CAPITAL FLIGHT AND POVERTY REDUCTION IN AFRICA[*]

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Abstract

This paper investigates the impact of capital flight on poverty reduction through the investment and growth channel. It uses two approaches. First, the Incremental Capital-Output Ratio (ICOR) approach is used to estimate additional income that would have been generated if all capital flight had been invested domestically. The second approach uses capital stock to derive the potential effect of capital flight on income per capita and on poverty. The effect on poverty reduction is computed by taking into account country-specific and time-varying income-growth elasticity of poverty. The ICOR method suggests that the average annual rate of poverty reduction over the period 2000-2010 could have been 1.9 percentage points higher. The capital stock method generates an additional 2.5 percentage points per year above the current rate of poverty reduction. The evidence in this paper confirms that capital flight has significantly undermined African countries' efforts to reduce poverty.

Key Words: Capital flight; Africa; sub-Saharan Africa; poverty reduction; capital stock; domestic investment; incremental capital-output ratio

JEL Classifications: E22; G11; O16; O55;

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1. Introduction

Recent studies of capital flight from Africa have focused on the estimation of the flows of capital flight with limited emphasis on their potential effects on socio-economic conditions (Ndikumana and Boyce, 2011a,b; UNDP, 2011; GFI, 2010).[1] Attempts to estimate the potential effects of capital flight on poverty reduction in Africa may have been limited by the lack of reliable country-level data.

Capital flight can affect poverty through different channels. They include low public service provision such as education and health, resulting from limited budgets for public spending and investment; lost tax revenue; and flight-fuelled external borrowing. Embezzled public funds that are transferred abroad reduce the amount of resources that could be spent on the development of vital sectors such as agriculture, education, health, and infrastructure. Moreover, capital flight negatively affects tax revenue, as private capital fleeing a country is not taxed. Furthermore, there is an indirect effect between capital flight and poverty reduction via flight-fuelled external borrowing as governments may need to borrow more to service their debts, some of them odious. Capital flight can also affect poverty through inequality. Officials who are able to embezzle public resources not only contribute to increasing poverty, but this also deepens the cleavage between their group and the majority of the population that bear the brunt of poor public service provision. Capital flight also fuels and perpetuates poor governance, creating an environment that discourages investment, negatively affecting economic growth and poverty reduction.

[1] See also contributions in *ACAS Bulletin* No. 87, 2012 (Fall).

This paper focuses on the effect of capital flight on poverty reduction through its impact on investment and economic growth.[2] Since capital flight reduces the stock of financial resources available for financing growth-enhancing investments (e.g. in agriculture and infrastructure), the loss of potential investment due to capital flight negatively affects economic growth and income per capita. In turn, a slow increase in income per capita hampers poverty reduction efforts in view of the critical role of income growth for poverty reduction.[3]

Two approaches are used to quantify the potential effect of capital flight on poverty reduction. First, the Incremental Capital-Output Ratio (ICOR) approach is used to estimate how much income per capita would have been generated if all the funds transferred abroad, referred to here as flight capital, had been invested domestically with the same productivity as that of actual investment. The effect on poverty reduction is computed by multiplying the income-growth elasticity of poverty and the potential annual percentage of the difference in income per capita with and without capital flight. The second approach uses capital stock instead of investment to simulate the effects of investing flight capital domestically on poverty reduction. Capital stock series, both with and without capital flight, are estimated on the basis of the perpetual inventory method. Assuming constant capital stock to GDP shares when actual and potential (that is, including capital flight) investment stocks are used, we

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[2] The extent to which investment and growth reduce poverty depends on the income-growth elasticity of poverty which, in turn, depends on a number of factors, including political and institutional environments (Olson, 1996). However, even with improvements in institutions, it is inconceivable that high levels of poverty such as those prevailing in Africa could be drastically reduced without a substantial increase in poverty-reducing investments, as illustrated by the East Asian experience where a combination of high investment, high rates of economic growth, and institutional changes produced spectacular poverty reduction outcomes (see Section 2).

[3] Even though the discussion is limited to the potential effect of capital flight on poverty measured in monetary terms, this does not imply that capital flight could not have a negative effect on the non-monetary dimensions of poverty. This aspect deserves dedicated analysis.

derive the potential loss in annual growth of income per capita attributable to capital flight and multiply it by the income-growth elasticity of poverty to find the effect of capital flight on poverty.

The central hypothesis in this paper is that investing flight capital would have a positive effect on poverty reduction given that Africa is a capital-starved region. Africa's large investment gap (see discussion in section 2.3.2) implies that higher investment is needed to increase the region's absorptive capacity, which, in turn, would make further investment more productive. While most observers consider this hypothesis as reasonable, some dissenting voices argue that Africa does not need more capital. This literature is critically discussed in the next section.

This paper contributes to the literature on capital flight in Africa in several respects. First, to the best of our knowledge, it is the first country-level analysis attempting to quantify the effect of capital flight on the rate of poverty reduction in Africa. Whereas previous studies aggregated countries into three groups, namely oil-rich, resource-rich and non-resource-rich countries (AfDB et al., 2012), this study presents results at the country level, providing information that is more useful for policy and country case studies. Second, the analysis uses a larger sample of countries (35 countries), including North African countries, compared to the most recent studies, which covered 33 countries from Sub-Saharan Africa. Third, we use updated estimates of capital flight that cover the period from 1970 to 2010, instead of 1970 to 2008 previously (Ndikumana and Boyce, 2011a, b). Fourth, by basing the estimation of the effect of capital flight on poverty on country ICORs rather than a common ICOR of 4 applied in previous analyses, this study produces more robust results. Fifth, we use time-varying income-growth elasticities of poverty in the estimation of the potential effect of capital flight on the rate of poverty reduction. And sixth, this paper develops

a step-by-step methodology for estimating the effect of capital flight on poverty reduction.

The rest of the paper is structured as follows. Section 2 briefly reviews the literature on capital flight in Africa and then takes a detailed look at the relationships between capital flight and poverty reduction. A case is made for the need for more investment in order to achieve higher levels of poverty reduction. Section 3 presents the methodology used to estimate the potential effect of capital flight on the rate of poverty reduction in Africa. Section 4 presents the data used and discusses the empirical results. Section 5 concludes.

2. Capital flight and poverty reduction in Africa

In order to put the discussion of the relationship between capital flight and poverty reduction in perspective, the first part of this section briefly reviews the relevant literature on capital flight in Africa. Then, the section provides a brief comparative description of poverty trends in Africa and other developing regions. The section ends with an exposition on why Africa needs more financial resources in order to reach poverty reduction rates that are compatible with its development objectives, especially the Millennium Development Goal of halving the 1990 level of poverty by 2015 (referred to as MDG1 in the rest of the paper).

2.1. The literature on capital flight from Africa

Recent literature on capital flight from Africa has been dominated by studies primarily focused on estimating the magnitude of capital flight (Boyce and Ndikumana, 2001; GFI, 2010; Ndikumana and Boyce, 2011b; UNDP, 2011; AfDB

and GFI, 2013) [4] as well as the linkages between external debt and capital flight (Ndikumana and Boyce 2011a, b).

Very few attempts have been made to quantify the socio-economic effect of capital flight in Africa. The limited literature includes Fofack and Ndikumana (2010) who show the potential effect of capital flight repatriation on domestic investment in Africa. They find that repatriating and investing only a quarter of the stock of capital flight would place sub-Saharan Africa among the developing regions with the highest ratios of domestic investment to GDP. This would contrast with the current trend, whereby Africa has been trailing other developing regions in terms of investment level (see section 2.3). In their book, Ndikumana and Boyce (2011a) find that Africa spends a large share of its scarce financial resources to service its external debt, part of which could be odious. Weeks (2012) investigates the nature of capital flows in sub-Saharan African countries and finds large and highly volatile non-FDI outflows, particularly in the 2000s. These outflows are not linked to any productive activity, so they are interpreted as representing resource losses that could have been invested in originating countries. The loss of potential investment results in reduced rates of growth in Africa.

On the literature specifically addressing the topic of capital flight and poverty reduction in Africa, we are aware of only two recent publications. The first is a chapter in the 2012 *African Economic Outlook* (AfDB et al. 2012).[5] The second publication, which partly draws on the first, is by Nkurunziza (2012). These two studies quantitatively estimate the effect of capital flight on poverty reduction in

[4] Refer to the literature review in Ndikumana and Boyce (2003).

[5] This AEO 2012 piece was prepared by the author of this paper while he was working for the Regional Bureau for Africa, United Nations Development Programme.

Africa. They derive the growth rates of income per capita that would have been achieved if all flight capital had been invested in originating countries with the same productivity as actual investment. The main result of these studies is that investing flight capital domestically would have increased the rate of poverty reduction by 4 to 6 percentage points per year, on average. Such an increase in poverty reduction would have allowed most African countries to meet MDG1.

2.2. Capital flight and poverty

Two issues are discussed in this section: how does capital flight affect poverty and how the latter has evolved over the last three decades in Africa?

