# Political leader's background effect on health status in Africa: do foreign education matter?


## Abstract

It is increasingly recognised in the economic literature that political leader is a major actor in the development process of his country. As public resources become scarce against growing needs due to demographic pressure, leaders are faced with the trade-off between development policies. Hence the need to determine the factors motivating their public policy preferences. This paper focuses on the intrinsic motivations, including the leader's background, in health policy outcomes. In a sample of 31 African countries over the period 1984-2015, for a total of 134 leaders, we show through fixed and random effect, OLS and GCM, Drisc/Kraay and GMM methods that high educated leaders preside over periods of increased life expectancy. However, their place of education, especially foreign western education, confronts them with numerous constraints, making the effect of their stay in the West on the health status of their native country negative. The study contributes to the emerging literature on political leaders theory by providing further evidence that the background of the incumbent political ruler is likely to shape his or her economic policy preferences and hence health outcome.



**Keywords:** foreign education, political leaders, health outcome, military.


- **Introduction**

A considerable level of economic development has very often been attributed to quality leadership. In economics, the political leader has since the article by Jones and oklen (2004) been the keystone of the improvement and or the deterioration of living conditions in his country. This goes back to philosophical thought with Comte (1819) for whom, "the management of the city or of public affairs should be left to scholars"; in other words, highly educated leaders are able to manage public affairs better than less educated once (Sackey,2020). Political leaders with a master's or doctorate degree, are growth drivers around the world (Besley and al, 2011); this

means that, the more educated a president is, the better his economic performances; one would therefore expect that the greater the proportion of highly educated leaders, the better the living conditions of many.

However, in Africa, since the years after independence, it seem that, the evolution of presidents level of education was not accompanied by the improvement of the living conditions so much desired by his sons. Between 1975-1990, 2010 and 2015, the proportion of presidents holding a master's degree or equivalent rose respectively from 17.26 to 27.11%; and those with a doctorate or equivalent rose respectively for the same periods from 1.09% to 17.78% (see section 3). However, the standard of living of the majority of Africans remains close to that of the 1970s (UNCTAD, 2013, 2013a), the school exclusion rate and infant mortality remains the highest in the world. Indeed, while many water-borne diseases, notably cholera, have been eradicated in many countries, they continue to decimate African populations; in 2002, for example, 136,299 cases of cholera were reported to the WHO for Africa (20,940 in 1999), representing almost 90% of the cholera cases reported in the world. According to the 2017 UNESCO/WHO report, worldwide, half of the children under five who died were in sub-Saharan Africa and 30% were in South Asia. In sub-Saharan Africa, 1 in 13 children die before their fifth birthday, compared to 1 in 185 in high-income countries.

The World Health Organization's 2019 report reveals that half of all under-five deaths occur in just five countries: Nigeria (858,000), India (824,000), Pakistan (399,000), the Democratic Republic of Congo (29,000) and Ethiopia (178,000). African countries are thus considerably represented in the top 10 countries with the highest child mortality in the world. The report also points out that the causes of these deaths are related to infectious diseases such as pneumonia, diarrhoea and malaria, as well as premature births, birth asphyxia, trauma and congenital anomalies. Malnutrition-related factors contribute to about 45% of deaths among children under five. In this regard, the ranking of the world's countries by prevalence of malnutrition in the under-fives reveals that in the top 20 most affected countries, there are 14 African countries (UNICEF, FAO, World Bank, 1990, 2000, 2010 and 2019). If Africa is to achieve the SDGs, it will need to reduce the maternal mortality rate from 500 and 1,500 to 228 per 100,000 and infant mortality from 171 to 61 per 1,000. However, other countries stand out positively, such as Tunisia, Algeria, Mauritius, Seychelles and Cape Verde, which have been ranked in the top 100 countries with the highest health expectancy since 2000. In view of this controversy, this article aims to answer the following question: **does political leader's background explains living conditions in Africa? Specifically, do African president background a determinant of health status of their country?**

This study is based on the assumption that: the preferences of political leaders to carry out social policies, in particular those of health, depend on their background; this for at least two reasons

Firstly, leaders such as Paul Kagame of Rwanda or the late Robert Mugabe justified their preference for spending on education by having attended unsanitary and under-resourced schools

in their countries. This does not rule out the possibility that these investments in education may have boomerang effects on health. According to the Demographic Health Surveys (2012), in a sample of 20 African countries, maternal education (or information) has a positive effect on child health.

Secondly, Presidential election campaigns usually result in a number of promises: promises to improve the health system, to strengthen social security, which are often kept or deferred to future elections. In Africa, a recent UNFPA report notes the progress made by some countries, such as Sierra Leone (Ernest Bai Koroma), Rwanda (Paul Kagame), Uganda (Mussenevi), Gabon (Ali Bongo), which have launched free health care initiatives aimed at improving the catastrophic rates of maternal and infant mortality (one in eight women is likely to die from complications of childbirth, and one in 12 children dies before reaching their first birthday). Indeed, Botswana under Iyan Khama and Rwanda under Paul Kagame have invested heavily in maternal health enabling their countries to achieve their demographic dividend. The state of health or social security in a country is linked to the political cycle. A young political leader with a distant political horizon would be more interested in social security than an older one (Law and Readlawsk, 2008).

Thirdly, Political leaders come to power democratically (constitutionally) or de facto. The second can take the form of a popular coup, also called a popular uprising (Arab Spring, Mali, Burkina Faso) or a military coup. Africa was between 1964 and 1990 the epicenter of coups; resulting in loss of human life, internal and external displacement, the dissolution of institutions, the sluggishness of the business climate. Thus justifying the high infant mortality rate in many countries (McGowan and Johnson, 2008).

In addition to the economic environment, researchers identify: the quality of institutions (KA Moat and J. Abelson, 2011), colonial history (Meredeth Turshen, 1977), political stability (Songul Cinaroglu, 2018), social factors such as ethnic diversity (Melina R. Platas, 2010)... as the main explanations for the differences in public health expenditure in Africa. These studies have thus focused on structural and cyclical variables of the country, neglecting differences in the profile of the leaders. However, researchers show that the education of elected officials is positively correlated with the quality of government and discuss the impact of the latter on promoting economic development (Djankov et al., 2003; Glaeser et al., 2004; Fortunato and Panizza, 2011).

To the best of knowledge, two articles are directly relevant to our theme: the first shows how primary education and infant mortality of ethnic groups have been affected by changes in the ethnicity of country leaders over the past fifty years (Franck and Ilia Rainer, 2009). The second analyses on the one hand the effect of the transition from one democratic to a non-democratic leader and vice versa; on the other hand the effect of changing political regimes on health expenditure, life expectancy and child mortality (Serrano and G. Sackey, 2016). However, these authors do not take into account the educational background of the political leader. Yet, for academics such as Paige (2009), foreign-educated leaders are more likely to build strong human relations, attract more foreign investment, become familiar with development theories that promote human capital and democratic values (Gift et al (2015; Siplimbergo, 2009); and once at home, opt for high public health spending. However, a theoretical contrast suggests that subjective experiences shape perceptions. Leaders who are distant from their home country's higher education systems end up being less aware of local needs and deficiencies, and potentially adapt outward-looking economic strategies.

Given that 43.89% of African leaders have completed at least part of their tertiary education or their military and/or professional training abroad (Houmpe and Ngouhouo, 2020), our study aims to verify whether this particularity has a positive, negative or null effect on health performance. We use a panel of 31 African countries over a period from 1984 to 2015, i.e. about 134 political leaders, to estimate the effect of the of national leaders background on health status using the GMM approach.

