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**The Impact of Quality Foundational Skills on
Youth Employment in Africa**

Does Institutional Quality Matter?

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ABSTRACT

Despite impressive progress in the economic performance of many African countries in recent years, youth unemployment remains one of the continent's main socioeconomic and political problems. This study employs panel data covering 49 African countries for the period 2000–2017 to provide the first attempt to explicitly examine the dynamic relationship between quality foundational skills, measured by basic education quality (teacher-pupil ratio), and youth unemployment, while considering the conditional role of institutional capacity, measured by control of corruption, regulatory quality, and financial development. The empirical estimation in this paper is based on a two-step system generalized method of moments (SGMM), in order to control for unobserved heterogeneity and potential endogeneity of all the explanatory variables. The following are the main findings: First, youth unemployment is persistent in Africa. Second, quality of basic education exerts a negative impact on youth unemployment. Third, greater control of corruption, improved regulatory quality, and better structured financial sectors strengthen the effect of quality basic education in reducing youth unemployment. These findings provide a clear policy pathway for reducing youth unemployment. In particular, we recommend that better quality basic education, a well-structured financial structure, and institutional quality should constitute a fundamental component of the policy mix to reduce youth unemployment in Africa.

Keywords: Basic education, job creation, youth; institutions, Africa

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ACRONYMS

ILO	International Labour Organisation
SGMM	System Generalized Method of Moments
SSA	Sub-Saharan Africa
WDI	World Development Indicators
WGI	World Governance Indicators

1 INTRODUCTION

The past two decades have seen remarkable economic growth in Africa. For instance, sub-Saharan Africa (SSA) recorded over 4.5 percent average growth rate between 2000 and 2012, compared to a 2 percent growth rate recorded over the preceding 20 years (World Bank 2018). This growth has certainly resulted in the creation of jobs, however, the number of jobs created is insufficient to absorb the large youth population. Hence, youth unemployment remains a socioeconomic and political challenge in the African continent (Baah-Boateng 2016). On the average, the youth unemployment rate in Africa is almost double that of adults, as the number of formal jobs created in Africa annually is only about 3 million, whereas there are about 10 to 12 million youths seeking employment each year (African Development Bank 2018).

The role of quality education in reducing youth unemployment is emphasized by development agencies and government bodies, with the understanding that quality education is crucial to obtaining not only cognitive skills but also technical and socio-emotional skills required for creating jobs and sustained economic growth (Nieuwenhuis 2012). The proponents of human capital theory often argue that investment in quality education increases the innovation capacity of the labour force which, in turn, fosters the creation of opportunities (Hanushek & Woessmann 2008; Nieuwenhuis 2012). There is a concordant increase in educated youths even as the entire youth population keeps increasing across Africa (ILO 2019). The African Development Bank (2018) estimated the proportion of youth aged 20–24 years with secondary education will increase from 42 percent in 2018 to 59 percent in 2030. The increasing share of educated youth signifies positive effects in terms of the increase in human capital and productive and innovation capacities (Baah-Boateng 2016). Similarly, many African countries have dedicated considerable portions of their budgets to improving the educational system. For example, in 2018/2019, South Africa budgeted about 16.7 percent of total government revenue to its basic education programme, while Tunisia devoted about 22.9 percent of general government expenditure to education (World Bank 2018). Despite these efforts, young people with educational qualifications but lacking access to employment opportunities have become a common problem in many African countries. The observed differences in the severity of youth unemployment across countries depends, to some extent, on how well the national institutions such as financial, political, and legal institutions are structured (Ryan 2001). Some countries have therefore created or reinforced an institutional framework to support entry into the labour market. The major concern then is the strength and quality of such institutions (Baccaro & Rei 2007; Sachs & Smolny 2015).

The quality of institutional arrangements, especially those relating to education and labour market conditions, is very important to the evolution of the ‘school-to-work’ transition framework and to shaping employment in an economy (Nickell 2003; Brzinsky-Fay 2017). According to Rodrik *et al.* (2004), quality institutional and financial structures are crucial to all economic phenomena because they determine the outcome efficiency of all investments in economic processes. Several studies have argued broadly that local institutional conditions and access to finance are crucial in shaping trajectories of economic growth indicators, including unemployment rates, in different regions of the world (Rodríguez-Pose & Storper 2006; Tanveer Choudhry *et al.* 2012; Rodríguez-Pose 2013; Ogunniyi *et al.* 2018; Opeyemi *et al.* 2019; Ogunniyi *et al.* 2020). However, most of the existing studies focus only on the impact of government policies that are targeted directly at economic growth indicators such as unemployment, with less attention paid to the relevance of the institutional structures, such as the rule of law, political stability, voice and accountability, and the government’s effectiveness as well as its ability to control corruption. For example, financial malfeasance and neglect of the rule of law on the part of the Malawian government in the sale of the country’s strategic grain reserve triggered the country’s terrible 1949 famine (Clover 2003).

Based on the complexities involved in the interaction of social, economic, cultural, and political factors across African states (Issahaku *et al.* 2018), and the resultant effect on youth unemployment, it is important to analyse the overall basic education-youth unemployment-institutional quality nexus. As noted in preceding paragraphs, most empirical studies have focused on the influence of one institutional factor on employment, and this has produced inconclusive results. The observed inconclusiveness of these findings may be due to the quality of institutions as well as the interrelationship among institutional forces (Brzinsky-Fay 2017).

This paper focuses on the moderating role of institutional quality in measuring the effect of quality basic education on youth unemployment in a cross-country framework. Investigating the link between youth employment and institutional structures is not a new idea in global development literature. For instance, Brzinsky-Fay (2017) studied the relationship between labour markets, educational institutions, and youth unemployment, finding that no single institution sufficiently explains youth unemployment, but the phenomenon results from an interplay of institutional forces. Baah-Boateng (2016) also carried out an empirical assessment of the main causes of youth unemployment and found that the youth population surge and poor economic growth are the prime drivers of youth unemployment in Africa. Similarly, Abé Ndjé *et al.* (2019) examined the effect of governance on youth unemployment in Africa, and found that control of corruption and political stability has a positive influence on youth employment. However, none of these studies considered that quality institutional structure could play a mediating role in the relationship between education and unemployment in Africa. Therefore, this study aims at filling this gap in the literature.

Our study makes three significant contributions to the body of academic knowledge and policy discussions on youth unemployment in Africa. First, to the best of our knowledge, this paper provides the first attempt to explicitly examine the conditional role of institutions in the quality basic education–youth unemployment nexus in Africa. The large literature highlighted above has only focused on the one-to-one relationship between education and youth unemployment as well as between institutions and youth unemployment, with no attention to how institutional quality can mediate the education-youth unemployment nexus. This paper is of policy relevance for African countries, first, to better understand how they can take full advantage of quality basic education in order to create opportunities for the growing youth population through innovations, thereby reducing youth unemployment in the continent. Second, also from a policy perspective, this study makes a relevant case for not only increasing human capital but also strengthening institutional capacities as an antidote to the persistent problem of youth unemployment in Africa. Although youth unemployment is a global policy issue that has received considerable attention in development research as well as international policy discussions, such as the Sustainable Development Goals (United Nations 2018), owing to its impact on economic growth, socio-political stability, and poverty reduction; its effect is rather more grievous among African youths and has been the cause of frequent illegal exodus across the Mediterranean Sea, as hundreds of youths risk their lives in search of ‘greener pastures’ in European countries. Therefore, we make policy recommendations to address this ugly situation at its root cause. Last, most previous studies employ traditional econometric tools, which might not be free from bias related to potential endogeneity in the models mainly due to reverse causality between youth unemployment, education quality, and institutional capacity indicators (for example Baah-Boateng (2016) employed random-effects GLS regression; Anyanwu (2013) used fixed effect estimations). Conversely, our study employs the dynamic System Generalized Method of Moments (SGMM), which not only enables us to capture the dynamic economic interplay between education, institutional quality and youth unemployment but also helps cut through the computational complexities and biases associated with other estimators. This analytical

technique is efficient in addressing unobserved heterogeneity estimation issues and different sources of endogeneity and thereby provides unbiased estimates reliable for policy recommendations.

The remainder of this paper is organized as follows. Section 2 presents the study context and reviews of relevant literature. The empirical strategy employed in the study is discussed in Section 3 followed by the description of the data in the fourth section. Section 5 presents the empirical results and discussions. Finally, the conclusion and policy implications of the findings are presented in the sixth section of the paper.

