base ourselves on a diverse and recent literature, as presented in table 1, which gives a summary of the main authors as well as the methods and results found in relation to our problem.

Finally, we found studies that analyze growth with the Generalized Moment Method (GMM), but to our knowledge, there are no studies that analyze growth with a panel of 54 African countries and/or that use GMM estimators for the period 2012-2022.

Table 1: Summary of literature review, methodology and results

Author(s)	Methodology and results
Narayan et al. (2011)	They examine the relationship between democracy and economic growth in 30 SSA countries, finding mixed support for the Lipset theory in the long run.
Jaunky (2013)	He studies the linkage between democracy and economic development in 28 SSA countries over the period 1980–2005 using the GMM model. He has found that economic growth precedes democracy in the short run, while bi-directional causality is found in the long run. At

Author(s)	Methodology and results
	last, the effects on growth are positive.
Fayissa and Nsiah (2013)	They use fixed and random effects models, and GMM models for investigating the governance effect on African growth. They have found that governance contributes to the growth gap of African countries, which depends on the countries' income.
Toh (2016)	He investigates the long-run growth drivers of a group of SSA emerging economies. His findings indicate that the economies diverge more on economic characteristics, institutional quality, and governance than the slow-growth group.
Ogbuabor et al. (2020)	They examine the impact of governance on economic growth in Western Africa after the global economic recession using a panel of 13 countries and find a negative relationship between governance and growth. Specifically, corruption, government ineffectiveness, political instability, the weakness of the rule of law, and the absence of accountability are the main obstacles to growth, while the per-capita GDP, gross fixed investments, employment, and foreign direct investment are the other significant drivers of growth in the region.
Walle (2014)	He examines the long-run relationship between the financial development and growth in 17 SSA countries over the period 1975-2005 by applying an error correction term based on the co-integration tests for considering the cross-sectional dependence between the countries. He has found that there is a long-run relationship between financial development and growth, although there is a weak reverse causal impact.
Shaaba and Ngepah (2018)	On a panel of 35 African countries from 1990 to 2015, they analyse the relationship between military expenditure, industrialization, and growth, by finding that industrialisation and growth precede military expenditure in the short- and long run, but that military power can be used to achieve industrialisation and growth under given conditions.
Mensah et al. (2019)	They used ADL models to exaggerate the impact of public debt on growth in 38 African countries from 1970 to 2015, discovering that public debt stifles growth when it exceeds 50% of the country's GDP.
Arizala et al. (2020)	They investigate the effects of government expenditures and revenues on growth in SSA from 1990 to 2016. They discovered that cutting off public investments has a greater impact on growth than cutting off public consumption or increasing revenues. Attempts to consolidate public finances, on the other hand, have had a negative impact on short- and medium-term growth, which has been mitigated by financial adjustments
Ehigiamusoe and Lean (2020)	They examine the effects of public debt and deficit on growth in Western Africa by implementing empirical strategies that account for various econometric issues. They find that the impact of financial development on growth depends on the levels of debt and deficit. When debt and deficit levels exceed a certain threshold, the marginal effects of financial development on growth are negative.
Irun (2021)	He believes that the use of technology in financial systems can contribute to African growth in the long run, provided that other growth drivers such as human capital formation, openness, and infrastructural capital are present in the countries. However, financial development produces divergent responses to growth within African country clusters. Financial innovation in COMESA and ECCAS

