

On Financing Post-Conflict Development in Sudan¹

Abstract

The paper adopts a Millennium Development Goal framework to explore the question of the required growth and investment rates to reduce poverty by half over two alternative time horizons (10 and 15 years starting 2005) in post-conflict Sudan. It is shown that the required GDP growth rate ranges between 7.9 to 6.2 percent per annum with corresponding required investment/GDP ratios of 0.34 and 0.26 for the shorter and longer time horizons respectively. The South/North required GDP growth rates and investment ratios, as well as the overall resource gaps to be filled by foreign assistance, are also reported. In the context of the signed peace protocols the paper also notes the major economic policy challenges facing the country.

ملخص "حول تمويل التنمية بعد تحقيق السلام في السودان"

تبنى هذه الورقة إطار الأهداف الإنمائية للألفية لاستكشاف معدلات النمو والاستثمار المطلوبة للإقلال من الفقر إلى نصف مستواه الذي سيسود عام 2005 وذلك بعد مرور عشرة أعوام وخمسة عشر عاماً بعد التوقيع على اتفاقية السلام . وتوضح الورقة أنه لتحقيق هدف الإقلال من الفقر يتوجب على السودان تحقيق معدلات نمو الناتج المحلي الإجمالي الحقيقي تبلغ 7.9 و 2.6 في المائة سنوياً مما يتطلب تحقيق نسب للاستثمار للناتج المحلي الإجمالي تبلغ 0.34 و 0.26 وذلك للمدين القصير والطويل على التوالي . كذلك تقوم الورقة بتقدير هذه النسب لكل من الجنوب والشمال كما تقوم بتقدير فجوة الموارد التي ينبغي مقابلتها من المصادر الأجنبية . وفي إطار الاتفاقيات التي تم توقيعها حتى الآن تستعرض الورقة تحديات صياغة السياسات التنموية التي تواجه القطر .

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I. Introduction:

At long last a peace settlement for the second civil war in Sudan, the longest civil war in Africa, is reaching a final phase. The Nairobi Declaration on the Final Phase of Peace in the Sudan, signed on the 5th of June 2004, notes that the Government of Sudan (GOS) and the Sudan People's Liberation Movement/Army (SPLM/A) have met in continuous negotiations between May 2002 and May 2004. The Declaration enumerates the agreements reached by the two parties: The Machakos Protocol (signed 20th July 2002); Agreement on the Security Arrangements During the Interim Period (25th September 2003); Agreement on Wealth Sharing During the Pre-Interim and Interim Period (7th January 2004; hereinafter referred to as FAWS); Protocol on Power Sharing (26th May 2004; hereinafter referred to as PPS); Protocol on the Resolution of Conflict in Southern Kordofan/Nuba Mountains and Blue Nile States (26th May 2004); and, Protocol on the Resolution of Conflict in Abyei Area (26th May 2004). In the declaration the parties jointly agreed "that the Protocols and agreements already signed, together with the Annexes that remain to be negotiated on the Permanent Ceasefire Arrangements and the Agreement on the Modalities of Implementation of the Agreement that shall also include regional and international guarantees, shall constitute the Comprehensive Peace Agreement, which, when signed, shall initiate the Pre-Interim Period"².

The first article of FAWS enumerates the "guiding principles in respect of an equitable sharing of common wealth". Among the guiding principles are the following:

- (a) "the wealth of the Sudan shall be shared equitably so as to permit each level of government discharge its legal and constitutional responsibilities and duties" (article 1.2);
- (b) "the sharing and allocation of wealth emanating from the resources of the Sudan shall ensure that the quality of life, dignity, and living conditions of all citizens are promoted without discrimination on grounds of gender, race, religion, political affiliation, ethnicity, or region. The sharing and allocation of wealth shall be based on the premise that all parts of Sudan are entitled to development" (article 1.4);
- (c) "Southern Sudan, and those areas in need of construction/reconstruction, shall be brought up to the same average social/economic standard and public services as the Northern states. To achieve these objectives will take time and effort to build up local institutional, human, and economic capacity" (article 1.7);
- (d) "the parties recognize that the National Government, during the Interim Period, will need to mobilize additional national resources" (article 1.12);

² The full texts of the various agreements are to be found in www.gurtong.org.

