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Editorial Foreword

We are pleased to announce that the third issue of UKH Journal of Social Sciences (UKHJSS) is now out in print. As the Editorial Board of the journal, we are honoured to be part of this achievement and have devoted a great deal of time and effort to ensuring that the journal follow the highest standards and international best practices. Rather than simply add its name to the list of periodicals out there, UKHJSS will make an impact within the scientific community both locally and internationally. We aspire to become a globally recognised academic journal that makes valuable contributions to science and scholarship.

The UKH Journal of Social Sciences is a semi-annual journal published by the University of Kurdistan Hewlêr, Erbil, Kurdistan Region, Iraq. Its e-ISSN number is 2520-7806, and its Crossref DOI is 10.25079/issn. 2520-7806. UKHJSS publishes a variety of research and review articles, letters, and original studies in many areas of social sciences. It is a peer-reviewed open access journal with a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License (CC BY-NC-ND 4.0). As such, the journal offers immediate, worldwide barrier-free access to all its published manuscripts without requiring a subscription or article processing charge (APC). By so doing, we intend to make available our authors’ contributions to science while adhering to the highest standards of rigorous scrutiny and academic research.

UKHJSS is intended to be a stimulating platform for all serious researchers and scholars in Kurdistan and abroad. We invite them to contribute to our journal by submitting their innovations, insights, and research findings. While original research is particularly cherished, we also value reviews and the scientifically reasoned opinions of experts, and scholars in a wide range of academic disciplines. We apply a uniform approach to all contributions: Research that is scientifically valid and technically sound deserves to be published and made accessible to the research and academic community. By publishing with us, your research will get the coverage and attention it deserves. As we follow an open access and continuous online publication practice, your work will be published swiftly and easily accessed by anyone, anywhere, and at any time. Moreover, Article Level Metrics allows you to continuously check the progress of your submitted work.

Finally, the Editorial Board of the UKH Journal of Social Sciences would like to extend its appreciation and gratitude to the 10 reviewers from different parts of the world who supported the journal by anonymously reviewing and assessing the submitted papers for the journal’s first issue. We also greatly value the distinguished researchers and authors who showed their interest by publishing the results of their hard work in our journal.

UKHJSS Executive Publisher
Dr. Mohammed Mochtar

UKHJSS Editorial Board:
Dr. Sherwan Kafoor, Prof. Almas Heshmati, Dr. Nabaz Khayya, Dr. Adam Mayer, Dr. Zana Ibrahim and Mr. Martin Hilmi.
1. INTRODUCTION

The school-to-work transition represents a long dark tunnel for many young people worldwide. A large and growing population of young people and increasing educational attainments make creating youth employment opportunities a challenge in most countries in sub-Saharan Africa (Pastore, 2015).

In 2011, an estimated 200 million Africans were aged 15–24 years, of which around 40% had studied up to the secondary level. Recent job creation efforts have not benefited young people without job market experience; youth unemployment is also seen as a source of social unrest and conflicts in society. Only 20% of the 73 million jobs created by African countries between 2000 and 2008 went to 15–24 years old.

The main determinants of youth unemployment can be summarized as follows: Low labor demand because of low growth of productive yet labor-intensive activities, especially in the formal private sector; underdeveloped entrepreneurship; non-organized labor supply; unequal access to education; low quality of education; low relevance of skills acquired in general education and technical vocational education and training (TVET); lack of skill development for self-employment and employment in the informal economy; non-optimal labor market functioning; non-availability and low quality of information; non-transparency in hiring practices; and insufficient labor market regulations.

In Rwanda, where a third of the 3.7 million population is aged 15–34 years, youth unemployment and job creation are...
Ndagijimana, et al.: Determinants of youth employment

a critical policy issue, particularly since over 14% of this age bracket is unemployed. Although youth employment rates are relatively high (71% for women and 91% for men were aged 20–24 years in 2010), labor segmentation is pronounced. Due to the agricultural nature of society and low levels of services sector development, young women are more likely than their male counterparts to work on family farms (Mcarthur et al., 2014).

Between 2010 and 2011, 74% of the employed women aged 20–24 years were in agriculture compared to 55% employed men. At the same time, increasing school enrolments have meant that youth entering the labor market has higher educational attainments and is thus likely to seek different kinds of jobs. Fortunately, the percentage of women aged 15–34 years with no education fell from 16% in 2006 to 4% in 2011. The corresponding drop among their male counterparts was from 14% to about 5%.

Rwanda has a number of affirmative action programs to address inequalities in access to economic opportunities. For example, the Vision 2020 Umurenge Program (VUP) is both a cash transfer scheme and a public works program (Etfo and Lufumpa, 2014). The program is means-tested, targeting households in the lowest two poverty/consumption quintiles.

Under VUP, eligible households earn wages by working on community infrastructure projects in the expectation of reducing unemployment in Rwanda. Rwanda’s large and growing youth population presents both a challenge and an opportunity to development. Rwanda is currently at a turning point in its demographic transition as fertility rates are decreasing, and the labor force is growing as the youth population ages. If Rwanda’s economy is able to productively absorb this segment of the population, the country could reap the benefits of a demographic dividend. However, the scale of the challenge should not be underestimated. An estimated 125,000 jobs need to be created every year just to absorb new entrants into the labor market (Filmer and Fox, 2014).

Further, most youth (70%) still live in rural areas (Escudero, 2013). Their skills gaps are critical and their transition from school to work is highly problematic. It is crucial to analyze the determinants of youth employment to understand the barriers that go beyond the usual lack of skills and financial and collateral issues. The following question can help in this analysis: What are the determinants of youth employment in Rwanda?

Our research assesses the determinants of youth employment in Rwanda from the demand (formal and private sector and entrepreneurship), supply (equal access to education, quality of education, relevance of skills acquired in general education, and TVET), labor functioning (availability and quality of information, transparency in hiring practices), and labor market regulations. These aspects are among the most critical for the youth to transition from school to work. Questions also remain about the factors that influence youth employment in Rwanda and how youth employment is related to poverty, its reduction and the distribution of income.

Our research uses a multinomial logit model for testing all the youth employment determinants. The data are obtained from the National Institute of Statistics of Rwanda. The study also discusses the status of youth unemployment in Rwanda over time and provides policy recommendations.

The specific objectives of our study are as follows:
- Identifying the determinants of youth employment from both demand and supply sides;
- Analyzing the determinant factors of youth employment from the point of view of labor market functioning; and
- Formulating recommendations directed at policymakers for improving youth employment.

2. LITERATURE REVIEW

This section has two components: A review of theoretical literature dealing with the determinants of youth employment in general and a review of empirical literature with evidence from other countries.

2.1. Theoretical Literature Review

To understand the main challenges to youth employment in developing countries, it is useful to first discuss the determinants of labor market outcomes. While these determinants are interrelated, they can be grouped into three types: Labor demand, labor supply, and the functioning of labor markets. The main determinants of labor market outcomes can be summarized as follows: Labor demands growth in productive and labor-intensive activities, especially those in the formal private sector, entrepreneurship, labor supply, equal access to education, quality of education, relevance of skills acquired in general education and TVET, skill development for self-employment and employment in the informal economy, market functioning, availability and quality of information, transparency in hiring practices, and labor market regulations (Zimmermann et al., 2013).

Referring to the labor market policy for Rwandan youth, market-led capacity building is placed at the heart of youth
employment in collaboration with non-governmental organizations involved in youth empowerment and poverty reduction programs. Capacity building in small businesses is being offered, and skill training is designed in conjunction with the private sector to meet varied and evolving market requirements.

When analyzing the determinants of youth employment, it is important to note that when labor demand slows down, self-employment may be the only alternative employment opportunity available to the unemployed. The self-employed thus consists of those who are driven by necessity on the one hand and voluntary entrepreneurs on the other hand. The main supply-side determinants of youth employment outcomes are education and skills in terms of quantity and quality and their relevance. Skills are built through formal general education, formal technical vocational education, training and apprenticeships, and through informal education and training (Lee, 2013).

In the same vein, lack of non-cognitive skills is often mentioned by employers in the private formal sector as an obstacle to hiring young workers. Thus, access to primary education is the first requirement for obtaining basic literacy and numeracy skills which are a precondition for ensuring access to decent work. Besides general education, youth can acquire work-specific relevant skills through TVET programs. TVET can be integrated into compulsory schooling as an alternative to an academically oriented track, or it can be part of several post-compulsory schooling options.

Studies conducted in the Middle East and North Africa countries show that TVET has a limited role quantitatively because of the weak links between the skills provided by the TVET system and those demanded by the private sector, insufficient funding, poor monitoring and evaluation, stigmatization, and lower returns compared to secondary education. The benefits of TVET in terms of earning and social promotion vary across countries and influence its attractiveness.

2.2. Empirical Literature Review
Brixiová et al., (2014) researched youth employment in Africa and came up with new evidence on the effects of policies in Swaziland during 2007–2010. They carried out a multinomial logit regression analysis to analyze the socioeconomic drivers of the unfavorable youth labor market outcomes on the supply side. Since many of the factors that can unlock potential employment of Swazi youth are on the demand side of the labor market, the authors examined the barriers to job creation and youth entrepreneurship. Their study concluded that learning from the experiences of other countries could inform the design of more effective interventions for youth employment in Swaziland.

Etfo and Lufumpa (2014) used a multinomial logit model to examine factors associated with employment outcomes in Rwanda including (i) employment in formal and informal sectors and agriculture and (ii) wages in non-agriculture and self-employment in non-agriculture and agriculture. The authors estimated separate regressions for both categories of employment for women and men and urban and rural areas. Their research found that the percentage of Rwandans aged 15–64 years who were unemployed fell from 9.3% in 2005–2006 to 6.9% in 2010–2011. However, in urban areas, one in four women and one in five men were classified as unemployed (Etfo and Lufumpa, 2014). On the other hand, a relatively low percentage of youth was unemployed which may be attributable to delayed labor force entry as a result of continuing education.

According to Bicaba et al. (2015), the need to invest in education persists because of the association between high educational attainments and better jobs. This is especially necessary to ensure that young people receive post-secondary education as this appears to be a prerequisite for high paying, non-farm wage employment. The authors add that investments are also needed in skill development, especially for women to allow them to compete in the labor market and to reduce the male-female wage gap.

This review of the literature shows that different researchers have been interested in finding the determinants of youth employment in developed and developing countries, but no one has used a model using natural characteristics such as age, gender, and geographical location to capture the determinants leading to youth employment. Therefore, our research seeks to fill this gap in literature by considering a number of key variables.

3. METHODOLOGY
We used a multinomial logit model to assess the determinants of youth employment by considering the demand and labor market functioning in Rwanda. This approach helped us shed light on youth employment, identify its determinants, and estimate their effects.

In fact, this estimation procedure helped us to examine some of the key socioeconomic determinants such as age,
gender, education, and location that are qualified as factors from labor market and demand functioning which contribute to youth employment. Our research studied young adults (aged 20–34 years). Following Etfo and Lufumpa (2014), a multinomial logit model is specified as:

\[ \text{EMP}_i = \beta_0 + \beta_1 \text{GE} + \beta_2 \text{AG} + \beta_3 \text{EL} + \beta_4 \text{LO} + \epsilon \]  

(1)

Where, \( i \) stands for individuals and \( \text{EMP} \) for employment status which is the outcome categorical variable indicating whether the individual has a wage employment in the public sector, the formal private sector, and the informal private sector or is self-employed, inactive, or unemployed. Natural characteristics (NC) including gender (GE), age (AG), education level (EL), and geographical location (LO) constituted independent variables. The error term (\( \epsilon \)) is appended to capture any measurement error in the employment status and left out variables.

The gender variable captured any gender gap in the labor market. Age tested the sensitivity of the likelihood of the employment status depending on age. For education, the two main qualifications in our research are undergraduates (BSc and TVET qualification) and postgraduate levels. As people living in urban areas may have higher job opportunities in the formal private and public sectors, we controlled for location to capture locational heterogeneity in employment status among the youth.

The main source of data on the determinants of youth employment in Rwanda is the National Institute of Statistics in Rwanda. We used the STATA/SE 13.0 software for data analysis.

4. INTEGRATED AND PARTICIPATORY APPROACH

Experience shows that youth employment programs and policies aimed at refining labor market dynamics often result in interventions that are fragmented, too narrow, or isolated and do not fully take into account the general economic, institutional, and social framework. Inconsistencies may arise in terms of the content of the interventions, their level, geographical location, and target beneficiaries. Moreover, supply-side measures tend to outweigh demand-side measures. Anecdotal examples of not provable interventions include skill training programs not backed by an appropriate demand for the skills in the labor market or entrepreneurship training without any possibility of gaining appropriate access to credit. It is, therefore, indispensable in the domain of youth employment to dispose of an overarching, integrated strategy for growth, and job creation.

This strategy covers labor demand (job opportunities) and supply (employability) as well as the mediation or matching process combined with well-targeted and structured interventions. A lifecycle approach to youth employment is also highly useful as it recognizes that what happens at one stage is affected by, and in turn affects, opportunities at other stages. For example, premature entry into the labor market as a child lessens the chances for better employment in adulthood because of lack of education.

Youth employment policies must be embraced in the broader context of a country’s employment and growth policy considering possible crowding-out effects on other age groups. Productive employment and decent work for young people require sustained, determined, and concerted action by a wide number of actors. As they cannot stand on their own, youth employment interventions must be linked to broader development frameworks. Coherence and coordination between relevant government agencies and other national and international (for example, donor community) stakeholders are crucial.

While not necessarily the only mechanism, the use of national action plans for youth employment can be useful in facilitating this. To be successful, however, these plans should have strong and sustained political commitment and be based on broad participation. In this context, it is important that youth also participates actively in the decision-making process as they know best what they want and what they can offer. The participation of young people in membership-based organizations and their engagement in decision-making processes affecting their employment and working conditions is crucial for fostering social inclusion and advancing democratization. Young people are often underrepresented in these processes. A good example is the consultation of youth in PRSPs in Ghana, Honduras, Indonesia, and Uganda (Kingombe, 2011).

4.1. Special Attention to Youth

In view of the challenges to youth employment, many governments are investing considerably in youth employment programs which complement general poverty reduction and employment policies.

Questions arise as to what justifies these youth-specific interventions and why it is not sufficient to focus only on promoting a favorable investment and business climate.

The main arguments that have been put forward to justify youth-specific interventions include young people facing
specific challenges in accessing the labor market which lowers their chances of finding decent employment.

