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Governance, capital flight and industrialisation in Africa

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Abstract

The study examines the role of governance in modulating the effect of capital flight on industrialisation in Africa. The empirical evidence is based on Generalised Method of Moments and governance is bundled by principal component analysis, namely (i) political governance from political stability and "voice and accountability"; (ii) economic governance from government effectiveness and regulation quality; and (iii) institutional governance from corruption-control and the rule of law. First, governance increases industrialisation whereas capital flight has the opposite effect; and second, governance does not significantly mitigate the negative effect of capital flight on industrialisation. Policy implications are discussed.

Keywords: Econometric modelling, Capital flight, Governance, Industrialisation, Africa

JEL Classification: C50, F34, G38, O14, O55

1 Introduction

This study examines the role of governance in modulating the effect of capital flight on industrialisation in African countries. It is motivated by three main factors, namely the (i) growing trend of capital flight in Africa; (ii) relevance of governance in dampening negative macroeconomic signals such as capital flight; and (iii) lagging position of Africa in industrialisation.[1]

First, as documented by Boyce (2012) who have provided an update on estimates of capital flight, over the past decades, Africa has experienced substantial capital outflows. For example, approximately 814 billion US Dollars (in constant of 2010 US Dollars) was lost by 33 sub-Saharan African (SSA) countries during the period 1970–2010. The lost sum to capital flight is higher than foreign direct investment and foreign aid which during the same period stood at respectively 306 billion and

[1] In this study, we are not assessing the role of a policy variable (e.g. governance) in modulating the effect of another policy variable (such as domestic investment) on industrialisation. On the contrary, we are assessing the role of a policy variable (e.g. governance) in modulating the effect of a policy syndrome (such as capital flight) on industrialisation. We are aware of the fact that the channel of domestic investment could lead to more feasible results. However, consistent with the motivation of the study, we are concerned about capital flight as a policy syndrome. Nonetheless, we have considered domestic investment as a potential channel in a robustness check and could not establish significant and feasible results.
The concept of governance used in the study is not specifically tied to industrial governance. Good governance indicators from the World Bank affect both capital flight and doing business conditions that are potentially positive for industrialisation. Hence, we are not concerned about industrial channels through which governance can mitigate the negative impact of capital flight on industrialisation. Nine main good governance channels are explored in the study. These include political stability, "voice & accountability", political governance, government effectiveness, regulation quality, economic governance, corruption-control, rule of law and institutional governance.

659 billion US Dollars. This mismatch is important because lack of finance has been established to be a principal constraint to the development of the continent (Asongu 2013; Adu and Asamoah 2016; Charles and Mori 2016; Nyasha and Odhiambo 2017; Amponsah 2017; Danquah et al. 2017; Asongu and Odhiambo 2019a).

Second, good governance has been documented to, *inter alia* improve the efficient allocation of resources (Fonchingong 2014), consolidate the foundations of social change (Efobi 2015), decrease capital flight (Asongu and Nwachukwu 2017) and boost industrialisation (Nobuyuki 2010). Hence, this study is particularly relevant in the light of Africa's lagging position in industrialisation.

Third, compared to other world regions, Africa is substantially lagging in terms of industrialisation. The comparatively slow progress towards industrialisation in the continent has been traceable to a number of factors, including (i) poor skills, infrastructure and investment climate (Page 2012; Gui-Diby and Renard 2015) and (ii) shortage of the investment capital required to fund the industrialisation process (Tuomi 2011; Darley 2012; Tibebe and Mollick 2017; Nukpezah and Blankson 2017; Asongu and Odhiambo 2020; Asongu et al. 2019).

As far as we have reviewed, there is currently no study that has investigated how governance modulates the effect of capital flight on industrialisation. Hence, the positioning of this study departs from the broader contemporary literature on capital flight in Africa. The strand of the literature closest to this positioning has established capital flight to originate from poor governance (Christensen 2011; Gankou et al. 2016; Asongu and Nwachukwu 2017). Moreover, whilst there is a substantial body of literature on governance (Musila and Sigué 2010; Kangoye 2013) and capital flight (Ndiaye and Siri 2016; Mpenya et al. 2016; Asongu and Amankwah-Amoah 2018) in Africa, we know very little about how governance modulates the effect of capital flight on macroeconomic outcomes. We improve the extant literature by focusing on industrialisation as a macroeconomic outcome owing to the growing relevance of African industrialisation in policy and academic circles (Asche and Grimm 2007; Tchamyou 2017; Diao et al. 2017; Ssozi et al. 2019). To make this assessment, governance indicators are bundled and unbundled. The motivation for bundling governance indicators builds on evolving paradigms in the conception, definition and measurement of governance (Asongu 2016). For example, it is inappropriate to employ the term "political governance" unless the variable underlying the term is a composite measurement of "voice and accountability" and "political stability/non-violence".

The positioning of the research also departs from contemporary African development literature which has largely focused on, *inter alia*: nexuses between finance, remittances and industrialisation (Efobi et al. 2019); remittances, the diffusion of information and industrialisation (Asongu and Odhiambo 2020); the importance of governance in development outcomes (Pelizzo and Nwokora 2016, 2018; Pelizzo et al. 2016); linkages between trade and industrialisation (Kaplinsky and Morris 2019; Oloruntoba and Tsowou 2019); green industrialisation (Okereke et al. 2019) and financial reforms as the drivers of industrialisation (Folarin 2019). The rest of the study is structured as follows: Section 2 discusses the theoretical underpinnings and testable hypotheses. The data and methodology are covered in Sect. 3, whilst Sect. 4 presents the empirical results and discussion. Section 5 concludes with future research directions.

2 Intuitions and testable hypotheses

Consistent with Naude et al. (2013) and Efobi et al. (2019), industrialisation can be defined as a socio-economic process of quick transformation within the manufacturing sector in relation to a plethora of avenues of production and work done within an economy. It is important to note that the underlying definition builds on information from the United Nations Conference on Trade and Development (UNCTAD). It encompasses the added value of the manufacturing sector when the overall size of the economy is considered. In accordance with Gui-Diby and Renard (2015), when the level of development in the manufacturing sector is comparatively high with regard to other sectors within an economy, the industrialisation rate in the country is also relatively high. With insight into these definitions provided, two dimensions are essential for the consolidation of the industrialisation process, notably (i) the provision of incentives of production to the manufacturing sector and (ii) the sustainability of production in order to meet requirements at the local and international levels.

Having clarified the conception and definition of industrialisation, in the sections that follow, we discuss how linkages between various aspects of governance and capital flight affect industrialisation. In so doing, the related notions of governance and capital flight are elucidated correspondingly. Political governance, economic governance and institutional governance are discussed in the first, second and third strands, respectively.