A. From capital flight to poverty: transmission channels

Capital flight can affect poverty through several channels.[6] The first is through the loss of potential investment. As a capital-starved region, Africa would benefit from investing flight capital in the domestic economy, particularly in the agriculture and infrastructure sectors, where the benefits to the poor are higher than in sectors that are weakly linked with the poor, such as oil, mining and other high-tech extractive sectors. In turn, higher investment would increase income per capita. In Nigeria and Angola, for example, this would imply average additional investments of $18.4 billion and $3.2 billion per year, respectively, over the period from 2000 to 2010. It has been estimated that if only a quarter of the stock of flight capital from Africa was repatriated to the continent and invested, Africa's ratio of domestic investment to GDP would increase from 19 per cent of GDP to 35 percent of GDP. This would raise Africa's investment to GDP ratio significantly, from the lowest to one of the highest

[6] This discussion partly draws from AfDB et al. (2012) and Nkurunziza (2012).

in the developing world (Fofack and Ndikumana, 2010). The resulting growth of income per capita would reduce poverty in a proportion determined by the income-growth elasticity of poverty. This conjecture is supported by the empirical results in Section 4.

The second channel is the repayment of Africa's odious debts. There is evidence that a substantial fraction of African countries' external public debts could be odious (Ndikumana and Boyce, 2011a). The repayment of such debts crowds out resources that could be spent on health, education, infrastructure, and other poverty reduction programs. For example, by reallocating the resources spent on servicing Africa's external debts to funding programs aimed at reducing infant mortality, 70,000 infant deaths could be prevented every year in Africa (Ndikumana and Boyce, 2011a).

The same argument could be applied to a third channel, namely aid. Although there does not seem to be research specifically linking aid with capital flight, there is anecdotal evidence suggesting that not all the aid reaches the poor. To the extent that part of this aid is appropriated by powerful elites, it could end up as "capital flight".

A fourth channel is the deepening of inequality resulting from capital flight. Not every citizen has the same opportunity to engage in trade misinvoicing practices or to unlawfully appropriate and transfer public resources abroad. African elites disproportionately benefit from these practices. Recently, media headlines have featured cases of African leaders plundering their countries' wealth and hiding their ill-gotten assets in safe havens while the majority of their populations live in abject poverty (Ndikumana and Boyce, 2012). Even where capital flight is mainly the result of portfolio motives, as is arguably the case in Latin America, wealthy people benefit disproportionately as they have access to foreign investment instruments that are not

accessible to the average citizen (Rodriguez, 2004; Vespignani, 2008). The individuals embezzling public resources and hiding them abroad increase poverty while deepening the cleavage between their group and the majority of the population, particularly those who are more dependent on public services. Sufficiently high inequality can lead to rising poverty (Ravallion, 1997).

Finally, capital flight from Africa is associated with a fifth channel, poor governance, known to harm poverty reduction efforts. Corruption, one of the main manifestations of poor governance, negatively affects poverty reduction by increasing capital flight and discouraging investment in the domestic economy, resulting in the neglect of social services. Since elites have access to foreign services such as healthcare and education, they are not affected by the poor quality of social services in their home countries that the rest of the population relies on.[7] Good governance is, therefore, important for stemming capital flight and fighting against poverty.

B. Poverty trends in Africa and other developing regions

The high levels of economic growth recorded in Africa[8] over the last decade have helped the continent reduce extreme poverty, defined here as the proportion of a country's population living on less than $1.25 per day, measured in 2005 Purchasing Power Parities (PPP). However, sub-Saharan Africa still has the highest level of poverty of any other region (Figure 1). This section motivates the need for scaling up

[7] In recent years, African leaders from countries that are highly affected by capital flight have died in foreign countries' clinics due to the lack of appropriate health infrastructure in their own countries. Examples include President Mobutu of the Democratic Republic of Congo, who died in Morocco in 1997 (having been denied access to France), and President Bongo of Gabon, who died in Spain in 2009, also while seeking medical treatment.

[8] The data used in this section does not include North Africa.

investments towards poverty reduction projects and programs by comparing poverty trends in Africa and other developing regions since the early 1980s.

[Insert Figure 1 here]

Figure 1 shows that Africa has not been able to reduce poverty at the same rate as other developing regions. In fact, the absolute number of poor people in Africa increased from 205 million in 1981 to 414 million in 2010.[9] Of the four regions considered (sub-Saharan Africa, South Asia, East Asia and the Pacific, and Latin America and the Caribbean), sub-Saharan Africa had the second lowest level of poverty incidence until 1987, with Latin America and the Caribbean having the lowest incidence over the sample period.[10] With 77.2 percent of its population living under the poverty line in 1981, East Asia and the Pacific had the highest incidence of poverty. Over time, this region recorded the most dramatic progress in poverty reduction, from 77.2 percent in 1981 to 12.5 percent in 2010. With the exception of Papua New Guinea, where the poverty headcount increased from 29.7 percent to 38.6 percent of the population between 1981 and 2010, most countries in East Asia and the Pacific experienced high rates of poverty reduction. For example, over the 29-year period, the average annual rate of poverty reduction in China was 6.6 percent compared to 13 percent in Thailand (but from a relatively low initial level of poverty), 6.0 percent in Vietnam, 5.4 percent in Cambodia and 4.6 percent in Indonesia.[11] Hence, the impressive reduction of poverty rates in the region was not due to just one particular country.

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[9] Data from POVCALNET, at http://iresearch.worldbank.org/PovcalNet/index.htm?1.

[10] Figure 1 shows that Latin America and the Caribbean have a low and constant rate of poverty with a slight decline only at the end of the sample period. Our discussion, therefore, focuses on the other three regions.

[11] Computed based on POVCALNET data.

South Asia also experienced a steady decline of poverty from 61 percent to 31 percent over the same period. In contrast, poverty incidence in Africa increased from 51 percent in 1981 to 59 percent in 1993, before declining slowly to 48.5 percent in 2010. Therefore, on average, the annual rate of poverty reduction between 1981 and 2010 was 6 percent in East Asia and the Pacific, 2.3 percent in South Asia, and only 0.2 percent in Africa. Considering the period between 1999 and 2010, when Africa recorded relatively high rates of economic growth, the annual rates of poverty reduction are 9 percent in East Asia and the Pacific, 3 percent in South Asia, and 1.6 percent in Africa. The rate of poverty reduction in Africa is still the weakest of all three regions, even during the recent period of high growth.

The high level of poverty in Africa and its slow decline illustrate the need for additional resources to accelerate the rate of poverty reduction. Several factors help to explain why Africa has been unable to achieve comparable progress in poverty reduction. Five factors are briefly discussed.[12] First, throughout the 1980s up to the mid-1990s, Africa had real economic growth rates that were so low—close to zero—that they could not have any substantial impact on poverty reduction. On the contrary, as illustrated in figure 1, this period was associated with increasing poverty incidence.

Second, high population growth has contributed to limiting rises in income per capita, which is one of the factors directly affecting poverty reduction. The young age dependency ratio in Africa was 78 percent in 2009, compared to 51 percent in South Asia and 31 percent in East Asia and the Pacific.[13] The implication is that in Africa, household incomes are shared among a higher number of inactive members than in other developing regions.

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[12] Also refer to AfDB et al. (2012) and Nkurunziza (2012).
[13] Computed using data from the World Development Indicators.

Third, although the rate of economic growth has increased in Africa since the late 1990s—the period from 2000 to 2010 recorded an average rate of real economic growth of about 5 percent, twice the average growth rate in the previous decade (World Bank, 2012)—growth has not been high enough in sectors where the poor live or work. Growth has been driven by high prices of commodities, such as oil, which generate little local employment, as well as high-end services such as hotels and restaurants, financial services, transport, and communications (McKinsey Global Institute, 2010). Agriculture, and the rural sector in general, where most poor people work and live, has been stagnant or, at best, growing much more slowly than needed to pull rural people out of poverty. Total factor productivity in Africa's agriculture grew by an average 1.4 percent per year between 1984 and 2002, up from 0.14 percent per year between 1960 and 1984. About 36 percent of the increase in total crop output over the period from 1960 to 2002 was due to total factor productivity (Block, 2010). A slow increase in productivity and declining investment in agriculture resulted in declining food production. As a result, given an annual rate of population growth of about 2.7 percent, per capita food availability dropped steadily, hampering poverty reduction.[14]

Fourth, even as African economies recorded high economic growth rates of roughly 5 percent on average in the past decade, growth was not strong enough to reduce poverty at a rate comparable with the performance observed in other developing regions. It was estimated that in order to reach the goal of halving the 1990 level of poverty by 2015, Africa needed to post an average rate of economic growth of 7 percent per year (UNECA, 1999). Only a handful of African countries have reached this rate.

[14] Agriculture value-added per worker has been steadily declining.

Fifth, high inequality has hampered Africa's fight against poverty. As one of the most unequal regions in the world, Africa's growth disproportionately benefits the rich, who represent a small proportion of the population.[15] For example, the most recent data show that the richest 10 percent of the population own 65 percent of total wealth in Namibia, 55 percent in Comoros, and 51 percent in Botswana (World Bank, 2012). Hence, successful poverty reduction requires high and broad-based economic growth that is accompanied by a reduction in inequality.

2.3. Capital flight and domestic investment

As the discussion in the previous sections suggests, investment is considered one of the main conduits through which capital flight affects poverty. However, there is some controversy about investment productivity in Africa and whether more investment would lead to faster economic growth.