2 CONTEXT AND CONCEPTUAL FRAMEWORK

2.1 Study context: youth unemployment in Africa

Africa has the largest concentration of youth population in the world, with about 62 percent of its population below the age of 25 years (United Nations 2017). The continent is projected to be home to one in five of the world's young and the world's largest working-age population by 2040 (United Nations 2017). Figure 1a presents the spatial distribution of youth unemployment rates in Africa. From the figure, youth unemployment is more concentrated in Southern and Northern Africa and the phenomenon is most prevalent in Southern Africa, especially South Africa and Swaziland which have 53.1 percent and 45 percent youth unemployment rates respectively. Conversely, youth unemployment in sub-Saharan Africa is relatively low compared to Southern Africa. However, the SSA region suffers more from underemployment as most employed youths have to cope with poor working conditions (International Labour Organisation 2019), which can include abusive supervision, inadequate remuneration, and lack of work-life balance among others.

Figures 1b and 1c show the gender-based distribution of youth unemployment in different countries of Africa. Female youth unemployment reaches as much as 58.3 percent, relatively higher than male youth unemployment which reaches 47.8 percent. This suggests that there are more unemployed females than males on the African continent, especially in Northern Africa where women's participation in the labour force is the second-lowest in the world after the Middle East (International Labour Organisation 2019). Sub-Saharan Africa also has high youth unemployment among females compared to males. Generally, informal employment is common in Africa, as some youths are engaged in the informal economy such as casual staff in factories, domestic aids, and other activities in the unregulated sectors of the economy. Figure 2 presents the distribution of average youth unemployment rates across African countries. Similar to the observation earlier made in figure 1a, South Africa has the highest youth unemployment rate, especially within the 15-24 age bracket (53.1percent), while countries like Lesotho and Namibia also have a youth unemployment rate above 40 percent. The phenomenon appears relatively mild in countries like Rwanda, Benin Republic, Togo, Liberia and Ethiopia whose individual youth unemployment rate stands below 5 percent of the total unemployed population.

According to the World Bank (2017), the increasing African youth population presents a number of opportunities. First, the production and distribution of goods and services across the globe require working-aged labour which may be a major constraint in countries faced with aging populations. Therefore, the world is likely to depend on Africa as the main supplier of workforce, by sending labour to countries or regions that are deficient of workers, or by producing goods and services in the region. Second, increasing urbanization rates largely driven by youth could be a source of accelerated innovations and economic growth in Africa (Anyanwu 2013; Baah-Boateng 2016). This is because African youths are always in the frontline of development process (United Nations 2015). Third, if the total fertility rate drops, Africa's workforce is likely to witness an increase in the number of workforce-age people relative to the population below 15 years old (who are mainly "dependent"), thereby freeing

up incomes for families to increase investments in health, education and overall sustainable economic growth of the continent (Ashford 2007).

While Africa's youth population bulge presents potential opportunities for the continent's development, the current role played by youth in Africa's development has not been positive as expected. This may be attributed to challenges faced by these youths including unemployment, social insecurity, political exclusion and so on, which vary by regions and groups across the continent. Notable among these issues is the high rate of youth unemployment, which predisposes youths to participate in criminal or informal activities, making them susceptible to recruitment efforts of terrorist organisations, or leads youths to attempt illegal migration (United Nations 2015; Adebayo *et al.* 2016). Creating potential for the large youth population to contribute to economic development rather than constitute a possible source of social and political vulnerability will require expanding the current job opportunities in the continent. Consequently, the World Bank (2017) and United Nations (2015) stress the need to place youth unemployment issues as a top priority for socio-political and economic research and development plans and programs of all African countries.

Figure 1. (a) spatial distribution of youth unemployment rate (% of total labour force ages 15-24) (b) male youth unemployment rate and (c) female youth unemployment rate in Africa

Source: Authors' computation World Bank WDI (2018).

Figure 2. Bar chart showing the distribution of average youth unemployment rate (% of total labour force, ages 15-24) in selected African countries (1991 – 2018)

Source: Authors' computation from World Bank (2018)

2.2 Youth unemployment, education quality and institutions: A literature review

2.2.1 Education and youth unemployment nexus

The empirical relationship between education and youth employment is well investigated in academic literature. The seminal paper by Card (1999) argued that this relationship is based on imperfect substitution between the work and the availability of formal and informal skills in the labour market and concluded that there are employability and productivity biases in favour of quality education and vocational skills. Zimmermann *et al.* (2013) examined the factors affecting labour market condition for young people in both developing and developed countries, with specific emphasis on the impacts of education and vocational training policies. The study submitted that general education at schools and different forms of vocational training are important prerequisites for youth employability and productivity. It further argued that vocational training tends to provide a link between employers' needs and youths' competences and recommended that implementation of education and training systems should be strongly emphasized by the sustainable youth employment policy documents of national governments. Blinova *et al.* (2015) employed an Ordinary Least Square regression technique to assess the role of education on youth unemployment in Russia regions. The study found that formal and vocational education tends to reduce the risks of youth unemployment. According to Wilson (2013), educational attainment is a significant determinant of labour market success, asserting that youth with

higher educational attainment are more employable and earn more than those with lower or no qualifications. He argued that active labour market policies for youth should have a strong focus on formal and informal training. Similarly, Bishop and Mane (2004) found that young people who had a certain percentage of vocational subjects in secondary school have higher likelihood to earn greater wages and display higher labour participation rates. Using aggregate-level data, Psacharopoulos and Patrinos (2018), as well as Toutkoushian and Paulsen (2016), compared average earnings of those that have education and those without. These studies found that lifetime earnings of people who have enrolled in or completed higher education are significantly higher than earnings of those without higher education.

In contrast, early studies such as Hotchkiss (1993) examined the impact of vocational education on employment and wages for high-school graduates in 1980 in the United States, and found no significant returns to education even after accounting for all other factors. With a particular focus on South Africa, Nieuwenhuis (2012) employed a meta-interpretive research design to understand the impacts of foundational skills, proxied by literacy and numeracy levels of primary school children, and investment in education on unemployment rates. The study found that the current shape and form of education in South Africa could not ameliorate the unemployment challenge in the country. Anyanwu (2013) engaged the Pooled Feasible Generalized Least Squares to explore the macroeconomic factors influencing youth employment in Africa, and found that the level of general education is negatively associated with higher youth unemployment. Similar results were reported in Baah-Boateng (2016). Using a Random Effect Panel model, Baah-Boateng (2016) also investigated the supply and demand drivers of youth unemployment in Africa, and found education to be insignificant among other factors, perhaps attributable to poor quality of basic education in Africa.

Despite these divergent views, human capital development is recognised as a panacea for the lingering youth unemployment problem, by improving economic growth through its positive effect on production and employment (Mankiw 2013). However, governments across African countries need to do more in order to retain their youth skilled labour on the African continent. This is because the youths who succeed in acquiring some skills through formal education or vocational training often prefer to migrate from Africa, in search of greener pastures in Europe, America or other developed countries (Ackah-Baidoo 2016). Hence, the need for a concerted and coordinated effort in the form of regional policies becomes imperative.

As a regional policy intervention to address the problem of youth unemployment, amongst other challenges associated with the youth age bracket, the International Labour Organisation has partnered with the African Development Bank, the African Union Commission, and the United Nations Economic Commission for Africa (UNECA) to address youth employment both at the regional and country levels. This has birthed some project initiatives amongst which is the Youth-to-Youth Fund (International Labour Organisation 2019). The African Union has also launched a multisectoral and multi-level stakeholder engagement plan, themed 'African Youth Decade' 2009-2018 plan of action, to achieve a 2 percent annual reduction in youth unemployment across member States (United Nations 2011). However, most of the countries failed to realise this objective due to insufficient job creation to absorb the large youth labour force, thus underscoring the complexities involved in tackling the problem of youth unemployment in Africa (Ackah-Baidoo 2016). Hence, this calls for a holistic, institutionally embedded approach, one that is able to cut through socioeconomic and political complexities of different African nations.

