Governmental stability and emigration in Sub-Saharan Africa: the role of skills and gender

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Received 17 April 2022
Revised 19 October 2022
Accepted 2 December 2022

Abstract

Purpose – Using data for a set of 32 Sub-Saharan countries over the years 2000, 2005 and 2010, the paper investigates the effects of domestic governmental stability upon emigration and assesses whether education and gender shape the relationship.
Design/methodology/approach – The paper adopts instrumental variable (IV) Poisson regressions and two-stage least squares (2SLS) as robustness tests.
Findings – The paper suggests that increased governmental stability has a larger impact on the emigration of high-skilled individuals. Nevertheless, once emigrants are partitioned according to both education and gender, the authors find evidence of a larger impact of stability on the emigration of highly educated females.
Research limitations/implications – The empirical findings may lack generalizability because of the chosen research approach. Then, researchers are encouraged to test the proposed propositions further.
Practical implications – The paper includes implications that can be drawn for both the growth and the development of Sub-Saharan Africa.
Originality/value – This paper fulfills an identified need to study how both education and gender shape the relationship between domestic governmental stability and emigration.

Keywords International migration, Governmental stability, Education level, Gender role
Paper type Research paper

1. Introduction and related literature

In the past two decades, an increasing amount of economic literature has been devoted to assessing the relationship between emigration and different measures of institutional quality, with two main and competing views [1].

One strand of the literature, summarized here by the contributions of Batista and Vicente (2011), Pfutze (2012), Clark *et al.* (2015), Docquier *et al.* (2016), Ivlevs and King (2017) and Barsbai *et al.* (2017), has stressed the role of international emigrations in shaping institutions in both the sending and receiving country, identifying various channels through which emigration affects the evolution of the institutional environment. According to these papers, international emigrations have a positive impact on the quality of institutions in both the sending and receiving country. International emigrations improve the quality of governance in the sending country as they promote democratization and reduce corruption, while the beneficial effects on receiving countries are driven by a strengthening in property rights, rule of law and economic freedom.

A second strand of the literature, see for instance Rowlands (1999), Bertocchi and Strozzi (2008), Dimant *et al.* (2013) and Poprawe (2015), has instead emphasized the role of domestic institutions as a push factor of emigration, suggesting that the quality of governance is a key

JEL Classification — D27, F22

Journal of Economic Studies
Vol. 50 No. 7, 2023
pp. 1450-1466
Emerald Publishing Limited
0144-3585
DOI 10.1108/JES-04-2022-0219

factor in explaining emigrations from poor to rich countries. Though these contributions document that the quality of institutions significantly affects emigration, they fail to consider the role of education in explaining emigrations' patterns, a topic which has caught the attention of scholars more recently.

Bang and Mitra (2011) analyze the effects of institutional quality in the source country on immigration in the USA over the 1988–1998 period. Their analysis reveals that credibility and transparency in the source country stimulate the emigration of high-skilled individuals, while higher political stability is found to reduce the brain drain. On the other hand, democracy exhibits no significant effect on high-skilled emigration.

Okey (2016), using data for a set of 50 African states over the 1995–2004 period, investigates the effects of corruption on medical brain drain, emphasizing that higher levels of corruption promote the emigration of physician, a result driven by the fact that increased corruption reduces the returns to education.

Ariu *et al.* (2016), using data for a set of 195 origin and destination countries and relying on the six pillars of governance proposed by the World Bank (see Kaufmann *et al.* (2009) for more details), assess the effects of governance differential on emigration, showing that countries with better governance quality tend to attract more high-skilled emigrants, while countries with weaker governance tend to experience negative net flows. Cooray and Schneider (2016), using data for 115 origin countries, examine the impact of corruption on high, medium and low-skilled emigrants, suggesting that high-skilled individuals are more affected by increased corruption relatively to other groups. More closely related to our paper are instead the contributions of Docquier *et al.* (2007) and Dutta and Roy (2011). Specifically, Docquier *et al.* (2007) identify the main determinants of high-skilled emigration from developing countries for 1990 and 2000, showing that higher political instability has a detrimental effect upon the brain drain. Dutta and Roy (2011), on the other hand, investigate the relationship between high-skilled emigration and political stability, finding that higher political stability significantly decreases the emigration rates of high-skilled individuals. Though the consensus among these papers is that high-skilled emigrants are more sensitive to variations in the institutional environment and that the quality of government directly affects the amount of human capital available in the economy, none of them is entirely based on Sub-Saharan Africa nor considers whether the emigration–governance nexus is influenced, beyond education, by gender. In this paper, using data for a set 32 Sub-Saharan African origin countries and 20 high-income Organisation for Economic and Co-operation Development (OECD) destination countries over the years 2000, 2005 and 2010, we investigate the effects of domestic governmental stability on emigrations, paying particular attention on how this relationship is shaped by skills and gender. In our opinion, Sub-Saharan Africa represents a promising field of analysis given its demographic, economic and institutional characteristics. Starting from the beginning of 2000s, the region has experienced both sustained economic growth (Cleland and Machiyama, 2017), substantial improvements in the quality of governance and in the degree of political stability [2], with a contraction in the number of conflicts (Asante and Fosu, 2013; Zamfir, 2016). Moreover, the region is the second largest worldwide in terms of overall population, with 1.3 billion of inhabitants, which is further expected to double by 2050. With a median age of 19 as of 2015, the region is the youngest in the world, and although there have been substantial improvements in terms of economic performance and governance quality, it is still experiencing high emigration rates among high-skilled and an increasing involvement of high-skilled females in its international emigrations (see Docquier *et al.*, 2009; Adepoju, 2008; OCED, ILO, IOM and UNHCR, 2018).