A. **The domestic investment controversy**

Capital accumulation was the central driver of economic growth in Asian development (Bosworth and Collins, 2003), which in turn increased income per capita, accelerating the rate of poverty reduction. In Africa, it is widely accepted that a similar process of capital accumulation is needed to substantially reduce poverty. However, some authors challenge this view (Devarajan et al., 2001, 2003; Easterly, 1999). According to them, poor economic policies and adverse domestic political factors create an environment that drastically reduces the productivity of private and public investment. In this context, increasing investment would not produce the higher

[15] Five of the ten most unequal countries are in Africa. They are: Angola, Botswana, Comoros, Namibia, and South Africa. Namibia, Comoros, and Botswana are the most unequal countries in the world, with Gini coefficients of 74, 64 and 61, respectively.

rates of economic growth needed to substantially reduce the level of poverty. The conclusion from this research is that given the prevailing negative domestic factors in Africa, the level of investment is too high, not too low. As a result, rather than advocating for investing flight capital in Africa, these authors consider capital flight as a rational response by investors to Africa's deleterious investment climate.

In addition to the fact that the studies backing the conclusion that Africa does not need more capital were challenged on methodological grounds (Jomo et al., 2011), the authors cited above do not acknowledge that slow human and capital accumulation could have been the root cause of low investment productivity in the 1980s and 1990s in Africa (Badunenko et al., 2010). Estimates based on growth accounting find that factor accumulation and productivity each accounted for half of the difference in the long-run rate of growth of real GDP per worker between Africa and other developing regions over the period from 1960 to 2000 (Ndulu and O'Connell, 2008). In addition, recent evidence shows that factor productivity has been increasing in Africa. Between 2000 and 2007, productivity growth has been, on average, 2.7 percent per year (McKenzie Global Institute, 2010). Microeconomic data also suggest that African firms are more productive—albeit with lower profitability—than their counterparts in other countries at the same level of economic development (Clarke, 2012).

Africa's political and economic environments have also substantially improved relative to the 1980s and 1990s. In the 1980s and 1990s, Africa undertook massive efforts to address its structural economic weaknesses, and they paid off in the 2000s. The ratio of investment to GDP increased from about 16 percent in 2000 to 22 percent in 2009 before falling to 20 percent of GDP in 2010, probably as a result of the international economic and financial crisis (Figure 2).

[Insert Figure 2 here]

Even though the rate of investment in Africa is half of the rate in East Asia and the Pacific, it is difficult to conceive how Africa could have attained an average growth rate of 5 percent per year (AfDB et al., 2012) during the 2000s without an increase in factor accumulation and/or factor productivity. Therefore, the argument that investment in Africa is unproductive, and that increasing it would be wasteful, is at odds with recent evidence. Moreover, investment productivity in Africa could be low because economies are caught in poverty traps. Getting out of such traps requires more, not less, financial resources (Andrimihaja et al., 2011), contradicting the argument that low productivity should imply a need to reduce the level of investment. The recent finding that public investment in Africa is below its optimal level (Fosu et al., 2011) strengthens the view that Africa needs more investment, not less. Hence, African countries need to increase both the volume and efficiency of investment.

Take the case of power generation in Africa. The availability and reliability of power could make otherwise unprofitable investment more profitable. Burundi, for example, boasts one of the world's ten largest nickel deposits. They were discovered in the 1970s but have not been exploited due to insufficient electricity in the country among other factors (AfDB, 2009a). Exploiting Burundi's large nickel deposits could bring transformational change to the country in the form of job creation, tax revenue, income generation, and associated poverty reduction.

While acknowledging that factors such as the quality of governance, human capital, and political stability are important for successful poverty reduction, the central hypothesis of this paper is that poverty reduction in Africa cannot be achieved without

scaling-up the current investment levels. In other words, higher investment is a necessary, albeit insufficient, condition for successful poverty reduction in Africa.

B. **The investment gap**

Several studies assume that Africa needs more investment to reach its poverty reduction goals and have attempted to estimate how much additional investment is needed. More specifically, a few studies have estimated the amount of additional investment needed in order to enable Africa to meet MDG1. A study by the New Partnership for Africa's Development, NEPAD, estimated that Africa will need to fill a resource gap representing 12 percent of GDP or $64 billion per year in order to meet MDG1 (NEPAD, 2001). Another estimate by Atisophon et al. (2011) suggests that sub-Saharan Africa would need additional investments of between $72 billion to $89 billion per year in order to reach economic growth rates that are compatible with the achievement of MDG1.

Shimeles (2010) [16] found that additional aid is needed to reach MDG1 in Africa under the hypothesis that this additional aid would be as productive as investment in the period between 1980 and 2004, representing 11 per cent of GDP on average. This amount would indicate that the current level of aid be increased by 79 per cent, on average. It is also a fact that development programs in most African countries are under-funded. Further aid increases, at least up to the 2005 Gleneagles commitments, would help African countries move closer to achieving their development objectives (Berg et al., 2012).

[16] Shimeles (2010) also shows that if donors were to allocate aid optimally at the global level and if recipients were to use it more efficiently, no additional disbursements would be needed, on average. However, the reality of aid allocation and its use makes these two hypotheses less likely.

At the sectoral level, some estimates show that in order for Africa to have a reasonable level of infrastructure, it would need to invest $93 billion a year for ten years; about one-third of this amount would be for the maintenance of existing infrastructure (AfDB, 2009b). In the agricultural sector, developing small-scale and large-scale irrigation in areas where it is economically viable would cost about $54 billion (You et al., 2009).[17]

These global and sectoral estimates illustrate the fact that Africa needs significant additional resources to attain higher levels of economic growth and accelerate poverty reduction. If flight capital were to be invested in originating countries, it could help to bridge the large investment gap the continent faces.

3. Methodology

This section develops the methodology used to quantify the potential effect of capital flight on poverty reduction. The main assumption is that Africa has a resource gap that needs to be filled in order to reach its poverty reduction targets. Investing flight capital could partly fill this gap. Hence, the methodology is based on the financing gap model. For a target growth rate, this model determines the financing gap between available and required levels of investment. In this paper the model is used to determine the potential growth in GDP that could result from additional investment represented by flight capital. Despite criticisms leveled against this approach, the financing gap model is widely used in international financial institutions, planning ministries, and central banks.[18]

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[17] This amount excludes the cost of rehabilitating existing irrigation infrastructure.

[18] The financing gap model has been criticized for two main reasons. The first is the assumption that not every dollar of additional investment leads to an increase in GDP. This criticism is addressed by using historical values of investment productivity (ICORs), which vary country by country. These

Two parameters are needed in order to use the financing gap model. The first is the parameter calibrating the relationship between investment and output. In this paper, this relationship is explored using two measures: the Incremental Capital-Output Ratio (ICOR) and the capital stock to GDP ratio. The second parameter is the income-growth elasticity of poverty, which determines how much poverty declines when income per capita increases by one percentage point. We derive time-varying elasticities following Ram (2013).[19]

3.1. ICOR-based methodology

The ICOR is defined as the amount of marginal capital investment needed to produce one additional unit of output. Over a specific time period, ICOR is approximated as the ratio of average investment to average GDP growth. The ICOR methodology may also be seen as relating a target growth rate to a specific ratio of investment to GDP, adjusting for the productivity of investment.

$$g_{it} = \frac{\frac{I_{it}}{GDP_{it}}}{\sigma_{it}} \tag{1}$$

Where g is the growth rate, I is investment, σ is the ICOR and subscripts i and t represent country and year, respectively, with $i \in (1,2,\dots,35)$ and $t \in$

ICORs capture eventual investment inefficiencies depending on the countries considered. The second criticism relates to the assumption that the ICOR measure assumes a fixed linear relationship between growth and investment. A detailed discussion of the model and its limitations, as well as the reasons why the model is still used despite its limitations, may be found in Easterly (1999).

[19] The income-growth elasticity of poverty is calculated as $\varepsilon_{it} = \frac{d(P_{it})}{d(y_{it})}$ where the numerator is the annual percentage rate of poverty reduction and the denominator the annual percentage rate of growth of income per capita for country i and time t.

$(1970, 1971, \ldots, 2010)$. Investment, GDP and the rate of economic growth are known and used to compute the ICOR as:

$$\sigma_{it} = \frac{\frac{I_{it}}{GDP_{it}}}{g_{it}} \tag{2}$$

Low ICOR values imply that investment is more efficient: producing one unit of incremental output requires less incremental capital. Although straightforward, the computation of ICORs is associated with two major issues. First, when rates of economic growth are negative, as has been the case for several years in many African countries, the ICOR turns negative. Negative ICORs do not have any economic meaning. Hence, the different computations relating investment to output in this paper exclude all observations with corresponding negative ICORs. Second, high volatility of growth and, to some extent, investment rates, leads to large variations in ICORs. In order to help address this issue, rather than basing the analysis on mean or individual ICORs, we use median ICORs. The empirical results discussed later in the paper consider median ICORs over the period between 2000 and 2010. Therefore, for each country in the sample, there is one (median) ICOR used to compute the effect of capital flight on economic growth (Table 1).

Using the median ICOR based on historical values to compute the amount of additional output that could be generated by investing flight capital implicitly assumes that additional investment would be as productive as past investment. This is a conservative assumption. Many African countries may be caught in a poverty trap because their stock of capital is very low (Andrimihaja et al., 2011). African countries, caught in a poverty trap, need substantial resources to emerge out of them (Sachs, 2005). Hence, accessing large financial resources to undertake the sizable

investments needed, for example, in infrastructure would increase the productivity of capital, leading to lower ICORs.