- (e) “there is a limit on how much additional national resources can be mobilized and part of the national needs in a post-conflict Sudan will need to be met by external assistance” (article 1.13);
- (f) “in agreeing to these wealth sharing arrangements the Parties signal to the international community that it will have to play a strong and constructive role in providing post-conflict construction/reconstruction assistance to Sudan, especially to Southern Sudan and other war affected and least developed areas” (article 1.15).

In an earlier paper we have shown that principles (a)-(c) can be interpreted in the light of the Millennium Development Goals as requiring the reduction of poverty in the country subject to an overall resource constraint³. We have also shown that the specific formula for sharing oil revenue agreed to in article 5 of FAWS can be justified on the basis of such interpretation (see Ali (2003))⁴.

We suggest that principles (d)-(f) above, in addition to principles (a)-(c), can be understood as dealing with financing the post-conflict development process inclusive of construction/reconstruction of war affected areas. The principles envisage both increased domestic resource mobilization effort by the national government, subject to a limit, and a “strong and constructive” role for the international community in providing assistance. Indeed in the last paragraph of the Nairobi Declaration the parties to the conflict jointly appealed to the “Regional and International Community to continue their unwavering support to the Sudan Peace Process at this final phase, and further appeal to avail resources for necessary and urgent programmes and activities of the transition to peace, and programmes of The Joint Assessment Mission (JAM) and the Joint National Transition Team (JNTT)”.

³ Note that principle (a) emphasizes the importance of respecting the administrative constraints of the various levels of government to enable them to “discharge legal and constitutional responsibilities and duties”. Such requirements are usually reflected in government budgets. Principle (b) can be understood as emphasizing the importance of promoting non-discriminatory development, where development is broadly defined in terms of the “quality of life” and “living conditions” of all citizens. Principle (c) could be interpreted as embodying an objective function to guide the design of a wealth allocation formula in the form of minimizing the gap in average “social/economic standard and public services” between the South and the North. Once again the “social/economic standard” is left undefined.

⁴ Article 5.3 defines the “net revenue from oil” in a very precise way, with appropriate caveats for possible future events on the price front. In addition an “oil revenue stabilization account” is to be set up such that net oil revenue derived from exports at prices above an agreed benchmark prices (established annually in the context of the national budget) are to be deposited. After payments into the stabilization account, if any, 2% of the net oil revenue “shall be transferred to oil producing states/regions in proportion to output produced in such states/regions”. “After payment to the Oil Revenue Stabilization Account and to the oil producing states/regions, fifty percent (50%) of net oil revenue derived from oil producing wells in Southern Sudan shall be allocated to the Government of Southern Sudan as of the beginning of the Pre-Interim Period and the remaining fifty percent to the National Government and States in Northern Sudan”.

In addition to the above, it is perhaps important to note that the Protocol on Power Sharing (PPS) provides for the establishment of a Government of Southern Sudan (GOSS) “as per the borders of 1/1/56”. Schedule B of the agreement enumerates “the exclusive legislative and executive powers” of GOSS to include the following economic powers:

- (i) “borrowing money on the sole credit of the Government of Southern Sudan within the national macro-economic policy”;
- (ii) “development of financial resources for the Government of Southern Sudan”;
- (iii) “taxation and revenue raising in Southern Sudan as a whole”;
and,
- (iv) “reconstruction and development of Southern Sudan as a whole, subject to the provisions of the Wealth Sharing Agreement”.