In this paper, we test two main hypotheses: H1) the effects of governmental stability on emigration vary across skills and H2) the effects of governmental stability on emigration vary across both skills and gender. With respect to the first hypothesis, we expect, *a priori*, a larger impact governmental stability upon the emigration of high-skilled individuals. Indeed, it can be argued that, as the investment in education is irreversible, increased governmental stability

reduces the magnitude of the brain drain and reduces the incentive to relocate abroad (Bang and Mitra, 2011). While this argument holds irrespective of gender, there could be additional channels that might affect the emigration of males and females unevenly and such to justify the second hypothesis of the paper. Indeed, in a contribution based on a sample of 42 Sub-Saharan countries over the 2004–2014 period, Asongu and Odhiambo (2020) have shown that improvements in quality of institutions, including higher political stability, enhance gender economic inclusion, the latter measured using various labor market indicators, such as female labor force participation, female unemployment rate and female employment rate. It turns out that as higher institutional quality provides females with new and better employment opportunities and increases gender equality, emigration for this group might be less attractive, hence suggesting that the impact of governmental stability upon emigration might be influenced not only by the level of education but also by the gender of the potential emigrant. To test these two hypotheses, we mainly rely on bilateral emigration statistics provided by the IAB brain-drain dataset and the Government Stability Index proposed by the International Country Risk Guide (ICRG) [3]. The focus on governmental stability is, in our opinion, relevant more than other dimensions of governance, as increased governmental stability increases individual safety, reduces the likelihood of conflicts and political violence, coups through unconstitutional means and increases the trust in laws and courts which, creating a more favorable environment, might reduce the incentive to emigrate. The relevance of instability, especially for Sub-Saharan countries, has been notably highlighted by Fosu (1992, 2003, 2004) and Easterly and Levine (1997), who show that political instability in the region had a detrimental effect on growth, export performance and economic development. To empirically assess whether the effects of governmental stability on emigration vary according to both skills and gender, in our benchmark specifications we propose the application of an instrumental variable (IV) Poisson approach, which allows to simultaneously control for the presence of zeros in the matrix of bilateral migrations and for the likely endogeneity of governmental stability. After controlling for income differentials and a set of customary controls, aimed at measuring the geographical and cultural proximity between origin and destination countries, empirical findings presented in this paper suggest that, once emigrants are partitioned according to their educational attainment, higher governmental stability significantly reduces the emigration of high-skilled individuals, while no significant effect is found on low and medium-skilled emigrants. Nevertheless, once emigrants are partitioned according to both education and gender, our empirical analysis reveals that increased stability has a relatively larger impact on the emigration of females and of highly skilled females.

To appraise the robustness of our findings, a two-stage least squares (2SLS) approach has been employed. While the major drawback of this estimator consists in the impossibility to deal with the zeros in the matrix of bilateral emigrations, it allows us to deal with the likely endogeneity of governmental stability.

Once emigrants are partitioned according to their level of education, the 2SLS estimate provides evidence of a highly significant effect of governmental stability on the emigration of high- and medium-skilled individuals. On the other hand, once they are partitioned according to education and gender, we show that governmental stability reduces emigration among high-skilled males and females, regardless the level of education. As our econometric analysis reveals that governmental stability significantly affects the emigration of high-skilled, and especially high-skilled females, the findings presented in this paper are relevant not only from a quantitative perspective but also in terms of the policy implications that can be drawn for both the growth and the development of Sub-Saharan Africa.

According to the World Bank (2016), indeed, highly educated females play a fundamental role for the development of poor countries, as higher education among females is usually associated with improved health, nutrition and immunization rates across children. Moreover, highly educated females directly affect the formation of human capital as their

children are more likely to be better educated (Summers, 1992; Haverman and Wolfe, 1995), which, rising the costs of children, usually leads to lower fertility rates (Basu, 2002). The crucial role of females is further reinforced by other contributions in the literature, which show that gender gap in education and in the formal employment depress economic growth and labor force participation (see Knowles *et al.*, 2002; Klasen, 2002; Klasen and Lamanna, 2009; Thévenon and Salvi Del Piero, 2015). This seems to be particularly true, as shown by Blackden *et al.* (2007), in the case of Sub-Saharan Africa, where gender inequality significantly hinders growth opportunities and where the removal of gender-based barriers would enhance economic performance.

The remainder of the paper is organized as follows: Section 2 describes the main variables employed in the paper, along with the related descriptive statistics, while Section 3 introduces the methodology adopted to empirically analyze the impact of governmental stability upon emigration. Section 4 presents the main results, while Section 5 provides a robustness analysis. Section 6 concludes and discusses the main policy implications.

2. Data and descriptive statistics

To empirically assess the impact of governmental stability upon emigration and to test whether this effect varies across both skills and gender, five datasets have been combined. The source of data concerning bilateral emigrations is represented by the IAB brain drain dataset developed by Brücker *et al.* (2013), which collects information on the stock of bilateral emigrants over a five-year interval covering the 1980–2010 period, further partitioning them according to both educational attainment and gender. In particular, the dataset contains information on bilateral emigrations from 195 origin countries [4] to 20 high-income OECD destination economies (see Table 1).