The main difficulties are as follows:

- A higher chance of losing their jobs during economic downturns (“last in, first out”): Specific barriers to entry often stemming from lack of experience;
- Path dependence: Early unemployment increases the likelihood of subsequent unemployment (Pastore, 2007);
- Underutilized young people incur significant economic costs as the national workforce is not used to its full potential. Moreover, in general, young people are more dynamic and often have higher educational levels than their parents. It is also mainly young people who opt for migration if they cannot find adequate employment in their own country;
- Underutilization of young people in the labor market can trigger a vicious circle of intergenerational poverty and social exclusion; and
- Often, lack of employment opportunities may result in social conflicts such as violence and juvenile delinquency which, in turn, leads to high social costs. Moreover, post-conflict countries have predominantly young populations without decent jobs; many of them are deprived of education as they have grown up in violent societies and often been combatants themselves.

4.2. Strategy to Promote Youth Employment

4.2.1. Labor demand

Resolving the problem of youth unemployment and underemployment requires growth in salaried employment in the formal economy. This leads to more jobs for young people and encourages a transition from the informal to the formal economy. Further, the quality of employment (for example, productivity and working conditions) in the informal economy, where a majority of young people work, should be improved.

Job creation depends primarily on economic growth which itself depends on investments and on the international context. A stable macroeconomic environment which boosts investments - both private and public - and thus growth, is fundamental in the creation of new formal jobs for all groups of workers but is of particular benefit to young people who suffer most from economic downturns because of their short job tenures and lack of experience (“last in, first out”) (Braziene and Dorelaitiene, 2012).

Sectoral policies, in particular, can promote job creation in the medium- to long-term provided they are well designed and targeted at sectors with high potential for employment growth. Well-targeted policies can promote private initiatives in traditionally “youth-friendly” sectors such as tourism, catering, information, and communication technology (for example, commercialization of mobile telephones has increased job creation in Rwanda) and basic and social services including health as well as in the sports sector.

In developing countries, 75% of the youth living in poverty are in rural areas (Burrus and Roberts, 2012). Rural youth are more likely to have started work in childhood. They are the victims of human trafficking and sexual exploitation and are more vulnerable to being recruited by militant extremist groups. Most urban poverty, on the other hand, is a result of rural deprivation and the resulting distress urban migration (Coenjaerts et al., 2009).

Therefore, special attention should be paid to the agricultural sector by moving away from subsistence agriculture and introducing commercialization and productivity improvements (for example, maize and vegetables) through technological changes, infrastructure support, and rural sector support projects. The international trade and aid policy (the Vision Umurenge in Rwanda) should also be taken into consideration in this context.

In general, youth shows a strong interest in the conservation of our planet. Environmental management also has an interesting employment potential. A successful example is a youth employment project in the Indian state of Goa (Markos, 2010; Klasen et al., 2013). As part of the project, a mix of interventions based on individual motivation, use of best practices, public-private partnerships, and legislative measures were used. The measures resulted in creation of more than 2000 jobs for young people in waste management and recycling, with opportunities for further expansion in the past 3 years (Hewett and Foley, 2000).

However, it is the private sector that is the main driver of growth and job creation. Entrepreneurship is a driving force for initiating business ideas and mobilizing human, financial, and physical resources for establishing and expanding enterprises and creating jobs. Entrepreneurship is another way of unleashing the economic potential of young people. The promise of youth entrepreneurship can be maximized through programs and strategies that address the barriers in doing business.

Societies that appreciate entrepreneurship and thus promote its values and norms can create a dynamic and vibrant class
of young entrepreneurs. Empirical evidence shows that educating young minds in enterprising behavior and boosting their confidence for calculated risk taking, increases the incidence of entrepreneurship being adopted as a career option (Rolfe, 2010).

The successful development of youth businesses hinges on good access to well-integrated services such as management training, business mentoring programs, financial services, support in gaining access to markets, and networking opportunities. Enhancing the youth’s capacity in association building and policy advocacy can address their disadvantaged position. Young women entrepreneurs face additional hurdles as in many cultures they are more risk averse, while their roles in the family and society keep them from tapping opportunities in business development (Kabeer, 2012). This also means that they are more likely to be in the informal economy and less likely to be entrepreneurs employing others.

4.2.2. Labor supply

Education and vocational training should be designed around the informal economy where most of the young working people are found in developing countries. Often, vocational training has to be complemented by remedial education as many young workers in the informal economy may have dropped out of the educational system at an early stage (Council, 2014). Young people may have begun working prematurely (while still children) because of economic necessity (for example, AIDS orphans in some African countries may have become heads of households and breadwinners) or cultural constraints. As a result, they lack basic skills including literacy and numeracy.

In fact, young people face particular challenges, because they lack appropriate skills and experience, are less creditworthy and have more difficulties in accessing business networks and sources of information. A burdensome business environment is difficult for all, but as youth has generally less knowledge and experience of business regulations and related legal and institutional frameworks, this constraint can discourage them from venturing into a business career and so increase the risk of business failure (Coenjaerts et al., 2009).

Young informal workers acquire technical skills in informal activities, but as these skills are often not recognized officially, they face difficulties in accessing better jobs. Recognition and certification of skills acquired through informal channels are key elements in this regard. In addition, young people often do not know which profession to join and where to look for a job. Special youth labor market information and employment services and early career guidance may facilitate their entry into the labor market and help avoid a mismatch between youth labor supply and demand.

With regard to labor market institutions, it has been argued that employment protection legislations (EPLs) and minimum wages, in particular, increase youth unemployment by making labor too expensive. Moreover, many young people in developing countries work in the informal economy, where EPL and minimum wages have a rather limited impact. The question is not whether to regulate, but what kind and what level of regulations are appropriate to get the best forms of protection for young people without inhibiting firms from hiring.

Higher volatility and lack of work experience are strong reasons why entrepreneurs often shy away from hiring young people. Wage subsidies or reduction in payroll taxes for firms that hire inexperienced workers seem to be the best options to counterbalance employers’ concerns and thus increase the demand for young workers.

5. RESULTS AND DISCUSSION

5.1. Multinomial Logistic Regression

In this section, we test if youth employment in Rwanda is influenced by gender, age, education, and geographical location. The employment status should be the outcome variable which is related to the different categories analyzed.

5.2. Results and Interpretations

Our analysis focused on Rwanda’s youth employment data using published raw data from the annual household budget survey’s (EICV4) results. We used unweighted data only on respondents who had no missing variables in all variables of interest.

The dataset contains variables for 284 respondents. The outcome variable is employment status. The predictor variables are gender, age, education, and geographical location. The descriptive statistics of the variables of interest are given in Tables 1-4. Table 1 presents the distribution of employment status by gender.

The distribution of employment status by gender in Table 1 shows that there were more women respondents than men. In the aftermath of the Rwandan genocide, women have played a major role in the country's economic recovery. The government has also actively promoted women’s labor market participation and empowerment.
Table 2 gives employability of labor and different educational degrees obtained. Paid employee, own account workers, and unpaid family workers dominate the sample. Formal education at all levels shows high frequencies.

The distribution of the highest diploma obtained by employment status [Table 2] shows that more respondents had completed humanities; a few of them had completed post-primary education. Table 3 gives the employment status by geographical location divided into urban and rural areas.

Table 3 shows more respondents were living in urban areas at the time of data collection. The gap in frequency distribution by location should not be considered negative. Recent years of urbanization give a bigger weight to urban youth employment.

Our research used the “mlogit” command to estimate a multinomial logistic regression model. The variables used are indicator variables (that is, categorical variables) and specification test results show that they should be included in the model. We also used the option “base” to indicate the category to use for the baseline comparison group.

We chose to use the type of employer as the baseline category in our model. The results of the regression are reported in Table 4.

The multinomial logit model is a powerful estimation tool when the dependent variable is discrete, such as alternative forms of employment studied in this case. Since this type of models is qualitative, the estimated parameters cannot be directly interpreted. Parameter estimates only give the expected change in logit and not the probability of choosing a certain employment option. To examine the direct effect of the variables on the probability of employment status, ideally, the marginal effects should be computed which allow to examine the direct level of the effects. These are not reported here to conserve spaces. The estimated model fits the data well. The log likelihood ratio test (LR test) of restricted and unrestricted models suggests the unrestricted model as accepted model and basis for analysis of the results. The frequencies of actual and predicted alternative choices of employment outcomes from the model also suggest the model valid.

Based on the regression results, the outcomes of the model and the conclusions thereof as far as youth employment is concerned in Rwanda are as follows:

- The outputs show the iteration log indicating how quickly the model converged. The log likelihood found in the results (−169.9312) can be used in comparison to nested models;
- The likelihood ratio $\chi^2$ of 107.98 with $P = 0.0001$ tells us that our model as a whole fits significantly better than an empty model (that is, a model with no predictors);
- This leads us to conclude that the model is in line with what was expected: That youth employment in Rwanda is influenced by gender, age, education, and geographical location;
- A one unit increase in the variable age is associated with a 0.023 decrease in the relative log odds of being a paid employee versus another employment status;
- A one unit increase in the variable education level is associated with a 0.46 decrease in the relative log odds of being a paid employee versus another employment status;

### Table 1: Distribution of employment status by gender

<table>
<thead>
<tr>
<th>Employment status (last job)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paid employee</td>
<td>89</td>
<td>120</td>
<td>209</td>
</tr>
<tr>
<td>Employer</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Own account worker</td>
<td>9</td>
<td>44</td>
<td>53</td>
</tr>
<tr>
<td>Unpaid family worker</td>
<td>11</td>
<td>7</td>
<td>18</td>
</tr>
<tr>
<td>Intern/volunteer</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>VUP</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>111</td>
<td>173</td>
<td>284</td>
</tr>
</tbody>
</table>

Note: Pearson $\chi^2$ (5)=20.0191, Prob=0.001. Source: Authors’ calculations based on EICV4 data. VUP: Vision 2020 Umurenge Program

### Table 2: Distribution of employment status by the highest diploma obtained

<table>
<thead>
<tr>
<th>Employment status (last job)</th>
<th>Primary completed</th>
<th>Secondary common</th>
<th>Post-primary certificate</th>
<th>Diploma A3, D5, D4</th>
<th>Humanities Diploma</th>
<th>Bachelors Professional license</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paid employee</td>
<td>33</td>
<td>31</td>
<td>2</td>
<td>6</td>
<td>88</td>
<td>21</td>
<td>28</td>
</tr>
<tr>
<td>Employer</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Own account worker</td>
<td>26</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td>12</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Unpaid family worker</td>
<td>3</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Intern/volunteer</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>VUP</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>50</td>
<td>3</td>
<td>7</td>
<td>105</td>
<td>25</td>
<td>32</td>
</tr>
</tbody>
</table>

Note: Pearson $\chi^2$ (30)=84.0054, Prob=0.000. Source: Authors’ calculations based on EICV4 data. VUP: Vision 2020 Umurenge Program
A one unit increase in the variable age is associated with a 0.10 increase in the relative log odds of being an own-account worker versus another employment status;

A one unit increase in the variable education level is associated with a 0.80 decrease in the relative log odds of being an own-account worker versus another employment status;

A one unit increase in the variable age is associated with a 0.31 decrease in the relative log odds of being an unpaid family worker versus another employment status;

A one unit increase in the variable education level is associated with a 0.75 decrease in the relative log odds of being an unpaid family worker versus another employment status;

A one unit increase in the variable age is associated with a 0.36 decrease in the relative log odds of being an intern/volunteer versus another employment status;

A one unit increase in the variable education level is associated with a 13.5 increase in the relative log odds of being an intern/volunteer versus another employment status;

A one unit increase in the variable is associated with a 0.13 decrease in the relative log odds of being a VUP worker versus another employment status; and

A one unit increase in the variable education level is associated with a 0.68 decrease in the relative log odds of being a VUP worker versus another employment status.

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**Table 3: Distribution of employment status by location**

<table>
<thead>
<tr>
<th>Employment status (last job)</th>
<th>Urban</th>
<th>Rural</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paid employee</td>
<td>169</td>
<td>40</td>
<td>209</td>
</tr>
<tr>
<td>Employer</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Own account worker</td>
<td>40</td>
<td>13</td>
<td>53</td>
</tr>
<tr>
<td>Unpaid family worker</td>
<td>2</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>Intern/volunteer</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>VUP</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>215</td>
<td>69</td>
<td>284</td>
</tr>
</tbody>
</table>

Note: Pearson $\chi^2(5)=45.1386$, Prob=0.000. Source: Authors' calculations based on EICV4 data. VUP: Vision 2020 Umurenge Program

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**Table 4: Multinomial logistic regression estimates of youth employment in Rwanda**

| Variables              | Coefficients | Std. error | z     | P>|z| | 95% confidence interval |
|------------------------|--------------|------------|-------|-------|-------------------------|
| Paid employee          |              |            |       |       |                         |
| Gender                 | 18.0355      | 7297.1150  | 0.00  | 0.998 | −14284.050–14320.120    |
| Education              | −0.4592      | 0.9043     | −0.51 | 0.612 | −2.231–1.313             |
| Location               | 17.2835      | 12387.1100 | 0.00  | 0.999 | −24261.010–24295.580    |
| Age                    | −0.0227      | 0.2946     | −0.08 | 0.938 | −0.600–0.554             |
| Constant               | −9.9866      | 12387.1200 | 0.00  | 0.999 | −24288.290–24268.320    |
| Employer (Base outcome) Own account worker | | | | | |
| Gender                 | 19.3161      | 7297.1150  | 0.00  | 0.998 | −14282.770–14321.400    |
| Education              | −0.8021      | 0.9077     | −0.88 | 0.377 | −2.581–0.9770            |
| Location               | 17.9640      | 12387.1100 | 0.00  | 0.999 | −24260.330–24296.260    |
| Age                    | 0.1020       | 0.2971     | 0.34  | 0.731 | −0.480–0.684             |
| Constant               | −15.2563     | 12387.1200 | 0.00  | 0.999 | −24293.5600–24263.050   |
| Unpaid family worker   |              |            |       |       |                         |
| Gender                 | 18.2097      | 7297.1150  | 0.00  | 0.998 | −14283.870–14320.290    |
| Education              | −0.7518      | 0.9244     | −0.81 | 0.416 | 2.563–1.060              |
| Location               | 20.2085      | 12387.1100 | 0.00  | 0.999 | −24258.090–24298.500    |
| Age                    | −0.3147      | 0.3246     | 0.97  | 0.332 | −0.951–0.321             |
| Constant               | −9.3134      | 12387.1200 | 0.00  | 0.999 | −24287.620–24268.990    |
| Intern/volunteer       |              |            |       |       |                         |
| Gender                 | 2.0553       | 8431.4430  | 0.00  | 1.000 | −16523.270–16527.380    |
| Education              | 13.5504      | 1291.0090  | 0.01  | 0.992 | −2516.780–2543.881      |
| Location               | 4.0696       | 13930.4400 | 0.00  | 1.000 | −27299.090–27307.230    |
| Age                    | −0.3590      | 0.4831     | −0.74 | 0.457 | −1.305–0.587            |
| Constant               | −88.2856     | 16608.0100 | −0.01 | 0.996 | −32633.500–32456.930    |
| VUP                    |              |            |       |       |                         |
| Gender                 | 36.2363      | 10604.1300 | 0.00  | 0.997 | −20747.480–20819.950    |
| Education              | −0.1520      | 1.0251     | −0.15 | 0.882 | −2.161–1.857            |
| Location               | 0.2094       | 16035.2600 | 0.00  | 1.000 | −31428.330–31428.750    |
| Age                    | −0.1257      | 0.3635     | −0.35 | 0.729 | −0.838–0.586            |
| Constant               | −13.8366     | 17785.6500 | 0.00  | 0.999 | −34873.070–34845.400    |

Multinomial logistic regression Number of obs=284
LR $\chi^2(19)=107.9800$
Prob > $\chi^2=0.0000$
Log likelihood=−169.9312 Pseudo $R^2=0.2411$

Source: STATA results based on EICV4 data.
associated with a 0.15 decrease in the relative log odds of being a VUP worker versus another employment status.