First, political governance can be defined as the election and replacement of political leaders (Andrés et al. 2015). According to recent literature (Collier et al. 2004; Davies 2008; Ndikumana et al. 2015; Asongu and Nwachukwu 2017), the political environment has a substantial influence on capital flight because it is related to the damage/loss of assets. Accordingly, in the presence of political instability and violence, it is very likely that investors transfer their capital to economic environments that are associated with lower levels of investment risks. Furthermore, if investors think that national political institutions (e.g. competitive elections and executive accountability) are not favourable for economic performance, it is very probable that they would transfer their investments to other nations where political institutions are more stable and credible. A number of political features related to the performance of international markets and security of claims are contingent on international ownership (Lensink and Hermes 2000; Le and Zak 2006). For example, with respect to foreign direct investment (FDI), assets are controlled or owned by investors in a receiving nation and long-term investment and economic growth could be negatively affected by political risk.

In the light of the above, investors naturally react negatively to political events that, according to them, are unfavourable to their returns. A channel of reaction by such investors is disinvesting. Therefore, direct effects of political characteristics such as political instability, democracy and accountability influence the amount of capital that transits within a country. Consequently, unaccountable executives can produce unpredictable investment-related policies which ultimately influence capital flight. Hence, political stability and non-violence can mitigate the potentially negative effect of capital flight on industrialisation.

Second, economic governance is the formulation and implementation of policies that deliver public commodities (Andrés et al. 2015). In this strand, fragile economic governance could result in an economic outlook that is uncertain. This uncertain

economic outlook discourages investors from placing their assets in the economies concerned. This intuition builds on the evidence that investors prefer economic climates that are associated with less uncertainty (Kelsey and le Roux 2017, 2018). From common sense, bad economic governance can produce substantial economic damages which affect the concerns of investors, especially with regard to the valuation of assets and confidence in the economic outlook. Therefore, from the perspective of investors, assets and money can more easily leave a nation in situations of poor economic governance. Hence, bad economic governance can reduce macroeconomic performance and discourage capital flows owing to a blurred economic outlook. This is even more apparent when policies designed to deliver public goods and services are tailored by the elite such that they masterfully siphon and deposit stolen funds in tax havens. It follows from the underlying arguments that good economic governance can stifle capital flight that inhibits the process of industrialisation.

In the third strand, institutional governance can be understood as the respect of the State and citizens of institutions that govern interactions between them. On the nexus between capital flight and institutional governance, we argue that the rule of law and corruption-control affect the confidence of investors within an economy on the one hand, and on the other hand, the ability of officials in government to create mechanisms that siphon and deposit funds in tax havens. In essence, investors are more likely to invest in economies in which the respect of the rule of law is optimal for investment. In clearer perspective, investors are likely to invest if, according to them, the overall economic performance of an economy cannot be weakened with State predation, regardless of whether such investors are directly influenced by such predation. The fact that investors prefer environments with more information accounting standards (La Porta et al. 1998), more efficient courts (Djankov et al. 2003) and better institutions with less corrupt governments (La Porta et al. 1999), has been confirmed in recent African institutional literature (Asongu 2012; Fowowe 2014; Muazu and Alagidede 2017). Against the backdrop of these empirical arguments, the rule of law enables better protection of property rights and also guarantees foreign investors against expropriation of their invested assets. Such expropriation encourages capital flight and decreases foreign investment needed for the industrialisation process. This logic is more apparent when countries with corrupt executives are not fully committed to respecting investors' ownership rights.

In the light of the above arguments, the following three testable hypotheses are assessed within the empirical framework.

Hypothesis 1 Governance positively affects industrialisation.

Hypothesis 2 Capital flight negatively affects industrialisation.

Hypothesis 3 The negative effect of capital flight can be dampened by the positive effect of governance on industrialisation.

It is important to note that the first two hypotheses are expected to be valid because they reflect assumptions underlying the third hypothesis, which is the main

hypothesis of the study. In other words, Hypothesis 3 has two underpinning assumptions that should be validated by two prior hypotheses.

3 Data and methodology

3.1 Data

This paper investigates a panel of 36 African countries with data from 1996 to 2010.[2] The three main sources of the data are World Bank Governance indicators for governance variables; a capital flight indicator from Boyce (2012), and macroeconomic indicators from African Development Indicators of the World Bank. The sampled countries and selected periodicity are constrained by data availability issues. Accordingly, the capital flight measurement ends in the year 2010 whilst good governance indicators are only available from the year 1996.

Consistent with recent literature, the adopted outcome indicator, which is industrialisation, is measured as the manufacturing added value at constant price as a percentage of GDP (see Efobi et al. 2019). This indicator of industrialisation is consistent with the International Standard Industrial Classification (Section D). The measurement proxies for productive manufacturing are units that are classified in relation to the type of principal activity, which embodies activities that are (i) manually done (including household work) or (ii) done with the help of machinery that is power-tailored and factor-oriented (United Nations 1990). Furthermore, the suggested indicator for industrialisation has been preferred in recent literature (Kang and Lee 2011; UNIDO 2013; Gui-Diby and Renard 2015).

In accordance with recent studies (Weeks 2015; Efobi and Asongu 2016), capital flight, which is the main independent variable of interest, reflects unrecorded capital flows between a country and the rest of the world. The appreciation of such flows starts from inflows in foreign exchange that are acknowledged in a country's balance of payments, such that the amount of currency that is missing is presented in terms of "net errors and omissions". Such missing currency is also known as the disparity between recorded inflows and unrecorded outflows.

The main drawback in the indicator of capital flight is that it is not directly comparable with other indicators, given that it is presented in terms of constant 2010 US Dollars. Consistent with Asongu (2014a), the issue can be addressed in three steps. We first transform the current GDP into constant 2010 terms. Then, we divide the corresponding value by 1,000,000 to obtain a "GDP constant of 2010 USD (in millions)". Finally, we divide the capital flight data by the "GDP constant of 2010 USD (in millions)". Ultimately, as shown in Appendix 2, a capital flight measurement that is comparable with other indicators is obtained.

The six policy explanatory governance indicators from Kaufmann et al. (2010) are bundled in Sect. 3.1 through principal component analysis (PCA). The bundling exercise produces (i) political governance (composed of political stability/non-violence and "voice and accountability"); (ii) economic governance (consisting of government

[2] The sampled 36 countries are Algeria, Angola, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Congo Democratic Republic, Congo Republic, Côte d'Ivoire, Egypt, Ethiopia, Gabon, Ghana, Guinea, Kenya, Lesotho, Madagascar, Malawi, Mauritania, Morocco, Mozambique, Nigeria, Rwanda, Sao Tome & Principe, Seychelles, Sierra Leone, Sudan, Swaziland, Tanzania, Tunisia, Uganda, Zambia and Zimbabwe.

effectiveness and regulation quality) and (iii) institutional governance (an embodiment of corruption-control and the rule of law). The six unbundled governance indicators from Kaufmann et al. (2010) have been used in recent governance literature (Gani 2011; Andrés and Asongu 2013; Yerrabati and Hawkes 2015; Andrés et al. 2015; Oluwatobi et al. 2015; Ajide and Raheem 2016a, b; Asongu and Nnanna 2019; Asongu and Odhiambo 2019b).

