Aid and Capital Flight

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Abstract

Aid is now small relative to the international movements of private capital to and from low-income countries. Although most attention has been given to foreign private capital inflows, for some regions outflows of domestically owned capital have been more substantial. In this paper we investigate whether aid affects capital flight. The issue relates to the important matter of whether aid is 'scaled up' by private movements in capital. This is usually seen in the context of whether aid attracts or displaces foreign private capital. Aid will be 'scaled up' if it induces domestic residents to retain a greater proportion of their wealth within the country, and it will be offset and potentially vitiated, if it induces a greater proportion of private wealth to be held outside the country. In the theoretical part we argue that even the sign of any link from aid to capital flight cannot be determined *a priori*. In the context of private portfolio choice we suggest that there are six distinct and sometimes opposing routes by which aid might affect portfolio choices. Using a global panel data set, spanning 48 aid recipient countries over 1970-98, we investigate the relationship empirically. We allow for the potential endogeneity of aid and find aid substantially reduces capital flight. As a consequence, aid is 'scaled up' by the induced decisions of domestic wealth holders. In the short term additional aid has substantial effects on the portfolio, being matched more than dollar-for-dollar by induced reductions in capital flight. In the longer term such changes in the portfolio are only maintained if aid itself is maintained for a substantial period, perhaps a decade. We tentatively suggest that taking a long view each dollar of aid might be scaled up by around twenty to forty cents of induced domestic investment that would otherwise have left the country as capital flight.

1. Introduction

Aid is now small relative to the international movements of private capital to and from low-income countries. Although most attention has been given to foreign private capital inflows, for some regions outflows of domestically owned capital have been more substantial. In a previous paper we estimated that by 1990 around 38% of Africa's private wealth was held outside the region (Collier, Hoeffler and Pattillo, 2001). In this paper we investigate whether aid affects capital flight. Potentially, aid is either 'scaled up' or vitiated by such movements. Indeed, because of the large size of capital flight, if aid has a statistically significant effect it is likely also to be significant in the economic sense. If aid is 'scaled up' by induced movements of private capital then its apparently modest size may be misleading. If, conversely, it is vitiated by offsetting private outflows then a fundamental rethinking of development financing may be required.

Surprisingly, although there are large literatures on both capital flight and aid, there is no literature that explicitly investigates their connections. In this paper we argue that even the sign of any link from aid to capital flight cannot be determined *a priori*. In Section 2 we start from our previous work on capital flight, placing it explicitly in the context of private portfolio choice, and introduce aid into the analysis. We suggest that there are six distinct and sometimes opposing routes by which aid might affect portfolio choices. In the remaining sections we therefore turn to an empirical analysis. Section 3 explains the construction of our measure of capital flight, and of the proxies for the explanatory variables. Section 4 presents the results and interprets them. Section 5 concludes.

2. Theories of Aid and Capital Flight

In previous work we have analyzed capital flight in the context of a theory of portfolio choice (Collier, Hoeffler and Pattillo, 2001, 2002). Private agents choose to hold their wealth as between domestic and foreign assets depending upon relative levels of risk and rates of return. Many investment decisions are difficult to reverse. In particular, although individual owners of domestic real assets may be able to sell them, private owners in

aggregate may only be able to divest themselves of them through the slow process of depreciation. Hence, the proportion of the portfolio held abroad will adjust only gradually to changes in risks and returns. In our previous studies we have measured the stock of private domestic real wealth and the stock of flight capital, thereby deriving as a dependent variable the proportion of private wealth held as flight capital. We have shown that this portfolio choice is well-explained by the US interest rate, which proxies the return on flight capital, and a few variables which proxy the political and economic risks, and the rate of return on domestic capital. We summarize these results in Section 4.

This theory of capital flight in the context of portfolio choice suggests that aid will affect capital flight to the extent that it affects either the risks or the returns on private domestic assets. There are many routes by which aid might have such effects. Several routes are quite plausible and *a priori* no single route commands primacy. Some routes imply that aid would increase capital flight, others imply the opposite: the net effect can only be determined empirically. It is important to recognize this limitation of theorizing, especially because in this case the opposing theories are philosophically so different and so tend to attract predictable clusters of adherents.

The corruption route

Probably the most widely accepted link from aid to capital flight is via corruption. The hypothesis depends upon two steps: aid increases corruption, and corruptly acquired assets are more likely to be placed abroad.

Spectacular and credible instances of aid being diverted by corrupt politicians into Swiss bank accounts have supported a more generalized critique of the effects of aid on governance. It is well-attested that the origins of accountable government came from the demands of tax-payers for the scrutiny of how their money was used. Since aid reduces the need for taxation it is feared that it thereby reduces the pressure by the electorate for accountability. In addition to this highly generalized link to weakened governance, aid may directly create opportunities for public sector corruption through high expenditures

on procurement. Using global data, Knack (2001) indeed finds some statistical evidence that aid is associated with increased corruption.

In turn, corruption may increase capital flight. Corruptly acquired money may be held more securely abroad than retained within the country. This can be thought of in terms of the risk-corrected rate of return. Corruptly acquired assets have distinctive risk properties, being as safe as honestly acquired assets when held outside the country but being riskier than honestly acquired assets while held domestically. Again there are spectacular instances of corruptly acquired money being held abroad – for example, the estimated $4bn of former president Abacha of Nigeria.

We will term this hypothesized link from aid to capital flight the *corruption route*. Because of the combination of its direct implications for morality and the media attention given to supporting instances, it attracts passionate support. It is therefore important to recognize its limitations. First, the route depends upon two links – from aid to corruption, and from corruption to capital flight – neither of which may be correct beyond the level of the anecdote. The effect of aid on corruption can be contested: donors currently exert considerable pressure on governments to reduce corruption. In response, some governments have introduced budgetary systems that make it more difficult to misappropriate public moneys, whether generated by aid or not. Taking as an example a particularly sensitive component of public expenditure, namely military spending. It is commonly alleged that aid leaks into military spending. For example:

> 'it is important to note that all of these perpetrators of proxy wars used fungible money from the World Bank and the International Monetary Fund (IMF) to finance their nefarious activities. These countries received, and continue to receive, generous cash grants from the Bank and the IMF because they are successfully implementing economic reforms. At the same time, the multilateral lending agencies look the other way when these regimes spend grant money on arms for rebels in neighboring countries. The presidents and executive directors of these international financial institutions should be ashamed.'