The rest of the article is organised as follows: in addition to this introductory section, section 2 present different theories supporting our founding and related empirical research, section 3 describes the data compiled for the study, potential measurement errors, the operationalisation of the research and the statistical methods used. In section 4, the econometric model, section 5 we presents result and interpretation and section five the conclusion of the study.

## 2. Political leader's background and health status: theoretical and empirical review of the literature

**The citizen-candidate approach:** Besley and Coate (1997) and Osborne and Slivinski (1996) model political competition as a game between citizens competing for the occupation of a function in the political sphere. In such context, and with limited commitment, selection based on political preferences, talent or virtue can affect economic results. This approach has motivated studies of the effect of political reservation (i.e., reserving political office for particular groups of the population). Pande (2003) studies caste reservation and Chattopadhyay and Duflo (2004) reservations for women. Both argue that the reserve is important in changing the identity of those

elected. Lee et al. (2004) use US data on strong political competition to argue that political affiliation plays an important role in political selection.

The qualitative dimension in political selection has also been studied in a citizen-candidate framework by Caselli and Morelli (2004), Poutvarra and Takalo (2003), Caselli and Morelli (2004) who argue that the key issue is to understand the factors that affect the supply of poor political leaders, such as the rents they can enjoy once in power. Information asymmetry can also affect the incidence of underperforming leaders by making it difficult to detect the quality of candidates. Poutvarra and Takalo (2003) develop a model in which the value of the civil service impinges on the quality of candidates via its effect on electoral campaigns. Gehlbach et al. (2010) ask under what circumstances economic elites (such as businessmen) decide to run for political office. Recently, Acemoglu et al. (2010) showed that when the incumbent (incumbent leader) has no right of veto, the system selects the most competent government. Otherwise, the least competent government may be elected and persist for a long time.

Other works show that education is positively correlated with the quality of government and discuss the impact of the latter in promoting economic development (Djankov et al, 2003, Glaeser et al, 2004, Fortunato and Panizza, 2011). Thus, an analysis of the effect of the 1993 law on quotas for women in municipalities in Italy shows that gender quotas are associated with a higher average number of years of schooling for elected officials, with a ranging from 0.12 to 0.18 years of education (Baltrunaite et al, 2012); This effect is due not only to the higher number of elected women, who are on average highly educated than their male colleagues, but also to the lower number of poorly educated elected men; this also shows that the identity of the leaders is important and that education is an individual characteristic that plays a crucial role.

Milligan and al (2003) use empirical evidence to verify that education has positive effects on civic behavior in the United States and the United Kingdom. Although the study focuses on two developed countries with outstanding education systems, it argues that education leads to positive externalities. Besley and Reynal-Querol (2011) build on the work of Milligan, Moretti and Oreopoulos (2003) and Jones and Olken (2005) to investigate whether educational attainment affects leadership quality and economic growth. They find evidence that a leader's education matters for economic growth, lending credence to the idea that an individual's education is an important component that helps explain differences in policies outcomes (Jones and Olken, 2005; Besley and Reynal-Querol, 2011).

In another study, Besley and Reynal-Querol (2001) use a fixed-effects model to test whether democracies choose more educated leaders and find strong evidence in favor of their hypothesis. Their research is based on the theory that education is strongly correlated with income, skills, civic engagement and quality of leadership, which supports the idea that education has an impact on the quality of government and policy-making (Jones and Olken 2005; Besley and Reynal-Querol, 2011).

**The social theory of public choice:** Hayo and Florian (2012) analyse the allocation of public resources by applying sociological theory. To do so, they link preferences for the composition of public expenditure to social status. In contrast to approaches based on political-economic cycles or partisan theory, they find strong evidence consistent with the theory that prime ministers tend to favour fiscal policies that support the social class into which they are socialised. Governments led by prime ministers from poor socio-economic backgrounds spend significantly more on social security, education, health and infrastructure.

Studies on gender economics relate political leader's background to the provision of public goods. Chattopadhyay and Duflo (2004) analyse the influence of women's representation on local councils in India on the types of public goods provided locally. They show that council members invest more in infrastructure directly related to their own gender needs. According to their results, women invest more in infrastructure such as water and roads while men invest in education. Similarly, Svaleryd (2009) tests the effect of women's representation in Swedish local councils on the structure of local public expenditure and finds a positive relationship between women's share of local councils and spending on childcare and education compared to care for the elderly. In developing countries, the increase in female political representation has caused a better provision of public goods, especially with regard to education and health; while in developed countries, higher female representation has no effect on public policies (Hessami and Fonseca, 2020). At the national level, very few women in the world have served as leaders of the country. So far, there are about 60, including 17 interim and two chancellors; 11 are currently in office, including two in Africa, Sahle-Work Zewde (elected to lead Ethiopia in October 2018) and Samia Suluhu (elected in March 2021 in Tanzania following the death of Magufuli). During Ellen Johnson Sirleaf's presidency, public spending on health was three times higher annually than on defence, in contrast to her male predecessors. Unfortunately gender will not be part of our data analysis since women representation is low at national level.

**Lessons from institutional change theory:** Within the framework of Institutional Change theory, North (1990) defends a theory influenced by property rights and the crucial role played by the political elite. By comparing France to Spain and then England to the Netherlands, he highlights the way in which the quest for rent for the state led to the construction of an inefficient property rights system that led to economic stagnation of the France and the decline of Spain. While in England and the Netherlands, the dominant interests of the merchant class have led to an incentive property rights system protecting individual property. This comparison shows the abandonment of the vision of effective institutions and highlights the fact that a country's property rights are crafted by rulers according to their personal interests and are typically ineffective. The arrangement of property rights is no longer seen through the prism of efficiency but is tailored to the measure of those in power. Institutions thus appear as tools at the service of the political elite and not of the majority. In the case of Africa, the 1990s were marked by a wave of democratization that softened the phenomenon of coup d'état and led to the loss of power through resignation or electoral defeat. The striking phenomenon therefore is that of the retention in power of Presidents following a constitutional change in the article limiting the presidential term of office and / or the age limit for accession to the supreme office. In total since 2000, nearly 11 African leaders have or are in the process of changing the constitution. The consequences of the latter, like those of the failed attempts, can be assessed on the social, economic and political aspects in these countries. Socially, any success or attempt invariably results in losses of pressure group members and significant material damage. In the case of Burundi, according to the International Monetary Fund (IMF) the stubbornness of the late President Pierre Nkurunziza to remain in power in 2015 cost his country a 7.4% recession that mainly affected the industry and construction, a displacement of nearly 230,000 people to Rwanda and Congo, more than a hundred imprisoned following protest rallies, (Massil, 2019). Therefore, constitutional reforms driven by elite, could harm health status. Several other examples of institutional reforms in Africa that have ended in failure or success can be considered. Like the failed agrarian reform in Zimbabwe which plunged the country into an inflationary spiral and a food crisis. Robert Mugabé in 2000 under pressure from the fighters for independence and the unions undertook land reforms based on land rights. In fact, President Mugabé has expropriated White farmers for the benefit of black farmers; unaware that his last were less equipped and had little experience in the field. This has therefore resulted in the under-

exploitation of agricultural land, the abandonment of some farms resulting in low agricultural production; as a result the country found itself in an economic depression and an inflationary spiral often reaching triple digits, and food crisis.