Emigrants are defined in terms of country of birth rather than nationality. The rationale behind this classification is that while the county of birth is time-invariant, citizenship might change over time. The IAB brain drain dataset therefore provides information on bilateral emigrations of foreign-born individuals – males and females– aged 25 and older and classifies them according to three main educational attainments, namely low, i.e. emigrants with no schooling, primary or lower secondary, medium, i.e. high-school leaving certificate or equivalent and, finally, high, i.e. emigrants with an educational level higher than high-school leaving certificate. The second source is instead represented by the ICRG dataset, from information relevant information on governmental stability has been taken. The ICRG Government Stability Index measures the government's ability in carrying out its political agenda and its ability to stay in office. The final indicator, which ranges between 0 (high risk) and 12 (low risk), is a function of three different sub-components, namely Government unity, Legislative strength and Popular support, which all range in the [0,4] interval. The third source is instead represented by the World Bank Development Indicators dataset, from which information concerning incomes in both origin and destination countries has been taken. Specifically, to capture the effects of income differentials on emigration, defined here as the difference in per-capita income between destination and origin countries, we rely on World Bank statistics on per-capita gross domestic product (GDP), expressed in current US dollars. Moreover, to adequately capture the effects of the proximity and cultural factors which are assumed to influence the costs related to emigration, two additional data sources have been considered represented by the CEPII GeoDist Dataset, developed by Mayer and Zignano (2011) and Ortega and Peri (2013), respectively. While from the GeoDist database the relevant information employed in the paper relates to bilateral distances, the existence of a former colonial relationship and the presence of a common official language between origin and destination countries, information from Ortega and Peri (2013) is instead related to the existence of common legal origins and common currencies between the countries involved in bilateral emigrations. Specifically, the bilateral distance indicator proposed

Origin	Destination
Angola	Australia
Botswana	Austria
Burkina Faso	Canada
Cameroon	Chile
Congo, Dem. Rep. of the	Denmark
Congo, Rep. of the	Finland
Cote d'Ivoire	France
Ethiopia	Germany
Gabon	Greece
Gambia, The	Ireland
Ghana	Luxembourg
Guinea	Netherlands
Guinea-Bissau	New Zealand
Kenya	Norway
Liberia	Portugal
Madagascar	Spain
Malawi	Sweden
MAli	Switzerland
Mozambique	United Kingdom
Namibia	United States
Niger	
Nigeria	
Senegal	
Sierra Leone	
Somalia	
South Africa	
Sudan	
Tanzania	
Togo	
Uganda	
Zambia	
Zimbabwe	

Source(s): Own elaborations

Table 1.
Origin and destination countries

by Mayer and Zignano (2011), labeled here as *DIST*, measures the distance between origin and destination countries weighted by the distance between the two biggest cities. Other relevant information provided by the CEPII dataset concerns the existence of a former colonial relationship between origin and destination countries (*COLONY*) and the presence of an official common language (*COMLANG*). These two controls are basically two dummy variables which take the value of 1 if origin and destination countries have historically been involved in any type of colonial tie and if they share an official common language, and 0 otherwise. Information concerning the existence of common legal origins (*COMLEG*) and of a common currency (*COMCUR*) has instead been taken from Ortega and Peri (2013). Even in this case, the two controls are two dummy variables which take the value of 1 if origin and destination countries share the same legal origins and make use of the same currency, and 0 otherwise.

After combining all these different data sources and due to data availability reasons, our dataset contains information for 32 Sub-Saharan countries over the 2000–2010 period.

Table 2 discusses the descriptive statistics for the main variables used in the econometric analysis proposed in the paper [5].

According to Table 2, bilateral emigrations from the set of Sub-Saharan countries examined mostly involve high-skilled individuals, as the average bilateral stock is about 1951

Variables	Obs	Mean	SD	Min	Max
High-skilled	1,824	1951.320	8282.206	0	136,769
Medium-skilled	1,824	850.449	3685.407	0	81,972
Low-skilled	1,824	1,273.121	5971.376	0	99,053
High-skilled (males)	1,920	1,035.610	4364.132	0	79,943
Medium-skilled (males)	1,920	479.333	1908.770	0	40,565
Low-skilled-(males)	1,920	585.355	2762.347	0	48,082
High-skilled (females)	1,824	891.561	3898.648	0	56,826
Medium-skilled (females)	1,824	415.757	1905.802	0	41,407
Low-skilled-(females)	1,824	691.794	3214.029	0	50,971
ΔGDP	1,710	36,261.047	19,102.020	709.898	104,623.750
DIST	1,824	7651.653	3319.307	2780.635	17,170.781
COMLANG	1,824	0.250	0.433	0	1
COMLEG	1,824	0.316	0.465	0	1
COMCUR	1,824	0.002	0.041	0	1
COLONY	1,824	0.048	0.213	0	1
STABILITY	1,920	9.059	1.428	5.750	11.583

Source(s): Own Elaborations

Table 2.
Descriptive statistics

units, followed by 1273 low-skilled emigrants, on average. The number of medium-skilled emigrants is instead quantitatively lower, as the average bilateral stock is close to 850 individuals. A similar picture emerges once we observe the trends in the stock of emigrants partitioned by gender. In particular, the bilateral stock of male emigrants is, on average, higher for high-skilled workers (1,035), followed by low- (585) and medium-skilled workers (479). The same holds for female emigrants, as the average stock of high-skilled is 821, followed by low- (585) and medium-skilled workers (415). Descriptive statistics presented here therefore confirm that the involvement in international emigrations from Sub-Saharan Africa is quantitatively relevant and mostly involves high-skilled individuals, both males and females.