—Herman J. Cohen (formerly Assistant Under-Secretary of State for Africa), *Foreign Policy*, October 2003.

While Herman Cohen is undoubtedly correct in particular instances, the accusation does not generalize. Collier and Hoeffler, (2002) test the link between aid and military spending statistically and find no significant effect. Evidently, donors are successful in exerting pressure on governments to contain spending and this offsets the income effect of aid.

Further, despite spectacular examples such as Abacha, corruption may not in general lead to capital flight. In some highly corrupt societies, such as Suharto's Indonesia, elites appear to have invested their wealth domestically. Conversely, even relatively honest societies may experience a high level of capital flight if policies make the domestic deployment of legitimate wealth unprofitable. The high profile given to occasional cases of corrupt money held abroad may lead to a confusing conflation of essentially distinct phenomena.

In addition to these limitations of the corruption route, there are several other similarly plausible routes, as we now discuss. Some also predict that aid would increase capital flight but for different reasons. Hence, even were aid to be found to be empirically associated with capital flight, corruption need not be the explanation. Some routes predict that aid would reduce capital flight. Hence, the corruption route could be correct and yet the net effect of aid might be to reduce capital flight.

The volatility route

Various authors have accused aid of being volatile (for a recent example see Bulir and Hamann, 2003). Donors may be 'fickle', or due to the increasing use of governance conditionalities, relatively minor political events may trigger coordinated interruptions in aid. To the extent that aid is volatile, it can increase capital flight in two different ways.

First, as is well understood, macroeconomic volatility will tend to increase uncertainty and thereby reduce the risk-corrected returns on domestic investment. In turn, as set out

in Section 2, this will tend to increase the proportion of the wealth portfolio held abroad. This is not a phenomenon confined to developing countries, indeed it has recently been proposed as an important explanation for the relatively low rate of domestic investment and high rate of capital outflows in the UK (Barrell and Weale, 2003).

Secondly, aid volatility may induce capital flight for speculative purposes. If aid is perceived to be unsustainably high, as might occur for example in the aftermath of civil war, or during the political honeymoon of a donor-wise government, the real exchange rate will be temporarily appreciated. Private agents can take speculative advantage of this temporary price change both by purchasing durable imports and by shifting capital abroad. As discussed in Section 2, the standard analysis of capital flight allows for some exchange rate incentive by including the premium on the parallel market exchange rate as an explanatory variable. A high premium indicates a large, and probably unsustainable subsidy for purchases of foreign exchange at the official rate and so provides a powerful incentive for capital flight. However, during a temporary influx of aid the premium is likely to decline as official foreign exchange is more abundant, yet the incentive for flight remains.

As with the corruption route, the volatility route can be questioned. First, some measures of aid volatility, such as that of Bulir and Hamann (2003), measure aid in domestic currency. Since aid accrues as foreign exchange such a measure can be badly contaminated by exchange rate variability. Secondly, the volatility of aid must be assessed in terms of its co-variation with other sources of revenue and foreign exchange. For example, even were aid to be more volatile than tax revenue, it may nevertheless be revenue-stabilizing as long as it is not highly co-variate with tax revenues. Collier (1999) found aid to be essentially uncorrelated with tax revenue and thereby overall stabilizing. Were aid to be stabilizing, the volatility argument would be stood on its head, with aid reducing capital flight by virtue of raising the risk-corrected returns on investment. Third, even were volatile aid to induce speculative capital flight this might be something to be welcomed. Such capital flight would, by its nature, be temporary: private agents would be smoothing the ‘fickle’ behavior of donors.

The Dutch disease route

A third route by which aid might increase capital flight is Dutch disease (Corden, 1984). It is well-understood that aid will tend to appreciate the real exchange rate and thereby reduce the profitability of the tradable sector. The non-tradable sector may offer relatively few opportunities for the investment of private capital. The capital-intensive parts of the non-tradable sector, such as power, telecommunications and transport, may be in the hands of the public sector (or foreign privatizations). The private part of the non-tradable sector may be informal and so unable to absorb bank financing, and in any case is likely to be highly labor-intensive. A remarkable apparent example of such a phenomenon is Nigeria following the oil boom of the 1970s, oil revenue being somewhat analogous to a massive inflow of aid. As a result of the massive influx of oil revenue, Nigerian non-oil exports collapsed, and even more remarkably private investment collapsed (Bevan, Collier and Gunning, 1999). Such a decline in the opportunities for domestic investment would tend to shift portfolio allocations abroad and so induce capital flight.

Again, however, the Dutch disease route can be challenged. For example, as Bevan, Collier and Gunning (1999) show, Indonesia received much the same oil windfall but was able to expand exports rapidly and indeed attracted a large private investment inflow. The consequences of a foreign exchange windfall for capital flight might not follow automatically from Dutch disease, but rather depend upon the policy context.

We should note that there is also a potential *valuation effect* arising from the appreciation of the real exchange rate. Flight capital is a foreign currency asset whereas domestic investment is a domestic currency asset. As the real exchange rate appreciates in response to aid then for a given configuration of assets flight capital will become relatively less valuable and so decline as a share of the portfolio. We abstract from this valuation effect by valuing domestic investment at international purchasing power parity prices, using the Penn World Tables.

The public investment route

While the first three routes have all implied that aid would increase capital flight, we now consider a route by which it would have the opposite effect. The traditional view of aid was that it financed the 'two gaps' – savings and foreign exchange. As the scope for transforming output and consumption between tradables and non-tradables became better appreciated, the foreign exchange gap fell into abeyance, leaving the savings gap center stage: the role of aid was to finance investment. Once different roles are allowed for the public and private sector, the role of aid becomes further nuanced – it finances public investment, which in large part is coincident with infrastructure. By the 1970s this was probably the main conception of the role of aid. Although the implications for capital flight were not considered, the link is relatively straightforward: aid should reduce capital flight because public and private capital are complementary. That is, the enhanced stock of public capital should raise the return on private capital and so reduce the incentive to shift portfolios abroad.