**Lessons from the political economy of natural resources rent:** In an analysis of the slow development of oil-producing countries, political economy can be used to show how revenues from natural resource exploitation lead to a shift from production to rent-seeking and rent-capture activities by private agents. Political economy can also show how the availability of rent leads to perverse political incentives on the part of political leaders. In the predation effect of rulers (or centralized predation), it is considered that the abundance of natural resources makes the exercise of power attractive. In addition, it is also considered that the availability of income, generated by natural resources, increases competition for control of the state apparatus. These two main aspects give rise to a range of possible strategies in the hands of rulers. Depending on the strategy adopted, natural resources can be used to enrich a minority or to direct productive investments towards enriching the many (Omgba, 2012).

In most cases, the rulers of resource-rich countries decide to stay in power, and thus to deal with political challengers. This is done through repression, patronage and especially corruption (Omgba, 2012). It shows a negative correlation between oil dependency and the fight against corruption in African countries (Laurent, 2021). Through corruption, public decision-makers divert resources intended for productive activities from their primary objective. This results in poor economic performance.

"Political leaders have an interest in preventing new production if it poses a threat to their political power" Acemoglu (2008). For the latter, the source of the malaise of oil producing countries does not lie in the structure of their economies but in the preferences of their leaders. Thus, certain economic policy decisions of the political leaders of oil-producing countries may be detrimental to the industrial process. Indeed, in order to protect their interests, presidents develop strategies that allow them to achieve the double objective of safeguarding their power and controlling the natural resources that are the pillar of their power; this prevents any prospect or initiative of diversification of the production process and thus prevents the economic development of their respective countries.

In 2015, Angolan President Edouardo Santos had been in power for 36 years. At the end of the civil war in 2002, he built his country's economy on oil revenues and to a lesser extent on diamond revenues. He has prioritized commercial agriculture and industrialization using these rents. However, high levels of corruption, misappropriation of public funds and the excessive cost of these projects have led to the failure of the latter. Similarly, between 2002 and 2012, the leader Eduardo Santos, in a bid to combat unemployment, doubled the number of civil servants in his country, thus encouraging an increase in public charges that were not very productive because they constituted public consumption or operating expenses. This expenditure in a sector such as health or education could in the long term prove beneficial; but most of it was spent on defense.

Using a large panel dataset of world countries covering the period from 1995 to 2009, Cockx and Francken (2014) find a robust, significant inverse relationship between natural resource dependence and public health spending over time. The effect remains significant after controlling for state autonomy, volatility, and other factors.

The most institutional problems caused by natural resources rents are by order: corruption; problem of rule of law or justice; inefficient public administrations; bad regulation; lack of voice and accountability; political instability. Natural resources rents also cause volatility of GDP per capita, leading to low level of physical and human capital accumulation (Henri, 2019).

For every dollar borrowed by African countries, 40 to 60 cents are lost in bribes, over-billing, embezzlement and other forms of misappropriation. Less money available can mean inferior roads, railways or buildings, fewer health services, schools and sanitation facilities, and fewer police, firefighters and social workers Ndikumana (2022).

**Are foreign-trained leaders changing the way governments invest in health? :** Experiences such as study abroad are difficult to research because of their complexity and the range of factors involved, such as choice of programme, host country, duration and university. Nevertheless, the literature has found significant evidence that receiving an education outside one's own country has lasting individual and societal impacts. Results from Paige et al's survey of 6391 students abroad revealed increased levels of global engagement (civic engagement, knowledge production, philanthropy, social entrepreneurship and voluntary simplicity) and 87% of

respondents reported that study abroad influences subsequent educational experiences and career choices (Paige et al.2009). Surveys also show that after a year abroad, 98% of participants report increased self-confidence and 97% report a lasting impact on worldview (Dwyer and Peters, 2004). These results support the intuitive assumption that foreign study would have lasting impacts on decision-making and opportunities later in life, which supports the theory that leaders who are educated abroad make decisions differently from those who are educated in their native and/or home country.

The literature also studies the country-level impacts of foreign-trained leaders. Constant et al (2010) use a conditional quantile regression of 40 African countries to show that foreign-educated returnees are more likely to promote democracy, market liberalisation reforms and better government (Constant et al, 2010; Besley and Reynal-Querol, 2005). Education abroad is also an important determinant of foreign direct investment inflows due to the role of social capital, networks and connections established by leaders while abroad (Constant et al. 2010). Based on the literature described so far, the intuitive assumption would be that foreign-educated leaders have a positive impact on government spending on education in their home country.

However, a contrasting theory suggests that leaders who are educated abroad may actually invest less in education once they return home. Researchers have found that when problems are removed from view, there is a lack of recognition of the problem. Thus, there is a subjective 'poverty blindness' that describes the tendency to ignore problems that are not subjectively experienced, thus facilitating their ignorance (William and Geoff, 52, 2014). Furthermore, as studies by Constant et al (2010), Besley and Reynal-Querol (2005) show, leaders may become more outward looking in terms of development strategies. Extrapolating these findings and linking those to educational experiences, it could also be that when leaders receive their higher education entirely outside of sub-Saharan Africa, they are not familiar with the education system in their home country, particularly higher education. As a result, as leaders, they devote less attention and investment in the system than leaders who receive their education in sub-Saharan Africa and have first-hand knowledge of its weaknesses. For example, Rwandan President Paul Kagame cites his experience of attending school in Uganda and Rwanda without proper books, inadequate buildings and understaffed teachers as motivation for ensuring access to education for all Rwandan citizens (Kagame, 2007). If he had not directly experienced his country's education

system, could this have changed his determination to give greater priority to Rwanda's national health system?

## 3. Empirical analysis and data

The data on political leaders contains information on 31 African countries over the period from 1984 to 2015 for a total of 134 political leaders. The choice of this period is in order to include as many independent countries as possible while keeping the objective of having at least two successive leaders in power in each country; the study period is also limited by some control variables essential to the model. In order to identify the main leader of each country in different years, we use the Archigos database. We only include leaders who have been in power for at least two years because of the existence of Lumberg or Robertson time limits; moreover, this also minimises the possibility of political instability or crisis.

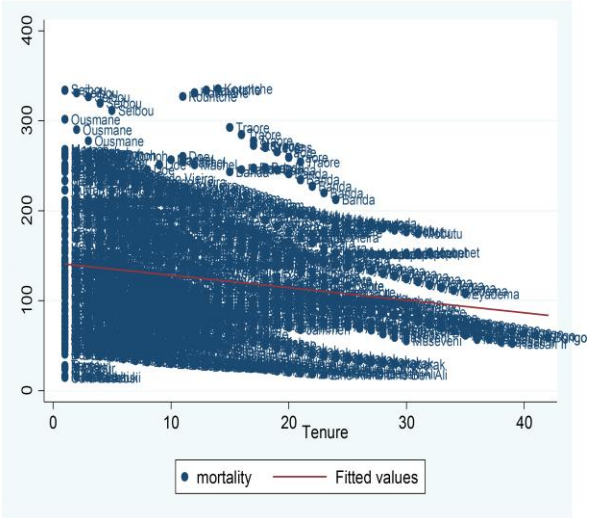
Leader's level of education is inspired by Besley and al (2011). We define the explanatory variable vector of interest (AWAY); study or train abroad which captures the fact that a leader has completed higher education or training outside their home country. Two destinations were selected: the West represented by the variable (Western) taking the value 1 if the leader completed his or her studies in Europe, America, Asia and 0 if the opposite; then Africa represented by the variable (Africa) coded 1 if the leader completed his or her studies in an African country other than his or her native country and 0 if not.