Following the calculation of the ICOR, the next step is the computation of the effect of capital flight on growth. On the basis of equation (1), the growth of output attributable to capital flight is:

$$\Delta GDP_{it} = \frac{KF_{it}}{\sigma_i} \tag{3}$$

where ΔGDP_{it} is additional GDP in real terms in country *i* and year *t* and *KF* is the flow of real capital flight from the same country in the same year. Therefore, the level of potential GDP incorporating the effect of investing flight capital is:

$$GDP_{it}^{KF} = GDP_{it} + \Delta GDP_{it} \tag{4}$$

With equation (4), the growth of GDP per capita due to capital flight may be computed as:

$$\Delta GDPCAP_{it}^{KF} = \frac{GDP_{it}^{KF} - GDP_{it}}{Population_{it}} \tag{5}$$

On the basis of equation (5), the average annual relative difference in income per capita due to the investment of flight capital is:

$$g_i^{CAP} = \frac{1}{n}\left(\sum_{t=0}^{n}\left(\frac{GDPCAP_{it}^{KF}}{GDPCAP_{it}} - 1\right) * 100\right) \tag{6}$$

The potential impact of capital flight on the rate of poverty reduction is computed by considering the period between 2000 and 2010.[20] Hence, the year 2000 is the initial

[20] Given that the data on poverty in 2000 is not available, we used data for the closest year, which is 1999. Hence, all the medians for which poverty data is used are computed on the basis of data covering the period from 1999 to 2010.

time or beginning of the period of analysis, and 2010 the end of the period, so *n=10*. This period is chosen for several reasons. First, computing a ten-year median reduces the effect of outliers on the results.[21] Second, due to missing observations, it is impossible to adopt a single year as the basis for the computation of the annual difference in income per capita for all countries. Third, the median for the period 2000-2010 better reflects the current reality than, for example, using observations from the 1970s. Fourth, using the period from 2000 to 2010 minimizes the effect of errors in the values of initial capital on the computation of current capital (see equations (9) and (10) below).

The potential effect of capital flight on the rate of change in poverty is simply:

$$\Delta POV_{it}^{KF} = g_{it}^{CAP} * \in_{it}^{POV} \quad (7)$$

where the left-hand side term is the percentage change in poverty due to the increase in income per capita resulting from the investment of flight capital, and the second term of the right-hand side is the time-variant income-growth elasticity of poverty for country *i* at time *t*. It is different from the econometrically derived elasticity used in previous studies (AfDB, 2012; Nkurunziza, 2012) where income distribution was assumed to be constant over the period of analysis (Fosu, 2011). Here, the temporal variation of the elasticity captures changes in the reactivity of poverty to income growth over time and allows for changes in income distribution, albeit at a constant rate (Ram, 2013).

3.2. Capital stock-based methodology

[21] Given the presence of extreme values in the data, medians are used instead of means.

The difference between the ICOR-based and capital stock-based methodologies is that the first relies on investment as the variable through which capital flight affects poverty, while the second method uses capital stock. Investment has only a short-term effect on output, which could underestimate the effect of capital flight on income and poverty. Using capital stock captures the long-term effect of investment on output and hence on poverty reduction. The estimation of the capital stock series starts with the canonical equation of capital accumulation:

$$K_{it} = K_{it-1} - \delta K_{it-1} + I_{it} \tag{8a}$$

where K is capital stock, δ the rate of depreciation of capital, and $0 < \delta < 1$. Other variables and subscripts are as defined earlier. The lagged value of capital stock may be expressed as:

$$K_{it-1} = K_{it-2} - \delta K_{it-2} + I_{it-1} \tag{8b}$$

Substituting equation (8b) into equation (8a) and solving backwards for the level of capital at the initial period of analysis leads to the perpetual inventory equation that is used to derive capital stock series (Nehru and Dhareshwar, 1993):

$$K_{it} = (1-\delta)^n K_{i0} + \sum_{t=0}^{n-1} I_{i,n-t}(1-\delta)^t \tag{9}$$

where n is the number of years of observation or the lifetime of the aggregate asset K, and K_{i0} is initial capital stock. The fact that $0 < \delta < 1$ implies that:

$$\lim_{n\to\infty}(1-\delta)^n K_{i0} = 0 \tag{10}$$

This property implies that the influence of the initial stock of capital on the current stock weakens over time. For example, using a depreciation rate of 5 percent as is the norm, $1 of capital stock in 1970 was worth only $0.13 in 2010. The implication is

that any errors in the estimation of initial capital stock have a weak effect on current estimates of capital stock as the time separating the two estimates increases. This property has been used as a simplifying feature invoked in the computation of capital stock when initial capital is ignored and the focus is on the second part of the right-hand side of equation (9).

In cases where the observation period is not long enough, the contribution of initial capital stock in the determination of current stock is more important. There are different ways of estimating initial capital stock, each with its limitations. The most common approach of estimating initial capital is based on Harberger (1978) and it is consistent with the Solow growth model. Given a fixed capital-output ratio during some time period, the rate of growth of capital must be equal to the rate of output growth:

$$g_{it} = \frac{K_{it} - K_{it-1}}{K_{it-1}} \tag{11}$$

Replacing K_{it} in equation (11) by equation (8a) and simplifying, we have the formula for lagged or initial capital stock:

$$K_{it-1} = \frac{I_{it}}{(g_{it} + \delta)} \tag{12}$$

Applying equation (12), the calculation of the initial capital stock series appears to be straightforward. However, two problems affect the use of equation (12) in the African context. The first is the volatility of growth rates over time. Picking one year as the basis for this estimation could bias the computation when the year is not representative of the sample period. This problem is normally addressed by using an average rate of growth instead of one observation. The second issue is more difficult to address. The fact that many countries in the sample experienced periods of negative

rates of economic growth, particularly towards the beginning of the sample period in the 1970s, implies that equation (12) could return a negative figure for initial capital. Using an average growth rate does not necessarily address this problem.

In order to address these two issues, another method is used. One estimates the series on investment accumulation focusing on the second part of the right-hand side of equation (9). By virtue of equation (10), the values obtained are closer to the stock of capital as time increases. Then the average coefficient of capital share to real GDP covering the period from 2006 to 2010 is computed.[22] The share is then multiplied by the value of GDP at the beginning of the sample period (1970 for most countries) to generate an estimate of initial capital. Finally, the first and second parts of equation (9) are added to get the stock of capital (Nehru and Dhareshwar, 1993; Weisbrod and Whalley, 2011). Equations (8a) to (12) are used to estimate the potential effect of capital flight on poverty reduction in the case of the capital stock-based methodology. First, the values of the stock of capital are derived, and then equation (6) is adjusted to calculate the annual rate of the difference between actual and potential income per capita as follows:

$$g_i^{CAP} = \left(\sqrt[n]{\frac{GDPCAP_{in}^{KF}}{GDPCAP_{i0}}} - 1 \right) * 100 \qquad (13)$$

where all the variables are as defined earlier. The derivation of the potential effect of capital flight on poverty follows a similar process as the one outlined in equations (3) to (7).

4. Data and empirical results

[22] This is to avoid basing the calculation on a one-year observation which could be an outlier or simply missing. Moreover, taking the median value over a longer period (e.g. 2000-2010) would introduce a stronger bias in the result as equation (10) shows.

This section briefly presents the data and their sources before discussing the empirical results.

4.1. The Data

The main variables used in this paper are the following: capital flight, Gross Domestic Product (GDP), Gross Fixed Capital Formation (Investment), GDP growth, population, rate of depreciation of capital, headcount poverty, income-growth elasticity of poverty, and political instability.

Capital flight series were computed by Ndikumana and Boyce; they are available online at www.peri.umass.edu/africa. GDP, GDP growth, fixed capital formation and population are from Glob Stat, a United Nations Conference on Trade and Development (UNCTAD) database.[23] For consistency, all nominal variables (GDP, investment and capital flight) are deflated using the US price deflator with 2010 as the base year. The choice of the base year is motivated by the fact that a dollar that left the continent in 1970 was worth more than one dollar of 2010. Real income per capita used in the tables below is calculated by dividing total real income by the population.

A constant rate of depreciation of capital of 5 percent is adopted for all countries and years; this is the practice in the literature. Information on poverty headcount is from POVCALNET at the World Bank.[24] Poverty statistics are based on the international poverty line of $1.25 per day in 2005 purchasing power parities (PPP). The values of the income-growth elasticity of poverty are computed as discussed in the

[23] The data are available online at http://globstat.unctad.unctad.org/ReportFolders/reportFolders.aspx?sCS_referer=&sCS_ChosenLang=en.

[24] The data was accessed on 30 April 2013 at: http//iresearch.worldbank.org/PovcalNet/index.htm?1.

methodology section. One caveat should be kept in mind when using estimates of income-growth elasticities of poverty. A large proportion of the poor could be clustered around the poverty line for individuals going in and out of poverty following small changes in income. An income-growth elasticity of poverty does not necessarily capture this dynamic.

