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Civil War and Post-Conflict Physical Capital Reconstruction in Africa¹

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Abstract

Africa's image as a war-prone region with bleak economic prospects is changing. Most of the conflicts that raged in the 1980s and 1990s have ended. For the first time in 50 years, there are currently more cases of post-conflict than conflict countries. Thus, instead of focusing on conflict resolution, it is time that more attention is given to post-conflict reconstruction, understood in terms of physical and non-physical capital accumulation. Domestic savings, fiscal revenue, foreign aid and capital flight repatriation are important funding modalities of reconstruction. Therefore, one of the priorities of post-conflict reconstruction must be to put in place the necessary institutional and physical infrastructure to rebuild the financial systems, limit capital flight and foster capital repatriation, and adopt policies that encourage the donor community to provide and sustain large amounts of aid – the main source of funding of the reconstruction process in the short to medium term following a civil war.

Keywords: Civil war, post-conflict, capital accumulation, reconstruction.

1. Introduction

“Why are there so many civil wars in Africa?”. This is the title of a paper published by Elbadawi and Sambanis (2000). Using the conventional definition of civil war as an internal violent combat between a sitting government and a rebel organisation, where at least 1000 people are killed with at least five percent of the casualties incurred on each side, the authors find that

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Africa had the highest number of civil wars between 1960 and 1999. Nearly 20 African countries experienced at least one episode of civil war in this period.

The objective of this paper is twofold. First, it updates previous quantitative studies of the evolution of civil war in Africa to reflect the most recent picture. Secondly, the paper discusses post-conflict reconstruction in Africa with a focus on its funding modalities. While recognising that post-conflict reconstruction has political, institutional, financial, and cultural dimensions, the analysis here focuses on physical reconstruction proxied by physical capital accumulation. The argument is that when economies have been destroyed by civil wars, physical capital accumulation in the post-conflict period is one of the clearest indicators of economic reconstruction. Also, the paper shows that the process of capital accumulation in a post-conflict context can be organised in such a way that it contributes to correcting economic imbalances that could have contributed to causing the conflict in the first place.

What are the main causes of civil war? This question has captured the attention of many analysts over the years, but it is mostly over the last 10 years that economists have shown a renewed interest in the topic. Elbadawi and Sambanis (2000) go beyond the simplistic clichés attributing Africa's civil wars to social divisions measured in terms of ethno-linguistic fractionalisation. Using an econometric model, they test for the validity in Africa, of civil war determinants proposed by Collier and Hoeffler (1998). They find that the high incidence of civil war in the continent is due to three main factors, two of which are the same as those identified in Collier and Hoeffler (1998). First is Africa's high dependence on natural resource exports, which are relatively easy to loot to finance rebellions. Sierra Leone and Angola are cases in point. Second, low per capita income and low levels of education imply that the youth can be easily enlisted in rebellions, given that they have little to lose. In other words, their opportunity cost of joining rebellions is very low. Elbadawi and Sambanis add poor governance as a third factor, which is not discussed by Collier and Hoeffler. They argue that Africa's propensity to political violence may be due to weak democratic institutions that have limited capacity for peaceful conflict resolution.

Collier and Hoeffler (1998) propose ethnolinguistic fractionalisation as another determinant of civil war onset in addition to the first two factors discussed above. This is a measure of ethnic diversity in a country, a variable used to proxy for coordination cost when mobilising for the formation of a rebellion. Its relationship with civil war is non-monotonic. Highly fractionalised societies do not seem to have a greater risk of civil war than homogeneous ones, the risk being highest somewhere in the middle of the distribution. Collier and Hoeffler also find that past civil wars tend to increase the probability of future civil wars.

Other analysts have shown that distributional inequalities are at the heart of most African civil wars. Violence often arises as a result of distributional conflicts between the defenders of a given social order, generally the ruling

elites, and opposition forces who calculate that their gains can only be realised if the current order is overthrown (Skidmore 1997). In Africa, Ngaruko and Nkurunziza (2000), Azam (2001), Addison (2005), and Ndikumana (2005) argue that political violence is often the consequence of selfish behaviour of those controlling political power and their associates, who accumulate the country's wealth for personal gain at the expense of other groups. This has been observed both in resource-rich and resource-poor countries. In a poor country like Burundi, Nkurunziza and Ngaruko (2008) show how the cycle of violence has been fuelled by the leaders' fights for the control of "rents to sovereignty." This concept refers to the way those controlling political power appropriate part of foreign aid and international borrowing; allocate public investment and public employment to benefit members of their group; and organise the economy with a view to generating rents that they enjoy while marginalising those not affiliated to them. This attitude creates inter-group tensions which, eventually, result in political violence.

Almost a decade after the publication of Elbadawi and Sambanis' paper, how has the situation evolved? The current reality is that a number of civil wars have ended and some new ones have emerged. Updated information on the incidence of civil war shows that the latter halved from an average of 7.5 to 3.4 civil wars per year between the 1990s and 2000s.³ In the second half of 2007, Africa had active civil wars in three countries: Chad, Sudan and Somalia. This is the lowest war incidence in about 50 years.⁴ These statistics suggest that the traditional representation of Africa as a war-prone continent is no more supported by empirical facts. In fact, in the current decade, Africa counts more post-conflict countries than war countries. As a result, post-conflict reconstruction should be given prominence in current development strategies implemented in the continent.

This paper has five sections. Section 2 attempts to delineate the concept of "post-conflict" to make it analytically tractable. This allows the definition of three political states, namely "peace," "war" and "post-conflict." These three categories are used to organise the discussion in the rest of the paper. Section 3 analyses the process of post-conflict physical reconstruction, measured by the level of physical capital accumulation. The section also discusses the potential sources of financing reconstruction. Section 4 is an econometric analysis, which uses a reduced form equation to determine the main funding sources of post-conflict physical reconstruction, both in aggregate and in each of the three political states. Section 5 concludes.

3. The average number of wars per year for a country is computed by taking the total number of years in a decade during which the country was at war. Adding up the years for all 53 countries and dividing them by 10 (with the exception of the latest period which covers 2000-2007) gives the average number of wars in Africa per year and per decade.

4. The incidence was 4.5 wars per year in the 1960s; 4.9 wars per year in the 1970s; and 8 wars per year in the 1980s, the highest incidence over the sample period.

2. From Conflict Resolution to Post-Conflict Reconstruction

2.1. Defining “post-conflict”

As the name indicates, the concept of post-conflict refers to the period following the end of a conflict in a given country. Despite its apparent simplicity, this concept has two definitional problems. The first is the determination of the beginning of a post-conflict period. It is often impossible to know precisely when a conflict ends. Even after the signature of a peace agreement by belligerents, low-intensity hostilities might continue. We use two major events to determine the beginning of a post-conflict period. The first is the immediate period following a landmark victory by either of the warring parties. This could be the fall of the capital city, seat of political power, following a long protracted war. For example, the long war between Ethiopian government forces under the so-called “Dergue régime” headed by Colonel Mengistu Haile Mariam and rebel forces led by Meles Zenawi is known to have ended when Addis Ababa fell on May 29, 1991.