We suggest that these economic powers need to be kept constantly at the background in any analysis seeking to explore the issues involved in financing post-conflict development. The most important implication of these powers is that subject to the provisions of the FAWS and the constraints set by an agreed upon overall macroeconomic policy, GOSS is entitled to pursue an independent “development strategy”, given the initial conditions of Southern Sudan. Despite this, it is important to note that in a recent speech Garang (2004) elucidated the implications of the peace agreement to a national development strategy. In addition to good governance aspects the development strategy is envisaged to “combat poverty and the sense of marginalization and exclusion in all regions of Sudan”; to “meet the Millennium Development Goals”; to “enhance economic growth through rural development and transformation of traditional agriculture that is integrated with agro-industries”; and, “to deliver social services through devolution and decentralization of power and empowerment of people”⁵.

The objective of this paper is to explore a few issues involved in financing post-conflict development in Sudan. As in Ali (2003), and consistent with Garang’s conception of a national development strategy, we adopt as a framework of analysis the UN Millennium Development Goal (MDG) on poverty reduction⁶. The first Millennium Development Goal (MDG) is to eradicate extreme poverty and hunger. Two major targets under this goal have been specified. The first target is to halve the proportion of people living in extreme poverty (living on less than US\$1.08 per person per day) by the year 2015. As is well known, the proportion of people living in extreme poverty is the head count ratio while the income level of US\$ 1.08 per person per day is the poverty line.

⁵ Speech delivered on the occasion of signing the Nairobi Declaration on launching the final phase of the peace process. The full text of the speech is to be found in www.gurtong.org.

⁶ See UN (2002), Implementation of the United Nations Millennium Declaration: Report of the Secretary-General; report no. A/57/270; page 8; www.un.org.

The rest of this paper is organized in five sections. Section (II) presents a few analytical preliminaries on poverty measurements and dynamics. Section (III) deals with some data issues relevant to the approach we are adopting. Section (IV) presents the results on growth scenarios. Based on the growth scenarios section (V) presents results on financing requirements while section (VI) concludes with a few remarks on policy implications.

II. Analytical Preliminaries:

In view of the fact that the MDG on poverty reduction is stated in terms of the head-count ratio it is instructive to note that the head-count ratio, H , can be written in general format as follows:

$$(1) H \equiv q/n = H(\mu/z, \theta); \text{ with } \partial H / \partial (\mu/z) = H_1 < 0 \text{ and } \partial H / \partial \theta = H_2 > 0.$$

Where q is the number of the poor, n is total population, μ is per capita consumption expenditure; z is per capita poverty line; θ is the Gini coefficient of the distribution of consumption expenditure; and where subscripts on the function H are the usual partial derivatives with respect to the indicated arguments.

The change in poverty over time at the national level can be shown to have two components: a growth component, where poverty would be expected to decline as a result of an increase in mean consumption given the state of inequality in the distribution of consumption expenditure; and a distribution component, where poverty would be expected to decline as a result of a decline in the degree of inequality in the distribution of consumption, given mean consumption expenditure. In technical terms differentiating the national head-count ratio, $H(\mu/z, \theta)$, logarithmically with respect to time gives:

$$(2) G(H) = (1 - \varepsilon) \eta G(\mu) + \nu G(\theta)$$

where $G(x) \equiv (dx/dt)(1/x)$ is the respective growth rate of the variable and η and ν are the elasticities of the head-count ratio with respect to mean consumption expenditure (negative) and with respect to the Gini coefficient (positive) respectively; and, where ε is the elasticity of the poverty line with respect to mean consumption expenditure. Note that ε is non-negative but less than, or equal to, unity (i.e. $0 \leq \varepsilon \leq 1$)⁷.

The above equation shows that the percentage change in poverty over time two components: a growth component, where poverty would be expected to decline as a result of an increase in mean consumption given the state of inequality in the distribution of consumption expenditure; and a distribution component, where poverty would be expected to decline as a result of a decline in the degree of inequality in the distribution of consumption, given mean consumption expenditure.

⁷ Note that the case where the elasticity of the poverty line is equal to zero corresponds to the frequent assumption used in empirical work where the poverty line is held constant over time and between regions or sectors. The other extreme where the elasticity of the poverty line with respect to mean consumption expenditure is equal to unity corresponds to the European practice of choosing the poverty line as a fixed proportion of the standard of living (usually taken as median income).