Author(s)	Methodology and results
	causes growth, while that in ECOWAS and ARABMAG has been found to be dangerous to growth
Hagan and Amoah (2019)	Using an instrumental variable approach to panel data, they investigate whether the effect of foreign investments on African growth is dependent on the resilience of the financial system. They have found that when the financial markets are fragile, as they are in some African countries, the foreign investment inflows can have a small positive effect on growth.
Kumar and Saleh (2021)	They use co-integrated vector autoregressive analysis to examine the output and prices of tradable and non-tradable sectors in SSA countries. They find that aids have a heterogeneous effect on sectoral output and prices.
Ibrahim (2018)	He examines the effect of human capital formation on the financial depth and growth in 29 SSA countries over the period 1980-2014 by using GMM models. They discovered that human capital formation and financial depth both promote growth in the short and long run, with financial depth stimulating human capital formation.
Anetor (2020)	He analyses the impact of human capital formation on foreign direct investment and growth in 28 SSA countries over the period 1999-2017. He finds that SSA countries do not have a sufficient, high-quality workforce for absorbing and transforming the FDI's spillover toward growth.
Nwani (2021)	He examines the role of human capital formation in relation to foreign aid and growth in SSA countries from 1985 to 2019. He has found that foreign aid and human capital formation have a negative impact on growth, nevertheless, this impact is mitigated by the interaction between human capital formation and foreign aid, which reduces the negative effect of foreign aid on growth.
Udeagha and Ngepah (2021)	They use a non-linear ARDL approach for exploiting the relationship between openness and growth in South Africa over the period 1960-2016, by finding that there is a short- and long-run causality from the openness to the growth.
Bruckner (2012)	He analyses the effects of the value-added growth in the agricultural sector and per-capita GDP growth on the urbanisation rate in African countries over the period 1960-2007. He has found that an increase in the urbanisation rate has a negative effect on the per-capita GDP growth on average, but this does not affect the urbanisation rate. At last, he has found that a decrease in the value-added in agriculture leads to an increase in urbanisation.
Onjala and K'Akumu (2016)	They found that the relationship between GDP and urbanisation in sub-Saharan African countries differs from that in developed economies. Their results indicate that the traditional thesis is still valid in the SSA countries, in fact, they urbanise without growth. However, new trends emerge when urbanization coexists with growth.

Source: reformulation of the author with references to Francesco Scalamonti, 2024.

3- Data analysis

a. Econometric dataset and models

We used a set of explanatory variables from the UN dataset (UNCTAD and UNDP) and the World Bank dataset (World Development Indicators-WDI and World Governance Indicators-WGI) for the period 2012-2022 for the 54 African countries. Time series have been integrated, if necessary, for some missing values (2%) with data from the IMF (World Economic Outlook-WEO), otherwise from secondary sources (CIA-World Factbook country surveys). A dashboard dataset allows us to explore not only the transversal dimension, but also the variable over time. As a result, the reliability of our dashboard dataset based on its integrity is 98%.

In the appendix of Table A.2, we show the main descriptive statistics and proxies for the variables used. There is an acceptable level of variability in the time dimension, while the transverse dimension shows a higher level for some variables. In Table A.3, still in the Appendix, we show the statistical associations between variables that are not excessive for dependent variables and between returnees, in general.

Our estimation strategy examines Africa's growth using the Generalized Method of Moments (GMM) estimator. We calculated in the 2012-2022 time series the average value every two units of time, and then we have a fixed time series of five units of time. The use of a GMM to estimate growth patterns is certainly not new, and many previous studies have used this approach for growth analyses, so it is suitable for a study like ours. In other words, this estimator makes it possible to correct for endogeneity when using a panel data set with potentially endogenously determined variables (Bond et al., 2001). Using orthogonality conditions, GMM estimators allow efficient estimation even in the presence of heteroskedasticity of unknown shape.

We adopted the GMM system estimator in “two steps” (Arellano and Bover, 1995; Blundell and Bond, 1998). This procedure is more efficient than differentiation, especially for a panel dataset like ours, where N is greater than T . The GMM-sys extended the difference model by adding level equations to the regressions executed in the first differences. The second equation allows the introduction of additional instruments.

In other words, for endogenous variables in levels, their own differential differences serve as instruments, which increases the efficiency of the additional moment conditions. This means that modelling also addresses finite sample bias if the variables are very persistent and used as weak instruments for early differences (Bond et al, 2001). We also used Windmeijer's (2005) finite sample bias correction for robust standard errors in models. Finally, an impartial GMM estimator depends on the validity of the instruments and keeping the number of instruments below the number of groups is a good general rule (Roodman, 2009a, b).

Instruments must be correlated with endogenous instrumented variables while adjusting to the orthogonality condition to avoid errors (Baum, 2003). A high p-value for Sargan and Hansen is a confirmation of the correct specification of the models in the null hypothesis of non-over-identification and instrumental validity.

On the one hand, Sargan relies on the assumption of homoecetic errors, but this limits the strength of the test when the assumption is weak. On the other hand, the test is not exposed to the same instrumental proliferation weaknesses as the Hansen test.