With respect to the degree of governmental stability, the average ICRG index is 9.05, with a maximum of 11.58 and a minimum of 5.75, hence confirming the previous findings of Asante and Fosu (2013) and Zamfir (2016), according to which African countries registered substantially improvements terms of governmental stability [6].

Furthermore, although Sub-Saharan African countries have experienced sustained economic growth over the period considered, the difference in terms of per-capita GDP levels between destination and origin countries is still remarkable, as the average wage gap is almost 36,261$, signaling that convergence between Sub-Saharan economies and the most developed countries in the world is still far away to take place. Statistics not reported in the paper indicate that, for the set of Sub-Saharan countries included in our sample, the average GDP per capita is 1,275$. The African country with the highest level of per-capita income is represented by Gabon where, over the period considered, the average GDP per capita was 6,618$, while the poorest country in our sample is Ethiopia, whose estimated average GDP per-person is about 210$. As the average GDP per-capita in destination countries is 37,563$, the level of income in Sub-Saharan African is almost 30 times lower compared to the ones registered for the set of high-income OECD destination economies.

3. Methodology

To empirically assess the role of governmental stability in explaining Sub-Saharan emigration and to test whether the effects are spread asymmetrically across educational

levels and gender, we propose, in our benchmark specifications, an IV Poisson regression, which allows us to deal to handle the zeros in our matrix of bilateral emigration and to control for the potential endogeneity in our measure of governmental stability. We therefore propose the following specification:

$$MIGR_{it} = \beta_o + \beta_1 STABILITY_{it} + \delta_k \sum_{k=1}^{K} X_{it} + \lambda_i + \theta_j + \varepsilon_{it} \quad (1)$$

$$STABILITY_{it} = \gamma_o + \gamma_1 STABILITY_{it-n} + \gamma_2 LAT_i + \gamma_3 MIGR_{it} + \rho_k \sum_{k=1}^{K} X_{it} + \lambda_i + \theta_j + \varepsilon_{it} \quad (2)$$

where $MIGR_{ijt}$ represents the stock of emigrants from i (origin) to j (destination) at time t, $STABILITY_{it}$ is the *ICRG* index of governmental stability of origin country at time t, $STABILITY_{it-n}$ and LAT_i represent the instruments of governmental stability with its initial value and the latitude, respectively, while X_{it} is a vector of customary economic, geographical and cultural controls [7] which includes factors like income differentials, calculated as the logarithmic difference between destination and origin per-capita GDP, ln(ΔGDP); geographical distance, i.e. *ln(DIST)* [8]; *COMLANG*, dummy variable indicating whether the two countries share an official common language; COMLEG, dummy variable indicating whether the two countries have common legal origins (Source: Ortega and Peri, 2013); *COMCUR*, dummy variable indicating whether the two countries share a common currency (Source: Ortega and Peri, 2013); *COLONY*, dummy variable indicating whether the two countries have been involved in any type of colonial tie (Source CEPII dataset), while λ_i and θ_j represent, respectively, origin and destinations country-specific effects [9], included to capture the role of possible unobserved factors which might affect emigration. Finally, while ε_{it} is a conventional error term, β's, γ's, λ's, δ's, ρ's and θ's are the unknown parameters to be estimated. To estimate equation (1) and (2), we rely on the application of an IV Poisson to simultaneously control for the presence of zeros in the matrix of bilateral emigration and to deal with the likely endogeneity of governmental stability. More specifically, the application of this econometric procedure is justified by possible reverse causality issues in the relationship between governmental stability and emigration. Indeed, as various contributions have pointed out, see for instance Batista and Vicente (2011), Pfutze (2012), Clark *et al.* (2015), Docquier *et al.* (2016), Ivlevs and King (2017) and Barsbai *et al.* (2017), international emigrations affect the quality of domestic institutions. In the context of the current contribution, though domestic governmental stability is assumed to be a relevant push factor of international emigrations, at the same time, higher emigration might affect the degree of domestic governmental stability, hence suggesting that reverse causality between our measure of governmental stability and emigration is very likely. To deal with the issue of endogeneity, we therefore propose the application of an IV Poisson approach and rely on an instrumentation strategy equivalent to the one employed by Cooray and Schneider (2016), who empirically address the effects of corruption upon emigration and propose to instrument corruption using its initial value and latitude. The argument adopted to justify this instrumentation strategy is that while latitude influences corruption but not the propensity to emigrate, its initial value is instead assumed to be pre-determined. Using the same argument, we therefore propose to instrument governmental stability with its initial value and latitude. Income differentials and distance enter in log to estimate the elasticity of emigration with respect to variations in the economic environment and in the geographical distance, while all other variables, being dummies or indices, enter instead in levels. With respect to the main unknown parameters, it is reasonable to assume that higher governmental stability reduces the propensity to emigrate and that its effects vary across both skills and gender. Higher stability increases individual safety, reduces the