2.2.3 Institutions and youth unemployment nexus

The relevance of institutional embeddedness in ensuring the success of policy interventions has been emphasized in the literature (Rodríguez-Pose 2013; Kufuor 2017). Every policy requires an enabling institutional framework (Mazzucato 2016). Institutional factors are key to the successful implementation of any strategic action, especially those targeted at solving complex social or economic problems such as unemployment or underemployment (Acemoglu *et al.* 2005; Brunnschweiler 2008). By employing a first-difference instrumental variable approach, Baccaro and Rei (2007) investigated the institutional determinants of unemployment in 18 OECD countries and highlighted that strong union density (a measure of voice and accountability) and good regulatory environment are significantly associated with lower unemployment. A similar conclusion was echoed in Bouzid (2016), who examined the connection between corruption (an indication of a weak institutional framework) and youth unemployment rates in 92 (developed and developing) countries over the period 1985–2008 using an SGMM estimation approach. The study found that the development of corrupt practices among public officials in the form of bribery tends to increase the youth unemployment rates, which in turn leads to increase in unlawful practices by forcing job seekers to engage in bribing rent-seeking government workers so as to secure gainful jobs.

Drawing on the institutional theories and employing a Qualitative Comparative Analytic (QCA) approach, Brzinsky-Fay (2017) investigated the relationship between labour market and educational institutions, and youth unemployment. Intuitively, this connotes that it is advisable for policymakers not to focus on one particular institution when designing policy interventions for addressing the problem of youth unemployment. Instead, to ensure effectiveness, there is need to consider the general institutional embedding of such policy action (Brzinsky-Fay 2017). Similarly, Yao and McDonald (2003) examined the relationship between unemployment and institutions in Mauritius and found that employment prospects in the country can be improved by not only by investing in education but also reforming the financial regulatory bodies including all pay-setting institutions in the country. Other literature that reached similar conclusions include Agénor *et al.* (2007) for Middle East and North Africa, Lackó (2004) for 28 OECD countries and partly on 18 transition countries for the period 1995–2000, Sahnoun and Abdennadher (2019) for 40 developed countries over the 2000–2015 period, Anand and Khera (2016) for India, and Lim (2017) and Abdullahi and Kardi (2019) for Nigeria.

2.2.4 Education, institutions, and youth unemployment

There are a number of valid arguments in the literature that support the importance of quality institutions to ensure quality education and skills development to deliver youth employment opportunities. First, quality education at the macro level requires proper funding and there is a huge funding gap in most African countries to support provision of good education. The majority of African countries still allocate budget that is below the UNESCO standard on education (Wils 2015). As a starting point, some studies have suggested mobilization of domestic resources through efficient taxation systems as a strategy to fill this financial resource gap (Fredriksen 2011; Shakira & Philipp 2016; Watts 2018; Joynes 2019). A study conducted by the Commonwealth Education Hub in 2015 found that domestic resources alone may not be enough to fill the funding gap and therefore suggested joint mobilization of financial resources, including public-private partnerships and investments. The argument is that as more funding becomes available to the education sector, the quality of schools' soft and hard infrastructure, recruitments of well trained teachers, professional development for existing teachers, and so on will be facilitated, and in turn, will translate to increase in youth's innovativeness (Joynes 2019). However, in the presence of weak economic and governance institutions such as poor financial structure, absence of internal checks and balances, and presence of corrupt system, private investors will be reluctant to invest

in education systems, which may reduce youth employment (Bouزيد 2016; Abé Ndjé *et al.* 2019). Similarly, Lackó (2004) finds that where there is high taxation but with a highly corrupt system, the effect of such financial mobilization will be increased unemployment. Second, the issue of weak administrative capacity and poor governance has also been identified in the literature (for example, Anand and Khera (2016) and Lim and Agénor (2017)). The authors of both studies highlighted that labour market success aimed at ensuring long-term employment opportunities can be ineffective and unproductive if there is weak administrative capacity and poor governance, both of which are hallmarks of economies with a high incidence of corruption.

Our study contributes to the existing literature by bringing together all the different arguments in the literature, and complements previous studies that focus on the impact of quality education on unemployment and such mechanisms as institutional quality and capacities that can support education, with particular focus on Africa.

3 EMPIRICAL STRATEGY

The empirical strategy in this section aims to estimate the impact of education quality on youth unemployment while considering the moderating or conditional role of institutional capacity in selected African countries. Following the youth unemployment frameworks suggested by Bouزيد (2016) and Abé Ndjé *et al.* (2019), we adopt a dynamic modelling approach. Theoretically, this is based on the argument that the economic process is dynamic. Given that youth employment reforms can have potential long-term effects that extend far beyond the immediate term into the future, it is expedient to specify a dynamic model rather than a static model (Olagunju *et al.* 2019). Hence, our empirical model is presented as:

$$YUR_{it} = \theta + \beta_1 YUR_{it-1} + \beta_2 EQ_{it} + \beta_3 INS_{it} + \beta_4 EQ_{it} \times INS_{it} + \delta_i + \mu_t + \varepsilon_{it}, \quad (1)$$

where the subscripts i and t represent the country and time periods (3-year average, that is, 2000-2002, 2003-2005; 2006-2008; 2009-2011; 2012-2014; 2015-2017)¹ respectively, YUR_{it} denotes youth unemployment rate, YUR_{it-1} is the lag of the youth unemployment rate, EQ_{it} denotes basic quality education and is represented by teacher-pupil ratio, while INS_{it} denotes institutional structure (proxy by financial structure, control of corruption and regulatory quality). The interaction term is used to assess the role of institutions based on the multiplicative term between basic quality education measure and the measures of institutional structure $EQ_{it} \times INS_{it}$. δ_i represents country-specific effects such as country characteristics that do not change over time, while μ_t is the time-specific effect which controls for shocks that do not vary among countries, and ε_{it} is the error term. The parameters to be estimated are θ , β_1 , β_2 , β_3 , and β_4 .

To effectively identify the conditional role of institutions in education–youth unemployment model, we include a set of control variables, X_{it} , into Equation (1). X_{it} represents the set of control variables capable of explaining YUR_{it} , which are included to avoid omitted variable bias problems in the model. The choice of X_{it} is guided by economic reasoning and previous similar empirical studies (Anyanwu 2013, 2014; Baah-Boateng 2015; Abé Ndjé *et al.* 2019).

$$YUR_{it} = \theta + \beta_1 YUR_{it-1} + \beta_2 EQ_{it} + \beta_3 INS_{it} + \beta_4 EQ_{it} \times INS_{it} + \beta_5 X_{it} + \delta_i + \mu_t + \varepsilon_{it}, \quad (2)$$

¹ We used an average of three-year intervals to smooth the effects of short-term fluctuations in the variables. Thus, the data used in our samples have observations with three-year intervals. A similar approach was employed in Baah-Boateng (2016).

The estimation of Equation (2) is complicated by the existence of confounding factors (Bergh & Nilsson 2014). There may be unobserved country-, system-, and time-specific factors that impact on the youth unemployment rate (YUR_{it}) that are also related to the basic education and institutional factors. In addition, the estimation of these equations poses a challenge of potential endogeneity that may result from reverse causation. An attempt not to consider these estimation issues will yield inconsistent estimates.

The estimation technique employed in this study is the dynamic SGMM developed by (Blundell & Bond 1998). This estimation technique makes an exogeneity assumption where any correlations between endogenous variables and unobserved fixed effects are constant over time, allowing the inclusion of level equations in the system and the use of lagged differences as instruments for the levels. In addition, this estimation technique is robust to heteroscedasticity and distributional assumptions, and implicitly incorporates fixed effects (Roodman 2009), making it preferred to other estimation techniques when dealing with panel data estimation, as it is in this study. There are four main reasons for adopting this approach. First, the estimation approach provides a good fit due to the persistent nature of the dependent variable—youth unemployment. The persistence of the dependent variable is confirmed given that its correlation with its first lag (0.978) is greater than the threshold of 0.800. This, according to Asongu and Odhiambo (2019) and Tchamyou (2019), is in line with the rule of thumb for validating persistence in a variable. Second, the number of countries (C) in our study is greater than the number of periods per country (T), that is from 2000 to 2017). Hence, the $C(49) > T(17)$ prerequisite for the use of SGMM technique is satisfied. Third, cross-country variations are removed given the longitudinal nature of the data. Fourth, the estimation approach accounts for possible endogeneity concerns in all the explanatory variables due to: (i) simultaneity or reverse causality, which are addressed using instrumentation procedure and (ii) unobserved heterogeneity is tackled by including time-invariant variables. For example, the change to basic education quality can be affected by some other factors that are in the error term, such as the level of education support aid from international organizations targeted at improving the quality of basic education in Africa. Furthermore, our measure of quality basic education may be endogenous in our model due to the reverse causality problem running from youth unemployment to quality basic education, such that past youth unemployment issues in many African countries have been the main driver for education improvement policies, that is, many African countries have adopted and implemented policies and programmes to improve education quality in response to past youth unemployment shocks.