Based on our heterogeneous dataset, there is a high probability of idiosyncratic shocks in each country, and there is a possible breach of the hypothesis of homocedasticity. Considering the Sargan

test alone can be misleading, while considering both tests can be more convenient. However, Hansen's test is better in our case.

The dependent variable is real GDP per capita, and the dynamic specification is given by the same dependent variable with a shift order in the models. We estimated models with time returns t , and $t-1$ to account for the possible delayed effect of macroeconomic policies on variables, or the lingering effect on trade. The models were estimated with the open-source statistical software Gretl, as follows [1]:

$$Yy_{i,t} = \alpha Y - 1 + \beta X + \delta X - 1 + \dots [1]$$

where, $y_{i,t}$ is the vector of the dependent variable; $Y, -1$ is the vector of the dependent variable with a shift order on the right side of the equation; X , and $X - 1$ are vectors of time-varying explanatory variables; with a shift order, these capture the closest and most significant between the shifted effects of macroeconomic policies and the persistence of trade; it is the vector of time-specific unobserved idiosyncratic effects to avoid contemporary correlation due to time-related shocks; finally, α , β and δ are vectors of the coefficients that want to be estimated, it is the vector of the idiosyncratic individual and the time-specific error terms in the returns.

Finally, we also estimated fixed-effect models to control for unobserved idiosyncratic individual effects of countries, such as cultural, ethnic and religious countries, that can indirectly influence growth, and without dependent variables with a shift order on the right side of the equation to avoid a multicollinearity problem, but with temporal mannequins to control time-related shocks.

We selected the list of setting retarders that implement a sequential selection algorithm that minimizes the Akaike-AIC information criterion (Chakrabarti and Ghosh, 2011). The Wald test is displayed for the joint significance of turrets, fixed effects, and temporal mannequins, as well as the Welch test for selecting the fixed effects model over pull-OLS.

b. Definition and interpretation

The models estimated with the significant variables are presented in Tables 2 and 3. In Table 3, we show models with fixed effects to account for cultural, ethnic and religious characteristics that can contribute more to promoting growth and explaining possible differences between countries.

Real GDP per capita with an order of delay is the significant variable with the greatest magnitude in all models. We are consistently expected the literature on growth.

However, its importance and positive magnitude for the lagging variable may be affected by competitive devaluations in related currency markets implemented by policy makers to encourage import-export, otherwise it may be linked to short-term assessments of labour market efficiency. In addition, external debt was deemed significant, meaning that African countries needed to finance their growth based on the financial development fundamentals of international organizations (Mbate, 2013; Kedir et al., 2017; Mensah et al., 2019; Ehigiamusoe and Lean, 2020; Idun, 2021).

Openness is significant and it is not uncommon for the most liberalized economies to be better positioned along global value chains, for example by benefiting from positive productivity externalities when learning through trade, or through collaborations and competition in international markets (Chang and Mendy, 2012; Elhiraika et al., 2014; Brueckner and Lederman, 2015; Koomson-Abekah and Nwaba, 2018; Osei et al., 2019; Udeagha and Ngepah, 2021; Abdu et al., 2021). However, rapid opening-up can also harm development, if it does not happen in the right way and at the right time, especially in developing countries, where they tend to specialize in traditional productions or in industries where innovation is not at the heart, thus becoming more vulnerable to negative external shocks. This means that the effect of openness on growth can be ambiguous in developing countries, and greater openness can have an exclusionary effect on domestic growth and investment.

However, greater openness can increase productivity, facilitate the modernization of the manufacturing industry, promote technological and institutional progress, and ultimately increase capital accumulation, resulting in increased intermediate imports of manufactured goods and exports of goods.

Productivity reflects the manufacturing industry's ability to add value to products. Increased productivity has important implications for growth. Although the variable displayed in the following models is significant, it has a negative sign. This effect may depend on the positioning of countries' manufacturing systems along global value chains, mainly in that of traditional industries.

The income from natural resources is significant. Resource-rich countries are typically characterized by high dependence on them, low economic diversification, and volatility in the prices and incomes of their commodities. As a result, a negative sign for the variable with a delay order refers to an exclusion effect, i.e. the Dutch disease due to the abundance of natural resources and raw materials.

