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Capital Flight and Foreign Direct Investment in Africa: An Investigation of the Role of Natural Resource Endowment

by

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Abstract

This paper aims to provide theoretical and empirical insights into the puzzling simultaneous rise in foreign direct investment inflows in Africa and capital flight from the continent over the past decades. It specifically explores two questions: is FDI a potential driver of capital flight? Is natural resource endowment a possible channel for the capital flight-FDI link? The econometric analysis is based on 32 African countries over the period 1970-2013 using dynamic panel data estimation methods. Three important findings emerge from the analysis. First, while there is no robust evidence that capital flight is fueled by annual FDI inflows (there is no equivalent to debt-fueled capital flight), there is a positive relationship between the stock of FDI and capital flight. Second, natural resource endowment is directly related positively to capital flight and resource endowment is associated with a stronger FDI stock-capital flight link, especially in the case of oil. Third, high-quality institutions somehow weaken the link between FDI and capital flight, although they do not completely eliminate the relationship. The results point to potential gains from improvements in institutional quality in African countries through minimizing the contribution of FDI and natural resources to capital flight.

Key words: capital flight; foreign direct investment; natural resources; Africa
JEL: F3; O16; O55

1 Introduction

Since the turn of the century the African continent has experienced a historical turnaround marked with growth acceleration in the context of a commodity boom in the lead up to the global financial crisis, but also thanks to improvement in overall macroeconomic stability. The period has also witnessed substantial surge in private capital inflows in the form of foreign direct investment (FDI), including from emerging markets, especially China. However, as is the case in other developing regions, the overall gains from foreign capital inflows in terms of employment and welfare have been limited mostly due to the weak spillovers and linkages with domestic economic activity (Morrissey, 2012). Moreover, commodity dependence exposes African economies to growth volatility and other risks inherent to export instability and exchange rate appreciation, or 'resource curse', as discussed in the literature. Indeed, growth in these countries remains erratic due to the narrow production base and exposure to the vagaries of international commodity markets. Moreover, natural resource-rich countries exhibit high levels of poverty and lag behind in development goals including access to social services such as health, education, water and sanitation. This raises a serious concern regarding the sustainability of the resource-led growth.

Recent history of African economies exhibits a stunning paradox whereby the acceleration of foreign capital inflows and economic growth have occurred simultaneously with an equally rapid increase in unrecorded capital outflows or capital flight (Ajayi and Ndikumana, 2015; Ndikumana et al., 2015). The phenomenon of capital flight from a capital-starved continent – a vivid illustration of the Lucas paradox (Lucas, 1990) – continues to be a theoretical and empirical puzzle while also constituting a major concern from a development policy standpoint. It is therefore worth investigating the linkages between the two phenomena.

The economics literature has devoted a fair amount of attention to the linkages between FDI and natural resources, and to a lesser extent on the relationship between natural resources and capital flight. But there has been relatively little attention to the role that natural resources may play in linking capital flight and FDI. Yet, from both conceptual and empirical perspectives, natural resources may help explain the co-movements between FDI and capital flight in several ways. In the case of African economies, the limited linkages and spillover effects of FDI in the domestic economy may be due to the fact that most FDI is directed to extractive industries which typically have weak links with the local economy, are capital intensive and therefore create little employment. Natural resources may also provide a vehicle for rent-seeking foreign capital inflows that are driven by illicit motives such as tax evasion. This study seeks to provide empirical evidence to shed light on the role that natural resources play in the linkages between capital flight and FDI.

Specifically, the paper aims to address two empirical questions. First, is there a relationship between FDI into Africa and capital flight from the continent? On the one hand, it may be hypothesized that FDI may provide resources that fuel capital flight, which would imply a positive relationship between the two phenomena; in other words countries with high FDI would also have high capital flight. This question is worth investigating given the fact that private capital flows have become more dominant than external borrowing as a source of foreign resource inflows. While the literature has established that external borrowing fuels capital flight (Boyce, 1992; Ndikumana and Boyce, 2003, 2011a), relatively little attention has been paid to the possibility that foreign private capital flows may also finance capital flight. On the other hand, high FDI would signal an environment that is conducive to investment in the destination country, in which case the two phenomena would be negatively related: high FDI would be associated with low capital flight.

The second question is: are natural resources a conduit for the relationship between capital flight and FDI? A pos-

itive correlation between capital flight and FDI may arise either because FDI channeled through natural resources provides resources that, ex-post, finances capital flight, or because the ex-ante motive of capital inflows is to use natural resource-rich African countries solely as a transit of capital towards secrecy jurisdictions. The objective of this paper is to explore the role of natural resources for the relationship between capital flight and FDI by providing both a conceptual motivation through a formal theoretical model and empirical evidence through econometric analysis for the case of African countries.

The paper is based on a sample of 32 African countries for which we have adequate data on capital flight from 1970 to 2013. The analysis uses panel data econometric estimation techniques to tease out the relationship between FDI and capital flight and the role of natural resources in the links between capital fight and FDI. The econometric specification and estimation take into account the persistence of capital flight over time as documented in the literature (or hysteresis; see Ndikumana and Boyce (2003) and Ndikumana et al., 2015) and potential endogeneity of regressors using the system dynamic panel data estimator proposed by Arellano and Bover (1995) and Blundell and Bond (1998).

Three key results emerge from the analysis. First, while the results show that there is no robust evidence that capital flight is fueled by annual FDI inflows, there is a positive relationship between the stock of FDI and capital flight. Second, natural resources appear to directly drive capital flight and resource-rich countries exhibit a stronger FDI stock-capital flight link, especially in the case of oil. Third, the quality of institutions seems to weaken the link between FDI and capital flight, but good institutions do not completely eliminate the relationship.

The remainder of the paper proceeds as follows. The next section provides a review of the literature, summarizing the evidence on the links between natural resources and capital flight, between natural resources and FDI, and between FDI and capital flight, especially highlighting the role that natural resources play in this latter relationship. Section 3 presents a theoretical model that links capital flight, FDI and natural resource booms. The data and some stylized facts are provided in Section 4. Section 5 describes the specification of the empirical model and the estimation methodology. Section 6 presents and discusses the econometric results. Section 7 concludes.

2 Literature review

This paper draws from three strands of the literature. The first two relate to the linkages between natural resources and FDI on the one hand, and the relationship between natural resources and capital flight, on the other hand. The third strand relates to the linkages between FDI and capital flight. While the first two strands of literature are relatively extensive, the third is comparatively thin.

Natural resources and FDI

The empirical literature has explored the role of natural resources as a driver of FDI especially in developing countries. The question is: do natural resources attract FDI? Conceptually, the relationship between natural resources and FDI could be either positive or negative. Two factors may explain or motivate a positive relationship between the two phenomena. First, in many developing countries, natural resource exploitation is dominated by multinational corporations (MNCs). This is especially the case in Africa where foreign ownership of resource exploitation companies is much higher than in other developing regions (UNCTAD, 2007). The dominance of MNCs in resource exploitation is due to the high capital costs required for investment in the sector, the high technological intensity

and high associated risk, which discourage the less capitalized domestic investors. Under these circumstances we would naturally expect a positive relationship between natural resource endowment and FDI. Secondly, in countries where the natural resource sector accounts for a large share of the national economy, it is most likely that, regardless of ownership structure, a large share of private capital inflows will be directed to extractive industries, yielding a positive correlation between FDI and natural resources.

