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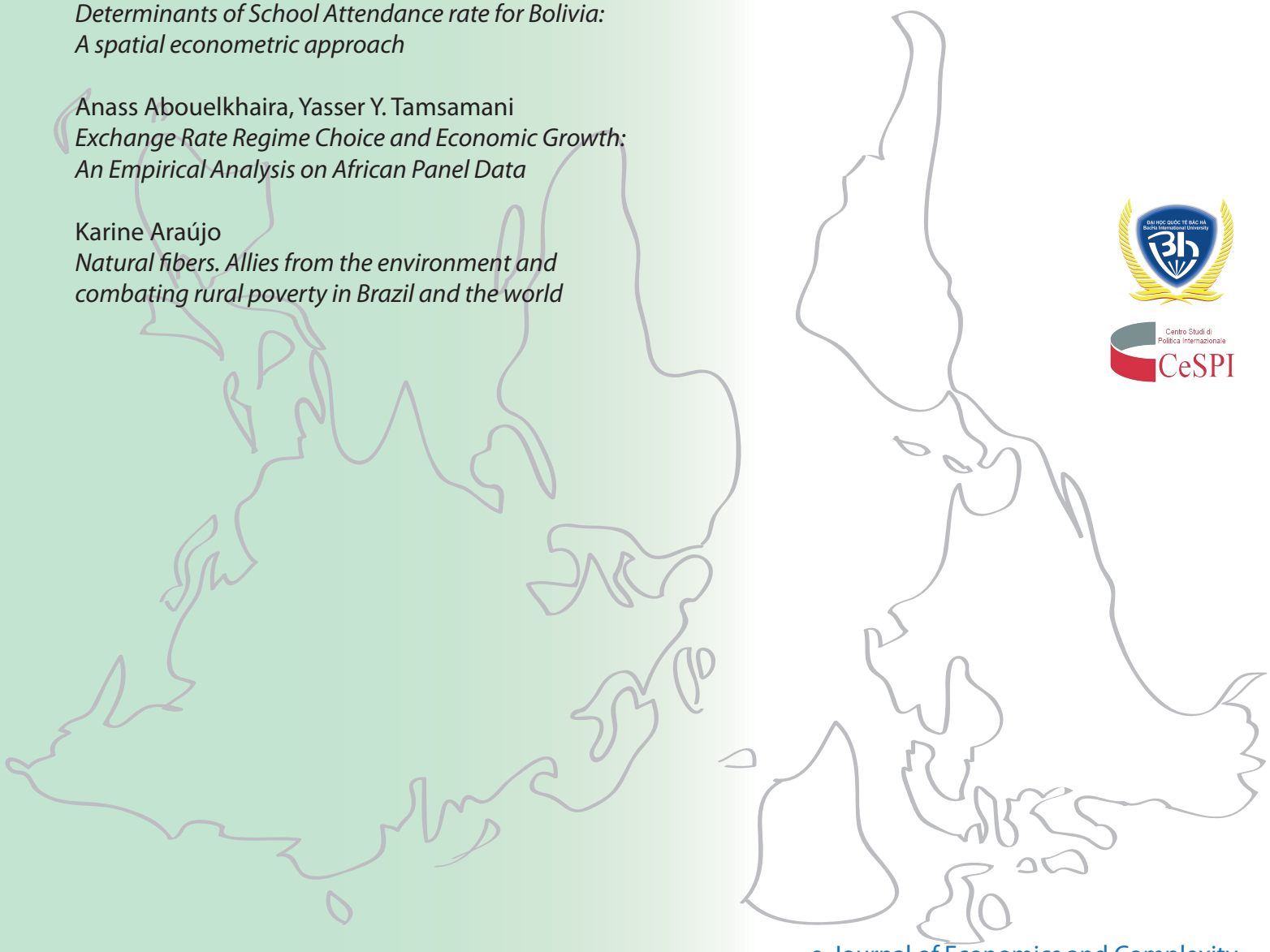
An Interdisciplinary Journal on Development and Global Studies



e-Journal of Economics and Complexity

An Interdisciplinary Journal on Development and Global Studies

This e-journal adopts a multi-disciplinary approach to development studies, by proposing different and alternative views, perspectives, ideas and analyses on local, national and international development, by highlighting the lessons learned from different experiences, with a focus on social change.

Our goal is to learn from one another, that is a process of mutual learning by strengthening links among members of a community of academic scholars from different countries spread mainly in Africa, Asia and Latin America.

In other terms, we hope to set an example of academic community among African, Asian and Latin American scholars who are interested in being involved in an international dialogue, exchanging ideas and facilitating mutual dissemination of research and its results, creating a forum for them and providing a dedicated publication.

This is a refereed e-journal that is distributed electronically: the primary means of distributing this e-journal is over the internet with the aim of guaranteeing free access to the articles.
The e-journal is organized into volumes and issues. Our idea is to publish the bound volume annually or semi-annually. Every issue is devoted to a specific topic, which will take into account the importance of having different perspectives on the subject and reviews, and to regular research articles.

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CONTENTS

Introductory Editorial

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The 2000 Millennium Development Goals (MDGs) proved to be important in orienting international development cooperation strategies in recent years, by placing poverty reduction at the top of international priorities and setting a time-bound term to improve the living conditions of the world population. However, in 2015 the MDGs were not fully accomplished, and more effort was still needed to complete the job. The 2015 agenda to reach Sustainable Development Goals (SDGs) by 2030 was more ambitious and more comprehensive, combining in a nest conceptualization the three intertwined dimensions of social inclusion (the MDGs legacy), environmental sustainability (linked to the challenges of climate change and the process of the Conference of the Parties or COP) and economic development, so as to ensure structural transformations.

Therefore, a paradigm based on the complementarity of social-economic development and environmental sustainability is the ambitious mark of the 2030 agenda, which is universal in aspiration and coverage, with goals for all countries, including the high income economies.

However, the very ambition of the agenda can become its weak point, reducing it to an over-proliferation of fragmented and silo mentality-based targets and indicators, rather than focusing on the interaction of social, economic and environmental cross-cutting dimensions.

At the same time, if the responsibility for achieving the desired SDGs is first and foremost national, the international political agenda today places as fundamental a perspective that is very different from that anchored to the nation states. The current Covid-19 pandemic is showing how interconnected the countries are, economically but also in other ways, like global health issues. It shows that countries' domestic decisions are no longer of purely national interest, but also affect others. This means that all countries would need to work together and agree on common objectives and common directions to achieve them.

More, the Covid-19 pandemic shows that issues that have traditionally been mere national are now global because they are beyond the grasp of any single nation. Crises endure because we lack the proper policy mechanisms to address such Global Public Goods, starting with health. Just to mention a few examples: the Doha round of WTO negotiations are still pending issues and disappeared from the political agenda; the reform of international financial institutions is stranded in a situation of uncertainty; the decision to postpone COP-26 in Glasgow until the end of 2021 raises fears that governments may repeat the same mistakes made after the 2008 financial crisis, when recovery plans led to

increased CO2 emissions. The current phase of globalization presents the under-provision of global public goods, just when a significant effort would be needed to address the immediate (Covid-19) and long-term (climate change) main challenges. How we respond to Covid-19 may offer us lessons for the long-term crisis which is already looming before us, the climate crisis and, in both cases, it is clear that urgent, decisive action can turn a crisis around.

In every relevant crisis, there are dangerous risks and great opportunities to shift the world towards urgent and needed changes. The fundamental questions connected to the relationship between economic development, socio-economic inequalities and ecosystem balances resurface like the Gordian knot that cannot or will not be courageously resolved with a radical change. In front of our eyes there is a real risk of missing an extraordinary opportunity for a coordinated turning point, not only to emerge from today's emergency, but also to create the conditions for the economic, social and environmental dimensions to be much more resilient than they are today and capable of mitigating the negative impact of world-wide crises and, if possible, their repetition.

The Covid-19 pandemic highlights the deep interconnections between the three pillars of development, but also the need for action on the governance front at the national but also global level.

Pre-existing conditions can make a person vulnerable to potentially fatal diseases such as Covid-19, as well as heart attacks and strokes, and certainly weaken the exercise of full ownership of active citizenship rights by vulnerable people, communities and groups. The disruption of ecosystem balances, the loss of traditional habitats for various animal species and the anthropization of space can "naturally" lead to these outcomes, even without inconveniencing conspiracy or human intentionality in the spread of viruses. Deforestation, in Africa as in Asia and Latin America, and the colonization by human settlements of former forest areas bring wild animals into direct contact with the human species, and the trade and consumption of the meat of forest animals that carry the virus, such as bats, through the wet markets, quickly spread epidemics.

In general, the situation in the countries of Africa, Latin America and Asia is very critical, on the health, social and economic level and, therefore, also on the political one. The Covid-19 pandemic and the relative measures to contain its spread have held back the world economy and exposed countries with fragile economies that are highly dependent on the performance of the world economy to serious repercussions. Low- and middle-income countries - usually at the mercy of commodity prices, tourism and the volatility of remittance and foreign investment flows, as well as trade - are now facing the interaction of a health crisis that the Covid-19 emergency is exacerbating with a direct negative impact on all other diseases and illnesses, a food crisis and chronic malnutrition that lock-down tends to aggravate, an economic and social crisis of systems based on the informal economy and dependent on world economy integration. In addition, the closure of international borders, the disruption of flights and supply chains and export bans limit countries' ability to procure personal protective equipment (also taking into account the fact that tariffs are applied to health products which, under these conditions, become unsustainable for many countries), diagnostics (recalling the problem of the limited availability of test

kits on international markets) and essential food products, which weakens the already reduced capacity of vulnerable national systems to cope with disease and famine.
If necessary, the Covid-19 pandemic, in addition of course to its dramatic impact on the lives of many people, shows us unequivocally how mutual effects and feedbacks structure and link the different dimensions of development. Economic, social and environmental dimensions that cannot be analyzed in isolation and neglecting the existing interactions. For this reason, development studies are naturally oriented to adopt a multidisciplinary or interdisciplinary perspective that has the ambition to overcome the silo mentality and to connect knowledge to read reality in its complexity. Development is a combination of quantitative and qualitative dimensions of the nested - rather than additive - concept of sustainable development: economic growth, social development, environmental sustainability.
The opposite view, unfortunately prevailing in terms of policies and approach to problems, is that of the silo mentality, implying the risks and the dangers of the so called "tunnel vision": orientation to focus exclusively on a single goal, point of view, specific problem.

The contributions of the authors in this issue of the e-journal should be understood as the result, first of all, of the choice to bring together different themes or dimensions of sustainable development, referring to different countries and continents – where development is always place-based and the context has a specific relevance –, analyzed through the use of different methodologies and techniques of analysis.
Ali A. Soliman is the author of the article focused on the relationship between fiscal policy – analyzing both the public revenue side and the public expenditure side – and the achievement of the Millennium Development Goals first and then the Sustainable Development Goals. Financing is explicitly addressed in the 2030 Agenda for sustainable development as part of the means of implementation under each of SDG 1-16 and, more specifically, under SDG 17, which is aimed at encouraging the mobilization of resources and their effective use in achieving sustainable development objectives. Nowadays, due to the Covid-19 pandemic, the global economy is projected to contract sharply, experiencing its worst recession since the Great Depression, and a key challenge for many countries – including Egypt – in the near future will certainly be that of a fiscal space that is likely to be limited. The risk of a probable contraction of financial resources in the immediate future adds, therefore, to the need to consider whether and how the Covid-19 should impose a profound rethink on priorities and modes of intervention in order to avoid the objective of simply "go back to normal", where normality appears to be a fundamental part of the structural problems of development. It is no coincidence, in fact, that the 2020 Financing for Sustainable Development Report outlines measures to address the impact of the unfolding global recession and financial turmoil.
Returning again to the global framework represented by SDGs, the official indicator list as refined by the 2020 Comprehensive Review, which were approved by the 51st Statistical Commission in March 2020, includes 231 unique

indicators (with twelve indicators repeated under two or three different targets). The SDG Indicator 16.6.1 refers to the degree of implementation of the national budget, in terms of actual primary government expenditures, as an indicator of government's ability to deliver public services and achieve development objectives. The article by Ali A. Soliman elaborates on this point and analyzes how Egyptian government revenues and expenses changed over time in quality and quantity and how these change affected the mixed achievements of MDGs. The author is clear in his judgment: over the years, a large increase in government expenditure was not matched with a commensurate increase in revenue; the resulting increase in deficit was largely financed through borrowing from local banking sector and, as a result, the government was forced to decide whether it should curtail spending on essential programs or to service its debt, while the option of raising general sales tax has a regressive re-distribution impact, completely inconsistent with the objectives of equity and redistribution of SDGs. The conclusion is severe with regard to the past, when the author says that Egypt has not been able to realize most of its accepted Millennium Development Goals due to the difficult situation of the state budget and, at the same time, offers policy guidance to orient government choices to better align with the SDGs framework.

Pierre Kamdem analyses the determinants of international migrations in Cameroon. If Egypt is a middle-income country located in North Africa, with a population estimated at 102 million people and has a set of problems that hinder development, Cameroon is a Sub-Saharan middle-income country with a population of over 25 million people, endowed with rich natural resources, including oil and gas, minerals, high-value species of timber, and agricultural products, such as coffee, cotton, cocoa, maize, and cassava. In particular, the author analyzes the dynamic change of migration factors in Cameroon and considers the prospects for the near future, putting forward some recommendations for optimizing the quality of migratory departures, in order to further enhance the impact of migration on the development of the country. The link between migration and development is clear in Cameroon as well as at global level. The 2030 Agenda for Sustainable Development recognized for the first time the contribution of migration to sustainable development, and migration is a cross-cutting issue relevant to all of the SDGs, with 10 out of 17 goals containing targets and indicators that are relevant to migration or mobility. In fact, the Agenda's core principle to "leave no one behind" addresses directly and abundantly the situation of migrants. The SDGs' central reference to migration is made in target 10.7 to facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies.
Official international data show that international migrants have increased from 153 million in 1990 to 271.6 million by mid-2019. The data also indicate that, as the world population grows, the share of the migrant population grows even more. The Global Compact for Migration, ratified on 19 December 2018 by the United Nations General Assembly, is the first agreement at global level that attempts to provide an internationally coordinated response to facilitate

“orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies". Over the years, significant differences of views emerged between and within countries that led to a radicalization of positions and sharp contrasts on international migration. Therefore, the analysis of a case study such as that of Cameroon offers many useful indications, which go beyond the specific case study. A particularly topical issue today, because the Covid-19 pandemic is having a disruptive effect on the specific living conditions of international migrants.
In fact, the picture that emerges today is of a particularly vulnerable migrant population, exposed to the risk of discrimination in access to health services and social and labor protection measures that are being prepared at international level, with a possible resurgence of xenophobic pressures. In pointing out the possible critical developments of the situation, it should be remembered the pre-existing structural problems, linked to the difficult migrants’ inclusion/integration process, but also to the incentive for the migration of health workers, which today makes the situation in the countries of origin more critical, while migrants, blocked by lock-down measures in their host countries, often find themselves bearing very high costs as a result of the current crisis.

The section dedicated to articles by PhD students and young researchers of the network of the International Doctoral School on the SDGs collects four interesting contributions.
The first, written by Vatana Chea, a demographer and population economist from Cambodia, is an article on Cambodia, a Southeast Asian country upgraded to the middle-income group in 2016 based on the fact that GNI per capita for 2015 was $1,070, that is above the threshold of $1,025 for low-income countries, with a population of 16.7 million of people. The author analyzes an important topic related to the link between migration and development, which is addressed by the 10.c target of the SDGs, that is remittances (the target being: “by 2030, reduce to less than 3 per cent the transaction costs of migrant remittances and eliminate remittance corridors with costs higher than 5 per cent”). The specific area of investigation of this article is the impact of remittances on poverty and inequality in Cambodia, by using monthly per capita consumption to measure household welfare. The method adopted by the author is based on the estimation of the so-called counterfactual, a key concept of any experimental and quasi-experimental econometric technique of impact evaluation. Vatana Chea applies one of the earliest models in econometrics to deal with selection bias, introduced by James Heckman (1976), a two-step procedure combining the estimation of a probit equation (similar to what is done for propensity score matching, except that the probit should contain one or more instruments for participation) to calculate fitted values, which are then used as a regressor in OLS estimation for the outcome variable. The results from the Heckman two-step estimation of per capita consumption of remittances and non-remittance-recipient households are compared to the results from alternative methods and shows how dependent are remittance-receiving households on the transfer of remittances to improve their welfare. The fact that the global shock triggered by the Covid-19 pandemic has

significantly impacted Cambodia's economy in 2020 at a time when the country also faces the partial suspension of preferential access to the EU market under the "Everything but Arms" initiative and is also expected to reduce drastically the flow of remittances sent by migrants back home to low- and middle-income countries makes the article of great interest also in relation to future prospects.

An economist, Mauro Oscar Lua Delboy Céspedes is the author of the article focused on Bolivia, a Latin American middle-income country, with a current population estimated of 11.7 million of people, and the topic discussed is school enrollment rate. Unfortunately, new data published by the UNESCO on the world's out-of-school children reveal little or no progress for more than a decade, with about 258 million children, adolescents and youth out of school in 2018: around one-sixth of the global population of this age group. The data reinforce concerns about the prospects of reaching global education targets by 2030, which is one of the key components of the SDG 4 (to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all). Therefore the topic proposed by the author is very relevant in the framework of the development debate and the specific method adopted - which is the impact evaluation of the spatial component on Bolivian school enrollment rate as a way to identify its main determinants - should be highlighted and recognized as a promising area of investigation. In fact, it is clear that in many cases, including but not limited to education, the outcomes of policies do not depend solely on the specific actions and the attributes of the individuals, but on the structure of the system, their position within it, and their interaction with other individuals. The Covid-19 itself is spread via interactions, and different types of interaction patterns between and within countries give rise to different disease dynamics. As highlighted by Michael Ward and Kristian Skrede Gleditsch in *Spatial Regression Models* (Sage, London, 2008), the role of interactions and their structures is almost completely absent from most empirical analyses in social sciences, and spatial analysis can help researchers take dependence between observations into account and deal with spatially clustered phenomena. The estimation of regression models with spatially lagged dependent variables help take spatial dependence into account, avoiding the risk to underestimate the real variance in the data. And the author can explicitly show that the spatial component affects directly the school attendance rate in Bolivia, with a negative impact of rural percentage of population on education being the proxy of a significant spatial dependence. Here too, unfortunately, the Covid-19 pandemic is amplifying and greatly worsening the picture of development problems linked to the issue of education at global level, making the risk of marginalization and exclusion of the most vulnerable groups of children one of the highest social and economic costs of this current crisis. Taking into account the geographical segmentation of development problems is an important *caveat* for Bolivia and not only.

Anass Abouelkhaira and Yasser Y. Tamsamania are two Moroccan economists who authored an article focused on an empirical analysis linking exchange rate regime choice and economic growth as referred to a panel of 30 African

countries. The SDGs framework aims to encourage sustained economic growth – one of the three pillars of the whole approach – by achieving higher levels of productivity and through technological innovation. In particular, there are 12 Targets and 17 Indicators for SDG 8, which is "to achieve full and productive employment, and decent work, for all women and men by 2030". At the same time, SDG 17 (Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development), especially target 17.4, emphasizes the need of "attaining long-term debt sustainability through coordinated policies aimed at fostering debt financing, debt relief and debt restructuring, as appropriate, and address the external debt to reduce debt distress". With reference to these strategic areas, the authors analyze a technical financial aspect, the exchange rate regimes, in order to find out which are most favorable to economic growth. In methodological terms, Abouelkhaira and Tamsamania apply the random effect technique to a dataset in which the behavior of countries are observed across time (cross-sectional time-series data). The rationale behind random effects model is that the variation across countries is assumed to be random and uncorrelated with the predictor or independent variables included in the model, taking into account the influence of the different exchange rate regimes across countries on the dependent variable, which is economic growth. The estimations, even though several alternative econometric specifications (with the usage of instrumental variables method and running various tests), confirm the absence of currency neutrality in the case of African countries and an outperformance of intermediate regimes in promoting economic growth in the case of countries experiencing positive terms of trade shocks and benefiting from FDI inflows. The opening of capital account appears as incompatible with intermediate regimes, and external indebtedness does not favor economic growth regardless of the exchange rate regime adopted.
These results are relevant in the context of what is expected to be the worst economic recession since the Great Depression, with an estimated decline by more than 4 per cent of GDP per capita at global level in 2020 and 1.6 billion workers in the informal economy – mainly in Africa and Asia – who are at risk of losing their livelihoods due to the Covid-19 pandemic. In Africa, informal workers account for 86 percent of all jobs; specifically in sub-Saharan Africa, they contribute 38 percent of GDP and up to 60 percent of Nigeria's GDP. The pandemic is expected to spread more slowly in Africa than in other parts of the world, but it will probably stay in the region longer, probably for several years. As in other regions, there is considerable variation in exchange rate regimes across sub-Saharan Africa and over time, including pegs, intermediates, and floats. The choice of an appropriate exchange rate regime is a subject of ongoing debate in international economics, as a consequence of the Covid-19 pandemics in addition to the very heated political debate about the common currency for the Franc Zone (CFA).

Karine da Silva Araujo, a Brazilian agronomist from the Federal University of Rio de Janeiro, analyzes the importance of natural plant fiber production chains for the sustainable development of poor regions in Brazil. Brazil is an emerging upper-middle income economy, with a population of over 210 million and a very

high level of economic inequality, which has been high since at least 1928, as a result of an impressive concentration of income among the rich, so that Brazil has always ranked among the first positions at world level in the Gini coefficient index of inequality assessment. Even though millions of people were lifted out of poverty during Luiz Inácio Lula da Silva's presidential terms from 2000 to 2010, through economic growth alongside social development to fight poverty, with strong government action expanding social coverage targeted to the poor to reduce poverty, inequality and hunger for the first time in contemporary history (including the famous conditional cash transfer program introduced in 2003, the so called *Bolsa Família* program), a very high level of inequality persists.

The article analyzes a specific and concrete case of intersection between the economic, social and environmental pillars of the SDGs, which is the potential of natural fiber chains, a production process involving many family farmers in small farms in the poor rural regions in the North and Northeast of Brazil, that integrates perfectly with the agro-climatic conditions of the areas, without damaging the environment. Through a concrete case study, by using available data published by the main statistical institutes in Brazil, the author shows how economic development cannot be pursued without considering the social and environmental dimension, just as there is no way to make homogeneous policies for a country the size of Brazil, with different biomes, soil types, climate, vegetation and water resources beyond cultural differences, and she strongly recommends a coordinated cooperation between all stakeholders – at sub-national, federal and global level, involving private and public sectors – to promote an effective and long-lasting international networking partnership capable of effectively supporting sustainable development of the natural plant fiber economies, respecting eco-systems, cultures and different identities. Read from a more general perspective, the article suggests that it is urgent to address some of the structural causes of inequality in Brazil, such as insufficient nested investments in social, economic and environmental policies to support fragile and vulnerable eco-systems.

This is dramatically topical, in the context of the current Covid-19 pandemic: Brazil ranks second worldwide in the total number of officially confirmed Covid-19 cases and deaths; understanding the possible socioeconomic and ethnic health inequalities is particularly important given the diverse population and fragile political and economic situation, as new studies are being published in Brazil that would confirm the thesis of increased mortality in the North region (regional effect) and in the Pardo (*Moreno*) and Black (*Preto*) populations (ethnicity effect): that is a further confirmation of the strong social and territorial heterogeneity present in the dynamics of development, in any context.

Fiscal Systems and Social Justice in Egypt. Response to Millennium Challenges

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Abstract

This paper studies the relationship between Egypt's achievements in relation to the Millennium Development Goals (2000-2015) and the fiscal policy parameters. In Egypt, and despite ever-rising government revenues and expenses, achievements of MDGs were mixed at best. There has been some improvement in education goals, due to higher and more gender-equitable distribution of school enrollment, as well as lower infant mortality rates and longer life span. On the other hand, poverty levels have been rising, coupled with an alarming increase in malnutrition.

We postulate that these mixed results can be explained by the dynamics of revenues and expenses policies. The ability of the country to support policies aimed at reducing poverty, hunger and illiteracy depends on its ability to raise taxes and fund social programs. On the revenues side, there has been an inordinate reliance on sales and indirect taxes, resulting in an increased burden the poor part of the population. A widening budget deficit was largely covered through increasing public debt. Servicing this debt became the largest item in government expenditure, outstripping government salaries and wages and crowding out investment resources for the private sector. These policies added to the precarious conditions of the poor people, who find less employment opportunities and have to carry the burden of high interest payments through a regressive tax system. On the expense side, the real value of the wages of public employees and pensions declined.

As Egypt moves towards a new strategy to achieve a second round of social policy objectives, namely the Sustainable Development Goals, a closer discussion concerning the social and economic policy objectives and a commensurate fiscal policy is required.

keywords: Egypt, Budget, Millennium Goals, Fiscal Policy.

1. Introduction

This research is an extension of an earlier paper by El-Sabie and Soliman on "Fiscal Policies and Equity: The Case of Arab Government's Post-revolutionary Budget". While the earlier paper focused on equity issues, this paper extends the research to the Government's social and developmental program. One improvement introduced is the use of a common yardstick to gauge the performance of the Egyptian policy makers in the area of social development and

equity, namely the UN Millennium Development Goals (MDGs) and, more specifically, in the area of poverty alleviation, health, education and social justice.

These goals, universally accepted, and largely followed by the Egyptian government since the early socialist days of the 1960's have come under severe pressure due to limited budgetary resources and changing priorities. Moreover, the commitment of the Egyptian governments to pursue these goals came under severe scrutiny as the political elite switched to a more capitalist orientation, especially under the last Prime Minister of the Mubarak regime, Dr. Ahmed Nazif, 2005-2011. During this period drastic reductions in income taxes were introduced, while the government continued an active program of privatization of state enterprises, including with the sale of a number of public sector banks and state enterprises. The state also shaved many of the social programs and reduced subsidies and public employment.

Despite a significant increase in foreign direct investments and a rapid increase in GDP growth, these positive trends were not widely shared and income distribution continued to deteriorate. Also, a large increase in government expenditure was not matched with a commensurate increase in revenue. The resulting increase in deficit was largely financed through borrowing from local banking sector. In the end, the government had to decide whether it should curtail spending on essential programs or to service its debt. A third option of raising taxes was pursued, which resulted in a wider coverage of the general sales tax, originally introduced in 1991; subsequently, an alternative 13% general value added tax was introduced under the International Monetary Fund (IMF) program in November 2016.

2. A Bumpy Ride for Budgetary Policies

Governments, especially those democratically elected, may look at their revenue raising and spending activities as part the system for setting their political priorities. Policy makers would always have to balance between the population's demand for services and their ability to keep the electorate happy as to the level of taxation which they consider to be reasonable and equitable (Schick, 2007).

In other words, the social welfare function, as viewed from the politicians' point of view, includes both the level of services offered and the level of acceptance of taxation, especially from powerful social groups. In the case of Egypt, the latter group would include, the rich and high-income classes, i.e. those who are able to save, invest, and finally support the politicians.

Since the "open door" policy of President Sadat in 1974, there has been a tacit understanding that the government will guarantee certain levels of basic goods

and services, through a combination of price subsidies or ration cards. Also, the government was the employer of last resort for many years. As budgetary pressures continued, the government had to face the uneasy choice of reducing services or raising taxes. This social contract was gradually modified or diluted as neo-liberal policies began to dominate the political scene especially, with the onset of the new millennium and the rise of the star of the heir-apparent "Gamal Mubarak", the chosen son of the President. These new policies were embodied in an accelerated privatization program, a new tax Law No. 91 (Ministry of Finance, 2005) which reduced the highest tax brackets on personal income from 30% to 20%; similarly, for company taxes the highest marginal rate was reduced from 32% to 20%. The same law forgave previous tax evaders, provided they agreed to settle part of their unpaid taxes and register with tax authorities.

Despite a marked increase in the GDP growth rate, the resultant prosperity was not felt by the majority of population. A World Bank report frankly asserted that, during 2005-2010, "Unfortunately, Egypt's economic growth was neither sustained nor inclusive, and even periods of rapid growth have not resulted in poverty reduction or improvements in shared prosperity" (World Bank, 2015). Many commentators attribute the January 2011 Revolution to rising income disparities and increased economic difficulties for the majority of the population.

The post-revolutionary policies adopted various reform slogans. All the same, the impact of these ideologies on the economic conditions of the population was mixed.

We shall discuss in this paper how the achievement of the UN agreed Millennium Development Goals was affected by the fiscal regime followed by the Egyptian government between 2000 and 2005. For the rest of this paper, we shall first present an overview of the status and performance of the State budget. Then present Egypt's success in achieving 2000-2015 MDGs. Finally, we shall relate this performance to fiscal variables.

3. Status and Performance of Egyptian Budget 2001-2016

A study of the status and performance of the Egyptian Budget for the New Millennium shows certain distinct features. These include excessive reliance on sales and indirect taxes as a main source of revenue, burgeoning deficit as ordinary revenue does not cover the budget expenses, declining share of subsidies and wages in total expenses and increased share of interest payments as national debt grows.

i. Heavy Reliance on Indirect Taxes

It is an established fact that the Egyptian budget relies mostly on indirect and sales taxes. This trend accelerated after 2011 (2013). Before the January 2011 Revolution, the fiscal authorities relied mostly on commodity taxes to respond to its expenditure pressures. K. Ikram concludes that the main purpose of the tax system in the period of 1965-2000 was to raise revenue (Ikram, 2006). He emphatically states that "considerations of incentive, efficiency and equity were less evident". He further observes that the Egyptian tax system during this period was largely regressive, as 50 to 60% of the tax revenue was coming from commodity taxes.

The author's own analysis shows that this statement held even more true in the decade preceding the January 2011 Revolution. Despite a robust increase of taxes on incomes and capital gains, the increase in commodity taxes was faster. At the end of the period, the tax on incomes and profits even declined (2013).

According to World Bank data, the share of taxes on incomes, profits and capital gains initially rose from 40.6% of total tax revenues (2005 financial year) to 51.2% (2008 FY); then, it declined to 44.9 % (FY 2011). It is to be noted that almost 80% of tax revenues reported as taxes on incomes, profits and capital gains came originally from Government and public companies. These include the Suez Canal Authority, the General Organization for Petroleum (which receives all oil revenues), public sector banks and electric energy companies (World Bank, several years).

Those revenues should be categorized as return on public property rather than taxes on profits. We also find that the tax effort in Egypt is low compared to other countries of similar per capita income, and reliance on taxes on incomes and profits is dwindling - rather than increasing - with respect to GDP growth. In sum, most of the increase in tax revenue in the new millennium was attributed to sales and indirect taxes. It goes without saying that this heavy regressive tax structure burdens the poor.

Fig.1 shows progress of total and direct taxes as percent of GDP: both continued to decline during the period 2006-2015.

Figure 1 - Income Tax and Total Tax Revenue as Percent of GDP

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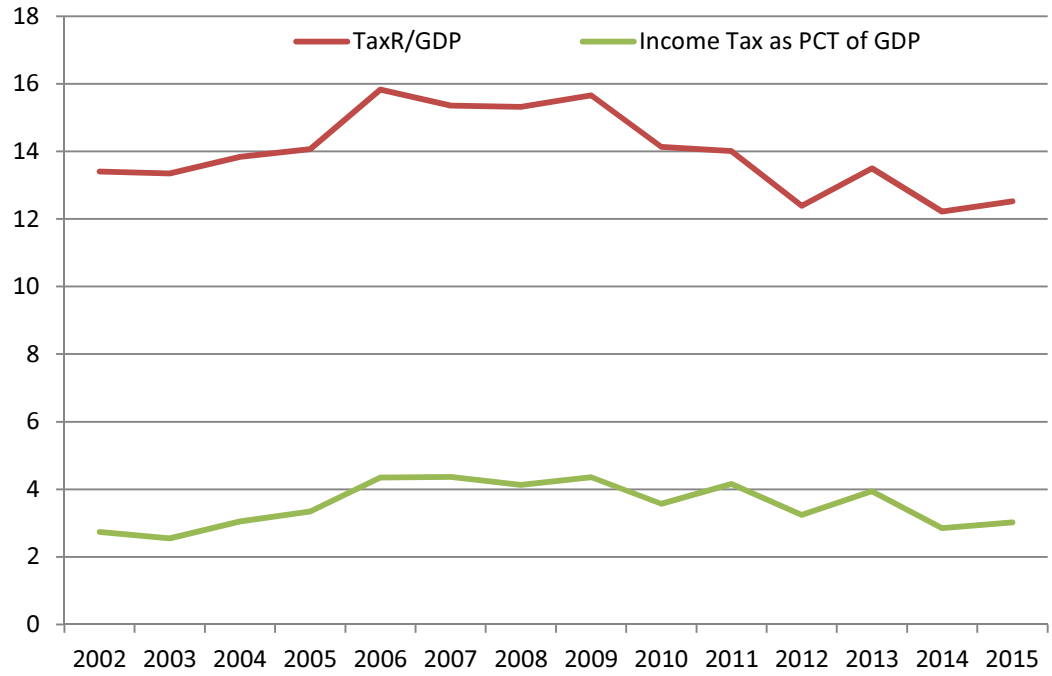


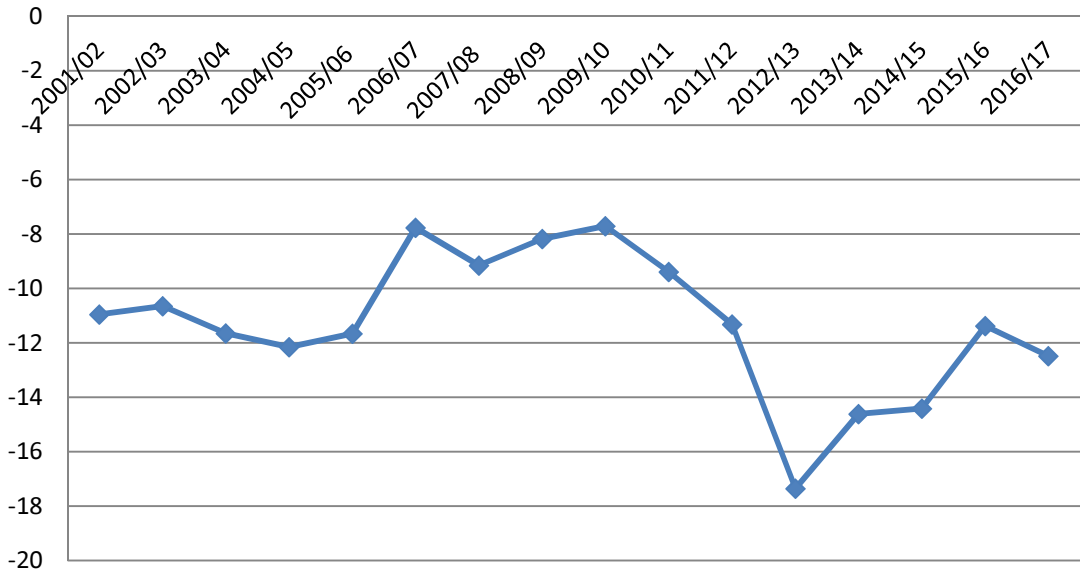
Source: Calculated by the author from WB data (World Bank, several years).

ii. Burgeoning Budget Deficit

The last years of the Presidency of Hosny Mubarak have seen a large increase in budget deficit. This trend increased greatly in the years following the January 2011 Revolution.

As Fig. 2 shows, the cash deficit of the budget reached a record 17% of GDP in FY 2013/14.