In developing and emerging economies, FDI inflows may contribute to growth in a different way, but evidence of their effect may be mixed (Poku, 2016; Shittu et al., 2020; Hagan and Amoah, 2020). In fact, we found evidence that FDI inflows affect growth positively, but by controlling for fixed effects that contribute negatively. However, this evidence is not too strong, and the magnitude of the estimated coefficients is very small. In other words, it may depend on the degree of complementarity, or the substitution effect between FDI and other foreign capital, such as net ODA and remittances received, or countries' internal policies on physical investment and human capital formation. Otherwise, it may be due to increased competition in the markets. As a result, its net effect can be positive even if the substitution effect has supplanted domestic fixed investment. After eliminating the effect of FDI inflows and those of variables representing innovation: ICT productivity and diffusion, it was found that the effect of human capital formation and gross fixed investment is significant and with a positive sign on the models.

Thus, in line with our expectations, gross fixed investments as well as the unemployment rate were considered significant (Seetanah and Rojid, 2011; Calderón and Boreux, 2016; Shittu et al., 2020). Gross fixed investment was found with a positive magnitude, while the unemployment rate and that of a delay order were found with a negative and positive magnitude, respectively. Gross fixed investment and unemployment rate are variables related to the income equation and labour market efficiency.

Human capital represented by greater training, or a higher level of education, is generally associated with greater growth (Kagochi et al., 2013; Kayaoglu and Naval, 2017; Ibrahim, 2018; Anetor, 2020; Nwani, 2021), however, we would find that its effects that have a direct and indirect impact on growth are also positive, negative or neutral. Remittances can have an effect on the economy to which they are directed via the Keynesian multiplier. Even if all income is consumed by the households that received the remittances, this would indirectly stimulate the exogenous component of demand, as there will be a general increase in overall income. This suggests that migrant workers' incomes represented by late remittances contribute positively to Africa's growth (Adusah-Poku, 2016).

Remittances received are also linked to population growth and the rate of migration to developed countries with better growth prospects. In fact, urban population growth with an order of delay is also significant and with a positive sign in the models of Table 2, although in the models of Table 3, by controlling for the fixed effects of countries, its magnitude is negative (Bruckner, 2012; Onjala and K'Akumu, 2016; Oluwatayo and Ojo, 2018). This may be related to the rate of population growth, the expansion of urban areas and the development of global cities after an increase in income, or vice versa; in any case, good national governance is needed. In other words, quality and institutional stability positively influence countries' growth. Improvements in the institutional and business

environment can have indirect effects on growth. As a result, the governance climate is an important indicator of the level of development achieved by a country, and it was found to be significant and with a positive sign.

Macroeconomic variables related to public expenditure, such as government, health and military expenditure, net ODA and ICT diffusion were not found to be significant in the models in Table 2, but they are significant in the models in Table 3, after controlling for country fixed effects (Seetanah and Rojid, 2011; Pinkovskiy and Sala-i-Martin, 2014).

Public expenditure is an indicator of the bureaucratic size of governance and may be associated with a negative impact on growth due to the issue of allocation of available resources (Arizala et al., 2020). Health expenditure and military expenditure with an order of delay were found to be significant and had a positive and negative impact on growth, respectively, although the second without the delay had a positive impact (Ahmed, 2012; Akhmat et al., 2014; Shaaba and Ngepah, 2018). However, assessing these impacts should be difficult, especially in economies with permanent or semi-permanent war and unrest, or because they could be related to other exogenous variables not accounted for (Mijiyawa, 2013; Nsiah et al., 2016; Boreux and Calderón, 2016; Franses and Welz, 2022).

The effect of net ODA is also significant and negative. Indeed, international aid can displace growth, whether it is not governance-led towards social and economic progress or poverty reduction (Alemu and Lee, 2015; Adusah-Poku, 2016; Cai et al., 2018). In other words, democracy and political rights promote growth, while protectionism of elite interests depresses it (Gaibulloev and Sandler, 2011; Narayan et al., 2011; Bertocchi and Guerzoni, 2012; Jaunky, 2013; Fayissa and Nsiah, 2013; Ahlerup et al., 2016; Toh, 2016; Epaphra and Kombe, 2017; Ogbubor et al., 2020).