It is important to validate the consistency of the SGMM estimator. To do this, we have to ascertain that lagged values of the regressors are valid instruments. We examine this issue by considering the Hansen test of over-identifying restrictions. None rejection of the null hypothesis implying that the instrumental variables are not correlated with the residual and the required orthogonality conditions are thus satisfied. A serial correlation test is also carried out and demonstrates that the errors exhibit no second-order serial correlation.

4 DATA

The data employed in this study are a balanced panel dataset comprising 49 African countries over the period 2000–2017 (see Table A1 in the Appendix section for a list of these sampled African countries). Data used in the study are mainly obtained from the World Bank’s World Development Indicators (WDI) and World Governance Indicator (WGI) databases (World Bank 2018). The choice of the variables and years considered is based on past related studies and data availability. All the variables measured in dollar values are constant 2011 US dollars.

4.1 Dependent variable: youth unemployment rate

The definition of unemployment adopted in this study is in line with the International Labour Organization (ILO) description: “job seeking out of joblessness and readiness to work,” and the target group is youth within the age range 15–24 years, based on the United Nations definition of youth. The definition of youth differs by countries and organizations and the adoption of the UN definition in this study is to ensure consistency across the African countries studied. The present study is a cross-country study, and therefore we follow Baah-Boateng (2016) by adopting the youth unemployment rate defined as total youth unemployment as a percentage of total labour force for the age group 15–24. This variable is sourced from the WDI database. According to Anyawu (2014), an employment gap exists between male and female youths in Africa, thereby necessitating an additional gender-disaggregated analysis that employs male and female unemployment rates as dependent variables. The male unemployment rate is defined as male youth unemployment rate as a percentage of male labour force aged 15–24, while the female youth unemployment is defined as female youth unemployment rate as a percentage of female labour force aged 15–24. These two variables are also obtained from WDI.

4.2 Main independent variables: basic skills, financial structure and institutional capacity

The main explanatory variable is the quality of education at the primary school, proxied by the teacher-pupil ratio obtained from the WDI. The quality of education at the primary school was the most appropriate measure for basic or foundational skills required to further training and get quality jobs (Asongu & Odhiambo 2019). These basic skills are developed during primary and secondary school education. However, we are limited to the use of education quality in primary school due to the lack of data on the indicator of education quality in secondary school. Furthermore, we employed teacher-pupil ratio at primary school because of the notion that primary education generates greater socioeconomic returns, relative to higher levels of education, when countries are at an initial stage of industrialization (Asiedu 2004). This is indeed the case with the sample of African countries considered in this study. The variable teacher-pupil ratio is defined as the ratio of teachers to pupils and a higher ratio denotes good education quality while a lower ratio denotes poor education quality.

To measure institutional capacity, we used three main indicators—control of corruption, regulatory quality, and financial structure. The first two measures are related to institutional quality and the last proxy is related to financial structure of a country. Similar to (Opeyemi *et al.* 2019), we employed corruption and regulatory quality as measures of institutional quality and the data were obtained from WDI. Several institutional quality measures have been developed in the literature, for example Kunčič (2014), however, most of these measures have been criticised for inconsistencies and cannot be used for cross-country studies. According to Kar and Saha (2012), corruption and regulatory quality variables obtained from the World Bank’s compilation of the institutional quality measures are the best and are suitable for cross-country analysis. Corruption control, which identifies both petty and grand forms of corruption, as well as those from the state by elites and private interests, is measured as a score from ‘-2.5’ (weak) to ‘+2.5’ (strong). Similarly, the regulatory quality, which reflects the government’s ability to formulate and implement sound policies and regulations that permit and promote private sector development, is also measured as ‘-2.5’ (weak) to ‘+2.5’ (strong).

Financial structure or financial development measures the extent to which the country has a favourable environment for industrial growth and private sector development through private sector access to finance—i.e., domestic credit from formal financial institutions to the private sector as a percentage of GDP. According to Anyawu (2014), access to credit by the private sector is positively associated with productive capacity of businesses, resulting in increasing potential of business to expand and creation of more jobs.

4.3 Control variables

The control variables are included in our model so as to avoid omitted variable bias in the specification. First, to account for the size of the economy and economic resources available to a nation we include GDP per capita. A positive effect of the level of GDP per capita is expected, as it increases the resources available to provide opportunities for job creation for young people. Several studies have found that an improved level of national economic wealth significantly reduces the youth unemployment rate (Anyawu 2013, Baah-Boateng 2016). Second, to account for the level of domestic investment, which is key for domestic employment generation, wealth creation, and increasing innovation among youths, we include the domestic investment measure as a percentage of GDP. It is expected that countries with low domestic investment are likely to be unable to sustain increased productive capacity and growth and, therefore, fewer opportunities for job creation for youth. Several studies have shown positive effect of domestic investment growth on job creation (Anyawu 2013, 2014, Abé Ndjé et al. 2019). We also include government consumption expenditure as a percentage of GDP. It is expected that the more resources government expends on economic and social programmes, the more the opportunities in terms of investment for job creation for the youths.

Given the importance of the quality of macroeconomic policy in enhancing the environment for job creation, we use the consumer price index (CPI) inflation rate to control for national monetary policy in our model. According to Loayza *et al.* (2012), high inflation is positively associated with poor macroeconomic policies. Unstable macroeconomic policies proxied by high inflation rate have been found to reduce economic growth and opportunities for employment creation. To account for the effect of integration of African countries into global economies, we include foreign direct investment (FDI), measured as a percentage of GDP, and trade openness. A country's trade openness is defined as the sum of net exports of goods and services measured as percentage of GDP. Some authors have argued that increasing FDI is associated with employment creation (Oostendorp 2009, Anyawu 2013, Anyawu 2014, Abé Ndjé et al. 2019).

We also account for the significance of infrastructure development as a determinant of employment creation, by including telephone and mobile phones (per 1,000 persons). Access to infrastructure such as transport and information and communications technology (ICT), electricity, and childcare centres has the potential of saving time expended on family chores and therefore creating more time for engagement in market-based income-earning activities that can lead to job creation. Similarly, infrastructure such as ICT has helped African youth in terms of removing information barriers and opening up avenues for new ideas and opportunities. To account for demographic structure of the African countries studied, we include three variables, namely annual population growth, urban share of the population, and ratio of adult to total population. We include annual population growth to control for population pressure on available economic resources. Population growth is expected to be negatively associated to youth employment because a fast-growing national population implies an increase in government's public service burden, therefore reducing the effect of social welfare spending and economic opportunities for youths. We include urban share of the population, a measure of urbanization rate, which is expected to lead to higher levels of youth employment. Finally, we include ratio of adult to total population, which captures aging population and a measure of adult labour supply. It is expected that an increase in the aging population will create more opportunities for jobs and will lead to increased youth employment.

The descriptive statistics of all the variables employed in the model estimation are presented in Table 1. In Figure 3, we show the bivariate relationship between youth unemployment and the measure of basic quality education (teacher-pupil ratio), without including interaction with measure of the financial, institutional, and regulatory structures. The relationship displayed in Figure 3 reveals that improvement

in the quality of basic education has not been able to translate into expected reduction in youth unemployment in Africa. However, the degree to which the improvement in institutional and financial structures in Africa can help enhance this relationship is the central question for the empirical econometric estimations in the next section of the paper.

Figure 3. Bivariate Relationship – Basic Quality Education and Youth Unemployment in Africa (2000–2017)

Source: Authors' computation from World Bank WDI (2018).