To control for omitted variable bias, five control variables are adopted, namely trade openness, gross fixed capital formation or domestic investment, population growth, financial allocation efficiency and domestic credit to the private sector. Whilst from intuition, positive relationships could be expected between industrialisation in the selected control variables; in reality, however, the expected signs are contingent on market dynamism and expansion. For instance, if domestic investment is more related to education, health and social amenities, the direct impact on industrialisation may not be so apparent. Moreover, the shift of such domestic investment from the productive sector could negatively impact the industrialisation process. It is also important to note that a positive demographic change may not have a positive effect on industrialisation if the incremental demand from the population is for foreign commodities. Moreover, the incidence of financial development depends on the capacity of financial institutions to transform mobilised deposits into credit for economic operators. Accordingly, surplus liquidity issues which have been substantially documented in African financial institutions (Saxegaard 2006; Asongu 2014b) may translate into the underlying financial development indicators influencing industrialisation negatively. This is essentially because economic operators do not have access to credit for investment purposes.

3.2 Methodology

3.2.1 Principal component analysis (PCA)

This study employs PCA for the purpose of bundling the governance indicators obtained from Kaufmann et al. (2010) into three main composite indicators, namely economic, institutional and political governance. Such an approach to bundling governance is consistent with recent literature on African governance (Asongu and Nwachukwu 2016a). The technique consists of reducing a set of highly correlated variables into an uncorrelated set of small indicators known as principal components (PCs). The corresponding PCs reflect a substantial variation in information from the original dataset.

Within the PCA empirical framework, the six governance indicators are reduced into institutional governance, economic governance and political governance. (i) Political governance (consisting of voice and accountability and political stability) is the election and replacement of political leaders. (ii) Economic governance (a composition of regulation quality and government effectiveness) is the formulation and implementation of policies that deliver public commodities. (iii) Institutional governance (encompassing the rule of law and corruption-control) is the respect by citizens and the State of institutions that govern interactions between them.

The criterion for selecting the PCs is from Kaiser (1974) and Jolliffe (2002). According to the authors, only common factors reflecting eigenvalues higher than one or the mean should be retained. The findings for the PCA are presented in Table 1. The following can be retained in the light of the information criterion (i) political governance

Table 1 Principal component analysis (PCA) for composite governance

Principal components	Component matrix (loadings)						Proportion	Cumulative proportion	Eigen-value
	VA	PS	RQ	GE	RL	CC			
First PC (Polgov)	0.707	0.707	–	–	–	–	0.835	0.835	1.671
Second PC	−0.707	0.707	–	–	–	–	0.164	1.000	0.328
First PC (Ecogov)	–	–	0.707	0.707	–	–	0.939	0.939	1.878
Second PC	–	–	−0.707	0.707	–	–	0.060	1.000	0.121
First PC (Instgov)	–	–	–	–	0.707	0.707	0.930	0.930	1.861
Second PC	–	–	–	–	−0.707	0.707	0.069	1.000	0.138

PC principal component, *VA* voice and accountability, *RL* rule of law, *R.Q* regulation quality, *GE* government effectiveness, *PS* political stability, *CC* control of corruption, *G.Gov (General Governance)* first PC of VA, PS, RQ, GE, RL and CC, *Polgov (Political Governance)* first PC of VA and PS, *Ecogov (Economic Governance)* first PC of RQ and GE, *Instgov (Institutional Governance)* first PC of RL and CC

(*Polgov*) which reflects about 83.50% of information from political stability and "voice and accountability" has an eigenvalue of 1.671; (ii) economic governance (*Ecogov*) which represents about 93.90% of information from regulation quality and government effectiveness has an eigenvalue of 1.878 and (iii) institutional governance (*Instgov*) which reflects approximately about 93.00% of variation in the rule of law and corruption-control has an eigenvalue of 1.861.

It is relevant to briefly discuss some critical concerns that may arise in regressors that are derived from initial regressions. As recently shown by Asongu and Nwachukwu (2017) and Asongu et al. (2018), the concerns are linked to the efficiency and consistency of estimates on the one hand, and the validity of related inferences, on the other hand. In line with Pagan (1984), whilst *two-step* estimators are efficient and consistent, only few valid inferences can be apparent. This inferential caution is consistent with a recent strand of literature, notably Oxley and McAleer (1993); McKenzie and McAleer (1997); Ba and Ng (2006), and Westerlund and Urbain (2013a).

The underlying concerns about inferential validity have been substantially engaged by Westerlund and Urbain (2012, 2013b), who have documented an interesting literature on concerns related to the inferential quality of PCA-augmented regressors. Building on a strand of past studies related to the concerns (Pesaran 2006; Stock and Watson 2002; Bai 2003, 2009; Greenaway-McGrevy et al. 2012), the authors have established that it is possible to obtain normal inferences with PC-derived regressors, in so far as corresponding estimated parameters converge to their real values at the rate of $\sqrt{NT}$, (with T denoting the number of time series and N reflecting cross-section observations). The authors have further articulated that, for the suggested convergence to occur, T and N have to be sufficiently large. Unfortunately, how "large should be large" is not defined. With regard to the specific context of this study, two major issues confront us. N cannot be further increased because we cannot stretch the dataset beyond the 36 countries given data availability constraints. Moreover, T can only be situated between 1996 and 2010 because of two main reasons, notably the capital flight data in our possession ends in 2010 and good governance indicators are only available from 1996. In summary, valid inferences are feasible because we have used the maximum values of T and N available at the time of the study.

3.2.2 Estimation technique

Five main motivations underline the choice of a Generalised Method of Moments (GMM) as empirical strategy. Whilst the first-two are requirements for the use of the technique, the last-three are advantages associated with the empirical strategy. (i) The empirical strategy enables the control for persistence in industrialisation. This behaviour is apparent in the dependent variable because the correlation between industrialisation and its first lag (i.e. 0.961) is higher than the rule of thumb threshold of 0.800 needed to ascertain persistence in a dependent variable. (ii) The T (or 5) < N (or 36) criterion for the employment of the GMM estimation approach is met, given that the number of time series in each cross-section is lower than the number of cross-sections. (iii) The approach to estimation accounts for endogeneity in all the regressors because, on the one hand, simultaneity is controlled using instrumented variables and on the other hand, there is some bite on the unobserved heterogeneity with the use of time invariant indicators. (iv) Biases that are related to the *difference* GMM strategy are addressed with the *system* GMM empirical approach. (v) Given the panel-oriented nature of the empirical approach, cross-country variations are considered.

It is in the light of the fifth reason above that the *system* GMM estimator of Blundell and Bond (1998) and Arellano and Bover (1995) has been documented by Bond et al. (2001) to reflect better properties of efficiency, relative to the difference estimator (from Arellano and Bond 1991). The adopted approach of this study is the Roodman (2009a, b) extension of Arellano and Bover (1995). This approach is based on forward orthogonal deviations instead of first differences. This extension has better properties because it has been established to limit instrument proliferation and/or avoid over-identification (see Baltagi 2008; Love and Zicchino 2006; Boateng et al. 2018; Tchamyou et al. 2019). A *two-step* specification is chosen because it controls for heteroscedasticity. Accordingly, the *one-step* approach is consistent with homoscedasticity.