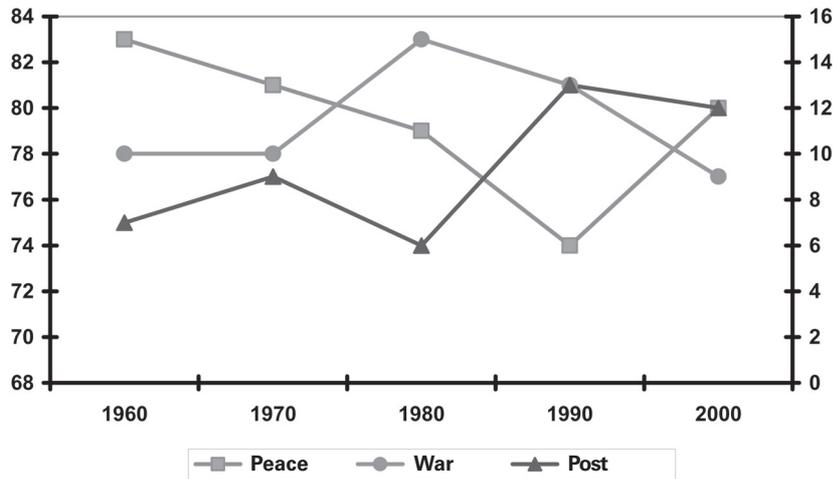
The second major event used to determine the official end of a war is the date of signature of a comprehensive agreement between the warring parties. Even when such an agreement does not necessarily end all acts of violence, it reduces them dramatically. Hence, it is easier to take the date of the signature of a ceasefire agreement as the end of the conflict and the beginning of the post-conflict period. For example, the recent war in Burundi officially ended when the government signed a comprehensive ceasefire agreement with the main rebel group on November 29, 2003, even if some sporadic violence by another small rebel group persisted until mid-2008.

Once the beginning of the post-conflict period is identified, the next question is how to determine its end. If the name “post-conflict” is justified on the grounds that countries emerging from civil war have specific characteristics that differentiate them from peaceful ones, a post-conflict period should end, in theory, when the specific attributes inherited from the conflict cease to have influence. In reality, however, it is impossible to say exactly when a country returns to normalcy from its post-conflict state. Hence, the post-conflict period is arbitrarily defined as the 10-year period following the end of a conflict (see for example, Collier and Hoeffler 2004).

On the basis of the definitions of civil war and post-conflict, Figure 1 groups countries into three categories: Peaceful, at war, and in post-conflict. It then shows the trend of each state over the 1960-2007 period.

The figure illustrates the change in the pattern of political instability in Africa over the last 50 years. In the 1960s and 1970s, war prevailed in nine percent of country-years and increased to 15 percent in the 1980s before

Figure 1. Proportion of three political states in country-years: Trend analysis (War and Post use the right scale)



declining to nine percent in the current decade (from 2000 to 2007).⁵ As expected, the trend of the peace variable has an opposite pattern. The 1960s were the most peaceful period, while the 1990s were the least peaceful. As noted earlier, for the first time since the 1960s, the current decade has more post-conflict than conflict countries, suggesting that the analysis of post-conflict reconstruction should be given prominence. By the end of 2007, there were three civil wars compared to seven post-conflict cases. The next section uses these three states to analyse transitions among them and across time.

2.2. Transitions

A global picture of the evolution of political instability in Africa is captured in transition matrices shown in Table 1. At any given time t , any African country C is in one of the following three states. If the country is experiencing a civil war, it is in state *War*. If the country is in a post-conflict period, it is in state *Post-conflict*. If the country is neither at war nor in a post-conflict period, it is in state *Peaceful*. The movement across the three states is captured in transition matrices, which show the conditional probability that a country is in state j in period $t + \tau$ given that it was in state i in period t . This probability is noted:

$$P[C(t + \tau) = j | C(t) = i] \quad (1)$$

5. We have a panel of 53 countries analysed over a period of 47 years. The total number of observations or country-years is 2,491.

The transition probabilities from state i to state j between period t and $t + \tau$ are noted:

$$P_{ij}(t + \tau) = P[C(t + \tau) = j | C(t) = i] \quad (2)$$

Given that there are three states, the transition matrix P can be represented as:

$$P = \begin{pmatrix} p_{11} & p_{12} & p_{13} \\ p_{21} & p_{22} & p_{23} \\ p_{31} & p_{32} & p_{33} \end{pmatrix} \quad (3)$$

p_{11} is the proportion of countries in the first state (peaceful, for example) in period t , that remain in the same state at period $t + \tau$. p_{12} represents the proportion of countries that change from a state of peace to war at time $t + \tau$. p_{13} stands for the proportion of countries that change from a peaceful state to post-conflict. p_{21} denotes the proportion of countries that change states from war to peace. p_{31} is the proportion of post-conflict countries that become peaceful between t and $t + \tau$, and so on. The transition matrix P is nonnegative as each transition probability $p_{ij} \geq 0$. Therefore:

$$0 \leq p_{ij} \leq 1 \quad (4)$$

Elements of the transition matrix are proportions, which are also interpreted as probabilities. Hence, elements in each row must sum to 1.

$$\sum_{j=1}^n p_{ij} = 1 \quad (5)$$

Conceptually,

$$\begin{cases} p_{13} = 0 \\ p_{21} = 0 \end{cases} \quad (6)$$

Given that the transitions are over decades and in view of the definition of post-conflict $p_{33} = 0$, by design.

There are three matrices covering transitions in three periods (see Table 1). The first covers the transition from the 1970s to the 1980s, the second from the 1980s to the 1990s, and the third from the 1990s to the 2000s.

Table 1. Empirical transition matrices

$$P_{70-80} = \begin{pmatrix} 0.92 & 0.08 & 0.00 \\ 0.00 & 0.78 & 0.22 \\ 0.75 & 0.25 & 0.00 \end{pmatrix} \rightarrow P_{80-90} = \begin{pmatrix} 0.87 & 0.13 & 0.00 \\ 0.00 & 0.64 & 0.36 \\ 1.00 & 0.00 & 0.00 \end{pmatrix} \rightarrow P_{90-2000} = \begin{pmatrix} 0.97 & 0.03 & 0.00 \\ 0.00 & 0.42 & 0.58 \\ 1.00 & 0.00 & 0.00 \end{pmatrix}$$

The transition from the 1980s to the 1990s saw more political violence than any other period. The second matrix P_{80-90} shows that there was a 13 percent probability that a peaceful country in the 1980s slid into war in the 1990s. The corresponding probabilities for the periods, 1970s-1980s, and 1990s-2000s, were much lower. They were eight percent and three percent respectively. Some analysts have associated this trend with the instability that followed the end of the Cold War. Before, the world was divided into the East and the West, with a relatively balanced influence accruing to each block. This guaranteed international political stability, which collapsed with the fall of the Eastern Block.

Information in the first matrix P_{70-80} illustrates the fact that some post-conflict situations fail and revert to war. Between the 1970s and 1980s, there was a 25 percent probability that such an outcome occurred. This is an indication that post-conflict situations are fragile, particularly during the first few years following the end of a war.

Transitions associated with the current decade show a higher tendency to end civil wars inherited from the past, which results in the highest number of post-conflict countries. The probability that a country at war in the 1970s ended it in the 1980s was 22 percent. It increased to 36 percent in the next period and to 58 percent in the period starting from the 1990s to the 2000s. It should also be noted that from the 1980s to the 2000s, all post-conflict cases recovered fully to become peaceful states as shown in matrices P_{80-90} and $P_{90-2000}$. The monotonic increase in the probability that countries at war enter in the post-conflict state, combined with the small probability that new wars start in the latest period, suggest that more attention should be given to post-conflict reconstruction.