Empirical evidence bears out this hypothesized positive relationship between natural resources and FDI. The relationship has been documented at the aggregate level in the context of multi-country panel data studies (Asiedu, 2006, 2013; Ezeoha and Cattaneo, 2012) and country case studies (as in the case of Ghana (Acheampong and Osei, 2014)), as well as at the disaggregated company and sector levels (Aleksynska and Havrylchyk, 2013). The evidence suggests that countries with high natural resources also attract high FDI inflows. Furthermore, this result persists even when the analysis controls for the quality of institutions. In fact, it appears that natural resource endowment diminishes the deterrent effect of bad institutions on FDI in resource-rich recipient countries (Aleksynska and Havrylchyk, 2013).

It is conceptually possible, however, that the relationship between natural resources and FDI may be negative. There are two possible reasons. First, a natural resource export boom may cause a depreciation of the national currency, which discourages export-oriented FDI. Second, at the sectoral level, an increase in FDI in extractive industries can discourage investment in other sectors, which may result in a decline in overall FDI in the economy. Evidence from data on Netherland multinational companies supports this prediction: Poelhekke and van der Ploeg (2013) find that the net effects of FDI in natural resources on total investment is indeed negative.

To make sense of the relationship between natural resources, the literature has explored the role of institutions. The impact of institutions may be either positive or negative. On the one hand, bad institutions discourage investment in natural resources by profit maximizing firms. Indeed, corruption amounts to a tax on capital, which reduces the net returns to investment. Under this view, FDI would be lower in badly managed countries, including those that are rich in natural resources (Wei, 2000). On the other hand, bad institutions create opportunities for rent seeking by MNCs through bribery of local rulers, resulting in high resource-seeking FDI in resource-rich countries. In the case of Angola, for example, Guidolin and La Ferrara (2007) point out that multinational diamonds exploitation companies profited from corruption during the war. In general, bad institutions create an environment that encourages rent sharing between the political elites and MNCs, resulting in a positive correlation between natural resources and FDI (Wiig and Kolstad, 2010). However, the evidence at the micro level is inconclusive. For example, Poelhekke and van der Ploeg (2013) find evidence suggesting that foreign direct investors are not systematically attracted to badly governed countries.

On the basis of the existing evidence, it is clear that the question of the nature of the relationship between natural resources and FDI remains a valid empirical question that is worth investigating. This is more so for the case of African countries given the rising global demand for natural resources from the continent.

Natural resources and capital flight

The evidence from studies that provide estimates of capital flight from developing countries show that resource-rich countries feature prominently at the top of the list of countries with high capital flight. In the case of African countries, oil-rich countries especially appear to be more prone to high capital flight than resource-scarce countries (Ndikumana et al., 2015). The empirical question is: what are the factors behind the positive association between

capital flight and natural resources? Several factors can be considered. First, the management of the natural resource sector is characterized by high discretionary control by the central government, which yields substantial economic and political power to the policy makers. This weakens mechanisms of control and it undermines accountability of the government vis-à-vis the public. The fact that natural resources generate high revenues also weakens accountability of the government vis-à-vis taxpayers and donors. This implies a high risk of embezzlement of government revenue due to corruption and rent-seeking in the management of natural resources. As Kolstad and Søreide (2009: 214) put it, "corruption is the development problem in resource-rich countries, rather than just one of a number of problems." Second, limited competition in the natural resource sector facilitates capital flight and other tax-evasion motivated outward financial flows. Third, the complexity of technological and financial processes involved in natural resource exploitation creates an imbalance of expertise and technical capacity between the governments of resource-rich developing countries and multinational corporations. This creates opportunities for export underinvoicing, export smuggling, and other forms of unrecorded outflows of resources from resource-rich countries. Finally, the complexity of multinational corporations with regard to ownership structure and residence facilitates capital flight especially through trade misinvoicing.

The analysis of the linkages between capital flight and natural resources suggests that, from an empirical perspective, it is important to distinguish among various types of natural resources because each resource may face different types of exposure to capital flight. The key risks of capital flight associated with resource exploitation pertain to corruption, illegal exploitation, and tax evasion (Le Billon, 2011). For example, oil-rich countries face a high risk of corruption due to high concentration of discretionary decision making in the management of the sector. Industrial mining faces further risk of trade mispricing due to variations in unit prices, which is less of an issue for the oil sector where prices are more standardized internationally. Artisanal mining faces a high risk of capital flight through illegal exploitation and export smuggling due to the large number of small players operating informally.

It is also important to distinguish between natural resource endowment as measured by underground stock of wealth and natural resource dependence as illustrated in the predominance of natural resources in total exports and government revenue (Brunnschweiler and Bulte, 2008). High natural resource endowment along with high resource dependence makes a country prone to high risk of capital flight due to corruption associated with high concentration of power. This scenario is also a symptom of poor institutions in general and weak governance of the natural resource sector in particular. In contrast, a country with high natural resource endowment but low dependence (with a diversified economy) faces a relatively lower risk of capital flight. This is what distinguishes Norway from Angola. The empirical analysis in this study will take into account these important distinctions by considering a variety of types and measures of natural resources.

Econometric evidence on the link between capital flight and natural resources remains mixed. While, as stated earlier, studies that estimate capital flight from developing countries find that resource-rich countries feature prominently on the top of the list of countries with high capital flight, robust econometric evidence of a direct impact of natural resources on capital flight is relatively scarce. In Ljungberg and Friedl (2014), natural resources are associated with high capital flight, which the authors attribute to rent seeking. The effect persists even when they control for the quality of institutions. In the case of African countries, existing studies find a positive effect of natural resources on capital flight, but it is only robustly significant when natural resources are interacted with the quality of institutions. The evidence tends to suggest that natural resources are a conduit of capital flight in the context of bad institutions (Ndikumana and Boyce, 2003; Ndikumana et al., 2015). In a study of 21 resource-rich countries, Demachi (2014) finds that while there is a positive relationship between capital flight and natural resource

revenues, a stronger link is found between capital flight and external debt inflows as documented in other studies. The foregoing discussion suggests that the relationship between capital flight and natural resources deserves further empirical investigation.

FDI and capital flight

The literature has provided substantial evidence that capital flight is partly fueled by inflows of external capital in the form of sovereign debt. This issue gathered attention especially in the wake of the debt crisis of the 1980s. In the case of Mexico, Cuddington (1987) found that about 31 cents of each dollar of new long-term external loans to the government flew out as capital flight in the same year. This phenomenon was also observed in a sample of Latin American countries by Pastor (1990), and in the case of the Philippines, a phenomenon referred to as 'revolving door' by Boyce (1992). Studies on African countries also find similar evidence pointing to a tight link between debt inflows and capital flight (Ndikumana and Boyce, 2003, 2011b; Ndikumana et al., 2015). The question is whether private capital flows such as FDI may also potentially fuel capital flight. This question was first posed directly by Kant (1996: 1): "Do FDI flows facilitate capital flight, by increasing the availability of foreign exchange, or do they instead, mark a reduction of capital flight or a gradual return of capital flight". This question is relevant for developing countries in general and for African countries in particular given the recent increase in FDI and the decline in the relative importance of external debt in total capital inflows.

The statement by Kant (1996) suggests that the relationship between capital flight and FDI cannot be established a priori. Two conceptual frameworks can be drawn upon to motivate the relationship between FDI and capital flight: the investment climate as a determinant of investment decisions; and discriminatory treatment as a determinant of investment decisions.