Finally, the diffusion of ICT was considered significant in the models of Table 3, after the control of the fixed effects of the countries. Although the use of new technologies such as the Internet and mobile devices has been found to be significant in growth studies, its meaning or absence may depend on the variables used as proxies (Batuo, 2015; Donou-Adonsou et al., 2016; David, 2019; David and Grobler, 2020; Ngameni et al., 2022). According to Haftu (2019), African societies are lagging in the adoption of new information and communication technologies.

In Table 3, we show models with indirect variables for merchandise trade of African countries in groups of developed and developing countries considered separately, and as classified by World Bank Group researchers. In the models below, the significant indirect variables of African merchandise trade between the groups of developed and developing countries are lagging exports to the group of developed economies with a positive magnitude, as well as imports and exports to or from the group of developing economies in East Asia or the Pacific, in which the Asian giants China and India are the two fast-growing economies, and imports from LMDCs in North Africa or the Middle East were found to be significant. Then, no other significant evidence was found in the remaining country groups.

Meanwhile, in the models presented below in Table 3, we found evidence of a positive link with the group of developing economies in Latin America or the Caribbean and those in North Africa or the Middle East, as well as with exports to developed economies lagging.

On the other hand, imports and exports from or to South and East Asia or the Pacific proved significant with a negative magnitude in growth, as well as, similarly, imports of HDC with a lag order, imports of LMDC in sub-Saharan Africa and exports to the LMDCs grouped in Europe or Central Asia, in which the Russian economy leads.

Sargan and Hansen's tests, Wald's tests on turrets and time dummies, as well as adherence to the general rule to keep the number of instruments below the number of cross-sectional units,

demonstrate the reliability of our model estimates. In addition, Wald and Welch's tests calculated on fixed-effect models confirm the reliability of the estimates.

Table 2. GMM system models with macroeconomic framework variables

	Model (1)			Model (2)			Model (3)			Model (4)			Model (5)			Model (6)		
	Real per-capita GDP																	
	Coeff.	Std. Err.		Coeff.	Std. Err.		Coeff.	Std. Err.		Coeff.	Std. Err.		Coeff.	Std. Err.		Coeff.	Std. Err.	
Real per-capita GDP (t-1)	1.227	0.220	***	1.029	0.106	***	1.062	0.184	***	1.158	0.157	***	0.994	0.177	***	1.126	0.183	***
FDI Inflows	0.008	0.012		0.001	0.008		0.003	0.013					-0.008	0.011		0.002	0.013	
FDI Inflows (t-1)	0.016	0.007	**	0.013	0.009		0.010	0.007					0.009	0.008		0.014	0.008	*
Inflation	-0.670	0.160	***	-0.638	0.118	***	-0.645	0.146	***	-0.651	0.138	***	-0.565	0.223	**	-0.594	0.243	**
Inflation (t-1)	0.905	0.204	***	0.883	0.148	***	0.892	0.175	***	0.901	0.191	***	0.816	0.301	***	0.832	0.323	**
Openness	-0.199	0.064	***	-0.167	0.057	***	-0.206	0.078	***	-0.248	0.064	***	-0.169	0.084	**	-0.144	0.062	**
Openness (t-1)	0.149	0.057	***	0.139	0.057	**	0.187	0.059	***	0.209	0.057	***	0.165	0.070	**	0.112	0.060	*
Natural Resources Rent	0.090	0.042		0.052	0.028		0.067	0.040		0.084	0.036		0.043	0.044		0.053	0.036	
Natural Resources Rent (t-1)	-0.053	0.030		-0.035	0.027		-0.064	0.034		-0.075	0.035		-0.042	0.033		-0.027	0.025	
Government Expenditure				-0.078	0.068													
Government Expenditure (t-1)				0.061	0.074													
Productivity	-0.467	0.206		-0.302	0.177					-0.456	0.183					-0.320	0.176	
Productivity (t-1)	-0.299	0.164		-0.351	0.220					-0.142	0.184					-0.340	0.148	
External Debt	-0.212	0.052	***	-0.210	0.049	***	-0.235	0.051	***	-0.244	0.053	***	-0.229	0.045	***	-0.207	0.047	***
External Debt (t-1)	0.197	0.050	***	0.224	0.050	***	0.234	0.056	***	0.211	0.053	***	0.241	0.054	***	0.196	0.051	***
Unemployment	-0.148	0.074	**	-0.103	0.045	**	-0.114	0.054	**	-0.146	0.064	**	-0.098	0.056	*	-0.120	0.056	**
Unemployment (t-1)	0.118	0.052	**	0.111	0.043	**	0.089	0.043	**	0.120	0.050	**	0.076	0.045	*	0.099	0.041	**
Military Expenditure				0.011	0.052		-0.046	0.077		-0.084	0.063							
Military Expenditure (t-1)				0.002	0.062		0.051	0.077		0.063	0.072							
Health Expenditure				-0.003	0.052		-0.016	0.053		0.005	0.060							
Health Expenditure (t-1)				-0.033	0.062		0.002	0.061		-0.027	0.057							
Received	0.010	0.012		0.007	0.010		0.005	0.009					0.009	0.010		0.008	0.009	