In order to assess the effect of political instability on capital accumulation, we constructed a dummy variable taking the value 1 for a year when a country was in a state of political instability and zero otherwise. The latter is defined as "a contested incompatibility that concerns governments and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths."[25] The dummy variable is constructed on the basis of information from the Peace Research Institute Oslo (PRIO) database, Version 4-2009.[26]

4.2. Empirical Results

Actual GDP per capita is compared with potential GDP per capita, defined as the level of GDP per capita if flight capital had been invested domestically, in order to derive the average annual difference in GDP per capita that would be attributable to the investment of flight capital. The difference between actual and potential per capita GDP is then multiplied by the income-growth elasticity of poverty to get the potential effect of capital flight on poverty reduction. The results reported in Table 1 cover the period from 2000 to 2010.

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[25] This definition is from "UCDP/PRIO Armed Conflict Dataset Codebook", Version 4-2009

[26] The data are available online at:
http://www.prio.no/Global/upload/CSCW/Data/UCDP/2009/Main%20Conflict%20Table.xls

[Insert Table 1 here]

Caution is needed when interpreting the individual country results shown in Table 1 and subsequent tables. For example, median countries' ICORs are based on observations where ICOR coefficients are positive. Moreover, only positive values of capital flight are used to estimate the potential effect of capital flight on income per capita. This reduces the number of valid observations, generating several missing values. Furthermore, it should be noted that the difference between actual and potential income per capita reflected in Table 1 is the 10-year median of annual differences; it is not the difference between the values shown in columns 3 and 4 of Table 1. In addition, the effect of capital flight on the rate of poverty reduction is not only dependent on the potential change in income per capita but also on the income-growth elasticity of poverty.[27] The latter is volatile, so its eleven-year (1999-2010) median value is used for each country.[28]

For instance, the estimates of the potential effect of capital flight on poverty in Côte d'Ivoire, Gabon, Togo, and Tunisia appear to be out of the norm (column 5 of table 1). This is due to the fact that the results are based on a limited number of observations that are not representative of the sample median. In Côte d'Ivoire, for example, out of three available observations, strong poverty reduction of 4.4 percent in 2005 combined with a very weak rate of GDP per capita growth produced a large elasticity, which drives upwards the estimate of the effect of capital flight on poverty.

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[27] Where the data on the potential change in income per capita are missing for year t, we use information for the preceding year (e.g. 2009 for 2010). When information is not available for both t and t-1, we treat data in year t as missing.

[28] Using constant country elasticity estimates econometrically derived by Fosu (2011), the effect on the rate of poverty reduction is about 3.5 percentage points (instead of 1.9 in Table 1) higher than the current rate of poverty reduction. The results, not presented in this paper, can be obtained from the author upon request.

In Gabon, very high levels of poverty reduction due to a very low initial level of poverty (1.9 percent of the population in 1990 and 0.47 percent of the population in 2010) combined with near-zero rates of per capita GDP growth rates resulted in large income-growth elasticities of poverty, which drove the results well above the sample median.

In the case of Togo, the period from 2007 to 2010 was characterized by abnormally high flows of capital flight relative to the previous period. From systematically negative capital flight up to 2005, the four years starting from 2007 were characterized by positive flows with an average of more than $2 billion per year. Given that all observations of capital flight are negative up to 2005, only the last five observations, which could be considered as outliers, are used to compute the potential effect of capital flight on poverty reduction in the country. And out of the three observations used to compute the median effect (decline) on poverty, two are very large (106.67 per cent and 69.31 per cent in 2008 and 2010, respectively) as a result of large differences between actual and potential income per capita (17.7 percent and 10.37 percent, respectively, in 2008 and 2010) and relatively large income-growth elasticities of poverty (6.03 and 6.68 in 2008 and 2010, respectively).

Tunisia's large value is the result of a strong income-growth elasticity of poverty which, in turn, is due to a high rate of poverty reduction largely owing to the very low rate of poverty headcount (from 3.23 percent of the population in 1999 to 1.06 percent of the population in 2010). The use of different approaches (the capital stock method) addresses some of the data issues associated with the ICOR-based methodology.

Despite the data limitations which are common to most developing countries' macroeconomic indicators, the results of this analysis seem to conform to

expectations that investing flight capital with the same efficiency as actual investment could have allowed Africa as a continent to accelerate poverty reduction. This investment would have added an average of 1.46 percentage points to income per capita per year and 1.94 percentage points to the current average annual rate of poverty reduction. On the basis of information on poverty as reflected in Figure 1, the investment of flight capital in Africa would have increased the rate of poverty reduction from about 1.6 percent per year to 3.5 percent, on average, over the 2000s. This faster rate of poverty reduction would mean that poverty in 2010 would affect 39 percent of the population instead of the actual 48.5 percent of the population. The average result, however, masks large country variations as Table 2 illustrates.

[Insert Table 2 here]

Countries are classified in four categories. The first (Low, Low) lists countries where the difference between actual and potential income per capita is "low", meaning lower than the average of 1.46, and a low income-growth elasticity of poverty, meaning lower than the average elasticity of 1.32. Within this group, the effect of capital flight on poverty reduction is negligible for Rwanda, Swaziland, Tanzania, and Uganda; it is less than one percentage point per year. Countries in this group could reduce even further the effect of capital flight on poverty by adopting policies that strengthen the relationship between income per capita and poverty reduction.[29]

The second group (Low, High) is where the effect of capital flight on poverty could be important not because capital flight is high relative to the countries' income per capita but because those countries have strong income-growth elasticities of poverty.

[29] On possible ways of strengthening the relationship between income per capita and poverty reduction, see, for example, discussions in section 4 in AfDB et al. (2011).

This is the case for Algeria, Botswana, Côte d'Ivoire, Egypt, Malawi, and Morocco. In these countries, even a small reduction in capital flight could have a relatively strong effect on the rate of poverty reduction.

In the third group (High, Low) the magnitude of the effect of capital flight on the rate of poverty reduction is determined by the combination of a relatively low elasticity with a relatively "high" difference in income per capita with and without taking into account the role of capital flight. The fact that the effect on poverty is high in Cape Verde, Republic of Congo, Lesotho, Mozambique, Nigeria, and Sierra Leone, despite these countries having low income-growth elasticities of poverty, implies that capital flight has a particularly strong effect on income per capita, in comparison with the previous two groups. Were income-growth elasticities of poverty high in this group, the overall effect of capital flight on poverty would be even stronger. Hence, these countries should not only attempt to reduce capital flight but also put in place measures that strengthen the relationship between income per capita and poverty reduction.

The fourth category (High, High) groups countries where the effect of capital flight on poverty is the result of high income-growth elasticities of poverty and "high" difference in per capita income. In this group, with the exception of Guinea Bissau, the effect of capital flight on the rate of poverty reduction is greater than the sample average.

To what extent do these results change if capital stock rather than investment is the channel through which capital flight affects the rate of poverty reduction? This is the subject of the discussion in the next paragraphs. The series of capital accumulation are

estimated based on equation (9) and the effect on poverty reduction computed as outlined in the Methodology Section.

The pattern of capital accumulation in Africa helps explain why the region has had limited success in reducing poverty. The average rate of capital accumulation is low and in many countries, there were periods of capital destruction as a result of political instability and low investment rates. Table 3 shows decadal averages of the rate of capital accumulation.

[Insert Table 3 here]

Africa has not been able to reduce its high rate of poverty substantially, partly because it has not been able to increase its stock of capital as quickly as other regions. As Table 3 shows, the median annual increase of capital stock is 1.9 percent over the period from 1971 to 2010. Slow capital accumulation implied low rates of economic growth and low income per capita, limiting the effect of economic growth on poverty reduction.

Several countries, on average, destroyed part of their capital over the sample period. In the 1970s, the period with the highest average rate of capital accumulation over the last 40 years, only 4 countries had negative rates of capital accumulation. This number increased to 10 in the 1980s and 16 in the 1990s, dropping to 8 in the 2000s. Using the dummy variable for political stability constructed in Section 4.1, Table 3 also suggests that capital accumulation is lower in countries facing political instability. Among the 6 countries with a negative rate of capital accumulation over the period from 1971 to 2010, five experienced long periods of civil war. These countries are Burundi, Democratic Republic of Congo, Guinea Bissau, Mozambique, and Sierra Leone. The median value of the rate of capital accumulation is 75 percent higher in

countries and years without political instability than with it. Table 4 shows what would have been the pattern of capital accumulation if flight capital had been invested.

[Insert Table 4 here]

If flight capital had been invested in domestic economies with the same productivity as actual investment, the median annual rate of capital accumulation would have been higher than that of actual capital accumulation. In the 1970s and 1980s, the median annual rate of capital accumulation would have been about 2 percentage points higher than actual capital accumulation. Actual and potential capital accumulation would be slowest in the 1990s but the annual rate of growth of potential capital accumulation would be almost twice that of actual capital accumulation. Overall, investing flight capital would have generated an annual rate of capital accumulation about one percentage point above that of the actual rate of capital accumulation. Although this result does not seem to be very high on an annual basis, it translates into an increase of the stock of capital of about 50 percent over the full sample period.

Another indicator of the negative effect of capital flight on capital accumulation is the number of countries with an overall negative rate of capital accumulation. In Table 3, which represents the actual pattern of capital accumulation, 6 countries have negative rates of capital accumulation when considering the full sample period (1971–2010). In Table 4, where capital flight is assumed to have been invested, only one country, the Democratic Republic of Congo, has a negative annual rate of growth of capital accumulation. How these results affect income per capita and poverty reduction is shown in Table 5.