The following equations in levels (1) and first difference (2) summarise the standard *system* GMM estimation procedure. In the modelling exercise, capital flight is specified to be one lag non-contemporary.

$$\mathrm{Ind}_{i,t} = \sigma_0+\sigma_1\mathrm{Ind}_{i,t-\tau}+\sigma_2\mathrm{Cap}_{i,t-\tau}+\sigma_3\mathrm{Gov}_{i,t}+\sigma_4\mathrm{CapGov}_{i,t}+\sum_{h=1}^{5}\delta_h W_{h,i,t-\tau}+\eta_i+\xi_t+\varepsilon_{i,t} \tag{1}$$

$$\begin{aligned}\mathrm{Ind}_{i,t}-\mathrm{Ind}_{i,t-\tau} &= \sigma_1\left(\mathrm{Ind}_{i,t-\tau}-\mathrm{Ind}_{i,t-2\tau}\right)+\sigma_2\left(\mathrm{Cap}_{i,t-\tau}-\mathrm{Cap}_{i,t-2\tau}\right)+\sigma_3\left(\mathrm{Gov}_{i,t}-\mathrm{Gov}_{i,t-\tau}\right)\\ &+\sigma_4\left(\mathrm{CapGov}_{i,t}-\mathrm{CapGov}_{i,t-\tau}\right)+\sum_{h=1}^{5}\delta_h\left(W_{h,i,t-\tau}-W_{h,i,t-2\tau}\right)+\left(\xi_t-\xi_{t-\tau}\right)+\left(\varepsilon_{i,t}+\varepsilon_{i,t-\tau}\right)'\end{aligned} \tag{2}$$

where $\mathrm{Ind}_{i,t}$ is industrialisation of country i in period t;$\mathrm{Ind}_{i,t-\tau}$ is industrialisation of country i in period $t-\tau$; $\mathrm{Cap}_{i,t-\tau}$ is capital flight of country i in period $t-\tau$; $\mathrm{Gov}_{i,t}$ is governance (political, economic, and institutional) of country i in period t;σ_0 is a constant;τ represents the coefficient of auto-regression; W is the vector of control variables (*trade openness, domestic investment, population, bank efficiency and domestic credit*), η_i is the country-specific effect, ξ_t is the time-specific constant and $\varepsilon_{i,t}$ the error term.

In accordance with Brambor et al. (2006) and Tchamyou (2019a, b), in interactive specifications, all constitutive terms should be incorporated regardless of the concern of multicollinearity. An interactive framework is also consistent with the main purpose of this study, notably an assessment of the role of governance in modulating the effect of capital flight on industrialisation. In the assessment, the net effect of capital flight on industrialisation is the sum of the unconditional effect of capital flight and the conditional effect of capital flight (i.e. from the interaction between governance and capital flight).

3.2.3 Identification, simultaneity and exclusive restrictions

Discussing identification, simultaneity and exclusive restrictions is relevant for a robust GMM specification. From the perspective of identification, all explanatory indicators are predetermined or suspected endogenous and exclusively time-invariant variables are considered to exhibit strict exogeneity. A similar approach has been adopted in recent empirical literature (Dewan and Ramaprasad 2014; Asongu and Nwachukwu 2016b; Tchamyou and Asongu 2017). The intuition for this identification strategy is that it is very unlikely for time-invariant omitted indicators to reflect endogeneity in first difference (see Roodman 2009b).[3]

With respect to simultaneity, lagged regressors are used as instruments for forward differenced indicators. Hence, Helmet transformations are also employed on the regressors to purge fixed effects that could influence the investigated relationships (Arellano and Bover 1995; Love and Zicchino 2006). The underlying transformations encompass the employment of forward averaged-differencing of the variables, which is different from the process of deducting non-contemporary observations from contemporary observations (see Roodman 2009b, p 104). Such transformations enable parallel or orthogonal conditions between lagged values and forward-differenced indicators. Regardless of lag numbers, the loss of data is minimised by computing the suggested transformation for all observations with the exception of the last observation in cross-sections "*And because lagged observations do not enter the formula, they are valid as instruments*" (Roodman 2009b, p 104).

From the perspective of exclusive restrictions, the adopted time-invariant indicators that are considered as strictly exogenous affect the outcome variable or industrialisation exclusively via the predetermined or suspected endogenous indicators. Furthermore, the statistical relevance of the exclusion restriction is assessed with the Difference in Hansen Test (DHT) for the validity of instruments. Accordingly, in order for the time-invariant indicators to elicit industrialisation exclusively via the predetermined indicators, the alternative hypothesis of the test should be rejected.[4] With the current GMM approach, the information criterion used to examine if time-invariant variables exhibit strict exogeneity is the DHT. Hence, given the above clarification, in the findings that are reported

[3] Therefore, the approach for treating *ivstyle* (years) is 'iv(years, eq(diff))' whilst the *gmmstyle* is used for suspected endogenous variables.

[4] It is relevant to note that in a standard Instrumental Variable (IV) approach, failure to reject the null hypothesis of the Sargan Overidentifying Restrictions (OIR) test indicates that the instruments do not elucidate the dependent variable beyond suspected endogenous variables (see Beck et al. 2003; Asongu and Nwachukwu 2016c).

in the next section, the assumption of exclusive restriction is validated if the alternative hypothesis of the DHT associated with IV (year, eq (diff)) is rejected.

4 Empirical results

4.1 Presentation of results

Tables 2, 3 and 4 disclose results, respectively, corresponding to political governance, economic governance and institutional governance. Four principal information criteria are employed to examine the validity of the GMM model with forward orthogonal deviations.[5] Based on the criteria, all the estimated models are valid. Three main dimensions are considered when assessing the investigated hypotheses, notably (i) *Hypothesis 1* and *Hypothesis 2* are assessed respectively with the estimated unconditional effect of governance and capital flight whereas (ii) *Hypothesis 3* is examined using the net effect of the role of governance in dampening the unconditional effect of capital flight on industrialisation. Hence, the computed net effects of capital flight involve both underlying unconditional and conditional effects of capital flight.

For example, in the third column of Table 2, the unconditional and conditional effects of capital flight are, respectively, -0.770 and -0.605, whereas the corresponding net effect of capital flight from the interaction with political stability is -0.376 $(-0.770+[-0.605\times-0.650])$.[6] Therefore, despite the unconditional positive effect of political stability on industrialisation of 5.158, political stability does not significantly dampen the negative effect of capital flight on industrialisation. It follows that in the light of findings pertaining to political stability, *Hypotheses 1–2* are valid whereas *Hypothesis 3* is invalid. Moreover, from the results disclosed in Tables 2, 3, 4, *Hypotheses 1–2* are consistently valid, whereas *Hypothesis 3* is consistently invalid with respect to political stability, political governance, government effectiveness, economic governance, corruption-control and institutional governance. Most of the significant control variables display the expected signs.