In a development context the state of income distribution, as summarized by the Gini coefficient, can be assumed to be a function of the mean consumption expenditure (e.g. due to a Kuznets' process). Recalling the behavioral assumption on the poverty line as a function of mean consumption expenditure, the head-count ratio will now be a function of mean consumption expenditure with a net growth elasticity of poverty that takes into account changes in the distribution of expenditure. In technical terms the head-count ratio can now be looked at as being a function of per capita consumption expenditure as follows:

$$(3) H = H(\mu/z(\mu), \theta(\mu)) = H(\mu),$$

The percentage change in the head-count ratio over time, $G(H)$, is given by:

$$(4) G(H) = [\eta(1 - \varepsilon) + \nu \kappa] G(\mu) = \gamma G(\mu)$$

where η is the elasticity of the head-count ratio with respect to mean consumption expenditure (which is negative), ε is the elasticity of the poverty line with respect to mean consumption expenditure (which is non-negative and equal to 1, or less than, unity), ν is the elasticity of the head-count ratio with respect to the Gini coefficient (which is positive), and κ is the elasticity of the Gini coefficient with respect to mean consumption expenditure (which could be of any sign depending on the stage of development of the economy: at an early stage we would expect it to be positive while at a later stage we would expect it to be negative). The expression $[\eta(1 - \varepsilon) + \nu \kappa]$, which is denoted by γ , is the growth elasticity of poverty. Note that if $\varepsilon = \kappa = 0$, then the growth elasticity of poverty is equal to the partial elasticity with respect to mean consumption expenditure. In general, however, the growth elasticity of poverty can be estimated or calculated.

In the context of the above framework if $G(H)$ is known, as in the MDG on poverty reduction, and if the growth elasticity of poverty is also known, then one can calculate the required rate of growth of per capita consumption expenditure as follows:

$$(5) G^*(\mu) = [G^*(H)/\gamma]$$

Where a star (*) over a variable denotes that it is a desired outcome. Now assuming that per capita consumption expenditure is a proportional function of per capita income such that they grow at the same rate, one can use the above equation to estimate the required rate of growth of GDP, $G(Y)$, as follows:

$$(6) G^*(Y) = G^*(u) + G(n) = [G^*(H)/\gamma] + G(n)$$

Where $G^*(u) = G^*(\mu)$, u is per capita GDP, and $G(n)$ is the population growth rate.

Now invoking a growth model such as that of Harrod-Domar or that of Rebello one can estimate the required investment to achieve the MDG on poverty reduction. In this respect it should be noted that under these linear capital models the growth of GDP is given by:

$$(7) G(Y) = [s/c]$$

Where s is the investment GDP ratio (i.e. the investment rate) and c is the capital output ratio. From equation (6) the required investment rate to achieve the MDG goal on poverty is given by:

$$(8) s^* = [c G^*(Y)]$$

The above framework can be applied for each region on its own as well as for the country as a whole.

III. Data:

As is probably well known there is a huge data problem in Sudan, especially with respect to information regarding Southern Sudan. Recent efforts by UNICEF, the World Bank, the IMF and UNDP have improved our knowledge, but a lot of noise in the data sets compiled by these organizations still exists. As a result resort to indirect methods of estimation is inevitable. In what follows such methods are used and no claim to absolute accuracy is made. The reported results are, therefore, rough orders of magnitudes. To apply the proposed framework of section (II) above there is a need to generate information on real per capita GDP, various poverty elasticities, and the capital output ratio. The following sub-sections deal with these aspects respectively.