Figure 2 - Budget Cash Deficit as Percent of GDP, 2001-2016

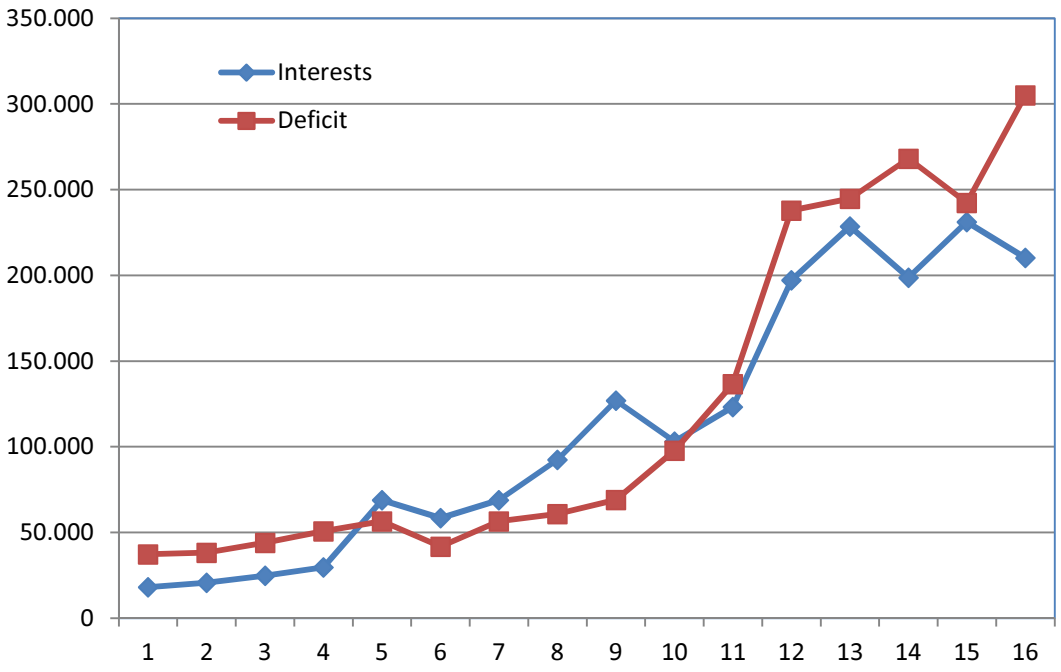


Source: Calculated by the author from Ministry of Finance (MOF) and World Bank data, several years.

iii. The Illusive Search for a Balanced Budget

Whether a government spends more because it is able to raise revenue or, on the contrary, it raises revenues in order to spend more, has always the dilemma. Not surprisingly, in a study about Egypt and Jordan the authors conclude that "empirical findings for Egypt indicate a unidirectional causation from revenue to spending, with higher revenue leading to higher spending (AbuAl-Foul & Baghestani, 2004). In fact, the relationship between revenue and spending was never ambiguous. It seemed that the fiscal authorities in Egypt followed a policy definable as "spend first, and raise revenue or debt later". A similar result is reached for Pakistan (Jamshaid, Iqbal, & Siddiqi, 2010).

Figure 3 - Interest Expense and Total Budget Deficit, 2001-16



Source: World Bank, several years.

Khalid Ikram (2006) had an interesting analogy. He proposed that expenditure was growing according to a geometric progression, while revenue was increasing only at a mathematical progression. He concluded that Egyptian authorities would spend first and then try to raise revenues or resources to cover these expenses. He estimates that budget deficit during 1981-1990 averaged 18% of GDP (Ikram, 2006, p. 65). Thanks to the Economic Reform and Structural Adjustment Program (ERSAP) concluded with the IMF in 1991, a drastic decline in expenditures, coupled with an increase in revenue, resulted in an overall decline in budget deficit, from 15.3% in 1991 to 0.9% in 1997. A change in the Government[1] in November 1999 brought back a period of reckless spending and renewed deficits. The deficit situation improved slightly in 2005-2010 but began to rise again after the January revolution of 2011. The last two budgets prepared after the conclusion of the IMF Standby Agreement of November 2016 estimated a large increase in revenues and a reduced deficit.

[1] Most of the hard ERSAP decisions were taken by the Cabinet of Dr. Atef Sedky (1987-95). The following cabinet of Dr. Kamal El-Ganzouri (Jan. 1996- Nov. 1999) pushed further in administrative and financial reform. Also, the privatization program was launched in earnest.

4. Status of Achievement of MDGs

The UN MDGs are the primary responsibilities of national governments with assistance from the global community. They can be grouped into 7 original goals, as follows (UN MDG Gap Task Force, 2015):

Goal 1: Eradicate extreme poverty and hunger

Goal 2: Achieve universal primary education

Goal 3: Promote gender equality and empower women

Goal 4: Reduce child mortality

Goal 5: Improve maternal health

Goal 6: Combat HIV/AIDS, malaria and other diseases

Goal 7: Ensure environmental sustainability.

An 8th goal was added regarding international cooperation and assistance, namely to "develop a global partnership for development." There was a lot of optimism about the possibility of achieving these MDGs in Egypt.

In a El-Saharty et al. study prepared by the World Bank (El-Saharty, Richardson, & Chase, 2005), Egypt was considered to be in a good position (in 2005) to achieve most of the MDGs. This study also states that Egypt's national priorities were in line with the MDGs, so the realization of these goals seemed to be feasible. It is our purpose in this paper to see if this was truly the case. We shall discuss how Egypt was successful in attaining three main MDGs, namely Poverty Reduction, Elimination of Hunger, and Education Attainment in detail.

i. Goal 1: Reduce Extreme Poverty

Although this MDG requires an action to reduce poverty rates by the end of 2015 to half the rate it was during the base year 1990/1991, the proportion of poor people, as measured by the national poverty line[2] (estimated at US $ 1.90), has been rising since 2004/05. The proportion of poor people rose from 19.6% in 2004/05 to 21.6% in 2008/09. This rise can be attributed to the economic, financial and food crises, and their economic, social and political impacts,

[2] The Egyptian poverty level was estimated, in 2015, at LE 482 per month. This is equivalent to US 1.90 per day at the then prevailing exchange rate. (28 percent of Egyptian population lives below poverty line: CAPMAS, 2016)

witnessed by the end of this period. Due to the events of the January 2011 Revolution, the poverty rate jumped to 25.2% in 2010/11 and then to 26.3% in 2012/13, with an increase of 22% in the poverty rate compared to 2008/09.

In 2015, the share of poor people was more than twice the rate targeted by the end of 2015, at approximately 27.78% (given that the poverty rate in the base year 1990/91 was 12.1%). This means that about 23.5 million people were unable to meet their basic food and non-food needs. It is even more worth noting that the poverty level was higher in rural areas and especially in Upper Egypt. On average, poverty ratios in rural governorates more than doubled the level reached in urban governorates.

The following table shows the development of poverty and nutrition indicators.

Table 1 - Development of Selected Poverty and Nutrition Indicators, 2000-2015

KPI/Year	2000	2004/05	2008/09	2010/11	20012/13	2015
Poverty rate (national)	16.74	19.56	21.56	25.20	26.29	27.78
Poverty rate (urban)	9.21	26.84	10.98	15.30	17.59	16.70
Poverty rate (rural)	22.07	10.06	28.94	32.30	32.38	36.13
Caloric deficiency	--	--	20.35	17.70	12.98	16.33

Source: Data prepared and kindly supplied by Prof. Heba El-Laithy, based on data from CAPMAS, Household Income, Expenditure and Consumption Survey (HIECS), various years. Cf. also Breisinger, Clemens et al., 2013, Tackling Egypt's Rising Food Insecurity in a Time of Transition, IFPRI, Policy Note, Washington, D.C.

National data clearly show that there has been a continuous increase in the proportion of people falling below the poverty line. In addition to the failure to achieve the poverty alleviation goal, there was big disparity in the level of extreme poverty in various governorates, with rates of poverty at twice the national average in Upper Egypt.

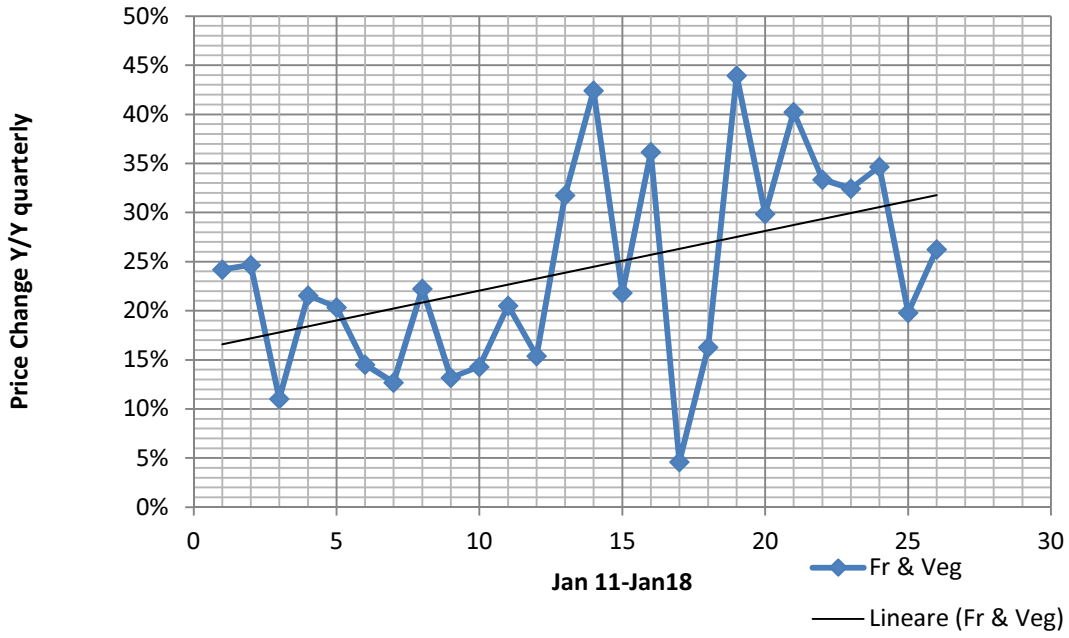
A UNDP report ventured to assess the reasons for Egypt's failure to achieve significant reduction in poverty (UNDP, 2015) . It attributed the main reasons to fluctuating rates of growth, declining investment and saving ratio, and declining public investment to gross development investment (GDI). During the period from 2000/01 to 2007/08, the share of public investment in total development investment fell from 49.4% to about 35.3%. Though it rose to about 51.6% during the global crisis year of 2008/09, after the State had started to inject investment packages to stimulate and support the Egyptian economy, it soon fell

to 33% (its lowest level) in 2011/12, then it rebounded again as of 2012/13, until it reached 37% during 2014/15. It was planned to reach 43.2% during 2015/16. This crucial contributor to poverty reduction was also unevenly distributed among various regions, with particular bias for urban and lower Egypt governorates.

The proportion of poor people is likely to have continued to rise in 2016-2018, due to the devaluation of the Egyptian Pound (EGP) by more than 60% and the subsequent rise in the price of food, fuel, transport and basic services.

Of particular note is the galloping inflation in the price of food items, especially fruits and vegetables. Although Egypt is almost self-sufficient in fruits and vegetables, it was surprising to see the rapid inflation in the price of these domestic products in response to devaluation of the Egyptian Pound in November 2016. The explanation lies in the fact that these products are affected by the increase in the cost of fuel, fertilizers, pesticides and other agriculture inputs. These in turn are directly affected by the removal of fuel subsidies, and export prices for petrochemicals and fertilizers. The following chart shows the year-on-year rise in the price of fruits and vegetables (an important component of Egyptian diet) during the period January 2011-January 2018 (quarterly figures). In recent years, the annual increase in Fruits and Vegetables Price Index reached 45%.

Figure 4 - Annual Inflation in Fruits and Vegetables
Quarterly Data (Jan. 2011-Jan. 2018)



Source: Prepared by the author from the Central Bank of Egypt, based on CAPMAS data.

The UNDP (2015) report indicates that another reason for failure to achieve these MDG's was the continued increase in unemployment rates, especially youth unemployment, which in 2013/14 had reached 39%. Other reasons for continued poverty are the low education levels, poor health and high population growth rates.

We believe that the explanation of most of the increase in poverty in Egypt is related to the dynamics of the State budget. These include the uneven distribution of tax burdens, the reduction in real government wages, and the quick withdrawal of the government from the area of public employment. Finally, the reduction of subsidies has meant, in effect, that poor people become more vulnerable to price increases and actual hunger.

Let us start by looking at wages. According to official statistics, and due to extreme popular pressure in the aftermath of the January 2011 Revolution, government wage bill increased from EGP 85,369 million in FY 2011 to EGP 225,513 million in FY 2016, i.e. a 164% growth. In the meantime, the general Consumer's Price Index (CPI) increased by only 93.1%, so in effect this would translate into an improvement in the standard of living of government workers. We shall not talk about possible maldistribution of government salaries, where certain groups and high officials were able to gain substantially higher salaries and retirement pensions than the rest. Even if the increase in wages was uniform, many would argue that the general CPI may not be the best measure of purchasing power. As government employees tend to have lower wages than the average, a higher percentage of that income goes to food and essential items. A more suitable price index would be the fruits and vegetables (F&V) price index published by the Central Bank of Egypt. This F&V has seen leaps and bounds since the January 2011 Revolution. According to CBE data the F&V Index increased by 219% in the six years following the revolution.

Using this index, we find that real government wages declined by 17.5%. Another item in the budget that affects the public is that of “subsidies”. This item may reflect real outlay by the government to reduce the cost of bread, oils and fuel distributed through ration cards or to special deserving group. The total amount of subsidies increased by 168.7% from EGP 102,974 million. Once again, if we applied the F&V Price Index, subsidies would have declined by 15.8% over the six post-revolutionary periods.

Form the above, we conclude that government is using inflation as a way to redistribute tax burden. The losing party is comprised of fixed income earners, government employees and pensioners.

ii. Goal 2: Elimination of Hunger

As mentioned above, one of the MDGs is the improvement of the nutritional status of the population and the reduction of hunger. Here again, Egypt failed to make much inroads in this area.

As the World Bank observes, "Income poverty is strongly linked to incidence of food insecurity and malnutrition in Egypt, where 15.9% of the population were found to have poor access to food" (World Bank, 2015). Poverty and food insecurity in Egypt have risen significantly over the three years following the January Revolution. The World Food Program (WFP) (The Status of Poverty and Food Security in Egypt: Analysis and Policy Recommendations, based on analysis of the CAPMAS 2011 Household Income and Expenditure and Consumption Survey [HIECS], 2013), estimated that 13.7 million Egyptians, or 17% of the population, suffered from food insecurity in 2011, compared to 14% in 2009. Available data shows some improvement in subsequent years, but the degree of children malnutrition continues to be high.

Another in-depth study of the Egyptian nutrition status asserts that the high "stunting rates" for children below 5 years of age "are usually seen only in developing countries with much lower national income levels than Egypt's" (Ecker, Al-Riffai, Breisinger, & El-Batrawy, 2016). Findings show that the poorest families spend more than half of their average households on food and often buy less expensive, less nutritious food.

The economic cost of malnutrition is substantial. According to the WFP (World Food Program, 2018), it is estimated that the economic and social cost of child undernutrition in Egypt in 2009 was EGP 20.3 billion and, in the absence of measures to combat it, this cost is expected to increase to EGP 26.8 billion by 2025. In addition to income poverty, low levels of nutrition awareness and unhealthy eating habits contribute to malnutrition among poor and vulnerable households.

According to a previous study by the WFP (World Food Program, 2013), malnutrition rose in 2011, with a stunting rate of 31% in children under five years of age, up from 23% in 2005[3]. The same report indicated that "in nine governorates across all regions in 2011, just over half of children under five were estimated to suffer from anemia, classified as a 'severe public health problem' by

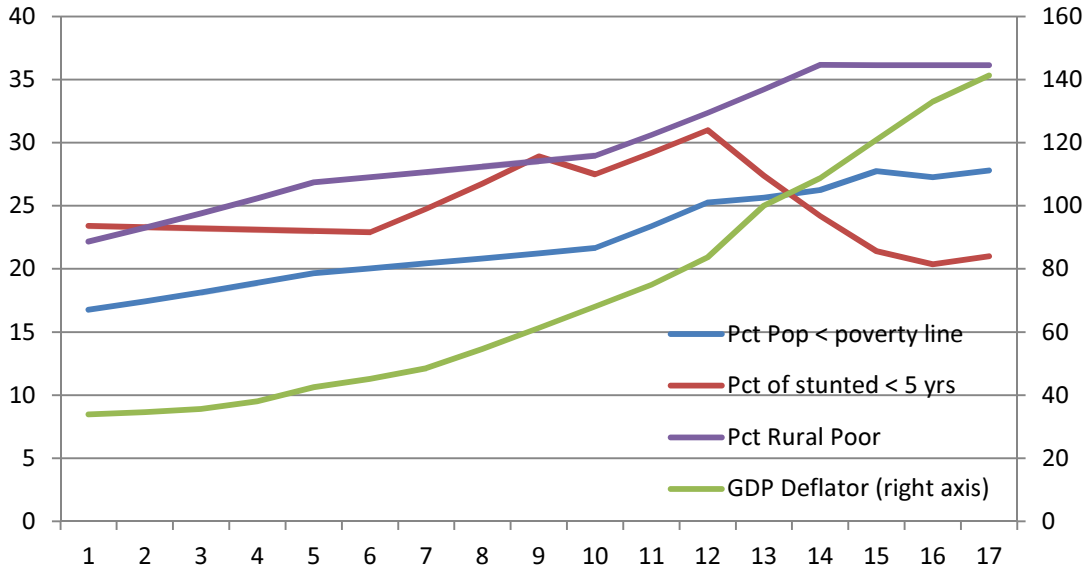
[3]Stunting reflects chronic malnutrition; it is irreversible and stops children from reaching their full physical and mental potential. The stunting rate is the percentage of children under five whose height relative to age is below minus 2 standard deviations (for moderate and severe stunting) and minus 3 standard deviations (for severe stunting) from the median height for age as per the WHO Child Growth Standards 2006.

the World Health Organization."

We have alluded above to the relationship between rising inflation and increased poverty. The following Figure 5 relates the percentage of population below poverty line to inflation, as adjusted by GDP deflator (World Bank, several years).

In this graph, we find an interesting relationship, as it shows how increased poverty goes hand in hand with inflation (as adjusted by GDP deflator). This is almost intuitive, as poverty is measured by the ability to purchase a certain basket of goods and services. As prices go up faster than income levels, the percent of people who cannot afford to buy such basket increases. If we add to this graph the percent of "Rural Poor", which is much higher than the national average, we can easily see that this ratio moves in tandem with inflation, as adjusted by GDP deflator. The same figure shows that the stunting rates began to decline after 2011. This is a welcomed change, but it is difficult to reconcile it with increased poverty levels in years following 2011.

Figure 5 - Relationship between Poverty Indicators, Child Stunting and Inflation. (2001-2017)



Sources: data are computed from sources of Fig. 1, (World Food Program, 2013), and (World Bank, several years). Data for stunting is available from CAPMAS' "HIECS" survey years: 2001, 2007, 2011and 2015. Other years were interpolated or extrapolated by the author.

There are several explanations for this contrary trend. One is that the new governments after the January 2011 Revolution increased food subsidies or direct food and child milk grants to lactating mothers. Another explanation is of a long-term nature, as the spike in stunting children of 2011 was a direct result of the Bird Flu epidemic of 2008 and the subsequent culling of the national stock of chicken. This crisis was responsible for an inordinate increase in chicken and meat prices, which could have caused child undernourishment with a time lag. As chicken supplies were replenished, the nutritional situation improved. Finally, there is an important trend towards charitable donations of food under various initiatives. One of these is the Food Bank Campaign, which started before 2011 and was responsible for distributing substantial sums in food aid.

What is alarming about the Egyptian case is that it seems that Egypt was moving in the wrong direction regarding global trends in three main MDG areas, namely poverty reduction, income distribution and quality of education. In most countries, according to the UNDP Human Development Report (UNDP, 2016), there has been significant decline in the prevalence of extreme poverty during the millennium years. Globally, the percentage of population living below the extreme poverty rate ($1.90 a day) is "estimated to have declined to less than 11% in 2013, a drop of more than two-thirds from its level of 35% in 1990. This achievement was particularly remarkable in East Asia and the Pacific, where the proportion of people living on less than $1.90 a day fell from 60.2% in 1990 to 3.5% in 2013, and in South Asia, where the proportion fell from 44.6% to 15%". By contrast, in Egypt the trend showed the opposite direction, especially in the new millennium. In a WFP study (World Food Program, 2013), the percentage of poor population (i.e. those who could not meet food and non-food basic needs) increased from 16.7% to 25.2% between 1996 and 2011. This meant that the number of poor increased from 9.9 million to 20.1 million during those 15 years. The trend continued in 2014/15.

One potential reason for the increase in the number of poor people is the growth of prices of essential food items. A significant percentage of poor families depended on subsidized food items to ward off hunger. According to the previously mentioned WFP study, about one third of the caloric intake of poor families came from subsidized food. As the government moves, after the advice of the IMF, to reduce subsidies, the percentage of poor people is expected to rise.

Accordingly, any reduction in food subsidies due to budgetary pressures (and hence not compensated by monetary transfers) would affect the nutrition and health status of the population at large.

Another factor that led to increased poverty rates was the observed continuous erosion in real wages as a result of the liberalization of the economy and the move towards a more market oriented economy (Assaad, 2002). Also, according

to Said (2002), "Between 1988 and 1998, wages have significantly declined in real terms…for almost all sectors" (Said, 2002). This trend towards lower real wages continued after the January 2011 Revolution (2013).

In sum, higher inflation rates and reduced employment opportunities have all led to increased poverty. Other analysts have found evidence that the IMF-sponsored Structural Adjustment Programs (SAP) led to increased poverty and increased unequal distribution of income. Most of these results can be explained by SAP-related inflation (Oberdabernig, 2017). From all of the aforementioned we have a clear picture about the status of MDGs in Egypt. On the one hand, there has been an unquestionable improvement in the economic welfare of the country as a whole as GDP continued to rise over the last 20 years, albeit at different rates. On the other hand, it does not seem that this growth has reached all segments of society.

In our case, this clearer reliance on debt has even more serious ramifications on equity. Rich people benefit from deficit financing in two ways. The first is the increase in government expenditure on goods and services normally consumed by the wealthier class that benefits more frequently from the new roads and infrastructure projects, especially in new suburban settlements and beach destinations. They also benefit of the majority (up to 80%) of fuel and energy subsidies. On the other hand, interest payments end up in the pockets of rich savers.

iii. Goal 3: Millennium Education Goals

The MDGs are also concerned with enrollment in primary education and improving literacy. Egypt has a good record in this level of education, but enrollment is not an exhaustive indicator. The right question is whether students are learning enough during their hours at these schools. Many studies noted that a rapid expansion in school enrollment was associated with a decline in the quality of education. El-Sabie and Soliman (2013) observed that "Stressing a policy of equal opportunity for all in a country with limited resources meant the primacy of quantitative considerations at the expense of quality. In Egypt, progress made in higher enrollments was offset by the declining quality of education in general."

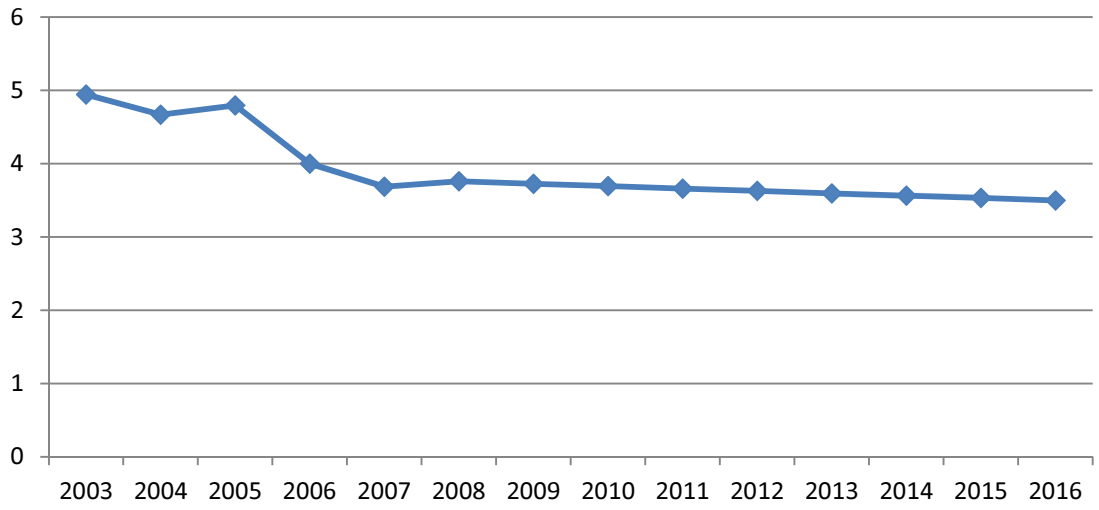
Official data show significant improvement in primary school enrollment between 2000 and 2015: this indicator has increased from 88.5% to 97.7% for males and from 84.0% to 98.0% for females, showing that plurality and gender equality have been almost achieved (World Bank metadata).

In effect, we note two contradictory trends: one that claims an increase in school enrollment and the other that indicates a decline in educational status. A report by Sywelem (Sywelem, 2015) indicates that illiteracy rates are still very high in Egypt, despite some improvement in younger generations. Illiteracy rate reached 56.5% for the age group over 60 years, while it was only 15.6% for the group 10-15 years. The report also quotes a recent and comprehensive (2010) Survey of Young People in Egypt (SYPE), which estimates that one third of those in the poorest households have never been to school and another 24% of them dropped out before finishing basic education. Failure to attend schools has its consequences, as illiterate people earn between 30% and 42% less.

There is strong evidence that access to quality education is not the same for various income classes or geographical regions. According to the World Development Report titled Learning, discrepancies in learning outcomes could be an indirect and invisible way of discrimination (World Bank, 2018, p. 16). The report also emphasizes that schooling does not necessarily mean "learning" (World Bank, 2018, p. 4).

While poor people fail to attend public schools, there has been a parallel trend for well-off families to rely on private lessons and private education. This trend coincided with less public spending on education as is depicted in the following graph.

Figure 6 - Percentage Public Spending on Education relative to GDP (2003-2016)



Source: World Bank, metadata for Egypt.

Access to "elite" faculties of higher education is highly related to income levels.

As an indication of lack of equal access, percent of students who belong to poorer families in primary education are estimated at 25% of all students. The percent goes down to 4% in higher and university education (El-Araby, 2010).

The same study indicates a continuous decline in government spending on education from 17% of total expenditure in 1999/2000 to 12% in 2007/08. A similar trend applies to the percentage of education expenditure to GDP, which declined from 5.8% to 3.7% for the same period.

Given this decline in spending on education, it is not surprising that Egypt occupies a low position in terms of quality of primary education. According to the Global Competitiveness Report, Egypt occupies the 134th place in terms of quality of primary education out of 138 countries, while it enjoys a more advanced rank, i.e. 29th, in terms of primary enrollment (World Economic Forum, 2016).

Equally disturbing is the rank achieved by Egyptian students in internationally supervised competitions in math and sciences (US Department of Education, 2015). According to this report, the percentage of Egyptian secondary school students who reach a "High" score was only 5%, compared to 8% in Lebanon and 81% in Singapore.

It goes without saying that efforts to improve the outcome of education and equal access to all income groups requires a substantial increase in the total spending on education, as well as increased efficiency and delivery of education services. According to El-Araby, education in Egypt accounted for only 12% of total budget expenses in 2007/08 (El-Araby, 2010), i.e. almost half the ratio accounted for by Morocco and Tunisia, two countries that were able to achieve great strides in educational attainments.

5. Summary and Conclusions

So far, Egypt has not been able to realize most of its accepted Millennium Development Goals due to the difficult situation of the state budget. Rising demands on the public expenditure and insufficient public revenue led to reduced expenditure on social services. In the meantime, conscious policy aimed at reducing government employment and real public wages increased unemployment and poverty in the society. Efforts to increase public revenues and reduce subsidies led to rising cost of government services and fees. In

addition, reliance on public borrowing to cover budget deficit led to higher inflation and additional burdens on poor people. The outcome was an increase in poverty, as measured by the percentage of population below poverty line. The percentage of people suffering from undernutrition also increased.

International comparative studies should have warned us about these outcomes. Structural adjustments programs usually mean more sacrifices and eventually increased poverty levels (Oberdabernig, 2017). The Egyptian case is of particular interest, as the percentage of people below the poverty line has been increasing for the last 15 years at least. Promises of improved living standards after reform programs seemed to have been even more elusive. This dismal result is a strong condemnation caused by decades of failed neo-liberal economic policies.

In essence, we can simply conclude that Egyptian commitment to MDGs can only be assessed in terms of the overall budget situation and other political priorities, such as its readiness to tax the rich segment of the population, the ease of tax collection, level of corruption and other limitations. In addition, the poverty alleviation objective requires conscious and direct policy measures for income redistribution, enhancement of employment opportunities and food subsidies.

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The state of the determinants of international migration in Cameroon

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Abstract

This paper Pierre Kamdem analyses the determinants of international migrations in Cameroon, by exploring Cameroon's position with regard to one of the major areas of concern, specifically from the perspective of a country of departure, focusing on the major factors at work.
The paper is based on a synthetic presentation of the context of Cameroon that highlights the differentiated effects of labor markets on the push and pull factors of migration, also revisiting the effect of structural transformations, environmental impacts and other policies as migration factors. Finally, the article will consider the prospects that emerge in terms of the dynamic change of migration factors in the future in Cameroon, as well as the major recommendations applicable for optimizing the quality of migratory departures, in order to further enhance the impact of migration on the development of the country.

keywords: Cameroon, Migration, Determinants, Job Market, Urbanization.

1. Introduction

Along with Congo, Gabon, Equatorial Guinea, Central Africa Republic, Chad and Sao Tome and Principe, Cameroon is one of the seven countries that constitute the migration system of the Central Africa sub-region, showing two specific modes of operation. A first mode mainly influenced by continentality, and a second affected by the coastline. In this context, Cameroon displays a certain number of peculiarities. It is the only country sharing a land border with all the states of the sub-region (except Sao Tome and Principe); therefore, it is crossed by all the influences affecting the sub-region in terms of migration. In addition, one of the additional arguments is that of the demographic weight of Cameroon, which gathers more than 45% of the population in the sub-region, thus weighing quite strongly on the whole of the sub-regional migration system.

From this point of view, and in view of its character as a country of departure, transit and host in migration, it becomes an interesting case to question two aspects. First, the theories and models proposed in international migration literature; second, and above all, the concerns of the High Level Group on Migration with regard to Africa, both from the point of view of its attachment to

global objectives and values and that of the mobilization of migration for development in a context of international cooperation.

In this sense, this paper plans to explore Cameroon's position with regard to one of the major areas of concern, specifically from the perspective of a country of departure, focusing on the major factors at work.

The paper is based on a synthetic presentation of the context of Cameroon that highlights the differentiated effects of labor markets on the push and pull factors of migration, also revisiting the effect of structural transformations, environmental impacts and other policies as migration factors. Finally, the article will consider the prospects that emerge in terms of the dynamic change of migration factors in the future in Cameroon, as well as the major recommendations applicable for optimizing the quality of migratory departures, in order to further enhance the impact of migration on the development of the country.

2. The situation of migratory departures in Cameroon: a continuous growth of migration

Located at the crossroads of all the countries of the Central Africa sub-region, Cameroon also offers a connection with the western part of Africa, thanks to its long border with Nigeria, the largest country in that region, which has a considerable impact on migration issues in that area. This sub-regional centrality reinforces the elements resulting from a long migratory practice, marked by a rather atypical colonial past with strong repercussions on the migratory profile of the country in general, and more particularly with regard to the "tropisms" of departures. With a stock of emigrants estimated at 2.7% of its total population in 2015, the Central Africa sub-region is confronted with the contemporary phenomenon of international migration, following the adoption of the 1956 Framework Law, establishing the breakup of French Equatorial Africa (AEF) under the impetus of Gaston Defferre, then Government Minister of Overseas France, led by the Prime Minister Guy Mollet. This area, consolidated since 1910, suddenly fragmented, generating four unequal and autonomous territories, which subsequently achieved their respective independence, that is tantamount to sovereignty marked by new borders, defined on the basis of economic and strategic considerations. This fragmentation gradually led through specific (geostrategic) segregation to the establishment of two distinct migratory sub-systems.

Cameroon offers a migratory specificity marked by its ability to connect the two sub-systems of the sub-region. Its main characteristics revolve around its geographical position, that offers an advantageous interface and is the prominent

factor relating to its status as the main demographic load of the sub-region, of which it shelters more than 45% of the total population. Its main reference elements consist as much in the combination of all the characteristics of the two sub-systems (grip of continentality in its northern part and influence of the coastline in its southern part), as its relative political stability since its independence, obtained in 1960.

These general characteristics underline some migratory peculiarities which are summarized in the following main points:

- Strong migratory dispersion: presence of Cameroonians on the five continents, with a strong concentration in Europe, where their presence is recorded in all the countries of this continent.

- Strong anchoring in migration to extra-African destinations: creation of diasporic movements in the main areas of destination, association movements, etc.

- Migration and multifaceted cooperation: an intense dynamic in the process of decentralized cooperation (Kamdem, 2015) - Programme de la Route des Chefferies (Kamdem, 2018)

This process is based on a few specific explanations. While the territorial framework during the colonial period was based on a principle of direct and legitimate command of the colonizing power throughout the French-speaking space in Africa, Cameroon was among the countries enjoying a special status: League of Nations trusteeship mandate based on the Treaty of Versailles (1920). One of the consequences of this special status was the establishment of a migration system based mainly on issues of training and studies. After independence in 1960, the country benefited from the effects of global growth, boosted by the Thirty Glorious Years, to outline an internal transformation placed under the constraints of the Cold War and the establishment of the Cameroonian diasporic migratory base, crossed by protest movements.

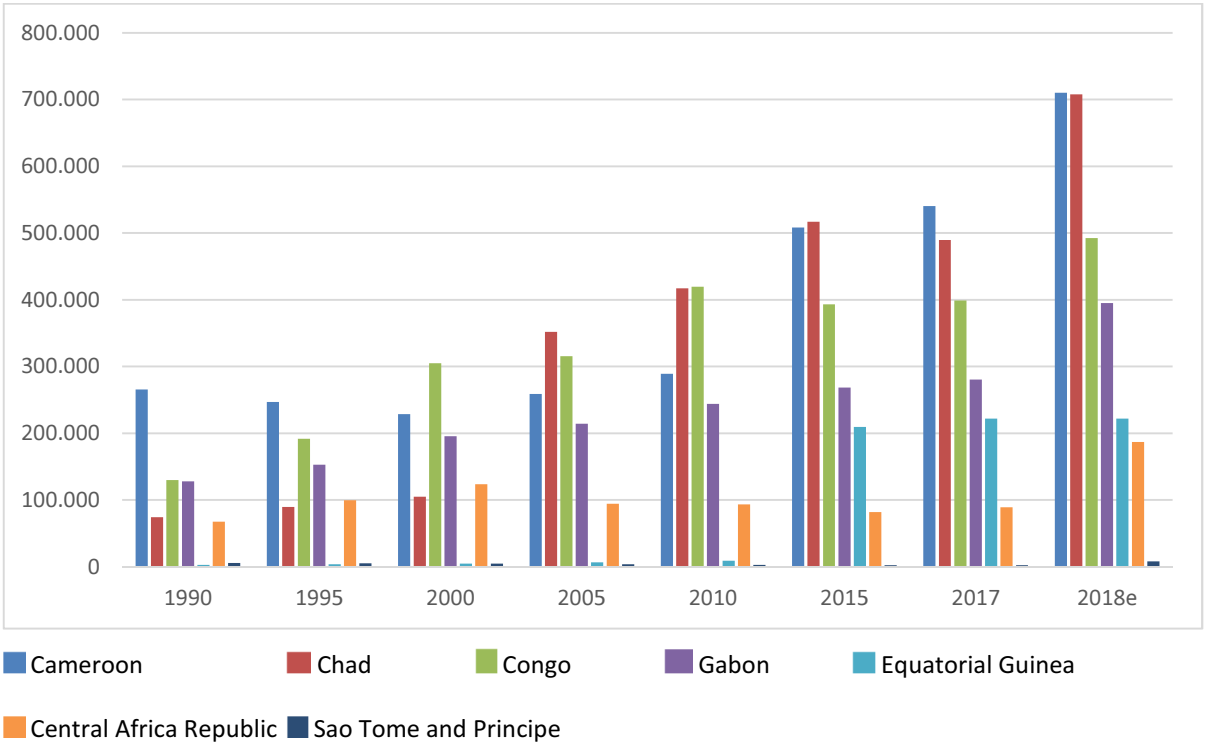
This internal transformation primarily takes into account educational and social issues, in a context of political blockage as an extension of the colonial system, with the specific effect on migration: the progressive “endogenization” of the entire educational path (creation of the University of Yaoundé in 1962, and numerous vocational training schools), the closing of borders (restrictive nationality code in 1968) and the reinforcement of control measures on the movement of people (double visa - for exit and entry - required for any border crossing by a Cameroonian citizen).