likelihood of conflicts and political violence, coups through unconstitutional means and increases the trust in laws and courts, hence making emigration less attractive. Given these considerations, the *a priori* assumption is that increased stability discourages emigrations, and we therefore expect a negative sign for the variable under scrutiny, with a higher impact on the emigration of high-skilled individuals. Further, given that higher stability is supposed to enhance gender equality and the labor market inclusion of females, we expect this group, and in particular high-skilled females, to be relatively more affected by an improvement in the degree of governmental stability. The opposite applies to the expected sign of the coefficient of income differential, as it is reasonable to assume that the higher is the income gap between countries involved in bilateral emigrations, the higher is the incentive for potential emigrants to locate abroad. With respect to the proximity factors included in our econometric specification, bilateral distances are assumed to discourage emigration, as they increase transportation costs, hence implying that we expect the coefficient of this variable to enter negatively in our specifications. Finally, other relevant proximity factors, namely common language, common legal origins, common currency and colony, are instead assumed to encourage emigrations, as they reduce their costs. We therefore expect the sign of these coefficients to enter positively in our regression strategy.

4. Empirical evidence: baseline results

It turns out that, in the specific context of this paper, a relatively more suitable estimator is represented by the IV Poisson regression [10], which allows to simultaneously deal with the presence of zeros in the matrix of bilateral emigration and to control for the endogeneity of the proposed measure of governmental stability.

In Table 3, we assess the effects of governmental stability upon emigration once emigrants are partitioned according to their level of education.

The evidence reported in Table 3 indicates that higher governmental stability significantly decreases emigration among high-skilled individuals, while no significant effect is found on both medium- and low-skilled emigrants. This result can be explained along the lines of Dutta and Roy (2011), who suggest that skilled individuals are relatively more sensitive to the degree of political stability in their home country, as they have better employment opportunities worldwide compared to their unskilled counterparts.

Income differentials, on the other hand, are shown to play no significant effect on emigration, while geographical distance is mostly found to be negative, as expected, and significant. With respect to other controls included in the econometric analysis, while a common language has a highly significant impact on emigration, no significant effect is found for common legal origins, common currency and colony. Concerning the validity of the instruments employed, the *p*-values of the Hansen test indicate that the instruments are valid though in the case of high-skilled individuals, the null hypothesis is accepted only at the 5% significance level.

In Table 4 we extend our IV Poisson specifications to assess whether the stability emigration is shaped by gender. Though it might be argued that our empirical framework does not account for possible interdependencies between males and females' emigration, at the same it is worth noting females' emigration from Sub-Saharan Africa involves an increasing number of independent females who "fulfil their on economic needs rather than simply joining a husband or other family members" (Adeopju, 2000, p. 385). This justifies, in our opinion, the fact that the two groups under scrutiny are separated, without considering possible interdependencies between the emigration of males and the emigration of females.

Accordingly, evidence of an inverse and significant effect of governmental stability is found on the emigration of high-skilled males, while for females, an inverse and significant relationship between governmental stability and emigration is found for both high and

Regressors	High-skilled	Medium-skilled	Low-skilled
STABILITY	−0.419***	−0.301	0.096
	(−2.873)	(−1.366)	(0.381)
ln(ΔGDP)	0.107	0.432	0.994
	(0.240)	(0.724)	(1.438)
ln(DIST)	−0.785**	−1.143***	−0.128
	(−2.185)	(−3.863)	(−0.295)
COMLANG	0.969***	1.184***	1.127***
	(3.410)	(4.589)	(3.536)
COMLEG	0.343	0.296	0.149
	(1.455)	(1.105)	(0.440)
COMCUR	0.799	0.970	2.009***
	(0.889)	(1.437)	(2.987)
COLONY	0.146	−0.056	0.474
	(0.497)	(−0.140)	(1.287)
Origin fixed effects	Yes	Yes	Yes
Destination fixed effects	Yes	Yes	Yes
Obs.	1,594	1,594	1,594
Hansen	0.053	0.214	0.578

Note(s): Robust *z*-statistics in parentheses, ***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

Table 3.
Governmental stability and emigration by educational attainment – IV Poisson

Regressors	Males High-skilled	Males Medium-skilled	Males Low-skilled	Females High-skilled	Females Medium-skilled	Females Low-skilled
STABILITY	−0.430***	−0.178	0.186	−1.056***	−1.104*	−0.298
	(−2.925)	(−1.287)	(0.855)	(−2.739)	(−1.941)	(−0.524)
ln(ΔGDP)	0.021	0.923***	0.984*	−1.297	−1.707	0.099
	(0.050)	(2.780)	(1.816)	(−1.289)	(−1.069)	(0.063)
ln(DIST)	−0.739**	−0.945***	−0.144	−0.601	−1.066***	−0.180
	(−2.387)	(−3.394)	(−0.361)	(−1.382)	(−2.646)	(−0.349)
COMLANG	0.934***	1.088***	1.157***	0.865***	1.318***	1.085***
	(3.658)	(4.952)	(3.679)	(2.692)	(3.508)	(2.838)
COMLEG	0.266	0.065	0.147	0.599*	0.423	0.117
	(1.364)	(0.276)	(0.505)	(1.734)	(0.916)	(0.292)
COMCUR	0.645	1.206**	1.713***	0.689	0.445	2.030***
	(0.791)	(2.250)	(3.020)	(0.677)	(0.479)	(2.652)
COLONY	0.192	0.193	0.360	0.318	0.219	0.620
	(0.707)	(0.535)	(0.962)	(0.804)	(0.351)	(1.456)
Origin-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Destination-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1,682	1,682	1,682	1,594	1,594	1,594
Hansen	0.083	0.514	0.580	0.338	0.193	0.710