As with the other routes, this can be questioned. Notably, aid is now seen as fungible, so that it does not necessarily finance the public investment projects that are its ostensible purpose. Further, the importance of public capital formation in the growth process has been questioned – it has come to be seen as wasteful rather than complementary to private investment (Devarajan and Swaroop, 2000).

The Portfolio substitution route

Recent work on the effects of large, persistent aid inflows in "post-stabilization" countries where currency substitution is high suggests another route whereby aid could reduce capital flight. A key feature of the Buffie et. al (2004) model is that a portion of aid ends up reducing domestic budgetary financing rather than supporting an increase in government spending or a reduction in taxes. They show that, for example, in sub-Saharan Africa between 1990 and 2001, 21 cents of the aid dollar substituted, on average,

for domestic financing A persistent aid inflow therefore reduces expected seigniorage and expected inflation. The fall in expected inflation is equivalent to a fall in the depreciation rate, i.e. the opportunity costs of holding domestic currency rather than foreign currency. With even relative modest portfolio substitutability, this triggers a portfolio adjustment generating an outright reduction in desired foreign balances, i.e. there is a private capital inflow. The implication is that capital flight would fall, or even turn from an outflow to an inflow, or repatriation of previous flight.

Of course, the assumptions underlying this route can be challenged. Large increases in aid inflows may not be highly persistent for many countries, but rather short-lived and volatile, as noted above. In some countries aid may be fully spent, rather than substitute for domestic financing with subsequent effects on long-run inflation, depreciation and portfolio substitution. However, the Buffie et. al (2004) model does not consider aid that finances public investment. This type of aid brings many new effects into play. Portfolio substitution toward domestic currency and the private capital inflow could be strengthened by higher rates of return on private capital due to complementary public investment.

The hypothesis of contingent effects

If both the public investment route and at least one of the other routes are correct, then the net effect of aid on capital flight cannot be determined a priori. In related work, Collier and Dollar (2002, 2004) investigate the effect of aid on growth and on investment. The find that the effects of aid are contingent both upon its volume and upon the policy environment. The volume effect follows from diminishing returns: beyond a certain level, aid ceases to raise growth and may begin to reduce it: Collier and Dollar term this the ‘saturation point’. In turn, the saturation point depends upon the policy environment. Collier and Dollar measure this using the Country Policy and Institutional Assessment of the World Bank, which is an annual rating of twenty different components of economic policy. Better policy increases aid absorption.

They interpret their results as suggesting that aid has both favorable and detrimental effects – such as might come about from the presence of both a public investment route and a Dutch disease route. With low volumes of aid and good policy the former route predominates, so that aid enhances growth, and conversely, with high volumes of aid and poor policy Dutch disease predominates. However, Collier and Dollar find that the saturation point is typically surprisingly high: in most aid-recipient countries aid continues to be productive at the margin.

While they do not consider the effect of aid on capital flight, their analysis has two implications for it. First, the effect of aid on private investment, and hence on capital flight, would be contingent both upon its volume and upon policy. Second, in view of the high level of the saturation point, the normal case would probably be for aid to reduce capital flight.

The concept of the saturation point – the point at which the marginal contribution of aid to growth is zero – carries over with modifications to the analysis of capital flight. One analogous concept is the point at which the net effect of aid on capital flight is zero. On one side of this point aid will be 'scaled-up' by private capital movements, on the other side it will be 'scaled down'. We might term this the 'no-scaling' point. A second analogous concept is the point at which capital flight is sufficiently severe that it fully offsets the inflow of aid: as a public dollar flows into the economy, a private dollar flows out. We might term this the 'full-offset' point.

The marginal income route

Finally, we should consider the pure effect of aid as an augmentation to income. In the conventional analysis of capital flight income is proxied by GDP. This of course controls for any output effects of aid, but misses the fact that aid permits aggregate expenditure to exceed aggregate production. Were there no other effects of aid, how would this affect

portfolio choice? There are two reasons to expect that the marginal propensity to acquire assets abroad exceeds the average. The first is that domestic investment is subject to diminishing returns, whereas there are essentially constant returns to foreign investment. The second is that with higher levels of wealth there is a stronger incentive to diversify the portfolio.

An implication

Conveniently, all the routes other than that of public investment and portfolio substitution predict that aid would increase capital flight. Hence, our empirical analysis is, in effect, a test of the aggregate of these adverse effects versus the two favorable effects. This will prove convenient in interpreting the results.

3. Measurement and Data Issues

The dependent variable is the ratio of the stock of flight capital to the stock of private wealth. Our capital stock is based on accumulated capital flight flows which we obtain by using a slightly modified version of the World Bank residual method. The work by Claessens (1997), Chang, Claessens, and Cumby (1997), Claessens and Naude (1993) discusses various methods of calculating capital flight mesures in great detail and concludes that the different concepts broadly yield the same results. According to the World Bank residual method capital flight is defined as the difference between the sources of funds and the uses of funds. Sources of funds is the sum of all net official inflows and the net flow of foreign direct investment. The uses of funds include the current-account deficit and addition to reserves[4]. We modify the World Bank concept by adding misinvoicing of trade and by not deducting private nonguaranteed debt.[5]

We accumulate these flows into stocks assuming the U.S. Treasury bills interest rate as the rate of return. One complication in the accumulation process is that sometimes the

[4] We used balance of payments data with the exception of net official external borrowing, these data were obtained from World Bank sources, since they are likely to be more accurate.
[5] For a more detailed discussion please refer to Collier, Hoeffler and Pattillo (2001).

flows can be negative. This can be due to two different reasons: first, previous flight capital might be repatriated and second, agents might borrow internationally. Empirically we want to distinguish between these two reasons. Following the World Bank methodology, we treat all stocks of flight capital as zero at the start of our period of observation, 1970. However, following Cline (1995) we count the stock of flight capital as becoming positive in the first year that the flow of capital flight becomes positive. In effect, we treat early years of negative flows as the accumulation of debts that are not reduced by subsequent capital flight. Our flight capital stocks are thus gross of indebtedness.