Under the investment climate perspective, capital flight is driven by the risk-adjusted return differential between domestic and foreign assets. Under this view, capital flight would be a signal of higher returns to investment abroad relative to the home country. But as Lessard and Williamson (1987) point out, the investment climate cannot explain simultaneous capital flight and FDI. If domestic assets are dominated by external assets in rate of return, this should be so for both domestic and foreign investors. In fact the investment climate perspective would suggest a negative relationship between FDI and capital flight: a good investment climate would attract FDI while discouraging capital flight; in other words, it would encourage both domestic investment and FDI.

Under the discriminatory treatment perspective, capital flight is explained by government laws and regulations that are biased in favor of foreign investment. These may include preferential taxation such as tax holidays, investment or exchange rate guarantees, and priority given to foreign claims over resident claims in the event of a financial crisis (Kant, 1996). Such preferential treatments would result in differential perceived or actual risk for domestic investment relative to FDI, which would induce capital flight (Dooley, 1988; Eaton, 1987; Khan and Haque, 1985). Under those circumstances, high capital flight would coexist with high FDI.

The literature has ignored a third possibility. Under the above two perspectives, capital flight and FDI may move either in the same direction or in the opposite direction due to a third factor that affects both. The relationship may not necessarily be direct. But there is a possibility that FDI can actually fuel capital flight directly, in a similar fashion as the debt-fueled capital flight. First, FDI may provide resources that can be siphoned out of the country in illicit channels, thus remaining unrecorded in the country's Balance of Payments. This would be a case of FDI-fueled capital flight. Second, ex ante, capital flight could be the true motive of FDI, in which case the host country

serves as mere transit for unrecorded financial outflows, especially those destined to secrecy jurisdictions. This would be the case for capital flight-bound FDI.

The question then is, could natural resources be one of the possible factors that facilitate the FDI-capital flight link? There are two possible ways in which this could be the case. First, natural resources attract FDI, which can then be used to finance capital flight. Second, as the natural resource sector is subject to corruption and rent seeking, FDI directed to natural resources is more susceptible to contribute to capital flight. This would suggest a positive relationship between capital flight and FDI that would be especially strong in countries that have both high natural resource endowment and bad institutions. The objective of this study is to contribute to the literature by providing a conceptual framework as well as empirical evidence that sheds light on the role that natural resources play in the linkages between capital flight and FDI in the case of African countries.

3 A theoretical model of FDI and capital flight in resource-rich countries

The objective of this section is to provide a theoretical motivation for a mechanism through which natural resources, FDI and capital flight may be linked. The world economy comprises two countries, a host nation that is heavily endowed with natural resources (subsoil assets such oil, gas, coal or minerals) and a capital source nation that is endowed with physical and human capital, and the capacity to extract the resources located in the host country. The model features two players: an incumbent ruler of the host nation and a multinational corporation originating from the capital source nation that specializes in natural resource extraction. The timing of the model is as follows:

1. The multinational corporation chooses the level of FDI F in the resource sector of the host nation.
2. Upon observing FDI F, the ruler chooses the amount of consumption c for the population and the amount of funds e to embezzle for his own benefit.
3. Given these choices, the ruler faces an endogenous probability $q(c)$ of being overthrown.

Multinational corporation's choices

The goal of the multinational company is to maximize the flow of profits by solving the following problem:

$$\Pi = \max_{F} (p-\tau) Q(F) - rF \tag{1}$$

where the production function $Q(.)$ exhibits decreasing marginal product so that $Q' > 0$ and $Q'' < 0$; p and r denote the commodity prices and the world interest rate (which is the rental rate for international capital F) respectively; τ represents the severance tax on extracted resources.

Optimality requires the multinational corporation to provide the level of FDI F^* such that the net value of the marginal product of foreign capital equals its rental rate:;

$$(p-\tau) Q'(F^*) = r \tag{2}$$

By the implicit function theorem, it follows from first order condition (2) that:

$$\frac{\partial F^*}{\partial p} = -\frac{Q'(F^*)}{(p-\tau)Q''(F^*)} > 0 \tag{3}$$

Expression (3) suggests that a rise in commodity prices provides the multinational company the incentive to increase its capital investment in the resource-rich country.

Ruler's choices

Now, consider the ruler of a small open economy who has the authority to enter into resource extraction contracts with the multinational corporation on behalf of the host nation. The host nation generates total output y from local production (z)[1] and from the taxation of the resource according to:[2]

$$y = z + \tau Q(F^*) \tag{4}$$

The ruler allocates total output between the population's consumption c and a flow of misappropriated funds e to be placed in a foreign account (as capital flight). The resource constraint in the host nation is:

$$c + e = z + \tau Q(F^*) \tag{5}$$

While in office, the ruler derives a flow of utility $u(\overline{w}+e)$ from his entitled remuneration $\overline{w}$ and misappropriated funds e. The utility function is strictly increasing and concave in e ($u' > 0$ and $u'' < 0$) . Misappropriation of public funds may, on the other hand, exacerbates discontent among segments of the society, and may eventually trigger the toppling of the ruler.[3] In this model, the ruler may be deposed with some probability $q(c)$. We assume that increased population's consumption reduces the ruler's probability of being toppled at a decreasing rate, i.e. $q' < 0$ and $q'' > 0$. Should he lose power, he will derive utility $u(\underline{w})$ where $\underline{w} < \overline{w}$ denotes the ousted ruler's entitlement. The ruler's expected utility function is therefore expressed as follows:

$$(1-q(c))\,u(\overline{w}+e) + q(c)u(\underline{w}) \tag{6}$$

Upon observing $F^* = F(p)$, the ruler's optimization problem is to maximize his net benefit subject to the host country's resource constraint (5). This optimization problem can be written as:

$$\begin{aligned} V &= \max_e (1-q(c))\,u(\overline{w}+e) + q(c)u(\underline{w}) \\ &\text{s.t.} \quad c + e = z + \tau Q(F(p)) \end{aligned} \tag{7}$$

[1] In an earlier version of the paper, we endogenized z by introducing a stock of physical capital. Doing so simply adds complexity to the model without changing the core results.

[2] We assume that the severance unit tax τ is exogenous since it is not the focus of this paper. Rather, we focus on the allocation decision of the total income between c and e. In any event, it would be fairly straightforward to endogenize the ruler's tax decision, for example by setting a constraint such as $0 < \tau \leq \bar{\tau}$.

[3] Such examples in recent history include rulers such as Ferdinand Marcos of the Philippines, Mobutu Sese Seko of Zaire, Alberto Fujimori of Peru, Zine al-Abidine Ben Ali of Tunisia, or Hosni Mubarak of Egypt.

The first order condition yields:

$$q'(c)\left[u(\overline{w}+e)-u(\underline{w})\right]+(1-q(c))\,u'(\overline{w}+e)=0 \tag{8}$$

Applying the implicit function theorem to equation (8) yields:

$$\frac{\partial e}{\partial p} = -\frac{\left\{q''(c)\left[u(\overline{w}+e)-u(\underline{w})\right]-q'(c)\,u'(\overline{w}+e)\right\}\tau Q'(F^*)\dfrac{\partial F^*}{\partial p}}{-q''(c)\left[u(\overline{w}+e)-u(\underline{w})\right]+2q'(c)\,u'(\overline{w}+e)+(1-q(c))\,u''(\overline{w}+e)} > 0 \tag{9}$$

Given the assumptions that $Q'>0$, $q'<0$, $q''>0$ $u'>0$ and $u''<0$, it is clear that the denominator is negative while the numerator is positive. This implies that misappropriation of funds (capital flight) will increase with commodity price boom, that is, $\dfrac{\partial e}{\partial p}>0$. The mechanism through which the increase in capital flight occurs runs through higher foreign investment. Higher commodity prices provide incentives for increased foreign investment in the resource sector, which in turn leads to increased resource extraction and therefore increased tax on the multinational corporation. This enhanced revenue provides further opportunity for capital flight.