	Model (1)			Model (2)			Model (3)			Model (4)			Model (5)			Model (6)		
	Real per-capita GDP																	
	<i>Coeff.</i>	<i>Std. Err.</i>		<i>Coeff.</i>	<i>Std. Err.</i>		<i>Coeff.</i>	<i>Std. Err.</i>		<i>Coeff.</i>	<i>Std. Err.</i>		<i>Coeff.</i>	<i>Std. Err.</i>		<i>Coeff.</i>	<i>Std. Err.</i>	
Remittances																		
Received Remittances (t-1)	0.017	0.010		0.012	0.012		0.009	0.007					0.004	0.008		0.013	0.010	
Net ODA	0.053	0.069					0.019	0.058		0.049	0.055		0.009	0.054		0.033	0.058	
Net ODA (t-1)	0.048	0.050					0.024	0.049		0.049	0.046		-0.008	0.044		0.021	0.046	
Urban Population2	-0.099	0.053	*	-0.071	0.056		-0.080	0.047	*	-0.115	0.066	*	-0.021	0.037		-0.076	0.046	
Urban Population2 (t-1)	0.094	0.052	*	0.072	0.066		0.081	0.046	*	0.114	0.067	*	0.023	0.044		0.076	0.046	
Human Capital Formation										0.009	0.028		0.003	0.031		-0.002	0.026	
Human Capital Formation (t-1)										0.054	0.031		0.047	0.027		0.022	0.029	
Gross Fixed Investments										0.109	0.054		0.090	0.067				
Gross Fixed Investments (t-1)										-0.046	0.058		-0.033	0.067				
ICT diffusion	0.006	0.066		-0.036	0.057					0.038	0.073					-0.005	0.069	
ICT diffusion (t-1)	-0.123	0.089		-0.056	0.059					-0.090	0.075					-0.083	0.076	
	0.213	0.158		0.135	0.110		0.131	0.124		0.109	0.108		0.144	0.137		0.227	0.124	*
Governance Climate (t-1)	-0.351	0.282		-0.101	0.152		-0.170	0.265		-0.176	0.189		-0.159	0.276		-0.297	0.216	
Standard Error	0.096			0.087			0.092			0.092			0.089			0.093		
Regressors Wald-Test (p-value)	(0.000)			(0.000)			(0.000)			(0.000)			(0.000)			(0.000)		
Time Dummies Wald-Test (p-value)	(0.000)			(0.000)			(0.000)			(0.000)			(0.000)			(0.000)		
AR (2) Test (p-value)	(0.660) 54 (20)			(0.918) 54 (20)			(0.820) 54 (20)			(0.820) 54 (20)			(0.640) 54 (20)			(0.758) 54 (20)		
Observations (%)	-80			-80			-80			-80			-80			-80		
Sargan Test (p-value)	(0.912) (0.952)			(0.429) (0.740)			(0.824) (0.852)			(0.824) (0.852)			(0.299) (0.529)			(0.340) (0.843)		