3. Financing the needs of post-conflict societies

Addressing the multiple needs of post-conflict societies poses a challenging problem. Depending on the duration of the period of instability, countries inherit ravaged economies with depleted physical and human capital as well as weak institutions. Post-conflict societies are characterised by curtailed civil liberties, diversion of resources to non-productive activities, and a tendency towards dis-saving and portfolio substitution favouring non-monetary and foreign currency denominated assets (Collier 1999). These attributes limit the amount of domestic resources available to fund post-conflict countries' reconstruction efforts. According to a recent study by IANSA *et al.* (2007), the average financial opportunity cost of armed conflict in Africa over the 1990-2005 period, in addition to the human tragedy of the conflicts, was estimated at \$18 billion or 15 percent of GDP

per year. The cumulated opportunity cost over the 15-year period is estimated at \$300 billion.⁶

3.1. Some specific needs of post-conflict economies

Reconstructing physical and human capital: Physical infrastructure such as roads, bridges, dams, and electricity poles are often key targets of belligerents attempting to disrupt the logistical flow of the enemy. They are also targets of rebels' acts of sabotage in order to put the government in difficulty. The destruction of physical capital causes economic disruptions that increase transactions and other production costs. For example, the damage to electricity installations may result in severe power shortages as observed in Burundi in the mid-1990s. Some firms responded by investing in their own generators, using important financial resources that could have been used for other productive activities. Generally, small businesses are unable to afford such alternative sources of energy, so many of them just collapse, with dramatic consequences on the economy and household welfare.

In addition to physical capital, human capital is destroyed through the killing or fleeing of part of the labour force. This deprives countries of one of their most important assets needed to sustain development efforts. Harm to civilians is often attributed to "collateral damage" but there is evidence that most of the civilian casualties are the result of a war strategy that specifically targets them. Indeed, violence against civilians is the norm in modern warfare where civilians represent up to 84 percent of all war-related casualties (Azam 2006).

Institutional forms of reconstruction

Reconstructing legal and security institutions to consolidate the rule of the law: The widespread availability of cheap weapons is one of the most enduring legacies of conflicts. These weapons continue to fuel violence even after the cessation of hostilities. In general, the intensity and duration of this residual violence is determined by the extent to which former combatants are successfully demobilised and reintegrated into civilian life or into the new security institutions. In some cases, post-conflict violence is fuelled by some members of the security structures who use their weapons and their privileged positions to loot or settle scores. In Burundi, for example, a household survey reveals that persisting violence is mainly attributed to gangsters, rebels, and government soldiers (Pézard and Florquin 2007).

One of the most difficult tasks that confront post-conflict leaders is how to swiftly deal with crime in a context of weak systems of governance and indiscipline. In some cases, political leaders sacrifice temporarily individual

6. The computation of these figures is based on the difference between a country's actual GDP and its projected level if the country had not experienced conflict. On the limitations of the methodology, see IANSA *et al.* (2007).

liberties for security imperatives. In Ethiopia and Rwanda, strong-handed response against crime almost eradicated post-conflict violence in no time. Now, Addis Ababa and Kigali are among the safest capital cities in Africa.

Reconstructing public and private institutions to reallocate resources to productive activities: In war and post-conflict societies, economic resources are diverted to non-productive activities in two major ways. The first is the diversion of output-enhancing financial resources to war and security services. Collier and Hoeffler (2006) have shown that most post-conflict countries continue to have a high level of military spending. Post-conflict countries spend 4.7 percent of GDP on military spending, which is slightly lower than spending in countries at war, but much higher than the share in peaceful countries where it amounts to only 3.3 percent of GDP. This high spending is primarily due to pressure from the militaristic lobbies constituted during the war period, as well as the need to ensure that the government maintains a dissuasive military capability to respond to any resurgence of conflict.

Also, integrating former combatants in government and security institutions during the post-conflict period is often a political choice made in order to consolidate peace even when it appears as wasteful. This is the case when the size of the army and the police are larger than the optimum number. In the private sector, the persistence of high risk and uncertainty in the post-conflict environment induce economic agents to dis-save and limit their investments. It takes time to change this habit. This is why capital continues to leave the country even after the conflict (Ndikumana and Boyce 2008). Post-conflict political leaders must put in place institutions that correct these anomalies.

3.2. Some comparative descriptive statistics

Wasteful financial resource allocation may explain why the “peace dividend” takes time to materialise in many post-conflict situations. For example, several years after the end of a civil war, GDP per capita remains much lower than the level attained before the conflict (Table 2). Even if the incremental capital-output ratio (ICOR) indicates that only three units of investment are needed to generate a unit of economic growth, which is half of the value in the war period, this improvement is not necessarily due to allocative efficiency. It might be due to productive efficiency that almost automatically follows the end of the war.

All the variables are defined by their names, except capital flight and polity. The data on capital flight are from Ndikumana and Boyce (2008), who define it as the residual difference between capital inflows and recorded foreign-exchange outflows. More precisely, capital flight is $KF_{it} = \Delta DEBTADJ_{it} + DFI_{it} - (CA_{it} + \Delta RES_{it}) + MISZINV_{it}$, where it represents country i at time t . $\Delta DEBTADJ$ is the change in a country's stock of external debt, adjusted for cross-currency exchange fluctuations and aggrega-

Table 2. Financing post-conflict reconstruction: Descriptive statistics for 40 sub-Saharan African countries (1970-2004).

	Peace		War		Post-conflict		Overall	
	Median	Obs.	Median	Obs.	Median	Obs.	Median	Obs.
Tax revenue to GDP in percentage	15	661	11	114	11	76	14	851
Real capital flight to GDP in percentage	2	959	5	133	6	124	3	1216
Stock of capital flight by 2004 in million US\$	303	969	2867	140	3595	124	609	1233
Aid per capita in US\$	33	1049	14	174	24	134	30	1357
Gross domestic savings to GDP in percentage	9	998	6	132	7	134	18	1264
Gross domestic investment to GDP in percentage	19	1015	12	132	16	134	18	1281
Public investment to GDP in percentage	7	679	5	100	7	93	7	872
Private investment to GDP in percentage	11	737	7	95	9	95	10	927
GDP per capita in US\$	353	1012	204	143	230	127	334	1282
GDP growth in percentage	4	1005	2	139	5	127	4	1271
ICOR (Incremental capital-output ratio)*	5	984	6	125	3	127	4	1236
Polity: varies from -10 (worse) to +10 (best)	-4	644	-7	120	-4	83	-5	847

Note: The ICOR is calculated by dividing the median values of gross domestic investment by median values of GDP growth.

ted in US\$. *DFI* represents the net foreign direct investment flows, while *CA* stands for the current account deficit. ΔRES is the change in the stock of international reserves, and *MISINV* denotes net trade misinvoicing. The stock of capital flight is equal to the cumulated flows of capital flight capitalised using the US rate on treasury bonds.

The data on capital flight might raise doubts on the argument that such an intractable phenomenon is hard to measure. While it is fair to say that capital flight is indeed hard to measure, its estimation as explained above relies on variables popularly used in macroeconomic analyses of African economies. These computations should not be considered as an exact quantification of the problem of capital flight in Africa, but rather as estimates giving a sense of the extent of this phenomenon.