6. CONCLUSION AND POLICY RECOMMENDATIONS

The results of our research conclude that for youth (aged 20–34 years) there was a negative relationship between ages on the one hand and education level on the other with being either a paid employee or an unpaid family worker or a VUP worker. In addition, there was a positive relationship between age and being an own-account worker which was directly linked to job creation. The youth faced specific barriers in the labor market. Their unemployment rate was significantly higher and their employment and working conditions were worse than those of the elders which led to high economic and social costs for society.

Therefore, special attention must be paid to integrating the youth better into the labor market. This is also important given that their number is so high. Further, support for youth should mainly be based on existing employment policies which are complemented where necessary by targeted interventions when implemented their impact on other age groups must be taken into consideration.

Supply-demand mismatch often lies at the root of the weak labor market integration of the youth. This can be resolved by adopting integrated approaches that consider both sides of the labor market effectively and involve all sectors of society.

The skills and aspirations of young Rwandans are an invaluable force. Helping young people have access to productive employment and realizing their potential is a precondition for poverty reduction and sustainable development.

Youth employment programs can serve as useful support to young people who often face specific barriers in the labor market. In fact, their underutilization certainly leads to economic and psychological costs to the country. Nevertheless, youth programs have to be designed with caution to avoid crowding-out effects on other groups of workers.

Even though youth program initiatives exist, the following policy recommendations are put forward:

- Investors in the country should support country-led efforts in various policies that are contributing to improving the labor market. The national commitment for the promotion of youth employment involves all economic sectors. There should be greater participation of the youth within their own organizations such as in trade unions;
- Existing policies on youth programs should be improved according to the current situation and adjusted easily to youth specific needs such as youth entrepreneurship, remedial education, and oriented vocational training or internships;
- Donors should support country-led efforts in various policies that are contributing to an improved labor market situation for the youth. Genuine national commitment for the promotion of youth employment requires the strong involvement of large sectors of society: First, a greater participation of the youth in their own organizations or as representatives in other organizations and also in trade unions and the private sector, as well as closer cooperation with, and among, ministries and other public institutions;
- Youth employment issues can often best be resolved with already existing employment policies which could be adjusted to youth-specific needs such as youth entrepreneurship, remedial education, and vocational training. Targeted interventions could, however, be useful under specific circumstances. Nevertheless, it is important to take into consideration the possible crowding-out effects on other age groups.

Despite significant differences in level of development between Rwanda and Kurdistan Region, the finding of this research can have strong implications for the youth unemployment in Kurdistan Region and policies toward job creation to reduce the rate of unemployment and brain drain among the young job seekers.

REFERENCES


social partnerships for better skills and better jobs. *Papers in Regional Science*, 84, 553-574.


1. INTRODUCTION

In recent years, the role of water has been increasing. The scarcity of this essential resource is getting to be more and more of an issue. There is a strong link between water and society. The lack of water could cause serious security challenges. The scarcity of water could cause radical reactions - such as armed conflicts - in society to get control over the water supplies. During the history of humanity, to seize the resources was one of the fundamental causes of wars. (Szalkai, 2012) Africa is the second most arid continent in the World. (Abdeen, 2010) Africa is certainly a divided and colorful continent in ethical, economical, and religious aspects, which sometimes causes certain tensions.

Water scarcity is one of these challenges. It could boost other - already existing - tensions.

According to the international definition, water conflict is: “The fight with the sole or primary purpose of gaining access to water, or where water forms the central weapon of offense in the arsenal of the aggressor.” (Ashton, 2000). There are authors who support the aforementioned definition (Kirmani, 1990; Khroda, 1996; Wolf, 1996; Pallett, 1997; Turton, 1999; 2000).

There are two significant causes of water scarcity in Africa.

1.1. Climate Change
During the past 100 years, the planet's average temperature has been growing about 0.9°C. This process has been accelerating in the past 35 years [Figures 1 and 2]. It is relevant to emphasize that 2016 was the warmest year since the 19th century (NASA, 2018).

There are countless consequences of global warming. These effects seriously affect the African continent. In Africa, the average precipitation is decreasing, which causes difficulties
to provide sufficient amounts of high-quality drinking water, which is essential for agriculture and food production. There is no life without water, which is essential to life. The water scarcity forces the local population to leave their territories and look for new places to live. The migration develops conflict between the newcomers and the original local population.

Climate change generates serious challenges in Africa. The lack of resources such as water and agriculture products aggravates tensions in the concerned countries. These countries are already facing challenges in connection with social, security, and economic issues. Water scarcity, which is one of the consequences of climate change, insufficient water management, and overpopulation, is capable of inflaming already existing conflicts. In general, water scarcity is not the primary cause of war, but it is undoubtedly one of the most important reasons. The water and food scarcity add oil to the fire.

The phenomenon is an important issue in Africa. The continent suffers from the consequences of climate change. Especially, the arid territories are affected by the situation.

1.2. Overpopulation

Regarding the water conflicts, another important factor is overpopulation. According to United Nations estimates, the population of Africa is 1.2 billion. This means that the African population is 16% of the total world population (United Nations, 2017).

There has been a rapid population explosion on the continent. In recent years, the population has been growing by 30 million people per year. By the year 2050, around 2.4 billion people will live in Africa [Figure 3]. According to the estimates, the annual growth of the population will be 42 million (Bish, 2016).

The rapidly growing population is consuming more water and food resources. The lack of resources causes tensions in society and raises the economic and security challenges in the affected African countries.

2. WATER CONFLICTS IN AFRICA

At present, there are no water wars in Africa, but the possibility of these conflicts is increasing. In the recent past and today, there are the following conflicts and disputes connected to water shortages and scarcities around Africa. In the Northeast African region, the hotspot is the Nile conflict among Egypt, Sudan, and Ethiopia. (Besenyő and Miletics, 2014) In the West African region, the Volta River and the Senegal River cause conflict. The Volta River is also the hotspot between Ghana and Burkina Faso, and war

![Figure 1. The Average Planet Temperature over the past decade. Source: NASA 2018](image-url)
has already broken out once for the Senegal River between Senegal and Mauritania. In the Central African region, tension increased among Niger, Mali, and Nigeria. Nigeria is involved in the conflict over Lake Chad as well. In the South African Region, Lesotho and the South African Republic as well as Botswana, Namibia, and Angola are affected in the Okavango River dispute (Treszkai, 2016). See Figure 4 for details about the main water conflicts in Africa.

As a result of climate change, the water shortage/scarcity and desertification, as well as demographic issues, are significant factors in the ongoing conflicts in Africa. Low rainfall and drought struck Somalia, Ethiopia, Kenya, and Eritrea. Famine increases the instability in Somalia, already in the throes of civil war. (Kis-Álmos et al., 2010) There are plenty of conflicts between the pastoral tribes on the border of Kenya and Ethiopia stemming from the struggle for survival during drought.

Desertification is also a serious source of the conflicts in the Sahel region. Especially in Sudan and Darfur, desertification and water scarcity forced the pastoral tribes to leave their territory and move to the lands of peasant tribes, which tension later generated the civil war. (Besenyő, 2016).

Chad is affected in the Darfur conflict because large numbers of migrants live in camps on its territory. The common territory of Chad, Niger, and Nigeria is also struck by drought and water scarcity, which cause famine. This famine increases dissatisfaction and tension, which is favorable to Boko Haram and other militias.

Mauritania and Mali are struck by conflicts, as well, and in parallel, there is a drought crisis in both of these countries.
As a result of the instability and poor governance, different transnational organized crime groups, as well as various radical and separatist groups, are benefitting from the situation (Gowan, 2017).

The above-mentioned conflicts generate large numbers of migrants and refugees on the continent. According to the United Nations, in 2017, 19 million migrants moved within Africa, and 9 million migrants left the African continent and moved to Europe (United Nations, 2017). The highest numbers of migrants have been coming from Sudan (Darfur), Nigeria, South-Sudan, and Somalia [Figure 5].

3. GEOPOLITICAL ASPECTS AND INTERNATIONAL ACTORS IN AFRICA

Since water is undoubtedly a valuable resource in Africa and the control of water resources is a relevant geopolitical issue, a number of international actors and powers are affected by the issue. There is a serious chance for disputes or conflicts, for example, among the resource-hungry superpowers in Africa. China, Russia, India, Brazil, the U.S., the EU, South Korea, and Malaysia are significant trade partners of Africa. All of them are beneficiaries of Africa’s natural resources; therefore, they have been trying to spread their influence to represent their political, strategic, and economic interests (Lin, 2017).

Beyond natural resources there are other factors that are important to the international actors, such as agriculture, finance, industry, and infrastructure; furthermore, the geographical location of some African countries is also a relevant aspect (Qoubo, 2012).

The water conflicts create a suitable opportunity to the international actors to extend their influence because they
can exploit the economic, social, and security tensions. On the one hand, stability is essential to beneficial business connections between the African countries and the international superpowers, although on the other hand tension and crisis are also useful for them to reinforce their position in the geopolitically and strategically important territories.

In recent years, the European Union has had to face a serious migration crisis, which is a simultaneous issue in political, security, and social areas. At the European Union Migration Summit held on 27.06.2018, the leaders of the European countries agreed on some measures regarding the managing of the migration. In the mutual agreement, they verified that the European Union must reinforce external border protection and set up “closed” reception camps for the migrants. The migrants have to stay in these camps during the asylum proceedings. The EU agreed that close cooperation with non-European countries, especially with African countries, would be essential (The Guardian, 2018).

The leaders of the European Union expect that the new measures will reduce the number of new migrants.

4. CONCLUSIONS

Water is an essential natural resource. The role of water is getting more and more significant. As a result of climate change, insufficient water management, and overpopulation, the water shortage or water scarcity is an ongoing issue. There are serious consequences for this new phenomenon. As an outcome of the situation, the African countries have to face new challenges. In the affected African countries, the lack of water causes drought, famine, and poverty, which raise the tensions in society or, in some severe cases, the situation forces the people to leave their land and look for a new life in other territories. This environmental migration is able to generate tensions and conflicts that generate more and more migrants.

The instability that is the outcome of the water conflict is, on the one hand, beneficial to separatist and radical groups as
well as the organized crime groups, but, on the other hand, the international actors and superpowers exploit the situation to expand their strategic and geopolitical interest.

Among the ongoing conflicts in the Sahel region, along with other serious issues, the water shortage or scarcity is also an extremely serious factor. The large numbers of inhabitants who are suffering from water scarcity, and the people who are affected by conflicts, have been going to Europe. The European Union is facing a serious challenge: Mass migration [Figure 6 and 7]. The leaders of the European Union are trying to manage the sensitive situation but the new measures could have counterproductive outcomes, because if they do not allow the migrants and asylum seekers to travel to Europe, the people who are affected by the issue have to stay in crisis zones or they are forced to move within Africa, which will generate more conflict. Nonetheless, Europe has to protect itself because the mass migration is would cause serious social, political, economic, and security tensions in Europe.

The solution of the water conflicts is international cooperation. That is the only effective way to prevent the

Figure 6. Refugees and IDPs in Africa.  
Source: United Nations
Consequences of African Water Conflicts

The dire consequences of water conflicts. The international community should force itself to fight against climate change and endeavor to assist the countries that are affected by water scarcity, to prevent further conflicts.

REFERENCES


1. INTRODUCTION

Following the classic paper by Solow (1956), there has been a significant development in the theoretical and empirical literature of endogenous growth. Much attention is paid to the issues of the failure of countries to converge in per capita income. A large number of studies use data from the Penn World Tables (Summers and Heston, 1991). Solow studied economic growth by assuming a neoclassical production function with decreasing returns to capital and the rates of saving and population growth are considered as exogenous determining the steady-state level of income per capita across countries. The countries reach different steady states due to variations in these key determinant factors. The higher the rate of saving and the lower the population growth the richer the country and the lower the rate of return to physical and educational capital. More than half of the cross-country variations in income per capita can be explained by those two variables. A large body of literature found Solow’s prediction of the direction of the effects to be consistent with the empirical evidence, but not the magnitudes.

The issue of convergence has developed in three different directions in the growth literature. The first type, beta-convergence, considers the speed at which income per capita tends to a steady-state value of income from some initial level. Depending on the type of data used, the estimate of the speed of convergence is based on the coefficients of lagged income or some initial conditions. Convergence can be conditional or unconditional on some country-specific variables and to a common or country-specific steady-state assuming a homogenous or heterogeneous growth rate (Lee et al., 1997).

The third type, sigma-convergence, considers the behavior of cross-country variance of income over time. It assumes that global technology and tastes determine convergence to...
a common steady-state of income at the same rate across countries (Quah, 1993). In the sigma type, the income per capita is treated as an integrated variable. The objective is to determine whether sample countries share a common deterministic and/or stochastic trend (Durlauf, 1996 and Evans, 1996). In this paper, we consider conditional convergence.