Note(s): Robust *z*-statistics in parentheses, ***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

Table 4.
Governmental stability and emigration by gender and educational attainment – IV Poisson

medium-skilled individuals though in the latter case, stability is significant only at the 10% level. Our evidence seems therefore to suggest that higher domestic governmental stability significantly increases the likelihood of emigration of high-skilled individuals. At the same time, our evidence indicates that the emigration of females is relatively more sensitive, compared to males, to variations in the degree of domestic governmental stability.

This evidence, along the lines of Asongu and Odhiambo (2020), may imply improved quality of government – and of political stability as well – enhances gender equality and facilitates the access to the labor market of high-skilled females, making emigration a less attractive option.

All in all, the empirical evidence presented in this section confirms the findings of Docquier *et al.* (2007), Bang and Mitra (2011) and Dutta and Roy (2011), according to which higher stability decreases the brain drain.

Results concerning other relevant variables included in our econometric specifications indicate that income differentials exhibit some statistical significance though limited to the emigration of medium and low-skilled males. These results, in line with the findings of Dumont *et al.* (2007), may suggest that the impact of income differentials on the probability of emigration increases as the level of skills declines, a result which is driven by the fact that as the economic system develops, less skilled individuals may be able to afford the fixed costs of emigration, hence stimulating the latter. Bilateral distances, on the other hand, are, to a lesser extent, inversely and significantly correlated with emigration. While a common language between countries involved in bilateral emigration is always found to be positive and highly significant, a weaker positive effect is found for common currency.

Finally, all other controls included in our econometric specifications, namely common legal origins and colony, are instead found to be statistically insignificant. In particular, the results concerning the non-significant impact of colony on emigration seems to be in line with the findings of Mayda (2009), who shows that the existence of a colonial tie between origin and destination countries has no impact on emigration.

Moreover, and in line with the evidence reported so far, favorable evidence concerning the validity of the instruments employed is found, as the *p*-values of the Hansen test are generally above the 10% threshold, though in the case of high-skilled males, we cannot reject the null hypothesis only at the 5% significance level.

5. Robustness check: 2SLS estimator

In this section, we replicate the estimates of Tables 3 and 4 through the application of the 2SLS estimator. However, the 2SLS estimator does not consider the presence of zeros in the matrix of bilateral emigration [11]. Our discussion begins by considering our empirical findings once emigrants are partitioned according to their educational levels only. With respect to the role of government stability, findings presented in Table 5 reveal that higher stability has a negative and highly significant effect on both high- and medium-skilled emigration, while no significant effect is found for low-skilled. Moreover, the evidence reported in Table 5 seems to suggest that high-skilled individuals are relatively more affected by higher domestic governmental stability compared to the other relevant groups. Results reported in Table 5 further indicate that income differentials have no significant role in driving Sub-Saharan emigration, while increased distance is always found to be negatively and significantly correlated with emigration. With respect to the main cultural factors included in our econometric framework, namely common language, common currency, common legal origins and colony, they are all found to be positive, as expected, and highly significant.

To assess the validity of our instruments and to test whether endogeneity is a relevant issue, Table 5 reports the *p*-values of the Hansen test and the C-statistics, respectively. As the *p*-values of the Hansen test are above the conventional 10% threshold, acceptance of the null hypothesis provides favorable evidence for the validity of the instruments employed. On the other hand, the C-Statistics, which is distributed as a $\chi_{(1)}$, serves to test whether the suspect regressor is endogenous or not. Under the null hypothesis, the regressor is assumed to be strictly exogenous, implying that the OLS is consistent. Under the alternative hypothesis, the regressor is instead endogenous, and the OLS is inconsistent. As the *p*-values of the

Regressors	High-skilled	Medium-skilled	Low-skilled
STABILITY	−0.616***	−0.413**	−0.277
	(−4.100)	(−2.372)	(−1.532)
ln(ΔGDP)	−0.628**	−0.335	−0.232
	(−2.057)	(−0.947)	(−0.638)
ln(DIST)	−0.668***	−0.620***	−0.546***
	(−4.116)	(−3.641)	(−3.439)
COMLANG	0.743***	0.688***	0.580***
	(5.678)	(4.867)	(4.208)
COMLEG	0.355***	0.408***	0.394***
	(3.120)	(3.353)	(3.298)
COMCUR	1.178*	1.865**	1.847**
	(1.893)	(2.283)	(2.379)
COLONY	0.996***	0.867***	1.151***
	(3.779)	(3.458)	(4.421)
Origin-fixed effects	Yes	Yes	Yes
Destination-fixed effects	Yes	Yes	Yes
Obs.	1,594	1,594	1,594
R^2	0.731	0.665	0.688
Hansen	0.488	0.740	0.447
C-Stat	0.002	0.042	0.126

Note(s): Robust *t*-statistics in parentheses, ***$p < 0.01$, **$p < 0.05$ and *$p < 0.10$

Table 5. Governmental stability and emigration by educational attainment – 2SLS

C-statistics reported in Table 5 are generally below the 10% threshold, rejection of the null hypothesis suggests that governmental stability must be treated as endogenous and provides evidence in favor of the 2SLS approach.