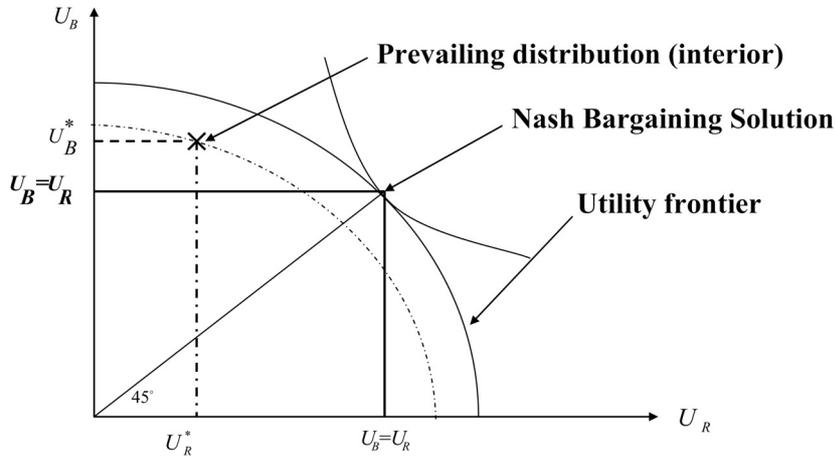
Aid per capita is the ratio of the sum of official development assistance (ODA) and official aid over a country's mid-year total population. We have no access to disaggregated data on aid, so we cannot distinguish the effects of humanitarian assistance and long-term aid on economic reconstruction. However, we should not consider that humanitarian assistance does not contribute to post-conflict reconstruction. Humanitarian aid is often used for reconstruction of basic infrastructure, such as schools, health centres and hospitals, clean water infrastructure, etc. Thus, using aggregate data on aid does not necessarily pose a problem.

With respect to the polity variable, it is an index that captures the quality of political governance. It varies from -10 for the worst governance regime to 10 for the best governance regime. This variable was collected from the Polity IV database. All the other data were collected from World Bank (2007a). With the exception of capital flight, variables in Table 2 are widely used in the empirical literature on development. Hence, in spite of some potential measurement errors that particularly characterise macroeconomic data in Africa, these are the best statistics available.

3.3. Post-conflict economic reconstruction through physical capital accumulation

Physical reconstruction entails physical capital accumulation as the stock of destroyed capital is repaired or replaced. The quality of physical capital accumulation in the post-conflict period is very important as it determines the sustainability of the reconstruction effort. On the negative side, if reconstruction unequally benefits different segments of society, it might revive pre-conflict tensions or widen social inequalities. For example, if reconstruction is concentrated in urban centers at the expense of rural communities, or if it benefits a few regions at the expense of others, this might heighten the probability of renewed conflict.

On the positive side, post-conflict reconstruction can be an opportunity for positive change. Post-conflict reconstruction can be, for example, an opportunity to replace old and inefficient infrastructure damaged during the

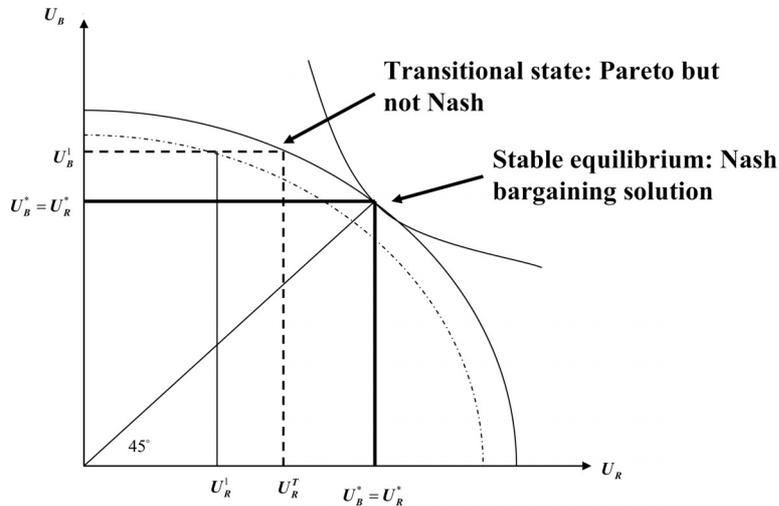
Figure 2. Initial distribution inherited from the war period

conflict. Also, considering the importance of distributional problems in most modern African conflicts, the process of capital accumulation in a post-conflict setting can play an important role in defusing such distributional conflicts. In fact, calls for new distributional arrangements are often prominent in a number of political settlements that precede post-conflict reconstruction.

Figures 2 to 4 illustrate a process of capital accumulation that could help post-conflict societies to move from a conflict-fuelling distribution to an equitable distribution of resources acceptable to leaders of different groups. The logic underlying the following figures is that power gives access to economic rents, which increase the level of utility of those enjoying the rents. The challenge is to organise reconstruction as a Pareto-efficient process, implying that the rents associated with reconstruction must be distributed in such a way that they equalise the utility of those previously marginalised and that of the members of the traditionally privileged group.

There are two groups: The group of power holders and their associates has an average utility level represented by U_B^* , while the representatives of the marginalised group have an average utility equal to U_R^* . Post-conflict societies inherit a distribution with $U_B^* > U_R^*$. Moreover, as Figure 2 shows, the immediate post-war distribution is not Pareto-efficient because war economies are associated with widespread inefficiencies, including resource misallocations discussed earlier. Hence, the distribution point is inside the utility-possibility frontier. An important objective in many civil war settlements is to achieve an egalitarian distribution, where both groups have the same utility level, $U_B^* = U_R^*$ on the utility frontier, which corresponds with the Nash Bargaining Solution (NBS).

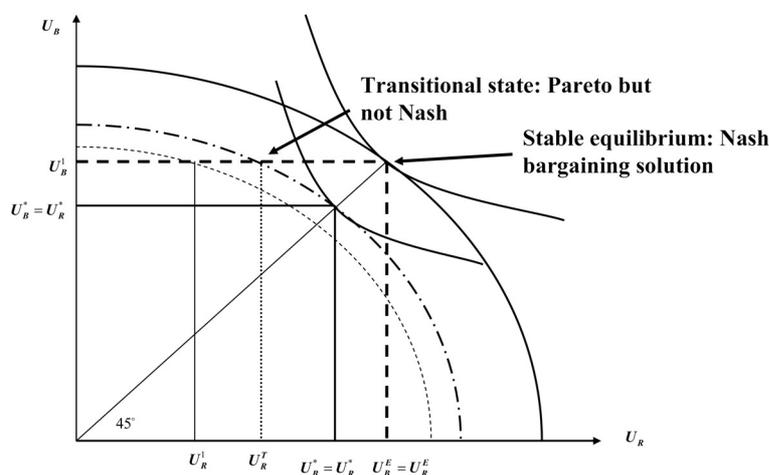
Keeping the utility frontier fixed, the NBS could be instantaneously achieved by transferring utility from B to R. However, this zero-sum distribution is not Pareto efficient. It is politically difficult if not impossible, to

Figure 3. Pareto but not Nash equilibrium distribution

implement. The reason is that even when they have lost political power, B-group members remain politically and economically powerful so they are more likely to oppose any move to reduce their utility. A politically acceptable solution is to generate more wealth through the process of capital accumulation, and allocate the additional wealth to members of the R-group. This process takes time and can be implemented in two stages. Figure 3 depicts an intermediate stage between the initial distribution and the post-conflict equilibrium distribution.

The key point in Figure 3 is that U_R^* can be increased without decreasing U_B^* . This is done by pushing the distribution point to the utility-possibility frontier by producing more efficiently and allocating all efficiency gains to U_R^* , even without additional investment. For example, allowing displaced people and refugees to return and engage in productive activities, reducing the defence budget and reallocating the resources to productive sectors, and allowing former combatants to return to their pre-war productive activities are avenues for efficiency gains. The fact that post-conflict economies post growth rates that are almost always higher than war and peaceful economies (see Table 2) is partly the result of efficiency gains. Also, the low ICOR in the post-conflict period is another illustration of the potential avenue for efficiency gains. Hence, R-group's utility increases from U_R^1 in the immediate period following the end of a civil war, to a transitional utility denoted U_R^T . It should be noted that this increase does not affect the level of U_B^1 .

