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# Brainy Africans to Fortress Europe: For Money or Colonial Vestiges?

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## ABSTRACT

### **Brainy Africans to Fortress Europe: For Money or Colonial Vestiges?**

Economic reasons along with cultural affinities and the existence of networks have been the main determinants explaining migration flows between home and host countries. This paper reconsiders these approaches combined with the gravity model and empirically tests the hypothesis that ex-colonial links can still play an important role in the emigration decision. We employ a general linear mixed model, and apply it to the case of skilled, educated and talented Africans, who migrate to Fortress Europe over the period of 1990 to 2001. While we find some differences in the exodus of skilled Africans by sub-regions, the magnitude of the colonial vestige in Africa is a significant determinant of emigration flows. Overall, Portugal is preferred to the UK which is preferred more than Belgium, Germany and Italy. Brainy Africans are, however, indifferent between the UK, France and Spain as a destination country. Established immigrant networks and higher standards of living with job opportunities in the host country are also very important drivers of the emigration of brainy Africans to the European ex-colonial powers.

JEL Classification: F22, O15, J61

Keywords: skilled migration, Africa, colonization, networks, economic reasons

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## 1. Introduction

The imbroglio surrounding the migration debate in general and especially in Europe is far from being resolved. Migration scholars, pundits and policymakers alike are deeply divided over the responsibilities and the best concepts for analyzing or solving the issue of international migration. At the same time, all immigrant countries advocate the need for skilled labor and try to liberate entry hurdles for brainy immigrants. This is, in particular, the latest trend in fortress Europe. In Germany, for example, immigrants with a university degree can enter and work freely, and foreign students who finish their degree in Germany can stay if they find employment. France has recently adopted the concepts “*immigration de remplacement*” (demographic replacement migration), “*immigration choisie*” (selective immigration according to criteria), and “*immigration concertée*” (bilateral temporary guestworker programs) (Chojnicki et al., 2005; Banegas et al., 2007).

Human capital is a critical input in the economic production function and skilled workers are very well compensated. Obviously, those who gain from this type of migration are the immigrants themselves and the host countries (brain gain). But where do the brainy skilled immigrants come from and what happens to the countries they leave behind? The answer is related to the term *brain drain*, coined by the British Royal Society in the 1950s. It refers to the permanent and non-replenished exodus of scientists, researchers and other highly skilled workers from developing countries to the USA and Canada. In its severe narrow form, brain drain deprives the often poor countries of origin of their most valued capital, that of educated, creative, talented and healthy individuals for whom the country of origin has paid to educate and provide. Naturally, the source country suffers a deceleration of economic development<sup>1</sup>.

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<sup>1</sup> Some argue, however, that the remittances these highly skilled individuals send back can significantly contribute to economic development; that some brain drain is beneficial as it alleviates unemployment pressures; and that return migration of these skilled workers with extra foreign training can be more advantageous. Moreover, others advance the idea that the emigration of highly skilled individuals may help remaining innovators access valuable

The fiscal impact notwithstanding, the loss for the developing countries and the people left behind can also come in different forms and can be hard to measure. One example is the exodus of students who acculturate abroad and hardly ever return. In the late 1970s, about 105,000 Sub-Sahara African students were studying in only six Western European countries (Russell et al., 1990). Another example is that many of these educated and skilled individuals could have an influence in the decision-making process of the government, could voice a healthy opposition, could also shape new ideas and give hope. In this case, the source country may be left politically vulnerable, victim of coup d'états, and various other ethnic conflicts.

Hatton and Williamson (2002) argue that emigration from Africa will continue and match the early 1900s emigration of Europeans to the New World. Restricting African migration may be partially successful, but has unpleasant side effects such as social problems at home, a rising share of illegals, and increasing diplomatic problems between Africa and Europe.

Africa is a continent that could easily fit in the brain drain, migration and development literature. For the last couple of decades, about 20,000 Africans emigrate to the Organization for Economic Co-operation and Development (OECD) countries each year (Adepoju, 2008). Africa has the longest colonial experience than any other continent, and shares a history with Europe for many centuries. While the colonialism era officially ended in the 1960s, Europe still constitutes the first main destination for African migrants. In 2000, more than 60% of African migrants live in Europe, while only 31% live in North America (Lessault and Beauchemin, 2009). Defoort and Docquier (2007) find that if France conducts a selective migration policy that would induce a significant increase in the brain drain from North Africa, Sub-Saharan Africa, the OECD countries and, at a lower extent, South Asia.

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knowledge accumulated abroad, the so called 'brain bank' (Agrawal et al., 2008). Beneficial brain drain is even more likely when models account for consumer consumption. That is, the sending country's consumers benefit more by knowledge produced abroad by their countrymen than at home if the skilled emigrants had stayed. The benefit is greater the weak or more endogenized intellectual property rights are in the sending country (Kuhn and McAusland, 2006).

African migration to Europe may not strictly follow the neoclassical economic model of migrating that is based on wage differentials. Certainly, economic migrants typically seek better living conditions and want to improve their lives; logic would dictate that countries with the highest living standards would attract a disproportional number of migrants. However, the Scandinavian countries that offer the highest standards of living and the best material conditions in the world, do not receive a high number of African immigrants (Hooghe et al., 2008). Using OECD and Eurostat data on the migrant inflow into European countries between 1980 and 2004, Hooghe et al. (2008) find that while migration flows react mainly to labor markets, cultural and colonial ties are equally important.<sup>2</sup> Docquier et al. (2007) also show that, inter alia, brain drain from all developing countries is strong where colonial links exist. Interestingly, while Beine et al. (2008) confirm that colonial ties are positive and significant for the exodus of skilled individuals from developing countries to all OECD countries, they do not find colonial ties to matter for the exodus of all individuals.

While African brain drain is of paramount importance for all economic actors and for the global economy and society, and while over the years there have been many studies on the subject mostly by political scientists very few studies have analyzed empirically African brain drain to the respective ex-colonial powers. The main reason is the non existence of adequate data or the existence of very fragmentary data. To the best of our knowledge, there is no empirical work in the economic literature that has attempted to explain bilaterally why highly skilled Africans leave their countries of origin to go to fortress Europe. While it is obvious and intuitive, and most experts acknowledge that there exists a long-term historic relation between the two continents, very few studies have examined the force of colonialism as a determinant of African migration to Europe.

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<sup>2</sup> Their study does not explicitly analyze the direct (bilateral) migration flows from a former colony to its ex-colonial power. They instead use a broad comparative dataset of migration patterns that covers 21 European countries over the period of observation.

The present paper seeks to contribute to the growing literature on brain drain from developing nations by revisiting the different approaches adopted so far in the literature, and explicitly applying to the case of the fifty three states in the African Continent. Using recently available and reliable data on Africa's outflows into OECD countries, our main focus is the role of colonial linkages. While we test other theories and models, such as the gravity model, the neoclassical model, and the networks theory, we conjecture that the magnitude of the colonial vestige in that continent outweighs any other factors explaining the African brain drain.

The rest of the paper is set as follows. In section 2, we proceed with a brief literature review on the recent research contributions on brain drain from developing countries and we provide an overview of post-colonialism facts. In section 3, we describe our model and the data being used for this study. The empirical evidence is presented in section 4, and section 5 concludes.

## **2. Review of Migration Theories, Literature and Colonization**

### **2.1. Theories of International Migration Movements**

Overall, even though there is no consensus among researchers on the determinants of international migration, different theories attempt to address and explain the drivers of migration. There are tangible and intangible drivers. Migration is also self-selective. Following Massey (1999), we provide an overview of the most prominent theories of migration in the social sciences. Neoclassical economic theories, like the famous "push-pull framework," have certainly dominated the literature over the last few decades; they have placed the labor markets in the heart of the movement. In 1970, the Harris-Todaro macro-model explained migration through geographic differences in the demand and supply of labor. As people leave areas of abundant labor and scarce capital to move to places of scarce labor and high wages to reap high returns,



wages equalize and the movement stops. Similarly, the micro-model of migration assumes a rational individual who maximizes utility and moves abroad because there are economic disparities (wages and jobs). As people move, the labor markets of the sending and receiving countries reach some equilibrium and migration subsides. Among several studies confirming migration due to wage differentials, Hatton and Williamson (2003) find that real wage gaps between Europe and the new world were one of the main forces of European emigration in the late nineteenth century.<sup>3</sup>

Every move entails monetary and psychic costs. When costs are much lower than the benefits then migration takes place; this is a cost-benefit analysis. The human capital model says that workers embody a set of skills that they can “rent” to employers. Workers invest in education, training, experience and health that make them more productive<sup>4</sup> and thus they command higher wages. Migration is also investment in human capital that increases productivity (Sjaastad, 1962). Human capital theory predicts that skilled and talented workers, the young and the brightest will move first and will remain highly internationally mobile. Undoubtedly, they move from areas of relatively low earnings to areas of high earnings. Nonetheless, the push-pull framework has been subject to critiques. The main argument against this approach is that the concepts were developed in an industrial era, and as such they no longer offer the best perspective on migration in a post-industrial, globalizing world (Hooghe et al., 2008; Massey et al., 1998).