These predictions on the linkages between capital flight, foreign investment and natural resources are investigated empirically in the remainder of the paper.

4 Data and Stylized Facts

The data used in the analysis covers the period from 1970-2013 and contains 32 countries that have adequate data on capital flight. The capital flight series are obtained by extending the series produced by Boyce and Ndikumana (2012) and Ndikumana and Boyce (2012), adding the years 2011-2013. We also extend the capital flight algorithm by including portfolio flows as a source of foreign exchange in addition to external borrowing and FDI. For a country i in year t, capital flight is measured as follows:

$$KF_{it} = \Delta DEBTADJ_{it} + FDI_{it} + PI_{it} - (CA_{it} - CRES_{it}) + MISINV_{it} \tag{10}$$

where $\Delta DEBTADJ$ is the change in the stock of external debt outstanding adjusted for exchange rate fluctuations, FDI is net FDI, $PI$is net portfolio investment, CA is the current account deficit, and $CRES$ is net additions to the stock of foreign reserves, and $MISINV$ is trade misinvoicing.

We retain only 32 countries from the Ndikumana-Boyce sample (39 countries) that have positive total capital flight over the 1970-2013 period. Data on FDI flows, FDI stock and GDP growth are obtained from the UNCTAD online database. Data on indicators of natural resource endowment – oil rents, mineral rents, and total resource rents, as well as the domestic deposit interest rate and the exchange rate, which are used to calculate the rate of return differential between African countries and the world (proxied by the US Treasury bill rate) are obtained from the World Development Indicators. Debt indicators (change in debt and total debt stock) are from the World Bank's International Debt Statistics. A detailed description of the variable definitions and data sources is provided in Table

A1 in the appendix. The list of countries included in the sample is provided in Table A2 in the appendix, along with their resource endowment status.

To minimize the effects of annual fluctuations over a long period, the data entered in the regressions are transformed from annual time series into a cross-sectional pooled data over 4-year non-overlapping periods. The summary statistics for the regression variables are presented in Table 1. The means and standard deviations for each variable are provided for the 1970-2013 as well as for the pre- and post-2000 periods. The post-2000 period exhibits substantial growth acceleration, a reduction in the debt indicators, and a marked increase in FDI flows and resource rents.

The data show some similarities in the trends of capital flight, FDI, and natural resource rents over the past four decades. Figure 1 presents annual total capital flight and FDI flows as well as the annual average ratio of natural resource rents to GDP for the sample of 32 countries. As can be seen on the chart, capital flight and resource rents have been quite volatile over the period under study, and they have moved broadly in the same direction. Of particular interest is the fact that over the past decade the commodity boom has been accompanied by an increase in both capital flight and natural resource rents, especially starting from the turn of the century. These co-movements suggest that it is worth exploring whether natural resource endowment may have been a driver of capital flight in African countries.

Several important observations can be made regarding the relative trends of capital flight and FDI. First, while FDI inflows increased relatively smoothly and slowly until the end of the 1990s, capital flight remained volatile during the entire period. From the turn of the century, this group of countries witnessed an unprecedented increase in FDI inflows. This surge in FDI occurred at a time of increased demand for natural resources from both developed and emerging economies that led to the pre-crisis commodity boom. From the early 2000s onwards, capital flight and FDI flows moved relatively closely and upward. This co-movement is surprising, because according to portfolio choice theory, the two variables are expected to move in opposite directions. Indeed, if higher returns are a major driver for foreign investment in Africa, these very returns should, ceteris paribus, also encourage domestic investment and therefore discourage capital flight. This observation calls for further investigation to understand the mechanisms through which this seemingly puzzling phenomenon occurs in the case of African countries.

The close relationship between capital flight and FDI is especially strong when we compare the stock of capital flight and the stock of FDI as depicted in Figure 2 (as measured in 2012) . Countries that host larger stocks of FDI have also experienced higher capital flight over time as illustrated in the high stock of FDI in 2012. The data also show that resource-rich countries such as Nigeria, Algeria, the Republic of Congo, Egypt and Sudan feature prominently on the top of the list of countries having both high FDI and high capital flight. The econometric analysis in this paper seeks to shed light on these relationships between capital flight, FDI and natural resource wealth.

5 Empirical specification and estimation methodology

According to portfolio choice theory, capital flight would be driven by the difference between the rate of return to investment abroad and in the domestic market. The relative return to investment is captured by the interest rate differential and the rate of economic growth. Following Fofack and Ndikumana (2015) we also consider that the investor faces a cost for transferring capital abroad, which depends, among other things, on the legal and regulatory

environment as it determines the ability to track, prosecute and punish capital smuggling. We incorporate the important fact that, as documented in the literature, capital flight tends to persist over time so that countries with high capital flight in the past and present tend to have high capital flight in the future (Ndikumana and Boyce, 2003, 2011b; Ndikumana et al., 2015). This suggests modeling capital flight as dynamic process where current capital flight depends on its lags.

The specification of the empirical model is motivated by the goal of this study which is to examine the relationship between FDI and capital flight, and the role played by natural resources in this relationship. For this purpose, we include FDI and natural resources as explanatory factors of capital flight. We first include these variables separately in the capital flight equation and test whether these two variables are significant determinants of capital flight. We then test the role of natural resources for the FDI-capital flight link by interacting FDI with a dummy for resource endowment (which equals 1 for resource-rich and 0 otherwise). Following the discussion in the literature review earlier, the sign of the coefficients on FDI and natural resources cannot be determined a priori; it can be negative or positive.

The empirical capital flight equation is therefore specified as follows:

$$KF_{it} = \alpha_0 + \alpha_1 KF_{it-1} + \alpha_2 FDI_{it} + \alpha_3 NR_{it} + \alpha_4 D_i \times FDI_{it} + \mathbf{X}_{it}\Gamma + \varepsilon_{it} \tag{11}$$

where KF is capital flight, FDI is FDI flows or stock, NR is alternatively total natural resource rents or oil rents and mineral rents, D is a dummy for natural resource endowment that takes the value of 1 if a country is resource rich (total resources, oil, or minerals) and zero otherwise, $\mathbf{X}$ is a vector of other determinants of capital flight, and ε is a random error term.

The vector $\mathbf{X}$ includes the following indicators:

- The annual flow of external debt capturing the possibility of a revolving door; it is expected to be positively related to capital flight.
- The stock of external debt, which captures the debt overhang effect, and is expected to be positively related to capital flight.
- The interest rate differential, representing the rate of return differential, which is expected to be negatively related to capital flight.
- GDP growth rate, representing the expected return on domestic investment associated with overall economic performance; it is expected to be negatively related to capital flight.
- A measure of institutional quality, using polity index (Polity2) political stability from Polity IV database.