[Insert Table 5 here]

Using capital accumulation instead of investment suggests that investing flight capital domestically would have reduced poverty by an additional 2.5 percentage points, on average, reducing the level of poverty in 2010 from the actual 48.5 percent of the population to 36.5 percent of the population. Country-level results depend on the difference between actual and potential income per capita as well as the income-growth elasticity of poverty. As for the results presented in Table 1, there are countries in Table 5 for which the potential effect of capital flight on the rate of poverty reduction appears to be too high due to the reasons discussed earlier (e.g., Togo and Tunisia). This does not substantially affect our analysis, which is focused on the median overall effect rather than the individual country effects.

In order to illustrate how different these results are relative to the results in Table 1 (derived from the ICOR-based methodology), countries are classified relative to their potential annual difference in per capita GDP and their income-growth elasticity of poverty, as in Table 2. The differences in country classification between Table 2 and Table 6 illustrate the differences in the results from the two methodologies.

[Insert Table 6 here]

The country configuration in Tables 6 is different from that in Table 2. For example, of the 6 countries with low per capita GDP difference and low income-growth elasticity of poverty, 5 remained and 3 new countries joined the group when capital stock is used to determine the potential effect of capital flight on poverty. Similarly, of the 5 countries classified as having a high per capita GDP difference and high income-growth elasticity of poverty using the ICOR method, only 2 (Gabon and

Togo) remain in this group while 5 new countries appear in the group when the capital stock-based methodology is used. Therefore, although the magnitudes of the estimated overall effects of capital flight on poverty reduction are not substantially different when ICOR and capital stock-based methodologies are used, these two approaches are different.

The last issue to be explored is how capital flight could affect African countries' capacity to meet the Millennium Development Goal of halving the 1990 level of poverty by 2015. Information in Table 7 provides the answer.

[Insert Table 7 here]

In Table 7, the rate of poverty in 1990, the base year for MDG1, is from POVCALNET. The next column is the MDG1 target, which is half of poverty levels in 1990. The third column gives the latest available statistics on the level of poverty, which are from 2010 (POVCALNET). Column 4 shows the average annual rate of poverty reduction over the period 1999–2010 (the data on poverty in 1999, not shown in the table, are from POVCALNET).[30] The last three columns are constructed as follows. In column 5, the expected level of poverty in 2015 is calculated with the assumption that the same annual rate of poverty reduction between 1999 and 2010 would be sustained. This information shows what countries would meet MDG1 by 2015 even without taking into account the potential effect of investing flight capital on their income per capita. In columns 6 and 7, the assumption is that the annual rate of poverty reduction would be equal to the current one plus the additional rate

[30] Note that the median rate of poverty reduction in this table is higher than the 1.6 percent used earlier. This is due to the inclusion of North African countries which are characterized by very low extreme poverty. We therefore use the rate of 1.6 percent in the discussion that follows.

computed on the basis of ICOR and capital stock-based methodologies (Tables 1 and 5).

The results in Table 7 show that if African countries sustain the average annual rate of poverty reduction observed over the period from 1999 to 2010, they will, on average reduce the median rate of poverty from 39.94 percent in 2010 to 33.39 percent in 2015. This is about five percentage points higher than the target headcount ratio of 27.95 percent needed to reach MDG1. Had these countries invested their flight capital in domestic economies over the period 2000–2010, they would, overall, have been within two and one percentage points from the target rate, depending on whether the ICOR or capital stock methodologies are considered. More specifically, investing flight capital over the sample period would have helped African countries reach an annual average rate of poverty reduction of up to 4.1 percent, which is still lower than the rate in East Asia and the Pacific (see Figure 1) but higher than the actual rate of 1.6 percent. With this rate of poverty reduction, the median rate of poverty in Africa in 2015 would be 29.1 percent of the population, which is still slightly higher than the target rate required to meet MDG1.

The analysis of country results in Table 7 shows that there are four groups of countries, depending on whether or not they would, individually, meet MDG1. The first group covers 12 countries which, by 2010, had met MDG1. They are Algeria, Cameroon, Cape Verde, Egypt, Ethiopia, Gabon, Ghana, Guinea, Morocco, Swaziland, Tunisia, and Uganda. In the second group are two countries that are expected to meet MDG1 by 2015 if they sustain the same average annual rate of poverty reduction achieved between 1999 and 2010. These countries are Botswana and South Africa. The third group consists of five countries where investing flight

capital in the domestic economy would have enabled them to achieve MDG1. These countries are Republic of Congo, Lesotho, Mauritania, Sierra Leone, and Togo. The remaining 15 countries, in the fourth group, would not meet MDG1 even if flight capital had been invested in their national economies. But all these countries would move closer to meeting the MDG1. Among these countries, Burkina Faso and Côte d'Ivoire would be about 3 percentage points away from meeting MDG1.

The finding that the investment of flight capital would have helped five countries to achieve MDG1 does not imply that capital flight had a negative effect on poverty reduction in only those countries. As illustrated in Tables 1 and 5, capital flight appears to have a negative effect on poverty in all the countries in the sample but at varying degrees. Depending on the method that is used to estimate this effect, investing flight capital in domestic economies over the period from 2000 to 2010 would have increased the annual rate of poverty reduction by less than one percentage point in the following countries: Burkina Faso, Guinea, Guinea Bissau, Madagascar, Malawi, Rwanda, South Africa, and Tanzania. In Cameroon, Côte d'Ivoire, Gabon, Sierra Leone, and Togo, investing flight capital in domestic economies over the same period would have increased the annual rate of poverty reduction by more than 10 percentage points. Hence, the magnitude of the effect of capital flight on poverty reduction is country specific.

5. Conclusion

Capital flight can affect poverty through different channels. This paper explored the investment channel. Considered as dis-saving, capital flight reduces the stock of financial resources available for poverty reduction, investment, and spending. The reduction of investment in a capital-starved region leads to lower potential income per

capita, with a negative effect on the rate of poverty reduction given the direct relationship between the growth of income per capita and poverty reduction. This study has attempted to quantify the magnitude of the effect of flight capital on the rate of poverty reduction for 35 African countries.

The empirical results suggest that on average, investing flight capital with the same efficiency as actual domestic investment could increase the annual rate of poverty reduction by between 1.9 and 2.5 percentage points over the period from 1999 to 2010, depending on whether the ICOR or capital stock-based methods are used to estimate this effect. These findings imply that investing flight capital would enable a number of African countries to reach or at least approach the target of halving the 1990 level of poverty by 2015.

The general results mask country specificities. Even though investing flight capital domestically would accelerate the rate of poverty reduction in all 35 African countries in the sample, 5 of them would be able to reach MDG1 as a result. Fourteen other countries have reached or are expected to reach MDG1 by 2015 with their actual rates of poverty reduction. For the remaining countries, investing flight capital would have helped them to approach, but not reach, their target level of poverty headcount by 2015.

Country differences highlighted in this paper illustrate the need for country analyses of the effect of capital flight on poverty in order to have a deeper understanding of the processes underlying the effect of capital flight on poverty. For example, why are there more negative flows of capital flight in some countries than others? What explains a country's pattern of capital accumulation? Is it realistic to use the same rate of capital depreciation for all countries in the sample given that some of them,

particularly those experiencing political instability, destroy their capital stock faster than in more politically stable countries? Why do so many African countries have low income-growth elasticities of poverty relative to countries in other regions? What is the effect of capital flight on non-monetary aspects of poverty? How does capital flight interact with external aid and how does this interaction affect poverty? Shedding light on these issues would be an important contribution to our understanding of the processes through which capital flight could affect the rate of poverty reduction.