4.2 Discussion of results

As emphasised in the introduction, to the best of our knowledge no study has focused on *Hypothesis* 3: the role of governance (i.e. as a policy variable) in modulating the effect of capital flight on industrialisation. The validity of *Hypotheses* 1 and 2 is consistent with mainstream literature on the role of good governance and capital flight on industrialisation. This section is engaged in three main strands, notably the consistency of the findings in the light of extant literature; some explanations as to why *Hypothesis* 3 is consistently invalid and caveats to the study. The three strands are expanded in chronological order.

[5] "*First, the null hypothesis of the second-order Arellano and Bond autocorrelation test (AR(2)) in difference for the absence of autocorrelation in the residuals should not be rejected. Second, the Sargan and Hansen overidentification restrictions (OIR) tests should not be significant because their null hypotheses are the positions that instruments are valid or not correlated with the error terms. In essence, while the Sargan OIR test is not robust but not weakened by instruments, the Hansen OIR is robust but weakened by instruments. To restrict identification or limit the proliferation of instruments, we have ensured that instruments are lower than the number of cross-sections in most specifications. Third, the Difference in Hansen Test (DHT) for exogeneity of instruments is also employed to assess the validity of results from the Hansen OIR test. Fourth, a Fisher test for the joint validity of estimated coefficients is also provided*" (Asongu and De Moor 2017, p 200).

[6] -0.650 is the mean value of political stability.

Table 2 Political governance, capital flight and industrialisation

	Dependent variable: industrialisation					
	Political stability		Voice and accountability		Political governance	
Industrialisation (− 1)	*0.875***	*0.844***	*0.878***	*0.910***	*0.870***	*0.927***
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
Constant	2.395	*9.548***	8.943	4.925	1.771	*7.986***
	(0.370)	*(0.000)*	(0.121)	(0.122)	(0.423)	*(0.000)*
Political stability (PS)	1.578	*5.158***	–	–	–	–
	(0.315)	*(0.000)*				
Voice and accountability (VA)	–	–	*8.995**	6.021	–	–
			(0.095)	(0.114)		
Political governance (Polgov)	–	–	–	–	1.632	*6.684****
					(0.243)	*(0.000)*
Capital flight (− 1)(CapFlight)	− 0.064	*− 0.770****	− 0.716	− 0.384	− 0.046	*− 0.773****
	(0.776)	*(0.002)*	(0.231)	(0.261)	(0.844)	*(0.000)*
PolS × CapFlight	− 0.164	*− 0.605****	–	–	–	–
	(0.274)	*(0.000)*				
VA × CapFlight	–	–	*− 0.941**	*− 0.720**	–	–
			(0.051)	*(0.065)*		
Polgov × CapFlight	–	–	–	–	− 0.182	*− 0.762****
					(0.203)	*(0.000)*
Trade	− 0.001	0.001	− 0.004	0.004	0.007	0.008
	(0.895)	(0.847)	(0.670)	(0.215)	(0.561)	(0.286)
Domestic investment	*− 0.020***	*− 0.026****	− 0.019	*− 0.013***	− 0.020	*− 0.017***
	(0.020)	*(0.005)*	(0.186)	*(0.022)*	(0.107)	*(0.047)*
Population	–	*− 0.020****	–	*− 0.010***	–	*− 0.009**
		(0.000)		*(0.040)*		*(0.052)*
Bank efficiency	–	*− 0.029****	–	*− 0.031****	–	*− 0.027****
		(0.000)		*(0.000)*		*(0.000)*
Private credit	–	*0.119****	–	*0.086****	–	*0.124****
		(0.000)		*(0.000)*		*(0.000)*
Net effects of capital flight	na	− 0.376	na	na	na	− 0.698
AR(1)	*(0.270)*	(0.087)	*(0.268)*	(0.080)	*(0.268)*	(0.076)
AR(2)	*(0.292)*	*(0.167)*	*(0.291)*	*(0.274)*	*(0.290)*	*(0.167)*
Sargan OIR	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Hansen OIR	*(0.501)*	*(0.487)*	*(0.308)*	*(0.558)*	*(0.475)*	*(0.359)*
DHT for instruments						
(a) Instruments in levels	*(0.251)*	*(0.771)*	*(0.782)*	*(0.478)*	*(0.472)*	*(0.975)*
H excluding group	*(0.648)*	*(0.290)*	*(0.148)*	*(0.539)*	*(0.433)*	*(0.100)*
Dif (null, H = exogenous)						
(b) IV (years, eq (diff))	*(0.535)*	*(0.166)*	*(0.172)*	*(0.412)*	*(0.567)*	*(0.210)*
H excluding group	*(0.331)*	*(1.000)*	*(0.884)*	*(0.914)*	*(0.245)*	*(1.000)*
Dif (null, H = exogenous)						
Fisher	*437.17****	*1542.15****	*123.47****	*1126.33****	*335.04****	*1092.53****
Instruments	26	38	26	38	26	38
Countries	35	35	35	35	35	35
Observations	323	307	323	307	323	307

*,**,***: significance levels of 10%, 5% and 1% respectively. DHT: Difference in Hansen Test for Exogeneity of Instruments' Subsets. *Dif* difference, *OIR* over-identifying restrictions test. The italicised values have a twofold meaning: (1) The significance of estimated coefficients and the Fisher statistics. (2) The failure to reject the null hypotheses of: (a) no autocorrelation in the AR(1) and AR(2) tests and; (b) the validity of the instruments in the Sargan and Hansen OIR tests. The mean values of political stability, voice and accountability and political governance are respectively − 0.650, − 0.705 and − 0.098. It is important to note that whereas the sample consists of 36 African countries, 35 countries may appear in the regression output because of issues in degrees of freedom associated with some variables used in the conditioning information set. na: not applicable because at least one estimated coefficient needed for the computation of net effects is not significant

First, on the one hand, the relevance of good governance in the promotion of industrialisation is consistent with a broad stream of macroeconomic- and industry-specific literature on the improvement of structural transformation in the manufacturing sector (Mijiyawa 2017); foreign direct investment (Rodriguez-Pose and Cols 2017) and technology- driven exports (Asongu and Asongu 2019), inter alia. On the other hand, the established unfavourable effect of capital flight on African industrialisation is broadly in line with a recent steam of literature on the relevance of capital flight in Africa's development (Ndiaye and Siri 2016; Mpenya et al. 2016; Gankou et al. 2016).

Second, the fact that *Hypothesis* 3 is not validated is an indication that governance is a necessary but not a sufficient condition in the mitigation of the effect of capital flight on industrialisation. On the premise that knowledge-based economies are relevant in the drive towards industrialisation in the twenty first century (Tchamyou 2017; Asongu and Tchamyou 2019; Asongu and Odhiambo 2020), the findings are consistent with Andrés et al. (2015), who have established that governance is a sufficient but not a necessary condition for knowledge-based economies in Africa. By extension, this inference also implies that governance standards need to be improved to better modulate capital flight and achieve net positive effects on industrialisation. Policy actions that can be used to enhance good governance are discussed in the concluding section.