The Solow model was augmented by Mankiw et al. (1992) to include the accumulation of human capital. According to this model, the convergence path is a linear time trend, the slope of which is determined by the rate of exogenous technical progress, while the intercept reflects the effects of factors characterizing the conditional convergence. The inclusion of human capital was motivated because the accumulation of human capital may be correlated with saving and population growth rates resulting in biased estimated effects. Thus, the exclusion of human capital can explain the overestimation of the effects of saving and population growth on the level of income. The explanatory power of the human capital augmented model increased to about 80% of the variation in income which provides a satisfactory explanation to the differences in the wealth among the sample of nations. Empirical results show evidence that countries converge given differences in their saving and population growth rates are taken into account. Furthermore, the model explains the magnitude of over-estimation of the influences of saving and population growth.

The objective of this study is to examine conditional convergence of Organisation for Economic Co-operation and Development (OECD) countries in the gross domestic product (GDP) and health care expenditure (HCE) per capita. The main emphasis is on estimating the effects of health on economic growth. It presents an estimation of the investment in physical, educational, and health capital augmented growth model to explain variation in output and HCE expenditure per capita across countries. Although the Solow model has been augmented in different ways, there are few studies that examine the effects of health capital on growth. In Knowles and Owen (1997), the labor variable in an aggregate production function is education and health augmented. Their result suggests that incorporating educational and health capital as labor augmenting or as separate factors of production do not change the conclusions empirically. Again results suggest a strong and positive relationship between income and health. Unlike in the MRW model, the effect of educational capital is insignificant. Temple (1999) also found the effects of educational capital to be data specific and sensitive to the model specification and estimation methods used. Bhargava et al. (2001) investigate the effects of health indicators measured as adult survival rates (ASR) on GDP growth rates. The results showed positive effects of ASR on GDP growth rates in low-income countries. McDonald and Roberts (2002) show that omitting health capital from augmented Solow growth models produces misspecification biases. They find health capital to have a significant impact on economic growth rates.

This paper is an extension of the previous literature in a number of ways. First, it augments the Solow model to health capital. Health capital is proxied by HCE per capita. Second, the analysis is further related to the studies of HCE where growth is vast. Dalgaard and Strulik (2013) analysed the history augmented Solow growth model. Chaabouni et al. (2016) and Chaabouni and Daidi (2017) studied the dynamic links between CO2 emissions, health spending and GDP growth for a cross section of countries. Zaidi and Saidi (2018) modelled the nexus between environmental pollution, health expenditure and economic growth. Chen et al. (2014) investigated the new evidence to tendency of convergence in Solow model. Wang (2011) conducted quantile panel data analysis of the health care expenditure and economic growth. Linden and Ray (2017) looked at the relationship between life expectancy effects of public and private health expenditures in OECD countries. Ogundai and Awokuse (2018) investigated the human capital contribution to economic growth comparing the effects of health and education. Mladenovic et al. (2016) analysed management of health care expenditure and GDP growth rate relationships.

1 In the literature the term “human capital” is used to refer to education. However, some readers might expect “human capital” to include education as well as health. To avoid confusion, hereafter I use the term “educational capital” instead of “human capital.”


3 Knowles and Owen (1997) used life expectancy, while McDonald and Roberts (2002) used infant mortality and life expectancy at births as proxy for health capital. Other alternative proxies of health capital other than health care expenditure are the use of all causes of mortality, maternal mortality, and perinatal mortality. Health care expenditure is preferable to life expectancy. This is because data on life expectancy are often interpolated and not ideal to use in panel data context. The period of study is long enough to enable picking up the lag between health care expenditure, improved health and economic growth.
GDP per capita appears to be the main factor determining the level of expenditure on health care (Bac and Pen, 2002). The issue of causality relationship between GDP and HCE is investigated. Third, in the later model regression of the speed of convergence on variables determining the speed of convergence show any link to the variables characterizing the health-care system of sample countries. Fourth, we investigate how sensitive the speed of convergence is to the literature frequently imposed restriction of constant depreciation and technological growth components. Finally, the empirical analysis is based on a study of a homogenous group of countries’ (OECD) data for an extended period of 1970–1992.

The findings in this paper are in line with those of Mankiw et al. (1992) and support the assumptions of decreasing return to capital, the improved prediction performance of the model and countries convergence to different steady states. Cross-country results indicate that OECD countries converge at the rate of 2.7% per year to their steady state of income per capita with the usual Solow model. HCE has a significant effect on the economic growth and the speed of convergence. When investment in health is explicitly taken into account in the model, the speed of convergence is increased to 3.7%. The speed of convergence is also found to be sensitive to various specifications of capital depreciation and technological growth components. In the absence of any assumptions about the sizes of those two components, the rate of convergence increases to 5.2%. Considering the rate of convergence in the HCE model, the results show that OECD countries converge at 2.5% to their steady state of HCE per capita.

In Section 2, the growth model is outlined. The model is augmented to include investment in physical, educational, and health capital. The issues of variations in output per capita across countries, endogenous growth, and convergence are discussed. The analysis is further extended to the health-care literature by analyzing the issues of causality between GDP and HCE. Section 3 presents the data from OECD countries. Section 4 discusses the issues of estimation and presents empirical results under the various specifications suggested in Section 2 and discusses their implications for the speed of convergence in income per capita or HCE. Section 5 summarizes the results and concludes.

2. THE HEALTH CAPITAL AUGMENTED MODEL

2.1. The Augmented Growth Model

In the Solow’s (1956) growth model, the rates of saving, population growth, and technical change are exogenous. Assuming a Cobb-Douglas form and two-factor inputs of capital and labor, the labor-augmenting technological progress at time $t$ is written as:

$$ Y_t = K_t A_t^{1-\alpha} L_t^{\alpha} \quad 0 < \alpha < 1 $$

where $Y$ is output, $K$ capital, $L$ labor, and $A$ the level of technology. The subscripts $i$ and $t$ denote country and time periods, respectively. To simplify the notation, we drop the subscripts $i$. Labor and technology are assumed to grow exogenously at rates of $n$ and $g$ as

$$ I_t = I_0 e^{nt}, \quad A_t = A_0 e^{gt} $$

that makes the effective units of labor ($AL_t$) grow at the rate $n+g$. Defining $k=(K/AL)$ and $Y=(AL)$ as the stock of capital and the level of output per effective unit of labor, the evolution of capital is governed by

$$ k_t = s_t k_{t-1} - (n_t + g + \delta) k_t $$

where a dot indicates change, $s_t$ is a fraction of output invested in physical capital in period $t$, and $\delta$ is the rate of depreciation. The stock of capital ($k_t$) converges to a steady-state value of capital ($k^*_t$) defined as

$$ k^*_t = \left[ s_t k / (n_t + g + \delta) \right]^{1/(1-\alpha)} $$

which is positively related to the rate of saving but negatively to the growth rate of population.

The Solow model concerns the impact of saving and population growth on real income. Substitution of equation (4) into (1) and taking logs, the steady-state income per capita is written as

$$ \ln y_t = \beta_0 + \frac{\alpha}{1-\alpha} \ln s_t - \frac{\alpha}{1-\alpha} \ln (n_t + g + \delta) + \varepsilon_t $$

where $\beta_0 = (\ln A_0 + g)$ denotes the technology factor and $\varepsilon$ is stochastic country-specific shock. The model in equation (5) has frequently been used as the basic model in empirical specifications (e.g., Summers and Heston (1988), Barro and Sala-i-Martin (1992), Islam (1995), among others). The rate of saving and population growth is assumed to be independent of $\varepsilon$ and the model is estimated with OLS.\footnote{4 For reasons of making assumptions of independence see Mankiw et al. (1992) pp. 411-412.}
Assuming that the countries are currently in their steady states, Mankiw et al. (1992) used (5) to see how saving, and population growth rates explain the difference in the current per capita income across countries. The coefficient of capital ($\alpha$) was found to be high requiring a definition of capital in a broad sense that incorporates educational capital. Thus, educational capital was included as another input of production (Barro and Lee, 1993; Benhabib and Spiegel, 1994). Augmentation of educational capital to the process of growth showed to be useful concerning the performance of the model and the size of $\alpha$. Ignoring educational capital affects the coefficient on physical capital investment and population growth leading to incorrect conclusions. The production function in equation (1) is rewritten as

$$Y_t = K_t^{\alpha} H_t^{\beta} L_t^{1-\alpha-\beta} + \alpha + \beta < 1$$  \hspace{1cm} (6)$$

where $H$ is the stock of educational capital and in addition to growth in physical capital (3), the stocks of educational capital growth is determined by

$$h_t = s^y_t y_t - (n_t + g + \delta)h_t = s^y_t h_t^\beta - (n_t + g + \delta)h_t$$  \hspace{1cm} (7)$$

where $s^y_t$ is a fraction of output invested in educational capital in period $t$ and $b_t = (H_t/A L_t)$ is educational capital per effective unit of labor. The relation in (7) indicates that the stocks of physical and educational capital grow only if new investment exceeds depreciation adjusted for population growth and technological progress. The steady-state income per capita as a function of population growth and accumulation of physical and educational capital is given as

$$\ln y_t = \beta_0 + \frac{\alpha}{1-\alpha-\beta} \ln s^k_t + \frac{\beta}{1-\alpha-\beta} \ln s^y_t - \frac{\alpha + \beta}{1-\alpha-\beta}$$  \hspace{1cm} (8)$$

$$\ln(n_t + g + \delta) + \varepsilon_t$$

Similar to the educational capital augmentation, the Solow model can be augmented to investment in health as well. The evolution of the HCE is determined by

$$\varepsilon_t = s^e_t y_t - (n_t + g + \delta)e_t = s^e_t e_t^\theta - (n_t + g + \delta)e_t$$  \hspace{1cm} (9)$$

where $s^e_t$ is the share of output invested in health capital in period $t$ and $e_t = (E_t/A L_t)$ is an effective investment in health per capita. The model in equation (8) is then rewritten as

$$\ln y_t = \beta_0 + \frac{\alpha}{1-\alpha-\beta-\theta} \ln s^k_t + \frac{\beta}{1-\alpha-\beta-\theta} \ln s^y_t$$

$$+ \frac{\theta}{1-\alpha-\beta-\theta} \ln s^e_t - \frac{\alpha + \beta + \theta}{1-\alpha-\beta-\theta} \ln(n_t + g + \delta) + \varepsilon_t$$  \hspace{1cm} (10)$$

where the model can be estimated with OLS. The model in equation (10) indicates that the steady-state path for the log of income per capita follows a linear time trend. The slope of this linear trend is exogenously determined by the rate of technical progress, while the intercept reflects the effects of the rate of population growth and investments in physical, educational, and health capital. Adding educational and health capital improve the performance of the Solow model. Investment in educational, physical, and health capital is expected to increase the level of income per capita, while high population growth lowers income per capita. Educational and health capital accumulations increase also the impact of physical capital accumulation on income. Educational capital and healthiness are positively correlated with saving rate and negatively correlated with population growth.

### 2.2. The Endogenous Growth and Convergence

The endogenous growth models are characterized by the assumption of non-decreasing returns to the set of production factors implying countries with a higher saving rate to grow faster. Hence, countries do not need to converge to a common level of income per capita even if they employ the same technology. The model predicts that countries reach different steady states. It does not predict convergence between countries, but only convergence within country or convergence to own steady-state value of per capita income. The convergence is thus conditional on the determinants of the steady state, accumulation of various components of capital and population growth. Predictions about the speed of convergence are given by

$$d \ln y_t / dt = \lambda [\ln y_t^* - \ln y_t]$$  \hspace{1cm} (11)$$

where $\ln y_t^*$ and $\ln y_t$ are the log of steady-state level and actual values of per capita income in period $t$ given by equation (10) and $\lambda$ is the annual rate of convergence at which the economy moves to own steady state

$$\lambda_t = (n_t + g + \delta)(1 - \alpha - \beta - \theta)$$  \hspace{1cm} (12)$$

Although the rate of population growth differs across countries and over time, in previous studies $\lambda$ is assumed to be constant across countries at a value interpreted as the average speed of convergence. Equation (11) implies that

$$\ln y_t = (1 - e^{-\lambda t}) \ln y_0^* + e^{-\lambda t} \ln y_0$$  \hspace{1cm} (13)$$

where $\ln y_0$ is log of income per capita at some initial year. According to the model above, countries are different both in their levels of income per capita and their growth rates in income. The latter differences result from differences in the initial level of income per capita
and the steady-state value. Countries with a higher level of initial income will experience slower growth. For the given initial level of income countries with higher rates of investment in physical, educational, and health capital or lower population growth will experience faster growth. Subtracting \( \ln y_t \) from both sides and substituting for \( \ln y_t \) the model

\[
\ln y_t - \ln y_0 = \beta_0 (1 - e^{-\lambda t}) - (1 - e^{-\lambda t}) \ln y_0 \\
+ (1 - e^{-\lambda t}) \frac{\alpha}{1 - \alpha - \beta - \theta} (\ln k_t - \ln (n_t + g + \delta)) \\
+ (1 - e^{-\lambda t}) \frac{\beta}{1 - \alpha - \beta - \theta} (\ln h_t - \ln (n_t + g + \delta)) \\
+ (1 - e^{-\lambda t}) \frac{\theta}{1 - \alpha - \beta - \theta} (\ln e_t - \ln (n_t + g + \delta)) + \varepsilon_t
\]

is the health capital augmented Solow model in which the growth in income is a function of the determinants of steady state and the initial level of income. Thus, in the endogenous growth model outlined above, there is no common steady-state level of income, and the difference in income per capita among countries can persist indefinitely for the same savings and population growth rates.