3.1. Real Per Capita GDP:

The first information gap that needs to be addressed by indirect methods of estimation is the per capita GDP in Southern Sudan. To be able to fill in this gap we estimated an equation relating life expectancy at birth (LE) to real per capita GDP. The reason for doing this is that the World Bank (2003-b) reports life expectancy figures for various regions in Sudan including Southern Sudan. We then inverted the estimated equation using these life expectancy figures to obtain real per capita GDP for various regions. The estimated equation is, where figures between brackets are heteroskedastic consistent t-values and where the estimation is for a sample of 134 countries for which relevant data was available for 1999:

$$(9) LE = 21.25 + 13.3 \log y; \text{ adjusted } R^2 = 0.5649$$

(7.19) (17.16)

By noting that life expectancy in the Southern Sudan is reported as 47 years, and by assuming that the region falls on the estimated line and after inverting the above equation we arrive at the result that per capita GDP in Southern Sudan was about US\$86 in 1999. Overall GDP per capita was about US\$346 and that for Northern Sudan was about US\$395. What is important to note is that the ratio of Southern Sudan GDP per capita to that of the North is 0.2177 and to that of the country is 0.2495⁸.

⁸ Note that in Ali (2003) we have shown that the ratio of per capita GDP of Southern Sudan to that of the North was equal to about 0.43 at independence in 1956!!!!

On these GDP per capita figures we performed two adjustments. The first adjustment is that we scaled them so that the overall average GDP per capita is US\$300 as per the calculations of the World Bank. On this adjustment real per capita GDP for Southern Sudan amounted to US\$75 while that for the North amounted to US\$343. We then used the adjusted figures to convert the base to 1985 PPP dollars. According to our adjusted PPP estimates Sudan's overall GDP per capita was about US\$944 in 1985 PPP. Using the above noted ratios we estimate GDP per capita for Southern Sudan in 1999 as US\$278 in PPP 1985 dollars. GDP per capita in North Sudan was about US\$1260 in PPP 1985. Note that per capita GDP for Southern Sudan is about 0.77 of the international poverty line adopted for the MDG on poverty reduction. In view of this, and without loss of accuracy, we shall assume that per capita consumption expenditure in Southern Sudan is equal to per capita GDP. For the North we note that the average of private consumption expenditure in the national income accounts over the 1990s was about 0.85 of GDP. Using this we calculate per capita consumption expenditure for the North as US\$1071.

3.2. Poverty Elasticities:

The application of the framework in section (II) requires the elasticities of the head-count ratio with respect to its determinants. To generate these elasticities we use equation (10). This equation is estimated for a sample of 18 Sub-Saharan countries where poverty measures were calculated based on a poverty line that changes with per capita consumption expenditure. A poverty equation is then estimated where the natural logarithm of the head count ratio is the dependent variables and per capita consumption expenditure and the Gini coefficient (percentage points) are the explanatory variables. Such a formulation is preferred to the double logarithm format because it allows the elasticity of the head count ratio with respect to each of its determinants to vary with the determinant. The resulting estimated equation for the headcount ratio, with White heteroscedasticity adjusted absolute t-values in brackets, is given below:

$$(10) \text{Ln } H = 4.1732 - 0.00163 \mu + 0.0124 \theta ; \text{ adjusted R-squared} = 0.94;$$

$$(34.36) \quad (15.96) \quad (5.40)$$

where H is the head-count ratio, μ is real per capita consumption expenditure in 1985 purchasing power parity dollars, and θ is the Gini coefficient in percentage points. The relevant partial elasticities of the head-count ratio are readily obtainable from the above equation as $\eta = [-0.00163\mu]$ and $\nu = [0.0124\theta]$ and can be calculated once information for μ and θ is available. Note that in view of the fact that the equation is estimated on the basis of a poverty line that changes with the level of consumption expenditure the partial elasticity η is inclusive of the elasticity of the poverty line with respect to consumption expenditure.

In the above estimated equation knowledge of the Gini coefficient, θ , is important for the calculation of the elasticity of the head-count ratio with respect to the inequality measure, the Gini coefficient. For this purpose we use equation (11). This is a Kuznets' equation reported in Ali (1998) and Ali and Elbadawi (2000). The estimation of the equation is based on a sample of 50 countries: 33 developing countries (12 Latin American, 9 Asian and 11 African) in addition to 17 advanced countries. Instead of the usual quadratic form, the functional form proposed by Anand

and Kanbur (1993) was estimated where the Gini coefficient (measured as a ratio) is regressed on mean income and its reciprocal. The result of the estimation, with an African dummy (Afdum), is reported below where figures between brackets are t-values:

$$(11) \text{ Gini} = 0.5121 - 0.0000203u - 49.8037(1/u) + 0.06927 (\text{Afdum}); \quad R^2 = 0.329$$

$$(13.41) \quad (-3.625) \quad (-2.199) \quad (2.078)$$

In this equation u is GDP per capita in 1985 PPP and $\text{Gini} = [\theta/100]$. Given the existence of a Kuznets' relationship according to equation (11) the implied turning point for the Kuznets' relationship is \$1566 per person per year in 1985 PPP. Thus for countries with per capita GDP below this turning point the Gini coefficient would be expected to increase as GDP per capita increases. For the purposes at hand, southern Sudan would be expected to have a lower degree of inequality than the North.

Recall that in applying equation (11) to the case of Sudan for prediction purposes the intercept term will be 0.58137 on account of the fact that Sudan belongs to Sub-Saharan Africa and as such the variable (Afdum) will take the value of one. We also note that the predicted Gini coefficients are much lower than those currently reported for Sudan albeit that the current Gini coefficients are based on household survey results confined only to the North and as such do not measure up to the requirements of high quality data based results.

The estimated coefficients are used to derive a Kuznets' elasticity, a component of the inequality elasticity of the head-count ratio. From equation (11) it is an easy matter to show that the Kuznets' elasticity is given by the following expression:

$$(12) \quad [d \log \text{Gini} / d \log u] = \kappa = [-0.0000203 u + 49.8037 (1/u)] / \text{Gini}$$

where the Gini in the formula is the predicted Gini.

On the basis of the above, the growth elasticity of the head-count ratio can be calculated in accordance with equation (13). It is to be recalled that in using this equation the Gini coefficient needs to be substituted in percentages and that the relevant measure of the standard of living is per capita consumption expenditure.

$$(13) \quad \gamma = [-0.00163\mu] + [0.0124\theta]\kappa$$

Once again recall that in applying equation (13) the Gini coefficient is in percentages.

Table (1) summarizes the results of applying the above methodology where it should be recalled that per capita GDP and per capita consumption are in PPP 1985 dollars. Moreover, the population weights are based on the World Bank (2003-b: table A1.1) where total population for the year 2001 is reported as 31.9 million, 5.1 million in Southern Sudan and 26.8 million in Northern Sudan.

Table (1): Sudan: Base Year Poverty Indicators and Parameters

Region	Share of Population (%)	Per Capita GDP (US\$)	Per Capita Consumption (%)	Gini Coefficient	Kuznets' Elasticity	Growth Elasticity of the Head-Count Ratio
Southern Sudan	16	278	278	0.3966	0.4375	-0.2296
North Sudan	84	1260	1071	0.5558	0.0251	-1.6963
Sudan	100	1102	944	0.5138	0.0444	-1.4827

The above, we suggest, are reasonable estimates. We note that the growth elasticity of the head-count ratio for Southern Sudan is very low implying that a percentage point increase in per capita GDP is expected to reduce poverty by only 0.23 percentage points. We suggest that this is a reasonable expectation given that the region was in conflict for a long period of time. The estimate is also consistent with our estimates for Sub-Saharan Africa. For the country as a whole head-count poverty is elastic with respect to growth, after taking into account changes in the distribution of consumption expenditure.

3.4. Capital Output Ratios:

As is well known, estimating capital output ratios is generally problematic. This is especially true for the case of Southern Sudan, where whatever capital stock which may have been built during 1972-1983 period may have been destroyed during the second civil war. But estimating capital stock for the North, or even for the whole country, is equally problematic due to the lack of relevant data.

Despite these problems an attempt can be made to estimate capital output ratios from existing time series information on GDP growth and investment rates. As I well known the growth record of the country, like many other developing countries, was characterized by a relatively high degree of fluctuations. To avoid the problems caused by the fluctuations in the year-on-year growth rates moving average growth rates and investment rates are usually invoked to calculate the capital output ratio. Ali (2003) used this method to gain an understanding of the orders of magnitudes of the capital output ratios in Sudan. Table (2) summarizes the results of calculating five-year moving average for the investment rate and the GDP growth rate in Sudan and the resulting capital output ratios. The results are reported as averages for half-decades over the period 1960-1999.