Third, a caveat to this study is that there is homogeneity regarding the level of industrialisation of the 36 African countries, which may not be accurate. The issue can be corrected with the employment of dummy variables to differentiate the levels of industrialisation in the sample and/or disaggregation of the sample into fundamental characteristics (such as income levels) that are exogenous to industrialisation. Unfortunately, the introduction of dummy variables is theoretically and empirically inconsistent with the GMM approach because they represent country-specific effects that are eliminated by first differencing to avoid endogeneity resulting from a correlation between the lagged dependent variable and country-specific effects. Two approaches have been used to account for heterogeneity in the levels of industrialisation, notably (i) sub-sampling by income levels and levels of industrialisation and (ii) Quantile GMM regressions. Both approaches produce biased estimated coefficients owing to instrument proliferation.

The concern about instrument proliferation pertains to a situation in which after estimations, it is apparent from post-estimation diagnostic tests that the number of instruments in specifications is higher than the corresponding number of countries. Whilst a procedure of dealing with the underlying concern of instrument proliferation consists of collapsing instruments, from the analysis in this study, the concern of instrument proliferation still persists even when the option of collapsing instruments is taken on board. It follows that there is a choice between substantially accounting for heterogeneity and having estimated coefficients that are robust. This study preferred the latter for reasons that are inherently associated with caveats pertaining to the adopted methodology.

Table 3 Economic governance, capital flight and industrialisation

	Dependent variable: industrialisation					
	Regulation quality		**Government effectiveness**		**Economic governance**	
Industrialisation (− 1)	*0.838***	*0.929***	*0.629***	*0.918***	*0.845***	*0.908***
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
Constant	2.943	2.024	*38.618***	*8.083***	1.812	*5.121**
	(0.482)	(0.473)	*(0.000)*	*(0.008)*	(0.642)	*(0.018)*
Regulation quality (RG)	0.841	0.135	–	–	–	–
	(0.746)	(0.946)				
Government effectiveness (GE)	–	–	*38.184***	*8.231***	–	–
			(0.000)	*(0.006)*		
Economic governance (Ecogov)	–	–	–	–	*2.904**	*2.516**
					(0.071)	*(0.056)*
Capital flight (− 1)(CapFlight)	− 0.258	− 0.259	*− 3.466****	*− 0.822****	− 0.181	*− 0.500***
	(0.480)	(0.307)	*(0.000)*	*(0.004)*	(0.602)	*(0.027)*
RG × CapFlight	− 0.120	− 0.127	–	–	–	–
	(0.637)	(0.511)				
GE × CapFlight	–	–	*− 3.824****	*− 0.994****	–	–
			(0.000)	*(0.001)*		
Ecogov × CapFlight	–	–	–	–	*− 0.301**	*− 0.325***
					(0.073)	*(0.016)*
Trade	*0.023***	*0.027****	0.014	*0.019****	*0.032****	*0.032****
	(0.014)	*(0.000)*	(0.217)	*(0.001)*	*(0.007)*	*(0.000)*
Domestic investment	− 0.023	− 0.002	*− 0.033**	− 0.009	− 0.023	*− 0.019***
	(0.147)	(0.772)	*(0.091)*	(0.177)	(0.273)	*(0.016)*
Population	–	0.0009	–	*− 0.005***	–	0.002
		(0.848)		*(0.045)*		(0.517)
Bank efficiency	–	*− 0.038****	–	*− 0.032****	–	*− 0.033****
		(0.000)		*(0.000)*		*(0.000)*
Private credit	–	*0.085****	–	*0.074****	–	*0.087****
		(0.000)		*(0.000)*		*(0.000)*
Net effects of capital flight	na	na	− 0.884	− 0.151	na	− 0. 531
AR(1)	*(0.267)*	(0.082)	*(0.270)*	(0.078)	*(0.261)*	(0.078)
AR(2)	*(0.293)*	*(0.348)*	*(0.304)*	*(0.361)*	*(0.289)*	*(0.322)*
Sargan OIR	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Hansen OIR	*(0.510)*	*(0.795)*	*(0.321)*	*(0.737)*	*(0.656)*	*(0.769)*
DHT for instruments						
(a) Instruments in levels						
H excluding group	*(0.498)*	*(0.303)*	*(0.316)*	*(0.813)*	*(0.605)*	*(0.808)*
Dif (null, H = exogenous)	*(0.457)*	*(0.921)*	*(0.353)*	*(0.544)*	*(0.567)*	*(0.592)*
(b) IV (years, eq(diff))						
H excluding group	*(0.335)*	*(0.808)*	*(0.539)*	*(0.557)*	*(0.719)*	*(0.669)*
Dif (null, H = exogenous)	*(0.890)*	*(0.411)*	*(0.103)*	*(1.000)*	*(0.317)*	*(0.811)*
Fisher	*417.99****	*481.48****	*99.04****	*302.18****	*145.96****	*1338.42****
Instruments	26	38	26	38	26	38
Countries	35	35	35	35	35	35
Observations	323	307	322	306	322	306

*,**,***: significance levels of 10%, 5% and 1% respectively. *DHT* difference in Hansen Test for Exogeneity of Instruments' Subsets, *Dif* difference, *OIR* over-identifying restrictions test. The italicised values have a twofold meaning: (1) The significance of estimated coefficients and the Fisher statistics. (2) The failure to reject the null hypotheses of: (a) no autocorrelation in the AR(1) and AR(2) tests and; (b) the validity of the instruments in the Sargan and Hansen OIR tests. The mean values of government effectiveness, regulation quality and economic governance are respectively − 0.675, − 0.663 and 0.098. It is important to note that whereas the sample consists of 36 African countries, 35 countries may appear in the regression output because of issues in degrees of freedom associated with some variables used in the conditioning information set. *na* not applicable because at least one estimated coefficient needed for the computation of net effects is not significant

5 Concluding implications and future research directions

This study has investigated whether a potentially positive effect of governance on industrialisation mitigates a potentially negative impact of capital flight on industrialisation. The focus of the study is on 36 African countries for the period 1996–2010. The empirical evidence is based on the Generalised Method of Moments. Three investigated hypothesis are examined, notably governance increases industrialisation (*Hypothesis 1*); capital flight decreases industrialisation (*Hypothesis 2*) and the positive effect of governance dampens the negative effect of capital flight (*Hypothesis 3*). Governance is bundled by principal component analysis, namely (i) political governance from political stability and "voice and accountability"; (ii) economic governance from government effectiveness and regulation quality and (iii) institutional governance from corruption-control and the rule of law. The following findings are established: *Hypotheses 1–2* are consistently valid whereas *Hypothesis 3* is consistently invalid with respect to political stability, political governance, government effectiveness, economic governance, corruption-control and institutional governance.