If flows subsequently turn negative, we treat them as the repatriation of capital. However, we do not allow the stock of flight capital to turn negative, consistent with our distinction between capital repatriation and foreign borrowing. Hence a country that had annual net flows during the first five years of -2, -3, +2,-1 and –4 would, by our measure, have a stock of flight capital of these years (before allowing for interest) of 0, 0, 2, 1 and 0. The flight capital stocks are converted to real US dollars to make the figures comparable to our private capital stock measures.

We now turn to the measure of private wealth which is the sum of flight capital plus the private real capital stock. We use the data on the share of private investment from Easterly and Rebelo (1993) and data on gross domestic investment from the Penn World Tables as well as World Bank data to calculate private investment flows. Following the method by King and Levine (1994) we calculate an initial private capital, denominated in 1985 U.S. Dollars. We then apply the perpetual inventory method to generate annual figures for the private capital stock from the flows of past private investment.

Descriptive statistics of our dependent and explanatory variables are presented in the Appendix. We model capital flight as a function of previous capital flight, policies, risks, returns to capital in the host country and diminishing returns to capital in the country of origin. Past capital flight is accounted for by including a lagged dependent variable, the lag is set to ten years. One measure of domestic tax policy is the net present value of the

total debt service to GDP. High ratios can be interpreted as a signal for high future taxes. The black market premium is a further indicator of monetary policies. The World Bank assesses countries' macroeconomic policies by the Country Policy and Institutional Assessment (CPIA) indicator. This is our third measure of economic policies. We proxy the level of risk by a civil war variable, indicating how many months per year the country experienced a civil war. A further risk indicator is the length of the current regime, measured in years since the last regime change. Returns to capital abroad are proxied by the US real interest rate and we use real per capita GDP to account for diminishing returns to capital in the country of origin. Our previous work (Collier, Hoeffler and Pattillo, 2001, 2002) shows that Sub-Saharan Africa has significantly higher capital flight ratios than other regions and we control for this by introducing an Africa dummy. Aid is measured as the sum of bilateral and multilateral overseas development assistance. Our aid variable is the percentage of total aid to gross national product (GNI). Finally, corruption is an index variable, lower values indicate lower levels of corruption. All variable descriptions and sources are listed in the appendix.

4. Results and Interpretation

Basic OLS Results

We now turn to our empirical results. We first explore the effects of aid and corruption separately, and then bring them together. Our starting point is our previous work on capital flight (Collier, Hoeffler and Pattillo, 2002), reported in the first column of Table 1. As might be expected given the irreversibility of installed capital, portfolios adjust only gradually. When very short lagged values of the dependent variable such as one year are included, few other variables are significant. In the results shown in column 1 we allow a ten-year lag in the dependent variable and this leaves sufficient adjustment time for other variables to become important. The significant variables tell a consistent story. Portfolios are shifted into capital flight in response to various aspects of domestic economic policy. High indebtedness increases capital flight, presumably in response to

fears of future taxation.[6] A large premium in the parallel market exchange rate increases capital flight, presumably because it acts rather like a temporary subsidy on assets shifted abroad. Poor policy as measured by the World Bank's Country Policy and Institutional Assessment (CPIA) also increases capital flight.[7] World economic conditions also matter: as might be expected, high American interest rates increase the proportion of wealth held abroad. Finally, domestic political conditions matter: both civil war and a lack of regime durability increase capital flight. While the model thus captures much that is consistent with economists' expectations of what would drive portfolio decisions, there remains a large and highly significant Africa dummy: African capital flight has been even higher than would be predicted by these characteristics.

--- Table 1 about here ---

We first synthesize this work with the analysis of aid and growth of Collier and Dollar (2002). This involves adding three terms into our capital flight analysis, namely aid, its square, and the interaction of aid and policy as measured by the World Bank's Country Policy and Institutional Assessment (CPIA). The results are reported in the second column of Table 1.

The addition of aid does not disturb the previous results on capital flight. However, aid appears to be highly significant. There are also significant diminishing returns, but the interaction with policy is insignificant. Hence, at low levels of aid the effect of aid is to reduce capital flight, but beyond a certain level this effect is offset so that first the 'no-scale- point and then the 'full-offset' point are reached. For the moment we defer issues of robustness and continue to the analysis of corruption.

[6] Ndikumana and Boyce (2003) also find a strong effect of debt on capital flight.
[7] Lensink, Hermes and Murinde (2001) document a robust positive link between political risk and capital flight.

The third column of Table 1 reports the inclusion of a standard measure of corruption into the analysis of capital flight. The variable is insignificant. Given the high profile of corruption in anecdotes of capital flight this is both surprising and important. It suggests that to the extent that our concern is capital flight, corruption is not central. In Africa, where capital flight has been massive, the debate has been dominated by attempts to reduce corruption and to repatriate corruptly acquired wealth. While such moves are highly desirably for other reasons, they basically miss the point that the decision as to where to locate a portfolio is largely distinct from the issue of how it is acquired. Most of the private wealth that has been expatriated from Africa was probably acquired honestly. It has been expatriated because risks on investment have been too high relative to returns. Thus, in addressing capital flight it is these risks and returns that must be altered.

In the fourth column of Table 1 we bring together aid and corruption in the same regression. In addition to all the variables previously added to the capital flight regression we add an interaction term between aid and corruption. The results do not disturb our previously accumulated results. That is, aid and its square are significant, but corruption and the interaction between aid and policy are insignificant. The new interaction term between aid and corruption is also insignificant.

Before interpreting these results in any detail we turn to issues of robustness. The key issue is of endogeneity: potentially aid is endogenous and this could make our results spurious. We deal with this by instrumenting for aid.

Instrumenting Aid

Shocks to capital flight may be correlated with aid. For example democratisation is likely to decrease capital flight but due to improved political openness the country may now also receive more aid. Thus, our regressions may suffer from endogeneity bias and we therefore instrument aid to address possible endogeneity issues. In our methodology we broadly follow Tavares (2003). He argues that the aid outflow from the donor countries are a good instrument because when an OECD country increases total aid outflows,

recipient countries that are culturally and geographically closer to that donor country experience an exogenous increase of aid inflows.