Solow’s model predicts both the sign and the magnitude of production factors of saving and population growth on the standards of living. Real income is predicted to be higher in countries with higher saving rates and lower in countries with higher values of \((n_t + g + \delta)\). Since the capital share in income \((\alpha)\) is about 1/3, the elasticity of income per capita with respect to the saving rate \((\ln s_t)\) is about 0.5, and the elasticity with respect to \(\ln (n_t + g + \delta)\) about –0.5. In empirical studies, the sum of \(g\) (0.02) and \(\delta\) (0.03) is assumed to be constant and equal to 0.05. MRW found that reasonable changes in this assumption have little effect on the estimates using US data. The model in equation (14) can then be estimated both with and without the constraint that the coefficients of \(\ln s_t\) and \(\ln (n_t + g + \delta)\) are equal in magnitude but opposite in sign, and tested. Alternatively, one can estimate \(\mu\) from the following relation

\[
\ln y_t - \ln y_0 = \beta_0 (1 - e^{-\lambda t}) - (1 - e^{-\lambda t}) \ln y_0 \\
+ (1 - e^{-\lambda t}) \frac{\alpha}{1 - \alpha - \beta - \theta} (\ln k_t - \ln (n_t + \mu)) \\
+ (1 - e^{-\lambda t}) \frac{\beta}{1 - \alpha - \beta - \theta} (\ln h_t - \ln (n_t + \mu)) \\
+ (1 - e^{-\lambda t}) \frac{\theta}{1 - \alpha - \beta - \theta} (\ln e_t - \ln (n_t + \mu)) + \varepsilon_t
\]

and compare the estimate of \(\mu\) with the imposed constraint \((g + \delta = 0.05)\).

The analysis is further related to the studies of HCE where GDP per capita appears to be the main factor determining the level of expenditure on health care

\[
\ln e_t - \ln e_0 = \beta_0 (1 - e^{-\lambda t}) - (1 - e^{-\lambda t}) \ln e_0 \\
+ (1 - e^{-\lambda t}) \frac{\alpha}{1 - \alpha - \beta - \theta} (\ln k_t - \ln (n_t + \mu)) \\
+ (1 - e^{-\lambda t}) \frac{\beta}{1 - \alpha - \beta - \theta} (\ln h_t - \ln (n_t + \mu)) \\
+ (1 - e^{-\lambda t}) \frac{\theta}{1 - \alpha - \beta - \theta} (\ln e_t - \ln (n_t + \mu)) + \varepsilon_t
\]

or alternatively, one can estimate \(\mu\) from the following relation

\[
\ln e_t - \ln e_0 = \beta_0 (1 - e^{-\lambda t}) - (1 - e^{-\lambda t}) \ln e_0 \\
+ (1 - e^{-\lambda t}) \frac{\alpha}{1 - \alpha - \beta - \theta} (\ln k_t - \ln (n_t + \mu)) \\
+ (1 - e^{-\lambda t}) \frac{\beta}{1 - \alpha - \beta - \theta} (\ln h_t - \ln (n_t + \mu)) \\
+ (1 - e^{-\lambda t}) \frac{\theta}{1 - \alpha - \beta - \theta} (\ln e_t - \ln (n_t + \mu)) + \varepsilon_t
\]

and test it against the imposed constraint. The slope is exogenously determined by the rate of technical progress, while the intercept reflects the effects of the rate of population growth and investments in physical and educational capital and GDP growth. Investment in educational and physical capital and GDP growth are expected to increase the level of HCE per capita, while high population growth lowers investment in health.

The issues of causality relationship between GDP and HCE are examined by regressing the log of GDP \((\ln y)\) and HCE \((\ln e)\) on their past values and testing for their joint significance as follows

\[
\ln y_t = \alpha_0 + \sum_{t=1}^{n} \alpha_t \ln y_{t-t} + \sum_{t=1}^{m} \alpha_t \ln e_{t-t} + \xi_t \\
\ln e_t = \beta_0 + \sum_{t=1}^{n} \beta_t \ln e_{t-t} + \sum_{t=1}^{m} \beta_t \ln y_{t-t} + \xi_t
\]

where non-zero values of \(\alpha_t^2\) and \(\beta_t^2\) are indications of causality relationships between the two variables.
Using the parameter estimates from equation (13) to (17) estimates of the rate of convergence are obtained. The rate of convergence varies across sample countries as a result of growth in population. The sensitivity of the speed of convergence is examined with respect to the assumption of constant depreciation and technological progress. A regression of the speed of convergence on variables determining the rate of convergence is performed

$$\lambda_i = \gamma_0 + \sum_j \gamma_j x_{ij} + \zeta_i$$

(19)

where $$x_{ij}$$ is a vector of variables characterizing the health-care system of the sample countries.

3. THE DATA

The data are obtained from the Penn World Data (PWD) known as Summers and Heston (1991) data. The current data set is an updated version of the previous versions called Mark 5.0 and Mark 5.6. PWD allows access to online statistics covering 29 key variables on 151 major world economies for which data are available. The data are annual and cover the period of 1950–1992. The information includes population, various definitions of GDP, private and public consumption, investment, different components of capital, exchange rate, standard living index, and measures of openness.

The PWD data were further completed with information on educational capital obtained from the Barro and Lee (2000) and HCE extracted from the OECD Health Data File. The Barro and Lee data contain information on educational attainment at various levels for male and female populations. The sample includes 129 countries observed quinquennially during 1960–1990. 115 of the sample countries are found in the sample countries of the Summers and Heston (1991).

Although the sample in this paper is restricted to OECD countries, our results can be compared to those of previous studies. Other factors determining the sample size are the availability of information on educational capital, HCE, and GDP per capita. The final sample used in this paper is similar to Summers and Heston (1988), Mankiw et al. (1992), and Islam (1995) subsample of OECD countries but updated to 1992.

The variables used are GDP ($$y$$), HCE ($$e$$), population growth ($$n$$), investment in physical ($$k$$), and educational ($$h$$) capital. The GDP is defined as real GDP per worker (RGDPW) in 1985 international prices. The investment in physical capital is measured as the percentage real investment share of the GDP in 1985 international prices. Population growth is defined as the year to year growth rate of the population that includes all ages. Educational capital is defined as average schooling years in the total population above the age of 25. Following a number of studies, the rate technological progress and depreciation ($$\delta$$) is taken to be constant across countries and over time. It is assumed to be equal to 0.05 in the constrained growth models, while it is estimated as a constant parameter in the unconstrained models.

Considering the period of 1970–1992, we have five data points for all of the sample countries. The growth rate in GDP, population growth, investment, and educational capital are with the exception of the last period measured as 5 years averages: 1970–1974, 1975–1979, 1980–1984, 1985–1989, and 1990–1992. HCE is measured in per capita terms at constant 1990 international prices. For the transformation of HCE the national GDP price index and purchasing power parities for the base year, 1990 as deflators are used.

A number of system variables are considered as determinants of the speed of convergence. These variables represented the sample countries’ health-care system in 1991. Public reimbursement (PUBLREIMB), public contract (PUBLICCONT), public integrated (PUBLINTEG), and gatekeeper (GATEKEEP) are defined as one indicating whether a country has any of the above systems as dominant parities for the base year, 1990 as deflators are used.

The variables used are GDP ($$y$$), HCE ($$e$$), population growth ($$n$$), investment in physical ($$k$$), and educational ($$h$$) capital.

5 Our sample differs from the sample used by Mankiw et al. (1992) and Islam (1995) by Iceland, Korea and Luxembourg are not observed and thus were excluded.

6 The investment in health can instead of health care expenditure per capita be measured as health care expenditure as a proportion of GDP. The former accounts for the population size.
to capture the dynamics of convergence. Third, the models were estimated both with and without imposing the constraint that the coefficients on investment and population growth are equal in magnitude but opposite signs. Fourth, later models are estimated assuming that the sum \((g+\delta)\) is equal to the constant 0.05 (equation 14) or alternatively estimate the sum from the data (equation 15). Fifth, the procedure is applied to the HCE class of models (equations 16 and 17) again with various degrees of augmentation (educational capital and GDP per capita) and restrictions imposed. Sixth, the issue of causality between GDP and HCE is examined (equation 18). Finally, the rate of convergence is regressed on the health-care system variables (equation 19).

The models are estimated using both linear and iterative non-linear regression methods. To conserve space, only estimation results from the general versions of the models are reported here.

### 4.2. The GDP per Capita Models

The results for the GDP models are presented in Table 2. Mankiw et al. (1992) found that including educational capital accumulation to the Solow model can potentially alter either the theoretical or empirical analysis of economic growth. At the theoretical level, the changes are related to the nature of the growth process which at the empirical level, educational capital can be considered as an omitted variable. Leaving out educational capital affects the coefficients on investment and population growth. Analogously a disaggregation of capital into physical, educational, and health capital investments has both theoretical and empirical implications.

The coefficient of the initial value of GDP is negative indicating a positive relationship between growth and the initial distance from the steady state. The coefficient of investment in capital is positive showing that growth is an increasing function of saving. The changes are related to the nature of the growth process which at the empirical level, educational capital can be considered as an omitted variable. Leaving out educational capital affects the coefficients on investment and population growth. Analogously a disaggregation of capital into physical, educational, and health capital investments has both theoretical and empirical implications.

<table>
<thead>
<tr>
<th>Variable definition</th>
<th>Mean±SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.A Causality test data set (N=22, T=5, NT=110)</td>
<td>80.00±7.10</td>
<td>70.00</td>
<td>90.00</td>
</tr>
<tr>
<td>HCE - Health care expenditure per capita</td>
<td>HCE - Health care expenditure per capita</td>
<td>942.18±468.51</td>
<td>75.78</td>
</tr>
<tr>
<td>1.B Growth data (N=22)</td>
<td>GDP70 - GDP/cap, average 1970–1974, 1985 international prices</td>
<td>19243.68±6396.82</td>
<td>4841.00</td>
</tr>
<tr>
<td>Education - Average schooling year, population &gt;25</td>
<td>DPOP - Average annual population growth, 1970–1992</td>
<td>8.38±2.20</td>
<td>3.35</td>
</tr>
<tr>
<td>DGDP - Change in GDP/cap (GDP90-GDP70)</td>
<td>DGDHCE - Change in HCE per capita (HCE90-HCE70)</td>
<td>1.47±0.26</td>
<td>1.05</td>
</tr>
<tr>
<td>1.C Health-care system variables (N=22)</td>
<td>PUBREIMB - Public reimbursement system</td>
<td>0.27±0.46</td>
<td>0.00</td>
</tr>
<tr>
<td>PUBCONTR - Public contract system</td>
<td>PUBINTEG - Public integrated system</td>
<td>0.18±0.39</td>
<td>0.00</td>
</tr>
<tr>
<td>GATEKEEP - Gate keeper</td>
<td>PUBINTEG - Public integrated system</td>
<td>0.55±0.51</td>
<td>0.00</td>
</tr>
<tr>
<td>1.D Rate of convergence (\lambda) Data, (n=22)</td>
<td>_HCE1 - Convergence rate HCE 1990–1970, (\mu=0.05)</td>
<td>0.037±0.004</td>
<td>0.031</td>
</tr>
<tr>
<td>_HCE2 - Convergence rate HCE 1990–1970, (\mu=0.05)</td>
<td>_GDP1 - Convergence rate GDP 1990–1970, (\mu=0.05)</td>
<td>0.052±0.004</td>
<td>0.046</td>
</tr>
<tr>
<td>_GDP2 - Convergence rate GDP 1990–1970, (\mu=0.05)</td>
<td>_HCE1 - Convergence rate HCE 1990–1970, (\mu=0.05)</td>
<td>0.025±0.003</td>
<td>0.021</td>
</tr>
<tr>
<td>_HCE2 - Convergence rate HCE 1990–1970, (\mu=0.0628)</td>
<td>_HCE2 - Convergence rate HCE 1990–1970, (\mu=0.0628)</td>
<td>0.027±0.002</td>
<td>0.024</td>
</tr>
</tbody>
</table>

Investment in health care is found to have positive effects on growth, while population growth has negative effects. These results are consistent with results found in previous studies. It should be noted that the proxy for investment in health capital in our study is the proportion of income spent on health, while Knowles and Owen used life expectancy to proxy health capital. Their choice of proxy was due to the fact that health spending can be associated with different actual outcomes across countries. The OECD countries are relatively homogenous group of countries. Hence, HCE per capita is an appropriate proxy for investment in health.

4.3. The HCE per Capita Models

The results of the HCE models are presented in Table 3. A simple specification similar to the one appearing in the health literature shows that GDP per capital is a major determinant of the investment in health (for a recent survey see, Gerdtham and Jönsson, 1998). The coefficient of GDP is found to be positive and significant. GDP alone explains >85% of the total variations in the HCE per capita in 1970. The corresponding explanatory power is 89% in 1990. The coefficient is larger than one indicating that a larger fraction of GDP growth is invested in health care. There is a decline in the size of the coefficient of lnGDP when one uses the change in lnHCE between 1970 and 1990.

The coefficient of the initial level of HCE is negative indicating a positive relationship between growth and the initial distance to the steady-state level of HCE. The effect of population growth on HCE is negative. The effect of investment in educational capital on HCE is unexpectedly negative and in most model specifications statistically insignificant. Unlike the GDP model, an augmentation of the HCE model to incorporate investment in physical and educational capital and population growth does not alter the sign and significance of the GDP coefficient. However, the model performance is not improved, and most of the extra parameters are found to be insignificant.

4.4. The Speed of Convergence

The estimated rate of convergence form the GDP and HCE models is presented in Table 1 and at the bottom panels of Tables 2 and 3, respectively. The GDP model predicts convergence to the steady-state level of income per capita at an annual rate of 3.7%. The corresponding rate where the technical change and depreciation rates are estimated is 5.2%. Restrictions imposed on the size of (μ=g+δ) results in the underestimation of the speed of convergence. The parameter estimates are constant, but the growth rate of population is country specific. Hence, the rate of convergence becomes country specific. Depending on the specification of μ, the percentage convergence rate varies in the intervals 3.1–4.6% and 4.6–6.1%, respectively. A summary statistics of the rate of convergence is given in Table 1.