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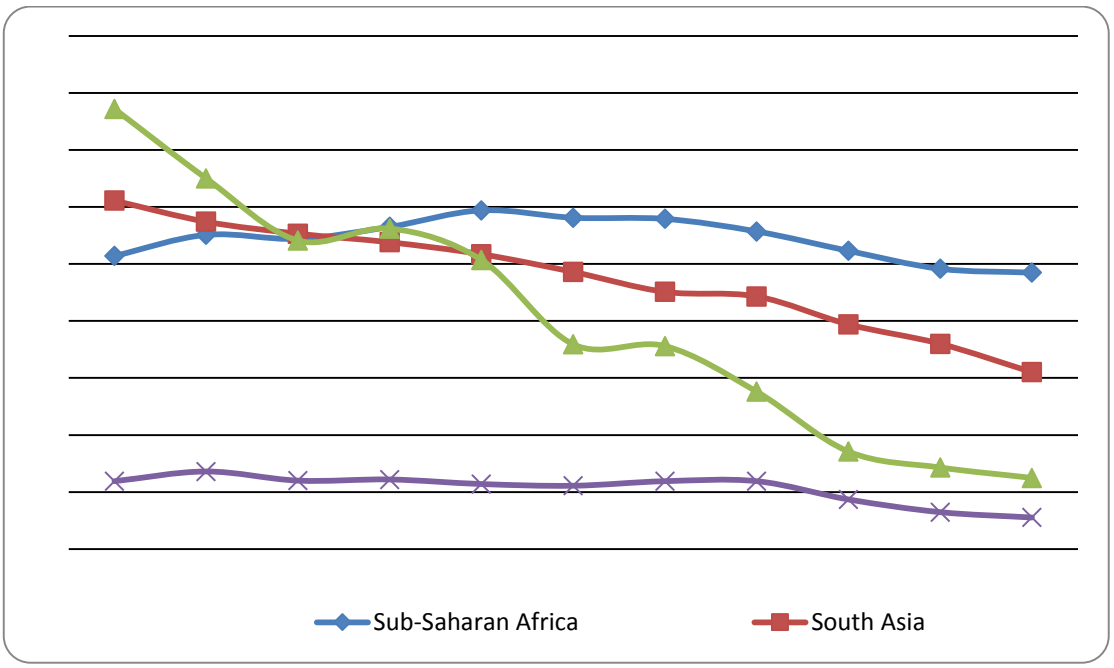
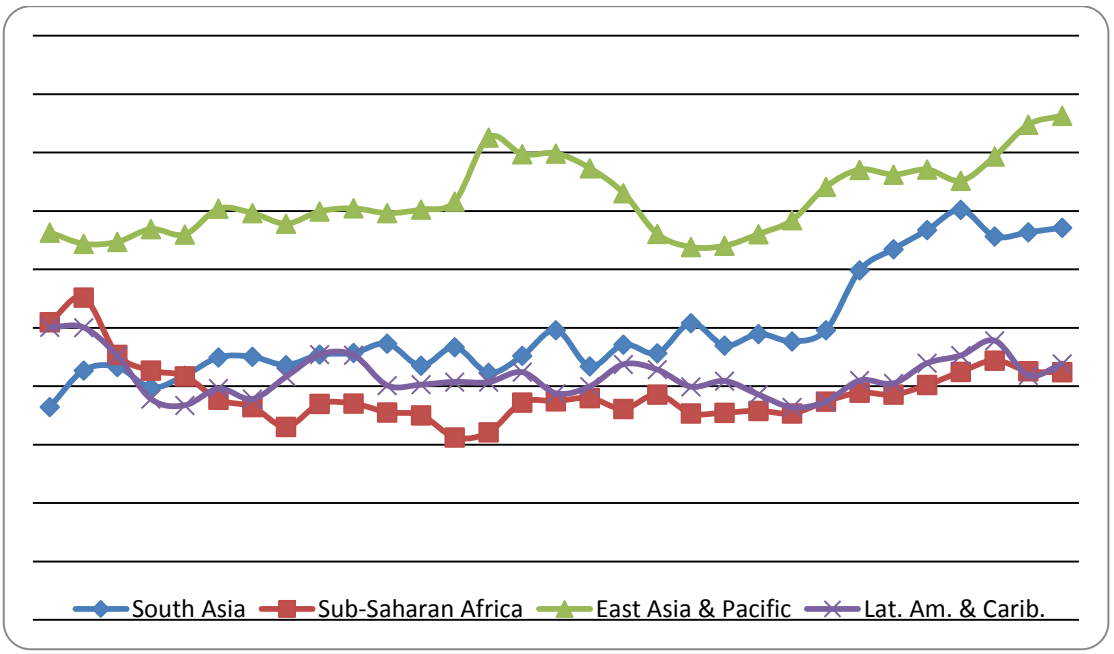
Annex 1: Figures

Figure 1: Poverty in developing regions (1981-2010)



Source: Based on data from POVCALNET

Figure 2: Investment trends in developing regions (1980-2010)



Source: Based on data from World Bank (2012).

Annex 2:

Table 1: ICOR-Based Estimates of the Effect of Capital Flight on Poverty, 2000-2010

Country	ICOR median	Actual income Median	Potential income Median	Difference Median	Elasticity Median	Effect Median
Algeria	7	3252	3275	0.81	9.06	8.67
Angola	4	2060	2144	1.99	0.39	1.05
Botswana	3	6028	6201	1.46	3.13	6.09
Burkina Faso	3	427	427	0.63	0.34	4.69
Burundi	4	170	183	7.79	0.42	1.38
Cameroon	4	1371	1374	0.32	5.14	0.69
Cape Verde	7	2158	2232	2.10	1.04	2.01
Central Afr. Rep.	4	380	383	1.05	1.41	1.86
Chad	3	533	532	1.75	0.21	0.37
Congo, Dem. Rep.	4	150	151	3.00	0.52	1.46
Congo, Rep	6	1434	1651	5.90	0.56	3.71
Côte d'Ivoire	4	1086	1097	1.31	5.79	33.54
Egypt	4	1611	1632	1.36	2.66	2.37
Ethiopia	3	199	199	3.26	0.32	0.37
Gabon	4	8355	8663	3.62	12.23	116.94
Ghana	3	884	884	1.24	1.13	1.64
Guinea	7	438	438	0.20	2.62	0.52
Guinea Bissau	4	457	477	3.67	4.15	0.41
Kenya	4	584	584	1.50	3.39	5.76
Lesotho	9	716	721	2.59	1.05	5.06
Madagascar	5	336	338	1.07	2.25	1.61
Malawi	5	270	271	0.91	2.35	7.11
Mauritania	7	808	808	1.11	1.53	1.61
Morocco	4	2173	2183	0.95	17.56	6.08
Mozambique	2	351	351	3.24	0.85	2.80
Nigeria	2	815	882	4.48	0.37	7.40
Rwanda	2	311	311	0.55	0.30	0.10
Sierra Leone	3	350	373	6.34	1.32	3.91
South Africa	5	5708	5721	0.69	1.54	0.71
Swaziland	4	2572	2572	1.03	1.12	0.73
Tanzania	5	399	404	0.90	0.79	0.46
Togo	5	431	433	10.37	2.38	53.34
Tunisia	5	3649	3667	1.90	9.26	17.24
Uganda	3	392	396	0.85	1.20	0.91
Zambia	4	702	747	3.37	1.01	1.94
Median	**4**	**702**	**721**	**1.46**	**1.32**	**1.94**

Table 2: Country Classification of the Effect of Capital Flight on Poverty (ICOR-Based Results)

		Income-Growth Elasticity of Poverty	
		Low	**High**
GDP Per Capita Difference	**Low**	Burkina Faso, Ghana, Rwanda, Swaziland, Tanzania, Uganda	Botswana, Cameroon, Central African Republic, Côte d'Ivoire, Egypt, Ghana, Guinea, Madagascar, Malawi, Mauritania, Morocco, South Africa
	High	Angola, Burundi, Cape Verde, Chad, Democratic Republic of Congo, Republic of Congo, Ethiopia, Lesotho, Mozambique, Nigeria, Sierra Leone, Zambia	Gabon, Guinea Bissau, Kenya, Togo, Tunisia

Table 3: Median rates of actual capital accumulation (1971-2010)

Country	1971-1980	1981-1990	1991-2000	2001-2010	1971-2010
Algeria	12.3	6.2	-0.8	2.5	4.5
Angola	4.7	1.3	2.1	3.7	3.2
Botswana	15.3	8.7	5.8	6.1	6.9
Burkina Faso	3.1	4.2	2.5	3.9	3.6
Burundi	-0.7	2.3	-1.4	-1.9	-1.1
Cameroon	8.6	5.0	-0.7	2.3	2.8
Cape Verde	5.3	2.3	3.3	6.6	3.4
Central African Republic	3.5	0.9	0.6	-0.4	1.2
Chad	1.2	-0.3	2.3	11.8	1.9
Congo, Dem. Rep.	5.9	-1.7	-4.0	-1.4	-1.6
Congo, Rep	6.4	3.2	1.3	7.1	3.9
Côte d'Ivoire	11.5	-0.4	-0.4	-0.4	0.1
Egypt	4.4	3.5	4.0	2.8	3.6
Ethiopia	0.6	3.4	0.0	5.1	1.5
Gabon	11.8	2.8	-0.6	2.1	2.4
Ghana	-1.9	-0.8	4.2	7.0	1.4
Guinea	0.1	1.3	2.9	-0.6	0.6
Guinea Bissau	0.2	-0.6	-1.6	-3.1	-1.0
Kenya	4.6	1.9	0.9	3.9	1.9
Lesotho	3.1	5.7	7.8	0.5	4.0
Madagascar	2.5	-1.0	-0.5	3.8	1.3
Malawi	6.3	0.4	-0.8	0.9	1.0
Mauritania	7.6	0.8	-1.6	4.3	1.3
Morocco	7.3	2.2	2.6	4.8	3.0
Mozambique	-1.2	-2.6	-0.3	1.6	-0.9
Nigeria	15.4	-2.0	-3.8	-0.9	-1.7
Rwanda	7.4	6.9	0.4	3.5	4.2
Sierra Leone	2.7	-0.2	-2.5	-0.9	-0.7
South Africa	6.9	1.7	0.8	4.0	2.6
Swaziland	8.3	2.5	3.4	2.0	3.2
Tanzania	4.4	1.6	-0.4	3.5	2.0
Togo	7.5	0.8	-1.4	1.1	1.0
Tunisia	10.1	2.8	3.4	3.1	3.6
Uganda	-0.2	1.2	3.8	5.9	2.6
Zambia	6.7	-2.8	-2.2	5.8	0.1
Median	**5.3**	**1.6**	**0.4**	**3.1**	**1.9**