In the same vein, efforts to improve health and food conditions have taken place, contributing to demographic change and fueling the massive rural exodus, a precursor to the dynamism of international migration already timidly underway. This dynamism took shape in the early 1990s, thanks to an international thaw

context marked by the fall of the Berlin Wall.

International migration then took a specific turn, in Cameroon as well as in the sub-region in general, entering a phase of continuous expansion until then. The country has established itself over time as a veritable migrant-receiving sub-regional area (Figure 1).

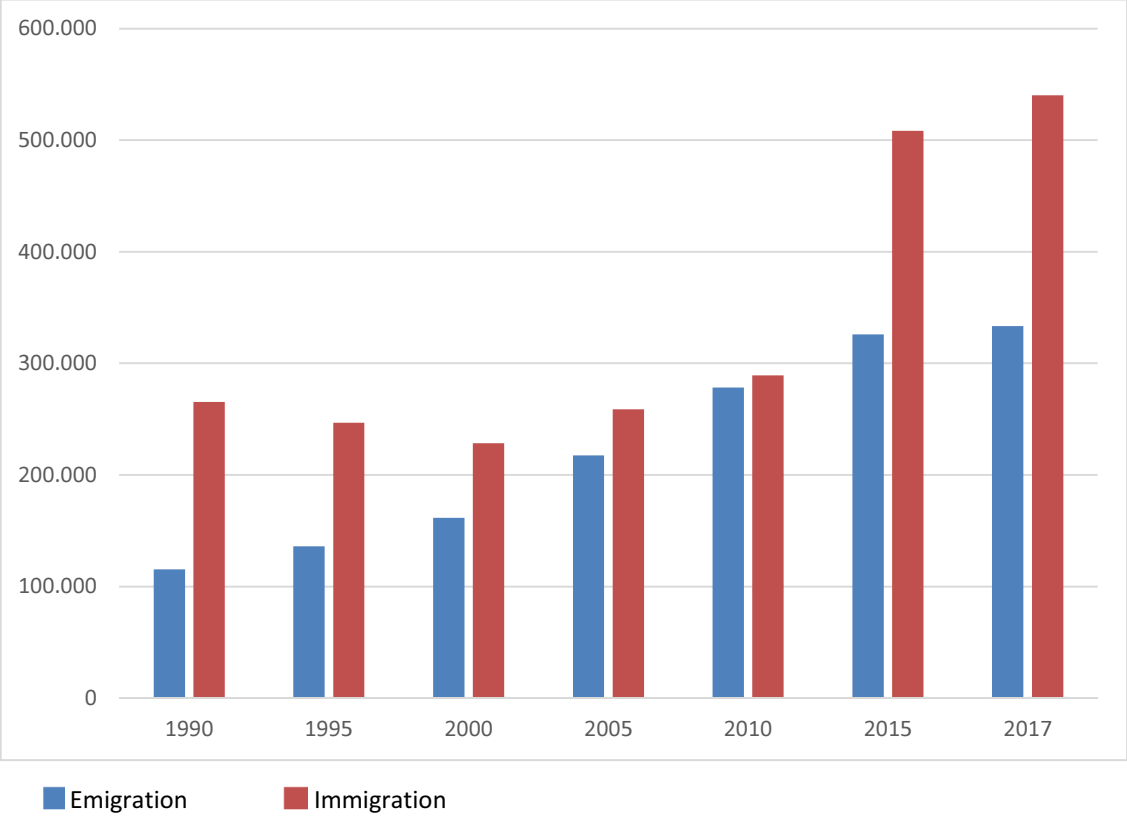
Figure 1 - Evolution of migrant stocks by country in the Central Africa sub-region from 1990 to 2018



Sources: P. Kamdem, 2018. Data from United Nations (2017) Trends in International Migrant Stock: The 2017 revision, United Nations database, (POP/DB/MIG/Stock/Rev.2017). 2018e: The World Bank estimates.

This phenomenon mainly concerns African populations, with a strong presence of sub-regional nationals from countries crossed by multifaceted crises (Central African Republic and Chad), but also from West Africa composed among others of Nigerians, Malians and Senegalese. The migratory dynamics observed at the arrival is also recorded from Cameroon during this take off phase of Cameroonian emigration (Figure 2).

Figure 2: Migration and immigration in Cameroun from 1990 to 2017

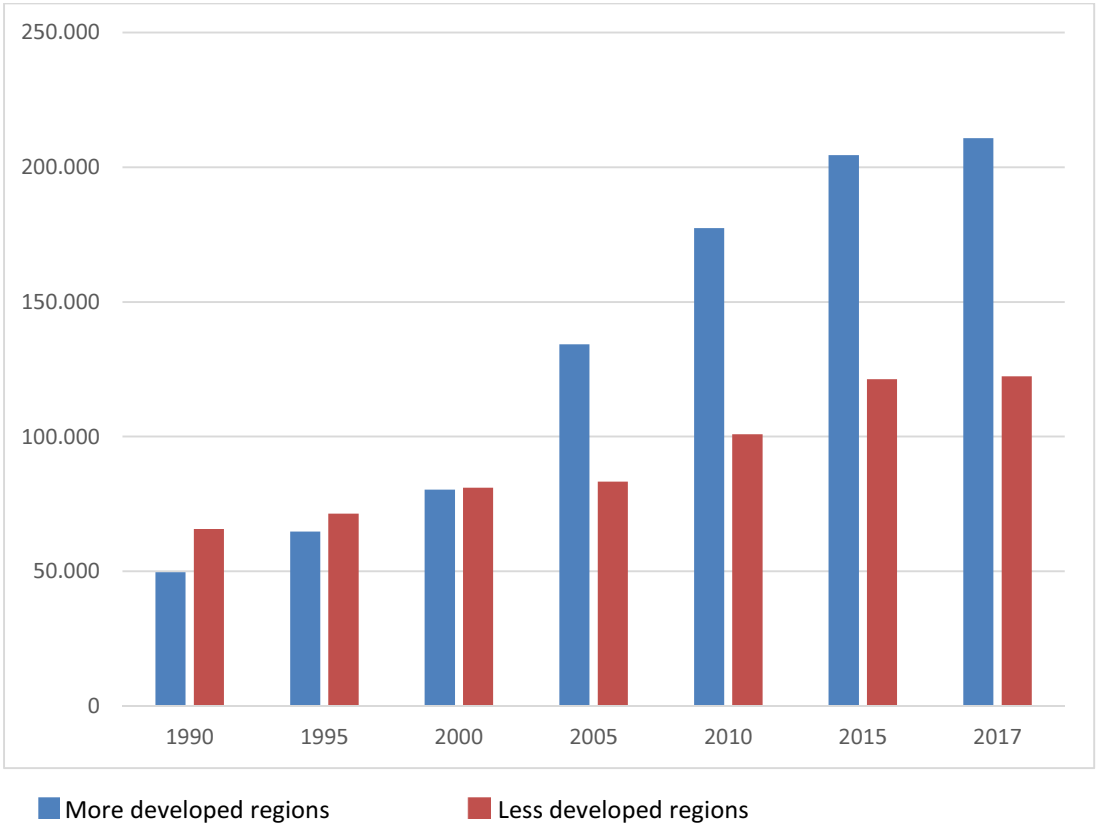


Source: based on United Nations (2017) Trends in International Migrant Stock: The 2017 revision (United Nations database, POP/DB/MIG/Stock/Rev.2017

Continuous departures from the country then experienced an intense dynamism, which is not sufficiently and easily found in the available data: many procedures, such as naturalization in the host country (Kamdem, 2015) or changes in status in connection with the thorny issue of the irregularity, both at the stay and at the entry stage, remain without indication (Kamdem, 2007; De Haas, 207, 2010).

In this sense, Cameroon is part of a counter-model of the African migratory system, with a progressive preference of its nationals to migrate outside the continent. While only 43% of them settled in the most developed regions in 1990, their workforce continuously increased to more than 63%, or almost two out of three Cameroonian migrants.

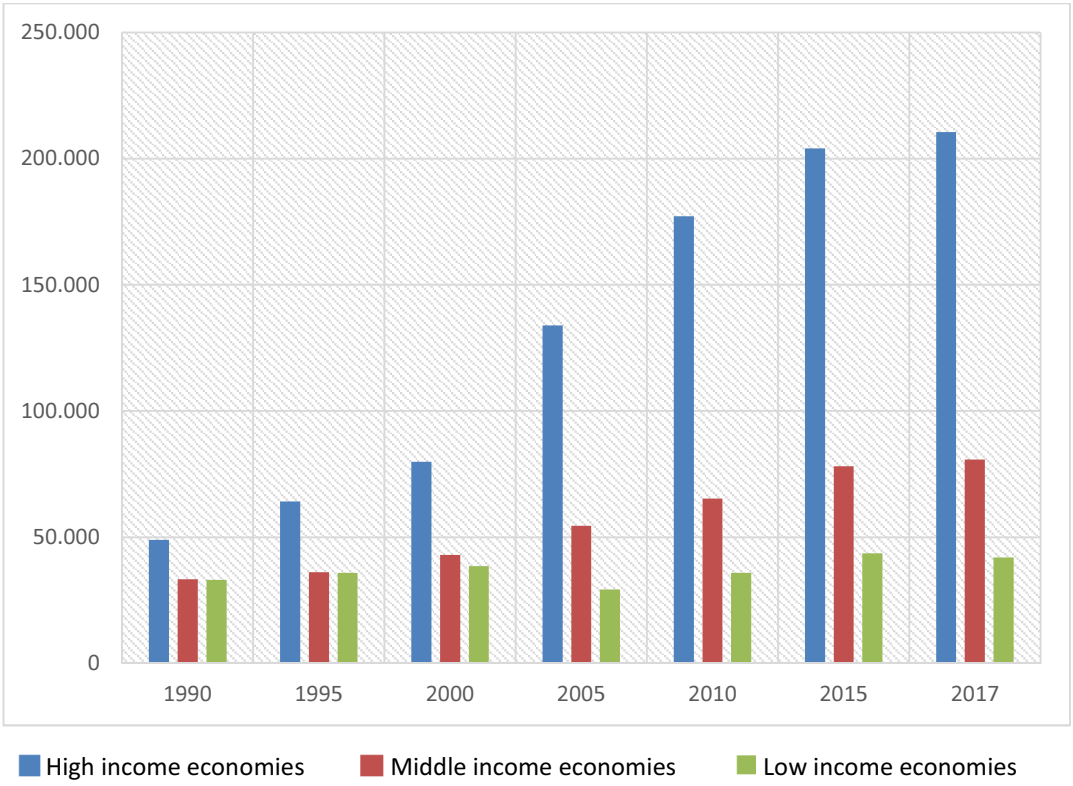
Figure 3 - Cameroonians in the world, by region, according to the level of development from 1990 to 2017



Source: based on United Nations (2017) Trends in International Migrant Stock: The 2017 revision (United Nations database, POP/DB/MIG/Stock/Rev.2017

The OECD countries are their main destinations with, in order of importance, France, the USA, Germany, Italy, the United Kingdom, Canada, Belgium, Switzerland and Spain. We should not underestimate the importance of Cameroonians who migrated in search of specific training structures, despite the "endogenization" efforts above mentioned. This observation is also highlighted by the income level criteria, as Cameroonian migrants showed a stronger propensity to move to countries with very high income levels than other migrants from the Central African sub-region.

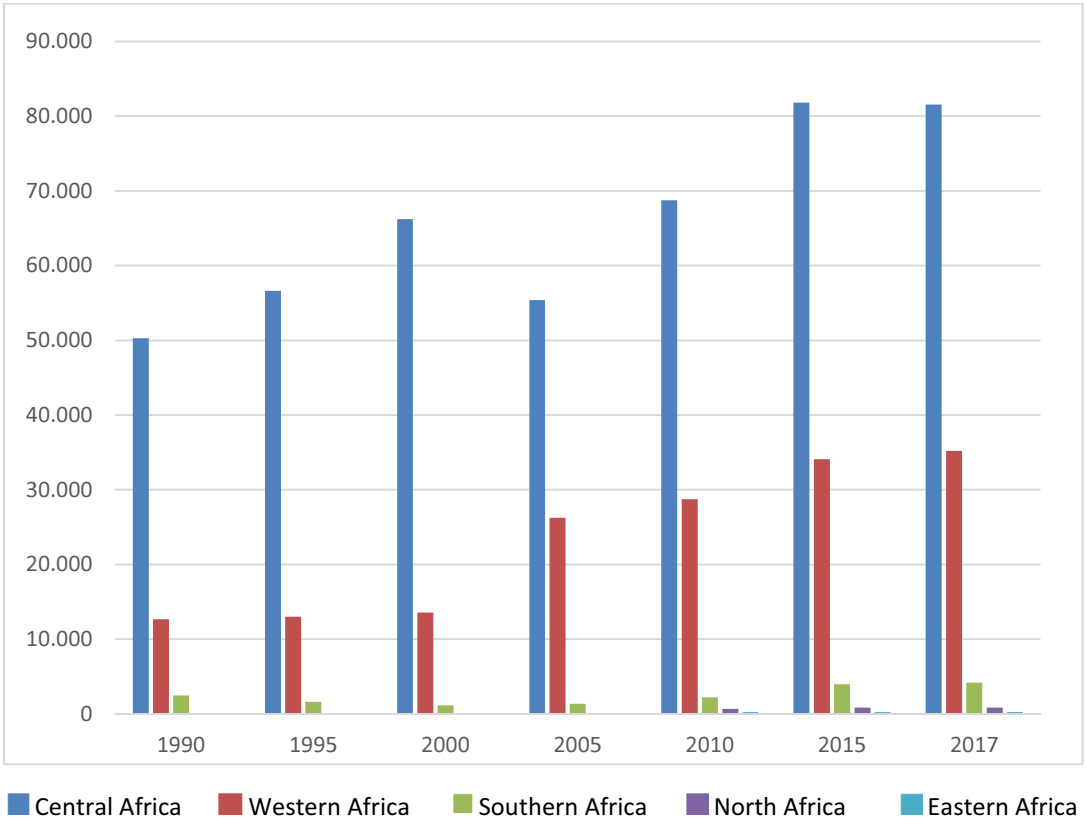
Figure 4 - Main destinations of Cameroonian according to income levels of countries, from 1990 to 2017



Source: based on United Nations (2017) Trends in International Migrant Stock: The 2017 revision (United Nations database, POP/DB/MIG/Stock/Rev.2017

For those of Cameroonian migrants who decided to stay in Africa (around 37%), the choice has always been focused on settling in neighborhood areas and communities. They are primarily moving to a country in the sub-region, although this preference has declined slightly in recent years, from just over four in five Cameroonians in 1990 to just two in three of them in 2017.

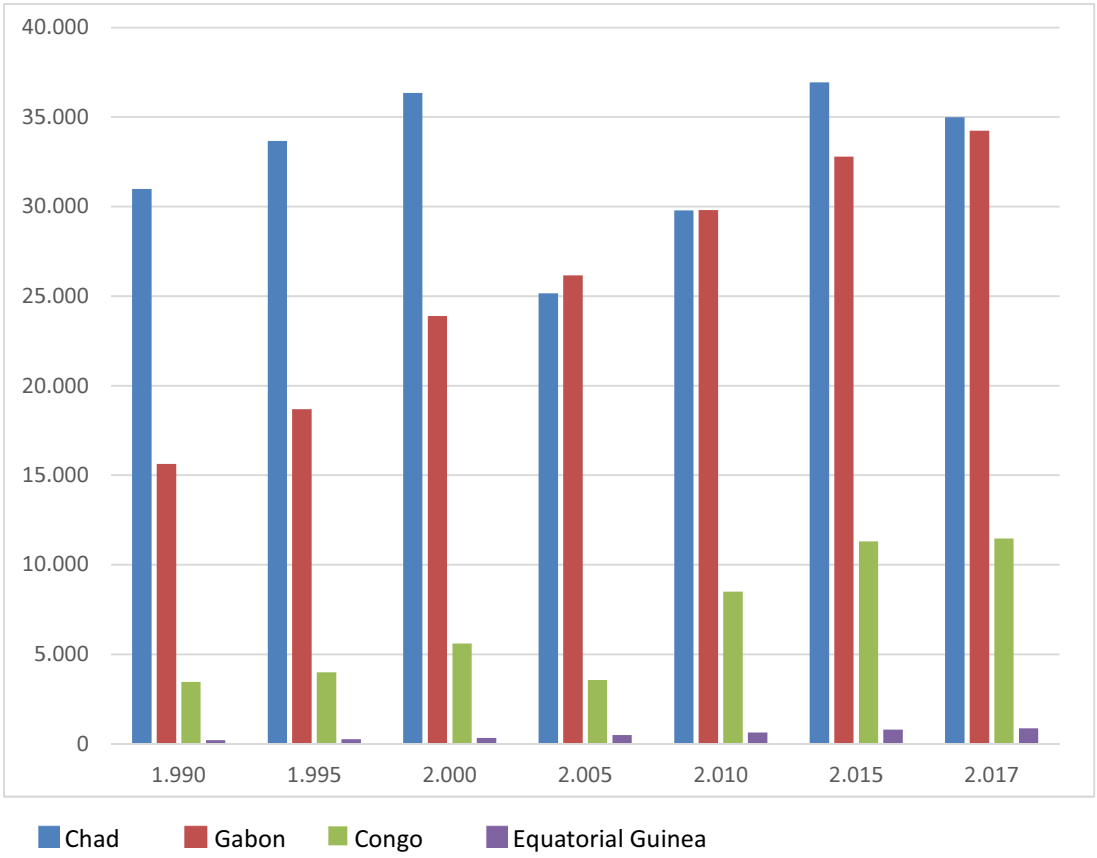
Figure 5 - Cameroonian presence in Africa by sub-region between 1990 and 2017



Source: based on United Nations (2017) Trends in International Migrant Stock: The 2017 revision (United Nations database, POP/DB/MIG/Stock/Rev.2017

This decline caused by the gradual strengthening of the Cameroonian presence in West Africa confirms the increasing concentration in Nigeria in recent years, with a gradual increase in their presence in Mali. The fact remains that this population still strongly favors proximity to the multifaceted links already established for a long time. In this sense, three countries are home to the entire Cameroonian community in the sub-region: Gabon, Chad and Congo. This distribution of the Cameroonian population in the sub-region highlights the spatial divide isolating the two migratory sub-systems operating in the sub-region, marked by continentality for one (Chad and Central African Republic) and by the coastline for the other (Gabon, Congo, Equatorial Guinea).

Figure 6 - Presence of Cameroonians in the countries of the Central Africa sub-region from 1990 to 2017



Source: based on United Nations (2017) Trends in International Migrant Stock: The 2017 revision (United Nations database, POP/DB/MIG/Stock/Rev.2017

These multifaceted imbalances presented by the Cameroonian migration system as a whole raise questions about the deep nature of the key migration factors of these populations, and therefore on the overall configuration of the migratory context in Central Africa.

3. Differentiated effect of the job market structure on departures of Cameroonians to their main destinations

i. Skilled Migration to OECD Countries

With regard to the analysis of data reflecting the migratory destinations of Cameroonians in the world, it is clear that the most advanced economies are their priority anchoring areas. The role of the job market thus seems questionable, due to the high level of qualifications found in these populations (Kamdem, 2007), where the majority has a secondary education level, with a strong fringe attaining post-secondary education. Hence, the labor needs of advanced economies seem to offer an outlet for a migratory flow whose original motive happens to be linked to studies and training. This argument finds a justification in the efforts of endogenization mentioned above, as evidenced by the high schooling rate out of phase with the realities of the Cameroonian economy, which is dependent on raw materials and, therefore, structurally unable to absorb all of the qualified human resources placed on the labor market (Ela, 1998).

The ability to reorient themselves (Kamdem, 2009) thanks to the support of migratory networks previously established in the destination countries (Kamdem, 2007, 2008) continues to represent the driving force for migration in Cameroon, the associative fabrics and the networks of economic nature (Ma Mung, 1996) proving to increasingly effective in terms of support generally to regular migration. In this sense, in these advanced economies, Cameroonians are found in almost all sectors of activity, at various and varied levels, thus constituting a source of information and guidance for safe and regular migration to those who aspire to emigrate. The migrating Cameroonian cultural and sports network plays the same role (Kamdem 2015) in attracting young people, as much as it comes up against employment problems and various aspirations in terms of freedom and human rights.

An additional factor of migration in Cameroon also lies in the ability of the diasporic network to be more structured around matrimonial strategies, by exploiting legal and administrative devices such as the family reunification procedures that are regulated through the issuance of visa, like the French visa for “private and family life”. This system, which is ongoing in the advanced economies and prompts migrations from the middle and upper classes, is also applicable to intra-continental destinations, as it is favored by some of those who remain in the country, generally belonging to the lower and lower-middle classes. The former are mainly oriented towards Gabon, where they devote themselves to various businesses such as, in some cases, the transport of people

and goods and, in other instances, the integration into the public service, particularly in the education sector, health and personal services. The same profile is found to a lesser extent in Congo and Equatorial Guinea.

In African destinations with a middle income economy, particularly those located on the seafront of the Gulf of Guinea, the appeal for migration is related to the opportunities offered both by the ample availability of natural resources and by the effects of the demographic differential, which plays strongly in favor of Cameroon. Such differential is often put forward by these host countries as a justification for their reluctance to agree on free movement in the sub-region. Consequently, intense migratory activities are ongoing on the borders of both countries with Cameroon, whether in the area of the Ambam-Abebiyin-Kye Ossi triangle, or by the Atlantic coast. The various tensions which result from this situation contribute to an intensification of irregular migration, to which the different authorities very often respond by means of multiform expulsions (Loungou, 2010), generally under the constraints caused by the price volatility of raw materials, on which their economies are fully dependent.

Migration flows are facing an additional difficulty in this economically better-off zone, namely the ethno-demographic tangles along the borders inherited from colonization, indiscriminately crossing homogeneous ethnic groups thus fragmented across the three countries. This last characteristic is also noted in the economically poor areas constituting the second destination of Cameroonians in the sub-region, namely the area of the Lake Chad basin.

ii. Forced migration around Lake Chad

Contrary to the previous zone marked by voluntary migrations with high irregular flows linked to the institutional tensions on the borders, the zone of the basin of Lake Chad receives mainly Cameroonian migrants fleeing from both climate change and natural disasters, as well as various forms of violence (terrorism by Boko Haram, and abuses by road cutters and cattle looters). These forced departures particularly concern the fishing populations of Lake Chad, whose surface has shrunk by 90% over the past three decades. The result has been a drastic reduction in fishery resources which has freed up fragile cultivable areas, which are seriously threatened by climate change, and unleashed as well ambitions and conflicts among the surrounding populations (herders against farmers), while keeping on the alert the four border countries around this lake, namely Cameroon, Chad, Nigeria and Niger. Their regrouping within a regional economic community imposed by this lacustrine link (the Commission of the Lake Chad Basin), struggles to contain these ambitions and

conflicts, of which the Island of Darack is one of the symbols (Hilarou, 2008).

Some additional parameters contribute in shaping migration in this Cameroonian migratory fringe, under the influence of its continentality: these are the structural transformations underway in Cameroon's migratory spaces, considering both a socio-demographic point of view and urbanization criteria.

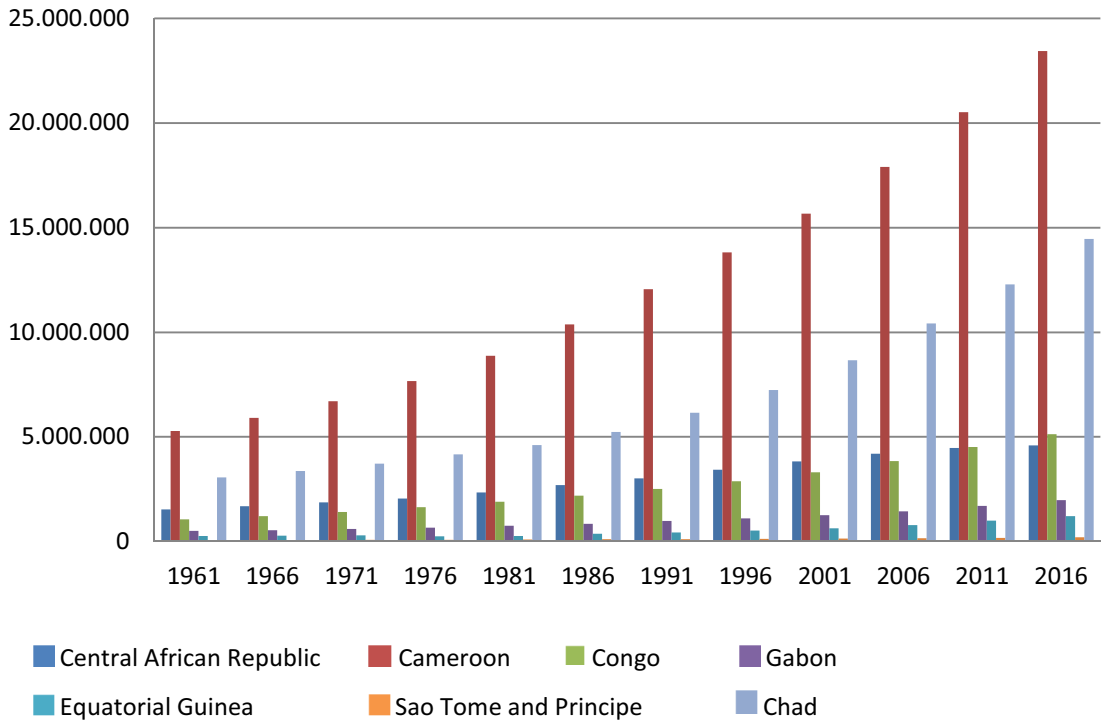
4. Structural transformations as factors of migration in Cameroon

Regarding the socio-demographic parameters, two criteria act intensely in the migration to Cameroon, i.e. the rapid population growth coupled with a spatial distribution marked by increasing urbanization.

i. Rapid population growth with a constantly changing structure

Demographic growth in Cameroon is proving to be rapid and regular (2.7% per year between 2000 and 2016 according to the World Bank), even if it remains close to the sub-regional average, similar to the African average (2.7% for the same period). The population is very young, with a 42% belonging to the age cohort from 0 to 14 years in 2016 (World Bank, 2017). It is therefore a population with a strong demographic dependence, which in fact complicates the task of the public authorities in terms of social and economic policies. Therefore, it constitutes an important pool of potential candidates for migration.

Figure 7 - Demographic evolution in central African countries from 1961 to 2016



Source: Elaborations based on The World Bank 2018 dataset.

Table 1 - Population growth indicators in central Africa from 2000 to 2016

	Total population (million)		Average annual growth (%)	Population by age group in 2016 (%)		
	2000	2016	2000-2016	0-14	15-64	65 et +
Cameroon	15,3	23,4	2,7	42	54	3
Chad	8,3	14,5	3,4	48	50	2
Central African Republic	3,8	4,6	1,3	39	57	4
Congo	3,2	5,1	2,9	43	54	4
Gabon	1,2	2	3	37	58	5
Equatorial Guinea	0,6	1,2	4,3	39	58	3
Sao Tome and Principe	0,1	0,2	2,3	42	55	3

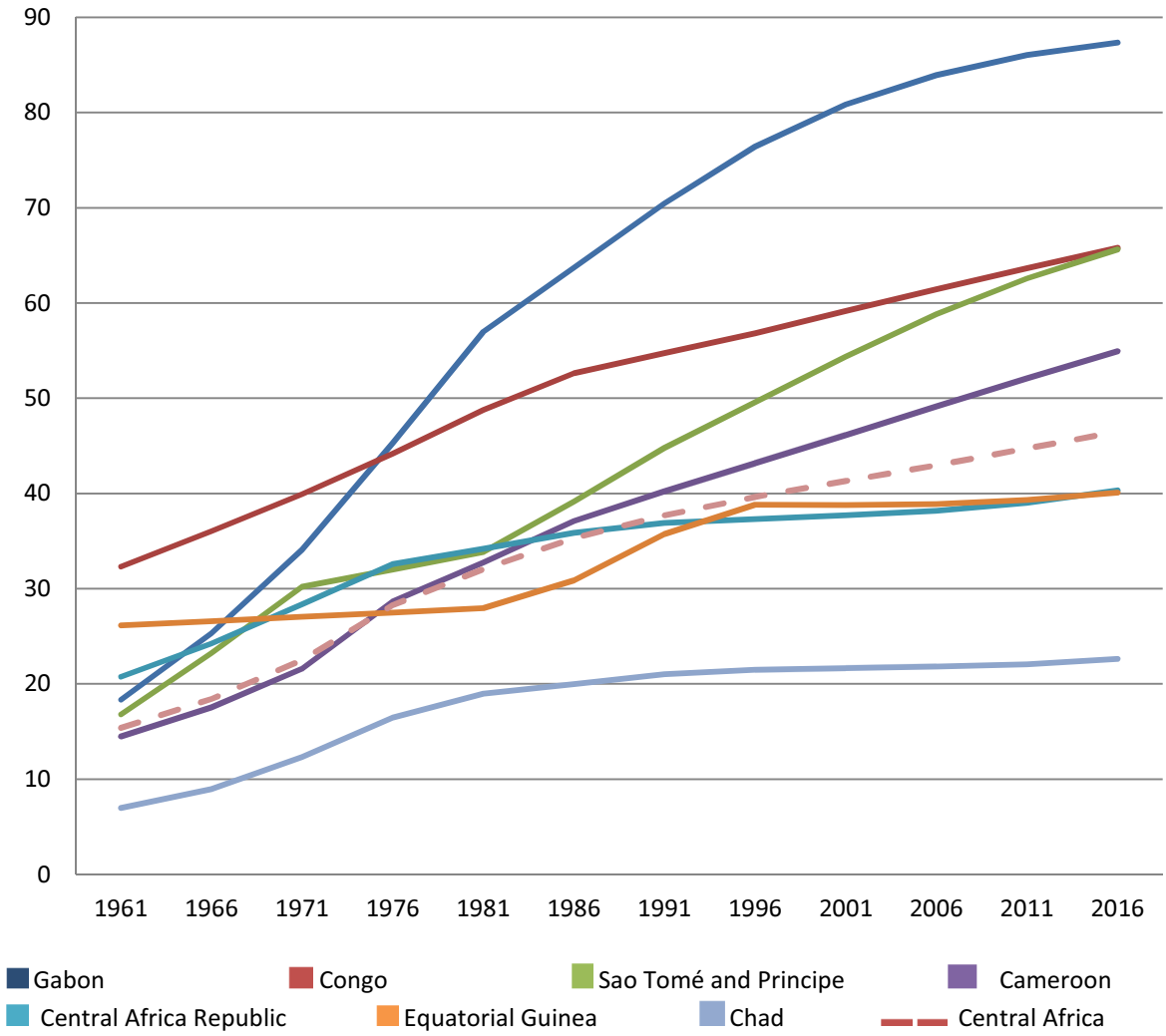
Source: Elaborations based on The World Bank 2018 dataset.

The next cohort - made up of the 15-64 age group - is that in which the active population is located. It represents 54% of the national population, which implies a large pool of labor to which the national job market must be able to respond. However, its structure, dominated by a rudimentary primary sector and a continuous development of the informal sector, constitutes a challenge for the country, which is severely exposed to the demands of globalization, particularly that of the mobility, even the hyper-mobility of people. Global technological leaps, such as those of mobile telephony, allow firms, communities, families and individuals to access certain mobility processes, more specifically those processes consisting in differentiating spaces through access to the necessary information. This further accelerates one of the determinants of international migration in Cameroon, namely the rural exodus, fueling a rampant and anarchic urbanization.

ii. Differentiated growing urbanization impacting migration factors

Urbanization is another factor of differentiated migration for Cameroonians. This is a phenomenon with the strongest continental expression in Central Africa: in Gabon, almost 9 out of 10 people live in urban areas. We can thus find here one of the justifications for voluntary migration flows to head towards Cameroonian destinations, especially since the country is also experiencing growing urbanization of the population, 55.5% of which lived in cities in 2017, compared to 13.9% in 1960 and 39.6% in 1990 (World Bank, 2017).

Figure 8 - Evolution of the rate of urbanization in Central Africa from 1961 to 2016 (%)



Source: Elaborations based on The World Bank 2018 dataset.

This phenomenon specifically characterizes the southern part of the country, where the three main cities of Douala, Yaoundé and Bafoussam form the national migratory triangle feeding voluntary migration in the oceanic and the intercontinental subsystems.

This is not the case for the continental subsystem, deploying in areas under more or less strong constraints, where rurality prevails, like in Chad, where nearly four out of five people still live in rural areas and depend heavily either on slash-and-

burn agriculture, with very low yields, or on nomadic pastoralism, with increasingly rare pastures. This is the case for the Mbororo populations (Seignobos, 2008), whose nomadic areas still ignore the state borders inherited from colonization, and which are the source of many conflicts. These nomadic populations are continuously sinking into the peri-forest and forest zone, sometimes resulting in bloody conflicts with farmers (Kamdem, 2015). This highlights how the environmental factor is influencing the migration of Cameroonians.

5. The environmental impact of migration in Cameroon

The environmental criterion is considered here from two angles, taking into account the anthropic environment, on the one hand, and the natural environment, on the other.

On the anthropic level, the migration of Cameroonians appears as one of the responses to the vicissitudes of a difficult socio-political, socio-economic and socio-cultural environment (Chouala, 2002). Obstacles to the various human rights are at this stage a main driver of the intentions to migrate animating the potential candidates. Despite the signing of numerous international instruments in the field, it remains to be noted that these tools are difficult to domesticate by the Cameroonian public authorities, which are still plagued by certain faults such as corruption, nepotism and many abuses of authority at various levels of Cameroonian society. Many NGOs such as Amnesty International (2017), Human Rights Watch (2017), Transparency International, the Network of Human Rights Defenders in Central Africa have criticized this, pointing to abuses emanating from the Cameroonian public authorities, in the form of political restrictions (Mbogning, 2002) and administrative abuses. These restrictions and abuses are often also blamed on the fight against the insecurities variously carried by the independence movements (Ambazonia and the English-speaking problem) and religious extremists (Boko Haram and Islamist terrorism), other powerful factors of forced migration to Cameroon.

This is also the case with regard to the very narrow economic prospects (Table 2) and the cultural burdens, which contribute to the intention of many applicants to emigrate. Part of these shortcomings that are fueling migration desires appear to originate from natural environmental constraints, paradoxically brought by certain international NGOs like WWF, recently called into question by the NGO Survival International due to the abuses of its eco-guards (Le Monde Africa, 2018).

Table 2 - Ranking of Central African countries in the 2016 and 2017 editions of the economic freedom index

	Central Africa		Africa		World	
	2017	2016	2017	2016	2017	2016
Gabon	1	1	14 ↑	15	103 ↑	105
Sao Tomé and Principe	2	2	26 ↓	23	124 ↓	120
Cameroon	**3**	**3**	**37 ↓**	**29**	**150 ↓**	**130**
Central African Republic	4 ↑	5	38 ↑	45	151 ↑	168
Chad	5 ↓	4	42 ↑	44	162 ↑	164
Equatorial Guinea	6	6	48 ↓	46	174 ↓	170
Congo	7	7	51 ↓	47	177 ↓	172

Source: Data elaboration based on http://www.agenceecofin.com/gouvernance/2704-46918-classement-des-pays-africains-dans-l-edition-2017-de-l-indice-de-liberte-economique; consulté le 25 août 2017

These various abuses tend to promote forced departures for the most vulnerable, in the context of the numerous internal displacements affecting more than 250,000 people (IRC, 2017) and the recurrent requests for asylum in neighboring countries (UNHCR, 2017). Many of the less vulnerable opt to embark on the perilous paths of clandestine migration, whether by land (via conventional trans-Saharan routes), sea or air. These choices are fostered by the dysfunctions of the civil status services and the difficulties of obtaining regular travel documents, directing a good number of candidates towards the use of false documents that allows the ambient corruption in the issuing services, or to unscrupulous smugglers (Bell, 2018).