Table (2): Five-year Moving Average Capital Output Ratio in Sudan

Year	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	1990-99
Investment Rate (%)	15.53	13.43	13.18	16.96	16.79	19.52	16.48	16.10	16.29
GDP Growth Rate (%)	2.08	2.17	2.07	6.43	1.53	1.63	3.71	5.21	4.46
Capital-output Ratio	7.38	6.19	6.37	2.64	10.97	11.98	4.44	3.09	3.65

Source: Ali (2003: 21, table 4).

As should be expected in view of the volatility of the growth process the table shows that the five-year moving average capital output ratio fluctuated widely during the period and ranged from about 2.6, reflecting a fairly high level of efficiency use of capital, during the period 1975-1979, to about 12 reflecting a fairly low level of the efficiency use of capital for the period 1985-1989. These extremes of the efficiency use of capital are reflected in the real rate of return to capital of 37.9% per annum for the period 1975-79 and about 8.4% per annum for the period 1985-89. For the remaining periods the real rate of return to capital ranged from a low of 9.1% per annum for the period 1980-84 to a high of 32.4% per annum for the period 1995-99.

IV. Growth Scenarios:

The required growth rates to reduce poverty by half by the year 2015 depend on the length of horizon adopted. Originally the MDG on poverty had a 25 year horizon (1990-2015). One possibility is to insist on reducing poverty by half by the original terminal year of the MDGs. In this case the horizon is 10 years starting from 2005. Under this horizon the head-count ratio should decline by annual rate of about 6.7 percent. That is:

$$(14) [G^*(H)]_O = -0.06697$$

Where the subscript O is meant to reflect the original MDG horizon.

An alternative horizon that takes into account the fact the country is emerging out of conflict, and that the two parties to the conflict have already agreed to an interim period of 6.5 years, and given uncertainty as to when the pre-interim period of six months is likely to commence, a horizon of 15 years is likely to be acceptable to the parties. Under this alternative the head-count ratio should decline by an annual rate of about 4.5 percent. That is:

$$(15) [G^*(H)]_A = -0.04516$$

Where the subscript A denotes the alternative horizon.

Using these two alternatives together with the growth elasticity of the head-count ratio tables (3) and (4) summarize the required growth rates to achieve the MDG on poverty for the two alternative time horizons. In the two tables the figures for the whole country are weighted averages where the weights used are 0.04712 for

Southern Sudan and 0.95298 for North Sudan⁹. Note that we have also used population growth rates as reported by the World Bank (2003-b). Needless to note that the required GDP growth rates need to be adjusted if different population growth rates are assumed, especially for Southern Sudan during and after the interim period.

Table (3): Sudan: Required Growth Rates for Poverty Reduction over Ten Years ($[G^*(H)]_O = -0.06697$)

Region	Growth Elasticity of Poverty	Required GDP per Capita Growth Rate (%)	Population Growth Rate (%)	Required GDP Growth Rate (%)
Southern Sudan	-0.2296	29.17	1.6	30.77
North Sudan	-1.6963	3.95	2.8	6.75
Sudan	-1.4827	5.14*	2.6	7.88*

Source: own calculations based on table (1). * means weighted average.

Thus, if the country is to respect the original terminal year of the MDGs it has to grow by an average annual rate of about 8 percent over a ten years period starting in 2005. This is slightly higher than the required rate of GDP growth for Sub-Saharan Africa to achieve the MDG on poverty, and as such is not unreasonable. Southern Sudan's GDP is to grow at annual rate of about 31 percent per annum. This is a very high rate of growth to contemplate in normal circumstances. But we trust that regions emerging out of conflict may not be considered as normal. Moreover, it should be noted that the required rate of growth for the region will be higher than this if a more reasonable, and higher population growth rate is used¹⁰. This, however, should not be cause for concern as such high GDP growth rates have been recorded for countries discovering mineral wealth for the first time as has happened with Equatorial Guinea during the second half of the 1990s¹¹.