The capital flight equation specified above is estimated using the Arellano-Bover/Blundell-Bond linear panel-data method (Arellano and Bover, 1995; Blundell and Bond, 1998), referred to as "systems dynamic panel data estimator". It is an extension of the original GMM estimator of Arellano and Bond (1991), enabling to address potential bias to the results in case of serial correlation in the endogenous variable. This approach is particularly appropriate given the persistent nature of capital flight (Ndikumana and Boyce, 2003; Ndikumana et al., 2015), which is accommodated by inclusion of the lag(s) of the dependent variable. This approach also enables us to handle potential

endogeneity of explanatory variables. In this case FDI and the change in debt are explicitly modeled as endogenous in the estimation procedure.

The time series properties of the regression variables are examined using the Fisher-type panel-data unit-root tests. The results for the Augmented Dickey-Fuller test are presented in Table 2. They show that capital flight, change in debt, GDP growth, total resource rents, and the covered interest rate differential are stationary in level. The debt stock, FDI flows and stock, oil rents and mineral rents exhibit a unit root in level and are stationary in first difference or integrated of first order. These variables are therefore entered in the regression in first difference, whereas the stationary variables are entered in level (i.e., in their original measurement).

To econometrically investigate the linkages between capital flight and FDI and the impact of natural resources of this relationship, we proceed as follows. We first estimate the effects of FDI flows and the stock of FDI on capital flight separately. The results are presented in Table 3 for FDI flows and 4 for FDI stock. We then estimate an equation including both FDI flows and lagged FDI stock simultaneously. The results are reported in Table 5. This is similar to the approach employed in studies that analyze the linkages between capital flight and external borrowing where both the change in debt and the stock of debt are entered in the regression (Ndikumana and Boyce, 2003, 2011b; Ndikumana et al., 2015). In those studies, the coefficient on the change in debt measures the extent of debt-fueled capital flight while the coefficient on the lagged stock of debt measures the debt overhand effect. In this paper, the coefficient on FDI measures the extent to which inflows of private capital are used to finance unrecorded capital outflows in the short run, while the coefficient on the stock of FDI measures the medium to long-run impact of FDI on capital flight.

The impact of natural resources is tested by considering alternatively total resources, oil, and minerals. Natural resource endowment is measured alternatively by rents as a percentage of GDP and a dummy taking the value of one for a country classified as resource-rich and zero otherwise. A country is classified as oil-rich or mineral-rich if oil or minerals account for at least 20% of total exports. A resource-rich country is one that is either oil-rich or mineral rich or both. An interaction term of the resource dummy and FDI (flow and stock) is entered to assess the extent to which FDI in a resource-rich country may facilitate or fuel capital fight.

The Polity2 index is entered in the regression to take into account the impact of the institutional environment. The index is entered as an interaction term with resource rents in the regressions including resource rents, and separately in the regressions including an interaction term of a resource dummy and FDI.

6 Empirical results

Impact of FDI on capital flight

The results in Table 3 show that there is no systematic robust relationship between FDI inflows and capital flight. FDI inflows have a positive and significant coefficient only in the base regression including total natural resource rents (column 1). But the coefficient becomes negative and significant when we control for institutional quality using an interaction term between the Polity2 index and various measures of natural resource wealth (columns 2, 4-5) and when we interact FDI inflows with the resource-rich dummy (column 3). The results suggest that FDI inflows do not constitute a driver of capital flight; and more precisely, they do not fuel capital flight.

The results for the stock of FDI are substantially different as shown in Table 4. The stock of FDI appears to have a positive relationship with capital flight when it is entered directly in the regression along with natural resource rents

(column 1) or when it is interacted with a resource-rich dummy (column 3) or oil-rich and mineral-rich dummy (column 5). Unlike FDI flows, no specification yields a statistically significant negative coefficient on the FDI stock.

The results with the regression including both the flow and stock of FDI presented in Table 5 show differences in the effects of FDI inflows compared to the stock of FDI. The stock of FDI turns out to have a systematic positive and significant effect on capital flight when it is entered separately (columns 1, 2, 4). However, while the coefficient remains positive and statistically significant at the 10% level when FDI stock is interacted with a overall resource-rich dummy (column 3), it becomes insignificant when oil-rich and mineral-rich dummies are used in the interaction term (column 5). In contrast, FDI flows appear to have no systematic link with capital flight. They seem to be negatively related to capital flight when entered directly in the equation along with oil and mineral rents (column 4) or when interacted with the oil-rich dummy (column 5). The coefficient is insignificant in other regressions (columns 1 and 5). Overall, the results show a positive relationship between capital flight and the stock of FDI, but no apparent relationship between capital flight and FDI inflows.

The role of natural resources

The results for natural resource endowment are quite insightful. High natural resource endowment appears to be positively associated with capital flight as illustrated by the positive and statistically significant coefficient on the total resource rents in all three runs as reported in columns 1 and 2 in Tables 3-5. This result is consistent with the stylized facts presented in the previous section (Figure 2) and it is in line with evidence in the literature. The positive relationship between natural resource endowment and capital flight holds even when we control for the institutional environment as shown in column 2 of Tables 3-5.

The results with the resource endowment dummies are also informative. The coefficient on the natural resource dummy is systematically positive and significant in all the regressions (column 3 in Tables 3-5). This result suggests that being heavily resource endowed makes a country more prone to capital flight. When we consider the types of resources separately, it turns out that the positive link holds for oil but not for minerals (column 5). An oil-rich country appears to have higher exposure to capital flight, but a mineral-rich country is not statistically different from the typical country in the sample as far as the potential exposure to capital flight.

The results also point to the possibility that natural resources may be one of the conduits of the positive link between capital flight and FDI. This holds for FDI stock but not for FDI inflows. This is illustrated by the positive and statistically significant coefficient on the interaction term of FDI stock and the natural resource-rich dummy (column 3 in Tables 3-5). When we include oil and minerals dummies separately, the result holds for oil but not mineral resources (column 5). The results confirm that different types of natural resources may be associated with different risks of being exposed to capital flight as discussed earlier in the literature.

Taken together, the results lead to two important conclusions. First, the results do not provide consistent evidence of FDI-fueled capital flight: there is no systematic positive association between FDI inflows and capital flight. In this sense, FDI inflows behave differently from external borrowing, which is consistent with evidence in the literature (see Demachi, 2014). In contrast, the stock of FDI seems to be positively related to capital flight. Second, natural resources appear to be a possible conduit of the positive relationship between capital flight and FDI, and the relationship is driven by oil endowment and not by minerals.

The role of returns to investment

We tested the impact of the relative rate of return to investment at home vs. abroad using the US Treasury bill as a proxy for world interest rate with the aim of assessing whether capital flight may be consistent with portfolio choice theory. The results are presented in Table 6. The coefficient on the covered interest rate differential is negative and significant (columns 2 and 4 of Table 6), suggesting that a high interest rate differential in favor of the domestic market discourages capital flight as would be expected. However, the coefficient loses its significance when we include both FDI stock and FDI inflows (column 3). The interest rate differential becomes significant again when we include dummies for countries that have experienced extremely high inflation rates and currency depreciation, notably Angola, the Democratic Republic of Congo, and Zimbabwe. The latter represents the extreme case of currency collapse. It therefore follows that, according to the data for African countries, the theoretical prediction that capital flight from African countries is driven by higher relative interest rates abroad needs to be further investigated to assess its robustness.