The distribution in Figure 3 is only transitional because although it is Pareto-efficient, it is not in Nash equilibrium. The distribution still privileges members of the B-group, despite the gains made by those in the R-group.

Figure 4. From transitional to Nash equilibrium distribution

The next step is to move from this transitional state to a stable equilibrium achieved at the point representing the NBS. However, the original NBS is not Pareto-efficient because it reduces B-group's utility. A feasible NBS must be compatible with the current utility level of B. Figure 4 illustrates how a Pareto-efficient and NBS-compatible utility distribution can be reached.

The configuration in Figure 4 equalises utilities of both groups without reducing U_B^* . This requires shifting outwards the utility-possibility frontier curve, which cannot be done simply on the basis of production efficiency gains. This is where investment becomes important. It is assumed that physical capital accumulation creates more wealth that shifts outwards the utility-possibility frontier. In reality, distributional mechanisms represented in these three figures refer to tangible items that define utility. They include money, better housing, access to education, or better jobs. Economic growth with more equal income distribution can help more people previously outside the favoured group to access these amenities, improving their living standards. This result can be achieved only when accumulation of physical and human capital, as well as technological advances, shift the production frontier upwards. If the Pareto-efficient and Nash equilibrium distribution is maintained, it could reduce the probability of further distributional violence.

Capital accumulation in Africa

Despite the importance of capital accumulation in the process of economic transformation of developing countries, there is no unified theory of investment behaviour in such economies. For example, imperfections in capital markets, credit constraints, and the important role of the state in the economy, are factors specific to developing countries' investment decisions, which theory does not take into account. The analysis of investment beha-

viour in developing countries has rather focused on the importance of financial factors (Agénor and Montiel 1996), and the literature has established a strong and positive link between financial development and investment in Africa (Ndikumana 2000).

By international standards, the rate of investment in sub-Saharan Africa has been very low. Over the 1970-2004 period, the rate amounted to 18 percent of GDP (see Table 2), which is half the rate in the East Asia and Pacific region (World Bank 2007a). This investment rate is particularly low in comparison to the level of 34 percent of GDP required to generate economic growth rates that would reduce poverty by half by 2015 as targeted in the Millennium Development Goals (UNECA 1999). The region is far from achieving this objective. Over the last ten years, the actual investment rate has remained almost half of the target rate (World Bank 2007a).

There are three major factors explaining the continent's low investment rate. First, given that most savings are in the form of short-term deposits, Africa lacks sufficient long-term savings to finance long-term investment (UNCTAD 2007a). Second, investment resources are constrained by the continent's limited access to international capital flows. For example, FDI flows to Africa have been oscillating between two percent and three percent of total flows, and about 10 percent of the flows to developing economies (UNCTAD 2007b). This makes Africa the least attractive region to foreign direct investment. Third, potential investors in Africa are discouraged by a particularly difficult investment climate. Despite some progress over the last few years, Africa still has the least conducive investment climate in the world (World Bank 2007b).⁷ This environment is characterised by high uncertainty and low investor protection, low standards of governance, poor physical infrastructure, high entry costs, rigid labour markets, and inefficient tax systems, among others (UNCTAD 2007a).

In conflict and post-conflict economies, the factors constraining investment are expected to be even stronger than in peaceful countries. For example, the collapse in law and order decreases the standards of political and economic governance, increasing uncertainty and making contract enforcement difficult. The destruction of infrastructure as a result of war worsens a post-conflict country's infrastructure constraint. Moreover, conflict and post-conflict economies tend to be tax unfriendly because governments in war economies lose revenue from traditional sources and increase taxes to fund the war effort. This predatory taxation and the other negative consequences of political turmoil often induce capital flight. The direct impact is a reduction in domestic investment and the resulting decline in the tax base and government revenue (Nkurunziza 2005).

7. Although widely used by researchers and policymakers, these new statistics should be interpreted with caution. They generally portray a negative image of Africa without clearly explaining why. The data are also relatively new, so they fail to show Africa's progress over the last few years. For a more detailed critique of these data, see Johnson *et al.* (2007).

We conclude from the above that productive investment combined with an equitable distribution of income could be the best way to keep peace in post-conflict periods and beyond. The modalities for financing such investments are discussed below.

3.4. Financing post-conflict reconstruction

The dearth of resources available for post-conflict reconstruction contrasts with the enormity of the needs to cater for. This paper focuses on four main sources of financing post-conflict reconstruction: Domestic savings, fiscal revenue, external aid, and capital flight repatriation.

Domestic savings

Early views on the relationship between domestic investment and savings held that savings should have no significant effect on the rate of investment in economies where capital moves freely. The argument was that when capital is perfectly mobile, the cost of investment funded by using internal resources (savings) should not be significantly different from using external resources (borrowing, for example). In reality, financial markets are imperfect, so perfect mobility of capital is not observed anywhere. Therefore, the analysis of supply and demand of financial resources cannot be dissociated with the quality of financial intermediation. In many African countries, the weakness or absence of capital markets implies that the financial resource pool is dominated by short-term deposits in financial institutions, which cannot be used to finance long-term investment. Thus, borrowing for investment cannot be a perfect substitute for using own savings.

On the other hand, the demand for financial resources for investment depends on economic activity and the business environment. For example, high uncertainty reduces investment and therefore the demand for finance, even when potential supply is high. Also, poor financial intermediation can lead to credit rationing even when there is genuine demand for financial resources. In this light, Scholtens (1999) proposes a financial pecking order reflecting the fact that firms rely on their own savings (retained profits) to invest. Borrowing comes next, followed by other financing modalities.

Empirical studies in developed and developing countries find a positive and significant relationship between domestic investment and savings. In their influential paper, Feldstein and Horioka (1980) found a coefficient of investment on saving close to unity in OECD countries. Moreno (1997) reviews a variety of explanations to reconcile this apparent contradiction between theory and empirical facts. He imputes this discrepancy to statistical problems associated with the estimation of the coefficient, including the simultaneity bias and the small sample size. More importantly, he posits that the results of the estimation may be influenced by a common factor not included in the estimation, such as economic growth. Moreno notes also that

the statistical relationship between investment and saving contains no information about capital mobility, the basis of Feldstein-Horioka's argument.

In the African context, a cross-country microeconomic study covering firms in the manufacturing sectors of several countries finds that high capital costs are the most important factors adversely affecting investment by firms (Bigsten *et al.*, 1999). There is a high correlation between investment and the level of profits, which is the microeconomic equivalent of the savings-investment relationship under discussion. In this regard, there are reasons to expect that investment should be associated with savings in Africa, where alternative sources of finance are either inexistent or very limited.⁸ Low savings, particularly in the form of long-term deposits, could then help to explain why investment rates are so low in Africa.⁹

Fiscal revenue

The capacity to collect, allocate, and spend tax revenue is the economic core of well functioning states (Boyce and O'Donnell 2007). The speed with which post-conflict economies are able to rebuild their economies and fiscal systems in order to raise their tax revenue to pre-conflict levels should be considered as one of the indicators of their recovery. Data in Table 2 shows that fiscal revenue in post-conflict economies is much lower than in peaceful economies. The median ratio of tax revenue to GDP in post-conflict economies is only 10.7 percent, which is almost five percentage points lower than in peaceful economies, where the ratio is 15.4 percent. This can be explained by two factors. First, economic destructions and disruptions as well as resource misallocations during the war period constrain economic activity, narrowing the tax base. The median rate of economic growth in war economies is only two percent compared to four percent in peaceful economies and 5.5 percent in post-conflict economies.