The second strand of theory on international migration is the World System Theory. It centers upon the idea that there are dominant wealthy countries (core capitalist nations) and poor dependent countries (peripheral or semi-peripheral) and that global capitalism perpetuates these

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<sup>3</sup> Another force of emigration was demographic booms in the low-wage European sending regions.

<sup>4</sup> With regards to the movement and productivity of world class workers, Hunter et al. (2009) – using the world’s most-cited physicist’s case – find that almost half of them live outside their country of birth and they move systematically in countries with large R&D spending. They also find that elite movers, on average, are not much productive than elite stayers. There is no evidence on whether migration improves scientists’ productivity.

inequalities and reinforces a stratified economic order. Wage differentials are not important here. Migration in this theory is a structural consequence of the expansion of markets within a global political hierarchy, and migration patterns reflect center/periphery to the center, in terms of linguistic dominance or cultural hegemony (Massey, 1999; Hooghe et al., 2008). In other words, migrant flows are triggered when capitalist economic relations enter non- or pre-capitalist societies. There are various types of links between core capitalist countries and countries in the periphery such as enduring ideological, intellectual and cultural ties. The vestiges of colonization in the organization of the education system in former colonies, and specifically the dominance of European concepts in universities' structure of knowledge, is one of the factors contributing to the magnetism of the former colonies to their former colonial powers (Hooghe et al., 2008; Massey et al., 1998). Even simple tourists visiting Africa could also ignite the desire to go abroad to the European country.

The presence of armed forces in the colonies or in the peripheries in general also triggers emigration from the poor countries to the core countries. Military bases can easily expose the natives to the foreigners' way of living, their wealth, customs, culture, etc. Oftentimes military bases are the cause of intermarriages and further emigration from the home country. Specifically for Africa and its former European colonizers, we find that even after decades of decolonization, many European countries have kept some military bases in Africa for "just in case." France, for instance, has until now military bases along the Atlantic in most of its former colonies. We find the 23<sup>rd</sup> and 43<sup>rd</sup> BIMA (Bataillon d'Infanterie de Marine) in Senegal and Côte d' Ivoire respectively, and other bases in Gabon, Chad, and Djibouti. BIMA is ready to intervene<sup>5</sup> when political pressures mount or a coup occurs.

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<sup>5</sup> In the meantime, however, with the increasing remonstrations from some African leaders, France is trying to redefine its military bases in the continent.

Other powerful links are, for example, the established Airfare system (by the former colonial powers). Direct flights from the colony to the colonial power but not to other colonial powers may substantially influence the migration patterns of individuals in those former colonies. In a way, the ex-colonial powers make it very difficult for Africans to fly directly to their city of choice in Europe. Instead, they have to go to the former colony's country first.

Beside the historical causes, e.g. occupation, colonization, this kind of structural unbalance may also be brought up by means of mass communication, which vehicles information on Western lifestyle and shapes consumption expectations in the culturally peripheral societies (Hooghe et al., 2008). In this regard, Massey (1999) points out that the penetration of capitalist economic relations into non-capitalist or pre-capitalist societies is today made possible by neocolonial governments and multinational firms that perpetuate the power of national elites who either participate in the world economy as capitalists themselves or offer their nation's resources to global firms on acceptable terms. In the past, however, this market penetration was assisted by colonial regimes that administered poor regions, like in Sub-Saharan Africa, for the benefit of economic interests in colonizing societies.

The third theory explaining emigration is the social capital theory emphasizing the central role of social networks that include relatives. It postulates that migrants are attracted by the fact that other migrants from the same ethnic group or country have already settled in the host country, which consequently allows for the occurrence of networks of recruitment (Hooghe et al., 2008; Massey et al., 1998). Migrant networks come in the form of kinship, friendship, shared country of origin, etc. Networks, basically, lower the costs and increase the returns of migration. While networks have been acknowledged in the literature as powerful determinants of migration, it is not a priori certain that they also work for the skilled and educated group of migrants we are studying. It is possible that skilled migrants do not need networks because they

are educated and can find their own way. Note that while the previous two approaches claim to identify what essentially attract migrants to their destination countries, the networks approach explains emigration flows as well as it explains return and repeat migration. Notably, once migration has been initiated it can persist and be self-sustained due to cumulative causation (Massey et al., 1998).

The New Economics of migration is another theory that considers the role of a variety of markets not just labor markets. The basic idea here is that migration is a household decision to minimize and overcome constraints of the family's consumption or production. In developing countries, insurance, futures, capital or consumer credit markets either do not exist or they fail soon after they open. The goal of the household is then to diversify risks and improve its income in absolute and relative terms. While wage differentials are not necessary, economic development in the home country may intensify emigration pressures. For example, it may change where people are in the income distribution and relative income becomes an important push of migration.

The last migration theory is the segmented labor markets. It focuses on the bifurcated structure of the labor markets in two tiers and the irreversible sorting of workers by employers. Accordingly, immigrants are tied to the lower tiers of the markets and have no chance to escape them. Migration here is demand driven from the host country; it could be from the native employers or from immigrants who arrived earlier and need more co-ethnics to support the enclave. Examples of this type of migration are the guestworker schemes. Host countries demand mostly lower skilled immigrants who accept low rank jobs for a low wage and help the host country to maintain an occupational hierarchy. Immigrants are attracted to these schemes because they pay more than what they would earn in the home country and because they think that it is temporary.

A popular model in the literature of international trade is the gravity model. It is used to analyze the flow of bilateral trade. It is based on the economic sizes of the two trading partners (often using GDP measurements) and the distance between them. The model states that the amount of bilateral trade is an increasing function of the national incomes of the trading partners; it is positively affected by the presence of a common language and a common border; and it is a decreasing function of the distance between them. This model often very successful in predicting the flow of goods and services could also be used in migration to describe and predict the movement of individuals. In fact, the gravity model of migration is indeed used in urban geography. The idea is that – if we consider two cities – as the size or population of one or both of the cities increases, the movement of people will also increase between them, and the longer the distance between the two cities is, the lower the movement between them will be. This is often called “distance decay.”

To test these theories, empirical scientists need good data. Lack of data in some countries or incomplete data in others have prevented migration researchers to adequately study the issue of brain drain. Carrington and Detragiache (1998) were the first to estimate the magnitude of the brain drain from developing countries to OECD countries. They find substantial brain drain from the Caribbean, Central America, and some African and Asian countries. Only recently Docquier et al., (2007) produced and made available to the community a new dataset that allows research on emigration flows and in particular, on brain drain. They also provide a good study on brain drain from developing countries to OECD countries. Based on their aggregate international data they estimate skilled workers emigration rates for about 190 countries in 2000 and 170 countries in 1990, including both developed and developing countries. They show that brain drain is strong in small countries that are close to major OECD regions and in countries with colonial links, and that brain drain increases with political instability and the degree of fractionalization in the home

country (especially in Sub-Saharan Africa) and decreases with natives' human capital. Unlike geographic proximity, however, linguistic proximity is seldom significant for brain drain. They also evaluate the changes in brain drain intensity from 1990 to 2000 and show that Western Africa, Eastern Africa and Central America experienced a substantial outflow of their high skilled population during the past decade.

Looking at annual panel data on net migration between 1977 and 1995, Hatton and Williamson (2003) use the European emigration history as a paradigm to project emigration from Africa in the future. They provide evidence that not only is there dramatic pressure to emigrate from Africa, but that African emigration is driven by the exact same forces observed in late nineteenth century Europe. Acknowledging that most of African emigration takes place within the continent, they conclude that African emigration will intensify with increasing demand to migrate to the high-wage labor markets of the developed world.

Clemens and Pettersson (2008) concentrate on the brain drain from health professionals – doctors and nurses out of Africa. They find that about one fifth of African-born physicians in the world, and about one tenth of African-born professional nurses were working overseas in a developed country in the year 2000. The fraction of health professionals abroad varies enormously across African countries, from 1% in Egypt for nurses to 81% in Liberia and from 5% for physicians in Equatorial Guinea to 75% in Mozambique, according to the occupation and country. They also find that the emigration of health professionals does not really differ from the emigration of other educated workers such as engineers, teachers, entrepreneurs, etc.