Our sample consists of 48 non-OECD countries as aid recipients and we use OECD aid outflows to construct instrumental variables. We concentrate on bilateral aid from the five largest OECD donors: Japan, USA, France, Germany and the UK. In 1999 about 52 percent of total global aid was donated by these five donors[8]. The data source for aid outflows is the OECD (2001) data base. We then generate four variables to capture the political, geographical and cultural distance for each donor/recipient combination. For political distance we used an index of UN voting affinity (Gartzke and Jo, 2002). The values for the affinity data range from –1 (least similar interests) to 1 (most similar interests). We proxy geographic distance by the inverse of the distance in kilometers between the recipient countries' capitals and the donor countries' capitals. Cultural distance is captured by two dummy variables. The first dummy variable takes the value of one if the the donor and recipient share a common language. The other dummy takes a value of one if a religious group dominates in the donor as well as in the recipient country. All of our distance indicators are invariant over time but vary across the recipient countries while the aid outflow variable varies over time but not across the recipient countries. The aid inflows vary across recipient countries and over time.

We regress the aid inflows on all of the exogenous regressors and the product of the aid outflows times the four distance indicators. For our five donor countries we can potentially use 20 instruments. However, since no recipient country shares a common language with neither Germany nor Japan we can only use 18 instruments. In our capital flight regressions we use aid as a percentage of GNI as an explanatory variable. Since the OECD data base provides aid outflows in current US dollars we have to use some simple calculations to express these values in the appropriate units. For aid as a percentage of GNI we divide the instruments by the countries' GNI:

[8]Own calculations based on OECD (2001)

$$\frac{aid\ \text{inf}\ lows_{it}}{GNI_{it}} = \sum_{t=1}^{T}\sum_{i=1}^{N}\sum_{j=1}^{J} aidoutflows_{jt} \cdot d_{ij} \cdot \frac{1}{GNI_{it}} \qquad (1)$$

where subscript *t* denotes years, *i* denotes recipient countries and *j* denotes donor countries.

A further methodological issue is that our model is non-linear in the variables, making it awkward to apply standard Two Stage Least Squares (2SLS) estimation. Following the discussion on instrumental variables in Davidson and MacKinnon (1993) and Wooldridge (2002) we use a 'control function approach'. In the first stage regression we regress aid inflows on the 18 instruments and all of the other regressors. The first stage results are presented in the Appendix Table A1. Based on this regression we calculate the residuals and include it in our preferred specification. These two stage results are reported in Table 1, column 5. The coefficient on the residual is not statistically significant. Thus, suggesting that our results which represent the synthesis of the capital flight analysis with the aid and growth analysis are not subject to an endogeneity problem.[9]

Interpretation

For low-income Africa capital flight is not a marginal issue. The continent has hemorrhaged private capital over the same period as it has received relatively large inflows of international public capital. On reasonable metrics it is even more short of private capital than it is of public capital. Hence, it is important to arrive at a credible estimate of whether public capital flows are inadvertently contributing to the problem of scarce private capital, as suggested by some critics of aid, or whether the culprit in driving capital flight lies elsewhere, with aid playing a neutral or benign role.

Our analysis suggests that overall aid tends to be scaled up by private capital movements rather than being offset by them. The direct effect of aid is to significantly reduce capital

[9] We examined different specifications of the first stage regression. We eliminated all insignificant instrumental variables and generated a residual based on this reduced model. This residual was also insignificant when included in the second stage regression, thus confirming our previous results.

flight. Thus, at least at low levels of aid, each dollar of aid is supported by induced portfolio changes by residents. Note that this is in addition to any scaling up through induced changes in foreign investment which lies outside the present analysis.

We do not find evidence that either corruption on its own, or in combination with large aid inflows, induces capital flight. Critics of aid nevertheless can find some supporting evidence in our analysis since the effect of aid on capital flight is subject to diminishing returns. Beyond a certain point portfolio choices cease to scale up aid and begin to scale it down – the 'no-scaling' point. Using the results from Table 1, column 2, the 'no-scaling' point can be derived by differentiating capital flight with respect to aid:

$$\frac{\partial C}{\partial A} = -1.3948 + 2 \cdot 0.01849 \cdot A \qquad (2)$$

where C denotes the proportion of private wealth held as flight capital and A stands for aid as a percentage of GNI.

Setting (2) to zero and solving yields the 'no-scaling' point, which only occurs when aid is at the very high level of 37% of GNI. This is, of course, subject to a wide confidence interval. However, even if we take the lower bound of the 95% confidence interval for the coefficient on aid, and the upper bound of the 95% confidence interval for aid squared, the 'no-scaling' point is not reached until aid is around 7% of GNI.

Thus, in the normal range of aid programs, aid is scaled-up by domestic portfolio choices: aid induces residents to keep their assets at home. How large is this effect? Clearly, the scaling-up effect depends upon the volume of aid and the size of the private wealth portfolio. If aid is very large and private wealth very small then induced shifts in the portfolio will be less important, dollar-for-dollar, than when aid is smaller and private wealth substantial. Consider, however, the effects when aid is around ten percent of GNI, this being the level typical of those low-income countries with relatively substantial aid inflows. From (2), the effect of an additional one percentage point of GNI in aid is then

very close to a one percentage point shift in the private wealth portfolio. Since the value of private wealth normally exceeds GNI this might seem to imply that one dollar of aid is scaled up by more than one dollar of domestically owned additional investment due to reduced capital flight. This, however, would be to confuse stock-adjustment and flow effects. The change in the portfolio is a one-off stock adjustment, whereas aid is a flow. From the results so far it is unclear whether the effect of a flow of aid sustained over several years is cumulative – a succession of stock adjustments – or whether the current level of aid is proxying the actual sustained level of aid, so that the effect of aid is only transient: to maintain a given level of portfolio choice requires a sustained inflow of aid.