In Table 6, our baseline specification is extended to examine the impact of governmental stability on emigrations, partitioning emigrants according to both educational attainment and gender. In this way, it is therefore possible to test whether the effects of increased stability vary across the two relevant dimensions of skills and gender.

With respect to the main parameter of interest, represented by governmental instability, findings presented in Table 6 indicate that variations in the degree of governmental stability reduce emigration but that this effect is crucially influenced by both education and gender.

We show that higher governmental stability has a negative and significant impact on the emigration of high- and medium-skilled males, while no significant effect is found on low-skilled individuals. In the case of females, we instead show that, regardless the level of education, governmental stability is systematically correlated with lower emigration. The size and the significance of the coefficients reported in Table 6 seem to suggest that females are, relatively to males, more sensitive to variations in the degree of domestic governmental stability, with a larger effect found for high-skilled females, hence confirming our benchmark findings; the results obtained through the application of the 2SLS approach indicate that the impact of governmental stability on emigration is relatively more significant compared to our benchmark specification. This result, however, must be taken with caution, as the 2SLS, as notably argued by Knight (2002) is bias. Further, as emphasized by Murray (2006), in finite sample, the variance of the 2SLS is downward bias, and this, in turn, may affect the significance of the parameters of interest.

Our results further indicate that higher income differential exhibit an unexpected negative sign, while in line with the previous estimates, higher distance significantly decreases the likelihood to emigrate, a result which holds regardless the educational attainment and the gender.

The same applies to the relevant cultural factors included in the econometric analysis, as common language, common legal origins, common currency, and a former colonial

Regressors	Males			Females		
	High-skilled	Medium-skilled	Low-skilled	High-skilled	Medium-skilled	Low-skilled
STABILITY	−0.579***	−0.403**	−0.255	−0.795***	−0.657***	−0.417**
	(−4.031)	(−2.338)	(−1.488)	(-4.807)	(−3.864)	(−2.068)
ln(ΔGDP)	−0.566**	−0.252	−0.216	−0.947***	−0.941***	−0.537
	(−1.966)	(−0.737)	(−0.633)	(−2.819)	(−2.765)	(−1.341)
ln(DIST)	−0.694***	−0.645***	−0.517***	−0.598***	−0.491***	−0.419***
	(−4.481)	(−3.953)	(−3.541)	(−3.608)	(−2.996)	(−2.655)
COMLANG	0.702***	0.693***	0.496***	0.716***	0.554***	0.596***
	(5.536)	(5.040)	(3.854)	(5.245)	(3.986)	(4.266)
COMLEG	0.376***	0.413***	0.380***	0.410***	0.393***	0.324***
	(3.562)	(3.582)	(3.490)	(3.538)	(3.294)	(2.690)
COMCUR	1.015	1.852**	1.401**	1.907***	2.325***	2.631***
	(1.621)	(2.395)	(2.049)	(2.921)	(2.958)	(3.221)
COLONY	0.928***	0.830***	1.078***	0.918***	0.932***	1.217***
	(3.612)	(3.359)	(4.317)	(3.520)	(3.778)	(4.666)
Origin-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Destination-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1,682	1,682	1,682	1,594	1,594	1,594
R^2	0.707	0.640	0.659	0.713	0.654	0.690
Hansen	0.532	0.929	0.490	0.508	0.550	0.367
C-Stat	0.002	0.044	0.168	0.000	0.002	0.023

Note(s): Robust *t*-statistics in parentheses, ***$p < 0.01$, **$p < 0.05$ and *$p < 0.10$

Table 6. Governmental stability and emigration by gender and educational attainment – 2SLS

relationship are found to boost emigration. The diagnostic statistics reported in Table 6 again confirm the validity of the proposed instruments' set and the endogeneity of governmental stability, hence justifying the application of the 2SLS approach.

6. Conclusion and policy implications

In the last two decades, an increasing amount of economic literature has been devoted to the analysis of the effects of different dimensions of institutional quality on international emigration, showing that the quality of governance represents a push factor of international emigration. Although recent contributions have tried to assess the role of institutions in explaining the emigration of high-skilled individuals, the role of gender has been largely neglected in the economic literature. In this paper, using data for a set of 32 Sub-Saharan countries over the years 2000, 2005 and 2010, we investigate the effects of governmental stability on emigration, partitioning emigrants according to both educational attainment and gender. To the best of our knowledge, this is the first contribution in the literature focused entirely on Sub-Saharan Africa and which considers the dimension of gender, beyond skills. We believe that Sub-Saharan Africa, given its socio-economic, demographic and institutional characteristics, represents a promising field on analysis. Indeed, although the region remains underdeveloped, starting from 2000, it is experiencing sustained economic growth and the quality of its institutions registered remarkable improvements, most notably in the levels of political stability. Though these improvements, which we believe fundamental for the future development of the region and for a catching-up process with more developed nations, it is still experiencing high rates of emigration, especially among high-skilled individuals and of highly skilled females. To test whether government stability affects emigration and whether

this effect varies unevenly across educational attainments and gender, our analysis relies on bilateral emigration statistics provided by the IAB brain drain dataset, which contains information about the stock of emigrants partitioned by both education and gender, and on the government stability indicator provided by the ICRG dataset. To assess whether the effects of governmental stability vary across both skills and gender, in our benchmark specifications, we propose the application of the IV Poisson, which allows to simultaneously deal with the presence of zeros in bilateral emigration and to control for the endogeneity of the measure of governmental stability employed.