Table 4: Median rates of potential capital accumulation (1971-2010)

Country	1971-1980	1981-1990	1991-2000	2001-2010	1971-2010
Algeria	14.0	5.8	-0.1	2.4	4.1
Angola	…	14.8	4.5	6.3	5.4
Botswana	…	20.4	6.4	7.1	7.1
Burkina Faso	5.4	3.8	3.3	6.6	4.7
Burundi	…	8.2	1.5	1.3	2.3
Cameroon	12.7	7.2	-0.3	9.6	7.5
Cape Verde	13.0	5.5	4.5	7.4	5.8
Central African Republic	3.2	1.8	0.2	0.5	1.7
Chad	8.0	2.4	2.0	20.3	2.8
Congo, Dem. Rep.	3.5	-1.2	-2.7	-0.3	-0.5
Congo, Rep	10.2	9.5	1.6	8.3	8.3
Côte d'Ivoire	10.2	1.7	0.7	-0.7	2.0
Egypt	8.3	3.7	1.5	5.3	4.3
Ethiopia	-0.5	4.1	0.3	6.5	3.2
Gabon	36.9	6.0	0.6	4.7	4.6
Ghana	-0.7	0.5	3.9	6.2	1.9
Guinea	…	13.3	4.9	0.2	9.7
Guinea Bissau	…	3.8	0.1	0.0	0.6
Kenya	5.8	1.7	1.3	2.9	3.7
Lesotho	12.4	7.1	10.5	2.6	7.9
Madagascar	5.7	0.4	0.1	0.8	0.6
Malawi	6.7	0.6	0.3	-1.5	0.6
Mauritania	5.9	0.4	0.1	2.7	1.3
Morocco	5.3	3.2	3.0	5.1	3.4
Mozambique	…	5.0	0.7	0.5	0.7
Nigeria	12.3	-1.6	-3.6	5.1	1.3
Rwanda	8.7	0.4	-2.1	-1.7	0.1
Sierra Leone	1.6	-0.8	-0.6	0.5	0.0
South Africa	7.2	1.5	1.5	2.4	2.0
Swaziland	14.1	3.6	4.0	4.2	4.5
Tanzania	5.3	0.8	-0.8	1.6	1.4
Togo	19.4	…	-1.2	17.2	17.6
Tunisia	8.2	4.0	3.9	3.3	3.9
Uganda	1.1	1.0	2.8	6.1	2.4
Zambia	1.8	0.0	0.1	6.3	0.6
Median	**7.2**	**3.4**	**0.7**	**3.3**	**2.8**
Median without capital flight impact	**5.3**	**1.6**	**0.4**	**3.1**	**1.9**

Note: potential capital accumulation refers to the pattern of capital accumulation that would be observed if flight capital had been invested.

Table 5: Capital Stock-Based Estimates of the Effect of Capital Flight on Poverty, 2000-2010

Country	Actual income median	Potential income median	Difference Median	Elasticity Median	Poverty Effect Median
Algeria	3252	4261	2.53	9.06	23.99
Angola	2060	3249	4.24	0.39	1.64
Botswana	6028	7265	1.67	3.13	2.10
Burkina Faso	427	581	0.89	0.34	0.69
Burundi	170	238	2.28	0.42	1.35
Cameroon	1371	1488	2.78	5.14	10.85
Cape Verde	2158	2944	2.87	1.04	3.01
Central African Republic	380	550	3.45	1.41	5.18
Chad	533	378	1.65	0.21	0.25
Congo, Dem. Rep.	150	246	4.25	0.52	2.17
Congo, Rep	1434	3004	5.40	0.56	1.06
Côte d'Ivoire	1086	1912	5.62	5.79	33.35
Egypt	1611	2356	1.41	2.66	7.76
Ethiopia	199	255	2.53	0.32	1.97
Gabon	8355	11842	2.45	12.23	31.31
Ghana	884	1053	1.72	1.13	1.74
Guinea	438	406	-0.28	2.62	-0.71
Guinea Bissau	457	492	0.83	4.15	0.11
Kenya	584	966	1.32	3.39	16.97
Lesotho	716	753	1.39	1.05	1.03
Madagascar	336	509	4.02	2.25	10.25
Malawi	270	310	1.90	2.35	17.57
Mauritania	808	1078	2.02	1.53	2.52
Morocco	2173	2729	1.69	17.56	35.28
Mozambique	351	620	4.95	0.85	4.26
Nigeria	815	1137	2.65	0.37	1.68
Rwanda	311	406	5.37	0.30	1.18
Sierra Leone	350	874	8.93	1.32	17.41
South Africa	5708	5124	1.47	1.54	4.57
Swaziland	2572	3192	2.21	1.12	2.28
Tanzania	399	467	1.88	0.79	0.68
Togo	431	926	5.27	2.38	34.07
Tunisia	3649	4497	1.80	9.26	15.27
Uganda	392	467	2.13	1.20	2.75
Zambia	702	1039	4.87	1.01	0.26
Median	**702**	**966**	**2.28**	**1.32**	**2.52**

Note: For Cameroon and Kenya , values in columns 4 and 5 are medians for the period 1995-2010

Table 6: Country Classification of the Effect of Capital Flight on Poverty

(Capital Stock-Based Results)

		Income-Growth Elasticity of Poverty	
GDP Per Capita Difference		**Low**	**High**
	Low	Burkina Faso, Burundi, Chad, Ghana, Lesotho, Swaziland, Tanzania, Uganda	Botswana, Egypt, Guinea, Guinea Bissau, Kenya, Malawi, Mauritania, Morocco, South Africa, Tunisia
	High	Angola, Cape Verde, Democratic Republic of Congo, Republic of Congo, Ethiopia, Mozambique, Nigeria, Rwanda, Sierra Leone, Zambia	Algeria, Cameroon, Central African Republic, Côte d'Ivoire, Gabon, Madagascar, Togo

Table 7: The Effect of Capital Flight on MDG1

Country	Poverty 90	Target 2015	Poverty 2010	Growth 1999-2010	Poverty in 2015	ICOR	Kstock
Algeria	6.15	3.08	2.11	-11.65	1.14	0.96	0.71
Angola	47.31	23.66	43.68	-1.96	39.56	34.05	31.42
Botswana	25.62	12.81	13.36	-5.02	10.33	8.01	8.72
Burkina Faso	61.92	30.96	44.6	-4.02	36.33	34.51	33.78
Burundi	84.49	42.24	79.8	-0.72	76.96	49.74	65.15
Cameroon	45.67	22.83	9.25	-13.03	4.60	0.68	3.45
Cape Verde	36.55	18.27	8.71	-8.47	5.60	4.19	3.87
Central Afr. Rep.	81.20	40.60	62.34	0.45	63.77	59.12	51.82
Chad	55.90	27.95	46.38	-2.34	41.21	34.32	37.34
Congo, Dem. Rep.	80.21	40.10	85.01	1.47	91.46	74.61	70.06
Congo, Rep	66.32	33.16	48.41	-3.46	40.60	29.91	28.11
Côte d'Ivoire	17.34	8.67	22.65	-0.55	22.04	19.80	11.58
Egypt	5.18	2.59	1.12	-5.87	0.83	0.72	0.63
Ethiopia	65.88	32.94	30.65	-5.27	23.38	13.97	17.28
Gabon	1.92	0.96	0.47	-19.97	0.15	0.08	0.10
Ghana	50.68	25.34	22.23	-5.01	17.19	15.41	14.35
Guinea	94.07	47.04	38.33	-3.07	32.80	32.55	33.21
Guinea Bissau	42.32	21.16	46.51	-0.63	45.07	30.33	42.87
Kenya	35.35	17.67	39.94	4.69	50.23	42.63	43.46
Lesotho	57.66	28.83	36.46	-1.74	33.39	28.58	30.15
Madagascar	68.37	34.19	81.29	-0.11	80.83	78.23	65.76
Malawi	90.48	45.24	64.41	-2.04	58.11	56.96	51.94
Mauritania	45.92	22.96	23.97	0.89	25.05	20.96	19.16
Morocco	4.14	2.07	1.55	-14.67	0.70	0.56	0.52
Mozambique	84.03	42.01	61.22	-0.44	59.89	52.36	49.34
Nigeria	49.07	24.54	67.98	-0.17	67.40	47.39	58.18
Rwanda	70.46	35.23	63.17	-1.60	58.28	57.22	47.93
Sierra Leone	63.11	31.56	51.71	-0.84	49.57	29.94	24.07
South Africa	22.06	11.03	13.77	-5.32	10.48	10.03	8.78
Swaziland	83.68	41.84	40.63	-4.40	32.45	30.47	29.12
Tanzania	70.34	35.17	62.53	-2.92	53.92	51.79	49.48
Togo	35.60	17.80	29.52	-1.91	26.81	7.56	18.21
Tunisia	5.87	2.94	1.06	-9.63	0.64	0.52	0.45
Uganda	68.65	34.33	33.99	-5.11	26.16	21.56	22.79
Zambia	61.05	30.52	74.45	2.31	83.44	70.65	67.75
Median	**56**	**27.95**	**39.94**	**-2.34**	**33.39**	**29.94**	**29.12**

Note: For Cameroon and Kenya, values in columns 4 and 5 are medians for the period 1995-2010