To distinguish between these possibilities, in the final column of Table 1 we separate aid into two components, the level of aid in the preceding year, and the change in aid since that year. Each component of aid is potentially subject to diminishing returns and we allow for this by including the square of aid in the preceding year, and the interaction of the change in aid with the level of aid in the preceding year. Hence, we rerun the regression, replacing current aid with aid in the preceding year, and adding terms for the change in aid and the interaction of this change with the previous level of aid. In effect, the preceding level of aid now proxies the sustained level of aid. If we assume that the ten-year lagged dependent variable picks up the effects of aid that occurred more than ten years ago, the coefficient on the preceding level of aid potentially proxies the effects of aid over the preceding decade. On average aid has not been subject to strong trends to that aid during the preceding decade is usually roughly ten times aid in the penultimate year. Hence, if the effects of aid were entirely cumulative then the coefficient on the change in aid would be significant and have a coefficient approximately one tenth that of the coefficient on aid in the preceding year. If, alternatively, our previous aid result was entirely proxying the effects of a sustained aid level, the change in aid would be insignificant. In fact, our results fall between these extremes. The coefficient on the change in aid is around half that on the preceding level of aid, but it remains significant and substantial. This suggests that aid has both cumulative and transient effects.

One way of interpreting this is to imagine what would happen if a previously constant aid level were increased, either just for a single year, or sustained for a decade. For example, suppose that aid was initially at the level of 10% of GNI and was then increased to 11%. In the first year of the increase the change in aid would be positive and this would reduce the proportion of the portfolio held as flight capital by 0.44 percentage points.[10] In the second year of an unsustained increase the change in aid would be negative, precisely reversing the portfolio shift of the previous year, but the level of preceding aid would be one percentage point higher, inducing a shift in the portfolio away from flight capital of 1.28 percentage points relative to its initial level. The net effect would be a *further* shift of 0.40 percentage points beyond the first-year effect. In the following year the portfolio would revert to its initial configuration. If, however, the aid was sustained at 11% of GNI for a decade then the pattern would be different. After the first year portfolio shift of 0.44 percentage points, there would be a further shift of 0.84 percentage points and this would be sustained. After a decade, because the coefficient on the lagged dependent variable is close to unity, the effects of the decade-long increase in aid on capital flight would be more or less permanently locked in.

Hence, to put some orders of magnitude on the scaling-up effect of induced changes in flight capital, a sustained shift in the portfolio of 1.28 percentage points might be thought of as being brought about by an additional one percentage point of aid as a share of GNI sustained for a decade. Typically, private wealth portfolios in low-income countries are around two to three times GNI, so that a 1.28 percentage point shift in the portfolio is worth around two to four percentage points of GNI. This would be achieved by a ten-year increase in aid of one percentage point of GNI. Hence, approximately, one dollar of aid might be scaled up by between twenty and forty cents of domestic investment that would otherwise have been capital flight.

[10] That is, the coefficient on the change in aid, -0.823, less ten times the coefficient on the interaction term with the preceding level of aid, that is 0.383.

5. Conclusion

In this paper we have analyzed the links between aid and capital flight. The issue relates to the important matter of whether aid is 'scaled up' by private movements in capital. This is usually seen in the context of whether aid attracts or displaces foreign private capital. However, especially in Africa, capital flight has been very substantial, so that potentially movements in domestic wealth portfolios are very important. Aid will be 'scaled up' if it induces domestic residents to retain a greater proportion of their wealth within the country, and it will be offset and potentially vitiated, if it induces a greater proportion of private wealth to be held outside the country. The latter is a distinct possibility through the effects of corruption. Many commentators have suggested that in the context of the high levels of public corruption common in much of Africa, aid is likely to fuel capital flight. Some spectacular and disturbing examples of the abuse of aid by corrupt leaders adds credence to such concerns. Africa is after all the region with both the highest levels of aid to GNI and the highest levels of capital flight.

We have built on our previous empirical work on capital flight, which analyzed it as a portfolio choice. Specifically, we build as the dependent variable a measure of the stock of flight capital as a proportion of private wealth. We have this as a series of annual observations for 48 countries over the period 1970-98. We have integrated this analysis with the work of Collier and Dollar (2002) on aid and growth. In particular, we have analyzed whether aid has initially favorable effects that are subject to diminishing returns, and whether these effects in turn depend upon domestic policies. We have also investigated whether capital flight is affected by corruption, and whether there is any interaction between corruption and aid in inducing capital flight.

We have found that aid has significant and substantial effects on capital flight. Despite the concerns of aid critics, these effects are benign. Aid substantially reduces capital flight. As a consequence, aid is substantially 'scaled up' by the induced decisions of domestic wealth holders. In the short term additional aid has substantial effects on the portfolio, being matched more than dollar-for-dollar by induced reductions in capital

flight. In the longer term such changes in the portfolio are only maintained if aid itself is maintained for a substantial period, perhaps a decade. We have tentatively suggested that taking a long view each dollar of aid might be scaled up by around twenty to forty cents of induced domestic investment that would otherwise have left the country as capital flight.

Capital flight is a major problem in Africa. As a by-product of the present analysis we are able to draw an important conclusion about which strategies are likely to effective and which ineffective in reducing it. To date, considerable emphasis has been placed on corruption as a driver of capital flight. However, our analysis suggests that corruption is not central to capital flight. Tackling corruption is important for other reasons, but it will not in itself have much effect on capital flight. Rather, capital flight is driven predominantly by the risk-corrected rates of return available on domestically held assets. In Africa risks have been high and returns have been low, so that risk-corrected returns have looked very unattractive relative to foreign assets.

The massive amounts of flight capital held outside Africa now provide an important opportunity. If this capital could be attracted back it would make a major contribution to development. We have found that increased aid can play a significant part in inducing such a repatriation. So, too, can improvements in domestic economic policies and political conduct. This provides a further basis for partnership between donors and recipient governments.