After controlling for income differentials and a set of customary factors which measure the proximity between origin and destination countries and assumed to influence the propensity to emigrate, our evidence indicates that governmental stability significantly reduces the emigration of high-skilled individuals, hence confirming the findings of the previous economic literature (Docquier *et al.*, 2007; Bang and Mitra, 2011; Dutta and Roy, 2011). Further, once emigrants are partitioned according to both education and gender, we show that variations in the degree of governmental stability have a higher impact on the emigration of females, and in particular, of high-skilled females, a result which is probably driven by the fact that higher governmental stability enhances gender economic inclusion and provides high-skilled females with better employment opportunities, hence making emigration less profitable.

To appraise the robustness of our benchmark findings, the 2SLS approach has been employed although the major drawback of this estimator is represented by the fact that it does not allow us to adequately deal with the presence of zeros in the matrix of bilateral emigration.

The evidence obtained through the application of this approach reveals that increased governmental stability reduces the emigration of high and medium-skilled individuals and that the impact is relatively larger for high-skilled, in line with our benchmark results. Nevertheless, once emigrants are partitioned by both gender and educational attainment, our results confirm that females, and particularly high-skilled females, are more affected, relatively to males, by variations in the degree of domestic governmental stability.

The findings presented in this paper, in line with the main literature surveyed, suggest that the stability of the political environment affects the incentives to emigrate and reduces the brain drain, with the implication that the government, through emigrations, can affect the stock of available human capital in the economy. The main result, as stated before, concerns the higher sensitivity of the emigration of high-skilled females to variations in degree of government stability, a result which is relevant considered the key role played by high-skilled females in development stages and that brings various policy implications.

As notably highlighted by both international organizations and the economic literature, there are various channels through which high-skilled females affect the development of poor countries. It has been documented that high-skilled females affect the stock of future human capital in the economy, as their children are most likely to be better educated and provide them with better health conditions and better nutrition. Moreover, the economic literature has further emphasized that educated females display lower fertility rates and that their involvement in education and employment is fundamental in explaining economic performances. It turns out that public policies aimed at increasing the degree of governmental stability would be beneficial for the development of Sub-Saharan Africa, as they might prevent high-skilled females from emigrating. Nevertheless, the empirical evidence reported in this paper provides only a partial evaluation of the role of institutional quality in explaining Sub-Saharan emigration. It turns out that to have a full understanding of how the quality of institutions affects the emigration of high-skilled females; future research should take into account additional dimensions of governance and widen the range of institutional quality indices to be employed in the econometric models. Indeed, other dimensions of governance, like, for instance, control of corruption, rule or law,

government effectiveness, regulatory quality, voice and accountability, might affect Sub-Saharan emigration and might even have a strong impact on the emigration of high-skilled females compared to governmental stability. It turns out that widening the set of available governance measures would provide additional insights concerning the governance–emigration nexus and how gender and education shape this relationship, in order not only to identify additional channels through which the quality of government affects the propensity towards emigration but also to provide new and more precise implications in terms of policy.

Notes

1. For a comprehensive review of the literature concerning the nexus between migrations and institutions, please refer to Baudassé *et al.* (2018).
2. For a comprehensive overview of democratization processes and of the historical development of institutions in Africa, please refer to Fosu (2008, 2013).
3. See Section 2 for more details.
4. Origin and destination countries for the sample examined in this paper are available in Table 1.
5. For the sake of the convenience, correlations between variables have not been reported but are available upon request.
6. Statistics concerning international comparisons are available upon request.
7. Geographical contiguity has not been included in the specification as none of the origin country shares a common border with the country of destination of emigrants.
8. The authors use latitude, longitude and population data of main agglomerations of all countries available in the World Gazetteer web site, which provides current population figures and geographic coordinates for cities, towns and places of all countries.
9. For the sake of the convenience, fixed effects are not reported.
10. A common approach adopted in the literature to control for endogeneity problem, see for instance Poprawe (2015), Docquier *et al.* (2016), Ariu *et al.* (2016), consists in the application of the Poisson pseudo-maximum likelihood (PPML) estimator developed by Santos Silva and Tenreyro (2006, 2011a, b), who have proven that the PPML estimator is well-behaved, more resilient to numerical problems compared to the conventional Poisson (Santos Silva and Tenreyro, 2011a) and its performance is not particularly affected by a significant presence of zeros (Santos Silva and Tenreyro, 2011b). In spite of these advantages, the major drawback related to the application of the PPML in this environment is that it does not allow us to deal with the endogeneity of governmental stability.
11. For this reason, following the approach of Ortega and Peri, the dependent variable is specified as $\ln(1 + migr_{ijt})$. The constant 1 is included to deal with the presence of zeros in the matrix of bilateral emigration, to allow for a logarithmic specification and to deal with the presence of zeros in the matrix of bilateral emigration, hence avoiding a consistent loss of observations.

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