**Source:** Authors from Archigoes (2015)

From the figure above, it appears that the destination of African leaders were democratic European countries with a strong presence on the continent during the colonial period. This could be justified by the granting of scholarships and/or training by the European power. Democracies offer quality public services than dictatorships (Kane and Patapan, 2012).

In order to measure the health status in each country, two main indicators are generally used: Life expectancy at birth, and the under-five mortality rate. How are these dependent variables constructed? For the former, life expectancy at birth, it is derived from life tables and is based on sex and age-specific mortality rates. The UN values of life expectancy at birth are mid-year estimates, in line with the corresponding UN five-year population projections of average fertility change. For the second measure, the infant mortality rate, and according to the same source of information, is the number of new-borns resident in a specified geographical area (country, state, county, etc.) who die under one year of age divided by the number of resident live births for the same geographical area (for a specified period of time, usually a calendar year) and multiplied by 1000.

As control variables, we choose macroeconomic variables such as economic growth, public expenditure on health as a percentage of total expenditure, military expenditure, population growth of people aged 15-49, and primary education attainment, all from the WDI. The institutional variable, democracy (Polity II), is taken from Politiy IV database. Political tenure is built using the Archigoes database (2015)



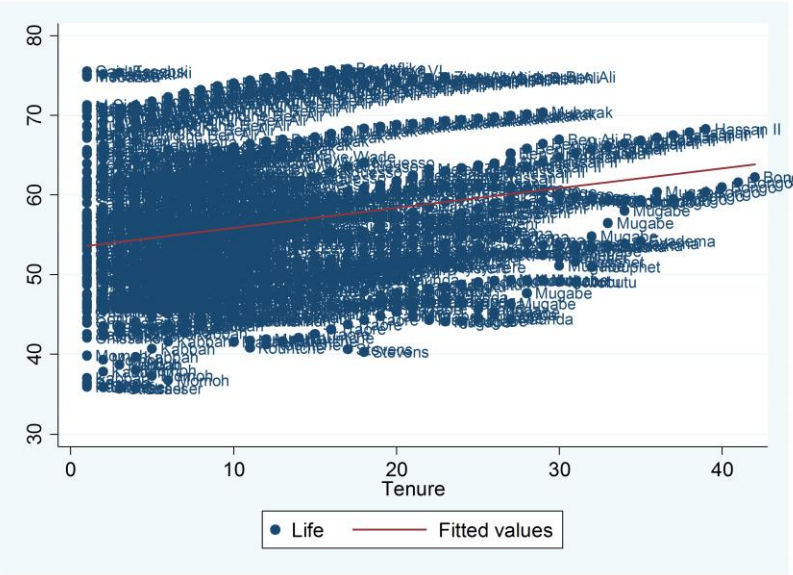




Table 1 give a description of data's uses in our study. From the table, average life expectancy is about 55 years in African countries, with a gap among them of about 7 years. People dies at almost 75 years and at least 35. Each year, in average, 125 children under 5 years died in Africa with a different of 65; hospital register at least 14 dead and at most 335 yearly. Table 2 shows a positive relationship between education and life expectancy and a negative one between

education and infant mortality. The identification of a causal relationship is of crucial importance in policy design. For example, if more education leads to better health, then policies to increase education could also be effective in improving population health. However, if the association (correlation) between education and health exists because better health enables individuals to attain better education (reverse causation) or because the correlation between education and health results from the correlation of education with other factors that also improve health (such as parental income), then policies to improve education may not be effective in improving health.

The authors examine responses to the US National Health Interview Survey and find a statistically significant effect of education on various measures of health, including mortality (measured as deaths within five years of the survey) and the incidence of common acute and chronic diseases (such as heart disease, stroke, hypertension, high cholesterol, diabetes, asthma....). The authors report that more educated people are less likely to suffer from these diseases. Interestingly, some common diseases, such as cancer, do not seem to have an effect on education, indicating that the incidence does not vary with education (Cutler and Lleras-Muney, 2006 and 2010).

## 4. Econometric model

The model is an adaptive modification of Besley et al(2011) which describes a linear relationship between economic growth and the education level of the political leader. It is written as follows:

**(1)**

With $X_{ilt}$ representing in the first instance the life expectancy at birth and in the second the under-five mortality rate of country i at period t when the leader l is in power; $AWAY_{ilt}$ designates the matrix of variables of interests studied in the West and in Africa of the leader l at period t in country i; $L_{ilt}$ the matrix of variables describing the other characteristics of the political leader, i.e. his duration in power, his highest level of education or training, his educational background, his profession. $Z_{ilt}$ is the vector of explanatory variables of the country's economic structure; these are public spending on health, population growth, military spending, economic growth; and Inst the variable describing the quality of institutions here represented by democracy. $\boldsymbol{\mu}_i$ represents the country fixed effect. Since we assume that the profile of the leader does not change during his or her tenure, we include $\Lambda_l$ the leader-specific fixed effect. It may turn out that $\Lambda_l$ captures two effects: heterogeneity in the leader profile and other unobserved characteristics in Z. Since a leader can only be in power in one country, the leader-specific fixed effect is confounded with the country-specific fixed effect. $\square_{ilt}$ the error term related to each period; the coefficients α, β, δ, □ and θ are the parameters to be estimated.

The coefficient on which our hypothesis is built is β, which captures the interest of foreign-trained managers in their home country's social security.

**Tenure:** The tenure of the leader represents political stability and informs about the experience of a president. A young leader will have different policy preferences than an old president in that the latter has a long political career to maintain, while the older one does not; age also informs the latter's ability (Lau and Readlawsk, 2008). Similarly, Daron Acemoglu et al (2008) explain how the length of time in power can create networks of corruption leading to the weakening of the institutional system. Serrano and G. Sackey (2016) consider the number of terms in office in African countries. They break down the length of time in power into different terms (leaders who have served less than 4 years in power, those who have served a second term that takes them to 8 years, those who have braved a third term that takes them to more than 8 years, and finally those who have served more than 16 years in power). However, this breakdown, in our humble opinion, does not take into account the average length of presidential terms in Africa after the wave of democratisation in some countries in the 1990s. Although before this period, the predominance of coups d'état and the fragility of constitutions in these countries did not allow for real delimitation of presidential terms, the average length of time in power was more than 5 years (Massile, 2019). Heads of state come to power either through constitutional (regular) or non-constitutional (coup d'état) means. It is often argued that democratic systems are more conducive to development because they require more accountability and participation of individuals in the management of public affairs (Lipset 1959; Acemoglu and Robinson, 2006). According to Agbaje and Roberts, (2002), older democratic leaders are committed to meeting the social needs of the people while relatively younger dictators devote more resources to their security in order to stay in power for life.

**The level of education of the president (HEL):** This is an important factor in the growth process; a president with a master's or doctorate degree would have been familiar with development theories making him or her a growth driver in the country (Besley et al, 2011). A highly educated leader invests more in the education of his country compared to a less educated one (Serrano and Pérez, 2013). As described earlier in the introduction, there is a causal relationship between education and health, and a leader with a master's or doctorate degree has a positive effect on health.

**Foreign educated leader's (Africa, Wester):** The economic effects of the political leader's place of education remain controversial; while some authors (Constant and Tiens, 2013) argue that leaders educated outside their home country attract more Foreign Direct Investment to their home country. Donal and Ngouhouo (2020) show that the latter discourage education in their home country; however, they only consider primary education.