The main policy implication is clear and straight forward: to boost ongoing industrialisation efforts in Africa, the governments of sampled countries would have to increase their efforts towards improving good governance in view of potentially mitigating the adverse effect that capital flight has on industrialisation. Actions aimed at promoting good governance should specifically be tailored towards limiting drivers of capital flight, notably (i) political governance can stifle capital flight resulting from political instability and the absence of accountability; (ii) economic governance can reduce capital flight resulting from economic instability, imposition of capital controls, currency devaluation, government ineffectiveness and poor regulation quality and (iii) institutional governance can mitigate capital resulting from corruption and disrespect of the rule of law. Such governance mechanisms should entail improvements in, *inter alia*: participation; technical and managerial competence; transparency and open information systems, and organisational capacity.

Beyond policy implications, the scholarly contribution of this study also builds on the fact that we have shown that, to avoid conceptual conflation, perceptual bias and misleading policy inferences, the terminology used in identifying governance variables should be consistent with the measurement of the corresponding governance variables. For instance, Kangoye (2013) has employed "corruption-control" interchangeably with "governance". Furthermore, the notions of political governance, economic governance and institutional governance have been employed in the literature without statistical validity (Kurtz and Schrank 2007a, b; Kaufmann et al. 2007a, b). Hence, in the light of the established findings, the term "economic governance" cannot be employed unless it is a composite measurement of government effectiveness and regulation quality. We have also shown that a dimension of governance may be driven exclusively by one of its components. Moreover, our findings have complemented recent capital flight literature which has largely focused on the relationship between capital flight and natural resources in Cameroon (Mpenya et al. 2016); the relationship between capital flight

Table 4 Institutional governance, capital flight and industrialisation

	Dependent variable: industrialisation					
	Rule of law		Corruption-control		Institutional governance	
Industrialisation (− 1)	*0.822*** *	*0.960*** *	*0.772*** *	*0.872*** *	*0.794*** *	*0.911*** *
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*
Constant	8.551	2.123	*18.086** *	*8.090** *	3.393	*6.160*** *
	(0.159)	(0.441)	*(0.065)*	*(0.030)*	(0.432)	*(0.002)*
Rule of law (RL)	*7.499*** *	2.802	–	–	–	–
	(0.072)	(0.237)				
Corruption-Control (CC)	–	–	*18.161** *	5.989	–	–
			(0.047)	(0.132)		
Institutional governance (Instgov)	–	–	–	–	3.028	*4.174*** *
					(0.144)	*(0.001)*
Capital flight (− 1)(CapFlight)	− 0.618	− 0.204	*− 1.511** *	− 0.552	− 0.217	*− 0.426** *
	(0.273)	(0.498)	*(0.098)*	(0.138)	(0.556)	*(0.025)*
RL × CapFlight	*− 0.762** *	− 0.415	–	–	–	–
	(0.066)	(0.111)				
CC × CapFlight	–	–	*− 1.807** *	− 0.676	–	–
			(0.045)	(0.100)		
Instgov × CapFlight	–	–	–	–	− 0.309	*− 0.495*** *
					(0.127)	*(0.000)*
Trade	0.004	0.009	− 0.001	*0.008** *	*0.023** *	0.003
	(0.586)	(0.186)	(0.904)	*(0.072)*	*(0.030)*	(0.435)
Domestic investment	*− 0.032** *	− 0.010	− 0.018	*− 0.031*** *	− 0.030	*− 0.014** *
	(0.058)	(0.148)	(0.358)	*(0.000)*	(0.102)	*(0.034)*
Population	–	*− 0.008** *	–	*− 0.011*** *	–	*− 0.012*** *
		(0.012)		*(0.005)*		*(0.000)*
Bank efficiency	–	*− 0.037*** *	–	*− 0.037*** *	–	*− 0.033*** *
		(0.000)		*(0.000)*		*(0.000)*
Private credit	–	*0.100*** *	–	*0.074*** *	–	*0.101*** *
		(0.000)		*(0.000)*		*(0.000)*
Net effects of capital flight	na	na	− 3.916	na	na	− 0.423
AR(1)	*(0.272)*	(0.080)	*(0.268)*	(0.085)	*(0.271)*	(0.086)
AR(2)	*(0.298)*	*(0.241)*	*(0.291)*	*(0.430)*	*(0.298)*	*(0.230)*
Sargan OIR	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Hansen OIR	*(0.354)*	*(0.644)*	*(0.396)*	*(0.674)*	*(0.540)*	*(0.591)*
DHT for instruments						
(a) Instruments in levels						
H excluding group	*(0.536)*	*(0.522)*	*(0.644)*	*(0.766)*	*(0.711)*	*(0.852)*
Dif (null, H = exogenous)	*(0.267)*	*(0.615)*	*(0.263)*	*(0.495)*	*(0.374)*	*(0.345)*
(b) IV (years, eq (diff))						
H excluding group	*(0.357)*	*(0.452)*	*(0.398)*	*(0.489)*	*(0.550)*	*(0.409)*
Dif (null, H = exogenous)	*(0.353)*	*(1.000)*	*(0.364)*	*(1.000)*	*(0.381)*	*(1.000)*
Fisher	*132.67*** *	*3538.10*** *	*124.32*** *	*2259.14*** *	*203.33*** *	*1690.12*** *
Instruments	26	38	26	38	26	38
Countries	35	35	35	35	35	35
Observations	323	307	322	306	322	306

*,**,***significance levels of 10%, 5% and 1%, respectively. DHT: Difference in Hansen Test for Exogeneity of Instruments' Subsets. Dif: Difference. OIR: Over-identifying Restrictions Test. The italicised values have a twofold meaning: (1) The significance of estimated coefficients and the Fisher statistics. (2) The failure to reject the null hypotheses of (a) no autocorrelation in the AR(1) and AR(2) tests and (b) the validity of the instruments in the Sargan and Hansen OIR tests. The mean values of the rule of law, corruption-control and institutional governance are respectively − 0.716, − 0.598 and − 0.006. It is important to note that whereas the sample consists of 36 African countries, 35 countries may appear in the regression output because of issues in degrees of freedom associated with some variables used in the conditioning information set. *na* not applicable because at least one estimated coefficient needed for the computation of net effects is not significant

and fiscal policy (Muchai and Muchai 2016); drivers of capital flight in Ethiopia (Geda and Yimer 2016) and Madagascar (Ramiandrisoa and Rakotomanana 2016); linkages between capital flight and tax revenue in Burkina Faso (Ndiaye and Siri 2016); public social spending and capital flight in Congo-Brazzaville (Moulemvo 2016); trade misinvoicing and capital flight in Zimbabwe (Kwaramba et al. 2016) and lessons from case studies on the causes and consequences of capital flight (Ndikumana 2016).