As for the natural environment, it also lends itself to migration or its deterioration, as we have already mentioned with reference to the continental migratory subsystem. A point in case is that of the drastic climate change experienced around Lake Chad and the Sahelian edge, that demonstrates how development sometimes may give rise to practices conducive to migration. In the best of cases it is that of the protection of the forest environment, that often deprived the local and riverside populations of certain resources on which they

depended. Sometimes it is pure and simple exactions aiming at abruptly modifying certain social practices deemed incompatible with the objectives of protecting nature, and paradoxically vital for certain populations dependent on these environments (Le Monde Afrique, 2018). In the worst case, it is often a matter of enhancing the natural environment in the context of major development works (Lom Pangar dam), and farming (APHP, SOCAPALM and others). This latest scenario contributes to the transformation of the role of agricultural areas either by production objectives targeting distant markets, or quite simply non-food purposes (production of biofuels), to which these lands are redirected in a context of food deficit, thus opposing food security of the populations and financial security of the investors (Gerber, 2008).

6. Political measures affecting departures in international migration to Cameroon

Overall, different actors of migration initiated some steps and measures in order to rationalize the factors of migration in Cameroon. Many of these long-standing measures have produced encouraging results. This involves, for example, the progressive application of international legal instruments for the protection of Human Rights to which the country is a party, like the various conventions aimed at protecting the rights of women, children and other vulnerable categories. One tangible sign is the emerging role of women in migratory flows from Cameroon, following the measures taken in 1990 in application of article 13.2 of the Universal Declaration of Human Rights, which provides that “everyone has the right to leave any country, including his own”. In the aftermath of this measure, which led to the abolition of exit visas that constrained the obtaining of entry visas in third countries, texts were also adopted abolishing levirate and sororate, which further restricted regular migration departures of Cameroonian women. This allowed women to become one of the major components of Cameroonian migration (Kamdem, 2015).

Likewise, more recent measures are also helping to rationalize the driving factors of migration into Cameroon. These include, for example, the numerous coordination efforts for the management of migratory events by the public authorities, which pay increased, although still insufficient, attention to them. There are also the numerous supporting initiatives for actors in the field of migration, particularly on the consular plan and in terms of help to Cameroonian organizations of international solidarity of migrants, through integration into events aimed at a multifaceted mobilization of migrants and their support structures (various forums such as DAVOC, FORECDIA, FODIAS, FOTRAC).

In addition to these coordination efforts, Cameroon has taken a proactive

approach to managing migratory flows. This involves the gradual inclusion of migration issues in sectoral development challenges through the development of multi-sectoral public policies in this area. These include, for example, the gradual inclusion of the management of forced migration in territorial policies, like in Decree No. 2011/389 of 28 November 2011, establishing refugee management bodies, and Decree No. 2016/373 of August 4, 2016, organizing the rationalization of the system of identification of refugees and migrants in Cameroon. However, these efforts are struggling to be clearly part of a sub-regional dynamic and therefore require support and reinforcements likely to come from bilateral and multilateral international cooperation, both at intra-community and extra-community level.

At the intra-community level, some timid, frequently questioned bilateral cooperation is emerging between the states of the sub-region, like the High Ministerial Summits on Long-term Refugees between Gabon and Congo, or the Joint Commission Cameroon-Equatorial Guinea set up on January 1, 1970, or the Cameroon-Equatorial Great Commission Mixed Commission initiated on November 06, 1980. Major structuring projects of a cross-border nature also accompany this desire of the states of the sub-region to collaborate, like the Chollet cross-border dam project on the Dja river, between Cameroon and the Congo, or the TRANSAQUA project, involving Chad, Central African Republic and the Democratic Republic of Congo to restore Lake Chad. These are all cooperation programs capable of settling the many disputes that underlie both voluntary and forced migration.

It is at the level of multilateral cooperation that the dynamics tackle head-on the questions of international migration in Cameroon in the same way as inside the sub-region. Indeed, the first milestone implemented in the sub-region consisted in the creation in 1959 of the Economic Customs Union (UDE). It is made up of the four new countries resulting from the breakup of French Equatorial Africa (AEF), namely Gabon, Congo, Central African Republic and Chad. Cameroon joined in 1962. This organization successively became the Customs Union of Central African States (UDEAC) in 1964 and then the Economic and Monetary Community of Central Africa (CEMAC) in 1994. The major challenges raised by this collective project are part of the consideration of mobility as a vector of development. Consequently, it implements and supports the promotion of free movement in order to achieve free installation for a complete sub-regional integration, as a prelude to the culmination of the Agenda 2063 of the African Union and the Sustainable Development Goals 2030 Agenda. This last level of cooperation is firmly anchored in the international dimension of an extra-community nature, in the search for the optimization of factors driving migration into Cameroon.

At the extra-community level, Cameroonian cooperation articulates bilateral and multilateral levels. It proceeds as much through the creation of bilateral

concertation structures, such as the Cameroon-Nigeria Mixed Commission of November 10, 2002, as through the establishment of economic fairs (Nigeria-Cameroon). Bilateral dynamics, often based on specific criteria such as historical ties, underlie other forms of bilateral cooperation, such as the concerted management agreements for migratory flows signed with France in connection with its solidarity development policy (formerly co-development).

Multilateral extra-community cooperation, for its part, seems to be difficult to regulate, due to a couple of reasons. Firstly, the differentiated multi-membership of the Cameroonian State in several Regional Economic Communities (CEMAC, CEEAC, Common Wealth, *Organisation Internationale de la Francophonie*); secondly, asymmetrical negotiations of agreements with grouped entities, such as the agreements for the concerted management of migratory flows negotiated and signed in partnership with the European Union, as well as the Economic Partnership Agreements (EPAs). The numerous initiatives in which Cameroon participates (Rabat Process, 2006, various EU funds) confirm this observation, in view of the mixed nature of the results obtained with regard to the rationalization of migration outflows. Hence the need to participate in global initiatives in terms of rationalization of migratory facts and harmonization of political discourse and practices like the process of the Global Compact for Safe, Orderly and Regular Migration, initiated by the General Assembly of the United Nations dated September 19, 2016 in New York. As such, some perspectives linked to the long-term evolution of the factors driving international migration to Cameroon are worth considering.

7. Perspectives of determinants of international migration in Cameroon

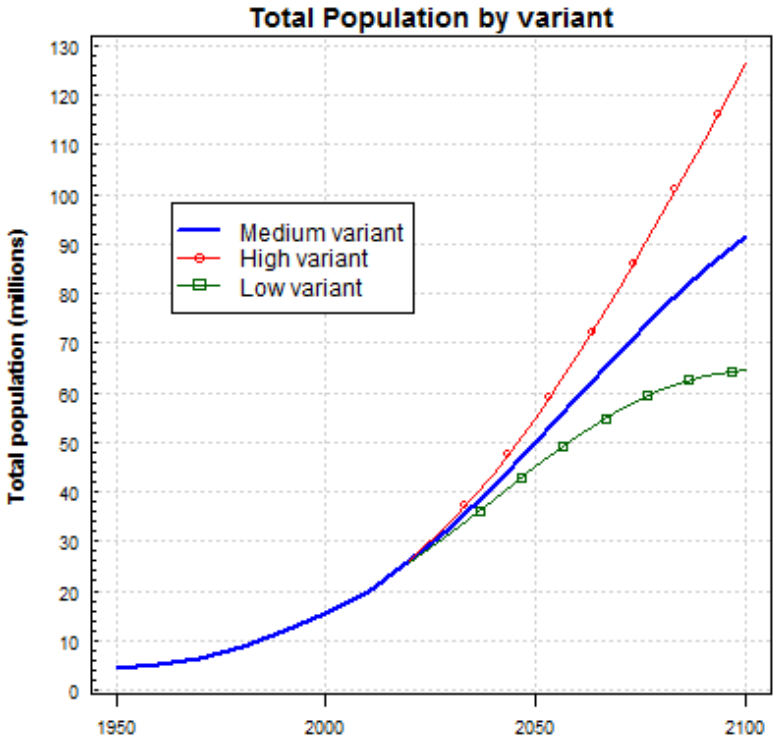
The analysis of the scenarios referred to the determinants of international migration in Cameroon requires taking into account the demographic question in its growth and spatial distribution dimension, and the structural requirements that such a question imposes, both at the political and strategic as well as environmental levels.

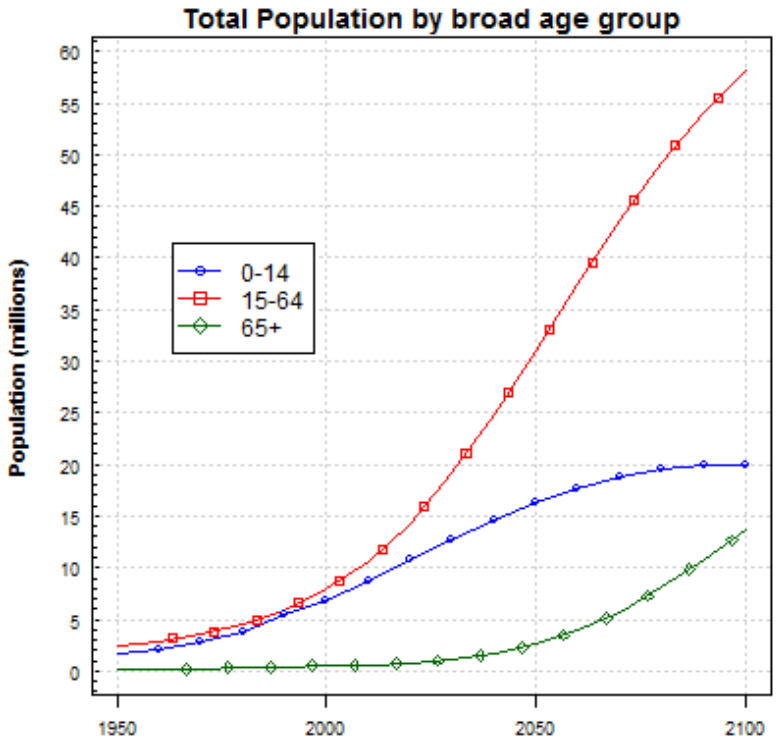
i. Determinants of migration linked to projections of strong demographic growth

Population growth is one of the main barometers for assessing the determinants of international migration in Cameroon. In this sense, the estimates of the United Nations population division reveal an almost exponential demographic growth in

the years to come. The country will multiply its population by four at the end of this century, after having already doubled it by 2050. It is therefore a major strategic challenge that indicates the classic theory of push and pull factors of migration as pertinent to the case of Cameroon. The trend towards structural reduction of demographic dependence by the end of the century is envisaged through the increase in the share of the working population in Cameroonian society. At the same time, the two dependent age groups, 0-14 and 65 and over, will see their share drop sharply, from nearly 42% today to around 37% at the end of the century.

Figure 9 - Demographic trends of Cameroon by 2100





Source: UN Population Division.
https://esa.un.org/unpd/wpp/Graphs/DemographicProfiles/

This structural change in the population will certainly lead to the amplification of a related phenomenon already linked to the determinants of migration, namely the rural exodus leading to urban massification. It is therefore a real urbanization challenge looming for the country whose urban dynamics are still struggling to meet the increasingly growing urban aspirations, thus nourishing the desires of departure for migration.

Overall, this is an important challenge on both the employment front and that of the various services expected by these increasingly urbanized populations. The various public and private actors are responsible for building proactive responses, particularly with regard to the factors leading to migration and, consequently, the potential contribution of migration to the country's development efforts. In this sense, it is still necessary to point to the concrete efforts already initiated by the various actors operating in this field, particularly in terms of good practices such as:

- The implementation of the Reception and Return Integration Program in Cameroon (*Programme d'Accueil au Retour et à l'Intégration*, PARIC) of the National Employment Fund (*Fonds National pour l'Emploi*, FNE).

- The actions of the Center for International Migration and Development (CIM) of the German GIZ related to the multifaceted transfers of the diaspora and to the processes of reception and integration upon return.
- Cooperation between the French Office for Immigration and Integration (*Office Français pour l'Immigration et l'Intégration*, OFII), the Cameroonian National Fund for Employment (*Fonds National pour l'Emploi*, FNE) and the Inter-professional Council of Cocoa and Coffee (CICC), to strengthen the integration of returning migrants, by signing the partnership agreement in Yaoundé on April 25, 2017.
- The emergence of local civil society actors specializing in diaspora issues (Welcome Back Cameroon - WBC, *Solutions pour le Migrations Clandestines* - SMIC, *RESPECT Cameroon* etc.).

These efforts are an indication of the magnitude of the task ahead and, consequently, new strategies in terms of structuring political and economic offers. It is also a question of addressing the implications of the various actors in different layers of the society, particularly those related to migration issues. In order to effectively respond to the challenge posed, issues of participation are to be addressed, both in the private sphere, where awareness and accountability must be promoted, and in the public sphere, where the role of each actor must be recognized, preserved and supported, which seems not always to be the case in Cameroon, according to the recriminations of the civil society. A real in-depth reform of Cameroonian society is essential if the country expects to achieve the Sustainable Development Goals in 2030 and the prospects of the African Union's Agenda 2063, particularly with reference to the driving factors of the international migration. In this regard, in view of the prominent role of public authorities in the management of international migration, some recommendations can be formulated with a view to address the determinants of migration.

8. Recommendations to address the determinants of migration in Cameroon

In order to effectively address the determinants of migration in Cameroon, mainly with regard to emigration flows, a list of concrete actions can be recommended to the country's public authorities. This requires both the creation of structures and procedures for the management and the effective implementation of migratory dynamics that are currently lacking, as well as the harmonization and strengthening of already existing measures.

i. Recommended actions to create structures and procedures for a better management of the determinants of migration in Cameroon

Given the current Cameroonian migration context and the challenges it poses in the long term, particularly with regard to migration outflows, the establishment of a certain number of structures and procedures is urgent. First of all, centers of academic excellence should be created combining research, training, application and dissemination of endogenous knowledge on international migration. This step is required in order to clarify the migration-development nexus and get out of the totally misleading commonplace that is inadequate to explain this link . This first step should give rise to the creation of a national observatory on migrations, in resonance with the ongoing global processes, in order to better adjust the specificities of the country to those of the various partners in the matter. Additionally, this would make it possible to proceed rationally to the concerted creation of migratory corridors, pledges of optimal security for migrations, which are mutually beneficial, both for the various public authorities and for all the other actors concerned, including the migrants themselves and their families.

ii. Recommended actions to strengthen existing structures and procedures for a better management of the determinants of migration in Cameroon

In addition to the creation of these various structures and procedures, the effective application of the devices and tools already available for the management of migratory flows, particularly in its departure dimension, constitutes one of the key recommendations to Cameroonian public authorities. Indeed, although Cameroon has signed the vast majority of international instruments targeting international migration and has transposed many of these norms into the country's legal and administrative systems, specific efforts still need to be made. In particular, the International Convention for the Protection of All Persons from Enforced Disappearance (ICPPED), and those rules recommended by the International Labor Organization and the United Nations about the rights of migrant workers should be adopted and implemented. These measures also include the requirement for an effective application of the protocol for the free movement of people and goods, negotiated in the CEMAC zone, and which is going to be implemented, with many contrasts, at the expense of Cameroonian migrants who are particularly active in this area of destination.

In the same vein, the context demands that the Cameroonian public authorities urgently proceed to the strengthening of the existing systems, measures and procedures. The reliability of civil status should thus facilitate full access to travel documents; other instruments include the strengthening of specific

training for emigration and immigration staff, coupled with other effective and concrete emergency measures, such as the strengthening of penalties related to migration issues, in synergy with the increased fight against corruption in this area. Furthermore, the effectiveness of these measures requires a strengthening of the technological, technical and operational capacities of the actors in charge of migration management, especially those of civil society working to protect the rights of migrants. It is also linked to an accentuation of the training of peoples about the culture of integration, in particular by multiplying specific programs in the media and in-school training. This last awareness-raising component imposes the need to improve what is already working well at this stage.

iii. Recommended actions to improve existing structures and procedures

The improvements that are likely to positively affect the migration of Cameroonians concern political, economic and social governance issues, currently in progress in Cameroon following the recent introduction of several reforms (decentralization and various constitutional reforms), as well as other questions related to the awareness, both in the media and the population, about the various realities related to migration.

In the same order of requirements, the Cameroonian public authorities must promote and encourage multifaceted cooperation around questions of international migration. A cooperation in terms of both circulation of information between the various actors in the territories concerned by Cameroonian migration, as well as improvements in the dialogue between the various stakeholders at the local, national, regional and global levels.

Lastly, it is not an understatement to say that the work of international migration in Cameroon, particularly with regard to the factors inducing the departure of Cameroonians, is only at its beginning. It is necessary to tackle it with the firmest resolution, with regard to the key and challenging perspectives that the country faces in relation to the Sustainable Development Goals of 2030 and the Agenda 2063 of the African Union.

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Annexes

Table 1 - Evolution of migrant stocks by country in the Central Africa sub-region from 1990 to 2017

	1990	1995	2000	2005	2010	2015	2017
Cameroon	265 344	246 864	228 383	258 737	289 091	508 357	540 266
Chad	74 342	89 584	104 825	352 062	416 924	516 968	489 690
Congo	129 597	191 635	305 002	315 238	419 649	392 996	398 890
Gabon	127 980	152 972	195 571	214 123	243 992	268 384	280 197
Equatorial Guinea	2 740	3 629	4 517	6 588	8 658	209 611	221 865
Central African Republic	67 234	99 712	123 529	94 449	93 466	81 598	88 774
Sao Tome and Principe	5 582	4 936	4 365	3 433	2 700	2 394	2 293
Total	672 819	789 332	966 192	1 244 630	1 474 480	1 980 308	2 021 975

Table 2 - Migration and immigration in Cameroun from 1990 to 2017

	1990	1995	2000	2005	2010	2015	2017
Cameroonians abroad	115 311	136 161	161 419	217 615	278 383	325 831	333 316
Foreigners in Cameroon	265 344	246 864	228 383	258 737	289 091	508 357	540 266

Table 3 - Cameroonians in the world by type of region according to the level of development from 1990 to 2017

	1990	1995	2000	2005	2010	2015	2017
More developed regions	49 649	64 720	80 335	134 273	177 449	204 464	210 864
Less developed regions	65 662	71 441	81 084	83 342	100 934	121 367	122 452

Table 4 - Main destinations of Cameroonian according to income levels of countries, from 1990 to 2017

	1990	1995	2000	2005	2010	2015	2017
High income economies	48 942	64 125	79 875	133 898	177 175	204 141	210 527
Middle income economies	33 349	36 165	43 012	54 516	65 351	78 058	80 794
Low income economies	33 020	35 871	38 532	29 201	35 857	43 632	41 995

Table 5 - Cameroonian presence in Africa by sub-region between 1990 and 2017

	1990	1995	2000	2005	2010	2015	2017
Central Africa	50 294	56 634	66 195	55 373	68 741	81 828	81 569
Western Africa	12 681	13 016	13 575	26 267	28 726	34 092	35 220
Southern Africa	2 478	1 603	1 134	1 347	2 237	3 967	4 186
North Africa	135	109	92	110	674	859	849
Eastern Africa	10	13	18	66	243	252	254

Table 6 - Cameroonian presence in the Central Africa sub-region, by country, between 1990 and 2017

	1 990	**1 995**	**2 000**	**2 005**	**2 010**	**2 015**	**2 017**
Chad	30 992	33 673	36 353	25 156	29 790	36 938	34 988
Gabon	15 636	18 690	23 895	26 161	29 811	32 792	34 235
Congo	3 464	4 003	5 614	3 570	8 502	11 300	11 469
Equatorial Guinea	202	268	333	486	638	798	877

SPECIAL GUESTS

International Doctoral Network on Development and Global Studies

Effects of Remittances on Household Poverty and Inequality in Cambodia

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Abstract

We use representative national data from the Cambodia Socio-Economic Survey in 2014 to investigate the impact of remittances on poverty and inequality. Unlike other studies that use income to measure poverty, we employ monthly per capita consumption data. We also consider remittances as a substitute income rather than an exogenous transfer. Therefore, imputing counterfactual expenditure in a scenario of no migration and no-remittances is necessary. To test for selection, a Heckman Two-Step estimation is required under the null hypothesis that non-recipient households are randomly drawn from the population. However, we find no significant effect of selection bias but strong evidence that remittances reduce the poverty rate by 0.6 on the national level or 1.6 percent for recipient households. In addition, remittances decrease the poverty gap by 6.8 percent or 17 percent for a sub-sample of recipient households, but they also increase inequality by 2 percent, as measured by the GINI coefficient. Although remittances-recipient households tend to be better-off, the finding reinforces our idea that remittances may exacerbate inequality between households from different social groups in the long run if such a circumstance prevails.

keywords: Impact, Family, Consumption, Expenditure, Income Distribution.

1. Introduction

Following a period of stagnation during the recent Global Financial Crisis, there has been a significant growth in the absolute number of migration phenomena worldwide and thereby an increase in funds remitted to countries in the developing world, especially in Asia (United Nations, 2017). Decisions to migrate and the subsequent inflow of remittances have the potential to play a crucial role in the development of low- and middle-income countries on both macro and micro levels, even if such remittances are merely used for consumption purposes (Acosta et al., 2007; Brown & Jimenez-Soto, 2015). In relation to remittances, the immediate direct benefit is to increase household income and consumption, but remittances also have an indirect influence on household income risk (Lucas & Stark, 1985) and household production/investment decisions (Stark & Levhari, 1982). Remittances may, moreover, act as an insurance and reduce risk-

averseness for low-income households who are then more willing to resort to riskier investments or agricultural activities with higher potential returns (Brown & Jimenez, 2008; Stark & Bloom, 1985).

Remittances generally constitute between 30 to 40 percent of household income in the Global South (Adams, 2011). It is in this context that the economic advantages of such money have increasingly caught the attention of governments of countries of origin of migration. Findings from the empirical literature on the impact of remittances on households suggest that in most contexts remittances contribute to poverty alleviation. Using macroeconomic data from 71 developing countries, Adams & Page (2005) found that a 10% increase in per capita international remittances leads to a 3.5% decline in the share of people living in poverty. In Nepal, it is estimated that one-fifth of the poverty reduction that occurred between 1995-2004 was attributed to labor migration and remittances inflow (Lokshin et al., 2010). However, in some instances, remittances are also found to have negatively impacted poverty and inequality (Adams, 2011; Brown & Jimenez-Soto, 2015 and references therein). It is worth noting that among the aforementioned studies, some, particularly those conducted during earlier migration waves, such as Barham & Boucher (1998), Brown & Jimenez (2008), and Rodriguez (1998), do not attempt to account for selection bias and/or opportunity cost of migration – that is, what household income would have been like had migrants decided to stay instead of migrating. These challenges may affect their estimations, so their findings have to be interpreted with caution.

When remittances are considered as purely exogenous extra household income, it is assumed that there can be no negative impacts on various household indicators. However, if we treat remittances as a substitute for the missing migrants and their pre-migration income contribution, a household can actually be in a more disadvantageous position if remittances are less than what migrants would have earned had migration not occurred. Cases like this are not rare and have been observed in some Latin American countries (Acosta et al., 2008; Brown & Jimenez-Soto, 2015). In addition, it is arguable whether remittances help reduce poverty, for a migration journey, especially an international one, is generally expensive and hence affordable only by those from relatively well-off families rather than really impoverished peasants. Therefore, remittances may not flow toward the poorest. On the contrary, they may increase inequality since richer households tend to have better access to migration. Nevertheless, some research suggests that inequality may fade away over time as a larger portion of the population is able to migrate due to lower costs (McKenzie & Rapoport, 2007), and others also argue that the indirect influence of remittances on other household earnings and agricultural activities will redistribute income in migrant-sending areas in the long term (Taylor, 1992).

This paper investigates the impact of remittances on household poverty headcount, the poverty gap, and income distribution in one developing country,

Cambodia. It represents a good case study on account of a few key factors. Cambodia has been an example of a post-conflict (1970-99) economic success, with annual growth rate of more than 7 percent for over two decades (World Bank, 2014). Following the end of a civil war, three quarters of the Cambodian population lived without basic consumption, yet since then extreme poverty has dramatically decreased, and in 2014, only 13 percent are still impoverished (World Bank, 2019). The country has also experienced one of highest rural-urban migration rates, which has resulted in a population boom within the capital city, Phnom Penh (Zimmer & Van Natta, 2018). Furthermore, international migration to neighboring Thailand is increasing at a remarkable pace despite the fact that Cambodia is a relative newcomer to experiencing this global phenomenon (Ministry of Labour & ILO, 2014).

It is thus fascinating to evaluate the causal relationship between remittances from both origins (internal and international) and poverty to understand to what extent migration has played a role in poverty reduction. To do so, we use the Cambodia Socio-Economic Survey in 2014, which allows us to distinguish between internal/domestic and international remittances, so that in turn we can delve deeper to learn the impact of remittances on a sub-sample of households instead of only on the national level. The survey is nationally representative, comprising a large sample of 12,000 households selected from both urban and rural areas across all 25 provinces. Our choice of using a household rather than an individual as unit of analysis follows Stark & Bloom's (1985) seminal work, famously known as the New Economics of Labor Migration, which argues that individual selection into migration and the decision to earn remittances is made collectively at the household level because such income is used by the household to improve all of its members' general well-being, directly and indirectly, rather than just benefiting migrants themselves.

Besides focusing on a sub-sample of households, another important contribution of this paper is that we employ monthly per capita consumption to measure poverty rather than using income, as has been done conventionally by other studies. In addition, we recognize two challenges in our estimation. First, remittances are the substitute for migrants' pre-migration income, in which case a hypothetical counterfactual scenario of no migration and no remittances needs to be imputed and compared with the actual scenario. Second, there can be a self-selection that has to be addressed in our empirical model. That is, the probability of receiving remittances can be biased toward richer families or households with better-educated members, as they have more possibilities to afford migration costs compared to their poorer counterparts. And as the human capital model in migration suggests, those who have higher education and skills and therefore expect to earn higher income at the destination, tend to be selected as the ones to migrate (De Vreyer et al., 2009; Kaestner & Malamud, 2013; Todaro, 1969). Consequently, remittances may increase exiting inequality rather than reducing it as we would have expected..

2. New Economics of Labor Migration

Most empirical studies in remittances research are more or less based on a theory called the New Economics of Labor Migration (NELM), which extensively investigates the determinants and consequences of migration in less developed countries, where the vast majority of migrants come from rural agricultural households. It was pioneered in the 1980s by Lucas & Stark (1985) and Stark & Bloom (1985) to challenge the main assumptions of neoclassical economic concept that migration choice is made by isolated individuals. In contrast, NELM argues that the household or family rather than a single person is the main actor in migration decision-making and that remittances are the most obvious, central, and direct outcome of an implicit contract between households and migrants. To put it another way, the decisions to migrate and determining who is to migrate are made collectively within a household that wants to diversify sources of income to minimize agricultural hazards (ibid). Thus, migration is not necessarily a method to maximize household earnings but rather a risk-sharing approach, and thus wage differential is not always a motive for migration, and migration does not necessarily stop even when the wage gap is eliminated.

In many developing countries (imperfect market), where poor families are mainly those in rural areas practicing cultivation as a main source of income, migration is seen as a strategy to guarantee household survival and smooth consumption over time. The crucial insight is that households can maintain the same level of their utilities only as long as their income is steady, but the risk of income shock for rural households is high in agrarian countries, where banking and insurance systems are underdeveloped and usually impose a limit on the amount farmers can borrow. To cope with natural calamities and liquidity constraints, households have to carve out a backup plan to sustain their level of consumption and manage risks. One such plan is to allocate family labor to pursue different income-generating activities. While some members may be assigned to local economic activities such as harvesting or running a small family business, others may be chosen and financed to migrate. But migration is costly, so a household tends to wisely select members with the highest human capital (education, skills, or experience) since they are more likely to succeed in what can be a risky venture, which in turn will allow the household to gain the most from its investment (Stark & Taylor, 1989).

In developed countries, risks to household income such as harvest failure or crop price fluctuation are normally kept at a minimum by governmental programs or affordable insurance policies that insure against future loss of crops, a new technology backfire, or a sudden drop of market price (Massey et al., 1993). But when these guarantees are not available or accessible due to high cost, households need to resort to self-insurance through international migration. Consequently, a flow of remittances can also reduce risk-averseness for very

poor families and motivate them to adopt a riskier agricultural investment or new production technology with higher potential returns, which they would not have done if they had not had access to migration (or insurance) (Brown & Jimenez, 2008). For example, some Mexican farmers who own a large amount of land but lack the money to invest in it migrate to the United States just to generate capital for their economic activities, which in turn improves their agricultural income and household welfare (Castles et al., 2014).

Some households may also want to increase their assets, improve consumption, or make additional investment in their children's education due to perceived higher returns to schooling, but, given budget constraints, they cannot simply increase a particular kind of consumption and hold the others constant unless there is a surge in family earning. A possible and attractive way for households to positively alter their income in the absence of banking and a credit loan system would be to send members away for higher-paying employment in another place (Stark & Bloom, 1985). Mutual assistance and support within households and decisions to allocate resources and secure subsistence for all members make households themselves the most relevant unit of analysis. However, the NELM entirely ignores intra-household differences such as age and gender of individuals and generational conflicts of interest.

Another important proposition of NELM is that households have significant motivation to send members away to not only increase their absolute income but to also improve their relative income in comparison with other households in the community and thus reduce relative deprivation and inequality (Stark & Taylor, 1989, 1991). To put it another way, internal and international migration is motivated by a household's desire to improve its comparative economic position with respect to relevant reference-group income distribution, say, that of other households in the village. But NELM also suggests that the role of relative deprivation may work quite differently for internal and international migration due to continuities of social and cultural homogeneity within and across national borders. However, it generally acknowledges that the propensity for sending migrants and receiving remittances is higher for more relatively deprived households (those at the bottom of income distribution) than their less relatively deprived counterparts, as the former have a stronger feeling of relative deprivation in the community.

As a result of households' intention to improve their social rank through migration, remittances are said to favorably affect income distribution and increase demand for consumption of goods and services by poor families. Nevertheless, in two Mexican villages it was found that the impact of remittances on rural inequality depends critically on the return to migrants' human capital and that it is the middle-income groups and not the poorest ones in the village that possess better schooling/skills and ability to afford migration (Stark et al., 1988). In another study using Mexican data, Stark et al. (1986) assert that

internal remittances are largely a result of the return to education, rather than other components that lead to migration or characteristics of migrants, which is also highly associated with household income (the positive correlation between education and income is intuitive and can be seen in daily life). Therefore, the impact of migrant remittances on income distribution and inequality among households in the village stems mostly from the distribution of human capital across households (ibid). In short, human capital mainly explains inequality, and hence its importance is highlighted.

3. Poverty Measurement in Cambodia

Before going further into a description of the data and the econometric method used in this paper, it is necessary to understand how poverty is defined and computed in Cambodia because this indicator and its measurement are also used in our empirical analysis. But it is worth noting that although the poverty headcount ratio in Cambodia was first estimated in 1997, it was not until 2004 that a more reliable and standardized methodology was employed. The civil war and Pol Pot's genocidal regime (1975-79), which left millions of people dead and the country's socioeconomic infrastructure completely in ruins, are the main reasons why the poverty level had never been measured.

"Extreme poverty" is officially measured as a lack of enough money to spend per day on food that provides 2,200 kilocalories (defined by the Reference Food Basket) and non-food items in order to attain basic necessities regardless of age and gender. The latest method to calculate the poverty line was updated in 2011 and was used by the Ministry of Planning to carry out work in parallel with the World Bank in order to compare results. The outcomes from both studies are very similar, so this paper will use the latest 2011 World Bank poverty line for Cambodia (World Bank, 2014). Cambodia's poverty line is not, however, internationally comparable, as it is not measured at Purchasing Power Parity values. Table 1 shows the national poverty line and poverty rate for three different areas in Cambodia in 2009 and 2011. As will be seen, Phnom Penh had a different poverty line and a much smaller poverty headcount in 2011 than did other urban regions in the country, which justifies its exclusion from the data analysis discussed in section 4.

Table 1 - National Poverty Line and the Poverty Rate in 2009 and 2011

Region	Poverty Line (KHR)		Food Poverty Rate (%)		Total Poverty Rate (%)	
	2009	2011	2009	2011	2009	2011
Phnom Penh (capital)	6,347	6,014	0.3	0	12.8	1.53
Other Urban Areas	4,352	4,828	2.0	3.75	19.3	16.1
Rural Areas	3,503	4,422	5.1	4.38	24.6	23.72

Source: Ministry of Planning, 2013; World Bank, 2014.

It should be emphasized that rather than employing per capita income to determine who is living below the poverty line, which is generally done by other research studies, the Cambodian government (and our paper) use monthly per capita household expenditure for certain types of goods and services that are considered as basic consumption items. Thus, some expenditures, particularly those for purchasing durable goods, are for the most part not taken into account when calculating poverty headcount because they are deemed not "basic." But there are reasons why using expenditure is better than using income. First, income fluctuates frequently especially in developing countries, where many people still earn a living through agriculture and small family businesses, hence the variance in income is often quite larger than that of expenditure. Second, income is more difficult to measure due to challenges in calculating some types of income deriving from agriculture and self-employment. Third, people are more likely to use saving to smooth their consumption over time when they face financial problems. Therefore, expenditure is more accurate in providing a picture of household welfare. Fourth, expenditure is less susceptible to classic measurement error and bias because people tend to underreport their income for various reasons.

To calculate household expenditure per capita, we follow official procedure by summing up the value of three different types of basic household consumption and dividing it by the number of household members. Basic consumption comprises food expenditure (22 food groupings) and non-food expenditure (medical care, education, transportation, communication, personal care products, clothing, recreation, gambling, etc. but excluding durable goods) as well as housing expenditure (water, sanitation, garbage disposal, energy, house rent if an actual expense incurred, and house maintenance and minor repairs,

excluding major construction). For those who own a house, imputed depreciation values of consumer durables are not taken into account, as the method was deemed unsuitable for Cambodia, where there is a large non-monetized sector, and many items are not fungible (Ministry of Planning, 2013).

All types of consumption of goods, both purchased and self-produced, are represented in Khmer Riel (KHR), the local currency. However, some types of expenditure are reported for different time periods, namely, the previous 7 days (food and beverage), the previous month (transport, communication, health, etc.), or the previous 12 months (recreation, education, gambling, etc.). Therefore, we need to convert the data into one-month units by considering that a month has 30.4375 days, which is the Cambodian standard. In addition, we assume that, on average, households spend the same amount of money on food over time. In other words, to calculate food expenditure in a month, we divide the amount of food consumption in the last 7 days by 7 and multiply by 30.4375. For expenses that are recorded for the previous 12 months, we simply divide the result by 12 to get monthly average consumption. Housing expense is reported for the previous month, so a simple addition is sufficient.

4. Data and Sample Description

Data used in this study derives from the nationally representative Cambodia Socio-Economic Survey (CSES) conducted by the National Institute of Statistics from January to December 2014. This timeframe was designed to ensure that the survey would be implemented during the whole year, so as to provide a full picture of annual living conditions of Cambodians, particularly those in rural areas practicing seasonal agriculture. The government uses this information to monitor the National Strategic Development Plan and the country's progression toward the UN's Sustainable Development Goals. The CSES contains rich and comprehensive data covering a wide range of information on individuals and households, including current members' general characteristics, household size and structure, household sources of income and expenses in the previous 12 months, and household assets. Statistics are also collected on the recent economic situation of the village, which is the smallest administrative unit in the country.

It should be emphasized that the 2014 CSES collects no data on individual migrants (whether they are remitters or non-remitters) such as age, gender, education, or their current whereabouts. Instead, the total remittances from local sources or from abroad are recorded at the household level. Therefore, we are

unable to learn who has sent what. In other words, we do not know whether migrants are distant relatives or just friends, whether the amounts of remittances differ greatly among migrants with different characteristics, or how many migrants the household has. Ignoring migrant characteristics is the main weakness of the survey and of the NELM, which considers household a more important and relevant entity as well as a unit of analysis. In-kind transfers (given as imputed value) are also excluded from data analysis due to lack of information in the survey on what types of goods are sent and why or how households obtained them. It is possible that migrants send back remittances in the form of in-kind transfers because such goods may not be available domestically for consumption. But it is quite impossible to determine if such transfers are really remittances in-kind sent by migrants or merely gifts sent to households by random people for other purposes. Moreover, certain types of goods are not officially considered as basic consumption items for the purposes of poverty calculation.