**Democracy:** the change from one political leader to another is manifested by a change in the leadership team, as no one person can lead a country. The collaborators of the incumbent political leader are key to the successful implementation of his or her economic policy and governance. The 'honeymoon effect' teaches us that the quality of the bureaucracy is often high at the beginning of a mandate; however, longevity in power is accompanied by the emergence of conflicts of interest that disrupt the rule of conduct established by the decision-making summit.

Rehmat and al (2020) use four indicators of institutional quality in a sample of 124 countries to show that institutional quality determines health outcomes. Specifically, they show that political stability, level of democracy, quality of regulation and quality of bureaucracy have a positive effect on life expectancy at birth and a negative effect on infant mortality.

**Economic growth (GDPgrowth):** there is a consensus on the positive relationship between health and economic growth; indeed, human capital theories demonstrate that health is a lever for growth. Similarly, economic growth is a major determinant of health. The study by Ajack and Ogeto (2020) examines the effect of economic growth on health in sub-Saharan Africa from 1991 to 2015. The results show that economic growth reduces infant mortality rates and fertility rates through the provision of health services and improves life expectancy. In addition, other variables, including agriculture, services and population, significantly affect health outcomes, while income per capita has more positive effects on health in sub-Saharan Africa.

**Military expenditure (EXPmilitary) and leader's profession (military):** analysis of the professional profile of political leaders on public spending reveals that some have preferences for military spending, particularly former military personnel who, according to Horowitz and Stam (2013), could trigger armed conflict. Studies by Seemab and al (2019) show that in countries with high military spending, life expectancy at birth is low and infant mortality high, in contrast to countries with low military spending. Military spending could have crowding-out effects. Indeed, in an environment such as that of African countries, program demands as measured by budgets are generally higher than resources. Thus, an expansion of resources will meet the growing needs of one or another programme. On the other hand, not increasing resources would lead to a trade-off (Kathleen and Margaret, 1979). The third possibility (state of war) inevitably leads to deterioration in living conditions and health.

**Public expenditure on health (EXPhealth**): Public expenditure on health is the measure of political interest in health. The political economy of health very often uses this indicator to capture the priority of health in public policy. However, the studies explain the choice of public expenditure allocation by the needs of the different ministries without taking into account the intrinsic preferences of the decision-maker; whereas the micro-economics of public choice reveals that political decisions often emanate from the academic, professional, religious... background of the decision-maker. The relationship between public spending on health and health in Africa is positive in many of the panel countries. Anyanwu and Andrew (2007) show that health expenditure has a statistically significant effect on infant and under-five mortality. For African countries, this implies that total health expenditure (as well as the public component) certainly contributes significantly to health outcomes. Moreover, infant and under-five mortality are positively and significantly associated with sub-Saharan Africa; the reverse is true in northern Africa.

**Youth population:** About 70% of the African population is made up of young people. Adolescent health is strongly affected by social factors at the personal, family, community and national levels. The most important determinants of adolescent health worldwide are structural factors such as national wealth, income inequality and access to education. In addition, safe and

supportive families, safe and supportive schools, and optimistic and supportive parents are essential to the development of young people's full potential to achieve the best health in the transition to adulthood. Improving global adolescent health requires improving the daily lives of young people, their families and peers in schools, by addressing risk factors such as drug and alcohol use to which African youth are exposed (Viner et al, 2012).

**Education:** Authors support the idea of positive relation between education and health for at least two reasons. The first is the economic opportunities provide by education. Well educated people have access to health facilities and health insurance in OCDE countries (Raquel and al, 2019). One additional year of schooling is associated with 6.85% reduction in reporting poor health. Using a panel of 49 African countries, Judge and al (2010) show that, education and health expenditures are complementary.

In order to test the effect of political leader's profile on economic performances, several methods are use in the literature. Primary studies (Jones and Okelen, 2004; William and Easterlin, 2005, Besley and al, 2011) uses natural leaders dead in power to randomize their tenure. According to them, leaders mandate is constant because well-known in the constitution; a Soudan dead in power due to an accident, sickness or a constraint to leave power because on sickness is random. In the case of African countries, before the 1990 vague of democratisation, many constitutions didn’t have the limit term article; and even after, several leaders in other to maintain power modify the limit term article. Berry and Flower (2021) build the RIFLE (Randomization Inference For Leader Effects) this to verify if good performances are due to leadership or luck; unfortunately, this method did not account for endogeneity in fixe effect methods.

## 5- Analysis of the results

### 5.1. Basic result

Equation (1) is previously estimated in its simple form. The methods used are: pooled ordinary Least Squared, fixed effects, Generalized Least Squares (GLS) and the Drisc-Kraay method. The use of these methods follows tests on OLS residuals which revealed the presence of serial autocorrelation and heteroskedasticity; corrected by GLS. However, as the Hausman test reveals the preference of the fixed effect model over the random effect model (see Table 7 in appendices), GLS are no longer sufficient as they only correct for random effects. Hence the use of the Drisc-Kraay method under the condition of presence of cross sectional independency (see Pesaran test in appendix).

| | (OLS) | (FE) | (GLS) | (Drisc/Kraay) | (OLS) | (FE) | (GLS) | (Drisc/Kraay) |
|---|---|---|---|---|---|---|---|---|
| VARIABLES | Life | Life | Life | Life | mortality | mortality | mortality | mortality |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| HEL | 0.532 | 0.808* | 0.532 | 0.808* | -22.31*** | -24.60*** | -22.31*** | -24.60*** |
| | (0.553) | (0.456) | (0.547) | (0.442) | (3.081) | (3.260) | (3.046) | (3.683) |
| Western | -1.192** | -0.844** | -1.192** | -0.844** | 13.70*** | 14.96*** | 13.70*** | 14.96*** |
| | (0.569) | (0.374) | (0.563) | (0.366) | (3.167) | (2.662) | (3.130) | (2.936) |
| Africa | -2.001** | -1.590* | -2.001*** | -1.590*** | 9.633** | 12.92** | 9.633** | 12.92** |
| | (0.785) | (0.867) | (0.776) | (0.507) | (4.362) | (6.183) | (4.312) | (4.736) |
| Tenure | 0.0839** | 0.0469** | 0.0839** | 0.0469* | -0.836*** | -0.610*** | -0.836*** | -0.610*** |
| | (0.0333) | (0.0203) | (0.0330) | (0.0228) | (0.185) | (0.145) | (0.183) | (0.166) |
| Oil rent | -0.00102 | -0.0924** | -0.00102 | -0.0924 | -0.367** | 0.561* | -0.367** | 0.561 |
| | (0.0265) | (0.0384) | (0.0262) | (0.0636) | (0.147) | (0.286) | (0.146) | (0.430) |
| $EXP_{military}$ | -0.0529 | -0.545*** | -0.0529 | -0.545*** | 1.837 | 3.724*** | 1.837 | 3.724*** |
| | (0.233) | (0.169) | (0.230) | (0.151) | (1.295) | (1.204) | (1.280) | (1.095) |
| $EXP_{health}$ | 0.104 | -0.358 | 0.104 | -0.358* | -3.379* | 5.204*** | -3.379** | 5.204*** |
| | (0.311) | (0.232) | (0.307) | (0.185) | (1.727) | (1.652) | (1.707) | (1.521) |
| Youth | 0.841*** | 1.019*** | 0.841*** | 1.019** | -3.657*** | -3.852*** | -3.657*** | -3.852* |
| | (0.0739) | (0.127) | (0.0731) | (0.363) | (0.412) | (0.912) | (0.407) | (1.888) |
| Democracy | -0.371*** | 0.330*** | -0.371*** | 0.330** | 1.134*** | -2.588*** | 1.134*** | -2.588*** |
| | (0.0655) | (0.0655) | (0.0647) | (0.115) | (0.364) | (0.466) | (0.360) | (0.872) |
| Education | 0.0324** | 0.128*** | 0.0324** | 0.128*** | -0.684*** | -1.026*** | -0.684*** | -1.026*** |
| | (0.0148) | (0.0128) | (0.0146) | (0.0273) | (0.0832) | (0.0913) | (0.0822) | (0.201) |
| GDP | 0.129** | 0.0483 | 0.129** | 0.0483 | -0.668** | -0.220 | -0.668** | -0.220 |
| | (0.0602) | (0.0340) | (0.0595) | (0.0411) | (0.335) | (0.242) | (0.331) | (0.342) |
| Constant | 10.07*** | -4.989 | 10.07*** | -4.989 | 353.1*** | 367.8*** | 353.1*** | 367.8*** |
| | (3.369) | (6.802) | (3.331) | (18.61) | (18.75) | (48.79) | (18.54) | (89.25) |
| Observations | 526 | 526 | 526 | 526 | 524 | 524 | 524 | 524 |
| R-squared | 0.513 | 0.448 | | | 0.593 | 0.473 | | |
| Number of countryid | | 31 | 31 | | | 31 | 31 | |
| Number of groups | | | | 31 | | | | 31 |