Table 1. Descriptive statistics

Variable	Description	N	Mean	SD	Min	Max
Total youth unemployment	Total youth unemployment (% of total labour force ages 15-24)	833	17.2	14.0	0.4	62.1
Male youth unemployment	Male youth unemployment (% of male labour force ages 15-24)	833	15.9	12.6	0.6	57.1
Female youth unemployment	Female youth unemployment (% of female labour force ages 15-24)	833	19.8	17.1	0.1	67.9
Education quality	Number of teachers-pupil in primary school.	510	0.03	0.01	0.01	0.06
Financial development	Domestic credit to private sector as percentage of GDP	802	24.9	32.1	0.5	257.1
Control of corruption	An index of control of corruption (tends from -2.5 to + 2.5)	833	-0.6	0.6	-1.8	1.2
Regulation quality	An index of regulation quality (tends from -2.5 to + 2.5)	833	-0.6	0.6	-2.3	1.1
Inflation	Inflation measured by consumer prices (annual percent)	779	8.0	23.0	-30.8	513.9
Domestic investment	Investment in physical capital as share of PPP-adjusted GDP per capita	833	20.7	11.2	-11.2	83.2
Gov consumption on education	General government expenditure on education as a percentage of GDP	470	4.4	1.9	1.0	13.2
Real GDP Growth	Growth rate of Real GDP Chain per capita, as a percentage	801	4.5	4.4	-19.2	33.7
Per capita GDP	Per capita GDP (constant 2011 US\$ adjusted for PPP)	816	5005.6	6212.4	275.5	40368.1
FDI Inflows	Foreign Direct Investment as percentage of GDP	833	4.6	6.9	-1.3	65.8
Trade openness	Sum of import and export as percentage of GDP	782	73.3	33.8	19.1	311.4
Credit to private sector	Domestic credit to private sector as percentage of GDP	802	24.9	32.1	0.5	257.1
Telephone and mobile phone	Number of telephones per 1,000 persons	810	3.2	5.25	0.0	31.2
Adult to total population ratio	Population ages 65 and above as a percentage of the total population	833	3.5	1.2	2.2	10.9
Urban population share	The ratio of people living in urban areas to total population	833	42.6	17.9	8.3	88.9

5. RESULTS AND DISCUSSION

5.1. Correlation matrix of the explanatory variables

In Table A2 in the appendix section, we present the pairwise correlation between the explanatory variables considered in the regression models. The correlation analysis provides a snapshot of the degree of bivariate association between variables (Self & Grabowski 2004). Due to the high correlation between financial structures, institutional quality variables, the estimation was done step-wise. However, other variables are not strongly correlated, suggesting that multicollinearity should not be a problem in our estimations. To further provide support for the results from the pairwise correlation, we also check for multicollinearity based on the variance inflation factor (VIF) as reported in Table A3 of the appendix. The results from the VIF show that all variables have VIF scores of less than 10 and none of the tolerance values were less than 0.40, suggesting that multicollinearity should not be a serious issue in the estimation.

5.2 The role of institutions in the education – youth employment relationship

The empirical results of the dynamic panel model analysis are presented in Table 2, in which total youth unemployment rate (percent of total labour force aged 15–24) is the dependent variable. There are three main highlights from the estimations: the effect of quality basic education on youth unemployment; the impact of control of corruption, regulatory quality, and financial structure or development on youth unemployment; and the moderating effect of control of corruption, regulatory quality, and financial development on the relationship between basic quality education and youth unemployment variable. The interaction term indicates how the quality of institutions and financial structure play a moderating role in the basic education–youth unemployment relationship. If negative, it means that the institutional structures provide a complementary role in the relationship. Conversely, a positive interaction term implies a substitution effect in the relationship.

The diagnostic tests to validate the consistency of the estimations in Table 2 are first discussed before turning to the main results. These are reported in the lower part of the table. The $AR(1)$ and $AR(2)$ validate the model in terms of presence of first-order autocorrelation and the absence of second-order autocorrelation in the residuals of the models respectively. The Hansen test fails to reject the hypothesis of joint validity of instruments for all the models. The Hansen test statistic of overidentifying restrictions is insignificant, which suggests that the set of instruments employed fulfil the exogeneity condition required to obtain consistent estimates in all the models.

We find that across all model specifications, the coefficient of the lagged youth unemployment rate is significant at 1 percent, that is, past unemployment rate is strong a determinant of its current level in Africa. This shows that the youth unemployment rate tends to be path-dependent, which implies that the present state of youth unemployment may have a strong impact in explaining youth unemployment level in the following year. This result further justifies the dynamic model specification employed in this study.

The results also show that, across all the models, the unconditional effect of quality basic education is negative across all the columns, but only significant in columns 3(a) and 3(b). This suggests that as quality of basic education increases in African countries, the level of youth unemployment decreases. This relationship between education and youth employment supports the predominant proposition in the literature that an increase in quality education is associated with a decrease in the level of

unemployment, and *vice versa*. In columns 3(a) and 3(b), the effect of education on youth unemployment rate are statistically significant at 1 percent and 5 percent. Similar relationships have been reported in previous studies (Anyanwu 2013; Baah-Boateng 2016), while Baah-Boateng (2016) found insignificant effect of secondary enrolment on youth unemployment. Accordingly, in column 3(a) and column 3(b), a percentage increase in the teacher-pupil ratio would lead to significant decrease in youth unemployment as a percentage of total labour force of a magnitude that ranges from 0.049 to 0.190. This finding is in line with the argument that quality foundational skills developed during primary and secondary school education are prerequisite to further training and skill development, without which the possibilities of attaining gainful employment or participating in entrepreneurship activities are reduced. Similarly, the World Bank (2017) affirmed that basic literacy and numeracy skills permit young people to get employment that can pay enough to meet daily needs. This argument was further supported by Baah-Boateng (2016), who emphasized that investment in quality education provides a viable pathway to make youth more productive and relevant in the labour market.

Table 2 further shows that, with the exception of regulatory quality, both control of corruption and financial development have shown a statistically significant negative effect on youth unemployment rate in all the models. Column 1(b) shows that a percentage increase in the control of corruption index would result to reduction in youth unemployment by 5.548. Similarly, improved financial structure would result to reduction in youth unemployment by 0.138 (see column 3(b)). The empirical findings confirm the unemployment reduction potential of improved institutional capacity and structures, which is capable of increasing the rate of youth employment in Africa as reported in (Anyanwu 2013; Abé Ndjé *et al.* 2019). This result suggests the important role of quality institutions in delivering a long-term reduction in youth unemployment. For example, the ILO labour standards with the aim of creating more jobs require African countries to have quality structures for enforcement in order to avoid breach of the core standards according to SDG target 8.8. Similar studies, in relation to economic growth, reported similar findings (Kilishi *et al.* 2013; Alexiou *et al.* 2014; Sani *et al.* 2019).

As reported in Table 2, columns 1(a) and 1(b), the institutional structures in Africa, in terms of control of corruption, were found to have a negative conditional effect on the relationship between quality basic education and total youth employment rate as a percentage of total labour force, although only significant in column 1(b). Specifically, the marginal effect of such interaction, as in column 1(b), implies that an African country with a corruption control level around the average value for the sampled countries (-0.627) will witness 0.172 percent decrease in youth unemployment rate. The results lend support to the argument that improvement in institutional quality in terms of control of corruption tends to improve transparency within economic and political systems, thereby giving foreign investors more trust in the system as well as increasing their willingness to invest and create more jobs in the local markets for young people who have basic education and are willing to take up decent jobs. Some other channels through which corruption control enhances the relationship between quality education and youth unemployment have been identified in the literature. Countries with strong control of corruption tend to have mechanisms to block all leakages in the system, thereby facilitating reduction in the cost of doing business and enhanced innovative input in the business processes, which increase firms' economic capacity to transparently recruit young people (Bouazid 2016; Dutta & Sobel 2016; Ajide 2017; Lim 2017; Abé Ndjé *et al.* 2019). Also, as corruption control is improved, the gross embezzlement of the borrowed funds and consumption expenditure budgeted for quality education and other "economy-friendly" projects are eliminated, and governments have more resources to invest in education and also create more jobs for the large youth populations. Summarily, our findings provide evidence of reform complementarity: the coefficient of the basic education variable is insignificant, although negative, in column 1(b), which suggests quality basic education is insignificant in influencing

youth unemployment, but the coefficient on the interaction term becomes significant. This indicates that the insignificant effect could become significant if corruption control improves.

Second, the institutional quality in terms of regulatory framework in Africa countries was also found to have a negative moderating effect on the relationship between quality basic education and total youth employment rate. Specifically, the marginal effect of such interaction, as it is in column 2(b), shows that an African country with a regulatory quality around the average value for the sampled countries (-0.670) will see a 0.141 percent decrease in the youth unemployment rate in Africa. The results lend support to the argument that improvement in institutional quality in terms of regulatory quality positively influences the relationship between quality basic education and youth employment. UNEP (2013) also highlights the potential of regulatory frameworks for opening up opportunities for market development, such as energy supply market, for infrastructure developers, investors and financiers, to engage in the supply side of provision of employment opportunities. It is therefore argued that improvement in regulatory framework plays an important role in not only increasing the positive impact of foundational skills on youth employment but also boosting the likelihood of enhancing entrepreneurial activities among Africa youths. This result is in line with previous findings (Anyanwu 2013, 2014). Therefore, all efforts to effectively stimulate job creation should consider a strong commitment to comprehensively improving regulatory quality in African countries.