The original CSES dataset comprises a sample of roughly 12,000 households in both rural and urban regions across all 25 provinces of Cambodia, including the capital, but some households do not provide the complete information that we need, while others are extreme outliers in terms of consumption or receiving remittances. As a result, we have to remove them from the analysis. As mentioned before, we also exclude samples from the capital city of Phnom Penh since it is not a receiving point for migrant remittances but rather a destination for rural-urban sojourners. In addition, the standard of living in Phnom Penh is very different from the rest of Cambodia, so incorporating it would unnecessarily influence our estimation. Ultimately, our study uses sample of 9,791 households, of which 3,611 or 36.9 percent received some kind of remittances in the previous 12 months (2,961 received internal remittances, 486 received international remittances, and 164 received remittances from both sources).

Table 1 - Summary Data on Non-Recipient and Recipient Households

VARIABLES	Non-Recipient Household (N=6,180)		Recipient Household (N=3,611)		Mean Test
	Mean	SD	Mean	SD	
Total Household Expenditure (USD)	310.7	192.7	280.6	181.2	***
Expenditure Per capita (USD)	72.59	43.42	71.70	41.93	-
Domestic Remittances (USD)	-	-	230.3	435.5	-
International Remittances (USD)	-	-	1,276	2,063	-
Household Head Age	43.64	12.72	53.96	13.86	***
Household Head is Male	0.833	0.373	0.685	0.465	***
Household Head is Married	0.847	0.360	0.666	0.472	***
Household Head Education	5.106	3.926	4.006	3.565	***
# of Children Under 6 Years Old	0.553	0.710	0.416	0.647	***
# of Adolescent (6-14 Years Old)	0.912	0.993	0.673	0.895	***
# of Adult without Education	0.597	0.886	0.731	0.883	***
# of Adult with Primary Education	1.195	1.094	1.278	1.104	***
# of Adult with Secondary Education	1.182	1.218	1.052	1.192	***
# of Adult with Tertiary Education	0.128	0.455	0.107	0.417	**
Distance to District Headquarter (km)	12.08	13.39	12.25	14.52	-
Distance to Provincial Headquarter (km)	36.14	29.83	34.57	26.92	***
Village Agricultural Land (ha)	384.2	658.9	381.1	623.4	-
Urban	0.192	0.394	0.181	0.385	-
% of Out-Migrants	25.66	12.04	27.57	12.47	***

Note: *** significant at 1%.; ** significant at 5%; "-" not significant

Source: Author.

Table 2 presents in more detail summary data on non-remittance-recipient and remittance-recipient households from the 2014 CSES. For the sake of international comparison, we turn all monetary values from local currency into United States Dollar (USD) equivalents at an exchange rate of 4,000 KHR/USD. We also perform the mean-comparison t-test, which offers an interesting insight. It statistically reveals that recipient and non-recipient households systematically differ in terms of their socioeconomic characteristics, indicating that remittances are not allocated randomly to households. But a substantial degree of selectivity may be observable and accounted for if the assumptions of the NELM and the human capital theory hold, in which case controlling for education will significantly capture selection bias. This supposition is our main motivation to include several variables for educational level of household members and household heads.

As for the comparison between recipient and non-recipient households, heads of the former tend to be non-married older females and to be less educated than their peers from non-recipient households. In addition, the latter have more members with higher education and have a greater number of children or adolescents in the family compared to recipient households, who have more less-educated members. These statistics are consistent with the literature on Cambodian migration showing that most migrants are low-skilled, as they mainly come from poor households in rural areas (Jampaklay & Kittisuksathit, 2009; Ministry of Planning, 2012). Borjas (1987) calls this negative selection into migration, but the phenomenon contradicts human capital theory, which asserts that well-educated people are more likely to migrate since they expect higher return to their education at the destination. Nevertheless, migration among the lower skilled supports the NELM assumption that migrants do not necessarily migrate due to expectations of higher income and that highly educated people are unlikely to migrate, for they have more ability to access capital or insurance, unlike those in non-elite groups. It is worth noting that there can also be a case in which recipient households have more low-educated members because their well-educated members have all left, but this is rare due to homogeneity among household members, who tend to have similar socioeconomic characteristics. For example, education levels of husbands and wives and their children are positively correlated since highly educated parents tend to earn a lot and most likely want their children to receive better education.

As for the amounts of expenditure and remittances, generally per capita expenditures of recipient and non-recipient households are not significantly different, and neither is the standard deviation. The smaller total expenditure of remittance-receiving households compared to that of their non-receiving counterparts is more likely a result of bigger average household size of the latter (4.6 vs. 4.3). Nonetheless, if we compare only the amounts from remittances among recipient households, international remittances are 5.5 times larger than those from internal sources, which can be attributed to the relatively much

higher salaries earned by Cambodian migrants who go to countries such as Japan and South Korea. Nevertheless, only 650 households actually received such money, compared to 3,125 households that received internal remittances.

5. Empirical Method

There are a few challenges in estimating the impact of remittances on poverty and inequality since a migration decision and subsequent inflow of remittances can have both direct and indirect effects on household income. A direct effect can be a result of a loss of a certain number of household members who would have contributed some positive income and expenditure to the family had they stayed, while indirect effects are the influence of migrants' absence on other remaining household members' income generating activities and earnings, as suggested by NELM. As a result, remittances cannot be simply treated as exogenous transfers, and we will entirely disregard their substantial influence. Thus, we will consider remittances as a substitute rather than a completely extra income of a recipient household, which would cause us to overestimate their effect, since it is possible that total household income excluding remittances and consumption would be lower relative to that of the pre-migration situation.

To remove both direct and indirect effects of remittances, we will adopt the counterfactual method in the scenario of no migration and no remittances that was initially developed by Adams (1989) in his paper on the impact of remittances in rural Egypt. To determine recipient household expenditure, we can use a simple linear regression based on information of non-recipient households that share similar characteristics. But employing such a method requires some necessary assumptions (Acosta et al., 2007; Rodriguez, 1998). First, in the absence of information on characteristics of migrants, we will suppose that remittances were sent by an adult member whether a household received remittances from either an internal or international source, but we will assume remittances were sent by two adults if a household received such money from both sources. We also need to approximate a migrant's level of education. Based on the conventional assumption made by other studies such as those by Acosta et al. (2008) and Barham & Boucher (1998), we will assume that migrants generally have years of education equal to the average of that observed by their adult household members. A shortcoming of this assumption is that a counterfactual additional adult member will linearly increase expenditure regardless of the initial household size. Second, we have to assume that labor market conditions remain unaffected with or without migration. But in reality, local wages or income may be influenced by the outflow of migrants and the

inflow of remittances (Brown & Jimenez, 2008). For example, employers may increase local wages to attract labors because it is harder to find employees due to out-migration.

The counterfactual method will, however, suffer from selection bias if recipient and non-recipient households significantly differ. Empirically, table 2 also provides evidence that there is a certain degree of selection between non-remittance-receiving and remittance-receiving households. Reviewing recent literature, Adams (2011) suggests that self-selection into migration can be driven by education, ability, or determination of individuals or households, which explain most of the differences in both migration decisions and the earning of remittances. As a result, we will make every attempt to take into account these effects. But a simple comparison between these two types of households still lead to an inconsistent estimation if unobservable characteristics that drive migration and remittances are statistically significant, meaning that a substantial bias cannot be reduced or captured by observed variables. To make sure OLS is effective in predicting counterfactual consumption, first we need to resort to an auxiliary regression to test for self-selection, which will also allow us to correct for bias in the process if there is any.

The supplementary approach is called Heckman's (1979) Two-Step Estimator, in which the first step (1) is to estimate the probability of not receiving remittances using all samples and obtain an inverse Mill's ratio (conventional notation is λ). The second step (2) is a linear model conditional on households that do not receive remittances, but we also include a variable, (λi), in the regression to allow the error term to be independent and identically distributed; hence our estimation will be consistent. The null hypothesis for λ is that non-recipient households are randomly drawn from a population, and if we fail to reject it, we do not need to correct for selection bias, as such bias will be small and therefore negligible. Thus, imputing expenditure for remittance-receiving households under the condition that migration had not occurred can be done using just OLS. Otherwise, controlling for λ is indispensable. Heckman's Two-Step method can be best understood using the econometric specifications as follows:

$$\text{Prob(NoRem)} = \delta_0 + \gamma_1 X_i + \gamma_2 H_i + \gamma_3 C_i + \gamma_3 Z + u_i\,, \quad u \sim N(0,1) \qquad (1)$$

$$Y = \alpha_0 + \beta_1 X_i + \beta_2 H_i + \beta_3 C_i + \beta_\lambda \lambda_i + \varepsilon_i, \quad \varepsilon \sim N(0,\sigma) \quad (2)$$

Where subscript i indexes individual household; Y is monthly per capita household expenditure excluding remittances; X is a vector of household head general characteristics such as age, gender, marital status, and education; H is a set of household characteristics, namely, household asset-based wealth quintile

that is calculated using Principal Component Analysis, number of children under 6 years old, number of adolescent (6-14 years old) and number of adults (15+ years old) with primary, secondary, tertiary, and no education, the rationales for including which lie in the NELM; C is a vector of village characteristics including distance to district and provincial capital, a dummy variable for urban region, a dummy for each province, and a log amount of agricultural land in village. These variables capture the structure of the village economy. For example, if a village has large amount of agricultural land in use, its economy depends mainly on cultivation, signifying that it is a poor area. Distance to the district and provincial capital also indicates the remoteness of a village and its development level, which are associated with income, consumption, and migration. λ is the selection inverse Mill's ratio that we obtain from equation (1) using formula

$$\lambda_i = \frac{\phi(\delta_0+\gamma_1 X_i+\gamma_2 H_i+\gamma_3 C_i+\gamma_3 Z_c)}{1-\Phi(\delta_0+\gamma_1 X_i+\gamma_2 H_i+\gamma_3 C_i+\gamma_3 Z_c)};$$

u and ε are error terms and may be correlated with one another.

Identification of equation (1) requires imposing an exclusion restriction (Cameron & Trivedi, 2005), denoted by Z. That is to say, we need to have at least a variable that will only appear in equation (1) and that is strongly correlated with remittances but that has no significant direct relationship with consumption of non-receiving households in equation (2). Our choice of variable is the percentage of out-migrants to the total population of the district in 2008. It is computed using information from the 2008 Cambodia census, which was also collected by the National Institute of Statistics. In the literature, the percentage of out-migrants generally represents a migration network that plays a crucial role in the likelihood of future migration and of receiving remittances. This variable has also been used by many other studies on impacts of remittances (Acosta et al., 2007; Hanson & Woodruff, 2003; McKenzie & Rapoport, 2011). Our assumption is that it does not have any significant direct effect on expenditure of non-remittance-receiving households. The percentage of out-migrants in our data varies a lot, ranging from 3.7 percent to as high as 73 percent, indicating a wide range of variation.

Table 3 demonstrates results from the Heckman Two-Step estimation of per capita consumption of non-remittance-recipient households. We also provide a regression outcome deriving from OLS without correction for bias in model (3). Apparently, most coefficients in model (3) are not largely different from those in model (2), in which we control for self-selection into migration and receiving remittances (λ). The lambda coefficient itself is not statistically significant either,

indicating that selection bias is small and not substantial, probably because we manage to include several educational variables that tend to capture the effects of selectivity. This is not, however, surprising. Some other studies such as Adams (2006) in Guatemala and Barham & Boucher (1998) in Nicaragua have also reached a similar conclusion, namely, that education can be an important factor explaining self-selection. In addition, because most employment populated by Cambodian migrant workers in Phnom Penh and in Thailand are low-skilled jobs (Ministry of Planning, 2012), they are not attractive to members of wealthy families and those who have a high education. Therefore, migration and education are strongly associated. Adams (2006) also finds that including remittances from all kinds of migrants (domestic or international and legal or undocumented), like in our case, will reduce the likelihood that migration is selective with respect to consumption, education, or skills. Consequently, including lambda in the regression is unnecessary since estimated coefficients are still consistent without such correction.

We will now begin to discuss regression outcome by first paying close attention to probit model (1). In practice, we can only observe the direction of a relationship between dependent and independent variables, as the coefficients estimated by probit are not directly interpretable without calculating marginal effect. Most variables have the sign we anticipated, including the percentage of out-migrants to total population in the district, which as the literature has suggested, is strongly correlated with the probability of (not) receiving remittances.

Table 3 - Heckman Two-Step Estimation of Non-Remittances-Recipient Household Per Capita Expenditure

Variables	Heckman Selection Model (1)		(2)		OLS (3)	
Household Head is Male	0.0545	(0.0596)	2.590	(2.150)	2.043	(2.048)
Household Head Age	-0.0408***	(0.00711)	0.747***	(0.290)	0.934***	(0.250)
Household Head Age Squared	0.0000859	(0.0000685)	-0.0108***	(0.00281)	-0.00934***	(0.00254)
Household Head is Married	0.233***	(0.0609)	3.158	(2.950)	0.515	(2.192)
Household Head Year of Education	-0.000417	(0.00530)	0.865***	(0.177)	0.875***	(0.171)
Number of Children Under 6 Years Old	-0.0140	(0.0217)	-11.80***	(0.738)	-11.65***	(0.705)
Number of Adolescent (6-14 Years Old)	0.0608***	(0.0152)	-8.693***	(0.646)	-9.252***	(0.487)
Number of Adults without Education	0.0112	(0.0209)	-7.007***	(0.751)	-7.156***	(0.720)
Number of Adults with Primary Education	0.0224	(0.0148)	-6.862***	(0.570)	-7.125***	(0.522)
Number of Adults with Secondary Education	0.0700***	(0.0139)	-6.966***	(0.725)	-7.697***	(0.482)
Number of Adults with Tertiary Education	0.0954***	(0.0343)	3.784***	(1.377)	2.779**	(1.133)
Household Wealth: Poorest is baseline						
Poorer	-0.000445	(0.0421)	8.503***	(1.457)	8.614***	(1.408)
Middle	0.0233	(0.0439)	13.96***	(1.525)	13.84***	(1.474)
Richer	0.0234	(0.0476)	26.64***	(1.660)	26.50***	(1.605)
Richest	0.203***	(0.0655)	54.65***	(2.497)	52.93***	(2.089)
Distance to District Headquarter	-0.00292**	(0.00114)	0.0185	(0.0447)	0.0441	(0.0395)
Distance to Provincial Headquarter	0.00191***	(0.000604)	0.0828***	(0.0244)	0.0633***	(0.0192)
Dummy for Urban	-0.0119	(0.0499)	0.792	(1.714)	0.977	(1.653)
Log Village Land	-0.00663	(0.00922)	-0.652**	(0.310)	-0.612**	(0.298)
Dummy for Each Province	Yes		Yes		Yes	
% of Out-Migrants	-0.00326**	(0.00141)	-		-	
Constant	1.572***	(0.205)	48.57***	(7.874)	54.05***	(6.617)
Lambda	-		18.73	(13.47)	-	
N	9,791		6,180		6,180	

Note: Dependent variable in model (1) is the probability of not receiving remittances while it is the monthly per capita household expenditure excluding remittances in model (2) and (3). Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

An examination of the ages of household heads indicates that households with older heads are more likely to earn remittances. A simple reason is that these households tend to have more members of working age, such as children of the head, who can possibly migrate, compared to households that have younger household heads. Also, contrary to the notion hypothesized by human capital theory, education tends to be negatively correlated with migration and thereby receipt of remittances. The number of household members with secondary or tertiary education variable directly suggests that households with additional highly educated members have a higher propensity not to receive remittances. This relationship can simply be attributed to the fact that those with high education tend to earn high income and also come from wealthy households or have advantageous backgrounds. And as mentioned before, most employment taken up by migrant workers is for unskilled positions. Our finding is also similar to that found in many Latin American countries, as documented by Adams (2006) and Acosta et al. (2007).

Similar to what we have expected under the New Economics of Labor Migration, migration is more likely to be experienced by poorer households rather than by the elite. The coefficient for the richest group indicates that they are less likely to receive remittances compared to the baseline, which is entirely understandable, as the former have no need to migrate and earn remittances in order to diversify sources of income, minimize agricultural risks, or provide a risk-sharing approach. The propensity not to receive remittances for other groups is not significantly different from zero, revealing that there is no substantially different tendency to migrate between them and the poorest group. This finding is, however, inconsistent with general views that migration is a costly journey and thus only those from relatively well-off families can afford it. A possible explanation for the inconsistency is that migration in Cambodia is mainly a rural-urban phenomenon, as only a small number of households did receive international remittances (as indicated in the previous section). Therefore, generally, the cost of migration is unlikely to be a major constraint for most households, even for those at the bottom of Cambodian economic pyramid. McKenzie & Rapoport (2007) also assert that when migration is incipient, the journey cost is likely to be high, so migrants are likely to come from richer families. But over time, this cost will diminish due to migration networks, and migration itself becomes more affordable even by those who are relatively worse off.

Moving onto model (2) and (3) concurrently, we see that most of the coefficients have the sign we would normally expect, but some points are also worth mentioning. Different from the result is model (1), the age of household head is positively correlated with expenditure. There are two reasons for this. First, older people tend to spend a lot on healthcare routinely, and second, they tend to have more work experience and thus are in a higher position, all of which stimulate earnings and thereby expenditure. Having a greater number of

children and adolescents, on the other hand, reduces per capita expenditure, which is totally understandable since they do not consume as much as the average adult.

Households having a head or members with high education are more likely to have high consumption, particularly so if such members have a tertiary education, which is not surprising given the current body of literature, thus requiring no further explanation. But with respect to other human capital variables, the direction of the relationship is negative, signifying that the average per capita consumption is much lower than it is for households with university-educated members, probably due to return to education, and those with a university degree may actually earn very much more than those with only a high school diploma. Adams (2006) has also documented this unusual finding and attributed the result to return to education. Regardless of that, combing results from model (1) and (2) suggests that households with better-educated members have a lower probability of receiving remittances but are more likely to have higher consumption due to higher earning power, which in turn curtails the desire to migrate. This could be why the educational factor predominantly explains the differences between recipient and non-recipient households, making lambda insignificant.

6. Impact of Remittances on Poverty and Inequality

Now that we have performed the auxiliary Heckman regression, we are in a position to estimate the impact of remittances on poverty in Cambodia. To impute expenditure for recipient households in the scenario of no migration and no remittances, the estimated coefficients from model (3) are used under the assumptions stated in the previous section. Then, we can proceed to calculate the poverty rate and show what would have prevailed if these households had not had migrating members. Would the poverty level have been higher or lower relative to the actual situation now that they receive remittances? Three basic scenarios are considered. In the first scenario, we treat remittances as a completely exogenous transfer to households. That is to say, we use both observed total expenditure and actual household size (observed number of residents in the household) to calculate the poverty headcount. In the second scenario, we still use observe household size, but we will exclude the amount of remittances from household expenditure. The third scenario is the counterfactual poverty situation in which migrants stayed at home, making household size increase, but households would not receive remittances. In each scenario, sampling weight from the survey is taken into account. In addition, Acosta et al. (2007) suggest extending the analysis by estimating the impact of

remittances on poverty using only a sub-sample of recipient households. His point is that the effect prevailing among such families could be largely different from that on the national level. Their recommendation is also considered.

Table 2 - Impact of Remittances on Poverty Indicators in Three Different Scenarios

Type of Household	Poverty Headcount (%)			Poverty Gap (%)		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
All Households	8.6	12.4	9.2	16.8	40.4	23.6
Only Recipient Households	8.4	18.9	10.1	16.1	58.4	32.9
Only Recipient Household of Internal Remittances	8.2	15.4	7.7	15.4	35.7	31.8
Only Recipient Household of International Remittances	10.6	40.2	21.5	18.1	98.5	36.5

Source: Author.

Table 4 reports analysis results of the impact of remittances on the poverty headcount and poverty gap in three different scenarios. On the poverty headcount, if we consider remittances as purely exogenous, then remittances would reduce poverty from 12.4 to 8.6 percent, which means there is a poverty reduction of 3.8 percent. However, if we regard them as substitute income, they only lower the poverty headcount from 9.2 percent (a 0.6 percent reduction) – a small decrease. If we only consider recipient households that receive only some types of remittances, the drop is 1.7 percent, but the impact is particularly large for households receiving international remittances, the poverty headcount for which drops almost 11 percent. On the other hand, remittances slightly increase the poverty rate of internal-remittance-recipient families. But a study conducted in Cambodia by Roth & Tiberti (2017), using Propensity Score Matching, found that internal and international remittances in 2009 reduced the poverty rate of recipient households by 3-7 percent. This reduction is a bit larger than what we

found, but this is reasonable because the pace of poverty reduction and impact of remittances itself can possibly become smaller over time, as Cambodian economy grew 7 percent annually between 2009 and 2014.

In an empirical study, Adams (2006) shows that the poverty rate decreased by 1 percent on account of domestic remittances, but international remittances increased the poverty of recipient households by 1.6 percent. Lokshin et al. (2010) additionally assert that remittances reduced poverty in Nepal by 20 percent over a period of 10 years. In another very convincing study using natural experiment, Yang & Martínez (2006) found a 10-percent increase in international remittances would lead to a 2.8 percent decrease in the probability that households would live in poverty. Even though they do not attempt to control for selection bias, Brown & Jimenez (2008) and Jimenez-Soto & Brown (2012) estimate that 9 percent and 30 percent poverty reduction in Fiji and Tonga, respectively, can be attributed to the impact of remittances. The much higher effect in the latter is due to the fact that the Tongan economy relies very much on remittances. However, Acosta et al. (2008) empirically argue that remittances actually increase poverty in Mexico, the Dominican Republic, and Nicaragua. Reviewing empirical studies, however, Adams (2011) finds remittances to have generally decreased poverty by 3-5 percent in the developing world.

In our study, remittances are also found to help reduce the poverty gap, which measures the depth of poverty, or simply how far, on average, the poor are from the poverty line. We find evidence that on the national level, both types of remittances reduce the poverty gap by 6.8 percent (from 23.6 to 16.8). Therefore, the poverty rate has not only decreased, but the poor are also living in a better condition relative to the scenario in which they had not received remittances. The effect is also much higher (roughly 17 percent) if we consider only a sub-sample of recipient households. This number is much larger than that found in Roth & Tiberti (2017), who observe a poverty reduction of only 2 percent on the national level. In Fiji and Tonga, Brown & Jimenez (2008) reveal that the poverty gap declines by 3 and 16 percent, respectively. In Guatemala, the poverty gap is found to drop by 3.6-12.6 percent (Adams, 2006). While most previous studies seem to reach a consensus that remittances reduce the poverty rate and the poverty gap in developing countries, the impact of such money on inequality is less agreed upon.

Table 3 - Impact of Remittances on GINI Coefficient

Type of Household	GINI Coefficient (%)	Type of Household	GINI Coefficient (%)
All Households	27.9 (27.1–28.8)	29 (28.2–30)	25.8 (25–26.6)
Only Recipient Household	27.3 (26.1–28.6)	29.9 (28.7–31.3)	20.2 (19.3–21.1)
Only Recipient Household of Internal Remittances	27 (25.8–28.2)	29 (27.6–30.4)	18.9 (18–19.8)
Only Recipient Household of International Remittances	29.1 (26.9–32)	36 (33.2–39.1)	24.7 (22.8–26.9)

Source: Author.

Table 5 shows the impact of remittances on the GINI coefficient for different scenarios. We also present a bias-corrected confidence interval (at 95 percent) that is computed using a bootstrap procedure that replicates the estimation 1,000 times. In all sample groups, the GINI coefficient indicates that remittances actually worsen inequality. On the national level, inequality increased from 25.8 to 27.9 percent. It is worth noting that the latter number, which is computed using observed consumption figures, is also very close to the World Bank's 2011 estimation of 28.2 percent (World Bank, 2014). But even though there is only a 2 percent rise, among recipient households, the situation is actually worse, as the increase is 7 percent. The finding reinforces our idea that remittances may exacerbate inequality between households from different social groups in the long run if such a circumstance prevails.

However, as observed by Barham & Boucher (1998) and Rodriguez (1998), an increase in inequality may also be caused by artificially reduced variance of expected expenditure of remittance-receiving households, which is based on only observed characteristics of the non-recipient households. In other words, the predicted values are conditional and hence disregard other unobserved attributes that explain the variation in consumption. Therefore, observed

expenditure of non-recipient households is more likely to have higher variability whereas that of the receiving households has lower variability, which may influence our indicators. Nevertheless, some research papers (Adams & Cuecuecha, 2010; Barham & Boucher, 1998; Brown & Jimenez, 2008; Rodriguez, 1998) have reported a similar finding, namely, that remittances severely aggravate inequality. But there are also studies that challenge this conclusion. For example, Adams (2006) finds that remittances have almost no impact while Acosta et al. (2008) discover that remittances reduce inequality.

7. Concluding Remarks

This paper investigates the impact of remittances on poverty and inequality in Cambodia using monthly per capita consumption to measure household welfare and a counterfactual method to impute it in a scenario of no migration, no remittances. We also test for selection bias, and the result shows that non-remittance-recipient households are randomly drawn from the population, thus, such bias is not substantial and negligible. Then, we simply proceed to predict per capita expenditure of remittance-receiving households using OLS. Comparing between households that do or do not receive remittances, we find strong evidence that in 2014 remittances reduced poverty by about 0.6 percent on the national level, but the impact is quite larger (1.6 percent) if we only consider recipient households instead of all households, and it is very large for international remittance-receiving households. But the implication is that these households rely very much on international funds and thus will fall back below the poverty line almost immediately if such money is transferred irregularly. In addition, we discovered that the poverty rate has not only decreased but that the poor are also living in a better condition compared to a scenario in which they received no remittances. Both types of remittances generally decrease the poverty gap by 6.8 or 17 percent for a sub-sample of recipient households. However, they also increase inequality by 2 percent, as measured by the GINI coefficient. This situation may be exacerbated in the long term due to increasing amount of remittances flowing into Cambodia, especially to households that can afford to have migrant workers in South Korea and Japan, as such funds tend to flow toward the middle-income families rather than the poor.

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Determinants of School Attendance rate for Bolivia: A spatial econometric approach

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Abstract

The main objective of this paper is to examine the impact of the spatial component on Bolivian school enrollment rate and to identify its main determinants. The contribution of this research is to stablish and identify the key relationships between the school attendance rate and spatial lagged explanatory variables.

Another aim of this research is to make an exploratory analysis of spatial data with reference to the Bolivian municipalities and identify spatial interaction. This objective is reached through the construction of a contiguity matrix using software Geoda. This methodology shows two types of contiguity: the rook contiguity and the queen contiguity. The research evaluates the results of the queen contiguity matrix.

Also, this paper employs Luc Anselin's Spatial methodology using spatial error models as a specification of the spatial regression. Previously running an ordinary least square (OLS) model and make the tests to examine the hypothetical presence of spatial dependence between the data. To achieve this objective, the paper uses Moran's I and Lagrange Multipliers to detect spatial interaction and obtain the correct specification.

This paper uses a municipal-aggregated level data basis built through Bolivian Census in 2012. The percentage rate of school attendance between 6-19 years old is considered as a unit of analysis. Cross-sectional and geo-coded data, as well as shape files and geographic information system (GIS) files of Bolivian municipalities are used for this analysis.The results reveal that there is an existent relationship between school attendance and the spatial component. Spatial diagnostics allow to use a spatial error model to estimate specification's parameters. Hence, the dependent variable can stablish statistically significant relationships with the explanatory variables.

The paper safely concludes that spatial component affects directly the school attendance rate in Bolivia. After the final specification and the spatial analysis, the paper concludes that the relationship between the dependent variable and education and household welfare variables is positive and it is negative with rural percentage of population and poverty variables.

keywords: Spatial Regression, Spatial Dependence, Spatial Error Model, Geo-Coded Data, Contiguity Matrix, School Attendance Rate.

1. Introduction

Spatial Econometrics had an important development over the last years. This

branch has highlighted the importance of spatial interaction when cross-sectional data and panel data are modeled (Paelinck and Klaasen, 1979). In this sense, this subfield of Econometrics allows to measure the effect of the spatial component of an economic variable. This effect is analyzed through two fundamental characteristics: (1) Spatial autocorrelation and (2) the spatial heterogeneity (Anselin, 2003).

The importance of specifying, estimate and include the spatial component in modern Econometrics arises as a result of two factors (Anselin, Florax, 1995): (1) increased interest in models that explain similar patterns of behavior between variables that share geographical proximity (contiguity). (2) the need for spatial data management given the existence of georeferenced data associated with availability of geographic information systems (GIS). The development of these factors has represented an innovative methodology that spectrally analyzes the incorporation of spatial effects to the causal relations that are used in regular research.

Spatial regression methods allow to observe spatial dependence between observations when they belong to border regions or neighboring areas (Lesage, 2008). Contiguity property means that observations tend to exhibit values similar to those in nearest locations. Spatial econometrics becomes also important when observed variation in the dependent variable comes as a consequence of unobserved influences. For example, intrinsic or cultural factors could be identified when there are variations in the same variable if it changes from dimension to dimension, Ertur y Koch (2007) use several models that propose physical and human capital externalities as spatially interdependent variables that behave similarly between neighboring regions.

Recent studies have determined that economic phenomena occur not only at a certain time but also in a given space (Haining, 2003). The "new economic geography" (Krugman, 1998) has highlighted the effect that spatial externalities have had on different socioeconomic variables such as international trade and economic growth.

Empirical evidence shows that urban population has a higher probability to attend a school than rural population (Cid, 2011). Given that spatial component has an impact over socio-economic variables, this phenomenon is observed in school attendance rate and municipal poverty (Torres and Franco, 2015).

School attendance has always been an interesting variable for educational economics and also for general economics, given that this is a key variable for development and growth economics (Cetrángolo, Curcio, Caligaro, 2017). Despite the importance of spatial econometrics, the level of this type of research in Bolivia has been low.

This working paper uses a spatial approach to evaluate the determinants of school attendance rate in Bolivia using disaggregated data by municipality for each one of 339 Bolivian municipalities. It seeks to encourage, from a theoretical perspective and an empirical application, the use of spatial lag and/or spatial error models in the field of education and, in this sense, to promote different investigations that may be carried out in the future. In particular, it is important to evaluate the impact of the determinants of school attendance rate, as well as the incidence of the spatial component in this relationship.

This paper's structure is organized as it follows: Section 2 makes a brief review of the basics of spatial econometrics that were used in this investigation. Section 3 shows an exploratory analysis of spatial data and the endogenous and exogenous variables that were used in the investigation. In section 4, we focus on the estimation of the model, as well as the different spatial autocorrelation tests observing the results involved. In section 5 the respective conclusions of this paper are analyzed.

2. The basics of spatial econometrics

Spatial econometrics starts from the principle of the first law of geography, which states that all things are related to each other, but the closest things in space have a greater relationship than the distant ones (Tobler, 1979). This postulate constitutes a cornerstone in the presentation of the spatial component as a determining variable in a regression. Luc Anselin (Anselin,1999) defines spatial econometrics as a branch of econometrics that deals with the appropriate treatment of spatial interaction (spatial autocorrelation) and spatial structure (spatial heterogeneity) in regression models with cross-sectional and data panel.

Spatial econometrics is concerned with showing the importance that the space component has in the specification of the model, Paelinck and Klaasen (1979) mention five characteristics of spatial econometrics, these are: i) The role of spatial interdependence in this type of models. ii) The asymmetry of spatial relationships. iii) The importance of other explanatory factors located in other spaces. iv) The differentiation between ex-post and ex-ante interactions and v) The explicit modeling of space.

Geographic information is one of the fundamental elements for the use of spatial models. Geo-referenced information data contain important information about

spatial interaction and its main characteristic is that they are associated with a location, that is, they can be represented by a map under latitude, longitude and/or distance coordinates. One of the most used forms for the representation of spatial information is to locate the set of polygons in a matrix of specific weights; this matrix is called contiguity and is symbolized with W (weights). Matrix W quantifies connections between regions of a given territory and neighboring regions and helps to identify whether there is spatial autocorrelation between observations. This spatial autocorrelation plays an important role in the spatial analysis of geographic systems (Haining, 2009). Several authors (Pinske and Slade, 1998. Chen, 2008) indicate different methodologies for the construction of a contiguity matrix. The most practical methodology is the construction of a square and binary W matrix that will be later standardized. Formally, spatial relationships are a B subset of a Cartesian product $\mathbb{R}^2 x \mathbb{R}^2 = \{(i,j): i \in \mathbb{R}^2, j \in \mathbb{R}^2\}$ where $i \neq j$ and a set cannot be united to itself: $(i,i) \subseteq \mathfrak{B}$ this relation will be fulfilled for all spatial objects (Tiefelsdorf, 1998). The elements of this matrix will be assigned in the following way:

$$W_{ij} = \begin{cases} 1 & if\ i\ and\ j\ are\ spatially\ linked\ to\ each\ other \\ 0 & otherwise \end{cases} \quad (1)$$

It should be noted that the elements of the main diagonal of this square matrix will be equal to zero (since a region cannot be close to itself). As equation (1) explains more simply, the value of the spatial weights matrix will express a binary relationship with values of one and zero. Each space unit will be symbolized by a row i and its neighboring potentials that will be found in column j being i ≠ j. The value Wij will be one if the region i is considered neighbor to the region j and will take the value of zero when they are not. It should be noted that spatial relationships show a clear difference with temporal relationships, given that temporal relationships show a past-present-future sequence while spatial relationships can be multidirectional and multilateral.

Geoda is a program that provides a graphical interface to methods of exploratory spatial data analysis and employ spatial weights denominated row-standardized form. Row-standardization takes the given weights W_{ij} (e.g, the binary zero-one weights) and divides them by the row sum:

$$W_{ij(s)} = {W_{ij}}\Big/{\sum_j W_{ij}} \quad (2)$$

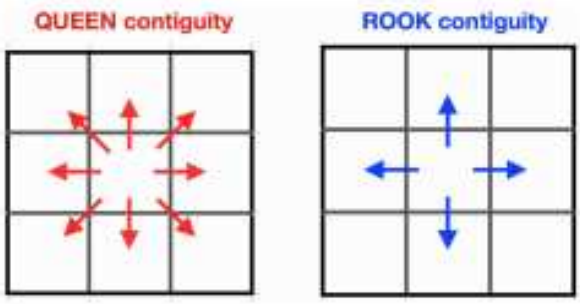
Intuitively, the mentioned standardization is done to obtain percentages of spatial influence (values that go between zero and one) whose sum of each row totals one, equation (3) shows this procedure:

$$S_0 = \sum_i \sum_j W_{ij} \tag{3}$$

As noted above, the spatial weights matrix is important for assigning contiguity between regions. Contiguity is defined as two spatial units that share a common boundary. This paper establishes a difference between two contiguity criteria, the "rock" criteria and the "queen" criteria. These terms refer to an analogy between the movement of chess pieces and the direction of contiguity between neighboring regions.

The rook criterion defines neighbors by the existence of a common edge between two spatial units. The queen criterion is somewhat more encompassing and defines neighbors as spatial units sharing a common edge or a common vertex. Figure 1 expresses this contiguity criterion as it follows:

Figure 1 - Contiguity Criteria



Source: De Bellefon, Loonis and Le Gleut, 2018

Spatial econometrics is a field in which techniques are designed to incorporate and analyze the spatial dependence that exists between observations that are considered contiguous. Spatial dependence is a functional relationship between what happens at a certain point in space and what happens elsewhere (Moreno and Vayá, 2000). This indicates that the dependent variable will have high levels of spatial autocorrelation when its values are affected by both exogenous variables and geographical variables. There are different statistical tests to detect spatial autocorrelation, one of the most common is the Moran I test (Moran,1948), which is a global indicator of spatial dependence.

$$I_i = \frac{\sum_i \sum_j W_{ij} Z_i Z_j}{\sum Z_i^2} \quad (4)$$

In equation (4) Moran's test I is explained where W_{ij} are the terms of a square binary matrix of standardized contiguity, Z_i represents the value of the dependent variable (in our case, the school attendance rate of each region). To determine the presence of spatial autocorrelation, the value of the Moran's I should be close to 1 or, more accurately, the null hypothesis that is the absence of autocorrelation should be rejected in a significant way. However, the Moran's I indicator is not able to detect the observations in which the spatial dependence develops with greater intensity. The identification of spatial clusters is given by two important tools: a) Moran's scatterplot and b) Univariate local Moran's I. Moran's scatterplot is a tool that Geoda software proposes to determine the intensity of spatial autocorrelation in neighboring areas (Anselin, 1993). This scatterplot shows the spatial phenomenon in a more disaggregated way because it analyzes the standardized dependent variable on the abscissa axis, and the spatial lag also standardized on the ordinate axis (y-axis). This graph is divided into four quadrants that show the intensity of the spatial relationship existing between the observations of the dependent variable in order to identify "hot spots". The first and third quadrants show a positive spatial association, while the second and fourth quadrants show negative relationships:

Another tool to obtain additional spatial evidence is Univariate local Moran's I. It is a statistical indicator used to identify the presence of spatial clusters, and this indicator has the null hypothesis of no spatial autocorrelation. These two spatial autocorrelation detection tools, the spatial contiguity matrix W and the data of both endogenous and exogenous variables, are the necessary inputs to represent an autoregressive spatial process and also build a first spatial regression model. The first reference when we want to build a spatial model is the model of Manski (Manski, 1998); this is the basic specification of a spatial model and has the following structure:

$$Y = \rho WY + X\beta + \theta WX + u \quad (5)$$

And the residual equation is:

$$u = \lambda Wu + \varepsilon \quad (6)$$

A parsimonious approach to represent an autoregressive spatial process is the one that shows a relationship between the dependent variables, the independent

variables and their respective relationship with the spatial term. If λ = 0 in equation (6), then we get the first specification that indicates the starting point on the spatial regression methodology, it is known as the Spatial Durbin model (Lesage and Pace, 2009). This expression is given by:

$$Y = \rho WY + X\beta + \theta WX + \varepsilon \quad (7)$$

In the expression (7) the dependent variable is related to the spatial lagged component of the same dependent variable WY with the vector of estimators ρ, the vector of regressors associated to the explicative variables $X\beta$, the spatial lagged component of the independent variables WX with the vector of coefficients θ and the residual term ε.