Table 1: Capital Flight and Aid

	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
$(\text{Capital Flight})_{t-10}$	0.869	0.893	0.847	0.858	0.887	0.892
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Diminishing returns						
GDP per capita	0.001	-0.001	0.001	-0.000	-0.000	-0.001
	(0.001)***	(0.069)*	(0.003)***	(0.328)	(0.277)	(0.015)**
Policies						
Debt	4.051	5.970	4.641	4.867	5.085	5.439
	(0.008)***	(0.000)***	(0.006)***	(0.025)**	(0.009)***	(0.001)***
Black Market Premium	0.002	0.002	0.002	0.002	0.002	0.002
	(0.000)***	(0.003)***	(0.003)***	(0.003)***	(0.002)***	(0.002)***
CPIA	-1.140	-1.737	-2.046	-2.168	-1.794	-2.227
	(0.134)	(0.026)**	(0.037)**	(0.030)**	(0.023)**	(0.003)***
Host country returns						
US real interest rate	0.979	0.686	0.956	0.838	0.748	0.657
	(0.006)***	(0.038)**	(0.050)**	(0.066)*	(0.028)**	(0.043)**
Risk						
Civil War	1.086	0.992	1.082	0.935	0.995	0.996
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Durable	-0.292	-0.276	-0.317	-0.301	-0.277	-0.283
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Dummy Variables						
SSA	9.289	12.623	11.996	14.422	12.226	13.089
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Aid and Corruption						
Aid_t		-1.395		-0.807	-1.311	
(% of GNI)		(0.000)***		(0.168)	(0.000)***	
Aid_t^2		0.018		0.017	0.019	
		(0.000)***		(0.000)***	(0.000)***	
Aid_t x CPIA		0.101		-0.012	0.099	
		(0.266)		(0.934)	(0.274)	
Corruption			4.339	5.399		
			(0.206)	(0.225)		
Aid_t x Corruption				-0.664		
				(0.369)		
Residuals					-0.152	
					(0.352)	
$(\text{Aid})_{t-1}$						-1.824
						(0.000)***
$(\text{Aid})^2_{t-1}$						0.027
						(0.000)***
$\Delta\ \text{Aid}_t$						-0.823
						(0.000)***
$\Delta\ \text{Aid}_t$ x $(\text{Aid})_{t-1}$						0.038
						(0.000)***
Aid_{t-1} x CPIA						0.162
						(0.049)**
Observations	691	691	497	497	691	689
R-squared	0.636	0.669	0.613	0.649	0.670	0.680

Dependent Variable: Capital flight (as a percentage of private wealth). Robust p-values in parentheses significant at 10%; ** significant at 5%; *** significant at 1%

Appendix

Table A1: Instrumental Variable Regression

	(1)
Capital Flight$_{t-10}$	*0.048*
	*(0.015)***
GDP per capita	-0.001
	(0.0001)***
Debt	2.652
	(1.088)**
BMP	-0.0005
	(0.0002)**
CPIA	0.238
	(0.350)
US r. i-rate	-0.128
	(0.144)
Civil War	-0.122
	(0.051)**
Durable	0.017
	(0.148)
SSA	1.005
	(0.699)
French Aid x language	-1.954
	(0.666)***
French Aid x religion	0.775
	(1.651)
French Aid x distance	57547.91
	(16652.57)***
French Aid x pol. similarity	-47.376
	(11.762)***
UK Aid x language	2.682
	(3.10)
UK Aid x religion	3.967
	(12.331)
UK Aid x distance	-47536.28
	(28484.4)*
UK Aid x pol. similarity	60.411
	(29.417)**
USA Aid x language	-1.112
	(0.500)**
USA Aid x religion	0.788
	(1.514)
USA Aid x distance	-2179.334
	(2633.936)
USA Aid x pol. similarity	-6.481
	(1.814)***
Japanese Aid x religion	-1.882
	(1.856)
Japanese x distance	69685.36
	(18570.09)***
Japaneses x pol. similarity	-4.386
	(2.235)**
German Aid x religion	-0.913
	(1.411)
German Aid x distance	-54252.19
	(10841.41)***
German Aid x pol. similarity	24.504
	(5.134)***
Observations	691
R^2	0.75

Note: Dependent Variable is Aid (% of GNI). Robust standard errors in parentheses significant at 10%; ** significant at 5%; *** significant at 1%

Sample:

Sub-Saharan Africa
Benin, Burundi, Cameroon, Chad, Rep. of Congo, Ethiopia, Gabon, Gambia, Ghana, Kenya, Malawi, Mali, Mauritania, Mauritius, Niger, Nigeria, Rwanda, Senegal, Togo, Uganda, Zimbabwe

Latin America and Caribbean
Argentina, Bolivia, Brazil, Chile, Columbia, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Paraguay, Peru, Venezuela

South Asia
Bangladesh, India, Pakistan, Sri Lanka

East Asia and Pacific
Fiji, Indonesia, Korea, Malaysia, Papua New Guinea, Philippines, Thailand

Middle East and North Africa
Egypt, Tunisia

Table A2: Descriptive Statistics

	mean	*standard deviation*	*minimum*	*maximum*	*observations*
Capital Flight$_t$	16.9	22.23	0	92.34	691
Capital Flight$_{t-10}$ (% of priv. wealth)	10.88	17.64	0	90.28	691
GDP per capita (const. US $)	2151	1765	274	9454	691
Debt (ratio to GDP)	.545	.393	.064	4.802	691
B.M.Premium (%)	80.36	534.62	-7.74	10477.38	691
CPIA (index)	3.07	.73	1	5	691
US real interest rate (%)	2.77	1.47	.068	5.41	691
Civil War (months)	1.85	4.25	0	12	691
Durable (years)	13.54	12.68	0	49	691
SSA (dummy)	0.45		0	1	691
Aid$_t$ (% of GNI)	8.01	10.28	-.47	82.65	691
Corruption (index)	.313	.155	.167	1	497