## **2.2. Colonialism and its Long-lasting Impact on Migration**

The colonization era of European nations to most African countries officially ended around and during the 1960s. By the end of the colonial rule, tens of thousands of people from Africa

migrated to Europe. The majority of them were colonial repatriates (who at the time were the main source of skilled and educated personnel),<sup>6</sup> but many native Africans also migrated to the motherlands. This was either due to natives seeking to ameliorate their life, the signing of agreements, or to civil wars and political repression. Decolonization also removed many military people, leaving the ex-colonies very vulnerable. The behavior of the former colonial powers vis-à-vis their colonies varies. While Belgium exercised a very restrictive stance towards ex-colonial immigrants, France experienced a different pattern. After the Algerian independence in 1962, about one million of French-Algerians moved to France, of whom there were 350,000 Algerians or “French Muslims.” Many Tunisians, Moroccans, and West-Africans also moved to France. In spite of the fact that France tried to restrict Algerian migration, it continued (Haas, 2007). In 1982, for example, Algeria was the leading group (in terms of immigrant stock) in France (Constant, 2005). By the mid 1960s immigration from Sub-Saharan Africa marked its debut to France. This mass migration created a serious shortage of housing in France (Constant, 2005).

In the 1970s we observe a significant migration of people from Angola, Mozambique,<sup>7</sup> and Cape Verde to Portugal, seriously affecting many sectors of their economy. With the exception of France that kept some skilled expatriates in Côte d’Ivoire and Gabon,<sup>8</sup> skilled personnel to sub-Saharan Africa came from aid agencies of industrialized countries. Germany was not a preferred destination from the former colonies, but Germany’s colonial rule ended in the early 1900s. During the post-colonization years, the German government actually sought guestworkers mostly from East and South Europe. Also France, Belgium, Denmark and the Netherlands formally signed guestworker agreements with Morocco and Tunisia.

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<sup>6</sup> The departure of Europeans from Zaire, where over 80% of the commercialized production was controlled by them, had a detrimental effect on agriculture (Russell et al., 1990).

<sup>7</sup> Mozambique’s port and railway sectors lost about 8,000 skilled and semi-skilled workers to Portugal; most of the plantation and factory owners, settler farmers, shopkeepers, government administrators, and professionals also immigrated to Portugal (Russell et al., 1990).

<sup>8</sup> France has also kept military bases in many of its ex-colonies along the Atlantic. French military readiness is executed by its 43<sup>rd</sup> BIMA.

The African brain drain to developed countries, with Western Europe being the main destination, has substantially increased over the last thirty years (Kohnert, 2007; Economic Commission for Africa or ECA, 2006). Between 33% and 55% of Africans with higher education left Angola, Burundi, Ghana, Kenya, Mauritius, Mozambique, Nigeria, Sierra Leone, Uganda and Tanzania in search for a better life and employment in OECD countries; about 20,000 Nigerian and 12,000 South African doctors migrated overseas (Kohnert 2007).

The human capital lost on the continent is mostly pronounced in the employment sector for highly qualified personnel. For example, statistics on 25 year olds and above as a percentage of the local work force show that African migration to OECD countries between 1990 and 2000 is as follows: from Western Africa it is 20.7 and 26.7% respectively; from Eastern Africa 15.5 and 18.6% respectively; from Central Africa it is 9.8 and 13.3% respectively; from Northern Africa it is 6.9 and 6.2% respectively; from Southern Africa it is 6.9 and 5.3% respectively (c.f. Kohnert, 2007; ECA, 2006; Docquier and Marfouk, 2004).

The outflow of highly skilled Africans also constitutes a heavy financial burden to their respective native countries. UNCTAD estimates that the loss of an individual who has been educated in Africa costs the sending country on average USD 184,000 in terms of funds invested in that individual's education and training. Other detrimental effects include delaying the building up of an African middle class, the development of structures of the African civil society, which may consequently exert a negative impact on the political and economic stability of the countries of origin (Kohnert, 2007).

To stave off the outflow of skilled and educated individuals in the 1980s, many Sub-Saharan African countries practiced regulatory or restrictive policies (such as passport regulation and exit permits, and remittances requirements); delinking policies (such as employing nationals rather than expatriates); and incentive policies (such as providing attractive employment



conditions) (Russell et al., 1990). Still rancor was present in both continents. At the same time geopolitical instability was also increasing. In the 1990s and beyond, some ex-colonial powers provided large amounts of capital in retribution (i.e. Germany to Namibia) and others signed bilateral treaties of migration (i.e. France with Senegal). The United Kingdom not only increased aid to the continent, but also pressured the G8 to write off debt from Africa and to devise a plan to take Africa out of its economic development quagmire. The United Nations also helped in capacity building.

The African brain drain, to the best of our knowledge, is an omission in the economics literature. It has been, however, widely debated in other social sciences (political science and sociology). For example, El-Khawas (2004) underlines the role of colonial ties in African migration by suggesting that some Africans prefer to migrate to their former colonial powers because of their familiarity with the language and culture. One of the recurrent arguments outlined in the papers resorting from other social sciences is Europe's responsibilities vis-à-vis the ever increasing number of African exodus to continental Europe. Kohnert (2007) argues that:

*“The European Union and its member states share a heavy dual responsibility for the continuing migration pressure: first, because they fostered over decades corrupt and autocratic regimes like that of Eyadema's Togo or successive Nigerian military dictatorships, with direct disregard to principles of ‘good governance.’ The aftermath of these regimes is still to be felt today, and constitutes one of the underlying factors for migration. Secondly, the EU contributed to Africa's growing economic misery, due to the damaging effects of European selfish external trade policy”* (p. 19).

Further, Banegas et al. (2007) describe France's foreign policy reforms towards Africa under the different regimes in the V<sup>e</sup> République. According to them “everything has changed so that

nothing changes;” this somehow transcends the *status quo* attitude of France towards the African Continent.

The feminization of African migration is also of increasing importance for both continents. In 2005, about 14.5 million women from Africa resided outside their country of origin compared to 9.5 million in 1965 (ECA, 2006; United Nations, 2006).

### 3. Model, Variables, and Data

#### 3.1. Empirical Model and Variables Hypotheses

To empirically study the determinants of the African brain drain to Europe, we use a simple OLS model, regressing the emigration flows of skilled African workers on various potential determinants of migration following the established literature. Denoting the origin country  $i$  and destination country  $j$ , at time  $t$  then the dependent variable ( $migr_{ijt}$ ) shows the migration flows from  $i$  to  $j$  at time  $t$ ; it is specified as a semilogarithmic function as follows:

$$\ln migr_{ijt} = a_0 + a_1 Network_{jt} + a_2 PPP_{it} + a_3 GDPc_{jt} + a_4 Pop_{jt} + a_5 GovExp_{it} + a_6 Civil_{it} + a_7 Colon_i + a_8 Language_i + a_9 Airfare_i + a_{10} SAP_i + a_{11} PopFormer_{jt} + e_{ijt} \quad (1)$$

The economics literature on international migration distinguishes many potential determinants of brain drain. On the basis of the different theoretical approaches outlined in Section 2, including the gravity model, we select a group of independent variables that can best explain the migration flows from Africa to former colonial powers in Europe. First, we include the population of the host country to control for the simple fact that large countries will attract a larger number of migrants than smaller countries. All the variables are listed and explained in Table 1.

Other variables following the push-pull and gravity models are the Gross Domestic Product (GDP) per capita in the host country. GDP is an indicator of the host country’s overall

economic performance and a widely used proxy for wealth. The variable GDP at purchasing power parity (PPP) per capita is taken from the World Development Indicator (WDI) 2006. In the equation, it enters in its log form. This is convenient because the coefficient is the elasticity.

The actual distance between Africa and Europe in miles or kilometers or the distance between the given two countries in Africa and in Europe, may be an important determinant. However, it may not be as important as is the easiness to cover this distance in terms of time and money. We therefore, use direct airfare connections as a proxy for distance. Direct flights from the respective African country to the European country can best capture the importance of distance as a determinant of migration. We carefully constructed a dummy variable by using the air transportation route, to analyze if there are some established transportation structures which *ab initio* make African Migrants land in one country instead of another. This variable is one if there is a direct flight from the former ex-colony to the former ex-colonial power and nowhere else and zero otherwise. Naturally, direct flights should increase emigration flows to the respective ex-colonial power and away from other European countries.

We include the PPP in the origin country, because it indicates the cost of living and living standards of the country; it takes into account the relative cost of living and the inflation rates of different countries. We use PPP numbers from the WDI 2006. We expect to find that the higher the PPP is the lower the emigration flows are. Government expenditures growth in the country of origin is another variable that captures wealth and ample labor market opportunities in that country. The higher the expenditures, the more jobs may be available and earnings will increase, deterring people from moving abroad. We created this variable from the WDI 2006.

Another set of variables accounts for the World System or cultural approach. Here, we stress the colonial ties between African countries and their former colonial powers. We consequently create a dummy variable for whether the African country was colonized or not.