If $\theta = 0$ then:

$$Y = \rho WY + X\beta + \varepsilon \quad (8)$$

Equation (8) reflects a model that shows an endogenous interaction effect where the dependent variable Y is an Nx1 vector consisting of one observation on the dependent variable for every unit in the sample (i=1, …, N). Also, the dependent variable is in function of the spatial lag vector Wy with the parameter ρ that reflects the strength of spatial dependence; the model is completed by the exogenous/explanatory variables including the before mentioned constant term vector and the respective regression vector of parameters β and the disturbance vector ε that contains independent, normally distributed terms. Note that if the parameter ρ is not statistically significant, the spatial component will not have an impact on the dependent variable, which means that the model becomes in a normally OLS regression, therefore the importance of this spatial parameter. For understanding the impact of the spatial interaction we could premultiplicate equation (8) by the term $(I - \rho W)^{-1}$ and reorganizing terms we obtain expression (9) as it follows:

$$Y = (I - \rho W)^{-1} X\beta + (I - \rho W)^{-1}\varepsilon \quad (9)$$

Expression (9) shows a traditional regression model with a spatial impact term $(I - \rho W)^{-1}$. This term shares much similarity with the Leontief inverse matrix in the input-output literature. The Leontief matrix shows that each element outside the main diagonal measures the indirect impact that one sector has on the other, while the main diagonal measures the direct impact plus the indirect impact of the sector itself. This argument is necessary to understand the role of the contiguity matrix W in this type of models (Aroca, 2000). If the term $\rho = 0$,

equation (5) becomes in a new model called Spatially Lagged X Model like denotes expression (8):

$$Y = X\beta + \theta WX + \varepsilon \quad (8)$$

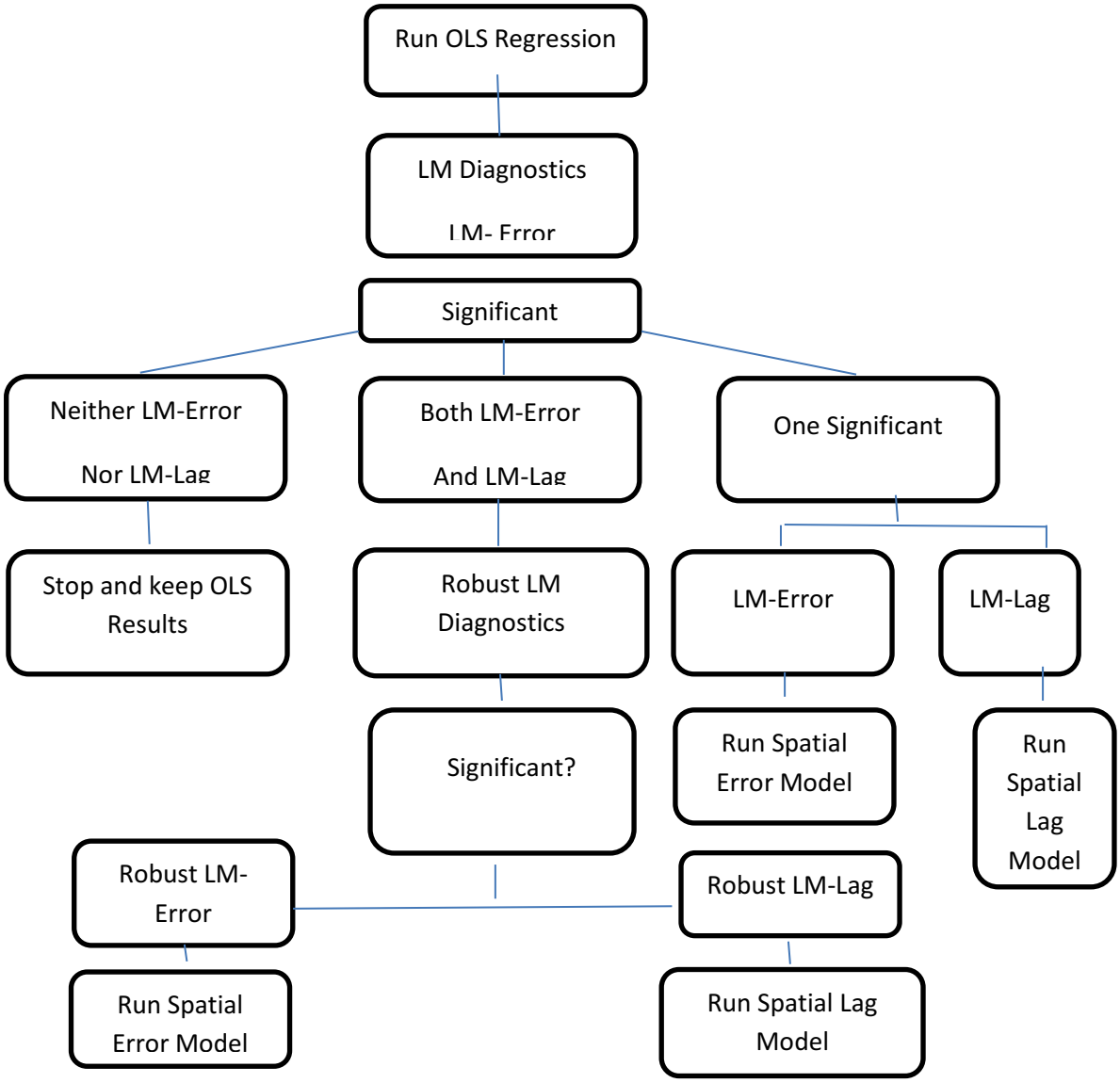
SLX Models are a second way to observe the spatial autocorrelation between neighbors. In this case, the spatial interaction is given when the values of the explicative variables in a region could be related to the value of y in a neighboring region. SLX models produce flexible spatial spillover effects. A Spatial spillover effect is defined as the marginal impact of a change to one explanatory variable in a particular cross-sectional unit on the dependent variable values in another unit, and is derived from the reduced form of a spatial econometric model (Elhorst and Halleck Vega, 2017).

Another case where we can identify spatial correlation would be if $\theta = -\rho\beta$. In this case, the Spatial Durbin Model becomes into a Spatial Error Model that shows spatial interaction on the error term. A demonstration of SEM models could become into regular OLS is showed in Anselin et al.,2003.[1]

Aside of demonstrate spatial interaction with Moran´s I (Local, Global and Scatterplot), this research is based in a methodology of selection criteria to choose which models can be considered for spatial analysis. This methodology shows a path of decision to obtain the most appropriate spatial model (Anselin,1999).

[1] $Let: Y = \rho Wy + X\beta + (-\rho\beta)Wx + \varepsilon$
$(I - \rho W)y - (I - \rho W)X\beta = \varepsilon$
Since: $\lambda = \rho$
$(I - \rho W)y - (I - \rho W)X\beta = (I - \rho W)u$
$Y = X\beta + u$

Figure 2 - Spatial Model Selection Criteria



Source: Adaptation from Anselin, Luc. Exploring Spatial Data with Geoda: A Workbook (2005)

This research will use the model selection criteria exposed in figure 2. It should be noted that if Robust LM-Error and Robust LM-Lag p-values are both significant, the selected model will be the one which has lower p-value on the significance tests.

In a Spatial error model (SEM) the specification is given by equation (5) with no spatial autocorrelation in the endogenous and the exogenous variables ($\rho = \theta = 0$) and equation (6), that also could be written:

$$y = X\beta + (I - \lambda W)^{-1} + \varepsilon \tag{9}$$

The residual term ε is assumed to be independently normally distributed, i.e. $\varepsilon \sim N(0, \sigma^2 I)$. Solving equation (9) for ε we obtain:

$$\varepsilon = (I - \lambda W)(y - X\beta) \tag{10}$$

And the Jacobian:

$$J = \left|\frac{\partial \varepsilon}{\partial y}\right| = |I - \lambda W| \tag{11}$$

Based on equations (9) (10) and (11), it is possible to create a log-likelihood function for the dependent variable. Thus, the Spatial Error Model (SEM) is obtained by adding the term ln $|I - \lambda W|$ to the log-likelihood function of the standard regression model:

$$\begin{aligned} lnL(\beta, \lambda, \sigma^2 | y, X) & \\ &= -\frac{n}{2}\ln(2\pi) - \frac{n}{2} ln\sigma^2 + \ln|I - \lambda W| \\ &- \frac{1}{2\sigma^2}(y - X\beta)'(I - \lambda W)'(I - \lambda W)(y - X\beta) \end{aligned} \tag{12}$$

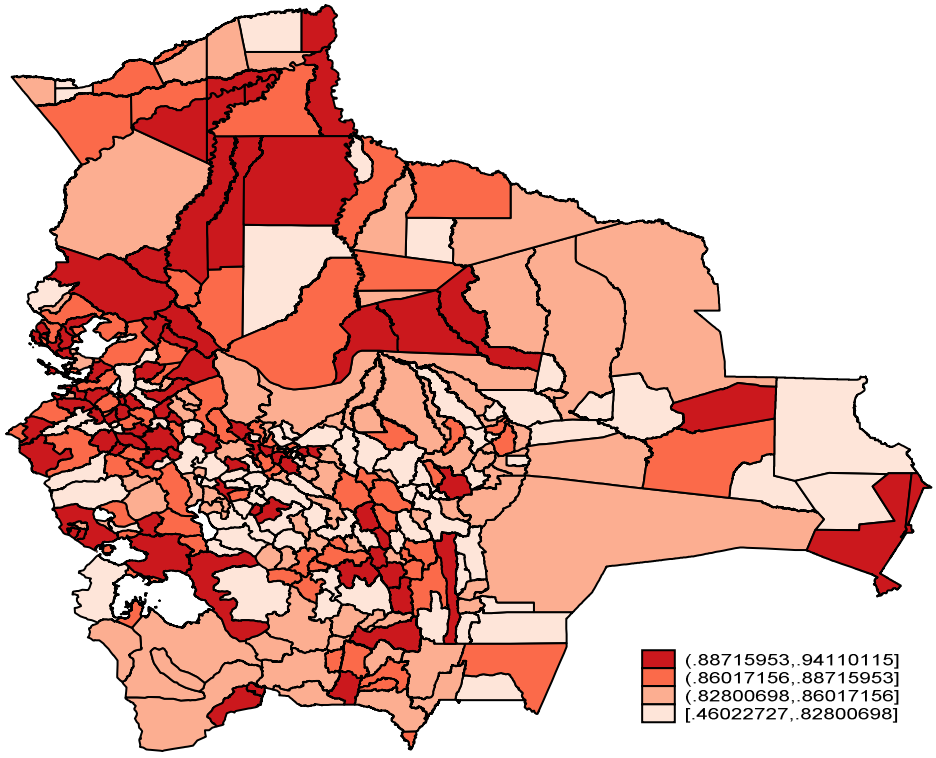
Maximizing the log likelihood function of equation (12) equals to minimizing the sum of transformed squared errors $\varepsilon'\varepsilon$ corrected by log of the Jacobian expression obtained in equation (11). With this procedure, the flowchart of spatial error models resumes in: i) Make the OLS regression and compute the residual vector ii) Maximize the likelihood function to obtain the autoregressive

parameter λ. iii) Make a GLS estimation using the estimated parameter λ. iv) Compute the GLS residual vector analyzing the convergence criterion. v) Compute ML estimator for the error variance given the residual vector and the autoregressive vector. To carry out this process, STATA and Geoda software are used on this research.

3. *An exploratory analysis of spatial data*

In this section we perform an exploratory spatial data analysis (ESDA) that consists in a graphical-statistical representation the endogenous and the exogenous variables of the spatial model. The ESDA represents a scrutiny of classic statistical methods like thematic map, histogram and dispersion diagram both of the exogenous and endogenous variables and is an indispensable instrument when making the first approximations to the study of the structure of socio-spatial information in a given area of study (Buzai and Baxendale, 2009).

Figure 3 - Bolivian School Attendance rate (%)

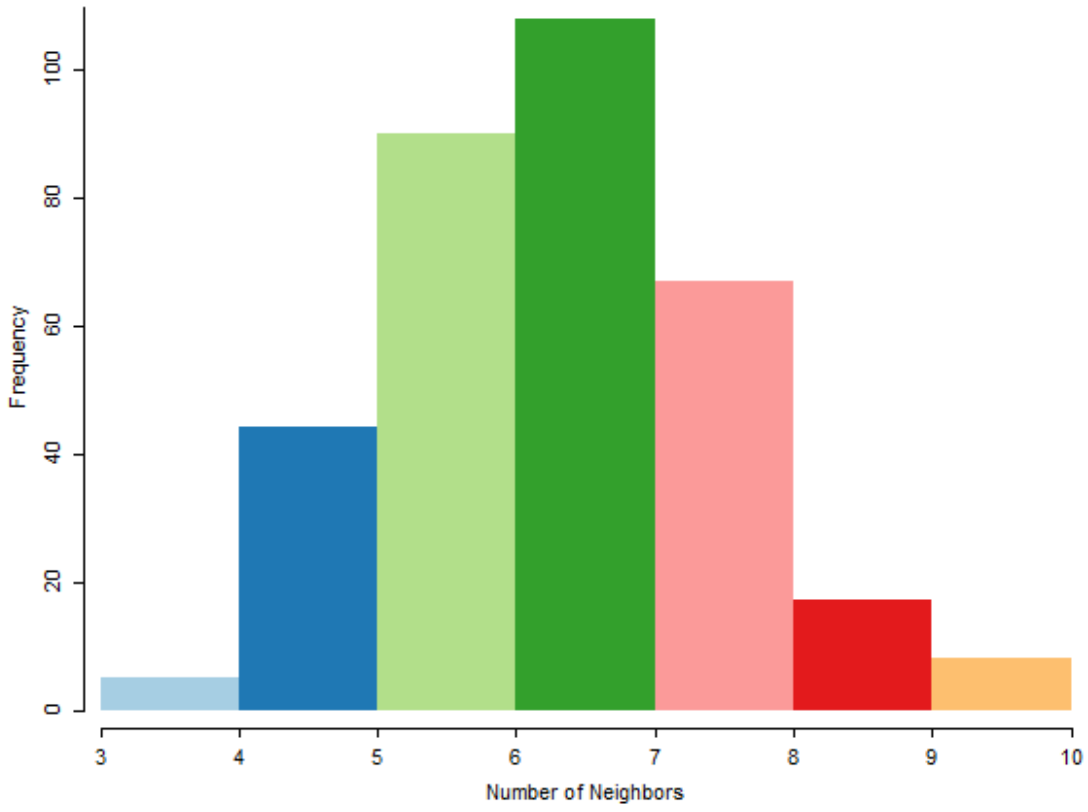


Source: Own elaboration based on INE data, 2012

Thematic maps represent the spatial distribution of the variable. To this purpose, figure 3 shows thematic map of Bolivia with the school attendance rate for each of the 339 Bolivian municipalities. This graphic shows the presence of "clusters" or graphical evidence that make us think that there is spatial correlation on the dependent variable (school attendance rate), but this is only a "clue" of spatial correlation. To be sure, it is important to make another graphical and statistical test.

ESDA suggests to build a histogram of frequencies of the dependent variable. Figure 4 shows the number of neighbors that share each municipality; we have five municipalities sharing borders with at least three neighbor regions, and eight observations sharing borders with 9-10 neighbor regions. It is worth noting that to determine the number of neighbors for each region the queen contiguity matrix is used, as explained in section (2).

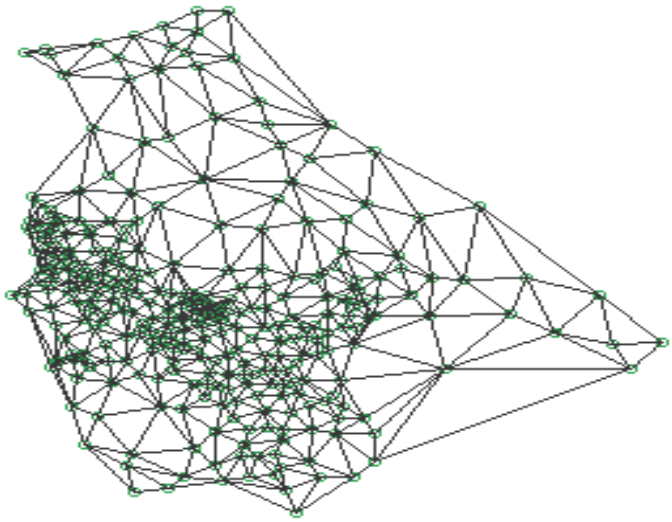
Figure 4 - Histogram number of neighbors (Bolivian Municipalities)



Source: Own Elaboration based on INE municipal data, 2012.

To understand how neighboring connectivity works, we use a connectivity graph that show us precisely how the neighbors are connected. Figure 5 allows to observe the spatial interaction between municipalities.

Figure 5 - Connectivity Map of Bolivian Municipalities



Source: Own Elaboration based on INE municipal data, 2012.

The proposed model on this research uses as explicative variables the level of education, electric power coverage, labor market's rate of participation, child labor rate, percentage of particular households, migration rate and percentage of rural population on every municipality. Briefly, the explanatory power of a variable can be quantified via the correlation coefficient. For this purpose, Table 1 in appendix section shows correlation matrix between the dependent and the exogenous variables.

The first explanatory variable is educational level of the municipality; we estimate this variable using the proportion of the population that has higher education. The main hypothesis is that this variable has a positive impact on the dependent variable because a more educated society should have higher percentage of school attendance rate (Cid, 2011).

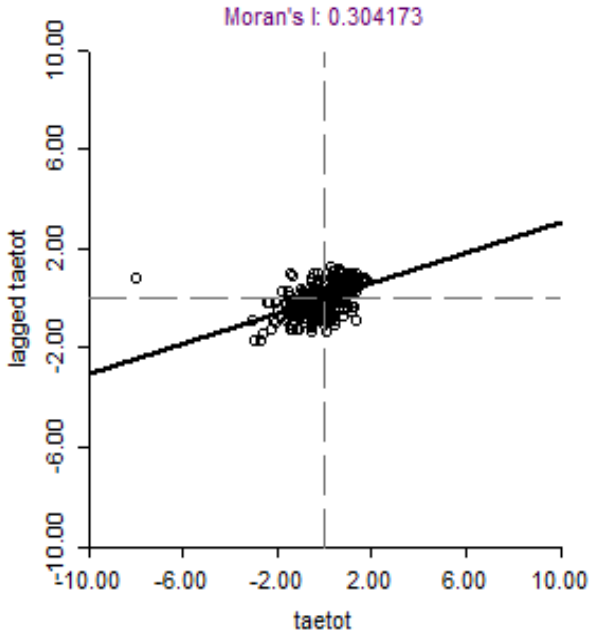
To measure the urbanization level of the municipality we use two proxy variables: electric power coverage the and percentage of particular households. Both variables are expected to be theoretically positive and statistically

significant to the model. Electric power coverage makes it easy to people study during the night or to those who have and allocate more time to that activity. At the same time, it facilitates access to Information and Communication Technologies, ICT (Kanagawa and Nakata, 2008). The other variable used to measure the urbanization level is the percentage of particular households; this variable shows a positive relationship between the urbanization level of a municipality and the percentage of particular households, so the expected sign of this variable should be positive.

Variables like migration rate, child labor rate and percentage of rural population on every municipality should be important to this model, because they represent a measure of the socio-economic dynamic context of the municipality, the impact of these variables on the school attendance should be negative. Higher migration rates show higher risk for scholar absenteeism and being held back (Vargas and Camacho, 2014). Child Labor rate have a negative incidence on school attendance rate, evidence from many countries suggests a close negative association between these two variables (Khanam, 2008. Kumar and Saqib, 2017).

School Attendance rate should show any hint of spatial correlation that will be tested subsequently. For that purpose, figure 6 evaluates Moran's I that could give a clue of spatial correlation (Anselin, 2000). It should be noted that, having a higher (or lower) value than zero in Moran's I does not necessarily implies spatial correlation. For evaluating spatial correlation, this value has to be different than zero and has to be also statistically significant in the spatial model.

Figure 6 - Moran's I School Attendance rate for Bolivia



Source: Own Elaboration based on INE municipal data, 2012.using GeoDa software.

4. Model estimation

In this section, the specification of the model is examined as well as the first results of the OLS and SEM regressions. Following Anselin's methodology, we estimate the model and evaluate the statistical significance of the variables as well as the significance of the spatial component through of Moran's I test. This result will determine if the spatial correlation observed before has an important impact on the model, and also which spatial(s) model(s) is(are) the most appropriate(s) for the research.

Theoretically, as it is explained in previous section, school attendance rate is positively related to educational level of the municipality, electric power coverage, percentage of particular households, and formal market labor participation. The relationship should be negative with the other variables, like migration rate, child labor rate and percentage of rural population. Based on figure 2 that shows spatial model selection criteria, once the LM diagnostics (i.e. both the parameters and the spatial component) are statistically significant then it is possible to pick one spatial model to represent the current relationship

between the dependent variable, the independent variable and the spatial component. It should be noted that the diagnostics for spatial dependence showed in table 2 are constructed using row-standardized weights in the spatial matrix, for that reason the evidence that we found is that there exists significant spatial interaction in the school attendance rate of Bolivian municipalities. As the theoretical review underlines and as it is shown in table 2 in the appendix, the coefficient of spatial interaction (Moran's I) is statistically significant which means that the null hypothesis of no spatial correlation is rejected. In other words, the spatial component has a significant impact on the dependent variable.

Also, table 2 shows Lagrange Multiplier tests (Lag and error) and results show that both models can be executed. Nevertheless, Anselin's spatial methodology indicates that if both LM tests are significant, then the robust tests should be observed, and as it is explained before, spatial error model (SEM) and (SARMA) model are the indicated approaches in analyzing the spatial impact on the dependent variable (significant spatial dependence).

Since we found that Lagrange Multiplier test for Spatial Error Model is statistically significant. Anselin's methodology indicates that SEM model should be estimated. Table 3 in the appendix shows the first results of the OLS and SEM regression; we found statistical evidence that lambda spatial component has a significant impact on the school attendance rate. Also, the relationships between the dependent variable and the explanatory variables are in accordance with those indicated by the economic theory. With the exception of fertility rate, all variables are statistically significant to the SEM model and the signs show the expected behavior that is explained on the previous section.

The obtained results show that levels of higher education are important for reducing the school absenteeism into Bolivian municipalities, and a more educated society is associated with a long-run growth economic rate (Hanushek & Woessmann, 2008).

Electric power coverage and the percentage of particular households have a positive and significant relationship with the dependent variable, although, there are different methodologies to measure the level of urbanization (Wen & Ren, 2016. Zhao et al., 2016). These relationships are important to underline that the level of urbanization becomes an important variable and have a significant impact into the school attendance rate.

Labor market participation has a significant impact on the dependent variable. It is important to remark that this is a key variable on the model, because it shows the percentage of (formal) labor market participation; the estimated model shows that there is a positive relationship between this variable and the

dependent variable. On the other hand, informality affects the school attendance rate and also economic growth (Urdinola and Semlali, 2010).

Child labor rate is the variable with higher impact in the model, it shows a negative relationship with the dependent variable and its important because it is a widespread phenomenon. Approximately 20% of children between 7-14 years are part of the Bolivian labor force (U.S. Department Labor).

Migration rate have negative impact over school attendance rate; empirical evidence suggests that living in a migrant household lowers the chances of children completing high school (Mackenzie and Rapoport, 2006). The percentage of rural population also has a negative impact on school attendance. This impact shows a measure of social exclusion in rural areas where the school rate attendance is lower.

5. Conclusions

Spatial econometrics has become a prominent topic in the recent scientific literature Emphasis has been made that spatial analysis is a modeling reliable and robust tool which allows to explain the behavior of variables linked to space. Interpretations of estimated parameters and inferences regarding the modeled relationships required steady-state view, where changes in the explanatory variables lead to simultaneous feedback that produce a new steady state equilibrium (Lesage,2008).

As it was clarified in the introduction of this research, the main goal of this paper was to evaluate the impact of the determinants over school attendance rate, as well as the incidence of the spatial component in this relationship. The obtained results proved that spatial component has a significant impact over the school attendance rate in Bolivian municipalities. Also, spatial diagnostics were helpful to determine that Spatial Error Model (SEM) was the most accurate specification to explain the dependent variable's behavior. The explanatory variables used on this research have a significant effect over the dependent variable; the signs and the established relationships were those expected, as the theoretical framework indicted before. It is important to remark the incidence of child labor rate on school rate attendance; this variable is the one that has the higher impact in the model and government should work on effective policies that diminish this variable's percentage in the Bolivian municipalities.

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Appendix

Table 1 - Correlation Matrix of the dependent and independent variable

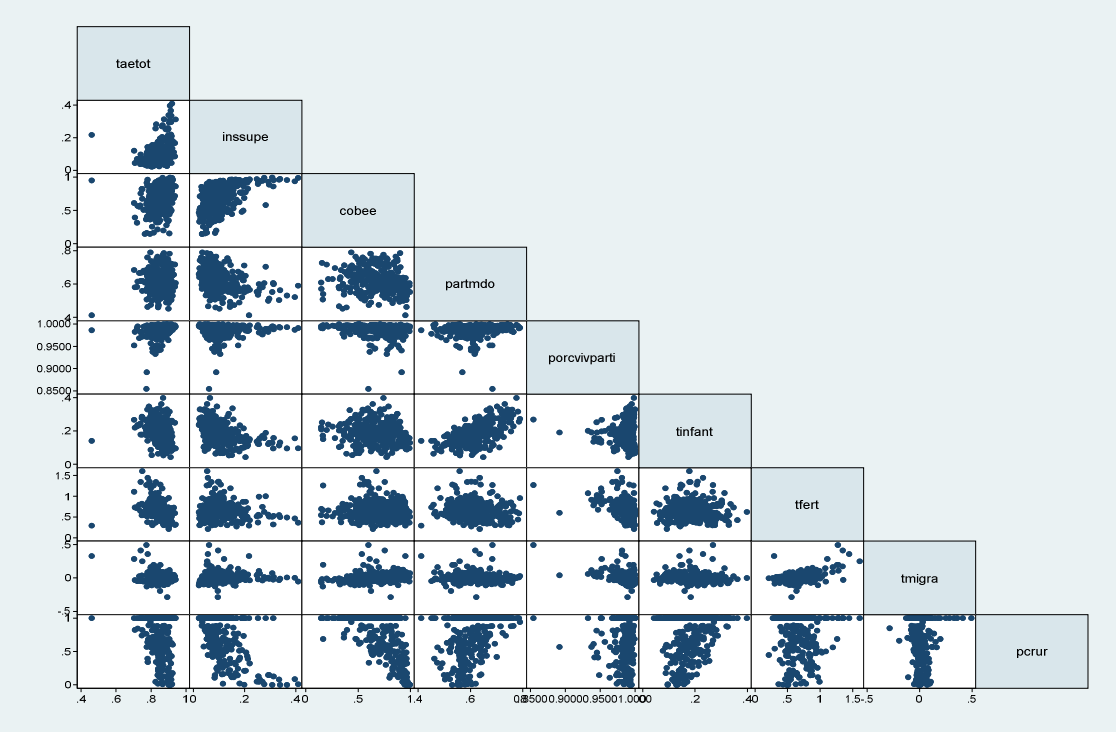

Table 2 - Diagnostics for spatial dependence for weight matrix (row-standardized weights)

Test	Value
Moran's I	6.1443***
Lagrange Multiplier (lag)	15.5537***
Robust LM (lag)	0.7023
Lagrange Multiplier (error)	31.3940***
Robust LM(error)	16.5426***
Lagrange Multiplier (SARMA)	32.0963***

*** Significance level 1% ** Significance level 5% *Significance level 10%

Table 3 - Econometric Results for dependent variable School Rate Attendance

Variable	MCO Coefficient	SEM Coefficient
R- squared	0.4729	0.5329
Adjusted R- squared	0.4601	
Constant	0.2101	0.3027*
	(0.1620)	(0.1548)
Educational level of the municipality (higher education)	0.0516	0.0787*
	(0.041)	(0.0419)
Electric power coverage	0.0519***	0.0519***
	(0.014)	(0.014)
Labor Market Participation	0.3543***	0.3927***
	(0.0398)	(0.0464)
Percentage of particular households	0.5071***	0.3818**
	(0.1616)	(0.1517)
Migration rate	-0.1467***	-01838***
	(0.0343)	(0.0343)
Fertility Rate	-0.029***	-0.0208
	(0.0117)	(0.0127)
Child labor Rate	-0.4358***	-0.0466***
	(0.0425)	(0.0477)
Percentage of rural Population	-0.0218***	-0.0154*
	(0.0092)	(0.0093)
LAMBDA	-	0.4300***
		(0.0712)

*** Significance level 1% ** Significance level 5% *Significance level 10%

Exchange Rate Regime Choice and Economic Growth: An Empirical Analysis on African Panel Data

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Abstract

The purpose of this paper is twofold. First, it tests a panel data concerning 30 African countries based on the thesis of currency neutrality, and it attempts to rank, in case of rejection of this thesis, exchange rate regimes according to their economic performances by referring to economic growth rate. Second, it aims to list the internal structural characteristics of the panel countries by crosscheking them with exchange rate regimes to find out which are most favorable to economic growth.

The paper concludes the absence of currency neutrality in case of African countries and an outperformance of intermediate regimes. On the one hand, the latter are more conductive to economic growth in the case of countries experiencing positive terms of trade shocks and benefiting from FDI inflows. On the other hand, the opening of capital account is incompatible with intermediate regimes, and external indebtedness does not favor economic growth regardless of the exchange rate regime adopted. These results remain robust by testing several alternative econometric specifications (long-term estimate on five years' window data, estimates by controlling regional effects and by adopting finer aggregations of exchange rate regimes).

keywords: Exchange Rate Regime, Economic Growth, FDI, External Debt, Opening of Capital Account, Terms of Trade, Panel Data, Africa.

1. Introduction: the terms of the debate on exchange rate regime choice

The debate over the choice of the optimal exchange rate regime is ancient, but not yet worn out. Overall, it appears that the question of the superiority of one regime over the others doesn't result in any lasting consensus that can be generalized to all countries. Since the beginning, this question has been addressed in such a way that the optimal choice is at times conditioned by the country's internal structural characteristics and other times by the major changes affecting the international economy.

By imagining a global system governing the modalities of determining the external value of currencies, Mundell (1961) argued in favor of a flexible global market where currencies are freely exchanged, with the caveat that each of these currencies be backed by an "optimal currency zone" where the parities of the

said currencies within the zone are fixed. Thus, Mundell's system foresees a nesting of different regimes whose contours of the monetary zones are conditioned by a convergence of the internal characteristics of the economies. In fact, a monetary zone is only optimal if the factors of production are perfectly mobile between the zone's member countries, which experience similar external shocks.

At the same time, the choice of the optimal exchange rate regime was also related to the degree of economies' openness (McKinnon, 1963) and to the diversification of their productive apparatus (Kenen, 1969). By adopting a fixed exchange rate, a small but increasingly open economy would gain in terms of its internal price system stability. However, a flexible regime is more appropriate through smoothing the impact of real external shocks in case of a less diversified productive structure.

More recent works continue on the same positive approach by considering the economies' internal specifities in the choice of an exchange rate regime. Eichengreen and Hausmann (1999), for example, consider that countries with heavy external debts should opt for a fixed exchange rate regime in order to control their fiscal sustainability. Other authors, taking note of 1990s crises and financial integration acceleration, particularly in emerging and developing countries, conclude the instability of intermediate regimes in the medium and long terms and the irreversibility, as a corollary, of the bipolar choice (Obstfeld and Rogoff, 1995; Fisher, 2001; Eichengreen, 1998). As for Levy-Yeyati and Sturzenegger (2001), they argue for a flexible exchange rate regime in countries experiencing terms-of-trade shocks and characterized by nominal rigidities. In line with the level of economic development, Ferrari-Filho and De Paula (2008) and Guzman et al. (2017) argue that a managed exchange could be used as an additional lever of economic policy in developing countries. According to these authors, the possibility of currency manipulation should ensure both a stability favorable to investment and gains in competitiveness accelerating the industrialization dynamic in these countries.

Moreover, the consensus that emerges from time to time around a particular exchange rate regime is also a direct result of major changes in the international environment (Frenkel, 2017). Indeed, the recent history of exchange rate regimes choice dates back to the early 1970s with the end of the Bretton Woods fixed exchange rate system, which paved the way for multiple choices towards more or less flexible exchange rate regimes. Since then, and following the trend, more and more countries opted for an intermediate regime that lasted until the end of the 1990s, when this consensus subsided following a succession of currency crises in Europe (1991), Brazil (1998), Mexico (1994) and Southeast Asia (1997). This episode in history has resulted in countries migrating towards extreme regimes.

Then, the 2002 Argentinean exchange rate (currency board) regime crisis

marked a halt to the bipolar choice and left the scene for a new global consensus around the superiority of flexible regimes only, supported in this by international institutions (Ghosh et al., 2003).

Thus, it goes without saying that both the academic works and countries' practical history are conclusive with regard to the absolute superiority of a particular exchange rate regime. The choice of the optimal regime is then subject to a trade-off between the stability provided by fixing the exchange rate and the expected competitiveness from a flexible exchange rate (Bénassy-Quéré and Coeuré, 2002), governed by the internal conditions of countries interacting with new trends in the international economy. It is then a case-by-case choice (Frankel, 1999).

In this sense, the practical answer to the question of the exchange rate choice necessarily involves a positive empirical approach. Therefore, this article looks at the African case and aims to assess which of the exchange rate regimes is the most suitable. Instead of a direct approach that consists of identifying the determinants of the probability of choosing a particular exchange rate regime and then deducing from it the most appropriate regime for a given context[1], we opt for an alternative approach that allows to judge the opportunity of choosing a foreign exchange regime via these real economic performances. Beside the possibility to capture the final effect of a particular foreign exchange regime on economic growth, this approach also highlights the interactions that the latter may have with macroeconomic behaviors and which may affect the magnitude of this effect.

The purpose of this article is not to reach a conclusion on the intrinsic superiority of an exchange rate regime, but rather to help guide the choice of the regime towards the one that best meets the (internal and external) structural characteristics of our panel countries. More explicitly, the article seeks to provide some answers to the following questions:

i/ Is exchange rate regime nature neutral in terms of the effect on economic growth? In other words, does the classic postulate of the dichotomy between the real and monetary spheres prove true on exchange rate policy in Africa?

ii/ What makes countries with a particular exchange rate regime record higher or lower rates of economic growth? And under which internal and external conditions, the intensity of the impact of a particular regime would have been more or less important?

[1] Russel (2012) presents a critical review of the work on the determinants of the choice of exchange rate regime and highlights their difficulty in predicting the most appropriate regime because of their intrinsic instability over time.