It is relevant to also clarify that the recommendation to boost good governance in order to mitigate capital flight and enhance industrialisation also builds on the fact that governance standards in Africa are comparatively low relative to other continents of the world. This is also apparent from the summary statistics in Appendix 2 in which, the mean values of governance dynamics are negative on the one hand and on the other hand, for the respective governance dynamics, the minimum negative values are higher than the corresponding maximum positive values. Hence, the unexpected findings can also be traceable to the inherent poor governance in the continent which is reflected in the negative skewness of the attendant governance dynamics.

Future research can focus on investigating the relevance of the established findings on industrialisation when the outcome variable is assessed throughout the conditional distribution of industrialisation. The motivation for this future research recommendation is that the role of governance in dampening capital flight to boost industrialisation may be contingent on existing levels of industrialisation. Moreover, it is worthwhile to assess if the established findings withstand empirical scrutiny when industry-specific governance indicators are involved.

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Appendices

Appendix 1

See Table 5.

Table 5 Definitions of variables

Variables	Signs	Definitions of variables (measurements)	Sources
Industrialisation	Industria	Manufacturing (ISICD)	UNCTAD
Capital flight	Capf.	Logarithm of capital flight (constant of 2010)	Ndikumana and Boyce (2012)
Political stability	PS	"Political stability/no violence (estimate): measured as the perceptions of the likelihood that the government will be destabilised or overthrown by unconstitutional and violent means, including domestic violence and terrorism"	World Bank (WDI)
Voice and accountability	VandA	"Voice and accountability (estimate): measures the extent to which a country's citizens are able to participate in selecting their government and to enjoy freedom of expression, freedom of association and a free media"	World Bank (WDI)
Political governance	Polgov	First principal component of political stability and voice and accountability. The process by which those in authority are selected and replaced	PCA
Government effectiveness	Gov. E	"Government effectiveness (estimate): measures the quality of public services, the quality and degree of independence from political pressures of the civil service, the quality of policy formulation and implementation, and the credibility of governments' commitments to such policies"	World Bank (WDI)
Regulation quality	RQ	"Regulation quality (estimate): measured as the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development"	World Bank (WDI)
Economic governance	Ecogov	"First principal component of government effectiveness and regulation quality. The capacity of government to formulate and implement policies, and to deliver services"	PCA
Rule of law	RL	"Rule of law (estimate): captures perceptions of the extent to which agents have confidence in and abide by the rules of society and in particular the quality of contract enforcement, property rights, the police, the courts, as well as the likelihood of crime and violence"	World Bank (WDI)
Corruption-control	CC	"Control of corruption (estimate): captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests"	World Bank (WDI)
Institutional governance	Instgov	First principal component of rule of law and Corruption-control. The respect for citizens and the state of institutions that govern the interactions amongst them	PCA
Bank efficiency	BcBd	Bank credit to bank deposits (%)	World Bank (WDI)
Domestic credit	Domcred	Domestic credit to private sector (% of GDP)	World Bank (WDI)
Trade	Trade	Exports and imports of goods and services (% of GDP)	World Bank (WDI)
Domestic investment	GFCF	Gross fixed capital formation (including Acquisitions less disposals of valuables) (% of GDP)	World Bank (WDI)
Population	Pop	Population (in millions)	World Bank (WDI)

WDI World Bank Development Indicators, *PCA* principal component analysis, *UNCTAD* United Nations Conference on Trade and Development, *ISICD* International Standard Industrial Classification (Section D)

Appendix 2

See Table 6.

Table 6 Summary statistics (1996–2010)

	Mean	SD	Minimum	Maximum	Observations
Industrialisation	11.355	6.699	2.207	36.858	528
Capital flight	9.934	0.784	6.816	12.333	417
Political stability	− 0.650	0.952	− 2.986	1.188	432
Voice and accountability	− 0.705	0.637	− 1.885	0.932	432
Political governance	− 0.098	1.243	− 2.974	2.709	432
Government effectiveness	− 0.675	0.547	− 1.974	0.727	431
Regulation quality	− 0.663	0.535	− 2.412	0.791	432
Economic governance	0.098	1.146	− 3.284	3.276	431
Rule of law	− 0.716	0.626	− 2.207	0.773	432
Control of corruption	− 0.598	0.562	− 2.057	1.249	431
Institutional governance	− 0.006	1.287	− 3.139	3.676	395
Bank efficiency	67.069	28.572	13.753	164.618	517
Domestic credit	16.596	15.036	0.198	103.632	511
Trade openness	69.974	39.783	0.000	225.043	540
Gross fixed capital formation	21.031	9.398	2.000	63.698	528
Population	20.97	26.681	0.077	159.424	540

SD standard deviation

Appendix 3

See Table 7.

Table 7 Correlation matrix (uniform sample size 291)

Control variables					Political governance			Economic governance			Institutional governance					
Pop	**GFCF**	**Trade**	**Domcred**	**BcBd**	**PS**	**VA**	**Polgov**	**GE**	**RQ**	**Ecogov**	**RL**	**CC**	**Instgov**	**Capfl.**	**Industria**	
1.000	−0.300	−0.288	0.159	−0.032	−0.313	−0.132	−0.247	−0.098	−0.132	−0.120	−0.115	−0.226	−0.177	0.420	−0.215	Pop
	1.000	0.382	0.200	−0.169	0.442	0.375	0.443	0.447	0.411	0.450	0.532	0.464	0.516	−0.028	−0.214	GFCF
		1.000	0.033	−0.159	0.336	0.094	0.241	0.150	0.062	0.112	0.179	0.241	0.218	−0.128	0.175	Trade
			1.000	0.406	0.282	0.105	0.215	0.539	0.328	0.456	0.457	0.425	0.457	0.132	0.250	Domcred
				1.000	−0.049	−0.155	−0.106	0.040	0.074	0.059	−0.076	0.036	−0.019	−0.086	0.239	BcBd
					1.000	0.724	0.938	0.715	0.683	0.732	0.801	0.743	0.801	−0.138	0.088	PS
						1.000	0.917	0.665	0.667	0.697	0.737	0.696	0.743	−0.074	−0.196	VA
							1.000	0.744	0.727	0.771	0.831	0.776	0.833	−0.117	−0.047	Polgov
								1.000	0.824	0.957	0.879	0.847	0.895	0.055	0.057	GE
									1.000	0.952	0.834	0.745	0.818	0.159	0.069	RQ
										1.000	0.897	0.835	0.898	0.110	0.066	Ecogov
											1.000	0.857	0.963	0.040	0.036	RL
												1.000	0.964	−0.073	0.130	CC
													1.000	−0.018	0.087	Instgov
														1.000	−0.063	Capfl.
															1.000	Industria

Pop population, *GFCF* gross fixed capital formation, *Domcred* domestic credit to the private sector, *BcBd* bank credit to bank deposits, *PS* political stability/non-violence, *VA* voice and accountability, *Polgov* political governance, *GE* government effectiveness, *RQ* regulation quality, *Ecogov* economic governance, *CC* corruption-control, *RL* rule of law, *Instgov* institutional governance, *Capfl* capital flight, *Industria* industralisation

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