This variable captures several aspects of colonial influences and ties that exist even decades after decolonization. They could be in the form of having perfect information about the former colony's country and labor markets, of lingering cultural and intellectual affinity, and of suffering lower psychic costs when migrating to that country. They could also indicate some formal agreements between the respective countries, like recognition of education degrees, guaranteed access to university, etc. The presence of armed forces by the former colonial powers definitely adds to the explanatory power of the colonial dummy.

Besides having one dummy variable for colonization, we create nine different categorical variables to analyze the precise impact, influence and attraction of each former colonial power in the respective former African colony. Specifically, we created one dummy variable for African countries colonized by each of the following European countries: Belgium, France, Germany, Italy, Portugal, Spain, the United Kingdom, and those colonized by two colonial powers. The last dummy variable applies to the African countries that were a priori Independent (i.e. Liberia). As others have suggested, if we believe in the cultural explanation of emigration, then it is inevitable that the ex-colonial powers will still attract migrants from their ex-colonies (Hooghe et al., 2008).

To have a more "pure" variable for colonialism, we do not include language affinity in it. In order to capture the importance of language affinity we created another dummy variable. This dummy variable takes the value one for the countries in Africa whose first official language is the same as the one of their former colonial powers. Language fluency of the ex-colonial power that is now the host country has been long found as a powerful determinant of the economic performance of immigrants (Chiswick, 2007). With this variable we want to test the hypothesis that Africans who are fluent in a European language due to the fact that they learn it officially at school will be more likely to go to that country than to another country with a different language.

The fourth set of independent variables is in line with the networks approach, which predicts that the presence of migrant communities in the host country or city facilitates and even perpetuates further immigration. In fact, in many European countries there are already immigrant enclaves that oftentimes even live in a parallel world to that of the natives. Potential migrants who know people in the destination country will be more likely to make the move than otherwise. Networks do not always need to be connected to the same family, village or country of origin. The power of networks comes also from the camaraderie that migrants have and the common plight they share in the host country as foreigners distinguished from natives. However, it is possible that network theory may not apply to the group of brainy migrants who may not need the network for help; skilled and talented migrants may rely on themselves, or connect with the natives in the host country for support. Lastly, while networks help immigrants, the network usually knows everything about everybody else. Perhaps some immigrants do not like to be exposed and “reported” back to the country of origin, especially if they come from a country with compromised civil liberties. Following previous studies, we include the stock of foreign population in the host country at each time period in our observation as a proxy for networks (Hooghe et al., 2008).

Finally, we borrow a determinant of emigration from political science and political economy. Accordingly, people move because of civil and political rights such as freedom of speech, freedom of press, freedom from any kind of discrimination, etc. Long after the independence waves in African countries in the 1960s, a considerable political metamorphose dominated many African countries in the last decade of the 20<sup>th</sup> century. Namely, it was the introduction of “political pluralism” (Quantin, n.d.). The political transition was sometimes accompanied by conflict and ending in violence. Onga’yo (2008) contends that “the life threatening political and economic conditions in Africa contribute enormously to the massive

exodus of both highly qualified and lowly educated people in Africa” (p. 8). In order to capture the role of the political situation in the emigration flows, we introduce a variable for freedom and liberty. We assume that individuals like to live in countries where civic liberties and individual rights are protected and apply to all. Accordingly, if the home country ranks high in freedom and liberty it will be less likely for its people to emigrate. We gather this variable from the Freedom House World Country Ratings 2009. Civil Liberties are measured on a one-to-seven scale, with one representing the highest degree of Freedom and seven the lowest. It is interesting that in our sample of all fifty three African countries no country scored one.

In addition to the sensible internal political transition, many African countries were also experiencing external pressures or “political conditionality” imposed by some international actors, like the World Bank and the International Monetary Fund (Quantin, n.d.). For example, countries under Structural Adjustment Programs (SAPs) were systematically obliged to apply and abide by these measures *inter alia* (Adepoju, 2008; Ekpo, 1992; Khan and Knight, 1985; Guitan, 1981). That is, they had to reduce the size of the public sector which in many countries is the leading source of jobs, adjust their currency, increase domestic interest rates, etc. We capture this effect of the SAPs on the African emigration by creating a dummy variable for countries under these external economic conditionalities. While in principle these programs should help, in fact they handicap most African economies and are a major cause of brain mobility. The failure of economic growth policies in most African countries is visible: low per capita income, severely limited access to fundamental needs regardless of multiple efforts to improve social welfare, high mortality rates, and deterioration of the terms of exchange. Through SAPs, the balance of payment crisis has led to high inflation and a trend towards decrease in real earnings (Dia, 2004). Consequently, most highly skilled workers do not think twice about leaving their home countries

to go abroad where they have brighter prospects and higher wages and can rely on a stable economic system.

### **3.2. Data**

For this study we employ various sources of data. Migration flows of brainy Africans to the designated European countries in our analysis come from the bilateral data on gendered assessment of the brain drain by Docquier et al. (2008).<sup>9</sup> They painstakingly compiled an aggregate<sup>10</sup> dataset to capture the bilateral emigration in the world by collecting census and registry data on the structure of immigration in all OECD countries. The dataset counts as migrants all working-age (25 and older) foreign-born individuals living in an OECD country. This is an aggregate dataset on the stock of emigrants from all developing countries to OECD countries by level of schooling. By comparing the number of migrants to that of natives in the home country in the same education group, they calculate the emigration rate by educational attainment for two decades: 1990 and 2000. The dataset devotes special attention to data homogeneity and comparability.

This dataset presents several comparative advantages. First, it provides estimates of bilateral emigration stocks and rates by educational attainment and gender for 196 OECD countries over the period of 1990-2000,<sup>11</sup> therefore covering the migration rate and stocks of all fifty three countries on the African continent to the OECD countries in the dataset. For our present study, we select the bilateral migration (stock) of the fifty three states in Africa to seven European countries, which were former colonizers on the continent. We also look at the total

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<sup>9</sup> This is the revisited version of Docquier and Marfouk (2006).

<sup>10</sup> Due to the lack of micro-data on African migration, we content ourselves by the aggregate data of Docquier et al. (2008). The dataset is downloadable from Docquier's website.

<sup>11</sup> Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea (Rep. of South), Luxemburg, Mexico, the Netherlands, Norway, New Zealand, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and USA.

migration stock of Africans to the respective country selected for our purpose. For the fifty three sending countries to the seven destination countries over the two time periods (1990 and 2000), there were no missing observations, in theory yielding 742 (53 African countries x 7 European countries x 2 points in time) observations. Africans who have finished at least high-school are counted in our brain drain sample.

According to Docquier et al. (2008), the construction of their dataset relies on three steps: collection of Census and register information on the structure of immigration in all OECD countries, sum up over source countries; which allows for evaluating the stock of immigrants from any given sending country to the OECD area by educational attainment, and finally, compare the educational structure of emigration to that of the population remaining at home; allowing the computation of emigration rates by educational attainment in 1990 and 2000. Calculating the brain drain as a proportion of the total educated labor force provides a better measure of the pressure imposed on the local labor market. The term emigration rate is thus used to refer to relative stock data and not to immigration flows.

As mentioned previously, the variables capturing the economic and labor market theories, as well as the networks approach (i.e. the stock of foreign population in the host country) are from the WDI (2006) database. The independent variables used to address the World Systems theory related to the colonial past were taken from different sources. The total number of inhabitants of the former colonial powers and the population of the host country are from the WDI (2006) database. The dummy variable categorizing the former colonial power was generated by using the classification made by Gieler (2007) and the CIA Factbook, and also the CEPII geographical data; we use these three different sources to double check the colonial footprint in each country in Africa.



Furthermore, the variable for Civil Liberties is taken from the Freedom House Annual *Freedom in the World* Survey (2009). We also take into consideration the external political and economic ‘pressure’ (political conditionality) by generating a dummy variable to control for the African countries that were or have been under Structural Adjustment Programs. To categorize the binary variable for SAP’s we consider the list provided by Boughton (2001). The dummies for language commonalities structure are created based on the data from the CEPII geographical information dataset. Finally, the variable that captures the airfare system and network between Africa and Europe is created by using the actual route map of the major airlines from the respective ex-colonial powers operating in Africa. These route maps can be downloaded from their respective websites. For example, for France, we use the actual route map of Air-France, for the United Kingdom we use British Airways, for Germany we use Lufthansa, and so on.

## **4. Results**

### **4.1. Sample Characteristics**

In Tables 2a-c, we present some colonization related facts between Africa and Fortress Europe. Table 2a describes the European colonization of entire Africa and by regions (North Africa and Sub-Saharan Africa). Out of the fifty three countries in Africa, fifty one countries were colonized by former European powers. Among the former colonizers, France ranks first with twenty colonies, or about 38% of the entire European presence in Africa. In North Africa, France occupied four out of six of the countries in Maghreb. The United Kingdom, as a second headliner occupied 32% of the African continent with seventeen countries. The third biggest colonial ruler was Portugal with five countries or 10% of Africa. The colonization was accompanied with its corollaries of cultural (here represented with the ex-colonizer official language) assimilation.