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)		Model (7)				
	Real per-capita GDP																
	<i>Coeff.</i>	<i>Std. Err.</i>		<i>Coeff.</i>	<i>Std. Err.</i>		<i>Coeff.</i>	<i>Std. Err.</i>		<i>Coeff.</i>	<i>Std. Err.</i>		<i>Coeff.</i>	<i>Std. Err.</i>		<i>Coeff.</i>	<i>Std. Err.</i>
Caribbean (t-1)																	
Imports from LMDCs in Europe or Central-Asia						0.004	0.016										
Imports from LMDCs in Europe or Central-Asia (t-1)						-0.010	0.018										
Exports to LMDCs in Europe or Central-Asia						-0.010	0.007										
Exports to LMDCs in Europe or Central-Asia (t-1)						0.005	0.009										
Imports from LMDCs in Eastern-Asia or Pacific									-0.055	0.057							
Imports from LMDCs in Eastern-Asia or Pacific (t-1)									-0.068	0.033	*						
Exports to LMDCs in Eastern-Asia or Pacific									0.026	0.011	*						
Exports to LMDCs in Eastern-Asia or Pacific (t-1)									-0.024	0.011	*						
Imports from LMDCs in Southern-Asia												-0.033	0.033				
Imports from LMDCs in Southern-Asia (t-1)												0.016	0.036				
Exports to												0.013	0.013				

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)		Model (7)				
	Real per-capita GDP																
	Coeff.	Std. Err.		Coeff.	Std. Err.		Coeff.	Std. Err.		Coeff.	Std. Err.		Coeff.	Std. Err.		Coeff.	Std. Err.
Test (p-value)																	
Time Dummies Wald-Test (p-value)	(0.000)			(0.000)			(0.000)			(0.000)			(0.000)			(0.000)	
AR (2) Test (p-value)	(0.238)			(0.226)			(0.269)			(0.556)			(0.421)			(0.188)	
Non-Observations (%)	54 (20)			54 (20)			54 (20)			54 (20)			54 (20)			54 (20)	
Observations (%)	216			216			216			216			216			216	
	-80			-80			-80			-80			-80			-80	
Cross-Sectional Units	54			54			54			54			54			54	
Sargan Test (p-value)	(0.008)			(0.012)			(0.013)			(0.061)			(0.004)			(0.005)	
Hansen Test (p-value)	(0.156)			(0.224)			(0.226)			(0.400)			(0.161)			(0.173)	
Instruments	17			17			17			17			17			17	

Note: *** significance for $\alpha = 0.01$ ** significance for $\alpha = 0.05$ * significance for $\alpha = 0.10$

Source: Autho

Conclusion

This study analyzed growth in a panel of 54 African countries using the generalized method of moment estimators (GMM) over the period 2012-2022. We also controlled for unobserved individual idiosyncratic effects of countries with fixed-effect models. In addition, we introduce an element of novelty in the analysis, considering African growth in relation to specific degrees of openness as the proxy of merchandise imports and exports for groups of developed and developing countries, as defined by World Bank Group researchers. Thus, from the time series data collected and the estimation methodology used, our results show the determinants of Africa's growth over the period 2012-2022.

Finally, on the question we raised in the introduction, where he wonders if Africa can break with its colonial trade past, we found evidence of a trade dependency added to that of the conglomerate of developed countries, in which certainly the former colonizing countries are located, in fact, we found evidence of a trade dependency with the conglomerate of developing countries.

A more developed institutional and business environment should lead to long-term sustainable African growth, but this depends on strong governance. Indeed, it was found that the governance climate is significant in the models.

In general, the importance of imports and exports from or to LDCs may depend on favourable links between developing countries that, for example, have a similar institutional and trading environment, or a similar technological gap compared to developed countries. However, the importance found in trading with HDC highlights the link throughout global value chains between African and developed markets.

Therefore, both statistical meanings may depend on the links found by growth studies that analyze development in the North-South and South-South frameworks. This may explain the trade relationship that exists throughout global value chains between African markets and developed and developing countries.

Global value chains developed in the new millennium, and low transport costs, low trade barriers, a few embargoes, as well as technological and financial outflows, made this possible, but it also meant greater uncertainty in the markets, which are then closely linked to each other (World Bank, 2020, 2022). This means that economies in transition face negative aspects related to globalization. As a result, there is a compensation between the reduction of trade barriers and technological advances resulting from international specialization of production, and the exposure of countries and their companies to economic and political imbalances and shocks (Togati and Visaggio, 2016).