**Source:** Authors from stata

**Note:** Robust standard errors are indicated in parentheses. (***, **, *) indicate statistical significance at 1%, 5% and 10%.

From Table 3, it follows that high education is positively correlated to health status. This result corroborates the work of Besley et al (2011), Serrano and Perez (2013) and could be justified by the fact that higher education allows leaders to familiarize themselves with human development theories; which will motivate them to invest more in health. The result also finds explanation in the theory of leader selection. Indeed, Caselli and Morelli (1996) show that democracies tend to choose the most educated leaders. However, according to these same authors, democracies provide better public services than autocracies. In Africa, many of the most educated leaders have completed their education outside their native country.

Table 3 above also reveals that leader's place of education matters for health status. Indeed, foreign education has a negative effect on life expectance and positive on under five

child mortality. Countries governed by foreign educated leaders experience at least 0.8 shoot down of life expectancy compare to the ones leads by home educated president. At least 9 children died more in foreign educated leaders mandates. This result is contrary to our expectations because leaders who have completed their education and/or professional training in Western countries would have become impregnated with a democratic culture consisting in offering better public services.

The results in table 3 also reveal a negative effect of public health expenditure on life expectancy. Although this result is not robust, it contradicts the literature. This leads us to think that our results would be biased due to the presence of endogeneity.

**5.2. Account for endogeneity**

In an analysis of the slowness of oil-producing countries in their development process, political economy presents the way in which natural resources lead to the abandonment of production activities in favor of rent-seeking ones by private agents. Political economy shows that the availability of rent leads to perverse political incentives from political leaders (Omgba, 2012).

Many analyses link political horizon of leaders, quality of institutions and oil rent (Acemoglu, 2008; Lipset, 2012; Omgba, 2012). The political economy of oil rent through the predatory behavior of political leaders shows that in order to stay in power, they invest little in human capital and maintain networks of corruptin as a pillar of their power. It would have been appropriate to verify the effect of corruption; however, democracy is the most valued measure in the evaluation of transparency in public fund. We thus assume that the variables: political horizon, democracy and oil rent would therefore be strongly linked. To this end, the endogeneity test with the condition of orthogonality of the variables reveals that equation (1) is endogenous and the Hansen's statistic greater than 10% (see tables 7, 8, 9 and 10 in appendix) proves that the instruments used are better.

Thus, in order to solve this problem of endogeneity, we use the Generalized Moment Method in difference because it takes into account the lags (see table 4 in main text; 5 and 6 in appendix).

**Table 4:** political leader background effect on health outcome

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| VARIABLES | Life | Life | Life | Mortality | mortality | mortality |

| | | | | | | |
|---|---|---|---|---|---|---|
| $Life_{t-1}$ | 0.997*** | 1.008*** | 0.991*** | | | |
| | (0.0256) | (0.0169) | (0.0197) | | | |
| $Mortality_{t-1}$ | | | | 0.969*** | 0.989*** | 0.983*** |
| | | | | (0.0154) | (0.0171) | (0.0191) |
| $EXP_{health}$ | 0.717** | 0.757*** | 0.654** | 2.395* | 1.949* | 2.328** |
| | (0.357) | (0.281) | (0.312) | (1.339) | (1.036) | (1.061) |
| $EXP_{millitary}$ | 0.105 | -0.0418 | -0.0208 | -0.0847 | 1.170 | 0.522 |
| | (0.0872) | (0.0636) | (0.0633) | (0.860) | (1.278) | (1.030) |
| GDP | 0.0188* | 0.0136 | 0.0188** | -0.112 | -0.0230 | -0.0630 |
| | (0.0108) | (0.00902) | (0.00924) | (0.0815) | (0.0618) | (0.0625) |
| Oilrent | 0.0555** | 0.0235 | 0.0180 | 0.135 | 0.175 | 0.147 |
| | (0.0260) | (0.0278) | (0.0251) | (0.138) | (0.128) | (0.118) |
| Youth | -0.165** | -0.141** | -0.118** | 0.0416 | -0.381 | -0.231 |
| | (0.0806) | (0.0568) | (0.0594) | (0.287) | (0.312) | (0.289) |
| Education | 0.00792 | 0.00921 | 0.0120 | -0.0103 | 0.106** | 0.0685 |
| | (0.0101) | (0.00757) | (0.00861) | (0.0241) | (0.0508) | (0.0630) |
| Democracy | 0.156* | 0.0913 | 0.137* | -0.467*** | -0.355* | -0.377** |
| | (0.0897) | (0.0654) | (0.0714) | (0.176) | (0.205) | (0.167) |
| Tenure | 0.0354** | -0.000226 | 0.0109 | -0.160*** | -0.0319 | -0.0874* |
| | (0.0176) | (0.0126) | (0.0123) | (0.0588) | (0.0472) | (0.0498) |
| Western | -1.115* | | | 5.223*** | | 2.587** |
| | (0.627) | | | (1.832) | | (1.192) |
| Africa | -2.444 | | | 8.836** | | 4.790 |
| | (1.623) | | | (3.965) | | (3.000) |
| HEL | | -0.280 | 1.648* | | 2.300** | 1.323 |
| | | (0.306) | (0.919) | | (1.001) | (1.108) |
| Western*HEL | | | -2.210** | | | |
| | | | (1.108) | | | |
| Africa*HEL | | | | | -27.79 | -20.27 |
| | | | | | (26.26) | (19.74) |
| Constant | 7.868** | 5.806*** | 5.156** | -8.702 | 5.777 | -0.0497 |
| | (3.515) | (2.196) | (2.429) | (15.24) | (16.57) | (14.15) |
| Observations | 526 | 526 | 526 | 524 | 524 | 524 |
| Number of countryid | 31 | 31 | 31 | 31 | 31 | 31 |
| Hansenp | 0.909 | 0.682 | 0.931 | 0.818 | 0.472 | 0.530 |
| AR(1) | 0.048 | 0.047 | 0.032 | 0.048 | 0.013 | 0.021 |
| AR(2) | 0.471 | 0.305 | 0.773 | 0.494 | 0.869 | 0.921 |

**Source :** Authors

**Note:** Robust standard errors are indicated in parentheses. (***, **, *) indicate statistical significance at 1%, 5% and 10%.