Turning to the third measure of institutional capacity, that is, financial development measured by domestic credit to private sector as percentage of GDP. The result shows that improved financial structure is negatively and significantly associated with youth unemployment as reported in columns 3(a) and 3(b). With a unit improvement in finance development measured by domestic credit to private sector as percentage of GDP, the effect on youth unemployment ranges from 0.131 to 0.138 percent. The consistent negative effect that is seen in most of the estimations is expected, considering the overwhelming literature on how finance affects youth unemployment of countries (Abé Ndjé *et al.*, 2019; Ajide, 2017). In answering the question of the moderating role played by financial development in basic quality education, the empirical results in column 3(b) reveal that the financial development interaction term is negative, suggesting a negative moderating effect on the relationship. In particular, the marginal effect of the interaction term between financial development and education, as it is in column 2(b), shows that an African country with a mean domestic credit to private sector as percentage of GDP for the sampled countries (24.515) will experience 0.263 percent decrease in the youth unemployment rate. Most of the African countries are characterized by small financial institutions and lack of access to formal financial services for educated youths, who are thereby constrained by finance from engaging in entrepreneurial activities. The finding of this study suggests that building financial institutions in Africa has a complementary role of breaking financial barriers for youth with basic education to engage in entrepreneurial activities and create jobs for others. For example, Ajide (2017) asserted that the high level of bureaucracy associated with securing credit in Nigeria banks is among the demotivating factors for entrepreneurship and corporate investment in the country.

Turning to the control variables, we observe uniformities in the signs of the coefficients of the control variables across all models, albeit with different significance levels. As expected, the coefficient of inflation is positive and significant in all the models, suggesting that a high youth unemployment rate exists in African counties characterized by instability in macroeconomic policies proxied by inflation. For example, the youth unemployment rate in Nigeria as of 2016 (with inflation rate of 25 percent) was 3.5 times higher than that of Somalia with an inflation rate of only 4 percent. A similar relationship was reported in Anyanwu (2013) and Anyanwu (2014). The results also reveal that high domestic investment rates are associated with a reduction in youth unemployment in Africa. This suggests that

investments in productive projects are capable of providing opportunities for Africa's growing youth populations, thereby reducing the increasing youth unemployment rates for the continent. For example, Rwanda's huge investment in productive activities such as SMEs and Agriculture may have contributed to reduction of youth unemployment in the country from 15 percent in 2014 down to 12 percent in 2017. Our empirical results also reveal that government consumption expenditure is significant and negatively influences youth unemployment in Africa.

Surprisingly, we find that the coefficient of real GDP growth is positive, suggesting that GDP growth in Africa is positively associated with youth unemployment rate. For example, Nigeria had substantial GDP growth from 2004 to 2014, yet the youth unemployment rate rose from 12 percent to 39 percent. This may reflect the non-inclusiveness of economic growth in African economies, thereby necessitating the ongoing call for inclusive growth in Africa. The result is in line with the findings of Anyanwu (2013) that GDP per capita negatively influences youth employment rates in North Africa. In a similar study, Baah-Boateng (2016) reported that real GDP growth showed no significant effect on youth unemployment in Africa. The results also show that the coefficient associated with the level of real GDP per capita is found to be negative and statistically significant, lending support to the hypothesis that increasing GDP per capita would contribute positively to youth employment. This is also consistent with the findings by Baah-Boateng (2016) and Anyanwu (2013).

The results show that FDI has a negative coefficient, suggesting that inflow of FDI reduces youth unemployment in Africa. This is rather expected given that the largest proportion of FDI inflow into Africa is into natural resources, such as the petroleum sector, which are capital-intensive sectors, thereby creating jobs (both formal and informal) for youths. This result is in line with Anyanwu (2013) and Asiedu (2004), which find that trade liberalization enhances multinational investments which in turn boost multinational employment. The coefficient of trade openness is also negative and statistically significant in all the models, suggesting that an increase in the degree of economic globalization of African economies is associated with reduction in youth unemployment rates. This result lends support to studies that argue that economic integration into world economies provides opportunities for increasing productivity, thereby providing employment opportunities (Ha & Cain 2017; Olagunju *et al.* 2019). The variable used to proxy aging population was found to be an important determinant of youth unemployment in Africa. The coefficient of this variable is negative, suggesting that an increase in share of population of age 65 and above is associated with a reduction in youth unemployment. The coefficient of urban population share is positive and significant, suggesting that as the population in urban areas increases, the level of youth unemployment also increases. The population exodus from rural to urban in search of scarce better-paid jobs has resulted in an increasing unemployment rate in urban areas. This result also supports the notion that the incidence of youth employment is higher in urban areas than in rural area (Baah-Boateng 2013; Baah-Boateng 2015). Finally, the variable used as a proxy for ICT is negatively signed and statistically significant in all the models, suggesting that improvement in the level of ICT infrastructure is associated with reduction in youth unemployment rate. Chen (2004) and Anyanwu (2013) reported similar findings for North Africa and China respectively.

Table 2. The Dynamic SGMM estimation of the Mediating Role of Institutional Capacity on Basic Quality Education - Youth Unemployment Relationship

Variable	Dependent Variable: Total Youth Unemployment					
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
Dependent variable _(t-1)	0.782*** (0.009)	0.672*** (0.026)	0.819*** (0.017)	0.637*** (0.065)	0.793*** (0.007)	0.721*** (0.028)
Education quality	-0.010 (0.012)	-0.046 (0.047)	-0.001 (0.014)	-0.046 (0.074)	-0.049*** (0.005)	-0.190*** (0.052)
Corruption control (CC)	-0.468 (0.739)	-5.548*** (1.937)	- -	- -	- -	- -
Regulatory quality (RQ)	- -	- -	-0.053 (0.910)	-3.497 (3.828)	- -	- -
Financial development (FD)	- -	- -	- -	- -	-0.131*** (0.007)	-0.138*** (0.035)
Education quality * CC	-0.015 (0.013)	-0.202*** (0.039)	- -	- -	- -	- -
Education quality * RQ	- -	- -	-0.027 (0.017)	-0.142* (0.075)	- -	- -
Education quality * FD	- -	- -	- -	- -	-0.003*** (0.000)	-0.003*** (0.001)
Inflation	- -	0.112*** (0.019)	- -	0.058** (0.023)	- -	0.017 (0.014)
Domestic investment	- -	-0.093*** (0.020)	- -	-0.106*** (0.017)	- -	-0.088*** (0.019)
Govt. consumption expenditure	- -	-0.064*** (0.014)	- -	-0.066*** (0.017)	- -	-0.004 (0.018)
Real GDP Growth	- -	0.043** (0.018)	- -	0.042 (0.029)	- -	0.076** (0.035)
Log Real GDP per capita	- -	-2.119** (1.016)	- -	-3.666** (1.480)	- -	-3.761*** (0.877)
FDI	- -	-0.014*** (0.007)	- -	-0.023* (0.013)	- -	-0.050*** (0.013)

Table 2. Continued

Variable	Dependent Variable: Total Youth Unemployment					
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
Trade openness	-	-0.016*** (0.006)	-	-0.006 (0.007)	-	-0.004 (0.008)
Log Tel. and mobile phone	-	-1.363*** (0.283)	-	-0.833** (0.395)	-	-0.933*** (0.219)
Adult to total population ratio	-	-0.321 (0.531)	-	-0.161 (0.450)	-	-0.921** (0.397)
Urban population share	-	-0.060 (0.042)	-	0.036 (0.086)	-	-0.015 (0.051)
Year fixed effect	YES	YES	YES	YES	YES	YES
Country fixed effect	YES	YES	YES	YES	YES	YES
Observations	218	218	218	218	218	218
Number of countries	49	49	49	49	49	49
Instrument	27	27	27	27	27	27
AR [1] Test	0.064	0.069	0.070	0.077	0.087	0.079
AR [2] Test	0.145	0.179	0.116	0.164	0.166	0.162
Hansen Test	0.867	0.866	0.838	0.846	0.884	0.822

*** Denote 1% significance level, ** Denote 5% significance level, * Denote 10% significance level. Robust standard errors are in parenthesis. Results presented in all the columns are based on the two-step dynamic SGMM, using the Windmeijer finite-sample correction.