In developing countries, trade in semi-finished products has intensified business activities along global value chains, but these goods may escape national accounting due to the lack of international accounting harmonization (Wolf and Zedillo, 2015). It should be considered that the system of harmonization of national accounts developed by the UN Statistical Commission has stagnated in the fifth version since 2008 as an update of the previous one launched in the early 1990s. Therefore, by causing an intensification of trade along global value chains, products can transit from one developing country to another after having had an increase in value at least equal to the cost of labour and, in turn, they can return to developed countries, but without having been properly accounted for. This means that a “country factory” may display macroeconomic structures characterized solely by consumed income, for example as small economies focused on import and export activities with dominant manufacturing output.

c. Policy implications

In the future, Africa's growth may depend more on strong governance, but countries should improve their institutional and business environments to achieve more inclusive and sustainable growth (Acemoglu et al., 2019; Lin, 2021). African governance could drive growth, whether by applying policies that incentivize exports rather than imports or by improving opportunities for businesses (Glegg et al., 2021). Strong institutions and forward-looking policies can therefore drive companies towards progress, technological specialization and well-being (Kurtishi-Kastrati, 2013; Collier, 2014; Trebilcock, 2015; Kim and Heshmati, 2019; Farahane and Heshmati, 2020; Babajide et al., 2021).

However, changes in institutional structures are typically loaded with: (i) a large inertial mass to change in defense of elite interests; and (ii) slow adaptive responses characterized by many societies. As a result, the acceptance of a new techno-economic paradigm and a new socio-institutional system is a difficult process, as the country will have to bear a higher cost due to the specificity of its historical development trajectory and the variety that characterizes the capitalist system as an expression of the institutional structure (Acemoglu and Robinson, 2012; Granovetter, 2017).

Socio-economic and institutional transition processes will inevitably lead to internal contradictions within capitalism and paradigmatic fluctuations. Recurrent crises show that the governance of globalization is an important subject related to capitalism (Dallago and Casagrande, 2023).

In the capitalist system, there will be a certain egoistic impulse to the accumulation of capital, so that intrinsic instability is not its failure, but constitutes its vital impulse (Razin, 2022). Therefore, capitalism is changing by

nature, and its capacity for self-production does not contribute to making the socio-economic system stable for too long.

In other words, social progress depends on the choices made by agents and the likelihood of an endogenous shock in the system, so that it triggers a dynamic process of change (Hallett et al., 2010). This process would evolve the system for incremental jumps, and prospective alternative solutions would be those near the optimal points of the Murian border. It is precisely the proximity of the socio-economic system to these effective points of Pareto that triggers the change, which makes mobility over time the stable state achieved by the system. This means that the disturbances, triggered by the agents within the socio-economic system, push it towards a "natural" search for possible Nash equilibria, which would then be chosen from among those who support and not from among those who respond to the logic of maximization (Festré, 2021).

The global pandemic and the war in Eastern Europe show that global governance is an important topic at the current stage of globalization (Cowling and Tomlinson, 2011; Author et al., 2016; Eichengreen, 2018; Saccone, 2021). The evolution of the world economy has for too long been left solely to the regulatory automatism of the markets, which has increased social inequalities.

The trajectory of globalization is progressively eroding stability and social cohesion in advanced and emerging economies, as it is not consciously governed. Globalization, on the other hand, can foster convergence between countries while increasing economic and political competition between them by causing a disruption of global balances (Heshmati and Lee, 2010; Valli, 2018; Obstfeld, 2020; Marelli and Signorelli, 2022).

In recent years, more attention has been paid to the relationship between growth and well-being. Two commonly adopted indicators are GDP per capita and the United Nations Human Development Index-HDI. The first is widely used and is available every year for all countries, although it only measures the economic dimension of development and suffers from some methodological problems, it remains a reliable growth rate. The second is better, but data may not be available for all countries.

In other words, the HDI is a composite and synthetic indicator that measures, on average, the country's performance according to three aspects: life expectancy at birth, schooling and income. However, another indicator that takes social impacts into account is also the Social Progress Index-SPI, developed by Porter et al. (2014) from the work of Sen, North and Stiglitz. This index measures society's ability to meet basic human needs and improve people's quality of life, so that everyone can aspire to the best personal achievement possible. Therefore, the HDI and SPI are indicators of well-being that prioritize social progress over economic progress.

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