7 Conclusion

This paper sought to investigate the puzzling simultaneous increase in capital flight and FDI in African countries over the past decades, which seems to contradict portfolio theory of investment. In particular, the paper focused on the role that natural resource endowment may play in the capital flight-FDI relationship. It specifically explored whether natural resources may be a conduit of this link. The paper provided a theoretical framework that helps to motivate how capital flight emerges from an environment characterized by both high natural resource endowment and poor institutions. The formalization of these relationships constitutes a substantial contribution to the literature on capital flight, FDI and natural resources.

The empirical analysis in the paper distinguished between FDI inflows and FDI stock, in the spirit of the analysis of the capital flight-external debt relationships which distinguishes between debt inflows (debt-fueled effects) and debt stock (debt overhang effects). It also considered the role of natural resources altogether as well as oil and minerals separately. The analysis explored direct effects of FDI as well as the interaction of FDI and natural resource endowment.

Three conclusions emerge from the empirical analysis. First, with regard to FDI, we find that FDI inflows do not appear to be robustly related to capital flight. Specifically there is no evidence that FDI inflows directly fuel capital flight. In contrast, the stock of FDI appears to be positively related to capital flight and the relationship is especially strong in the case of natural resource-rich countries. Second, natural resource endowment is both directly and indirectly related to capital flight. Resource rents are positively related to capital flight. Moreover, dummies for high natural resource endowment interacted with the stock of FDI are positively related to capital flight. Third, the quality of institutions tends to reduce the positive impact of natural resources on capital flight but it does not completely offset it.

The evidence from this study calls for further investigation of the role that natural resources may play in the links between capital flight and FDI. It also underscores the need to dig deeper in understanding the mechanisms that drive capital flight especially given the evidence that the standard portfolio choice explanation does not seem to fit the data well. Furthermore, the issue of management of natural resources, including ownership of resource exploitation corporations deserves serious attention if African countries are to harness their rich natural resource

endowment for accelerating inclusive development.

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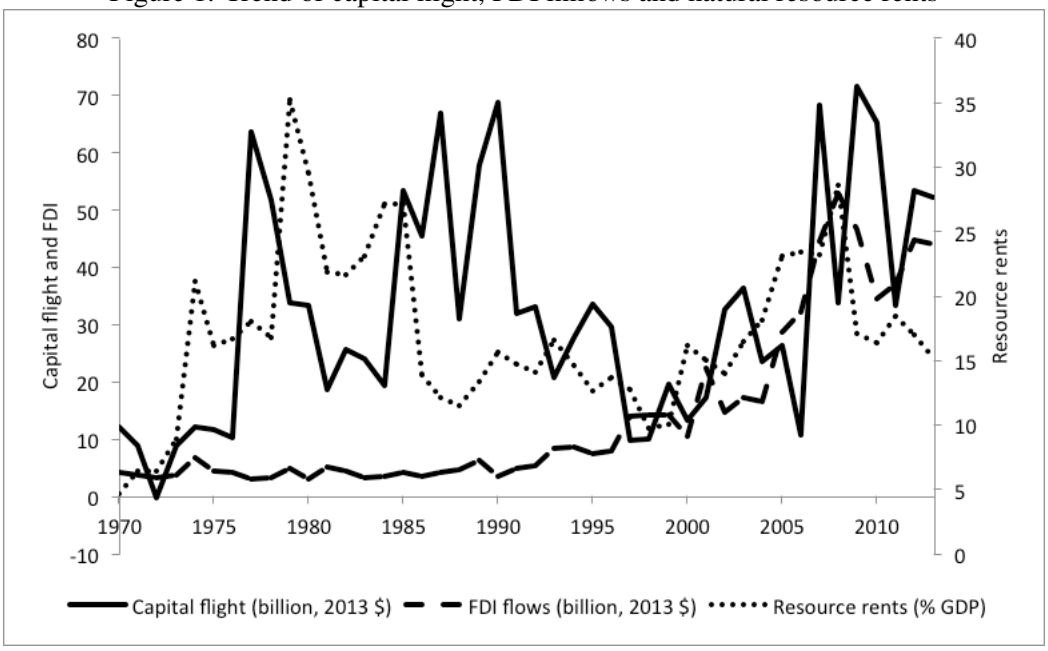
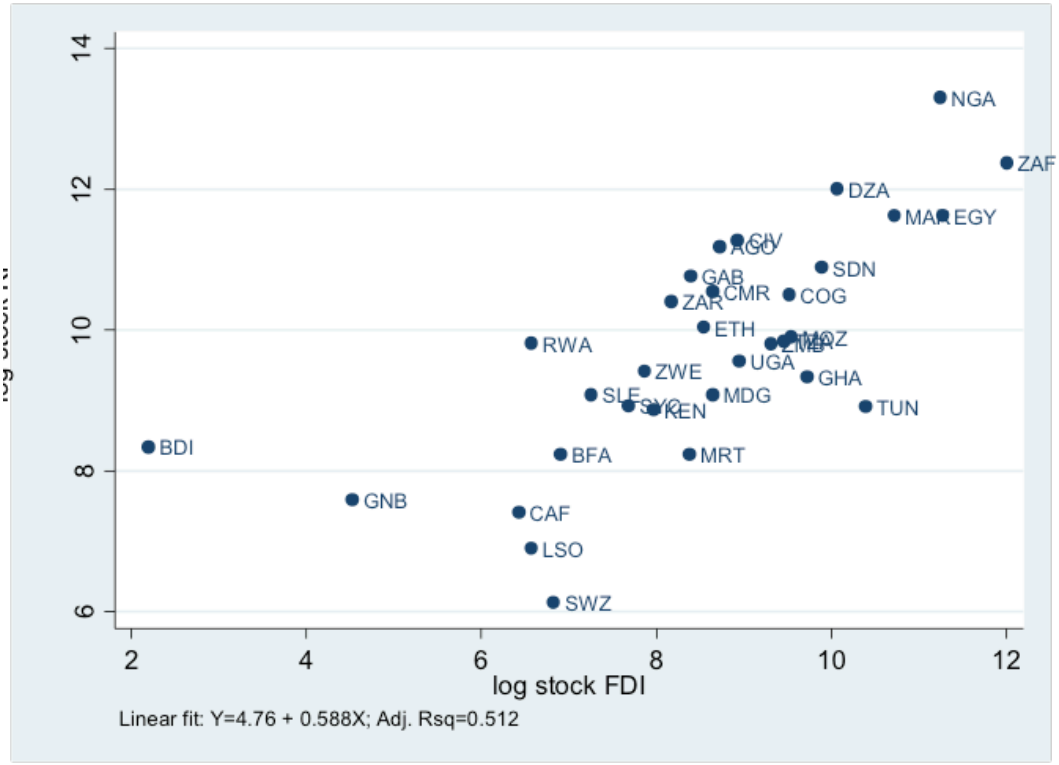
Figure 1: Trend of capital flight, FDI inflows and natural resource rents



Sources: Authors' computation (capital flight); UNCTAD database (FDI); World Development Indicators (Resource rents).

Figure 2: Stock of capital flight and stock of FDI in 2012



Sources: Authors' computation (capital flight); UNCTAD database (FDI).