### Table 2: Augmented static and dynamic GDP per capita models

<table>
<thead>
<tr>
<th>Models</th>
<th>Static models</th>
<th>Dynamic models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>InGDP70</td>
<td>InGDP90</td>
</tr>
<tr>
<td></td>
<td>Estimate</td>
<td>Standard error</td>
</tr>
<tr>
<td>2.A Linear models</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B0</td>
<td>7.1680a</td>
<td>1.2405</td>
</tr>
<tr>
<td>lnINV</td>
<td>-0.1734</td>
<td>0.1965</td>
</tr>
<tr>
<td>lnPOP</td>
<td>0.5812</td>
<td>0.4082</td>
</tr>
<tr>
<td>lnHUM</td>
<td>0.3546c</td>
<td>0.1740</td>
</tr>
<tr>
<td>lnHCE</td>
<td>0.5822a</td>
<td>0.1045</td>
</tr>
<tr>
<td>lnGDP70</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>R2 adjusted</td>
<td>0.8399</td>
<td>0.0001</td>
</tr>
<tr>
<td>F-test InHE=0</td>
<td>31.0194</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

2.B Non-linear models

<table>
<thead>
<tr>
<th>Models</th>
<th>Static models</th>
<th>Dynamic models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>InGDP70</td>
<td>InGDP90</td>
</tr>
<tr>
<td></td>
<td>Estimate</td>
<td>Standard error</td>
</tr>
<tr>
<td>B0</td>
<td>4.8668a</td>
<td>1.2303</td>
</tr>
<tr>
<td>lnINV - α</td>
<td>-0.2253</td>
<td>0.1766</td>
</tr>
<tr>
<td>lnHUM - β</td>
<td>0.2504b</td>
<td>0.1213</td>
</tr>
<tr>
<td>lnHCE-lnPOP - θ</td>
<td>0.3319a</td>
<td>0.1126</td>
</tr>
<tr>
<td>λ</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(g+δ)-μ</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Calculated λ</td>
<td>0.0370</td>
<td>0.0038</td>
</tr>
</tbody>
</table>

Significant at the <1% (a), 1–5% (b), 5–10% (c) levels of significance. GDP: Gross domestic product
The HCE model predicts a lower rate of convergence to the steady-state level of HCE. The rate is 2.5% and 2.7% depending on whether one imposes any restriction of the size of \((g+\delta)\) or not. Again the sum of \((g+\delta)\) is found to be statistically different from the 0.05. The lower convergence rate in investment in health compared to income per capita can be explained by the difference in the countries’ preferences in public spending. The range of variations in the convergence rate in HCE models is much smaller, 2.1–3.1% and 2.4–3.2%, respectively.

It should be noted that results from cross-sectional analysis of growth and convergence should be treated with caution. A number of recent studies (Solow (1994), Lee et al. (1997), Knowles and Owen (1997), among others) show potential sources of bias in cross-sectional, pooled and heterogeneous panel estimation of convergence coefficient. The magnitude of bias can be larger in the GDP model due to the simultaneity of health and educational capital inputs.

Their significance might reflect the ability of countries with faster growth in devoting more resources to investment in health care and education.

4.5. Causality Relationship between GDP and HCE

The augmentation of HCE in the growth model and the specification of HCE in the health literature as a function of GDP imply the issue of causality to be important in this respect. Granger’s concept of causality is that a variable \(x\) causes a variable \(y\) if taking account of past values of \(x\) leads to improved predictions for \(y\), all other things being equal. The most common approach to answer the question of the relationship between \(x\) and \(y\) is to regress \(x\) on \(y\) and test the coefficient of \(y\) for significance. In the current case, it is important to establish and test the direction of causality. Using the relation in equation (18) for the test of causality between GDP and HCE the values of \(m\) and \(n\) were set to 1, respectively. The choice of the minimum lag structure was due to a few periods of observations.

### Table 3. Augmented static and dynamic HCE per capita models

<table>
<thead>
<tr>
<th>Models</th>
<th>Static models</th>
<th>Dynamic models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>InHCE70</td>
<td>InHCE90</td>
</tr>
<tr>
<td></td>
<td>Estimate</td>
<td>Standard error</td>
</tr>
<tr>
<td>3.A1 Restricted linear models</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B0</td>
<td>-8.8904a</td>
<td>0.0001</td>
</tr>
<tr>
<td>lnINV</td>
<td>-0.0270</td>
<td>0.0496</td>
</tr>
<tr>
<td>lnPOP</td>
<td>0.2486</td>
<td>0.2256</td>
</tr>
<tr>
<td>lnHUM</td>
<td>0.5518b</td>
<td>1.6506a</td>
</tr>
<tr>
<td>lnGDP</td>
<td>1.4565a</td>
<td>0.0504</td>
</tr>
<tr>
<td>lnHCE70</td>
<td>-</td>
<td>0.2440</td>
</tr>
<tr>
<td>R2 adjusted</td>
<td>0.8817</td>
<td>2.0869</td>
</tr>
<tr>
<td>F-test lnGDP=0</td>
<td>34.2256a</td>
<td>0.0001</td>
</tr>
<tr>
<td>3.A2 Unrestricted linear models</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B0</td>
<td>-8.8904a</td>
<td>2.0869</td>
</tr>
<tr>
<td>lnINV</td>
<td>-0.0270</td>
<td>0.2440</td>
</tr>
<tr>
<td>lnPOP</td>
<td>0.2486</td>
<td>0.5040</td>
</tr>
<tr>
<td>lnHUM</td>
<td>0.5518b</td>
<td>0.0735</td>
</tr>
<tr>
<td>lnGDP</td>
<td>1.4565a</td>
<td>1.6506a</td>
</tr>
<tr>
<td>lnHCE70</td>
<td>-</td>
<td>0.2440</td>
</tr>
<tr>
<td>R2 adjusted</td>
<td>0.8817</td>
<td>0.0001</td>
</tr>
<tr>
<td>F-test lnGDP=0</td>
<td>34.2256a</td>
<td>0.0001</td>
</tr>
<tr>
<td>3.B Non-linear models</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B0</td>
<td>-10.0906a</td>
<td>2.8038</td>
</tr>
<tr>
<td>lnINV</td>
<td>-0.0926</td>
<td>0.1331</td>
</tr>
<tr>
<td>lnHUM</td>
<td>0.2845b</td>
<td>0.0801</td>
</tr>
<tr>
<td>lnGDP-lnPOP - (\theta)</td>
<td>0.4210a</td>
<td>-</td>
</tr>
<tr>
<td>(\lambda)</td>
<td>-</td>
<td>0.1356</td>
</tr>
<tr>
<td>((g+\delta) - \mu)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>R2 adjusted</td>
<td>0.7821</td>
<td>-</td>
</tr>
<tr>
<td>Calculated (\lambda)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Significant at the <1% (a), 1–5% (b), 5–10% (c) levels of significance. GDP: Gross domestic product, HCE: Health care expenditure.
The test results presented in Table 4 indicate the presence of unidirectional causality from HCE to GDP. Contrary to the case in the health care literature this is interpreted as a rejection of the hypothesis that causality is unidirectional from GDP to HCE. Hence, the GDP and HCE models can be estimated as single equations. Although the sample countries are very homogeneous, the data set is very small, the time series dimension of the data (T = 5) is short, and the results should be interpreted with caution.

4.6. Determinants of the Rate of Convergence

The results from a regression of the rate of convergence obtained from the HCE model on a number of health-care system variables that are considered as determinants of the speed of convergence are reported in Table 5. These variables represented the sample countries’ health-care system in 1991. PUBLCONT has a positive effect on the rate of convergence while GATEKEEP system has a negative effect compared to the reference group of PUBLREIMB. The coefficient of PUBLINTEG is found to be insignificant. Austria, Canada, Germany, and Netherlands have mixed PUBLCONT and GATEKEEP systems with both positive and negative effects on the rate of convergence. Most of the sample countries including Denmark, Finland, Greece, Ireland, Italy, New Zealand, Norway, Portugal, Spain, Sweden, Turkey, and UK have a PUBLINTEG system with no effects on the convergence rate. The reference group with PUBLREIMB health-care system includes Australia, Belgium, France, Japan, Switzerland, and USA. The two models which differ by the size of $\mu$ give identical results.

5. SUMMARY AND CONCLUSIONS

This paper examines conditional convergence of OECD countries in GDP and HCE per capita for the period 1970–1992. It presents an estimation of the augmented Solow model to explain variation in output per capita across countries. The variation is due to different steady-state growth paths resulting from differences in the countries savings rate, education, and population growth.
This paper is an extension of the MRW paper to HCE. The analysis is further related to the studies of HCE where GDP per capita appears to be the main factor determining the level of expenditure on health care. The causality tests show a unidirectional causality from HCE to GDP but not from GDP to HCE. The result indicates that OECD countries converge at 3.7% per year to their steady state of incomes per capita. HCE has positive effects on the economic growth and the speed of convergence. An inclusion of HCE in the growth model results in an insignificant coefficient of educational capital.

The speed of convergence is also found to be sensitive to whether one imposes a constant or estimates the depreciation and technological growth components. With no restrictions imposed the convergence rate is 5.2%. Considering the rate of convergence in the HCE model the results show that OECD countries converge at 2.5–2.7% to their steady-state level of HCE per capita. Again the assumption of constant rate of depreciation and technological growth understimates the rate of convergence.

In the latter models, a regression of the speed of convergence on variables determining the rate of convergence shows a close link to the variables characterizing the health-care system of sample countries. PUBLCONT has a positive effect on the rate of convergence while GATEKEEP system has a negative effect compared to the reference group of PUBLREIMB. The system of PUBLINTEG is found not to be significantly different from the PUBLREIMB.

REFERENCES


Macroeconomic Policy and Agricultural Value Chain in Nigeria

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ABSTRACT

The objective of the paper was to investigate macroeconomic policy and agricultural value chain in Nigeria. The period covered is 1981–2016. The analysis is based on the autoregressive distributed lag framework. A long-run equilibrium relationship was found among the variables used in the investigation. Government expenditure and broad money supply (the macroeconomic policy variables used) were found to have significant positive impact on the agricultural value chain. Energy was found to also have a direct statistically significant impact on agricultural value chain. Based on the results, it is recommended that there should be an enabling macroeconomic policy framework, which gives emphasis to improved budgetary allocation to the agricultural sector, increases money supply, and promotes agencies that can directly impact the level of finance to agricultural value chain related businesses in Nigeria. Above all, electricity supply should be enhanced.

Keywords: Agricultural Value Chain, Autoregressive Distributed Lag, Macroeconomic Policy

1. INTRODUCTION

Developments in the macroeconomic environment have become increasingly significant within the agricultural sector. This can be attributed to the fact that the sector has become more capitalized and relies more on international markets, which makes it more vulnerable to macroeconomic fundamentals including changes in interest rates, exchange rates, and international growth rates (Eyo, 2008). Consequently, since the mid-1970s, a number of theoretical and empirical studies have analyzed the impact of macroeconomic variables on the relative performance of the agricultural sector.

Over time, the Nigerian economy has been mainly dependent on oil. However, due to rising inflation, exchange rate crunch, and decline in output, triggered mostly by the global oil price crash and drastic drop in the country’s oil production, the country plunged into economic crisis (Opurum, 2018). As a result, the need to diversify the economy away from oil revenue to agriculture has been one of the major issues that have taken a center stage in Nigeria’s contemporary economic discourse.

The renewed call for diversification in recent times and its link to agriculture underscore the expected role that the agricultural sector and its value chain components are expected to play in attuning the country’s production and foreign exchange earnings to the non-oil sector. Lawal (2011) maintained that the prospects of non-oil subsector and the overall economy of Nigeria are usually tied to the performance of the agricultural sector. Oji-Okoro (2011) posited that over 70% of the active labor force in Nigeria is in the agricultural sector with 88% of non-oil foreign exchange earnings. In addition, approximately 70% of the population engages in agricultural production at a subsistence level (National Bureau of Statistics, 2010). Thus, an intellectual searchlight on agricultural value chain is imperative for
Nigeria in an attempt to diversify its economy, reduce the level of unemployment, and protect the value of its currency, and above all improve the living standards of its over 180 million citizens.

Many people in developing countries, Nigeria inclusive, live in rural areas, and the main occupation is agriculture. It is known that the agricultural sector contributes substantially to national income and economic growth, despite the rising trends toward urbanization. The imperatives of agricultural value chains, therefore, lie in the significance of the agricultural sector for economic development, especially for developing countries, majority of whose citizens face various degrees of poverty and are engaged in agriculture. The macroeconomic objective of poverty reduction, for example, can be said to be well orchestrated if it is targeted to improve agricultural value chain, as this will directly impact the rural areas in which almost 80% of the global poor live (Olinto et al., 2013). Thus, agricultural value chains are critical to a country’s growth, as they connect urban consumption with rural production, leading to the emergence of modern consumption patterns, new trends in international trade and impacts on rural areas, spilling over to marketing and production systems (Mango et al., 2015).

Nigeria’s wide range of climate variations allows it to produce a variety of food and cash crops. The staple food crops include cassava, yams, corn, coco-yams, cow-peas, beans, sweet potatoes, millet, plantains, bananas, rice, sorghum, and a variety of fruits and vegetables. The leading cash crops are cocoa, citrus, cotton, groundnuts, palm oil, palm kernel, and rubber. They were also Nigeria’s major exports in the 1960s and early 1970s until petroleum surpassed them in the 1970s (Abayomi, 1997). The import of this narrative is that, over time, the primary product from agriculture was hardly processed before exports, making the country lose the huge potential benefits arising along the value chains (exemplified by such nodes as processing, marketing, distribution, and allied dimensions such as transportation, packaging, storage, financing, insurance, and the like).

The performance of the agricultural sector and its associated value chain has important implications for the achievement of macroeconomic policy objectives (Dlamini et al., 2015). Some of the macroeconomic policies on the agricultural sector adopted in Nigeria from the 1970s include the financial policy where credit to the sector was given at a concessionary interest rate between 1970 and 1985; financial market reforms, which led to the total deregulation of the economy; and the establishment of the Nigerian Agricultural Commerce and Rural Development Bank in 2000 (Evbuomwan et al., 2003). As part of the comprehensive reforms in the financial system and in line with its developmental role, the Central Bank of Nigeria launched the National Micro Finance Policy in 2006. In addition, the Agricultural Credit Support Scheme was established through the initiative of the Federal Government and the Central Bank of Nigeria, with the active support and participation of the Bankers’ Committee. In 2013, an attempt to put an end to institutional problems militating against sustainable growth in the agricultural sector led to the introduction of the Agricultural Transformation Agenda by the Goodluck Jonathan administration. Specifically, the plan aimed to add about 20 million tons of food to domestic supply and create 3.5 million jobs by 2015 (Muftaudeen and Abdullahi, 2014).

Value chain studies have gained considerable importance in recent years. Although many definitions are applied, value chains essentially represent enterprises in which different producers and marketing companies work within their respective businesses to pursue one or more end-markets. The United Nations Industrial Development Organization (2009) defined value chain as the entire range of efforts undertaken to bring products from the initial input-supply stage, through various phases of processing, to its final market destination, and it includes its disposal after use. However, empirical research in Nigeria focused primarily on the link between agricultural output and bank credit. The link between agricultural value chain and monetary and Fiscal factors has rarely been considered. This, therefore, underscores the importance of exploring the role of macroeconomic policy on agricultural value chain in Nigeria.