From Table 4, it appears that high educated leaders are involved in the field of health. However, they face obstacles due to having completed their education abroad. Indeed, the mandates of western educated leaders are marked by a deterioration in the health status of their country. Although this goes against the hypothesis formulated, many justifications can be apprehended:

- As mentioned earlier, leaders who receive their education abroad could invest less in human capital, particularly in health, once they return to their native country. Researchers observe that when problems are removed from view, there is a lack of recognition of the problem. Thus, there is subjective “poverty blindness” which describes the tendency to ignore problems not subjectively experienced, which facilitates ignoring them (William and Geoff, 52, 2014). Moreover, as shown by the studies of Constant et al. (2010), Besley and Reynal - Querol (2005), leaders could become more outward-looking in terms of development strategies.

- Population issues: in Africa, population dynamics depend on many factors such as: religion, socio-professional status, technological evolution, climate, education, migratory flows, etc., which are very heterogeneous. This strong heterogeneity would be likely to bias the projections made on the population statistics. Indeed, population statistics in many African countries are collected from IMF projections, which become less reliable after 10 years, hence the need for population censuses. This would enable the composition of the different strains to be known and the related needs. Unfortunately, very few African governments are interested in this. This lack of information on the real needs of the population is accentuated when the government formulates outward-looking development strategies. As a result, public health policies may lack focus and health spending may be ineffective.

- The problem of capital flight: In 2006, Transparency International estimated the amount of embezzlement of public funds in Africa at 140 million dollars. According to UNCTAD (2007), of the 400 billion dollars (approximately 200,000 billion CFA francs) that have escaped from the African continent over the last thirty years, one third is said to be due to embezzlement, i.e. more than 130 billion dollars. More than $13 billion per year is said to have left Africa illegally between 1991 and 2004, making the continent "a net creditor to the rest of the world". According to another report by the World Bank and the UN, $40 billion is looted from the world's poorest countries every year, mostly by people at the highest levels of government. In a report entitled "Biens mal acquis... profit trop souvent" (ill-gotten gains) published in 2007, the Catholic Committee against Hunger and for Development (CCFD) estimates the fortune embezzled by dictators over the last few decades at between 100 and 180 billion dollars. The World Bank and the United Nations put forward a figure of between 20 and 40 million dollars that flee the countries of the South each year due to corruption and embezzlement. These illicit financial flows deprive developing countries of resources that could be used to fund essential public

services, such as security, justice and basic social services like health and education, weakening their financial systems and economic potential (Ndikumana, 2014).

-African countries lose millions of US dollars each year in medical tourism. According to the Health Care Index, derived from a compilation of data provided by the World Health Organization (WHO, 2022), Ministries of Health and independent watchdog bodies in the health sector, the South Africa leads the African ranking of health care terms with an index of 64.14, followed respectively by Tunisia, Kenya, Algeria, Nigeria, Egypt, Morocco, Rwanda, Tanzania, Zambia. This ranking highlights the countries mainly ruled by presidents who have completed their education and/or training in their native country, with the exception of Tunisia and Egypt.

The second channel through which the place of education of leaders influences health is that of FDI, as mentioned above, leaders who have completed their education in the West attract more FDI. However, these investments are concentrated in the primary sector (that of extractions); which is not a means of promoting health. Indeed, on a sample of 49 African countries, Sosson and al, (2022) show that oil rent has a negative effect on access to water and sanitation.

Democracies tend to provide quality public good than autocracies. This could be justify by political competition. Caselli and Morelli (1996) in the citizen-candidate approach, build a model of political competition were the best public service project is selected. A gain of one point of democracy led to an increase of at least 15% life expectancy and 35% decrease of infant mortality.

Finally, we report the Hansen over-identification test allowing the validity of the instrumental variables. The J-Hansen statistic replaces the Sargan statistic used in the original one-step Arellano-Bond estimator, since the Hansen test is robust to heteroskedasticity or autocorrelation. We find that the validity of the instruments is confirmed for all the specifications used, because the value of the chi-square statistic is not significant in any regression at the required threshold of 5%. Alternatively, we also show the results of the Arellano-Bond test for the AR (1) and AR (2) autocorrelation. The value of the structure AR (1) cannot be rejected for the estimated model from which the dynamic model is appropriate, while the structure AR (2) is rejected therefore lack of serial autocorrelation between the first differentiated variables used as instruments and residues; these are good instruments.

### 5.3 Robustness check

In democratic countries, the separation and independence of powers allows the control of the executive's action by the legislature. Indeed, the will of a leader alone would not be sufficient in a democracy to set up his or her preferred economic policies; each policy (budget exercise) would have to be defended before a parliament. Thus, the parliamentary majority would be a non-negligible indicator in the framework of our study; insofar as, the democratic bodies continue a limit that can bias the analysis of the preferences of political leaders (Kane and Patapan, 2012). To this end, Tables 5 and 6 in the appendix present the results of the estimation of equation 1 by the same methods as above, respectively in Democracy and autocracy.

Table 5 is similar to Table 4, which means that when the leader has a parliamentary majority, the above results do not change. On the other hand, in the absence of a parliamentary majority, the level of education of the leader is the profile variable to be considered. It follows that, in the context of a parliamentary majority or minority, the profile of the political leader explains health performance.

## 6. Conclusion

The aim of this article was to verify, in the light of the political leader theory, the effect of the profile of political leaders on social security, particularly health. We formulated the following assumption: health expenditure preferences are defined by the academic background of the latter. To test this hypothesis, we used an adaptive enhancement of the education model of Timothy Besley et al (2011). We first use non-dynamic version of the model which was estimated by pooled OLS, Fixe Effect, GLS and Drisc-Kraay. In order to account for the endogeneity of some variables, we uses the GMM in difference approach. Two main results were found: (i) foreign educated leaders positively influence infant mortality and negatively influence life expectancy; in other words, they have a negative effect on health status. (ii) In contrast, political tenure has positive effect on health status. These results are verified in democracies. The study contributes to the emerging literature on political leader theory by providing further evidence on the background effect of the incumbent. Political leader is likely to shape his or her economic policy preferences and hence health performance.

**Data Availability statement:** The data that support the findings of this study are freely available from the corresponding author, upon reasonable request.