5.3 Gender Analysis: The role of institutions in the education – youth employment relationships

Having conducted, in the preceding sections, an aggregate analysis of how quality basic education affects youth unemployment in Africa, we proceed to analyse the impact of quality basic education on youth unemployment, disaggregated by gender. This is to ascertain if there are observable gender-based differences in how institutional quality moderates the education-youth employment relationship. Put another way, this analysis should enable us see the differences (if any) in the impact of education on youth unemployment for males and females as well as the difference in the moderating effect of institutional quality in the relationship between education and youth employment across both genders.

There is gender-specific data available on youth unemployment rate in Africa. Table 3 provides the gender-specific moderating role of institutions on basic quality education–youth unemployment relationship. We find that across all model specifications from column 1(a) to 6(b), the coefficient of the lagged youth unemployment rate is significant at 1 percent, that is, past male and female unemployment rate is a strong determinant of their current levels. This shows that both male and female youth unemployment rates are path-dependent.

The results reveal that basic quality education has a negative relationship on male and female youth unemployment. On average, a percent unit increase in quality of education proxy by teacher-pupil ratio causes male youth unemployment to reduce by 0.003 – 0.222. Also, on the average, a percent increase in quality of education leads to reduction in female youth unemployment (between 0.001 – 0.175). These results suggest that the reduction effect of education on youth unemployment rate is stronger among male youths than their female counterparts. More explicitly, education reduces youth unemployment more among male youths than female youths.

Regarding the moderating effect of institutional capacity, in terms of control of corruption, the results show that the moderating effect of corruption control is both significant in the education-female youth as well as the education-male youth unemployment relationship. This suggests that the control of corruption may be significant in reducing the youth employment gap that exists between male and female youths. With regards to the moderating effect of institutional quality, in terms of regulatory framework, the results show that the moderating impact of regulatory framework is only significant in the education-male youth unemployment relationship and not significant in the education-female youth link. This may indicate that male youths who are educated are at an advantage in the existing regulatory framework in Africa. Turning to the third measure of institutional structure, that is, financial development measured by domestic credit to private sector as percentage of GDP, the financial development interaction term is negative and significant in moderating basic quality education–youth unemployment rates for male and female in Africa. This suggests that building effective financial systems in Africa is not only key to creating opportunities for educated males and females, but it is also relevant in bridging employment gaps that exist between males and females.

The empirical results also show that the significant factors that commonly affect both male and female youth unemployment include inflation (positive effect), domestic investment (negative effect), government expenditure (negative effect), real GDP growth (negative effect for male youth unemployment and positive effect for female), real GDP per capita (negative effect), and FDI (negative effect). The results also reveal that trade openness negatively influences the female youth unemployment, while adult labour supply and urban population share negatively affect the male youth unemployment rate.

Table 3 Gender Disaggregation of the Mediating Role of Institutional Capacity on Basic Quality Education - Youth Unemployment Relationship

Variable	Dependent Variable: Male Youth Unemployment						Dependent Variable: Female Youth Unemployment					
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)
Dependent variable(t-1)	0.784***	0.723***	0.805***	0.727***	0.768***	0.760***	0.799***	0.675***	0.814***	0.680***	0.785***	0.682***
Education quality	(0.012) -0.003	(0.030) -0.035	(0.011) -0.036***	(0.038) -0.016	(0.014) -0.045***	(0.036) -0.222***	(0.008) -0.032***	(0.035) -0.013	(0.011) -0.025	(0.049) -0.114	(0.005) -0.001	(0.016) -0.175***
Corruption Control (CC)	(0.014) -1.131	(0.062) 2.312	(0.011) -	(0.070) -	(0.007) -	(0.053) -	(0.010) 0.290	(0.071) 7.282***	(0.016) -	(0.081) -	(0.005) -	(0.059) -
Regulatory quality (RQ)	(0.905) -	(2.172) -	- 0.447	- 0.739	- -	- -	(0.515) -	(2.502) -	- 0.425	- 1.665	- -	- -
Financial development (FD)	- -	- -	- -	- -	- 0.134***	- 0.160***	- -	- -	- -	- -	- 0.130***	- 0.136***
Education * CC	- -0.014	- -0.122***	- -	- -	(0.005) -	(0.025) -	- -0.007	- -0.222***	- -	- -	(0.004) -	(0.041) -
Education * RQ	(0.016) -	(0.039) -	- -0.055***	- -0.120	- -	- -	(0.009) -	(0.044) -	- -0.022	- -0.074	- -	- -
Education * FD	- -	- -	(0.014) -	(0.075) -	- -0.003***	- -0.004***	- -	- -	(0.018) -	(0.050) -	- -0.003***	- -0.003***
Inflation	- -	0.077*** (0.021)	- -	0.076*** (0.026)	- -	0.008 (0.019)	- -	0.105*** (0.019)	- -	0.044 (0.032)	- -	0.041** (0.018)
Domestic investment	- -	-0.096***	- -	-0.108***	- -	-0.097***	- -	-0.095***	- -	-0.080**	- -	-0.066***
Govt. consumption expenditure	- -	(0.020) -0.068***	- -	(0.017) -0.060***	- -	(0.018) 0.007	- -	(0.030) -0.071***	- -	(0.032) -0.050*	- -	(0.025) -0.004
Real GDP Growth	- -	(0.015) -0.041*	- -	(0.017) -0.017	- -	(0.017) -0.077**	- -	(0.025) 0.064***	- -	(0.027) -0.025	- -	(0.025) -0.055
Log Real GDP per capita	- -	(0.024) -2.287**	- -	(0.028) 0.971	- -	(0.032) 1.694	- -	(0.022) -2.569*	- -	(0.035) -3.157*	- -	(0.038) -4.354***
FDI	- -	(1.036) -0.023	- -	(1.534) 0.009	- -	(1.145) -0.036**	- -	(1.329) -0.032*	- -	(1.781) 0.013	- -	(0.972) -0.041***
	-	(0.018)	-	(0.012)	-	(0.016)	-	(0.017)	-	(0.014)	-	(0.015)

Table 3. Continued

Variable	Dependent Variable: Male Youth Unemployment						Dependent Variable: Female Youth Unemployment					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Trade openness	-	0.002	-	0.000	-	-0.014	-	-	-	0.005	-	0.003
								0.016** *				
Log Tel. and mobile phone	-	(0.008)	-	(0.005)	-	(0.009)	-	(0.005)	-	(0.007)	-	(0.008)
	-	-1.200***	-	-1.403***	-	-1.257***	-	-	-	-	-	-1.097***
								1.247** *		1.082** *		
Adult to total population ratio	-	(0.346)	-	(0.298)	-	(0.291)	-	(0.328)	-	(0.316)	-	(0.358)
	-	-1.280**	-	-0.032	-	-1.277***	-	0.318	-	-0.171	-	-0.640
Urban population share	-	(0.512)	-	(0.517)	-	(0.340)	-	(0.445)	-	(0.488)	-	(0.585)
	-	-0.115***	-	0.014	-	0.050	-	-0.047	-	0.046	-	-0.039
Year fixed effect	-	(0.043)	-	(0.064)	-	(0.052)	-	(0.062)	-	(0.073)	-	(0.063)
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	218	218	218	218	218	218	218	218	218	218	218	218
Number of countries	49	49	49	49	49	49	49	49	49	49	49	49
Instrument	27	27	27	27	27	27	27	27	27	27	27	27
AR [1] Test	0.013	0.043	0.051	0.050	0.063	0.045	0.030	0.069	0.070	0.077	0.087	0.079
AR [2] Test	0.372	0.200	0.135	0.166	0.167	0.126	0.261	0.179	0.116	0.164	0.166	0.162
Hansen Test	0.793	0.835	0.956	0.898	0.974	0.992	0.967	0.866	0.938	0.946	0.984	0.922

*** Denote 1% significance level, ** Denote 5% significance level, * Denote 10% significance level. Robust standard errors are in parenthesis. Results presented in all the columns are based on the two-step dynamic SGMM, using the Windmeijer's finite-sample correction.

5.4 Robustness checks

The empirical findings from the estimations (after controlling for other control variables) show that improving the institutional structure, the regulatory framework, and access to finance have a negative net impact on total youth unemployment rate, as well as female and male youth unemployment. We conduct several robustness tests of our main findings, as reported in Table 4.