Table 2b portrays the language affinity to the ex-colonial power. Out of fifty three countries, thirty nine have adopted the language of their ex-colonial power as their first official language and still have it to this day. They represent about 74% on the continent. Language assimilation is mostly found in the Sub-Saharan region of Africa. In fact, thirty eight countries among the forty seven in this region (81%), share the same official language as their ex-colonizer. In twenty nine countries in the continent, the direct air transportation to access Europe is still provided by the national airlines of the former European colonizers. This presence of ex-colonial powers national airlines in Africa is highly observed in the Sub-Saharan countries with twenty seven countries relying on the former colonizer's airline compared to only two countries in the Northern part of the continent. France with Air France carries 51.72% of the direct flights from one major city in Africa to Paris Charles-De-Gaulle, making it therefore the biggest commercial carrier on the African continent. It is followed by the United Kingdom with British Airways (31.03%) and Belgium with Brussels Airlines (10.34%). Table 2c illustrates these statistics.

Table 3 provides summary statistics of some selected variables employed in the regression for 1990 and 2000 respectively. On average, 5,425 skilled Africans went to the seven European ex-colonial powers in 1990. A decade later, 7,910 skilled Africans left their countries to go to these European ex-colonial powers. This is an almost 50% increase. The percentages of the official languages in Africa and airfare systems between the two continents have not changed between 1990 and 2000. Naturally, the population in these seven European host countries we are considering has increased from 44.3 million to 45.6 million. The existing immigrant networks in these European countries have also grown from 1,588,675 in 1990 to 2,161,603 in 2000, an increase of 36%. Similarly, GDP in purchasing power parity per capita has increased from 17 thousand in 1990 to 24 thousand in 2000.

Looking at the PPP in Africa – in US Dollars – we see a tremendous increase in the decade by 210%. Assuming PPP depicts some economic well being, it is possible that this whopping change deterred more Africans from going to Europe. The last two remarks about the situation in Africa concern the existence of civil liberties and SAPs. It is noteworthy that on average, the score of the variable for civil liberties was about 5 in 1990 and it was also 5 in 2000. It is disconcerting not only that Africa scored 5 in 1990 – indicating rather trampled civil liberties – but that it remained at this level of stifled freedom by the beginning of the new century. As for the SAPs, we notice no change between 1990 and 2000. As verified by other sources, 72% of Africa practices SAPs under the instructions of the global lenders.

In Table 4, we present detailed summary statistics of the migration flows of brainy Africans in our sample from each country of origin in Africa to each of the seven European ex-colonial powers over the period of 1990 – 2001. These raw statistics show that there are persistent links between Africa and fortress Europe, often related to colonization. For example, on average 486,500 Algerians went to France compared to only 75 Algerians who headed to Portugal.<sup>12</sup> Furthermore, 27,121 people from Mali went to France while only 76 moved to the United Kingdom. Note that among those emigrants from France’s ex-colonies, those from the Maghreb constitute the vast majority that moves to France compared to their counterparts from the Sub-Saharan region. The same pattern of colonial linked destination is also observed by the countries colonized by Portugal and the United Kingdom. For example, while 106,862 Kenyans went to the United Kingdom, only 442 moved to France. And while 2,627 highly skilled migrants from Mozambique went to Portugal no one moved to Germany. The absolute numbers of brainy African emigration from Algeria, Kenya, Mali and Mozambique to the selected European countries from 1990-2001 are presented in the appendix.

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<sup>12</sup> As a heuristic example of the flows over time, in Table A1 in the appendix we provide the exact numbers for 1990 and 2000 respectively for Algeria, Kenya, Mali, and Mozambique. This Table shows that the direction of the flows has not changed over the decade, possibly due to colonization vestiges and language affinities.

## 4.2. Robust OLS Results

The results of the robust OLS estimation are presented in Tables 5 and 6. In Table 5, we report the coefficient estimates of the potential factors determining migration in equation (1) for the entire continent as well as by region. The asterisks show the significance level of the coefficients associated with each explanatory variable and the robust standard errors are reported in parenthesis. In this estimation exercise we use one dummy variable for colonial power. The reference group is countries that were not colonized. Overall, the variance inflation factor is below the tolerated value. It is interesting to look at the coefficients on the constant term. They show that while skilled Africans from the northern regions are more likely to move to Europe, skilled Africans from the entire continent are not. There may be some unobserved or cultural differences that play a role and this warrants the separate estimations by region.

The estimates show that, overall, in Africa the colonial linkage is a very important determinant of the skilled African migration. In the model, brainy Africans are 72% more likely to move to their ex-colonial power country than those who are a priori from a not colonized or independent African country.

In addition, the established international airfare system in Africa, explained by the presence of ex-power national airlines in the respective ex-colonies, is also a key factor driving the exodus of high skilled Africans to Europe. The airfare variable unveils well the so far non-empirically investigated assertion made by Hooghe et al. (2008). They, indeed, state that “communication and transportation lines are still being structured according to the colonial heritage. For example, direct flights from Kinshasa (Democratic Republic of Congo) are still controlled by French and Belgian airlines companies, rendering it more plausible that citizens of Congo will arrive in France or Belgium, rather than in Germany or the UK.” (p. 502).

To our surprise however, the colonization variable has a negative sign for the Sub-Saharan region. Looking at the language assimilation variable the picture becomes more confusing. For example, for the entire continent, countries that have the same language as the European ex-colonizer are less likely to export migrants to that country. Yet for the Sub-Saharan region language assimilation is a very powerful determinant of emigration. Migrants from Sub-Saharan Africa are overwhelmingly more likely (72.3%) to head to their former colonial power based on the sharing of a common official language. While strange at first sight, this result is not so surprising. As mentioned earlier, more than 80% of the Sub-Saharan countries share the same official language as their former colonial powers. This indicates that immigrants from those countries have been ‘assimilated’ through the language link, therefore, crowding out to some extent the colonial argument as a key reason for migration into a specific country. Notably, this is the case of France’s assimilation policy, whereby the French colonizers tried their best to convert “uneducated Africans” into citizens who understood the ideals of the French civilization (Jones, 2003).

The empirical results further confirm that existing networks in the host country (with an elasticity between 0.4 and 0.5) are a key determinant of African brain drain. Networks remain an important positive determinant even when we split the sample by region; except that the coefficient for North Africa is not statistically significant, but still with the expected sign. This shows that brainy Africans value and rely on social and familial networks when they consider to move abroad. The estimates of GDP per capita in the host country, a pull factor and a gravity force, yield the expected sign. However, it seems to attract more skilled migrants from the northern part of the continent than from the other region. With an elasticity of approximately 0.4 this reveals the importance of “money” and good living conditions in the migration decision of skilled North Africans to fortress Europe. Indeed, in the words of Hass (2007) North Africans

stand in an ancient tradition of circular migration where they intend to return to their country of origin after certain amount of money has been saved to buy some land, build a house, or start their own business. In sum, colonization and its correlates, along with networks and high GDP in the destination country are the only drivers that matter for the emigration of educated individuals in Africa.

Looking at the sub-regions in Africa, we find a few differences. SAPs in Africa constitute an important push factor of highly skilled Africans to Europe, but only for the Northern countries. Brainy people from North Africa whose country was under SAP's measures are 74% more likely to migrate to Europe. This confirms other scientists' findings that structural adjustments are a major cause of brain mobility because of their negative impact on African economies (Dia, 2004). Namely, because of the enforcement of SAP policies, countries experienced a balance of payment crisis that led to high inflation and caused deterioration of real wages. While this deterioration applies to all natives, it is the highly skilled workers who would be more mobile and able to flee and thus they no longer resist the temptation to go abroad.

For the North African countries, the variable government expenditures growth is significant and has the right sign, indicating that the more the government invests in its country, the fewer people go abroad. Government expenditures such as spending on research or investments in the infrastructure of the country are actions that encourage skilled individuals to stay in their country. Civil liberties also matter in the Northern African countries (at the 5% level). This shows that the fewer liberties a country has, the less likely people are to leave the country. This is plausible because in very restrictive countries of dictatorship it is very difficult for people to leave even if they want to. The gravity hypothesis that a host country of larger size will attract more immigrants is not confirmed for the entire continent or for the sub-regions.

In Table 6, we present the empirical results from the re-estimated equation (1) that now has eight separate colonial dummy variables; the reference ex-colonial power is the United Kingdom. In this exercise, the coefficients on the constant term show a big difference between North Africa and Sub-Sahara Africa. If no other determinants are valid, we see that North Africans will still exit to go to the ex-colonial powers in Europe. Sub-Sahara Africans on the other hand, would rather stay put and not migrate.