Table 1: Summary Statistics for regression variables

	1970 - 1999			2000 - 2013			1970 - 2013		
	Obs	Mean	Std dev	Obs	Mean	Std dev	Obs	Mean	Std dev
Capital flight/GDP (%)	848	4.0	7.3	447	2.8	7.2	1295	3.3	7.3
Change in debt/GDP	882	2.3	7.0	448	0.9	4.7	1330	1.5	5.7
Total debt/GDP (%)	914	43.6	41.0	448	24.9	21.5	1362	32.4	32.1
GDP growth (%)	887	2.5	5.4	448	4.9	4.1	1335	4.0	4.8
FDI flows/GDP (%)	958	0.8	1.8	448	2.4	3.2	1406	1.8	2.9
FDI stock/GDP (%)	637	12.6	13.6	443	28.2	16.7	1080	22.7	17.3
Oil rents/GDP (%)	960	11.9	15.9	448	12.3	14.8	1408	12.1	15.2
Mineral rents/GDP (%)	960	0.7	1.9	448	1.4	3.0	1408	1.1	2.7
Resource rents/GDP (%)	882	16.9	16.4	448	19.0	15.3	1330	18.2	15.8
Fuel exports/total exports (%)	960	32.3	40.4	448	38.4	38.9	1408	36.0	39.6
Minerals exports/total exports (%)	960	4.8	10.1	448	9.2	13.6	1408	7.4	12.5
Covered interest rate differential (%)	628	-29.6	251.9	395	-3.7	64.9	1023	-19.6	201.8
Polity2 index	909	-5.1	4.5	418	0.7	4.9	1327	-3.2	5.3

Note: Sample of 32 Countries with positive stock of capital flight. Average for variables expressed as ratios of GDP are weighted by nominal GDP.
Source: Authors' computation

Table 2: Panel-data Unit-Root Tests - ADF Inverse Normal statistic (Z)

Variable	In level	First difference	Order of integration
Capital flight/GDP	-5.39 (0.00) ***	-	$I(0)$
Change in debt/GDP	–5.86 (0.00)**	-	$I(0)$
Total debt/GDP	2.22(0.99)	-3.58 (0.00) ***	$I(1)$
FDI flow/GDP	2.76 (0.99)	-11.09 (0.00) ***	$I(1)$
FDI stock/GDP	5.77 (1.00)	-1.78 (0.04) **	$I(1)$
GDP growth	-6.94 (0.00) ***	-	$I(0)$
Total resource rents	-1.56 (0.06) *	-	$I(0)$
Oil rents	-1.18 (0.43)	-4.88 (0.00)***	$I(1)$
Mineral rents	0.49 (0.69)	-3.39 (0.00)***	$I(1)$
Covered interest rate differential	-6.62 (0.00) ***	-	$I(0)$
Polity2 index	3.92 (1.00)	-8.08 (0.00)***	$I(1)$

Note: The numbers in parenthesis are p-values. ***, **, * represent significance at 1%, 5% and 10% level, respectively. The other Fisher-type tests yield the same conclusions. Source: Authors' computation

Table 3: Impact of FDI flows on capital flight - Two-step GMM results

	(1) Total rents	(2) Total rents + Polity	(3) Resource dummy + Polity	(4) Oil & mineral rents + Polity	(5) Oil & minerals dummy + Polity
FDI flow	0.061*	-0.286***		-0.455**	
	(0.073)	(0.004)		(0.015)	
Resource rents	0.214***	0.176***			
	(0.000)	(0.000)			
Resource rents × Polity2		-0.011***			
		(0.000)			
Resource-rich			5.811***		
			(0.000)		
Resource-rich × FDI flow			-0.265***		
			(0.006)		
Oil rents				0.049	
				(0.115)	
Oil rents × Polity2				-0.012***	
				(0.001)	
Mineral rents				-0.007	
				(0.968)	
Mineral rents × Polity2				-0.122***	
				(0.000)	
Oil-rich					8.182***
					(0.009)
Oil-rich × FDI flow					-0.182*
					(0.087)
Mineral-rich					1.703
					(0.557)
Mineral-rich × FDI flow					0.128
					(0.511)
Polity2			-0.072*		-0.087
			(0.089)		(0.107)
Lag capital flight	0.236***	0.265***	0.305***	0.286***	0.233***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Change in debt	0.437***	0.399***	0.383***	0.233***	0.247***
	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)
Lag total debt	0.024***	0.031***	0.024***	0.023***	0.023***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Lag GDP growth	-0.506***	-0.609***	-0.393***	-0.530***	-0.508***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.907	1.897*	0.119	5.817***	1.629
	(0.158)	(0.071)	(0.883)	(0.000)	(0.158)
Sargan test Chi2 (p-value)	26.83	23.05	21.00	18.64	24.44
	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)
AR2 (p-value)	-0.492	-0.214	-0.02	0.004	-0.253
	(0.62)	(0.83)	(0.98)	(0.99)	(0.80)
Observations	264	252	256	256	256
Number of countries	32	31	31	31	31

Note: The numbers in parenthesis are p-values: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' computation

Table 4: Impact of FDI stock on capital flight - Two-step GMM results

	(1) Total rents	(2) Total rents + Polity	(3) Resource dummy + Polity	(4) Oil & mineral rents + Polity	(5) Oil & minerals dummy + Polity
FDI stock	0.053***	0.039*		-0.007	
	(0.002)	(0.067)		(0.800)	
Resource rents	0.233***	0.238***			
	(0.000)	(0.000)			
Resource rents × Polity2		-0.017***			
		(0.000)			
Resource-rich			4.132**		
			(0.010)		
Resource-rich × FDI stock			0.080***		
			(0.003)		
Oil-rents				0.032	
				(0.449)	
Oil rents × Polity2				-0.025***	
				(0.000)	
Mineral rents				0.017	
				(0.942)	
Mineral rents × Polity2				-0.105***	
				(0.000)	
Oil-rich					8.281**
					(0.011)
Oil-rich × FDI stock					0.020
					(0.622)
Mineral-rich					1.998
					(0.398)
Mineral-rich × FDI stock					0.085
					(0.116)
Polity2			-0.183***		-0.098
			(0.000)		(0.181)
Lag capital flight	0.232***	0.289***	0.271***	0.261***	0.238***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Change in debt	0.429***	0.489***	0.380***	0.335***	0.347***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Lag total debt	0.010	0.025***	0.022***	0.023***	0.023***
	(0.174)	(0.000)	(0.001)	(0.000)	(0.000)
Lag GDP growth	-0.553***	-0.528***	-0.453***	-0.293***	-0.481***
	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)
Constant	-0.017	-1.376	1.489***	3.249***	1.139
	(0.983)	(0.253)	(0.025)	(0.000)	(0.596)
Sargan test Chi2 (p-value)	26.78	20.07	26.82	21.61	20.85
	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)
AR2 (p-value)	-0.79	-0.19	0.34	0.49	-0.38
	(0.43)	(0.85)	(0.73)	(0.62)	(0.70)
Observations	242	229	233	233	233
Number of countries	32	31	31	31	31

Note: The numbers in parenthesis are p-values: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' computation