2. Exchange rate regime and economic growth: literature reviews

i. The postulate of the dichotomy of real and monetary spheres: the case of exchange rate

On the theoretical level, the origin of the divergence between economic thought currents on the equation of exchange rate choice is the dichotomous nature of monetary and real spheres' thesis. On the one hand, the neokeynesians, like the neoclassics before them, exclude any incident of exchange rate evolution and a fortiori of the modalities of determination of its value on the long-term equilibrium. The latter is stable, and the shocks eventually end up being absorbed as adjustment delays are reduced and the rigidities trail off. Thus, both spheres are dichotomous in the long run, and exchange rate policy, as monetary policy, is neutral. In this context, the only viable economic policy is one that removes the obstacles hindering the convergence dynamics of the economy towards its long-run equilibrium and the only exchange rate regime compatible with such a vision of the economy can only be the flexible regime.

In short run, these two schools diverge. Based on a particular set of assumptions (rational expectations, markets structure in pure and perfect competition, absence of rigidities and adjustment delays), the neoclassics go so far as to assume that not only exchange manipulation (supposing that the regime in place allows it) is still ineffective, but it is also counterproductive[2].

Furthermore, by refuting the result of the neutrality of monetary policy either in the short or in the long term, the heterodox current (post-keynesians, new structuralists) believes that exchange rate policy has a primordial role in macroeconomic management. This role is more important in the case of developing countries (DCs) to constitute one of their industrial policy levers (Guzman et al., 2017), essential to get out of the trap of sub-development (Szirmai, 2009).

As a result, the theory is unable to settle the debate on the real effects of exchange rate evolutions and, as a corollary, on the superiority of one or another exchange rate regime. The approach to be adopted in this debate is necessarily empirical.

The first empirical works on exchange rate neutrality go back to Baxter and

[2] A monetary injection, for example, on the foreign exchange market in order to create a competitive depreciation of the value of the domestic currency should result, according to a pre-established normative scheme, in an increase in inflation (in the absence of any monetary illusion) which drives down consumption and increases savings (to keep real cash balances constant) and a rise in investment. In the end, the effect on real output is zero, but with a higher level of inflation.

Stockman (1989) and Baxter (1991). Comparing the real performances of a group of 42 countries before and after the collapse of the Bretton Woods system. In their works, they reject any causal link between the nature of the exchange rate regime and macroeconomic aggregates dynamic. For that, they resorted to Real Business Cycle model (RBC), whose constructive assumptions fall under the neoclassics' standards that eliminate any real lasting impact of any macroeconomic policy. Apart from exogenous shocks to productivity, the economy is forced to return to its initial steady state.

By abandoning the normative approach based on canonical models for a positive approach, Ghosh et al. (1997) reach the same conclusion of real exchange rate neutrality for a large panel of 136 countries. On a larger panel, the same authors (Ghosh et al., 2003) confirm the absence of any real impact of the nature of the exchange rate regime on macroeconomic performances. Similarly, on time series data treating the countries separately, Mills and Wood (1993) and Rose (1994) find no causal link between the change of exchange rate regime and growth, during the collapse of the Bretton Woods system, respectively in the United Kingdom and Germany.

The conclusions of these works, which can be described as first generation, are limited in scope and have several limitations. In the Ghosh et al. (1997) study, for example, growth regressions on the exchange rate regime do not eliminate the effect of other traditional determinants of growth, and the estimators used may be biased. Also, it adopts a de jure classification of exchange rate regime relating to official statements of countries that do not necessarily converge with their actual policies. This explains the fact that empirical works that followed the first generation have systematically used a de facto classification of exchange rate regimes (Calvo and Reinhart, 2002) (Rogoff et al., 2003) (Levy-Yeyati and Sturzenegger, 2003) (Husain, Mody and Rogoff, 2005) (Miles, 2006) (Aghion et al., 2009) (Petreski, 2009; De Vita, and Kyaw ,, 2011) and some autors went so far as to develop their own classifications (Reinhart and Rogoff , 2004) (Dubas et al., 2005) (Levy-Yeyati and Sturzenegger, 2005, 2016).

This new empirical literature verifying the theory of neutrality of the choice of the exchange rate regime also remains inconclusive. Some authors (Petreski, 2009; De Vita and Kyaw, 2011), for example, approve the neutrality thesis using panel data. Whereas for Husain et al. (2005), the choice of exchange rate regime is not neutral and economic growth is positively sensitive to flexible regimes.

Other authors find more nuanced results and make them depend on the level of development of the countries: Levy-Yeyati and Sturzenegger (2003, 2001) and Dubas (2005) only take up this thesis of neutrality in the case of industrialized countries and reject it for the DCs. According to them, a fixed exchange rate regime is associated in DCs with a low rate of growth and contained inflation. Rogoff et al. (2003), for their part, show that fixed regimes in DCs do not present any obstacle to growth but, on the contrary, they provide a certain credibility of

institutions propitious to investment and growth. Similar results were obtained in the case of South-East and Central European countries by De Grauwe and Schnabl (2005). That said, one of the major limitations of these empirical works that we found in literature, which reduces the scope of their results, is that they only conceive a causal relationship between the choice of the exchange rate regime and economic growth in a unidirectional frame. However, this causal link can be very well bidirectional and the non-treatment, if any, of this effect of return of the exchange rate regime leads to biased regressions. After correcting this endogeneity bias in their regressions using adapted econometric techniques, Levy-Yeyati and Sturzenegger (2003), Miles (2006) and Aghion et al. (2009) refute the neutrality thesis and demonstrate that the link between the economic growth rate and the exchange rate regime is statistically significant.

ii. Exchange rate regime, economic structure and development

Although the exchange rate neutrality thesis remains a subject of theoretical and empirical debate that is not ruled out for advanced countries that are close to full employment, its rebuttal should, in principle, be more implicit in the case of developing countries where full employment, if it exists, is suboptimal. The actual effect of the choice of the exchange rate regime is well established in developing countries (Guzman et al., 2017) and is conditioned by economic, financial and institutional context in these countries.

Indeed, exchange rate regime choice impact on economic growth in developing countries depends on the combined effect of this regime with the frequency and the nature of external shocks (positive versus negative) and the presence of internal nominal rigidities, financial development (Aghion et al., 2009), external debts and Foreign Direct Investment (FDI) weight, capital account openness (Bailliu et al., 2003) and the existence or not of a parallel market (Miles, 2006).

In absolute terms, flexible exchange rate regime is renowned for its ability to absorb external shocks, but at the risk of financial instability and inflationary pressures negatively affecting growth. In the event of a real negative shock, adjusting the parity of the currency avoids the economy the cost of distortions in resources allocation that can be undergone in the short term in a context of domestic price rigidity (Freidman, 1953) (Bailliu et al., 2003). On the other hand, the scope of a positive shock is reduced in a flexible regime. In the event of the same shock, a flexible regime also saves the economy the cost of a rise in the interest rate that would have occurred in case of a fixed exchange rate. That said, the interest rate response depends on how Central Banks use the size of their balance sheet. For an unchanged balance sheet size, Central Banks would opt for

a sterilization operation of the withdrawal of liquidity in order to maintain a fixed exchange rate by supplying the monetary market and maintaining as a result the interest rest to its pre-shock level.

In an extensive empirical work, covering 183 countries, Edwards and Levy-Yeyati (2003) and Levy-Yeyati and Sturzenegger (2003) demonstrate that exchange rate flexibility is conducive to economic growth in the case of developing countries and reduces half of the negative impact of a deterioration of the terms of trade. In advanced countries, the nature of exchange rate regime has no real effect. Miles (2006) takes on his behalf the results of the latter works for developing countries and nuances them, considering that these countries suffer already from internal distortions negatively impacting growth regardless of the nature of the chosen exchange rate regime. By crossing fixed regime with an approximate variable of the internal distortions (Black Market Premium) in a regression of economic growth, it shows that the negative effect of the fixed regime goes through these distortions that characterize at least a part of the DCs. These distortions take the form of rampant inflation, unsustainable macroeconomic imbalances, poor quality of institutions (Calvo and Mishkin, 2003) or all of this together.

As for the risk of financial instability inherent to the exchange rate volatility in a flexible regime and its negative impact on the real economy, Aghion et al. (2009) make it depend on the ability of companies to be able to finance themselves and invest in order to improve their productivity. The authors clearly differentiate the case of developing countries with a shallow financial market and financing institutions that are relatively shy in the event of risks from advanced countries. For the first category of countries, they show that productivity is negatively related to the degree of flexibility of the exchange and consider preferable the adoption of a fixed regime.

The inflation risk is not to be discarded in case of flexible exchange. If an inflationary spiral would be unlikely to settle, following a negative external shock, via a salary indexing mechanism since the latter is often failing in DCs, it can still be triggered by imported inflation where the extent depends only on penetration rate and price elasticity of imports and/or of a low productivity which characterizes the developing countries far from the technological frontier.

In addition, the choice of the exchange rate regime also affects economic growth according to the debt structure of the economy (Eichengreen and Hausmann, 1999). The higher the private and public external debt, the more exchange rate flexibility may hinder growth in the event of a negative external shock. The latter is emphasized in the presence of a flexible exchange rate by a depreciation of external value of currency immediately increasing the internal cost of debt tightening the vice of the sustainability constraint (Calvo, 2000). Eventually, the risk premium increases for the next round of foreign currency fundraising jeopardizing further the programming of investment projects and, as a result,

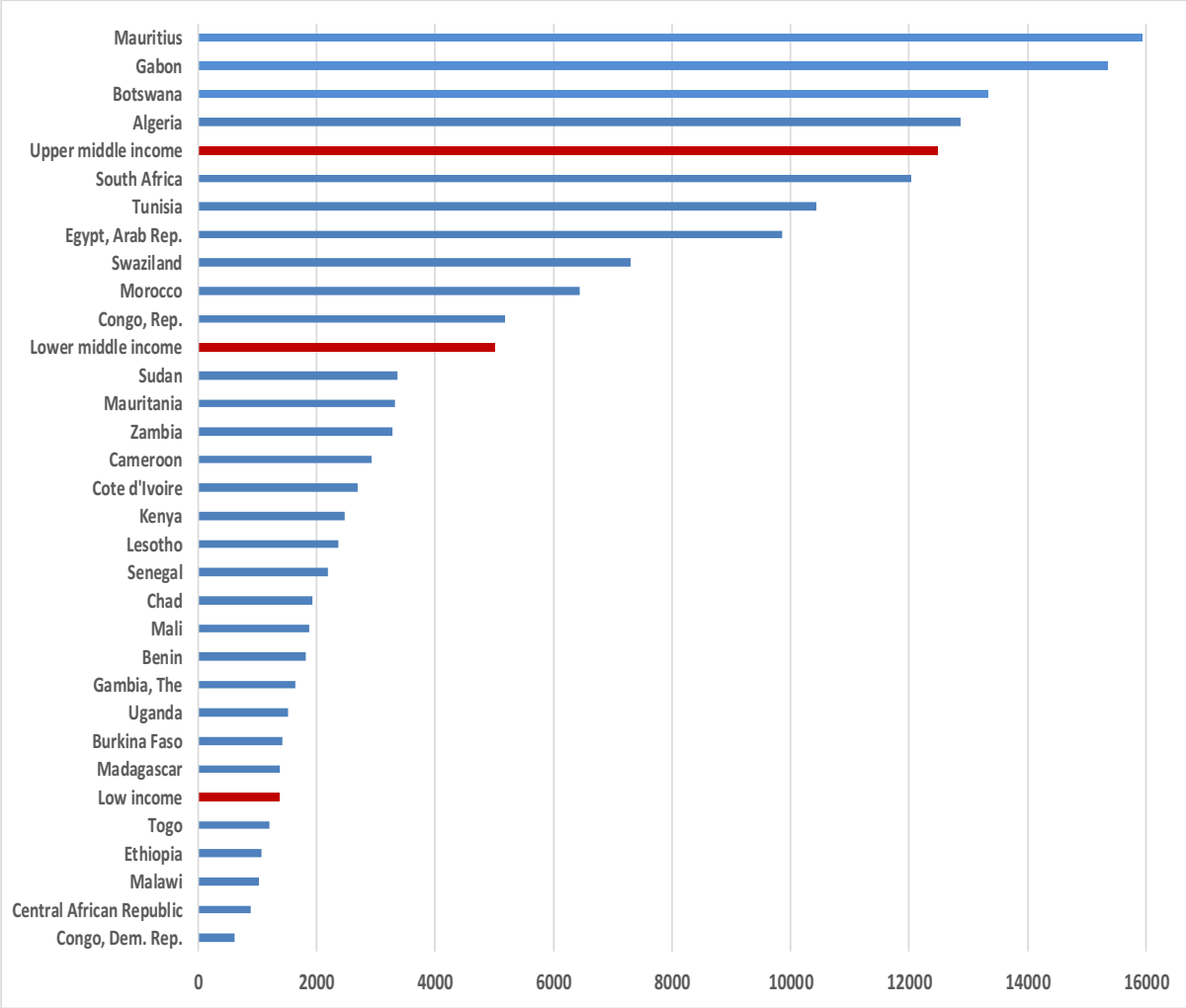
potential growth.

Another internal characteristic to be considered in assessing the ability of a particular exchange rate regime to generate growth, but which has received very little attention in the economic literature dealing with this issue, is FDI behavior. The variation in FDI would theoretically have two opposite effects on real output, depending on the degree of flexibility of the exchange rate regime: on the one hand, a net inflow of FDI in a flexible regime leads, ceteris paribus, to an appreciation of the exchange rate and a degree of control of imported inflation favorable to consumption and therefore to growth ; on the other hand, if the Marshall-Lerner condition is verified, this exchange rate appreciation ends up reducing production by undermining cost competitiveness. In the presence of a fixed exchange rate, the adjustment goes through interest rate, which reacts to the decline and consequently favors the investment. Also, capital account openness is another aspect to detain in the choice of exchange rate regime. In the aftermath of the 1990s crises, the first factor to blame was capital account openness and its incompatibility with the intermediate regimes prevailing in the countries that were at the heart of these crises. For some authors (Obstfeld and Rogoff, 1995; Fisher, 2001; Eichengreen, 1998), corner regimes are the only solutions able to avoid currency crises in a context of financial integration at an international level. For others (Bénassy-Quéré and Coeuré, 2002; Williamson, 1999, 2000), none of the exchange rate regimes is immune to speculative attacks.

3. Exchange rate regimes in Africa: a descriptive analysis

The article studies the behavior of the choice of exchange rate regime for a panel composed of 30 African countries. With exception of a few countries with a very rich basement (Algeria, Gabon and Botswana) or managed both effectively and equitably (Mauritius), the rest of the panel countries have a relatively comparable level of development and are broadly in terms of per capita GDP between the average of the lower middle-income countries and that of the low-income countries (Figure 1). In fact, any economic policy, including the one relating to the choice of the exchange rate regime, should be designed in a logic of economic catch-up and judged in the light of its ability to put these countries on a higher growth trajectory.

Figure 1 - Ranking of our panel's African countries by GDP per capita in 2010 (in dollars and PPP)



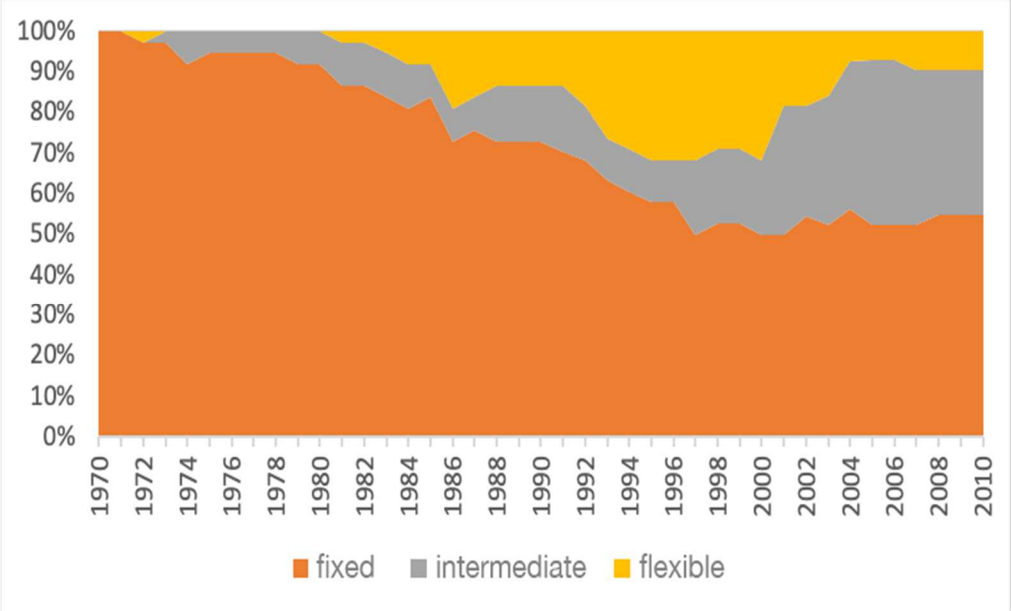
Source: World Development Indicators

Exchange rate regimes distribution in Africa remains dominated in 2010 by fixed regimes, but its share has been declining since the abandonment of the Bretton Woods system in the early 1970s (Figure 2). Migration to the flexible regime only began in the 1980s under the auspices of international institutions under the structural adjustment programs and stopped abruptly in the aftermath of the currency crises of the 1990s. Since then, the actual choice has shifted more and more to the intermediate regime, although some of these countries have continued to declare a float (Calvo and Reinhart, 2002).

The gradual abandonment of fixity in the 1970s was marked by a particular

international situation, characterized by a drop in the demand for raw materials and energy due to the rise in their price and the economic slowdown of the formerly industrialized countries. This reversal of the international situation has reduced foreign exchange inflows in African countries and made it difficult to maintain fixed exchange rates.

Figure 1 - De facto exchange rate regimes evolution in Africa between 1970 and 2010



Source: Reinhart and Rogoff (2004)

The observation of descriptive statistics comparing economic performances of African countries through exchange rate regimes put in place allows us already to have a first insight about the ranking of exchange rate regimes. They show that the middle regime outperforms the corner regimes in terms of economic growth, regardless of the country's level of development and its degree of trade openness (Table 1). On the other hand, the choice between a fixed and a flexible regime seems to depend on the level of development: if these two regimes are valid for the countries situated on the upper bracket of median income, fixed exchange rates generate better economic performances in the low-income countries. By referring to the degree of trade openness, between the two corner regimes the fixity is compatible with higher economic growth.

By widening the observation of statistical data to other macroeconomic aggregates, the latter finding of the superiority of the intermediate regimes

seems to be confirmed, without however concluding, at this stage, the existence of a causal link between the intermediate regime and economic performance (this link will be further econometrically tested). Thus, the highest investment rate is associated with the panel countries having opted for an intermediate exchange rate regime. Inflation, for its part, is between a floor level that prevailed in the fixed-rate countries and a high level characterizing countries whose value of money is determined by the market.

Table 1 - Median growth rates under exchange rate regimes in Africa and by the level of development and trade openness degree over the period 1980 – 2010

		Exchange rate regimes		
		Fixe	Intermediate	Flexible
Economic growth rate		1.1	2.9	0
Relatively …. Income panel countries	Low	1.2	2.8	-0.4
	High	0.9	2.9	0.9
…. Degree of trade openness	Low	1.1	2.8	-1
	intermediate	0.9	2.3	1
	High	1.2	3.4	-0.7

Source: Africa Development Indicators

Table 1 - Median investment share of GDP and inflation rate by exchange rate regime in Africa over the period 1980 – 2010

	Exchange rate regimes		
	Fixe	Intermediate	Flexible
Investment ratio	19	23.5	16
Inflation rate	4.1	7.4	17.9

Source : Africa Development Indicators

4. Exchange rate regimes and economic growth in Africa: Methodology and estimations

i. Data and models

The data is macroeconomic in nature, mainly from the World Bank's (Africa Development Indicators) database and covers the period from 1980 to 2010. The following table regroups the variables of interest and control introduced in the different regressions, their description, as well as the sources of information. The variables of interest represent the different exchange rate regimes and the control variables were chosen from among the standard recurrent determinants found in growth theory (Barro and Sala-i-Martin, 2004).

Table 2 - variables, descriptions and sources[3]

	Variables	Variables descreption	Sources
Interest variables	Fixe	1 if ERR is fixed ; 0 if not	Reinhart et Rogoff (2010)
	Intermediate	1 if ERR is intermediate ; 0 if not	
	Flexible	1 if ERR is flexible ; 0 if not	
	Free Falling	1 if the country in an hyperinflation situation ; 0 if not	
	Monetary Union	If the country is a mumber of CFA zone ; 0 if not	
Control variables	Real GDP per capita growth	Real GDP per capita growth rate	World Bank (Africa Development Indicators)
	Initial GDP	Real GDP per capita level in 1980	
	Investment	Investment ratio to GDP	
	Trade openness	Trade ratio to two times GDP	
	Public expenditures	Public expenditure in final consumption ratio to GDP	
	Inflation	Inflation	
	Δ terms of trade	Change in terms of trade	
	Reserves/ broad money	Reserves ratio to broad money	
	External debts	Stock of external debts to GNI	
	Domestic credit	Domestic credit	
	FDI	Foreign direct investment ratio to GDP	
	Natural ressources	Rent derived from natural resources ratio to GDP	
	Size of the economy	Country's GDP ratio to the sum of all panel countries GDP	
	Schooling	Average number of years of schooling	Barro et Lee (2013
	Capital account	Capital account openness index of Chinn-ito	Chinn et ito (2008)
	Institutional quality	Institutional quality index of Kuncic, A.	Kuncic, A. 2012
	Terms of trade volatility	Average of the absolute values of deviations from the trend	Authors
	GDP volatility	Average of the absolute values of deviations from the trend	Authors

Two types of models are estimated in this article. The first is linear and aims to evaluate the reaction of growth to different exchange rate regimes.

[3] Schooling variable is only available in 5 years periods. We had to make it annual on the assumption that the growth rate remains constant within each 5-year interval.

$$y_{i,t} = \mathrm{c} + \sum_{l=1}^{L} \beta_l X_{l,i,t} + \sum_{m=1}^{M} \gamma_m Z_{m,i,t} + \alpha_i + \varepsilon_{i,t}$$

The second is non-linear and introduces cross-variables with exchange rate regimes in order to identify which of the internal features of the economies are compatible with a particular exchange rate regime. It is written in the following canonical form:

$$y_{i,t} = c + \sum_{l=1}^{L} \beta_l X_{l,i,t} + \sum_{m=1}^{M} \gamma_m Z_{m,i,t} + \sum_{n=1}^{N} \varphi_n (X_{n,i,t} * Z'_{n,i,t}) + \alpha_i + \varepsilon_{i,t}$$

Where $y_{i,t}$ designates GDP per capita growth rate in country i at date t, $X_{l,i,t}$ is a line vector of variables of interest with L terms representing the nature of the exchange rate, the intermediate regime being the omitted modality. The control variable line vector Z is of dimension M and includes all the classical determinants of economic growth. $\beta, \gamma\ et\ \varphi$ are column vectors of sensitivity coefficients to estimate. α_i is a random component representing the individual effect specific to each country, $\varepsilon_{i,t}$ the term of the error and c a common constant to all the individuals in the sample.

The estimation method is that of a panel data random-effect model, as applied by Dubas et al. (2005) to address the same kind of questions. But first, special treatment has been reserved for endogeneity. In contrast to the Ordinary Least Squares (OLS) model used by Levy-Yeyati and Sturzenegger (2003), which assumes a perfect homogeneity of the individuals in the panel, even at the level of the variables of interest, the random effect model, considering a specific individual effect for each individual in the panel, is most appropriate for the heterogeneous nature of the choice of exchange rate regime between countries.

In addition, the fixed-effect model as used by De Vita and Kyaw (2011) to assess exchange rate performance in a panel of countries is not the most appropriate, because variables transformation (in deviation from the individual mean) required to validate the hypothesis of no correlation between the individual effects and the explanatory variables ($cov(\alpha_i, Z_{i,t}) = 0$) can not be applied to structural qualitative variables, in this case, exchange rate regimes.

Thus, the random effect model is the most appropriate for data that show variability among panel members, but some inertia over time. Which is the case for our variables of interest. That said, the composite structure of the error term with a time-invariant term is a source of autocorrelation whose processing involves the use of the Generalized Least Squares estimator (GLS), which consists in applying the method of OLS to a well-transformed model captures the inter-individual variability.

As for the risk of the endogeneity of the variables of the exchange rate regime, we

tested it by adopting a two-step approach, inspired by the work of Yougbaré (2009)4. First, we estimated a Logit model of the determinants of exchange rate choice in order to identify the relevant variables to retain as instruments in a linear instrumental variable regression model (Table 6). Subsequently, to test the endogeneity of the variables of interest, we used the two-step instrumental variable method (IV-GMM) applied to pooled data. Angrist and Krueger (2001) argue that the consistency of the instrumental variable estimator in the second stage is persistent regardless of the specification of the model in the first stage. The convergence of the estimated coefficients in the second step is ensured, disregarding the functional form of the "true" model of the first stage whether linear or not (Angrist, 2001).

Finally, the estimation of the determinants of economic growth by the instrumental variables method (Table 7) shows that the instruments used are valid (in terms of Hansen's orthogonality conditions) and the endogeneity assumption is rejected (according to the Durbin-Wu-Hausman test). Several model variants have been tested and conclude that there is no endogeneity bias in our application case.

ii. Estimations 1: exchange rate regimes and economic growth

In this section, it is a question of estimating the explanatory models of economic growth in Africa by explaining the effect of the exchange rate regime. Table 4 summarizes the results of the retained estimates (M1 to M5) which, after eliminating the role of traditional determinants of growth, test the hypothesis of exchange rate neutrality and rank them according to their economic performance. Models from M1 to M4 are estimated on annual data. The M5 model, on the other hand, tests the stability of the results of the first regressions over the long term and introduces the variables as means over 5 years.

[4] to deal with this endogeneity bias, other authors (Petreski, 2009; De Vita and Kyaw, 2011) have opted for an alterative method, that of the GMM system estimator applied to panel data. However, this approach poses a problem in the case of sctructural dummy variables because the transformation into a first difference of these variables does not make it possible to distinguish between the countries having respectively opted for different exchange rate regimes for two consecutive periodes.

Table 3 - Modeling the determinants of economic growth in Africa and the role of exchange rate regimes[5]

	M1	M2	M3	M4	M5
Fixe	-0.0147***	-0.0183***	-0.0145***	-0.0201**	-0.0123**
	(-3.51)	(-4.19)	(-3.23)	(-2.26)	(-2.44)
Flexible	-0.0202***	-0.0176***	-0.0145***	-0.0131***	-0.0240***
	(-5.15)	(-4.29)	(-3.70)	(-3.60)	(-4.23)
Free Falling			-0.0337***	-0.0338***	
			(-6.64)	(-5.67)	
Monetary Union				-0.00694*	
				(-1.77)	
Initial GDP	-0.00647***	-0.00639**	-0.00731***	-0.00841***	-0.00471*
	(-2.77)	(-2.18)	(-3.13)	(-3.67)	(-1.94)
Investment	0.0126**	0.0166***	0.0114*	0.00981	0.0112*
	(2.41)	(3.35)	(1.92)	(1.56)	(1.95)
Trade openness	0.00919**	0.0149**	0.0111***	0.0128**	0.00733*
	(2.44)	(2.11)	(2.99)	(2.26)	(1.82)
Public expenditures	-0.0221***	-0.0159***	-0.0220***	-0.0217***	-0.00218***
	(-3.88)	(-2.79)	(-3.74)	(-3.53)	(-4.05)
Δ terms of trade	0.0165*	0.0216**	0.0165*	0.0188**	
	(1.73)	(2.26)	(1.74)	(2.16)	
Inflation	-0.0240***	-0.0151***	-0.0206***	-0.0195***	-0.00280***
	(-11.54)	(-4.82)	(-7.62)	(-5.89)	(-12.19)
Schooling	0.00111	0.00277**	0.000801	0.000261	0.000512
	(0.73)	(2.07)	(0.54)	(0.15)	(1.37)
FDI	0.0975***	0.0782**	0.0914***	0.0900**	
	(2.77)	(2.15)	(2.66)	(2.53)	
Natural ressources		-0.0255*			
		(-1.84)			
GDP volatility					-0.00218***
					(-4.05)
Terms of trade volatility					-0.0300*
					(-1.71)
c	0.0399**	-0.00376	0.0417**	0.0416*	0.0393*
	(2.02)	(-0.11)	(2.13)	(1.91)	(1.94)
N	625	593	625	624	141
Overall	0.2930	0.2877	0.1964	0.2952	0.5583
Between	0.8379	0.8485	0.5956	0.8318	0.8786
Within	0.1506	0.2877	0.1084	0.1485	0.2640
Autocorrelation p value	0.5397	0.6567	0.5449	0.5545	0.1591

,**,** significant at a 10%,5% and 1% level. i*) t-students between brackets; ii) M1, M3, M4 and M5 include dummy variables to control for regional concentration effects*

[5] The statistical properties of the models are satisfactory: the heteroscedasticity is corrected upstream on STATA and the autocorrelation hypothesis is rejected. The Durbin Whu Hausman test associated with the IV-GMM method does not reject the null hypothesis of exogeneity of the explanatory variables, including those relating to exchange rate regimes (Table 7).

Overall, control variables are statistically significant in all models and come out with the expected sign: the coefficient related to the initial GDP variable takes a negative value, in line with the economic catch-up dynamics à la Solow; investment, trade openness, changes in terms of trade and FDI flows have a positive impact on economic growth in Africa; public expenditures, inflation and the abundance of natural resources have a recessive effect; The positive impact of the schooling only appears when the potential effect of the curse of natural resources is captured (M2), otherwise the two effects compensate for the non-significance of the schooling variable in the rest of the models.

Interest variables relating to the exchange rate regimes are of a qualitative nature, interpreted in relation to the omitted variable, which is, in this case, the intermediate regime. The M1 and M2 estimates conclude that intermediate regime is superior in terms of its ability to generate economic growth compared to corner regimes. This result reinforces the conclusions of some of the work on the question pleading for an intermediate regime in the particular case of developing countries (Williamson, 1999, 2000; Ferrari-Filho and De Paula, 2008; Guzman et al., 2017). The recurring argument in favor of this choice of regime is that it brings together the advantages of the corner regimes, while reducing the scope of their respective negative effects. Indeed, between a fixed exchange rate ensuring macroeconomic stability through the control of inflation and a floating exchange isolating the economy from negative external shocks and improving cost competitiveness, the intermediate regime gives the faculty to dose the intensity of fixity / flexibility to be introduced in the system by adapting to the specificities of each country and to the reversals of the situation of the international economy[6].

The M3 model re-evaluates the previous result of the underperformance of the flexible regime compared to the intermediate regime by separating from the group of countries opting for flexibility those characterized by galloping inflation (grouped under the Free Falling regime). This result remains unchanged and the superiority of the intermediate regime is confirmed. The M4 model goes into more detail by separating the CFA franc zone from the fixed regime assuming, a priori, that the adoption of a single currency encourages trade and growth. The estimation of this model hardly alters the first result of relative superiority of the middle regime. However, the negative impact on the growth of the monetary union is less than that of the fixed regime outside the monetary union.

[6] Another argument found in the literature used to guide the choice of the exchange rate regime is the independence of monetary policy and its ability to smooth the economic cycle that the flexibility supposed to ensure. It is increasingly challenged, and Mundell's trilemma tends to be reduced to a dilemma because of increased financial integration and trade openness (Rey, 2015; Han and Wei, 2016). Edwards (2015), for example, highlights the presence of a contagion effect of US monetary policy on that of South American countries having recently chosen the flexible exchange rate regime.

The M5 model tests the robustness of the results over the long term, neutralizing the effect of changes in economic conditions on the behavior of variables. As the regression is enriched by volatility variables in terms of GDP and terms of trade, the short-term result remains robust and the intermediate regime dominates the corner regimes in the case of African countries.

iii. Estimations 2: exchange rate regimes, internal characteristics and economic performances

As the effect of the choice of the exchange rate regime on growth is empirically established, it is now necessary to specify the explanatory models of growth that make it possible to identify the economic characteristics that are compatible with one or another exchange rate regime. In order to do this, cross-variables were introduced in the growth rate regressions (Table 5), testing the combined effect of the exchange rate regime with the variations of terms of trade (M6), FDI weight (M7), the degree of openness of the capital account (M8) and external debt weight (M9).

Table 5 - Panel Data Modeling of Transmission Channels of Exchange Rate Effect on Economic Growth in Africa[7]

	M6	M7	M8	M9
Fixe	-0.0183***	-0.0158***	-0.0156***	-0.0218***
	(-4.11)	(-3.56)	(-2.88)	(-2.97)
Flexible	-0.0163***	-0.0204***	-0.0148***	-0.0148*
	(-3.97)	(-3.53)	(-3.09)	(-1.69)
Fixe* Δ terms of trade	0.0354**			
	(2.28)			
Intermediate* Δ terms of trade	0.0344*			
	(1.96)			
Flexible* Δ terms of trade	-0.0129			
	(-1.60)			
Fixe* FDI		0.0410		
		(1.04)		
Intermediate* FDI		0.122***		
		(3.84)		
Flexible* FDI		0.228***		
		(2.97)		
Fixe* Capital accout			0.00263	
			(0.63)	
Intermediate* Capital accout			-0.00267**	
			(-2.12)	
Flexible* Capital accout			0.00436***	
			(2.84)	
Fixe* external debts				-0.0106***
				(-3.36)
Intermediate* external debts				-0.0145**
				(-2.10)
Flexible* external debts				-0.0142***
				(-4.05)
Initial GDP	-0.00654**	-0.00566*	-0.00723**	-0.00706**
	(-2.31)	(-1.80)	(-2.07)	(-2.41)
Investment	0.0164***	0.0158***	0.0138***	0.0134***
	(3.44)	(3.13)	(2.64)	(2.85)
Trade openness	0.0152**	0.0149**	0.0169**	0.0155**
	(2.15)	(2.02)	(2.17)	(2.29)
Public expenditures	-0.0154***	-0.0151**	-0.0156**	-0.0115*
	(-2.69)	(-2.54)	(-2.48)	(-1.91)
Inflation	-0.0173***	-0.0136***	-0.0151***	-0.0109***
	(-5.77)	(-4.32)	(-4.70)	(-2.91)
Schooling	0.00270**	0.00261*	0.00320**	0.00121
	(1.99)	(1.89)	(2.24)	(0.80)
Δ terms of trade		0.0213**	0.0197**	0.0221**
		(2.21)	(2.05)	(2.36)
FDI	0.0774**		0.0760**	0.0504
	(2.11)		(2.20)	(1.56)
Natural ressources	-0.0259*	-0.0256*	-0.0170	0.00104
	(-1.84)	(-1.90)	(-1.07)	(0.07)
c	-0.00390	-0.00935	-0.000565	0.0111
	(-0.12)	(-0.27)	(-0.01)	(0.40)
N	593	593	593	579
Overall	0.2018	0.1991	0.1961	0.2228
between	0.6737	0.6572	0.5887	0.7994
within	0.1008	0.1012	0.1091	0.1019
Autocorrélation p value	0.6591	0.5617	0.6728	0.6050

[7] The statistical properties of the models are satisfactory: the heteroscedasticity is corrected upstream on STATA and the autocorrelation hypothesis is rejected.

As for the first group of models (M1 to M5), the classic determinants of growth are, for the most part, statistically significant in this second group of regressions (M6 to M9) and stand out with the expected signs.

In these regressions (Table 5), the intermediate exchange rate regime outperforms, in absolute, the regimes of the corners (first two rows of the table), but its positive effect on growth is more pronounced in the case of positive shocks of the terms. Trade (M6), FDI inflows (M7) and a controlled opening of the capital account (M8). External indebtedness negatively affects African economic growth regardless of the nature of the chosen exchange rate regime. Nevertheless, its impact in fixed regime is slightly less important in absolute value than in flexible regime.

The model results (Table 5) also argue that between the two end regimes, the preference for flexibility (versus fixity) in African countries would be dictated by the occurrence of positive (versus negative) external shocks, positive FDI flows (versus negative), and an open capital account (versus closed).

5. Conclusion

The story of exchange rate regime choice has not yet reached a consensus. Between early works on the subject (Mundell, 1961; McKinnon, 1963) and the most recent (Frenkel, 2017; Guzman et al., 2017), no superiority of one specific foreign exchange regime over the others has been established *ad vitam aeternam*. It is all in a case by case basis.

This paper tested the thesis of currency neutrality through a panel data concerning 30 African countries and the results confirmed the absence of currency neutrality in case of African countries and an outperformance of intermediate regimes.