Table A3: Correlation Coefficients

	CF_t	CF_{t-10}	*GDP*	*Debt*	*BMP*	*CPIA*	*US r. interest rate*	*Civil War*	*Durable*	*SSA*	Aid_t
Capital $Flight_t$	1										
Capital $Flight_{t-10}$	0.68	1									
GDP per capita	-0.28	-0.25	1								
Debt	0.20	0.06	-0.16	1							
BMP	0.10	-0.05	-0.05		1						
CPIA	-0.28	-0.11	0.37	-0.24	-0.28	1					
US r. i-rate	-0.05	-0.17	-0.01	-0.02	0.04	-0.05	1				
Civil War	-0.03	-0.26	-0.08	0.01	0.20	-0.14	0.08	1			
Durable	-0.19	-0.02	-0.04	-0.07	-0.09	0.18	0.06	0.26	1		
SSA	0.50	0.44	-0.53	0.18	-0.06	-0.24	-0.03	-0.18	-0.05	1	
Aid_t	0.30	0.31	-0.49	0.52	-0.02	-0.18	-0.14	-0.07	0.00	0.49	1
Corruption	-0.07	-0.08	-0.18	-0.15	-0.05	-0.14	0.15	-0.06	-0.04	-0.13	-0.12

Table A4: Averages of Aid, GNI, Capital Flight Stocks and Private Wealth

	Sample (n=691)	*Sub-Saharan Africa (n=310)*
Aid	521	412
GNI	58200	6000
Capital Flight Stock	12100	5140
Private Wealth	164000	14300

Note: All figures in millions of constant 1995 US dollars.

Data Description and Sources

Aid

Aid is defined as official development assistance and net official aid less any repayments of loan principal during the same period. Grants by official agencies of the members of the Development Assistance Committee are included, as are loans with a grant element of at least 25 percent and technical cooperation and assistance. We measure aid inflows as a percentage of Gross National Product (GNI). The data source for the aid data is OECD (2001) and the data source for GNI is the World Bank (2001) World Development Indicators (WDI) database. Both data series are in current US dollars. Aid outflows are as instruments, they are the total of all aid outflows from a donor country. For the instrumental variable regression we deflated aid inflows and aid outflows by the US Consumer Price Index (CPI). The data source for the aid outflows is OECD (2001) and for CPI it is WDI (2001).

Capital Flight Measure

We measure capital flight as the ratio of foreign held capital stocks to total capital stocks, which are the sum of domestic and foreign capital stocks. The capital flight flows were calculated by using the World Bank method. See Claessens (1993) and Claessens and Naude (1997) for a detailed discussion of the various methods. They show that the commonly used methods to determine capital flight produce remarkably similar data series. Private capital stocks held domestically were compiled by aggregating private investment flows. We would like to thank Luc Moers for compiling these data series for us.

Civil War

Indicates the number of months the country experienced an internal major armed conflict in a given year. Major armed conflicts are defined as wars causing a minimum of 1,000 battle related deaths *per annum*. For further discussion and data see Collier and Hoeffler (2004).

Corruption

Corruption is measured on a scale from 0 to 5, lower values indicate a lower level of corruption. We transformed the index in the following way: 1/(1+Cor), i.e. for our transformed corruption measure lower values indicate a lower level of corruption. Data source: International Country Risk Guide (ICRG).

CPIA

The Country Policy and Institutional Assessment measure of policy has 20 equally weighted components divided into four categories as follows: (1) Macroeconomic Management and Sustainability of Reforms (General Macroeconomic Performance, Fiscal Policy, Management of External Debt, Macroeconomic Management Capacity, Sustainability of Structural Reforms); (2) Structural Policies for Sustainable and Equitable Growth (Trade Policy, Foreign Exchange Regime, Financial Stability and Depth, Banking Sector Efficiency and Resource Mobilization, Property Rights and Rule-based Governance, Competitive Environment for the Private Sector, Factor and Product

Markets, Environmental Policies and Regulations); (3) Policies for Social Inclusion (Poverty Monitoring and Analysis, Pro-poor Targeting and Programs, Safety Nets); and (4) Public Sector Management (Quality of Budget and Public Investment Process, Efficiency and Equity of Revenue Mobilization, Efficiency and Equity of Public Expenditures, Accountability of the Public Service). Index ranges from 1 to 5, lower scores indicate worse policies. Data source: World Bank.

Debt
Is the ratio of the net present value of the total debt service to GDP. Both variables are measured in current US dollars. Data sources: Easterly (2000) (net present value of the total debt service) and World Bank World Development Indicators, CD-Rom 2001 (Total GDP at Market Prices).

Distance Indicators
In the instrumental variable regression we use measures for linguistic, religious, geographical and political distance. Linguistic distance is a dummy taking a value of one if the donor country and the recipient country share a common language. Source: CIA Factbook 2003, http://www.cia.org/publications/factbook. Religious distance is again a dummy variable taking a value of one if 30 percent or more of the population belong to one religious group in the donor as well as in the recipient country. Source: Barrett (1982). Geographical distance is measured as the inverse of the distance in kilometres between the capitals of the donor and recipient country. We used the distance to Washington DC, the distance to Tokyo and the distance to Brussels for the three European donors. Data were made available by the World Bank. We measure political distance with an index of UN voting affinity (Gartzke and Jo, 2002). The values for the affinity data range from –1 (least similar interests) to 1 (most similar interests). For each donor/recipient combination we calculated the average over the entire time period and used this average for every single year. Although annual values are available we use the average because data series for Germany only start in 1974, the first year Germany was admitted to the UN. There also seem to be some coding problems with the 1994-96 data for Germany when every country's affinity with Germany is coded as 1.

Durable
Number of years since the most recent regime change which is defined as a three point change in the polity score over a period of three years or less. The polity score ranges from –10 to 10 and in the year of regime change, new polity is coded as year zero (value=0). A discussion of the data can be found in Jaggers and Gurr (1995). Data source: Polity IV at http://www.cidcm.umd.edu/inscr/polity/

Real GDP per Capita
Income per capita was obtained from the the World Bank 2001 World Development Indicators (WDI) database. GDP per capita is measured in 1995 constant US dollars.

BMP (Black Market Exchange Rate Premium)
Source: Reinhart and Rogoff (2002) and World Bank African Development Indicators.

US Real interest rate
US real interest rates, source: IMF International Financial Statistics.

SSA (Sub-Saharan Africa dummy)
This dummy takes the value of one for countries in Sub-Saharan Africa and zero for all other countries.

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