From the foregoing, the following research questions are expected to be answered in the paper.

i. What are the macroeconomic factors influencing agricultural value chain?

ii. What is the impact of macroeconomic policy on agricultural value chain?

Following the introduction, the rest of the paper is structured as follows. Section 2 deals with the literature review. Methodology is covered in Section 3. The estimated results and discussion are dealt with in Section 4. The paper is concluded in Section 5.
2. LITERATURE REVIEW

2.1. Theoretical Framework

The concept of value chains has been defined and described in several ways (Barnes, 2004; Jaffee et al., 2010; Kaplinsky and Morris, 2001; Altenburg, 2006). According to Kaplinsky and Morris (2001, p. 4), value chains are “the full range of activities which are required to bring a product or service from conception through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use.” Value chain covers activities such as packaging, storage, transport, and distribution. In other words all value-generating activities, sequential or otherwise vital to the production, delivery and disposal of a product (Schmitz, 2005).

Macroeconomic policy (encompassing Fiscal and monetary policies) is a tool of stabilization and economic growth. Many governments and Fiscal institutions have shown preponderance for Fiscal policies tilted toward high growth and employment (Aurbach, 2004). The macroeconomic objectives of Fiscal and monetary policies include economic growth, price stability, full employment, and sustainable balance of payments. It is expected that an appropriate deployment of Fiscal and monetary policies should bring about price stability, income redistribution, poverty alleviation, and employment generation, and this applies also to agriculture and its allied value chains.

From the foregoing, agricultural value chain and macroeconomic policies are paths in the effort to achieve sustainable economic growth in an economy. Hence, the study of growth has generated a lot of attention among the various schools of thought ranging from the classical to the neoclassical. The Solow-Swan neoclassical growth theory, for example, explains the long-run growth rate of output based on two exogenous variables. The theory concludes that output growth is determined by technical progress and growth in capital and labor inputs. This model provides a few channels for macropolicy influences. Thus, technical progress is assumed to be exogenous and most empirical studies do not suggest that macropolicies have much influence on labor force growth, and hence, it does not matter what the government did (Jhingan, 2010).

This paper benefits from the insights of economic growth models, especially the neoclassical paradigm. Essentially, a reaction to deficiencies found in the Solow-Swan neoclassical growth theory gave rise to the development of endogenous growth theory exemplified by Romer (1986) and Lucas (1988). The theory tries to explain the sustainable or steady growth rate of output based on endogenous factors. The theory recognizes that technological change can be endogenous and that changes in the stock of capital (human and non-human) may generate positive externalities and is not necessarily subject to diminishing returns. The principal motivations of the new growth theory are to explain both growth rate differentials across countries and a greater proportion of the growth observed. In particular, endogenous growth theorists seek to explain the factors that determine the rate of growth of GDP that is left unexplained and exogenously determined in the Solow neoclassical growth equation (the Solow residual). Dar and Amir (2002) pointed out that, in the endogenous growth models, Fiscal policy is very crucial in predicting future economic growth.

Models of endogenous growth bear some structural resemblance to their neoclassical counterparts, but they differ considerably in their underlying assumptions and the conclusions drawn (Moosa, 2002). The most significant theoretical differences stem from discarding the neoclassical assumption of diminishing marginal returns to capital investments, permitting increasing returns to scale in aggregate production, and frequently focusing on the role of externalities in determining the rate of return on capital investments. By assuming that public and private investments in human capital generate external economies and productivity improvements that offset the natural tendency for diminishing returns, endogenous growth theory seeks to explain the role of government (Fiscal policy) in enhancing growth pattern of an economy.

2.2. Empirical Literature

A vast majority of literature links macroeconomic policy to agriculture without actually dealing with value chain. However, such literature is important in an attempt to unravel the role of macroeconomic policy on agricultural value chain. Due to the paucity of literature in this regard, an attempt is made to emphasize the impact of macroeconomic policies on agriculture.

Muftaudeen and Abdullahi (2014) investigated the impact of macroeconomic policies on agricultural output (specifically on crop production) in Nigeria. They applied the vector error correction approach to examine both short-run and long-run relationship over the period of 1978–2011. They found a cointegrating relationship among agricultural output, government expenditure, agricultural credit, inflation,
interest, and exchange rates. The findings show that, in the long run, agricultural output is responsive to changes in government spending, agricultural credit, inflation rate, interest rate, and exchange rate. The results of impulse response functions suggest that one standard deviation innovation on government expenditure and interest rate reduces the agricultural output, thus threatening food security in the short, medium, and long terms. Results of the variance decomposition indicate that a significant variation in Nigeria’s agricultural food output is due to changes in exchange rate and government expenditure. The authors recommended that, to achieve a sustainable food security, an expansionary Fiscal policy that is not inflationary should be rigorously pursued along with a realistic exchange rate that takes account of the prevailing internal macroeconomic environment rather than the dynamics of the international undertones.

Dlamini et al. (2015) examined the effect of macroeconomic policies on the agricultural sector in Swaziland, using annual time-series data for the period of 1980–2012. The methodology used is the bound test approach to cointegration. The results revealed that there was a long-run relationship among the variables of agriculture GDP and export. The results also revealed that real money supply, real exchange rate, real GDP, and real government expenditure had a significant long-run impact on agriculture GDP with elasticity coefficients of 0.07, 0.24, 0.88, and −0.3, respectively, while short-run coefficients were −0.002, 0.23, −0.94, and −0.4, respectively. In the case of agricultural exports, the results further revealed that real money supply, real government expenditure, discount rate, real exchange rate, and real GDP had a significant impact on the sector’s exports with long-run elasticity coefficients of 0.13, −0.32, −0.01, 0.5, and 2.53, respectively, while short-run elasticities were 0.06, 0.35, 0.01, 0.46, and −1.34, respectively. The authors recommended that the Central Bank of Swaziland needs to adopt policies aimed to provide affordable credit to agriculture. In terms of the low response of the agricultural sector to macropolicy variables, they recommended that policymakers should intensify the promotion of finished or processed agriculture exports and create a disincentive to imports.

Aroriode and Ogunbdejo (2014) studied the impact of macroeconomic policy on agricultural growth in Nigeria using time-series data from 1970 to 2010, using the ordinary least squares technique. The results show that gross domestic product, credit to agriculture, and exchange rates have significant positive influences on agricultural growth. Income elasticity of agricultural growth was low at 0.939%, indicating the income inelastic nature of agricultural commodities. On the other hand, they found that money supply has an inverse relationship with agricultural production, contrary to expectations. The interest rate is positive but insignificant which can be explained by the restrictive monetary policies, which can cause farm incomes to fall.

Letsoalo and Kirsten (2003) investigated the importance of macroeconomic and trade policies on the agricultural sector in South Africa for the period 1991–1999. According to the authors, macroeconomic and trade policies are determined outside the agricultural sector, and since the 1990s, South Africa has been moving toward deregulation and trade liberalization. Two-stage least squares was the technique used. The results of the study show that 10% reduction in import tariffs will lead to 11.44% increase in the degree of openness of the South African economy. Furthermore, the appreciation of the Rand will raise the domestic prices received by farmers.

Abula and Ben (2016) examined the impact of public agricultural expenditure on agricultural output in Nigeria for the period of 1981–2014. They employed cointegration and Granger causality tests for analysis. The Johansen cointegration test revealed that there was a long-run relationship between agricultural output, public agricultural expenditure, commercial bank loans to the agricultural sector, and interest rates in Nigeria. The results of the parsimonious error correction model showed that public agricultural expenditure has a significant negative impact on agricultural output, while commercial bank loans to the agricultural sector and interest rate have insignificant positive impacts. The researchers, therefore, recommended that monitoring agencies be established by the federal government to ensure that the amount allocated to the agricultural sector is actually and judiciously spent on the sector.

Akpaeti et al. (2014) examined the growth rates in agricultural investments and output in Nigeria from 1970 to 2009 using the ordinary least squares for analysis. Findings revealed that agricultural investments and growth recorded a growth rate of 37.44% and 30.47% in the pre-financial sector reform periods. The result for the financial sector reform periods showed a growth rate of 23.00% and 7.04% for agricultural investment and growth, respectively. The differences in growth rates were not significantly different at 5% between the periods. There was also deceleration in the growth of agricultural investments in the two periods under consideration, implying that financial sector reform might have brought an overall decrease in agricultural investments.
in the two periods. Furthermore, while there was stagnation in the growth process of agricultural output in the pre-financial sector reform periods, there was an acceleration in the financial sector reform periods. Hence, the researchers suggested that policies and sound regulatory framework that would enhance the development of a strong, healthy, and dynamic financial system should be pursued.

3. METHODOLOGY

3.1. Data Sources and Description of Variables
This paper uses times series data covering 1980–2016, obtained from the World Development Indicators (World Bank, 2017). Our measure of agricultural value chain is agriculture value added as a share of GDP. Although this has certain weaknesses, in that it does not indicate the value at each stage of the agricultural value chain, and it is, however, sufficient for our purpose at the macroeconomic level. Agriculture in this context corresponds to the International Standard Industrial Classification divisions 1–5 and includes forestry, hunting, and fishing, in addition to the cultivation of crops and production of livestock. The value added is the net output of a sector after taking the sum of all outputs and deducting intermediate inputs.

General government final consumption expenditure (as share GDP) was used to capture Fiscal policy; broad money (as share of GDP) was used as a proxy for monetary policy, respectively. Energy supply (electric power consumption kWh per capita) was used as a control variable.

3.2. Model Specification and Estimation Procedure
Value chain aims at producing value-added products or services for a market through the transformation of resources using infrastructures, within the opportunities and constraints of its institutional environment. In this connection, the factors that influence value chain development include market access and market orientation (Grunert et al., 2005), available resources and physical infrastructures (Porter, 1990), and institutions (Scott, 1995).

Factor conditions here deal with a country’s endowment with resources such as physical, human, knowledge, technology, and infrastructure (Porter, 1990). In developing countries, organizations face such challenges as inadequate specialized skills, difficulties in accessing technology, inputs, market, information, credit, and external services (Giuliani et al., 2005). Another key aspect of value chain is the availability of adequate distribution and communication infrastructure, as weak infrastructures hinder the efficient flows of products and exchange of market information. However, emphasis in the paper is the extent to which macroeconomic policies impact agricultural value chain in Nigeria.

In other to capture the impact of macroeconomic policy on agricultural value chain, the following model is specified:

\[ AVC_t = \beta_0 + \beta_1 GE + \beta_2 M 2 + \beta_3 EN + \mu_t \]  \hspace{1cm} (1)

Where \( AVC \) represents agricultural value chain; \( GE \) denotes government expenditure (Fiscal policy); \( M2 \) represents broad money supply (monetary policy); \( EN \) denotes energy (a control variable); and \( \mu \) - the error term, respectively. A priori, Fiscal and monetary policy variables will have a significant positive relationship/impact on agricultural value chain.

In this paper, the autoregressive distributed lag (hereafter ARDL) bounds testing approach (Pesaran et al., 2001) was adopted to examine the macroeconomic policy and agricultural value chain in Nigeria. The advantages that the ARDL framework has over other cointegration methods such as the residual-based technique (Engle and Granger, 1987) and maximum likelihood methods (Johansen, 1988; 1991; Johansen and Juselius, 1990) are well documented (Nyasha and Odhiambo, 2014). According to Akinlo (2006) and Duasa (2007), the ARDL approach does not require pre-testing the variables. However, one needs to be certain that the series employed are not integrated of order 2, in which case, the employment of the ARDL framework becomes devious. To obviate the possibility of using time series data that are integrated of order 2, the stochastic properties of the variables were investigated, using the KPSS (Kwiatkowski et al., 1992), ADF (Dickey and Fuller, 1979), and PP (Phillips and Perron, 1988) tests.

The ARDL model of the specification in Equation 1 is presented as follows:

\[ \Delta \log (AVC)_t = \beta_0 + \sum_{i=1}^{k} \beta_{ii} \Delta \log (AVC)_{t-i} \]

\[ + \sum_{i=0}^{k} \beta_{i} \log GE_{t-i} + \sum_{i=0}^{k} \beta_{2i} \Delta \log M2_{t-i} \]

\[ + \sum_{i=0}^{k} \beta_{3i} \Delta \log EN_{t-i} + \mu_t \]  \hspace{1cm} (2)

Where \( \lambda \) is the first-difference operator and \( k \) is the lag length.
The unrestricted error correction model arising from Equation 2 is specified as follows:

$$\Delta \log (AVC)_t = \beta_0 + \sum_{i=1}^{4} \beta_i \Delta \log (AVC)_{t-i} + \sum_{i=0}^{4} \beta_{2i} \Delta \log GE_{t-i} + \sum_{i=0}^{4} \beta_{3i} \Delta \log M_{2t-i} + \sum_{i=0}^{4} \beta_{4i} \Delta \log EN + \sum_{i=0}^{4} \psi_i \log AVC_{t-i} + \psi_2 \log GE_{t-i} + \psi_3 \log M_{2t-i} + \psi_4 \log EN + ECM_{t-i} + \mu_i$$

(3)

Where the parameters $\beta_i; i = 1, 2, \ldots, 4$ are the short-run dynamic coefficients, the parameters $\psi_i; i = 1, 2, \ldots, 4$ are the long-run multipliers, and ECM denotes the speed of adjustment. The post-estimation diagnostics implemented in the paper include the goodness-of-fit, the joint significance of regressors, the serial correlation, and tests for heteroskedasticity, normality, specification error (bias), and stability.

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistics

The descriptive statistics of the variables used in the study are presented in Appendix 1. 36 observations were used, and there are four variables in the data set. All the variables are in log form. The data are normally distributed as adjudged from the Jaque-Bera (JB) statistics which is not statistically significant in each case. The kurtosis is reasonably within the required range as none of the values is >3. The correlation matrix indicates that agricultural value chain has a statistically significant positive relationship with government expenditure and money supply and an inverse relationship with energy. Importantly, the independent variables do not exhibit high multicollinearity, the highest correlation coefficient was being 0.42 or 42% between government expenditure and energy.