First, we attempt to examine the sensitivity of our findings with regards to alternative measures of education. In doing this, we focus our attention to the use of alternative education indicators, which are available for the same period and set of countries as employed in our core analysis. Results using the secondary school enrolment rate confirm the observations for the teacher-pupil ratio. Second, we further conduct robustness checks by using alternative institutional quality indicators. The institutional quality indicators considered include rule of law, political stability, voice and accountability, and government effectiveness. After these analyses, our core main findings are all confirmed. Third, we considered a different estimation approach that relaxes SGMM estimation while controlling for important factors such as geographic, strategic, or other time-invariant features that affect the relationship of interest. Specifically, we employ fixed effect regression analysis. The results obtained are consistent with our main finding that the relationship between basic quality education and youth unemployment can be enhanced by improvement of financial structure and institutional quality, including control of corruption and regulatory quality.

Table 4. Robustness checks

Robustness checks	Dependent Variable: Total Youth Unemployment
Check 1	
Secondary education enrolment * CC	-0.022** (0.010)
Secondary education enrolment * RQ	-0.098*** (0.031)
Secondary education enrolment * FD	- 0.017*** (0.004)
Check 2	
Education quality * rule of law	-0.610** (0.282)
Education quality * political stability	-0.022*** (0.005)
Education quality * voice and accountability	-0.013 (0.454)
Education quality * government effectiveness	-0.037***
Check 3	
Education quality * CC	-0.061* (0.026)
Education quality * RQ	-0.058 (0.079)
Education quality * FD	-0.002 (0.002)

*** Denote 1% significance level, ** Denote 5% significance level, * Denote 10% significance level. Robust standard errors are in parenthesis. All models contain all covariates in reported in Table 2 and Table 3.

5 CONCLUSION

This study examines the impact of quality foundational skills, measured by quality basic education, on youth unemployment in 49 African countries for the period 2000-2017. The study also assesses how three main measures of institutional capacity (including control of corruption, regulatory quality, and financial development) can moderate the relationship between basic quality education and youth unemployment. The analytical technique used is based on a two-step dynamic GMM estimator to account for unobserved heterogeneity and potential endogeneity of the explanatory variables.

The empirical results showed that the youth unemployment rate tends to be path-dependent, which implies that the present state of youth unemployment may have a strong impact in explaining youth unemployment level in the following year. The results also reveal that quality of basic education, on average, has a negative effect on youth unemployment. An interesting finding from this study is that the three indicators of institutional structures were found to have a negative conditional effect on the relationship between quality basic education and total youth employment rate (as a percentage of total labour force ages 15–24). The gender-specific estimation results show that corruption control, improved regulatory framework, and financial development are important moderating features for basic education–male youth unemployment relationship, while corruption control and financial development are the important moderators in the basic education–female youth unemployment nexus. This suggests that good institutional structures strengthen the impact of basic quality education in reducing youth unemployment in Africa. In particular, the study reveals that African countries that benefit more from the basic quality education–youth unemployment relationship are those that have well-structured financial institutions, followed by those with high control of corruption, then effective regulatory framework. In addition, we also find strong evidence that demographic factors, infrastructure development, and a beneficial macroeconomic environment influence youth unemployment.

What are the policy implications of these findings? First, given the negative unconditional effect of quality of foundational skills (basic education) on youth unemployment, increasing the quality of basic education will go a long way in reducing youth unemployment in Africa. The quality of education in some African countries is still poor. Hence, a complete positive overhaul of education systems can increase the innovation capacity of the labour force, which can in turn foster creation of opportunities. For example, the quality of foundational skills (basic education) can be improved by increasing the number of schools and teachers, on the premise that the number of pupils will not increase significantly in the coming years. An attempt to increase the number of teachers and schools will require that national governments of different African countries increase their budgets for primary and secondary education. In addition, governments should also commit to professional development of teachers through regular trainings in order to facilitate flow of quality knowledge and skills required by the students to further training or get decent jobs. Second, in terms of financial development, Africa's youth will be able to take full advantage of their increasing level of education when the financial sector is sufficiently well structured to provide financial support that youth need to engage in entrepreneurial activities. Even though some youths are keen to kick-start entrepreneurial activities, whether small or medium scale, the start-up capital is still relatively unavailable to fresh school-leavers. Similarly, a reduction in the level of bureaucracy associated with securing credit by youth will further enhance access to finance. This implies that, in cases where there is better access to finance for the youth, the potential for a positive outcome from foundation skills to reduce youth unemployment is higher, which is in line with the results of this study. Another implication of our findings is that quality foundational skills are expected to translate into increased youth employment. However, with the improvement of vital structural factors such as regulatory quality and corruption-control, the benefits associated with foundational skills development in terms of youth unemployment reduction can be maximized in the long term. We therefore recommend that better quality basic education as well as improved financial structure and institutional quality should constitute fundamental components of the policy mix for reducing the youth unemployment rate in Africa.

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APPENDIX

A1. LIST OF THE SAMPLE COUNTRIES

Algeria	Congo, Dem. Rep.	Gabon	Madagascar	Nigeria	Tunisia
Angola	Congo, Rep.	Gambia	Malawi	Rwanda	Uganda
Benin	Côte d'Ivoire	Ghana	Mali	Sao Tome and Principe	Zambia
Botswana	Djibouti	Guinea	Mauritania	Senegal	Zimbabwe
Burkina Faso	Egypt, Arab Rep.	Guinea-Bissau	Mauritius	Sierra Leone	
Burundi	Equatorial Guinea	Kenya	Morocco	South Africa	
Cabo Verde	Eritrea	Lesotho	Mozambique	Sudan	
Cameroon	Eswatini	Liberia	Namibia	Tanzania	
Central African Republic	Ethiopia	Libya	Niger	Togo	

A2. PAIRWISE CORRELATION ANALYSIS

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Total youth unemployment (1)	1.000																
Male youth unemployment (2)	0.989	1.000															
Female youth unemployment (3)	0.974	0.934	1.000														
Education (4)	-0.417	-0.402	-0.438	1.000													
Financial structure (5)	0.329	0.325	0.306	-0.319	1.000												
Control of corruption (6)	0.326	0.291	0.322	-0.349	0.400	1.000											
Regulation quality (7)	0.256	0.229	0.236	-0.277	0.437	0.757	1.000										
Inflation (8)	0.042	0.047	0.034	0.025	-0.094	-0.143	-0.193	1.000									
Domestic investment (9)	0.353	0.364	0.344	-0.081	0.048	-0.071	0.103	0.002	1.000								
Gov consumption on education (10)	-0.326	-0.339	-0.314	-0.005	0.042	0.193	-0.003	-0.032	-0.904	1.000							
Real GDP Growth(11)	-0.072	-0.069	-0.073	0.106	-0.064	-0.021	0.012	-0.044	0.169	-0.049	1.000						
Per capita GDP (12)	0.724	0.712	0.725	-0.611	0.343	0.251	0.254	-0.122	0.585	-0.494	-0.005	1.000					
FDI Inflows (13)	-0.067	-0.068	-0.065	-0.051	0.003	-0.006	-0.057	0.049	-0.229	0.383	0.201	-0.074	1.000				
Trade openness (14)	0.374	0.384	0.331	-0.340	0.143	0.169	0.069	-0.030	-0.030	0.176	0.027	0.373	0.387	1.000			
Telephone and mobile phone (15)	0.582	0.544	0.619	-0.675	0.450	0.505	0.390	-0.231	0.251	-0.178	-0.065	0.711	-0.137	0.249	1.000		
Adult to total population (16)	0.441	0.426	0.456	-0.472	0.444	0.410	0.350	-0.105	0.179	-0.107	-0.076	0.570	-0.055	0.248	0.628	1.000	
Urban population share (17)	0.486	0.489	0.484	-0.486	0.218	0.085	0.043	-0.060	0.480	-0.392	-0.076	0.699	0.124	0.382	0.475	0.448	1.000

A3. MULTICOLLINEARITY DIAGNOSTICS

Variables	VIF	Tolerance (1/VIF)
Education	1.96	0.51
Financial structure	1.95	0.51
Control of corruption	1.73	0.58
Regulation quality	1.64	0.61
Inflation	1.41	0.71
Domestic investment	1.27	0.79
Gov consumption on education	1.42	0.70
Real GDP Growth	1.41	0.71
Per capita GDP	1.26	0.79
FDI Inflows	1.15	0.87
Trade openness	1.12	0.89
Telephone and mobile phone	2.61	0.38
Adult to total population	1.96	0.51
Urban population share	1.02	0.98

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