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**Table 5:** political leader background effect on health outcome in democracy

| VARIABLES | (1) Life | (2) Life | (3) Life | (4) Mortality | (5) mortality | (6) mortality |
|---|---|---|---|---|---|---|
| $Life_{t-1}$ | 1.013*** | 1.011*** | 1.003*** | | | |
| | (0.0113) | (0.0122) | (0.0128) | | | |
| $Mortality_{t-1}$ | | | | 0.960*** | 0.977*** | 0.966*** |
| | | | | (0.0284) | (0.0230) | (0.0313) |
| $EXP_{health}$ | 0.212 | 0.248 | 0.367* | -2.595 | -0.586 | -2.327 |
| | (0.226) | (0.207) | (0.210) | (1.859) | (1.544) | (1.660) |
| $EXP_{millitary}$ | -0.0108 | -0.0775 | -0.0560 | -0.612 | 0.0466 | -0.675 |
| | (0.0760) | (0.0661) | (0.0590) | (1.538) | (1.099) | (1.478) |
| GDP | 0.0549** | 0.0498 | 0.0451 | -0.502** | -0.468** | -0.495*** |
| | (0.0257) | (0.0308) | (0.0282) | (0.198) | (0.183) | (0.191) |
| Oilrent | -0.0218 | -0.0262 | -0.00535 | -0.220 | 0.0858 | -0.195 |
| | (0.0249) | (0.0330) | (0.0219) | (0.393) | (0.368) | (0.343) |
| Youth | -0.112** | -0.0893* | -0.137*** | 0.563 | 0.193 | 0.500 |
| | (0.0568) | (0.0496) | (0.0523) | (0.399) | (0.369) | (0.385) |
| Education | 0.0190* | 0.0118* | 0.0171** | 0.0477 | 0.0800 | 0.0636 |
| | (0.0111) | (0.00671) | (0.00766) | (0.0796) | (0.0619) | (0.0870) |
| Democracy | -0.00228 | 0.0147 | 0.0308 | -0.376 | -0.288 | -0.390 |
| | (0.0394) | (0.0287) | (0.0356) | (0.321) | (0.343) | (0.305) |
| Tenure | -0.00398 | -0.00770 | -0.00305 | 0.0451 | 0.0232 | 0.0540 |
| | (0.0111) | (0.00626) | (0.00717) | (0.119) | (0.108) | (0.116) |
| Western | -0.836* | | | 5.911** | | 5.335** |
| | (0.432) | | | (2.296) | | (2.119) |
| Africa | -2.154 | | | 0.199 | | 1.893 |
| | (1.360) | | | (7.204) | | (7.231) |
| HEL | | -0.480 | 1.272* | | 3.511*** | 1.242 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | (0.365) | (0.674) | | (1.256) | (2.059) |
| Western*HEL | | | -1.846** | | | |
| | | | (0.858) | | | |
| Constant | 4.958** | 3.859** | 6.101*** | -28.22 | -15.98 | -27.17 |
| | (2.142) | (1.947) | (2.198) | (18.89) | (17.09) | (18.48) |
| Observations | 298 | 298 | 298 | 296 | 296 | 296 |
| Number of countryid | 24 | 24 | 24 | 24 | 24 | 24 |
| Hansenp | 1.000 | 1.000 | 1.000 | 0.858 | 0.760 | 0.810 |
| AR(1) | 0.048 | 0.043 | 0.029 | 0.046 | 0.016 | 0.035 |
| AR(2) | 0.171 | 0.245 | 0.408 | 0.657 | 0.350 | 0.680 |

**Source :** Author

**Note:** Robust standard errors are indicated in parentheses. (***, **, *) indicate statistical significance at 1%, 5% and 10.

| VARIABLES | (1)<br>Life | (2)<br>Life | (3)<br>Life | (4)<br>mortality |
|---|---|---|---|---|
| $Life_{t-1}$ | 0.980*** | 0.969*** | 0.970*** | |
| | (0.0344) | (0.0303) | (0.0247) | |
| $Mortality_{t-1}$ | | | | 0.959*** |
| | | | | (0.0170) |
| $EXP_{health}$ | 0.174 | 0.450** | 0.378** | -1.255* |
| | (0.315) | (0.204) | (0.151) | (0.643) |
| $EXP_{millitary}$ | -0.240 | -0.324** | -0.272** | 0.921*** |
| | (0.198) | (0.144) | (0.117) | (0.315) |
| GDP | 0.0729 | 0.0146 | 0.0223 | -0.0905 |
| | (0.0575) | (0.0345) | (0.0312) | (0.0782) |
| Oilrent | -0.00240 | -0.00444 | -0.00233 | -0.0677 |
| | (0.0188) | (0.0181) | (0.0143) | (0.0632) |
| Youth | -0.135* | -0.0876 | -0.0780 | 0.400** |
| | (0.0715) | (0.0738) | (0.0616) | (0.171) |
| Education | 0.0155* | 0.0161* | 0.0141* | -0.0189 |
| | (0.00934) | (0.00882) | (0.00846) | (0.0167) |
| Democracy | -0.0402 | 0.0521 | 0.0390 | -0.135 |
| | (0.0929) | (0.0757) | (0.0634) | (0.217) |
| Tenure | 0.00978 | 0.0200 | 0.0172 | -0.0516 |
| | (0.0108) | (0.0184) | (0.0190) | (0.0601) |
| Western | -0.280 | | | -2.315 |
| | (0.654) | | | (2.134) |
| Africa | -0.892 | | | 2.710 |
| | (0.792) | | | (2.995) |
| HEL | | 0.865 | 0.978 | -4.543 |
| | | (0.637) | (0.926) | (4.269) |

| | | | | |
|---|---|---|---|---|
| Western*HEL | | | -0.398 | 4.374 |
| | | | (0.721) | (5.028) |
| Constant | 8.362*** | 5.710* | 5.255* | -19.30** |
| | (3.078) | (3.349) | (2.880) | (7.925) |
| Observations | 193 | 193 | 193 | 193 |
| Number of countryid | 19 | 19 | 19 | 19 |
| Hansenp | 0.817 | 1 | 1.000 | 1 |
| AR(1) | 0.042 | 0.036 | 0.049 | 0.049 |
| AR(2) | 0.588 | 0.494 | 0.532 | 0.416 |

**Source :** Author

**Note:** Robust standard errors are indicated in parentheses. (***, **, *) indicate statistical significance at 1%,5% and 10%.

**Table 7:** Hausman (1978) specification test

| | Coef. |
|---|---|
| Chi-square test value | 6561.539 |
| P-value | 0 |

Pesaran's test of cross sectional independence = 23.023, Pr = 0.0000

**Table 8:** Instrumental variables (GMM) regression

| mortality | Coef. | St.Err. | t-value | p-value | [95% Conf | Interval] | Sig |
|---|---|---|---|---|---|---|---|
| oilrent | 2.775 | 2.175 | 1.28 | .202 | -1.488 | 7.038 | |
| HEL | -7.965 | 9.098 | -0.88 | .381 | -25.797 | 9.867 | |
| western | 7.191 | 5.348 | 1.34 | .179 | -3.292 | 17.674 | |
| Africa | -19.16 | 15.046 | -1.27 | .203 | -48.65 | 10.329 | |
| $EXP_{health}$ | .12 | 3.4 | 0.04 | .972 | -6.545 | 6.785 | |
| Youth | -5.049 | 1.192 | -4.23 | 0 | -7.386 | -2.712 | *** |
| Democracy | 2.778 | .951 | 2.92 | .003 | .915 | 4.641 | *** |
| Education | -.925 | .178 | -5.18 | 0 | -1.274 | -.575 | *** |
| GDP | -.378 | .644 | -0.59 | .557 | -1.64 | .883 | |
| Constant | 419.653 | 58.317 | 7.20 | 0 | 305.353 | 533.953 | *** |

| | | | |
|---|---|---|---|
| Mean dependent var | 98.063 | SD dependent var | 46.087 |
| R-squared | 0.217 | Number of obs | 524.000 |
| Chi-square | 524.969 | Prob > chi2 | 0.000 |

**** p<.01, ** p<.05, * p<.1*

Test of endogeneity (orthogonality conditions)

Ho: variables are exogenous

GMM C statistic chi2(1) =  5.95358  (p = 0.0147)

Test of overidentifying restriction:
Hansen's J chi2(1) = 2.27005 (p = 0.1319