4.2. Unit Root TESTS

The unit root test results are presented in Appendix 2. The test results indicate that there is a mixture of integration among the variables, a situation that is appropriate for the use of the ARDL approach to cointegration. Consequently, the use of the ARDL bounds test for cointegration is justified, given that none of the variables is integrated of order 2.

4.3. Cointegration Test

The test of cointegration results is presented in Table 1.

From Table 1, the computed F-statistics (3.85) is higher than the upper bounds of the critical values at the 5% and 10% levels of significance, respectively. The results suggest that there exists a long-run relationship between agricultural value chain and associated variables employed in the study. It needs to be noted that time series variables are cointegrated if the computed F-statistic is greater than the upper critical bounds value. If the computed F-statistic is lower than the lower critical bounds value, the conclusion is that there is no cointegrating relationship between the variables. If, however, the F-statistic lies between the upper and lower critical bounds values, the results would be inconclusive, and although estimation may proceed, the coefficient of the error correction model should be negative and statistically significant, to resolve the test result in favor of cointegration. It needs to be noted, however, that if cointegration is found, the appropriate step is to implement an error correction model (Engle and Granger, 1987).

4.4. Estimated Coefficients

The estimated cointegrating coefficients are presented in Table 2.

DISCUSSION

One-lagged value of agricultural value chain exerts a statistically significant positive impact on agricultural value chain output at the 5% level. Thus, past levels of agricultural value chain tend to enhance the current efforts at improvement. This is expected, given that past experience can help bring about the reduction or elimination of errors, consistent with the learning curve theories.

Fiscal policy (captured by government expenditure) has a statistically significant positive impact on agricultural value chain at the 5% level. Both the current and one period-lagged coefficients of government expenditure exert an upward pull

<table>
<thead>
<tr>
<th>Table 1: Cointegration test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test statistic</td>
</tr>
<tr>
<td>F-statistic</td>
</tr>
<tr>
<td>Critical value bounds</td>
</tr>
<tr>
<td>Significance (%)</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

k is the number of regressors in the ARDL model. Source: Pesaran et al. (2001)
Table 2: Estimated coefficients

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>SE</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Δ AVC(−1)</td>
<td>0.332790**</td>
<td>0.130196**</td>
<td>2.556063</td>
</tr>
<tr>
<td>Δ GE (-1)</td>
<td>0.125098**</td>
<td>0.061312**</td>
<td>2.040364</td>
</tr>
<tr>
<td>Δ GE (-1)</td>
<td>0.134839**</td>
<td>0.062632**</td>
<td>2.152880</td>
</tr>
<tr>
<td>Δ M2</td>
<td>0.406194*</td>
<td>0.096248**</td>
<td>4.220268</td>
</tr>
<tr>
<td>Δ AVC(−2)</td>
<td>0.288097*</td>
<td>0.096422**</td>
<td>2.987666</td>
</tr>
<tr>
<td>Δ EN</td>
<td>0.293981**</td>
<td>0.145617**</td>
<td>2.018860</td>
</tr>
<tr>
<td>Δ EN (-1)</td>
<td>0.450597**</td>
<td>0.173582**</td>
<td>2.595878</td>
</tr>
<tr>
<td>Δ EN (-2)</td>
<td>0.457130*</td>
<td>0.126865**</td>
<td>3.603268</td>
</tr>
<tr>
<td>ECM (−1)</td>
<td>−0.437796*</td>
<td>0.090211**</td>
<td>−4.853006</td>
</tr>
</tbody>
</table>

Diagnostic statistics

- $R^2$: 0.79
- Adj. $R^2$: 0.64
- SER: 0.097225
- F-statistic: 4.983548 (0.000952)
- DW: 2.06
- BG ($\chi^2$): 1.672036 (0.4334)
- JB: 0.234896 (0.889142)
- ARCH ($\chi^2$): 2.036040 (0.1536)
- RESET (t-stat.): 0.581152 (0.5688)

*., ** and *** denote significant at 1%, 5%, and 10% levels. SER: Standard error of regression, DW: Durbin-Watson test statistic for autocorrelation, JB: Jarque-Bera test for normality of residuals, BG: Breusch-Godfrey serial correlation LM test, ARCH: Engle's test for conditional heteroskedasticity, RESET: Ramsey’s residual error. RESET: Residual error specification test. In the diagnostic statistics, probability values are shown in values in parenthesis. Source: Authors’ computations

The speed of adjustment (i.e., the coefficient of the error correction mechanism) is negative and statistically significant at the 1% level. The sign of the ECM coefficient is consistent with the expectation of theory and is a further validation of the results of cointegration earlier presented in the study. The speed of adjustment indicates that a deviation in agricultural value chain from equilibrium is corrected by about 44% the following year.

The post-estimation diagnostics indicate that about 64% variation (adjusted $R^2$) in agricultural value chain is accounted for by changes in Fiscal and monetary policy variables, in addition to energy consumption. Moreover, the F-statistic indicates that all the regressors employed in the study are jointly statistically significant (at 1%) in explaining changes in agricultural value chain. The Durbin-Watson statistic is in favor of the absence of autocorrelation in the residuals (its value is approximately 2). However, due to the presence of a lagged dependent variable as a regression in the model, the Breusch-Godfrey (BG) statistic is a more appropriate test for the presence or otherwise of autocorrelation. From the estimated results in Table 2, the null hypothesis of no serial autocorrelation is accepted, given the non-statistically significant value of the BG test. Moreover, the residuals in the estimated model are normally distributed, as shown by the JB test statistic which is not statistically significant. Furthermore, the residuals are homoscedastic, as shown by the non-significant ARCH and white test results, respectively. Finally, the model passes the test for specification bias as indicated by the RESET test statistic.

4.6 Stability Tests

The cumulative sum of recursive (CUSUM) and cumulative sum of the squares of recursive residuals (CUSUMSQ) were used to test the stability of the estimated models. The results are presented graphically in Figures 1 and 2.

An examination of Figures 1 and 2 indicates that the plots do not cross the 5% critical lines. The implication is that the estimated coefficients within the period of investigation are stable. In other words, there is parameter constancy. Thus, the empirical results would be reliable for policy recommendation.

From the empirical findings and discussion, answers to the research questions posed in the study are provided as follows:

i. The macroeconomic factors influencing agricultural value chain: From the estimated results, government expenditure and money supply are important on agricultural value chain. Thus, government spending is important to the growth and development of agricultural value chain. Consequently, a 1% rise in government expenditure is associated with a rise in agriculture value chain by about 0.13%.

The monetary policy coefficients (provided by broad money supply) are positively related to agricultural value chain and statistically significant at 1%. In this connection, current and past levels of money supply exert positive influence on agricultural value chain. Thus, changes in the agricultural chain are explainable with recourse to monetary policy initiative. A rise in the current level of money supply by 1% is associated with a corresponding increase in agricultural value added by about 0.41%, while the influence of two-lagged period supply of money impacts agricultural value chain positively by about 0.29%.

All the coefficients of energy (proxied by electricity consumption per capita) are directly related to agricultural value chain and are statistically significant. This implies that higher energy consumption can bring about greater agricultural value added along the value chain. Thus, agricultural value chain can be improved given an improvement in the country’s energy consumption.
Macroeconomic factors influencing agricultural value chain.

ii. The impact of macroeconomic policy on agricultural value chain: The impact of government expenditure and money supply is statistically significant and their impact on agricultural value chain is positive.

5. CONCLUSIONS

The paper investigates macroeconomic policy and agricultural value chain in Nigeria from 1981 to 2016, using the ARDL framework as an analytical tool. A long-run equilibrium relationship was found among the variables used in the investigation. Macroeconomic policy (proxied by government expenditure and broad money supply) was found to have a significant positive impact on agricultural value chain. In addition, energy (captured by electricity consumption per capita) was found to exert a statistically significant positive impact on agricultural value chain.

The conclusion is that macroeconomic policy is critical to agricultural value chain in Nigeria. Consequently, given an enabling macroeconomic policy framework, agricultural value chain can be optimized.

Based on the empirical findings, the following are recommended:

i. Improved government expenditure is advised. In this connection, government budgetary allocation to agriculture needs to be improved and implementation is given a robust impetus. Banks established for the purposes of aiding and promoting agricultural value-added activities (such as the Bank of Industry, the Nigerian Agricultural Commerce and Rural Development Bank, and Small and Medium Enterprises Development Agency of Nigeria) should be strengthened to enhance their capacity to provide funds to agricultural value-added concerns such as processing, storage, marketing, and distribution.

ii. Monetary policy should be streamlined in a way that promotes increased money supply to the economy and especially to the real sector, in which agricultural value chain activities tend to be concentrated. Access to dedicated finance to agriculture and its allied value chain activities will go a long way in improving the operations along the value chain.

iii. Improved energy supply is required to develop and sustain agricultural value chain in Nigeria. Electricity supply is critical in this respect and falls within the general infrastructural development framework which should be given top priority by governments at all levels. Improvement in electricity can lead to a significant fall in the cost of business operations along the value chain in agriculture, spur growth in agricultural value chain in particular, in addition to reduce waste associated with inadequate storage facilities.

Future investigations of the impact of microeconomic policy on agricultural value chains using cross-sectional or survey data will probably help to shed more light on the microeconomic policy-agricultural value chains nexus.

REFERENCES


APPENDIX 1

Descriptive statistics

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<th>AVC</th>
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Correlation matrix

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Probability values are in parenthesis. Source: Authors’ computations

APPENDIX 2

Unit root test results

<table>
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The test was conducted with intercept and a linear trend. *, **, and *** denote rejection of the null hypothesis at 1%, 5%, and 10% level of significance, respectively. For KPSS, the null hypothesis is that the variable is stationary. The null hypothesis is that the variable is non-stationary for ADF and PP. Source: Authors’ computations.
Sir,

The originality of the organization called “Islamic State” is that it is quite different in its mode of operation from all the other jihadist movements, including the Al-Qaida. Its use of terror is particularly spectacular and meant to affect the public, horror is not hidden but is part of their propaganda, just like terror is meant to paralyze. The following examines the rise and decline of this organization.

How do you explain the birth of the Islamic State Organization?

The core of the organization is an indirect creation of the American intervention in Iraq in 2003. This latest clumsily and systematically marginalizes the Sunnis, who as early as July 2003 rebel and benefited of the organizations of a state whose structures have not been broken - special services, republican guard, and fedayeen. Soon after the insurgency of Fallujah and the sexual scandal of Abu Ghraib Prison (2004), the Sunnis will be joined by radical Islamists led by the Jordanian Abu Musab al-Zarqawi. The Ba’ath and Saddam’s followers are coopted in radical Islamism, more mobilizing.

What has allowed the organization to grow?

After the death of al-Zarqawi caused by the Americans (2006), Abu Bakr al-Baghdadi gradually imposes itself. Nothing is solved in 2011 when US troops leave Iraq. Terrorist actions go on. What journalists have named the Arab Spring is an opportunity for the Islamic State of Iraq to make a move to Syria. The opening is made by al-Julani who organizes the sympathizers in the country. The proximity of the Turkish border, which allows the passage of Jihad volunteers and profitable oil traffic, will later bring the troops of al-Baghdadi to Syria. Talks are held between al-Baghdadi and al-Qaeda, and a temporary alliance is built between the two movements.

In 2013, al-Baghdadi will break it, considering his movement more radical. The organization of Al-Baghdadi invests Raqqa, becoming the capital on the Euphrates - at a good distance from the coast held by the regime - and soon proclaims the Islamic State of Iraq and al-Sham. The movement receives concrete support and funds from the Gulf - Kuwait, Saudi Arabia, United Arab Emirates - and Turkey. Volunteers flock and pass freely through the Turkish border.

In 2014, al-Baghdadi decided to return to Iraq with well-trained, disciplined, and highly indoctrinated troops. Paradoxically, Mosul, the second city of Iraq, collapses almost without a fight. In their flight, Iraqi troops left important equipment and finances. The fall of Mosul brings an extraordinary aura to the movement. Taking advantage of the boon, Abu Bakr al-Baghdadi proclaims himself caliph and announces that the border erected by the European imperial powers between Syria and Iraq no longer exists. Soon after, his troops invest the Sinjar where they will massacre the Yazidis and reduce women into sexual slaves while crucifying Christians. They, thus, gain a reputation of extreme ferocity while unexpectedly they penetrate in the Kurdish region. Al-Baghdadi’s troops reach Gwer and Makhmur, 40 km away from Erbil, the capital. On August 8, the phone call given by the Kurdish leadership to obtain US aid allows in record time the US aviation to stop net the advance of thousands of jihadists.

From there, the conflict comes much more static; the Kurds try to hold a front of nearly a 1000 km, thanks to the sophisticated armament provided by Germany and other European allies. In Syria, Kurds who occupy a very large part of the Syrian Turkish border organize themselves. They manage to fight Daesh heroically in Kobane, thus bringing American aid that will allow them to be used as proxy forces.

What made it possible to defeat the Islamic State organization?

The Islamic State organization was defeated first by the de facto alliance between the United States and its allies, militias in Syria, and to a lesser extent in Iraq, both organized by Iran. The severe bombardments inflicted from summer 2015 to spring 2016 by Russia also impacted them heavily. Finally, it
was by land assaults, first by Iraqi forces and Kurds of Iraq against Mosul, later by the offensive mainly conducted by the Kurds of Rojava on Raqqa, the capital of the movement. The jihadists fought with a lot of determination in both Mosul and Raqqa and were defeated because Calif had officially territorialized the essentially desert area they controlled.

If the systematic use of terror using techniques already used by the Mongols has been shown to pay off to paralyze the adversary, territorializing has proved to be a trap. When one is a guerrilla, it should not pretend to territorialized what it has liberated (The Vietnamese never pretended to control their territory, the ground was controlled by day by the French or the Americans, and the population was controlled at night by the Vietnamese). When a guerilla pretends to control territory, it can do it with a weak adversary unable to direct ground confrontation. When reorganized Iraqi troops and Syrian Kurdish forces well equipped were ready to fight on the ground offensively against Daesh, it was not possible for the Islamists to resist the combination of ground forces with tanks, heavy weapons, and air force. Al-Baghdadi, achieved a tour de force, exceeding his means. He isolated himself, defying all his opponents including Jihadists organizations as well as states that contributed to his rise. To end with a note of humor, if Iranians Shiaism has a hidden Imam, now, Sunni jihadists in the Daesh version have a hidden caliph.
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- Discussion

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* Causality between Gross Domestic Product and Health Care Expenditure in the Augmented Solow’s Growth Model
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