For the entire African continent, evidence reveals magnetism to Portugal; a brainy African from a country colonized by Portugal is 69% more likely to go to Portugal compared to someone originating from a country colonized by the United Kingdom. The colonial forces of Portugal are important also in the sub-sample of Sub-Saharan Africa. It is interesting that the ex-colonial powers France and Spain are no different than the United Kingdom in attracting skilled immigrants through colonial ties when we look at the entire African continent. France, understandably, still exercises a big power on the emigration of highly skilled people from the Northern part of the continent. That is, Algerians, Moroccans, Tunisians, etc. are 74% more likely to move to France based on their colonial ties than elsewhere in Europe.

Results on the rest of the colonial dummies show that migrants from all African countries colonized by Belgium, Germany, Italy, and dual ex-colonial powers are strongly less likely to move to those former colonial powers than to the United Kingdom. The United Kingdom as the preferred destination also holds for African countries that were never colonized. This clearly shows the superior attraction of the United Kingdom for brainy Africans in 1990 and 2000. These results change slightly when we consider the Sub-Saharan region only. Now, while Spain and Germany are no different than the United Kingdom, France, Belgium and Italy are less preferred as a destination country in Europe than the United Kingdom. Sub-Saharan Africans

colonized by dual ex-powers are more likely to go to one of these countries than to the United Kingdom and so are those who have remained independent.

Similar to results in Table 5, the language variable is negative for the entire continent and positive for the Sub-Saharan countries. Likewise, the airfare dummy is highly significant and positive for both the entire continent and the Sub-Saharan region. This dependency of the African countries on European airlines for transportation is apparently a strong determinant of the emigration of skilled Africans to Europe.

Networks remain a significant magnet to the new host country for entire Africa and the sub-regional samples. This actually is very interesting because it indicates a never fading emigration. Networks will always exist in the host country, reinforcing the continuity of immigration and rendering immigration self-sustained and difficult to brake.

As expected, GDP per capita in the host country is also a powerful pull factor mainly in North Africa. All else equal, brainy Africans in general and northern Africans in particular care about a high standard of living and high production in the destination country and they are more likely to go where GDP per capita is higher. In this specification of Table 6 we find that PPP in the home country matters. It has a negative elasticity of 0.1, revealing that controlling for everything else, low standards of living in the home country push brainy Africans away to Europe. However, this is not significant in the sub-regions of the continent.

Our results also show that an increase in government expenditures growth deters the emigration of the highly skilled people in North Africa. Once again, an increase in SAPs triggers skilled emigration from North Africa to Europe, *ceteris paribus*. Trampled civil rights as in the case of a dictatorship make it more difficult for people to leave the country and go abroad. In sum, we find evidence that even thirty years after decolonization, ex-colonial powers play a role in attracting skilled immigrants from Africa. Portugal and the United Kingdom are the two most



powerful poles of attraction in Europe for Africans. The airfare connections between the respective countries in Europe and Africa play a very strong role in the emigration of brainy Africans to their countries' former colonial powers. The existence of networks in the host country and high GDP per capita in the host country are all significant determinants of the exodus of brainy Africans to these host European countries.

Lastly, our results also confirm that positive economic development and a strong or stable economy – either in the form of a high PPP, or high government expenditures, or no SAPs – in the African countries are powerful incentives for the brainy Africans to stay home.

## **5. Summary and Concluding Remarks**

It has been widely described in the literature that since the 1960s when Africa acquired its independence from European colonialism, it is losing more than 20,000 of its skilled labor force to the OECD countries yearly (Adepoju, 2008). It is also known that skilled and educated people are more likely to migrate and circulate around countries. They are the most mobile because of their demanded skills and because they command higher wages that they allow them the means to move easier. Note that depending on the circumstances and on the specific countries and occupations, brain drain may not always be detrimental to the origin countries. From this kind of migration, the migrants gain because they find better opportunities, jobs and remuneration in the destination country. The destination countries also gain when they receive skilled, healthy and educated workers, especially now when all developed countries are out to recruit the skilled migrants of the world. Some migration experts also argue that African migration will continue in big numbers over the next decades.

It is equally documented in the literature that Europe is the most favored destination of Africans. Given the long history that binds these two continents, the numbers certainly make

sense. In this paper we study the bilateral migration flow of highly skilled Africans to Fortress Europe and specifically to seven European ex-colonial powers. As we test several hypotheses on the determinants of the emigration of brainy individuals out of Africa, we endeavor to test in particular the colonial related vestiges hypothesis between Africa and Europe. Based on previous literature, we contend that European colonialism in Africa – although it officially ended about forty years ago – is still a strong magnet between the former colonial power and its former colony. Among other hypotheses, we acknowledge the power of networks and the hypothesis that people mostly migrate for money and better economic conditions. Due to the severe empirical handicap of non-existence of adequate data about Africa, this important subject has not been sufficiently analyzed in the empirical economics of migration.

This paper presents new estimates of the African brain drain to Europe over the period of 1990 –2001 based on the bilateral migration dataset by Docquier et al. (2008). Raw statistics reveal that colonial ties are still persisting on the continent. We find that while, on average, 486,500 Algerians emigrated to France only 75 Algerians went to Portugal; while 106,862 Kenyans went to the United Kingdom, only 442 moved to France; and while 2,627 highly skilled migrants from Mozambique went to Portugal none moved to Germany.

Colonial ties can take several forms. For example, even though colonialism has officially ended, the international air traffic system in Africa (mostly in the Sub-Sahara countries) is still structured according to the colonial state of affairs. For instance, somebody from Abidjan (Cote d'Ivoire) who wants to go to Europe can only land in Paris rather than in Milan. Moreover, 74% of the African countries have the same official language as the former colonial power, and military bases from the former European colonizers are still on guard in many African countries. But colonial ties could also be manifested through a lingering intellectual and cultural affinity, a shared political ideology, and even a taste and longing for the former colonizer's couture, music

and food. All these examples that bilaterally link the two countries in Africa and Europe respectively are even more pronounced among the highly skilled and educated Africans.

The regression results show that, indeed, there are certain determinants that can help us understand the African brain drain to Europe and to some specific countries in particular. In our analysis, we find that both economic reasons and the existence of networks, along with colonial ties and language affinities can predict the massive African exodus to Europe over the last decade. Evidently, as Africa is a large continent, it pays to sub-divide it into two regions: the North and the Sub-Sahara region. It is interesting that there are differences between the two regions, whereby Sub-Sahara Africans would rather stay put and North Africans would rather go to Europe.

Specifically, our results show that all variables in the World Systems Theory are even more important for the brainy African migration to Fortress Europe. *Ceteris paribus*, the magnitude of the colonialism coefficient (72%) is higher than any other factors explaining the brain drain from Africa with a significance level at 1%. At the same time we find that language assimilation is a deterrent to emigration. However, when we divide the continent in two sub-regions (Sub-Sahara and North Africa), we find, that brainy people from Sub-Sahara Africa are more likely (72%) to move to a European country if their country of origin shares the same official language as their former colonial power. This indicates the degree and footprint of assimilation through language that the former colonial powers applied in the Sub-Sahara African countries – 81% of these countries have the same language. But emigration is a negative function of the colonialism variable for the Sub-Sahara region.

Among all the European ex-colonizers Portugal exerts a very strong magnetism on the emigration of all Africans and of Sub-Sahara Africans, compared to the reference group – the United Kingdom. The United Kingdom, on the other hand, is preferred as a destination for

brainy Africans over Belgium, Germany, and Italy. Lastly, brainy Africans are indifferent about going to France, Spain or the United Kingdom.

Overall our results confirm that the structure of the international airfare system in Africa propels emigration from the ex-colony to the ex-colonial power. The airfare system is a proxy of the role of distance according to the gravity model, but also of some remnants of colonialism. The existence of networks in the destination country or in the ex-colonial power is a significant reason why Africans go to this particular European country. In the migration literature, and especially in sociology, it is long known and acknowledged that networks are important drivers of migration for all individuals. Here we find that the power of networks also applies to the highly skilled, talented and educated individuals.

The high standards of living in the destination country matter. Those European countries (among the ex-colonial powers) with high GDP per capita attract highly skilled Africans, who are, naturally, informed about job opportunities and the value of their human capital abroad. This applies to Africans from the Northern region. Therefore, brainy Africans do migrate for money. Lastly, we also find evidence that SAPs trigger emigration from the North African region, but government expenditures and non existing civil liberties deter it.