Second, as discussed earlier, the erosion of moral values during the war period and widespread corruption increase the incentive for tax evasion and tax leakage.¹⁰ These habits persist in the post-conflict period and it takes courage and strong leadership to eradicate them. The gap in fiscal resources collected during the war and peaceful periods can persist several years after the end of the conflict. For example, Uganda is often considered as a success story

8. Two caveats. First, savings data in Africa are poor estimates of the actual figures because a large share of savings is in the form of non-financial assets (see UNCTAD 2007a). Second, the distribution of savings rates is influenced by outliers. The averages are 12 percent for peaceful countries, nine percent for post-conflict and seven percent for conflict countries. None of these caveats, however, changes the fact that the continent's savings rate is the lowest in the world.

9. The median savings rate to GDP ratio for the 40 countries in Table 2 is a mere eight percent, and the rate is even smaller for war and post-conflict countries, with six percent and seven percent of GDP, respectively. The highest rate is in East Asia and Pacific, where savings represent 43 percent of GDP (UNCTAD 2007a).

10. Tax leakage means that taxes are paid but the money does not go to its intended developmental purpose. For example, taxes are paid but the revenue collected is appropriated by private individuals.

in terms of economic reconstruction after a long period of economic instability that lasted until mid-1980s. However, despite a steady increase since the end of the conflict in 1986, its current ratio of revenue to GDP is still lower than its level before the beginning of political instability in the early 1970s (see Ndikumana and Nannyonjo 2007).

External aid

External aid can hinder or help post-conflict reconstruction. Where political elites capture aid as part of their strategy to collect rents to sovereignty, this can perpetuate inequality, aggravating the marginalisation of some sections of the population. The result may be more resentment, which, in turn, might lead to violence. In a politically unstable environment, aid can also allow fledging governments to acquire weapons, a move that may affect the military balance on the ground, prolonging or reducing the duration of a conflict.

Aid to post-conflict societies can also be used to consolidate peace. It helps to “buy” peace by using it to address some of the grievances that may be at the origin of the conflict. These could be related to illiteracy, unemployment, marginalisation, etc. Brachet and Wolpe (2005) propose eight principles that should provide the foundations of aid policy in a post-conflict context. Among them are the following five, which are relevant to this analysis. Aid should: (i) “Do no harm” to anyone to avoid reinforcing trigger or causes of conflict. In other words, it must be Pareto-efficient; (ii) Make peace dividends visible to the population to demonstrate that peace is more rewarding than war; (iii) Deal with short-term challenges, particularly the restoration of security, to lay the foundation for long-term reconstruction; (iv) Address the structural causes of conflict to prevent future instability; and (v) Provide development assistance that is consistent and sustained to ensure maximum impact on the beneficiaries.

In order to meet these five principles, aid needs to be commensurate with post-conflict needs. External aid is particularly important in post-conflict countries, where domestic financial resources are very limited, as discussed earlier. However, data in Table 2 shows that post-conflict countries have less aid than peaceful countries. The median value of per capita aid drops from \$33 in peaceful countries to \$24 in post-conflict states. Countries at war have only \$14 per capita.

In a study of the pattern of aid allocation in the context of socio-political instability, Chauvet (2003) confirms the finding that stable countries receive more aid. Collier and Dollar (2002) develop a poverty-efficient aid allocation model, where they find that actual aid allocations are significantly different from their optimal levels, reinforcing the argument that aid is not necessarily allocated on the basis of economic need (see also Lancaster 1999).

While it is understandable that aid could be used to encourage good behaviour, for example the adoption of good standards of political and econo-

mic governance, two arguments could be advanced to justify why post-conflict countries should benefit from more aid. The first is a rational argument. If a civil war is considered as a public bad with negative externalities on the rest of the world, it is in the interest of the international community to help avoid civil wars. This logic justifies an increased level of aid to post-conflict countries to prevent them from falling back into conflict. In the words of Miller (1992), aid should be used as peacemaker.

The second argument is moral. It is morally just to allocate aid based on recipient countries' needs. This is particularly appealing in countries faced with political or economic instability and which often suffer from a drastic reduction in traditional financial resources. On the basis of an efficient allocation rule, the huge needs of post-conflict societies imply that aid would be more efficient there than elsewhere, suggesting that such countries should benefit from higher levels of aid. However, in the short-term, large aid flows in countries with fragile institutions such as those in post-conflict settings, can lead to problems of limited absorptive capacity, which could cause macroeconomic instability. The short-term dynamics of aid allocation must keep this caveat in mind.¹¹

Capital flight repatriation

Generally, war economies experience high levels of capital flight as economic agents transfer their assets abroad, either seeking safety or higher returns on investment or just placing stolen assets in secure foreign assets. Societies at war and post-conflict societies see the emergence of a new class of politico-economic agents who benefit from remarkable opportunities for profit. These arise from government controls or the disintegration of competitive markets (Collier and Gunning 1995). Due to widespread political and economic uncertainty, including insecure property rights, these agents tend to hold unusually high savings in liquid domestic assets or foreign currency denominated assets, both within and outside their countries. This leads to a decline in a country's tax base and hence lower government revenue to finance public investment and basic needs.

Nkurunziza (2005) provides some suggestive evidence of the positive association between political instability and capital flight. Up to the late 1990s, traditionally stable economies such as Mauritius, Ghana, Côte d'Ivoire and Zimbabwe (before the war in Côte d'Ivoire and political turmoil in Zimbabwe) had capital flight that was less than 20 percent of their private assets. In contrast, capital flight in traditionally unstable countries including Chad, Uganda, Nigeria, and Mozambique, was more than 50 percent of private assets in the same period. In Burundi, capital flight during the war period between 1993 and 1997 represented 55 percent of private assets,

11. On a detailed discussion and critique of these arguments, see UNCTAD (2006).

almost the double of the amount before the war, which stood at 30 percent of private revenue.¹²

Second, the breakdown in the rule of law and lack of transparency in the conduct of economic transactions, particularly the processing of arms contracts, encourage corrupt practices by political elites. Incomes from hefty commissions on contracts or outright embezzlement of funds are normally deposited in foreign bank accounts to avoid traceability of the assets. According to Ndikumana and Boyce (2008), the stock of capital flight from Africa between 1970 and 2004 amounted to US\$ 607 billion or 81.8 percent of the continent's GDP. Data in Table 2 also suggests a very strong association between political instability and capital flight. The average figure of capital flight in war countries is nine times higher than in peaceful countries.

Capital flight is even higher during the post-conflict period. It represents 12 times the amount in peaceful countries. One explanation is that even after the cessation of hostilities, economic agents do not fully believe that the warring parties will commit credibly to peaceful behaviour. As a result, economic agents may use the "window of opportunity" offered by the end of major hostilities to transfer even more capital abroad. According to Collier *et al.* (2001), the persistence effect of past capital flight lasts up to a decade. Econometric results in the study by Ndikumana and Boyce (2008) confirm the result that capital flight has a long persistence effect. The authors suggest that this is due to a habit formation. Those involved in smuggling capital abroad learn by doing, and put their accumulated experience to use over time.

Alternatively, the persistence of capital flight may be due to a contagion effect. As the technology to smuggle capital is accumulated, it becomes widely available particularly when the smugglers include government officials who are normally responsible for preventing it. Ultimately, the institutional chaos prevailing in conflict and post-conflict societies implies that the legitimacy of capital controls is put to question so capital flight is done more openly. This sends a bad signal for macroeconomic stability, resulting in even more capital flight. As a result, it may take a long time before post-conflict countries are able to curb capital flight and repatriate the resources already abroad for economic reconstruction.