Table 5: Impact of FDI flows and stock on capital flight - Two-step GMM results

	(1) Total rents	(2) Total rents + Polity	(3) Resource dummy + Polity	(4) Oil & mineral rents + Polity	(5) Oil & minerals dummy + Polity
FDI flow	0.011	-0.066		-0.219***	
	(0.826)	(0.193)		(0.000)	
FDI stock	0.120***	0.095***		0.173***	
	(0.000)	(0.000)		(0.000)	
Resource rents	0.273***	0.218***			
	(0.000)	(0.000)			
Resource rents × Polity2		-0.017***			
		(0.000)			
Resource-rich			4.720***		
			(0.004)		
Resource-rich × FDI flow			0.020		
			(0.841)		
Resource-rich × FDI stock			0.105*		
			(0.099)		
Oil rents				0.045	
				(0.451)	
Oil rents × Polity2				-0.022***	
				(0.000)	
Mineral rents				-0.172	
				(0.423)	
Mineral rents × Polity2				-0.088***	
				(0.000)	
Oil-rich × FDI flow					-0.360*
					(0.093)
Mineral-rich × FDI flow					0.294
					(0.205)
Oil-rich × FDI stock					0.083
					(0.114)
Mineral-rich × FDI stock					0.280
					(0.130)
Oil-rich					7.591*
					(0.075)
Mineral-rich					-4.481
					(0.578)
Polity2			-0.180**		-0.088
			(0.042)		(0.462)
Lag capital flight	0.222***	0.213***	0.277***	0.246***	0.227***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Change in debt	0.487***	0.471***	0.381***	0.433***	0.279***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
Lag total debt	0.030***	0.019**	0.005	0.004	0.028***
	(0.000)	(0.010)	(0.483)	(0.537)	(0.003)
Lag GDP growth	-0.386***	-0.587***	-0.609***	-0.522***	-0.496***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.434	1.347	1.521	4.790***	2.577
	(0.460)	(0.126)	(0.110)	(0.001)	(0.358)
Sargan test Chi2 (p-value)	27.32	18.49	20.62	15.67	20.09
	(1.00)	(1.00)	(1.00)	(1.00)	(1.00)
AR2 (p-value)	-0.61	-0.35	-0.42	-0.03	-0.51
	(0.54)	(0.72)	(0.67)	(0.97)	(0.61)
Observations	219	206	209	209	209
Number of countries	32	31	31	31	31

Note: The numbers in parenthesis are p-values: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' computation

Table 6: Impact of rate of return differential on capital flight - Two-step GMM results

	(1) FDI flows	(2) FDI stock	(3) FDI flows & FDI stock	(4) FDI flows & FDI stock + dummies
FDI flow	0.009		-0.050	-0.079
	(0.938)		(0.722)	(0.660)
FDI stock		0.090***	0.056	0.083*
		(0.000)	(0.223)	(0.082)
Resource rents	0.189***	0.203***	0.209***	0.250***
	(0.000)	(0.000)	(0.000)	(0.000)
Resource rents × Polity2	-0.007**	-0.016***	-0.018***	-0.015***
	(0.012)	(0.000)	(0.000)	(0.000)
Interest rate differential	-0.003	-0.004***	-0.001	-0.003*
	(0.109)	(0.000)	(0.364)	(0.053)
Angola dummy				-0.729
				(0.891)
DRC dummy				6.559
				(0.781)
Zimbabwe dummy				-345.860
				(0.272)
Lag capital flight	0.286***	0.229***	0.246***	0.159***
	(0.000)	(0.000)	(0.000)	(0.002)
Change in debt	0.431***	0.558***	0.466***	0.430***
	(0.000)	(0.000)	(0.000)	(0.000)
Lag total debt	0.031***	0.026***	0.027**	0.026***
	(0.000)	(0.000)	(0.011)	(0.002)
Lag GDP growth	-0.627***	-0.489***	-0.710***	-0.632***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	1.089	0.293	1.674**	0.270
	(0.318)	(0.596)	(0.018)	(0.860)
Sargan test Chi2 (p-value)	25.28	16.89	22.16	16.51
	(1.00)	(1.00)	(1.00)	(1.00)
AR2 (p-value)	-0.58	-0.93	-0.77	-1.05
	(0.56)	(0.35)	(0.44)	(0.29)
Observations	228	187	187	187
Number of countries	30	30	30	30

Note: The numbers in parenthesis are p-values: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Source: Authors' computation

Appendix

Table A1: Variable definitions and data sources

Variables in the dataset	Definition	Data Source
kf_gdp	Capital fight as a percentage of GDP	Capital flight estimated by the authors
gdpgrowth	Growth rate of GDP	UNCTADSTAT
totdebt_gdp	Total outstanding debt as a percentage of GDP	World Development Indicators and UNCTADSTAT
cdebt_gdp	Change in the stock of debt	Authors' computation
fdiflow_gdp	Inward FDI as a percentage of GDP	UNCTADSTAT
fdistock_gdp	Stock of FDI as a percentage of GDP	UNCTADSTAT
oilrents	Oil rents (as a percentage of GDP)	World Development Indicators
mineralrents	Mineral rents (as a percentage of GDP)	World Development Indicators
resourcerents	Total resource rents (as a percentage of GDP)	World Development Indicators
covintdiff	Covered interest rate differential = domestic deposit rate – US Tbill rate – exchange rate depreciation	Authors' computation using data from World Development Indicators
polity2	Polity2 score = -10 (worst) to 10 (best)	Polity IV Project database (online)

Table A2: List of countries and classification by resource endowment

Country	Oil rich dummy	Mineral rich dummy	Resource rich dummy
Algeria	1	0	1
Angola	1	0	1
Burkina Faso	0	0	0
Burundi	0	0	0
Cameroon	1	0	1
Central African Republic	0	1	1
Congo, Dem. Rep.	0	1	1
Congo, Rep.	1	0	1
Cote d'Ivoire	1	0	1
Egypt	1	0	1
Ethiopia	0	0	0
Gabon	1	0	1
Ghana	0	0	0
Guinea-Bissau	0	0	0
Kenya	0	0	0
Lesotho	0	0	0
Madagascar	0	0	0
Mauritania	0	1	1
Morocco	0	0	0
Mozambique	0	1	1
Nigeria	1	0	1
Rwanda	0	1	0
Seychelles	0	0	0
Sierra Leone	0	0	0
South Africa	0	1	1
Sudan	1	0	1
Swaziland	0	0	0
Tanzania	0	1	1
Tunisia	0	0	0
Uganda	0	0	0
Zambia	0	1	1
Zimbabwe	0	1	1

Note: The dummy = 1 if resource-rich and 0 if resource-scarce.

southern africa labour and development research unit

The Southern Africa Labour and Development Research Unit (SALDRU) conducts research directed at improving the well-being of South Africa's poor. It was established in 1975. Over the next two decades the unit's research played a central role in documenting the human costs of apartheid. Key projects from this period included the Farm Labour Conference (1976), the Economics of Health Care Conference (1978), and the Second Carnegie Enquiry into Poverty and Development in South Africa (1983-86). At the urging of the African National Congress, from 1992-1994 SALDRU and the World Bank coordinated the Project for Statistics on Living Standards and Development (PSLSD). This project provide baseline data for the implementation of post-apartheid socio-economic policies through South Africa's first non-racial national sample survey.

In the post-apartheid period, SALDRU has continued to gather data and conduct research directed at informing and assessing anti-poverty policy. In line with its historical contribution, SALDRU's researchers continue to conduct research detailing changing patterns of well-being in South Africa and assessing the impact of government policy on the poor. Current research work falls into the following research themes: post-apartheid poverty; employment and migration dynamics; family support structures in an era of rapid social change; public works and public infrastructure programmes, financial strategies of the poor; common property resources and the poor. Key survey projects include the Langeberg Integrated Family Survey (1999), the Khayelitsha/Mitchell's Plain Survey (2000), the ongoing Cape Area Panel Study (2001-) and the Financial Diaries Project.

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