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**Table 1: List and Definition of Variables**

<b>Variables</b>	<b>Definition</b>
<i>Dependent Variable</i>	
Emigration flow	Total number of skilled African emigration over the period of 1990-2001 (in ln) Destination is the seven ex-colonial European powers: Belgium, France, Germany, Italy, Portugal, Spain and the United Kingdom
<i>Explanatory Variables</i>	
<b>Push-Pull Framework and Gravity Model</b>	
Population Host	Population size of the host country at time t
GDP/Capita Host	GDP at Purchasing Power Parity per capita of the host country at time t
Airfare System	Existence of a direct flight from an African country's major city to a city of its ex-colonial power and provided by an national airline of the ex-colonizer
Population in the ex-colonies	The total number of inhabitants of the former colonies at time t
PPP Origin country	The Purchasing Power Parity of the country of origin at time t
Government Expenditures Growth	The government expenditures growth in the origin country at time t
SAP	Dummy for Structural Adjustment Programs in the country of origin
<b>World System Approach</b>	
Colonial ties	A dummy variable for being colonized or not
Belgium	A dummy variable for being colonized by Belgium or not
Dual Colonial Powers	A dummy variable for being colonized by other countries or not
France	A dummy variable for being colonized by France or not
Germany	A dummy variable for being colonized by Germany or not
Italy	A dummy variable for being colonized by Italy or not
Independent	A dummy variable for never being colonized
Portugal	A dummy variable for being colonized by Portugal or not
Spain	A dummy variable for being colonized by Spain or not
The United Kingdom	A dummy variable for the reference group
Language	Dummy if an African country's first official language is the same as the language of its former colonial power
<b>Networks Approach</b>	
Networks	Stock of foreign population in host country at time t
<b>Socio-Political aspects and Political Economy</b>	
Civic Liberties	Degree of freedom and civic rights in the country of origin; Civic Liberties are measured on a one-to-seven scale, with one representing the highest degree of freedom and seven the lowest

**Table 2a: Ex-Colonial Powers' Presence in Africa by Region**

European Ex-Colonial Power	African Sub-Regions		
	North Africa	Sub-Saharan Africa	Entire Africa
<b>Belgium</b>	0	3	3
	<i>0</i>	<i>6.38</i>	<i>5.66</i>
<b>Dual ex-Colonial Powers</b>	0	2	2
	<i>0</i>	<i>4.26</i>	<i>3.77</i>
<b>France<sup>a)</sup></b>	4	16	20
	<i>66.67</i>	<i>34.04</i>	<i>37.74</i>
<b>Germany</b>	0	1	1
	<i>0</i>	<i>2.13</i>	<i>1.89</i>
<b>Italy</b>	1	1	2
	<i>16.67</i>	<i>2.13</i>	<i>3.77</i>
<b>Independent<sup>b)</sup></b>	0	2	2
	<i>0</i>	<i>4.26</i>	<i>3.77</i>
<b>Portugal<sup>c)</sup></b>	0	5	5
	<i>0</i>	<i>10.64</i>	<i>9.43</i>
<b>Spain</b>	0	1	1
	<i>0</i>	<i>2.13</i>	<i>1.89</i>
<b>The United Kingdom<sup>d)</sup></b>	1	16	17
	<i>16.67</i>	<i>34.04</i>	<i>32.08</i>
<b>Total</b>	6	47	53
	<i>100</i>	<i>100</i>	<i>100</i>

<sup>a)</sup> France former colonies were: Algeria, Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Comoros, Congo Republic, Cote d'Ivoire, Djibouti, Gabon, Guinea, Madagascar, Mali, Mauritania, Morocco, Niger, Senegal, Togo, and Tunisia

<sup>b)</sup> Independent states: Ethiopia and Liberia

<sup>c)</sup> Portugal former colonies: Angola, Cape Verde, Guinea-Bissau, Mozambique, and Sao Tome & Principe

<sup>d)</sup> British former colonies: Botswana, Egypt, Gambia, Ghana, Kenya, Lesotho, Malawi, Mauritius, Nigeria, Seychelles, Sierra Leone, South Africa, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe

Note: For each ex-colonial power, the first row represents the absolute numbers and the second row in italic represents the percentage

*Source: Gieler (2007), CIA Factbook, CEPII Data Set; Authors Own Cross-Tabulation*

**Table 2b: Official Language Commonality**

<b>African Sub-Regions</b>			
<b>Same Language as the Ex-Colonial Power</b>	<b>North Africa</b>	<b>Sub-Saharan Africa</b>	<b>Entire Africa</b>
<b>No</b>	5 Countries <b>83.33%</b>	9 Countries <b>19.15%</b>	14 Countries <b>26.42%</b>
<b>Yes</b>	1 Countries <b>16.67%</b>	38 Countries <b>80.85%</b>	39 Countries <b>73.58%</b>
<b>Total</b>	6 Countries <b>100%</b>	47 Countries <b>100%</b>	53 Countries <b>100%</b>

Source: CEPII Data Set; Authors Own Cross-Tabulation

**Table 2c: International Airfare System between Africa and Europe**

<b>African Sub-Regions</b>			
<b>Direct Airfare Flights from the ex-Colony to the Ex-Colonial Power</b>	<b>North Africa</b>	<b>Sub-Saharan Africa</b>	<b>Entire Africa</b>
<b>No</b>	4 Countries <b>66.67%</b>	20 Countries <b>42.55%</b>	24 Countries <b>45.28%</b>
<b>Yes</b>	2 Countries <b>33.33%</b>	27 Countries <b>57.45%</b>	29 Countries <b>54.72%</b>
<b>Total</b>	6 Countries <b>100%</b>	47 Countries <b>100%</b>	53 Countries <b>100%</b>

Source: Selected Operating European Airlines route map; Authors Own Cross-Tabulation

**Table 3: Selected Summary Statistics**

<b>Variables</b>	<b>1990</b>		<b>2000</b>	
	<b>Mean</b>	<b>Std. Dev.</b>	<b>Mean</b>	<b>Std. Dev.</b>
Emigrants (in thousand)	5,424.94	32,018.32	7,910.32	39,234.62
Same Language as ex-Colonial Power (%)	0.74	0.441	0.74	0.441
Direct Airfare to ex-Colonial Power (%)	0.55	0.498	0.55	0.498
Population Host (in million)	44.300	24.400	45.600	25.000
Networks (in thousand)	1,588,675	1,351,133	2,161,603	1,658,015
GDP/C Host Country (in thousand)	17	2,751.623	24	3,061.405
PPP Origin Country (in US\$)	77.60	99.234	248.07	572.899
Civil Liberties (scaled from 1 to 7)	4.78	1.326	4.51	1.340
Structural Adjustment Programs (%)	0.72	0.451	0.72	0.451

Source: Docquier et al. (2008); Authors Own Calculation

**Table 4: Average Migration Flows of Brainy African to Ex-Colonial Powers by Country of Origin (1990-2001)**

<b>Going to a European Ex-Colonial Power</b>							
<b>Country of Origin in Africa</b>	<b>Belgium</b>	<b>France</b>	<b>Germany</b>	<b>Italy</b>	<b>Portugal</b>	<b>Spain</b>	<b>UK</b>
Algeria	7153.5	486568	6345	6397	75.5	16159	5994
Angola	727	4910.5	0	389	13164	1348.5	2646
Benin	182	5194	421.5	322.5	7.5	73.5	143.5
Botswana	6.5	51.5	0	3.5	2.5	0	735.5
Burkina Faso	106	1955.5	665.5	1450.5	1	219.5	52
Burundi	626	545.5	171.5	0	1.5	0	972
Cameroon	881	15516	2870.5	1231	0	689	1826.5
Cape Verde	141.5	8185	0	1873	16970	1252	175.5
Central African	24.5	3170	54	312.5	1.5	59	183.5
Chad	67	1228.5	131.5	40	1	0	93.5
Comoros	8	6608.5	0	5	16	0	40
Congo, Dem. Rep. of	5953	16061.5	4955	893.5	114	381	3989
Congo, Rep. of the	1866.5	17136	434.5	1029	145.5	468	1544.5
Cote d'Ivoire	357.5	16389	904	3816.5	33.5	176	1496.5
Djibouti	24	800.5	0	37	0	0	106.5
Egypt	842	14559.5	6212.5	14255.5	42	1346.5	19775.5
Equatorial Guinea	6.5	61.5	0	24	11	6945.5	30.5
Eritrea	0	49	0	2930.5	1	0	3709
Ethiopia	230.5	1289.5	8637.5	2206.5	3.5	102.5	4410
Gabon	95.5	2469	94.5	108	3	0	60.5
Gambia, The	59	666.5	1163	186	8.5	3441.5	2069.5
Ghana	1175.5	2936.5	10860.5	11572	20.5	1607.5	36587
Guinea	285	4727	707.5	341.5	425	3166.5	155
Guinea-Bissau	29	2520.5	0	94.5	5995	1490.5	210
Kenya	233	442	1567.5	958.5	51	220.5	106862
Lesotho	2	7	47	4	0	0	320
Liberia	110.5	327.5	1092.5	95.5	12.5	482.5	880
Libya	143	748	1049	1131.5	5	308	5812.5
Madagascar	276	18019	261.5	269	17	0	511.5
Malawi	20	32	33.5	6.5	26.5	0	9014
Mali	116	27121.5	368.5	161.5	22	1678	76.5
Mauritania	99	5465.5	0	325	7.5	2237.5	21.5
Mauritius	619.5	22069.5	0	3665	5.5	0	21891
Morocco	45987	376236	39045	85374	306	164003.5	8826.5
Mozambique	140.5	508.5	0	70	2627	484	2110.5
Namibia	10	47	0	1.5	9	0	561.5
Niger	89	891.5	259.5	262.5	0	0	53
Nigeria	658.5	1343.5	6595.5	9564	55.5	4111.5	50677.5
Rwanda	1061.5	736	311	148.5	10.5	0	898.5
Sao Tome and Principe	8	55	0	15	3235.5	0	63.5
Senegal	528	37725	1136.5	21092	241.5	6677	424
Seychelles	13	254.5	0	1037	0.5	0	2296.5
Sierra Leone	138.5	306	2118.5	266	16.5	556.5	8580.5
Somalia	133	395.5	3602.5	2393.5	2	132.5	16084.5
South Africa	562	1113	2202.5	175.5	461.5	733.5	65561