Among the four potential sources of funding discussed above, external aid is expected to be the most important source of funding of physical investment in post-conflict economies. The reason is that all the three alternative sources discussed above depend on the level of economic and institutional recovery, which takes time (see Table 2). Dis-saving continues into the

12. These figures refer only to capital flight based on portfolio choice, motivated by higher risk-adjusted rates of return on capital (see Collier *et al.* 2001). This definition of capital flight excludes transfers of stolen assets or proceeds of corruption. For a more complete definition and treatment of capital flight, see Ndikumana and Boyce (2008).

post-conflict period and tax revenues take a long time before they reach the pre-conflict level, depending on how fast the economy recovers. Moreover, reversing the outflow of capital is a long term objective. In fact, statistics in Table 2 show that capital flight increases in the immediate post-conflict period.

4. Financing Post-conflict Recovery: Data analysis

This section estimates the effect of different sources of funding economic reconstruction on capital accumulation. The nature and magnitude of this relationship give indications about financing policies that should be pursued during the reconstruction period.

4.1. Characteristics of the variables used in the econometric model

This section estimates an equation relating to investment, measured in three different ways, with a number of variables capturing different funding modalities. The dependent variable is first measured as the ratio of gross domestic investment to GDP. It is then decomposed into public and private investment, both as GDP ratios. Funding variables are: (i) Gross domestic savings to proxy for the availability of domestic resources; (ii) capital flight to capture the effect of capital outflows; and (iii) aid per capita to proxy for the availability of external financial resources. Other control variables include GDP growth to capture the effect of economic activity (the so-called accelerator effect), and political variables to proxy for the three political states discussed earlier. These are captured by three dummy variables. The first dummy variable, *peace*, takes value 1 if a country is neither at war nor in post-conflict, and zero otherwise. The second dummy variable, *war*, takes value 1 in countries at war and zero otherwise. The third dummy variable, *post*, captures the post conflict period. It takes value 1 if a country is in post-conflict and zero otherwise.

Establishing the order of integration of investment and independent variables helps to determine the econometric model to be estimated. If the variables are integrated, cointegration is the best approach to estimate the relationship between investment and its determinants. However, if the variables are stationary, we estimate a stationary model, where the long-run value of investment is simply equal to its mean.

The order of integration is formally established by performing unit root tests on each variable.¹³ As we are dealing with panel data, two types of tests are performed. The first assumes a null hypothesis of a common unit root process across panels. This test is based on Levin *et al.* (2002) *t* statistic. The

13. The tests were performed using E-Views software, version 6. The detailed results of the tests are available upon request.

Table 3. Descriptive statistics covering 40 African countries (1970-2004)

	Min.	Max.	Mean	Median	Inte- gration	Obs.
Gross domestic investment to GDP	0.76	73.49	19.99	18.00	I (0)	1281
Public investment to GDP	0.00	37.41	8.15	6.98	I (0)	872
Private investment to GDP	-4.16	52.40	12.00	10.44	I (0)	927
Gross domestic savings to GDP	-92.76	72.98	9.42	8.45	I (0)	1264
Tax revenue to GDP	0.00	71.16	16.40	14.12	I (0)	851
Real capital flight to GDP	-160.37	135.52	3.71	3.19	I (0)	1216
Aid per capita	-11.89	465.57	47.55	30.19	I (0)	1357
Log of aid per capita	-4.76	6.49	3.23	3.41	I (0)	1353
GDP growth per annum	-50.25	89.87	3.53	3.60	I (0)	1271
Peace	0.00	1.00	.078	1.00	I (0)	1400
War	0.00	1.00	0.12	0.00	I (0)	1400
Post	0.00	1.00	0.10	0.00	I (0)	1400

Source: See Table 2; I (0) means stationary variable or zero unit root.

second test assumes a null hypothesis of individual panel unit root processes. It is based on the well-known Augmented Dickey-Fuller and Phillips-Perron Fisher Chi-square statistics. Unit root tests of the continuous variables assume the presence of a drift term, but without a time trend. The tests of the three categorical variables include neither a drift term nor a time trend. All tests reject the null hypothesis of the presence of either type of unit root. Therefore, all the variables are considered to be stationary. Accordingly, cointegration is ruled out. Therefore, stationary models are estimated to probe the relationship between domestic investment and the relevant funding variables.

4.2. Econometric results

This section estimates a reduced-form investment model to gauge the effect of funding variables on domestic investment, controlling for economic growth and the political environment. Investment is specified as a dynamic serial correlation model following the standard practice.¹⁴ Therefore, investment is a function of its lagged value, with funding and political state variables as regressors.

$$I_{it} = \alpha_0 + \alpha_1 I_{it-1} + \alpha_2 S_{it} + \alpha_3 KF_{it} + \alpha_4 A_{it} + \alpha_5 g_{it} + \alpha_6 PC_{it} + \mu_i + \varepsilon_{it} \quad (7)$$

From the above equation, i and t are indexes referring to country and time period. There are three funding variables, namely domestic savings (S), capital flight (KF), and foreign aid per capita (A). GDP growth (g) is introduced in the model to account for the accelerator effect and the overall economic environment.¹⁵ Other control variables are the lagged value of investment (I)

14. This specification captures the fact that investment projects take time to build.

15. Aid per capita rather than aid to GDP is used to account for the fact that the latter measure is greatly influenced by the changes in the denominator that do not justify a proportionate change in the level of

to account for the persistence effect of investment, and two dummy variables to capture the effect of the political states discussed earlier. These are P , which captures the peaceful period and PC , the post-conflict period. The war dummy variable is the excluded state. μ_i represents time-invariant country-specific effects and ε_i is a Gaussian error term. In addition to the main equation of gross domestic investment, total investment is disaggregated into public and private investment models, which are estimated using the same regressors. This is motivated by the fact that some funding variables affect more strongly, public than private investment, and *vice versa*. For example, foreign aid is expected to affect public investment more strongly than private investment, given that aid is mostly channelled through government structures, partly through the budget.

The presence of the lagged dependent variable as a regressor implies that estimating the equation using procedures such as OLS and fixed effects introduces endogeneity that biases the estimation results. To address this problem that arises in dynamic panel data models, Arellano and Bond (1991) have proposed the generalised method of moments (GMM) estimation technique as the appropriate estimation procedure.¹⁶ This is the methodology used to estimate all equations in tables 4 and 5.

The saving variable is the most systematic positive determinant of capital accumulation.¹⁷ A one percent increase in savings leads to 0.12 percent increase in total investment. This result is comparable to the finding by Fofack and Ndikumana (2007), where each percentage increase in savings leads to 0.11 percent increase in domestic investment. Savings affect private investment more than public investment, suggesting that the participation of domestic private actors to economic reconstruction is highly dependent on their savings level. Capital flight has an opposite effect. Considered as dis-saving, capital flight has a negative and significant effect on the rate of capital accumulation and, as is the case with savings, it acts mostly through private investment. Therefore, the fact that post-conflict periods are characterised by low levels of savings and high capital flight relative to peaceful periods illustrates the importance of external resources, at least in the short-term, for post-conflict economic reconstruction.

Econometric results confirm that foreign aid is a key determinant of post-conflict physical reconstruction, particularly through public domestic investment. The fact that aid has no direct effect on private investment does not imply that aid is not important for the private sector. Public and private investments are complementary, so the positive effect of aid on public investment has an indirect positive effect on private investment. Indeed, the

aid. Such dramatic changes in GDP are observed in conflict and post-conflict environments (see discussions under section 3).