Secondly, having rejected the thesis of currency neutrality, the paper attempted to rank exchange rate regimes according to their economic performances by referring to economic growth rate and listed the internal structural characteristics of the panel countries by crosschecking them with exchange rate regimes to find out which are most favorable to economic growth.

On the one hand, intermediate regimes resulted more conductive to economic growth in the case of countries experiencing positive terms of trade shocks and benefiting from FDI inflows. On the other hand, the opening of capital account is incompatible with intermediate regimes, and external indebtedness does not

favor economic growth regardless of the exchange rate regime adopted.

These results remain robust by testing several alternative econometric specifications (long-term estimate on five years' window data, estimates by controlling regional effects and by adopting finer aggregations of exchange rate regimes).

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Natural fibers. Allies from the environment and combating rural poverty in Brazil and the world

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Abstract

This paper aims to analyze the importance of natural plant fiber production chains for the sustainable development of poor regions, and of the complex regional and local realities, which share similar problems in Brazil and in the world. Despite a considerable number of workers involved in cultivation, extraction and industrial processing of natural fibers, the public authorities have not given due attention and support to this sector to overcome problems that have persisted for decades. Although the world is drawing attention to climate change, seeking to favor forms of production that avoid environmental degradation and, mainly, to help fight poverty and hunger, many of the activities that naturally meet the requirements of environmental conservation and with strong social appeal are still not sufficiently organized and competitive in the face of large corporate agriculture. The priorities of the natural fibers sector in Brazil point to a strong dependence on the public power to initiate the necessary changes for its restructuring and revitalization. The diffusion of income generation possibilities in the countryside and the identification of new markets for natural fibers will depend on a collective and cooperative effort of the interested parties. New forms of global and local cooperation in seeking solutions to the difficulties faced by these sustainable economies and the use of technology may be key to the development and well-being of a considerable number of people, who are currently marginalized.

keywords: Brazil Local Development, Fight Against Poverty, Sustainable Development, Natural Fibers, Jute And Mallow, Sisal.

1. Introduction

The research of themes involving world development, whether in the economic, social and/or environmental dimension, allows society at large, and the public and private sectors involved, to commit themselves to improving the quality of life of all peoples, in all parts of the planet. As a reflection of these efforts, it is noted that each day the debates become more qualified, connected to and focused on the purpose of reducing social inequalities and protecting the environment.

It was in this spirit that a new development milestone was established in 2015, officialized by the document "Transforming Our World: The 2030 Agenda for Sustainable Development", at the United Nations (UN) Summit in New York. This

paper urged countries and all social segments to engage in broad dialogue on contemporary issues crucial to achieving the ambitious goal of eradicating poverty in all its forms and dimensions, including extreme poverty (OnuBrasil, 2015), the biggest global challenge to sustainable development.

In the 1970s, the world realized that it was already using more resources than could be regenerated by nature, producing more waste and emitting more greenhouse gases (GHG) than could be absorbed by the ecosystem. In spite of this evidence, humanity has been increasing its pressure on the environment, a trend that has intensified with population growth and, mainly, as a result of carbon-intensive economic activities and exploitation of natural resources, leading many cities to the inexorable destination of environmental unsustainability.

In this context, the search for new materials and sustainability based on renewable natural resources has been taking center stage in many markets, research groups and public opinion, making room for natural vegetable fibers to regain an important place in the discussion on environmentally biased production and consumption. Plant fiber is a renewable, biodegradable raw material. Its production and processing uses little or no chemical product (depending on the type of fiber) and integrates perfectly with the agro-climatic conditions of the producing regions, without damaging the environment through the use of pesticides, burning or deforestation. In addition, the production and processing of these natural vegetable fibers are largely carried out by family farmers on small farms, and their industries employ millions of people throughout the world.

Looking at the environmental, economic and social potential of natural fiber chains in different parts of the world, the Food and Agriculture Organization of the United Nations (FAO / UN) established 2009 as the International Year of Natural Fibers (IYNF), a way to draw the attention of public and private sector authorities to the importance of these agricultural crops for several developing countries. For FAO, the production, processing and export of natural fibers and their manufactured products are vital to the economies of many countries and play an important role in food security and as means of livelihood for millions of small farmers and low-income workers.

Ten years after the UN manifesto in support of natural fibers, and with the new global definitions and goals for the sustainable development of the planet, it is necessary to reflect on “how” and “how much” these agro-industrial activities are aligned with the Sustainable Development Goals (SDGs), so as to place them in a strategic position in the fight against rural poverty in regions with peculiar environmental and agro-climatic characteristics, not only in Brazil, but also in the world. And it was for this purpose that the United Nations General Assembly (UNGA), at its 74th session recently held on November 21, 2019, in New York, approved a new Resolution for natural fibers - Natural plant fibers and

sustainable development - suggested by Bangladesh. This document cites the recommendations presented by the International Natural Fibers Organization (INFO), built during the meeting of the FAO Intergovernmental Group on Hard Fibers Group held in Beijing in October 2019. What is expected from this resolution, announced by the UN in favor of natural fibers, is that the promotion of these raw materials worldwide by research centers, companies, investors and consumers can be stimulated, generating new market opportunities, innovation and development for the producing regions.

2. Why natural fibers? Historical importance

Science reveals that natural fibers[1], both vegetable and animal fibers, have been used by man since prehistory, in various activities and with numerous practical utilities. Like the domestication of food plants which gave rise to agriculture, textile fibers have been a fundamental part of human life since the dawn of civilization. There are reports that fragments of cotton items dating from 4,500 BC were excavated in Mexico and Pakistan; that the history of silk began in the 27th century BC according to Chinese tradition; that the oldest woolen textile, found in Denmark, dates back to 1500 BC; that the oldest woolen carpet in Siberia dates back to 500 BC, and that flax was already grown during the Neolithic era, being one of the oldest fibers known to man[2].

According to Hendges (2010), vegetable fibers were useful in braids, clothing, adornments, rope, food and other commercial, cultural and architectural uses. Throughout history, raw materials were fundamental to the development of internal and economic social relations among peoples and cultures. In his ethnohistorical research, Costa (2014) explains that many ethnic groups of Brazilian Indians have mastered the technique of braiding and have developed tools such as baskets, nets, fishing traps, bags and containers, even using resins to waterproof certain products and make them more resistant and lighter for transporting.

Due to their flexibility and high resistance to salinity, one of the most common uses of vegetable fibers for several centuries was in the manufacture of reinforced navigational ropes. The “knot”, a unit used in navigation, was idealized by the scientist Alexander von Humbolt using knotted fiber ropes at

[1] In this article, the analysis is restricted to natural fibers of plant origin, also called lignocellulosic fibers, structural components of plants, formed by cellulose, hemicellulose and mainly lignin, a polysaccharide present in approximately 25% of plant matter. These characteristics of the plant sclerenchyma enable its use in activities where strong and flexible tissues are needed.

[2] Prof. Dr. Rasiah Ladchumananandasivam: Fiber Technology Course - Introduction. Federal University of Rio Grande do Norte, Brazil.

regular distances to measure the speed of ships. There are also reports of the use of jute on Egyptian boats and in quipu[3] (a form of "written" communication of some pre-Columbian peoples) that were certainly fundamental to these civilizations (Hendges, 2010).

Nowadays, plant fibers have numerous applications in several industrial segments: automotive, naval, aerospace (as primary and secondary materials), civil construction (geotextiles and reinforced materials), bio-composites[4], animal feed, cosmetics, health, and in the sports industry, such as tennis racquets, golf sticks and ski boards (Ladchumananandasivam, 2011; Gonçalves et al., 2018). In addition to their classic applications, such as: packaging, sacks for agricultural products, ropes and textiles. Beyond this range of uses and applications, the production, processing and export of natural fibers and their manufactured products are vital to the economies of many developing countries. In many cases, they are the only income alternative for some traditional small farmers communities of and extractivists. A diagnosis presented by FAO in 2009 shows that practically all natural fibers (except cotton) are produced in subsistence farming systems, with low or no technological apparatus and with high demand for human labor, and reported some examples.

[3] The Incas did not have a writing system. Instead, they used a coding system known as "quipu", a set of ropes with lashings (knots) of different colors representing symbols or words.

[4] Composites are heterogeneous materials that have at least two distinct phases: one called reinforcement, which is responsible for generating resistance to the material, and another called matrix, that corresponds to the medium that receives this reinforcement. In the case of bio-composites, one of the phases is made up of material of natural origin (e.g. vegetable fiber).

Table 1 - Diagnosis performed by FAO, 2009

Fiber	Scenario in 2009
Silk	- It is another important industry in Asia - Sericulture generates income for about 700,000 farm households in India, while silk processing provides jobs for 20,000 weaving families in Thailand and about 1 million textile workers in China
Jute	- In India and Bangladesh, it is estimated that 4 million small farmers earn a living directly, and support 20 million dependents, with jute cultivation
Coconut	- Each year, developing countries produce around 500,000 tons of coconut fiber, mainly for export to developed countries, for use in ropes, nets, brushes, mattresses and insulating panels. - Sri Lanka is the largest supplier of coconut fiber to the world market, and its coconut fiber products account for 6% of agricultural exports. - 500,000 people work in small coconut fiber factories in South India
Sisal	- The cultivation and processing of sisal in Tanzania directly employs 120,000 people and the sisal industry benefits about 2.1 million people. In this country, the government and private industry have been working to revive the demand for sisal fibre

Source: FAO, 2009. Prepared by the author

In the quest to secure and protect these traditional agricultural activities from non-food crops that involve little understanding of their value and importance, leaders of the natural fibers sector presented some arguments in 2006 at the United Nations General Assembly:

1. Natural fibers play an important role in the clothing of the world's population, besides presenting new and promising industrial uses;
2. Much of the world's natural fiber was produced as a source of income for small farmers in low-income and developing countries;
3. It is necessary to draw global attention to the role of income derived from the commercialization of natural fibers for food security and in the fight

against poverty of various populations;
4. Although the production and consumption of natural fibers offers significant environmental benefits, concerted efforts should be made to ensure that these same benefits are not compromised by improper practices;
5. It should be recognized that there are important potential partnerships among participants in the various natural fiber industries around the world;
6. It is essential that work is done to increase public awareness of the economic and environmental attributes of natural fibers.

On the occasion of the inclusion of this theme in the official calendar of the UN, and in the wake of the IYNF, the *International Symposium of the International Year of Natural Fibers* was held in Brazil (Salvador, Bahia) in 2009, which brought together authorities and experts on the subject from around the world. At this meeting, four main areas were established in the direction of broader work that would be coordinated by the International Natural Fiber Organization (INFO / FAO):

- Sensitize and stimulate the demand for natural fibers;
- Encourage appropriate government policy responses to the problems faced by natural fiber industries;
- Promote an effective and lasting international partnership between the various natural fiber industries;
- Promote the efficiency and sustainability of Natural Fiber Industries.

The IYNF was expected to have international repercussions. However, ten years after this major event, the scenario of the last decade is still worrying. In fact, there has been a considerable decline in natural fiber production, and threats to many of these economies and livelihoods persist due to the global financial crisis and the emergence of much cheaper synthetic alternatives, which is reducing the demand for these fibers each year.

According to the *Discover Natural Fibers Initiative* (DNFI)[5], which works in cooperation with the FAO, the world natural fiber production in 2018 was estimated at 32 million tons. During the past decade, world production of natural fiber has ranged from 28 million to 35 million tons, with most of the year-on-year variation caused by climate-related declines in productivity. The amount of natural fiber produced in 2018 represents only 29% of total world production of

[5] The Discover Natural Fibers Initiative (DNFI) was established in January 2010 as a result of the IYNF 2009, declared by the United Nations General Assembly. The DNFI is a voluntary association of individuals and organizations working to promote the interests of natural fibers. Available at: <www.dnfi.org>.

textile and clothing fibers (including animal and synthetic fibers) which reached 110 million tons in the same year, which means a productivity drop of almost 71%. in 10 years. One aspect strongly related to the fall in fiber production is the low use of technologies, either in the field or in primary processing, and the underutilization of the plant, since fiber represents only 5% of the potential use of many fibrous plants such as malva, jute and sisal (Araújo and Pereira, 2018; Van Dam, 2018; Santos e Silva, 2017).

Even with their strong ecological appeal, traditional vegetable fiber products have been losing space to plastics and synthetic fibers due to their cost. However, it is noteworthy that only about 10 companies are responsible for more than 50% of world production of synthetic fibers, employing relatively little labor, while cotton is produced by tens of thousands of producers around the world, in several countries with lower environmental impact (Freire et al. 1997). Some industries such as automotive, two-wheel, naval and plastic began in the early 2000s to seek to use renewable raw materials, such as vegetable fibers in their products or processes, due to their advantages in replacing inorganic/ minerals fibers, such as fiberglass, commonly used in industry in formulations with different resins, plastics and rubbers (Galvani; Felix, 2017).

There is a huge field of business opportunities, including in the international market, for natural fibers, bearing in mind that we are living in times of significant changes in ethical values regarding the production and consumption of goods and services, which increasingly seek environmental and social sustainability. According to the Common Fund for Commodities (CFC, 2008), other reasons for increased demand for natural products may also be cited, such as: (i) recent concerns about shrinking oil stocks and their final depletion in the not too distant future; (ii) increased government legislation, such as land taxes; (iii) a greater emphasis on sustainability and biodegradability of industrialized products; and (iv) carbon credit.

According to Brandão (2012), this new bias in driving economic systems, often called “green economy”, is formed by: (i) the management of low carbon generating production processes; (ii) the rational use of natural resources and (iii) social inclusion. The author emphasizes that the timid practices of certain production systems, which tend to result in sustainable development, have been incorporated into the monitoring of climate change, the control of the role in the ozone layer and the accounting for greenhouse gas (GHG) emission levels. Starting from the premises defended by Brandão (2012) for a new social progress, one can try to associate this tendency with the qualitative changes that have been occurring in the way that the manufacturing industries are adjusting to consumers' environmental perceptions. By the end of the 20th century, most efforts to capitalize on the green movement focused on recycled products and environmentally friendly packaging materials, such as those made from biodegradable plastics or sustainably produced cellulose.

FAO (2012) confirms that industries, particularly in high-income countries, are seeking more sustainable ways of operating, and looking at natural inputs in a more positive and proactive way. Natural inputs are being considered not only as technically valid components, but also as elements that can contribute to the pricing of products, due to their superior quality, environmental attributes that are compatible with production requirements and the possibility of responsible disposal, a subject widely discussed today, known as "life cycle assessment". On the other hand, changes in the regulatory environment are playing an increasingly important role in encouraging industry to develop environmentally sound practices. In this regard, FAO drew attention to the regulation of the natural fibers market of direct relevance to these economies, pointing out legislative provisions ranging from the prohibition of non-biodegradable plastic bags to the establishment of material life cycle requirements for automotive industry. These regulatory provisions are indicative of the pronounced trend in many high-income countries towards legislation and production practices aimed at reducing social costs and environmental damage.

This pro-environment movement, which is also concerned with better living conditions for people and future generations, has been stimulating the growth of sustainable agriculture. Consequently, it has also induced the adoption of production and processing technologies that seek not to harm the environment (*environmentally friendly*)[6], fostering economic development and strengthening the participation of small producers in the value chain.

3. Natural fibers in Brazil: their challenges and opportunities

In Brazil, the production of natural vegetable fibers is distributed in almost all national territory. Cotton is the leader in the ranking, accounting for about 2.6 million tons production in the 2018/2019 harvest, with significant growth of revenues, due to both the increase in prices (17.64%) and in production (30,96%) in the year, with Brazil being the world's second largest exporter (ABRAPA, 2019). However, cotton is one of the most environmentally expensive fibers to produce due to the intensive use of pesticides; approximately 16% of global insecticide use is due to cotton cultivation. In Brazil, cotton cultivation ranks 4th in pesticide consumption (after soy, corn and sugarcane, respectively), using an average of 28.6 liters of pesticide per hectare (PIGNATI et al., 2015).

[6] Environment-friendly or environmentally friendly (also known as eco-friendly, nature-friendly, and green) are sustainability and marketing terms relating to goods and services, laws, guidelines, and policies that claim reduced, minimal, or no damage to ecosystems or the environment (WIKIPEDIA, 2018).

In addition to this negative impact on the environment, unlike other vegetable fibers, cotton cultivation in Brazil makes intensive use of cutting-edge technology, with highly mechanized field processes, which reduces the number of jobs. The production system of the plant fibers addressed in this article, despite their smaller scale, require a much larger number of workers, including family farmers and extractivists. This is probably due to the fact that the technologies used in these agricultural and industrial activities have hardly evolved. However, these crops are now well aligned with modern concepts of environmental preservation, such as "low carbon agriculture" and "organic agriculture", as pesticides and chemicals are not used in their processes.

According to the 2010 *Brazilian Institute of Geography and Statistics* (IBGE) demographic census, Brazil's population was 190.8 million people, with 84.36% (160.9 million) living in urban areas and approximately 15.64% (29.8 million) in rural areas[7]. In a 2018, IBGE estimated that Brazil has already reached a population of 208.5 million people, and that of this total, the equivalent of 15.28% lives in rural areas, with the highest percentage being in the North (25%) and Northeast (27%). These regions are predominantly agricultural, which leads us to reflect on the importance of this activity, whether small or medium-sized (family farming) or large (agribusiness), for the country's economy and especially for the development of rural regions, since we are talking about 32 million people who depend on alternatives that generate employment and income in rural areas. Also, contributing to the reflection on the importance of agricultural production for Brazil, I point out some data: in 2017 the sector represented 21.6% of Gross Domestic Product (GDP)[8], and in 2018 it increased by 4.6% (CEPEA, 2018). This growth was driven by a rise in the amount production of crops such as cotton, coffee, wheat and soybeans, which are important in terms of value. Despite all this strengths, there is no doubt about the urgency to balance the environmental and social cost of these highly pesticide-consuming activities (since it involves the health of farmers and consumers), and their water and energy consumption.

In this scenario, in search of sustainability for ecosystems and local populations, natural fibers can play an important role as an economic alternative for the poorest rural regions. In Brazil there are at least 10 types of vegetable fibers with real market potential: sisal, jute, mallow, piassava, bamboo, coconut, silk, curaua, golden grass, buriti, among others. Some are cultivated species, such as jute (*Corchorus capsularis*), mallow (*Urena lobata*), sisal (*Agavea sisalana*), coconut

[7] The methodology for characterization of the urban and rural population adopted in Brazil differs significantly from the methodology adopted by OECD countries. For this reason, this high rate of urbanization of the Brazilian population is quite questionable (SILVA, 2018), available at: <https://anovademocracia.com.br/noticias/10028-populacao-urbana-e-rural-no-brasil-analise-comparativa-dos-percentuais-segundo-criterios-do-ibge-e-da-ocde> Access in: August 2019.

[8] In addition to the primary activities carried out in the establishment, the GDP of agribusiness comprises the transformation and distribution activities.

(*Cocus nucifera*) and curaua (*Ananas erectifolius*), and others come from extractive management, such as piassava (*Attalea funifera*), buriti (*Mauritia flexuosa*) and golden grass (*Syngonanthus nitens*). In addition, the proportion of family farmers who work and depend directly on the cultivation and extraction of these fibers is considerable, representing a socioeconomic weight for the producing regions, as well as strong cultural elements associated with the cycle of production, extraction and processing of fibers.

For many of these traditional farming populations, there are no other economically viable local activities in the short- or medium-term, due to the characteristics of rural infrastructure and even the ecosystem of these regions themselves. Jute and mallow, for example, have completely adapted to the Amazonian floodplain ecosystem, which follows the river water cycle. Sisal has adapted well to the climatic characteristics of the northeastern backcountry, which goes through long periods of drought. These farmers have the traditional knowledge of fiber maceration and defibration; they also preserve the popular knowledge of plant management for seed harvesting using technologies that were developed in their own communities and production system.

It is estimated that the cultivation of natural fibers alone directly involves about 190,000 people (formal and informal) distributed in more than 600 municipalities from north to south of the country, especially in the North and Northeast (Table 2). Most of these municipalities have a low Human Development Index (HDI) and are in the extreme poverty range.

Table 2 - Production regions and number of workers involved in the cultivation of natural fibers in Brazil[9]

Natural Fiber	Region	Number of fiber producers	Number of Municipalities involved
Mallow and Jute	North (Amazon)	4.500	15
Sisal	Northeast	35.000	152
Piassava	North and Northeast	5.000	25
Coconut	Northeast	100.000	9
Bamboo	Northeast	40.000	250
Silk	South	7.550	230
	TOTAL	192.500	681

Source: Brazilian Ministry of Agriculture's Natural Fibers Sector Chamber (prepared by the author)

We are talking about an economy that produces approximately 500,000 tons of vegetable fibers and generates about 350 million reais, involves 40 industries, almost 50 family producer organizations (Table 3) and about 300,000 workers (from planting to industrial transformation). It is important to emphasize that many of these workers in the natural fiber sector live exclusively from this activity, and over time have developed their own production technologies in adverse situations. However, the production of almost all these fibers has been falling every year, and this may reflect the lack of a government agenda prioritizing small production sectors.

[9] Data gathered in recent consultation with members of the Natural Fibers Sector Chamber, as much important information to analyze the fiber sector is not found in official statistics.

Table 3 - Data from the natural fibers sector in Brazil

Natural Fibers	Production 2018 (Ton)	Gross value of production (million R$)	Number of industries	Number of Associations / Cooperatives of producers
Mallow and Jute	7.264	19,00	3	2
Sisal	57.962	224,00	14	12
Piassava	8.481	12,00	4	4
Coconut (coir)	4.500	9,00	14	4
Bamboo	400.000	36,00	4	14
Silk	517	55,00	2	11
Total	478.724	355,00	41	47

Source: Brazilian Ministry of Agriculture's Natural Fibers Sector Chamber (prepared by the author)

Based on the premises of *sustainable development*, aiming at maintaining harmony between economic, social and environmental factors to ensure the integrity of the planet, nature and society throughout the generations, it is believed that the natural fibers sector can play an important role in local and regional development in Brazil. Natural fibers present a differentiated potential for opportunities in relation to other food crops, that cannot grow in certain regions such as the semi-arid (due to long periods of drought) and in the Amazonian floodplains (flooded lands every six months with rising rivers). Despite their countless qualities and market potentials, and possible new applications, the natural fibers industry has faced real obstacles that have been known for decades without receiving due attention from governments, such as: i) lack of investments in research and development of technologies to improve fiber planting, harvesting and fiber processing systems; ii) lack of technical assistance to small farmers; iii) rural credit lines inappropriate to the crop cycle; iv) precarious rural infrastructure for storage and disposal of production; v) lack of reliable industry statistics; and vi) little social organization of producers, which makes them vulnerable in the face of difficulties (Alves et al., 2004; Ferreira, 2016; Araújo and Pereira, 2017; Naves, 2017).

Added to these aspects that weaken the fiber sector, the lack of basic public services such as education, health, sanitation, safety and transportation in the producing regions continue to persist. It can be affirmed, therefore, that there are two central issues in the discussion about the difficulties faced by the natural fibers sector in Brazil: the weak public action in promoting these productive chains and in meeting the basic needs of these citizens.

Situations such as these put at the center of the debate the development of public policies and a sustainable agenda that may truly fulfill the simplest tasks, with the most practical scope and at the speed that the environment and the poorest people need. However, despite the frequent use of the term "sustainability" in slogans and political discourses, in practice the basic and essential steps to protect the environment and the most vulnerable populations have not been taken. Public policies may or may not transform a reality in a positive way, depending on the priorities of the government agenda for different topics.

Natural fiber chains in Brazil have a long history of discontinuing public initiatives and have suffered twice due to the worsening of the climate issue, which has significantly affected the ecosystems of the producing regions, causing food shortages and consequently hindering production. This year, for example, the Amazon had 50.5% of the hot spots, followed by the Cerrado with 39.1% and the Atlantic Forest with 11% (data from the *National Institute of Space Research*, INPE) in 2019[10]. Most states in the Legal Amazon had fires above the historical average, and some had to declare emergency situations - Amazonas and Acre - because of the vast regions affected by smoke. Climate changes have also directly affected the behavior of Amazonian rivers, which lately have filled or dried much above average in the floodplain regions, as well as in the northeastern semi-arid region, with prolonged droughts occurring for long periods, beyond historical records.

These and other limitations, such as the large distance between rural producing regions and their administrative centers, as well as the lack of political representation in municipal and state assemblies, left these small farmers with little say in achieving and conducting sectoral public services policies.

[10] Half of the fires in 2019 were concentrated in the Amazon region. Available at: <https://g1.globo.com/natureza/noticia/2019/08/20/amazonia-concentra-metade-das-queimadas-em-2019.ghtml> Access in: Dec. 2019.

4. How can natural fibers contribute to fighting rural poverty and protecting the environment?

In a summary analysis of the poverty figures - 865 million people worldwide live on less than a dollar a day, or USD 0.99 more precisely. Esther Duflo, the most recent Nobel laureate economist, points out that with this scenario it is possible to think "*this is a problem I cannot solve*". In this sense, Esther Duflo, along with her poverty research partners Abhijit Banerjee and Michael Kremer, argues that the way out may be to look at the problem from a more micro and localized perspective, in order to understand how the poor really live, in which contexts and which problems they face.

The need for a regional and local approach, also advocated by Elinor Ostrom (2012), is of paramount importance to understand the dynamics of poverty and its determinants, leading a broad and diverse concept of poverty. For Ostrom, it is impossible to map out a single plan for the entire planet that can protect it and avoid a global humanitarian crisis. This will only be possible with multi-level polycentric initiatives, involving local, regional and national actors, leading to the development of their own strategies to deal with different issues in each context and ecosystem. Zupi (2018) contributes with the analysis that development comprises complex systems in evolution, with objectives and interlaced processes. The author argues that "*standardizing development aid practices can entail risks of routinizing, institutionalizing and depoliticizing participation, which should be an active enabling process to enable people to engage in the self-determined development of their lives and environments, rather than a co-optation practice and a process of making local people participate in the 'project' to achieve predetermined national or global development goals*".

In this conception, it becomes urgent to propose reflections on the economic alternatives that can meet different needs of complex realities regarding the ecosystem, social, cultural, economic and political aspects, in order to reduce the inequalities of populations most vulnerable to poverty.

Despite having achieved considerable poverty reduction rates from 2002 to 2014, in 2018 Brazil still presented a significant number of 23.3 million people (11.2% of the population) living below the poverty line, including 13.5 million below the extreme poverty line[11] (6.5% of the population) - 4.5 million more than in 2014 -, when the country experienced the lowest levels of unemployment (IBGE, 2018). The persistence of the regional component is also observed, with the worst rates of human development, education and basic sanitation concentrated in the North and Northeast regions of the country. Only in the Brazilian Amazon, around 20 million people (49% of the population) live in

[11] Monthly per capita income below R$145.00 or U$S 1.9 per day, a criterion adopted by the World Bank to identify the condition of extreme poverty.

poverty.

Studies conducted by the *Getúlio Vargas Foundation* in 2018[12] point out that although Brazil has left the "Hunger Map", the largest number of individuals living in extreme poverty is still concentrated in its rural areas. The 2010 census conducted by the *Brazilian Institute of Geography and Statistics* (IBGE) indicates that the proportion of the population living in permanent private habitation below the poverty line was 3.7% in urban areas, rising to 20.8% in rural areas. By focusing in particular on the population in extreme poverty in rural areas, it can be seen again that the concentration is critical especially in the Northeast, reaching 30.7%. Using another parameter, such as people who received up to R $ 127.50 (¼ of the minimum wage at the time), the percentage rises to 52.1%, or 6.9 million people living under the condition of extreme poverty.

The incorporation of multiple dimensions into the concept of poverty makes it possible to translate a social phenomenon, which in itself is quite heterogeneous, since people differ from each other in various ways, both in terms of external and circumstantial characteristics. For example, more than 100 million Brazilians today do not have access to sewage collection and treatment, and 70% of these people live in the North and Northeast, the vast majority in the Amazon region. Likewise, only 57% of the population in the Northern region is supplied with treated water (Trata Brasil Institute, 2019). Thus, Arrecthe (2018) draws attention to the preliminary need to distinguish between monetary and non-monetary inequality in poverty studies, since the former refers to the income of individuals, while the latter refers to the dimensions that go beyond income such as access to public services, living conditions and capacities.

The definition of such dimensions is controversial among authors who recognize the difficulties involved in measurement (as highlighted by Martha Arrecthe), and the effects of these dimensions are the result of combining, in time, of policies with other exogenous factors such as demographic changes, social behaviors and market forces. Paula et al. (2013) emphasize that knowledge of rural poverty is useful for researchers and policy makers, especially in stimulating actions aimed at reducing regional inequalities, leading development to the areas most affected by this phenomenon. These researchers recommend policies that aim to stimulate local potentialities, in which the geographical component is considered as a marker of where these anti-poverty policies should initially be employed.

Much is discussed about regional "development models" in Brazil. With the radical change of political groups in power, as a consequence of the democratic intention to purge an endemic corruption that has plagued the country over the

[12] Poverty and inequality have increased in the last 4 years in Brazil. Available at: <https://portal.fgv.br/noticias/pobreza-e-desigualdade-aumentaram-ultimos-4-anos-brasil-revela-estudo> Access in: Jun. 2019.

past 20 years, these debates have become much tougher, especially when it comes to the Amazon biome. As stated by Fregapani (2000) the links between environment, development and conflict are complex and often misunderstood. There are numerous interests involved, and conflicts tend to increase as resources become scarce and competition for them increases. Perhaps for this reason the Amazon Rainforest is the protagonist of so many headlines. The fact is that the eastern part of the Amazon has already been significantly deforested, but the western part still has over 95% of its preserved forest.

Moreover, in the Amazon region we find the largest reserves of renewable natural resources in the world, which if exploited based on science and biotechnology – in a sustainable way - will be able to develop and protect the populations living there. The potential in the field of vegetable fibers, medicinal plants, regional fish, acai, chestnuts, cocoa, tropical fruits, essential oils and adventure tourism is enormous, not to mention the unexplored mineral reserves. In fact, the axiom is that the forest has its survival assured only if its maintenance and management have economic value, that is, if it is worth more standing than the ground. Moreover, there is no way to protect the environment without providing decent living conditions for the people who live in the forests, which is the first aspect to be noted and which highlights the importance of natural fiber agriculture for these ecosystems.

It is important that countries with extensive plant coverage, like Brazil, research and seek markets for species with high plant fiber production, which can even be produced and semi-industrialized by family agriculture. Jute and mallow plant fibers, for example, have been able to fulfill a relevant social role by fixing riverine populations in their natural and cultural environment for almost nine decades. Cultivated mainly in the northern region of the country, and currently in decline, they still generate income that feeds about 4,000 smallholder families. These vegetable fibers generate the yarns used to make sacks that pack much of Brazil's coffee export production, about 40% to 50%, and are the basis of various handcrafted articles; moreover, these fibers are used by the fashion and clothing industry for multiple purposes.

Sisal fiber, on the other hand, assumes the same role as mallow, but in the northeastern semi-arid region, as it is produced mainly in the state of Bahia. This supply chain alone supports more than 35,000 families, includes 152 municipalities in 3 Brazilian states, has 14 industries and 12 producers' associations (as shown in Table 3). The other fibers mentioned, such as piassava, silk, coconut, bamboo and even those with smaller production scale, such as carnauba, buriti, curaua, golden grass etc. follow the same local economic, social and environmental dynamics. The challenges to rebuild some of these supply chains are mainly related to technology and governance, not only by the agents themselves, but also on the market mechanisms, as shown in a survey of priorities in the natural fibers sector presented in the following table (Table 4).

Table 4 - Priorities of the Brazilian natural fiber sector (mallow / jute, coconut, sisal, piassava, silk and bamboo)

1º	To seek incentives and encouragement for feasibility studies and research that develop technologies aimed at the production system, processing and new uses of different natural vegetable fibers with economic potential
2º	Carry out a census of the vegetable fiber sector, with georeferencing of producers, for monitoring and planning of harvests, which will support several other policies
3º	Establish a National Program to Support the Cultivation of Vegetable Fibers through the Ministry of Agriculture, Livestock and Supply (MAPA), with goals and deadlines set for a decade
4º	Rural credit: adapt financing demands; create specific promotion and credit lines for the different natural fibers (cultivated and extractive); extend the scope of the financing policy to the most distant fiber producers
5º	To seek support from the public authorities in strengthening the social organization of producers (associative and corporativism) and in training in different skills important to their activity
6º	Articulate new partnerships with companies in the automotive, plastic transformation, cellulose, construction, fashion, among others with interests in natural vegetable fibers
7º	Restructure the minimum price policy and implement agricultural insurance for specific crops of the floodplain region
8º	Articulate the support of the legislature (municipal, state and federal) in the agendas of interest of the natural fibers sector
9º	Create a register or seal of "organic" for natural fiber products in Brazil that meet the main sustainability requirements by adopting criteria for standardization, classification and certification
10º	Create mechanisms to manage and articulate Brazil's natural fiber production chains through corporate governance with the creation of an Institute for the Governance and Development of Brazil's Natural Fibers, and; strengthen its Sector Chamber of the Ministry of Agriculture

Source: Author's elaboration

However, the cost of production of natural fibers and their products needs to be reduced so that they can be competitive and perform better than other products.. If natural commodities do not achieve a greater advantage than their competitors, especially in terms of quality, environmental and social appeal alone will not yet be able to promote the development of these supply chains. In this competitive race, it is understood that for a reorganization of the natural fibers sector, it is important the actors of the production chain be involved in the strengthening of the institutional environment and participation in decision-making processes in the scope of public policies, factors that determine the forms of governance of the chain.

5. Final considerations

Economic development cannot be pursued without considering the social and environmental dimension, just as there is no way to make homogeneous policies for a country the size of Brazil, with different biomes, soil types, climate, vegetation and water resources beyond cultural differences. We know, therefore, that sustainable development can only be built with enterprises that, besides economic growth, prioritize the conservation of the environment and the valorization of human capital. Having said that, it is unacceptable to neglect an ecologically based economy that, in Brazil alone: (i) produces around 400,000 tons of natural fibers (excluding cotton); (ii) generates about 300,000 jobs (including industry and commerce); (iii) reaches about 680 municipalities in different parts of the country, especially in the poorest regions, including the much coveted Amazon; (iv) generates around 350 million reais, and; (v) includes more than 40 industries, will be neglected. The decline in production and cultivated area, together with insufficient investment in research and technological development, is compromising the future of these fibers. On the other hand, the natural fibers sector is nevertheless resilient for having resisted the various economic and political crises that marked its trajectory and, despite everything, still strives to occupy a space worthy of its importance in the local development of its regions.

The priorities raised with the productive sector through the *Natural Fiber Sectorial Chamber* demonstrate that most of the actions depend on the support or even on the total initiative of the public power. Only actions 6, 9 and 10 (Table 4) are feasible without any support or dependence on the government. Moreover, the first of the ten priorities highlights the need for investment in research and technologies that can develop the sector from the farming level to new applications of fibers to new markets. In this sense, it is important to

emphasize that the different vegetable fibers produced in Brazil have great potential to be explored by biotechnology, and even nanotechnology, with expectations of considerable economic and ecological results.

However, it is worth mentioning that the social factor expressed in priorities 5 and 10, "*need for greater organization and empowerment of producers*" and "improving sector governance mechanisms" corroborate that it is not a simple task to restructure and develop the fiber sector. For this long-awaited progress, it is necessary to make changes in the countryside, taking a look at the rural producers, especially their living and working conditions. This requires the involvement of public authorities in the adoption of public policies that prioritize basic needs in rural areas such as education, health, transportation, sanitation; and the private sector in the pursuit of improving its production systems, developing new products and, mainly, qualifying the participation of agents in the production chain in the decision-making processes that interest them, that is, in the governance of the sector.

It is therefore necessary to focus on new forms of cooperation to guide the collective search for solutions to the common problems experienced by the natural fibers sector and its thousands of rural workers who struggle daily to survive the limited geographical conditions and especially the scarcity of basic services in rural areas in Brazil and other producing countries. The resolution of the 74th session of the UN General Assembly on natural fibers stresses that this effort should involve international and regional organizations, the public sector, the business community, academia and especially the entities representing workers and farmers. Therefore, based on my experience as a researcher for over ten years, I reaffirm that only strong and coordinated cooperation between all stakeholders can promote an effective and long-lasting international networking partnership capable of effectively supporting research and sustainable development of the natural plant fiber economies.

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