**Table 4: Average Migration Flows of Brainy African to Ex-Colonial Powers by Country of Origin (1990-2001)**

<b>Going to a European Ex-Colonial Power</b>							
<b>Country of Origin in Africa</b>	<b>Belgium</b>	<b>France</b>	<b>Germany</b>	<b>Italy</b>	<b>Portugal</b>	<b>Spain</b>	<b>UK</b>
Sudan	86.5	547.5	1585.5	291.5	7	146.5	4765
Swaziland	12	2	0	1.5	4.5	0	316
Tanzania	138	318	448	0	65	0	27894.5
Togo	279.5	7038.5	3405	438.5	12.5	0	329.5
Tunisia	2565.5	182753	13062	25416	21	628	2354
Uganda	103	237	591	125.5	17	0	46102.5
Zambia	67	161.5	165	61.5	10.5	0	12817.5
Zimbabwe	87.5	148.5	0	36.5	78.5	0	24619
<b>Total</b>	<b>75,134</b>	<b>1,298,649</b>	<b>123,575.5</b>	<b>202,905.5</b>	<b>44,371.5</b>	<b>221,325.5</b>	<b>507,730</b>

Note: The World Development Indicator (2006) classifies the African Countries into two main categories: Sub-Saharan Africa (SSA) and North Africa. The countries that belong to the latter category are: Algeria, Djibouti<sup>13</sup>, Egypt, Libya, Morocco and Tunisia. The others belong to Sub-Saharan Africa.

Source: *Docquier et al. (2008); Authors Own Calculation*

<sup>13</sup> Even though Djibouti is the Horn of Africa, it's not classified in the World Development Indicator as part of Sub-Saharan Region in Africa. We therefore classified it among the Northern Countries.

**Table 5: Robust Coefficient OLS Estimates with one Colonization Dummy Variable<sup>a</sup>**

Variables	Entire Africa	Sub-Saharan Africa	North Africa
<b>Networks in Host Country (logs)</b>	<b>0.490***</b> (0.116)	<b>0.450***</b> (0.101)	0.222 (0.199)
<b>PPP in Origin Country (logs)</b>	-0.089 (0.067)	-0.034 (0.072)	-0.029 (0.283)
<b>GDP/C in Host Country (logs)</b>	0.090 (0.061)	0.036 (0.058)	<b>0.366***</b> (0.115)
<b>Population in Host (logs)</b>	0.053 (0.102)	0.066 (0.082)	0.276 (0.181)
<b>Gov. Expend. Growth (logs)</b>	-0.046 (0.045)	0.046 (0.042)	<b>-0.390**</b> (0.184)
<b>Civil Liberties in Origin Country</b>	0.042 (0.036)	-0.017 (0.035)	<b>-0.475**</b> (0.180)
<b>Colonization Dummy</b>	<b>0.715***</b> (0.197)	<b>-0.773***</b> (0.210)	
<b>Language Same as ex-Colonial Power</b>	<b>-0.566***</b> (0.150)	<b>0.723***</b> (0.183)	
<b>Airfare Dummy</b>	<b>0.330***</b> (0.110)	<b>0.481***</b> (0.115)	<b>-0.737***</b> (0.273)
<b>Structural Adjustment Programs</b>	0.119 (0.151)	-0.019 (0.149)	<b>0.737***</b> (0.215)
<b>Sum of Population in Ex-Colonial Power (logs)</b>	0.035 (0.049)	<b>0.095*</b> (0.052)	0.077 (0.102)
<b>Constant</b>	<b>-0.683***</b> (0.254)	-0.234 (0.240)	<b>3.000***</b> (0.810)
Observations	363	311	52
R-squared	0.365	0.448	0.700

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

<sup>a</sup> Independent African Countries is the Reference Category

**Table 6: Robust Coefficient OLS Estimates with Separate Colonization Dummy Variables for Each Ex-Colonial Power<sup>a</sup>**

Variables	Entire Africa	Sub-Saharan Africa	North Africa
Networks in Host Country (logs)	<b>0.438***</b> (0.108)	<b>0.392***</b> (0.098)	0.222 (0.199)
PPP in Origin Country (logs)	<b>-0.129*</b> (0.074)	-0.027 (0.058)	-0.029 (0.283)
GDP/C in Host Country (logs)	<b>0.117**</b> (0.057)	0.082 (0.056)	<b>0.366***</b> (0.115)
Population in Host Country (logs)	0.085 (0.095)	0.098 (0.081)	0.276 (0.181)
Gov. Expend. Growth (logs)	-0.028 (0.045)	0.049 (0.042)	<b>-0.390**</b> (0.184)
Civil Liberties in Origin Country	0.019 (0.038)	0.004 (0.036)	<b>-0.475**</b> (0.180)
<b>Colonization Dummies</b>			
Belgium	<b>-0.434***</b> (0.150)	<b>-0.688***</b> (0.150)	
Dual Ex-Powers	<b>-0.818***</b> (0.218)	<b>0.470*</b> (0.250)	
France	0.044 (0.103)	<b>-0.270**</b> (0.104)	<b>0.737***</b> (0.273)
Germany	<b>-1.539***</b> (0.268)	-0.237 (0.273)	
Italy	<b>-1.609***</b> (0.200)	<b>-0.352*</b> (0.213)	
Independent	<b>-0.805***</b> (0.239)	<b>0.531**</b> (0.265)	
Portugal	<b>0.688***</b> (0.204)	<b>0.659***</b> (0.204)	
Spain	0.476 (0.968)	0.413 (0.980)	
Language Same as Ex-Colonial Power	<b>-0.844***</b> (0.162)	<b>0.379*</b> (0.217)	
Airfare Dummy	<b>0.496***</b> (0.108)	<b>0.768***</b> (0.119)	
Structural Adjustment Programs	0.087 (0.149)	0.049 (0.137)	<b>0.737***</b> (0.215)
Sum of Population in Ex-Colonial Power (logs)	0.080 (0.049)	<b>0.122**</b> (0.050)	0.077 (0.102)
Constant	0.284 (0.246)	<b>-0.924***</b> (0.224)	<b>2.262**</b> (0.983)
Observations	363	311	52
R-squared	0.455	0.509	0.700

Robust standard errors in parentheses

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

<sup>a</sup> The UK is the Reference Category



**Table A1: Emigration Flows of Brainy Africans to Ex-Colonial Powers by Selected Country of Origin in Absolute Numbers (1990-2001)**

Country of Destination: a European ex-Colonial Power							
Country of Origin in Africa	Belgium (1991;2001)	France (1990;1999)	Germany (1991;2001)	Italy (1991;2001)	Portugal (1991;2001)	Spain (1990;2000)	The UK (1991;2001)
Algeria	5,939 <sup>a)</sup>	<b>460,358</b>	3,758	4,683	40	10,238	2,820
	8,368 <sup>b)</sup>	<b>512,778</b>	8,932	8,111	111	22,080	9,168
Kenya	135	352	622	702	46	141	<b>93,800</b>
	331	532	2,513	1,215	56	300	<b>119,924</b>
Mali	101	<b>23,254</b>	292	118	6	1,056	50
	131	<b>30,989</b>	445	205	38	2,300	103
Mozambique	81	336	0	51	<b>1,676</b>	308	1,367
	200	681	0	89	<b>3,578</b>	660	2,854

Note: <sup>a)</sup> The number in this column represents the total migrants from Algeria in Belgium in 1991

<sup>b)</sup> The total number of migrants from Algeria in Belgium in 2001; the same for the others following countries

Source: *Docquier et al. (2008); Authors Own Calculation*

## Appendix