16. For a detailed discussion of the estimation of dynamic models, see Arellano and Bond (1991).

17. The savings variable is weakly related to public investment but strongly related to private investment. In contrast, tax revenue is positive and significant in the public investment model but not significant in the private investment model. These results are available upon request.

**Table 4. Effect of funding sources on gross domestic investment:
GMM estimates**

The dependent variable is the ratio of investment to GDP

	Total	Public	Private (1)	Private (2)
Lag investment	0.63*** [0.00]	0.65*** [0.00]	0.57*** [0.00]	0.53*** [0.00]
Saving	0.12*** [0.00]	0.05* [0.10]	0.07*** [0.00]	0.11*** [0.00]
Capital flight	-0.02** [0.04]	0.00 [0.67]	-0.02* [0.07]	-0.01 [0.18]
GDP growth	0.07* [0.08]	0.02 [0.19]	0.00 [0.99]	-0.01 [0.78]
Log aid per capita	0.50 [0.11]	0.44** [0.04]	0.47 [0.21]	0.44 [0.23]
Peace dummy	-0.10 [0.95]	1.27*** [0.00]	0.01 [0.99]	0.45 [0.71]
Post-conflict dummy	0.33 [0.73]	0.30 [0.45]	-0.13 [0.88]	-0.20 [0.82]
Public investment				-0.23** [0.03]
Lag public investment				0.18** [0.04]
Constant	4.42*** [0.00]	-0.47 [0.58]	2.85 [0.16]	2.91 [0.12]
2 nd -order autocorrelation	-1.29 [0.20]	0.28 [0.78]	0.78 [0.44]	0.08 [0.93]
Observations	1037	745	770	723

Note: Bracketed values are p-values based on White (1980) heteroskedasticity-consistent standard errors. Three, two and one star, correspond to one percent, five and 10 percent significance level, respectively. The reference group for political state is war. The second-order autocorrelation is the value of the *z*-statistic computed based on the null hypothesis of no autocorrelation.

contemporaneous effect of public investment on private investment is negative and significant, suggesting that public investment crowds out private investment. One percentage point increase in public investment reduces private investment by 0.23 percent. This is a reflection of the importance of the state as an economic actor in African economies. The positive and significant effect of the lagged value of public investment on private investment implies that past stock of public investment increases the current level of private investment. An increase in the stock of public investment by one percent results in 0.18 percent increase in private investment in the next period.

To put these findings in perspective, Agénor and Montiel (1996) point out that the effect of public investment on private investment cannot be signed *a priori*. The contemporaneous effect is negative in economies with a relatively important public sector competing for resources with the private sector. This is what the results in Table 4 suggest. The lagged effect, on the other hand, depends on the type of public investment that dominates. For example, public investment in infrastructure has been found to increase private investment, while some other types of public investment might not

Table 5. Capital accumulation in three political states: GMM estimates
The dependent variable is the ratio of investment to GDP

	Peaceful	War	Post-conflict
Lag investment	0.63*** [0.00]	0.40*** [0.00]	0.37*** [0.00]
Saving	0.13*** [0.00]	0.20** [0.04]	0.14*** [0.00]
Capital flight	-0.03** [0.02]	0.00 [0.86]	0.03** [0.03]
GDP growth	0.09 [0.17]	0.07 [0.19]	0.01 [0.74]
Log aid per capita	0.56 [0.27]	2.34*** [0.00]	0.78** [0.03]
Constant	4.45*** [0.02]	-0.18 [0.93]	7.10*** [0.00]
2 nd -order autocorrelation	-1.59 [0.11]	-0.59 [0.93]	-0.85 [0.40]
Observations	821	104	112

Note: Bracketed values are p-values based on White (1980) heteroskedasticity-consistent standard errors. Three, two, and one star, correspond to one percent, five and 10 percent significance level, respectively. The reference group for political state is war. The second-order autocorrelation is the value of the *z*-statistic computed on the basis of the null hypothesis of no autocorrelation.

have any effect. Therefore, one way of increasing private investment in Africa is to raise the quality and level of public investment (see UNCTAD 2007a).

The results also confirm the view that peaceful economies invest more than economies at war. However, this effect is only significant for public investment. One interpretation could be that war funding crowds out public resources that are normally spent on public investment. There is no evidence that post-conflict periods witness higher investment, public or private, relative to the war period most probably due to the limited resources available as discussed earlier. The factors constraining investment during the war period, for example uncertainty and poor infrastructure, do not change immediately when the war ends.

In addition to assessing the effects of the political state variables on investment through the use of dummy variables, Table 5 displays the results of three models of investment, each corresponding with a political state. It is important to note that war and post-conflict states are relatively infrequent, so the corresponding estimates are based on a limited number of observations.

The *peaceful* sub-sample is large and its estimates are not affected by the small sample problems that are potentially associated with the other two sub-samples. The estimated coefficients are comparable with those of the general model of gross domestic investment in Table 4. All the coefficients have the same signs and comparable magnitude.

With respect to the other two political states, despite the limited number of degrees of freedom, there are some interesting results. There is a marked difference in the effect of capital flight on investment in the war sub-sample as it is the only state where it is insignificant. Aid is highly significant in the war

and post-conflict states, but not in the peaceful state to illustrate that during periods of war, aid remains the main source of gross domestic investment through public investment, because domestic savings decline as growth slows and capital flight intensifies.¹⁸

5. Conclusion

The image of Africa, once known as a politically unstable region with bleak economic prospects, is changing. Most of the conflicts that raged in the 1980s and 1990s have ended, bringing stability to countries that had been torn by political strife for many years. For the first time since the 1960s, there are more countries in post-conflict phase than countries at war. The attention of the international community should reflect this shift.

Civil wars destroy infrastructure and other economic assets. Therefore, reconstruction understood in terms of capital accumulation is a crucial step towards economic recovery. How reconstruction should be financed is the central theme of this paper. Given that domestic savings are the most systematic determinant of investment, one of the priorities in post-conflict countries must be to rebuild their financial systems. Such a policy could encourage economic agents to save and invest in the domestic economy as political stability returns to the country. However, this process takes time. Regaining the lost confidence of local investors is a slow process. The speed of recovery depends on the nature of the signals sent by those tasked with the management of post-conflict transitions.

One specific way to increase domestic savings is to fight against capital flight and try to repatriate the assets already held abroad. Doing away with corrupt practices developed during the war period through the re-establishment of the rule of the law and the empowerment of oversight institutions can help to achieve this objective. Countries emerging from civil war usually attract the sympathy of the international community. Thus, it is important that these countries show that they are committed to establishing good standards of governance. This boosts the donors' confidence that foreign aid will be put to good use.

Aid remains the most important source of funding in the absence of the required level of domestic savings. In fact, post-conflict countries need large amounts of aid in the early phase of reconstruction to rebuild their financial systems, which will eventually allow them to mobilise higher savings in the medium to long-term. As a result, a successful post-conflict reconstruction process requires amounts of aid that are commensurate with the needs to cater for. For example, aid used to repair or reconstruct infrastructure would

18. The change in the sign of the *capital flight* variable during the post-conflict period is difficult to rationalise. It could be due to multicollinearity introduced by the drastic reduction of the sample.

encourage the private sector to increase its own investment, given that public investment comes ahead of private investment.

Aid must be fairly allocated to avoid its capture by post-conflict lobbies and political elites. If aid is used to consolidate the process of economic recovery, it could increase the credibility of the transition from war to peace. If reconstruction generates a peace dividend relatively quickly, there is a high likelihood that a country sets on a stable development path. Otherwise, poorly managed post-conflict transitions are not credible and can quickly degenerate and result in renewed conflict.

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