Table (4): Sudan: Required Growth Rates for Poverty Reduction over 15 Years ($[G^*(H)]_A = -0.04516$)

Region	Growth Elasticity of Poverty	Required GDP per Capita Growth Rate (%)	Population Growth Rate (%)	Required GDP Growth Rate (%)
Southern Sudan	-0.2296	19.67	1.6	21.27
North Sudan	-1.6963	2.66	2.8	5.46
Sudan	-1.4827	3.46*	2.6	6.21*

Source: own calculations based on table (3). * means weighted average.

⁹ These weights are obtained from the fact that per capita consumption for Southern Sudan is taken as US\$278 (with a constant population share of 0.16) and that for the North is US\$1071 (with a constant population share of 0.84) while overall per capita consumption is US\$944. Thus the weight in a growth equation of per capita consumption, with constant population shares, would be for Southern Sudan $[278/944][0.16] = 0.04712$. If per capita GDP is used the weights would be 0.04 for Southern Sudan and 0.96 for the North. Such refinements can be introduced without affecting the magnitudes involved.

¹⁰ In a recent compilation of initial conditions the World Bank uses a population growth rate of 2.9 percent per annum for both parts of the country. We did not use this higher growth rate due to the unreasonable implication of the equal rates of growth. A higher population growth rate for Southern Sudan will be expected on account of returning displaced people. Such a refinement, however, can easily be incorporated in the analysis.

¹¹ For Equatorial Guinea the average annual growth rate of GDP for the period 1996-2000 is about 36.1 percent, ranging from a low of 16.9 percent for 2000 to a high of 71.2 for 1997.

Table (4) provides the alternative for required rates of GDP growth after allowing for a transition period of five years. This results in a longer time horizon of fifteen years to achieve the MDG on poverty. Under this alternative the required rate of growth of GDP for the country is about 6 percent per annum. Such a rate was achieved during the second half of the 1990s despite the fact that the conflict was still raging. Under this alternative scenario Southern Sudan is to grow at annual rate of about 21 percent.

V. Financing Implications:

As noted earlier to draw the implications of the above growth scenarios for financing post-conflict development use will be made of the results of section (III) and equation (8) of section (II). To use the equation we need estimates of capital output ratios. In what follows, and utilizing the results of table (2) we will use the average of the 1990-1999 capital output ratio for North Sudan and the average of 1960-1964 capital output ratio for Southern Sudan. Of course, this is an arbitrary choice. However, it can be justified on account of the stage of development of the two regions and the type of development projects that are likely to be initiated during the post-conflict period. In this respect it can be noted that construction/reconstruction projects are most likely to be heavily biased in favor of investment in infrastructure, where projects usually have long gestation periods. Table (5) summarizes the results for the required rates of investment.

Table (5): Required Investment Rates (investment/GDP)

Region	Capital Output Ratio	Required GDP Growth Rate: $G(Y)_O$ (%)	Required Investment Rate $(I/Y)_O$ (%)	Required GDP Growth Rate: $G(Y)_A$ (%)	Required Investment Rate $(I/Y)_A$ (%)
Southern Sudan	7.38	30.77	227.08	21.27	156.97
North Sudan	3.65	6.75	24.64	5.46	19.93
Sudan	3.83	7.88	34.18	6.21	26.39

Source: own calculations based on tables (2) and (4).

These, we suggest, are interesting results. For a short time horizon over which the MDG of reducing poverty by half the economy requires to invest about 34.2% of its GDP. Southern Sudan's required investment rate is a staggering 227.1% of its GDP, while the investment rate for the North is about 24.6% of its GDP. What is more important, and possibly interesting, is that the share of Southern Sudan in the overall investment to be undertaken in the country is 31.2 percent (amounting to 10.7% of overall GDP) leaving the remainder of 23.5% of GDP to be invested in the North. This, we suggest, is a benchmark that is obtained from a purely analytical standpoint, and that can be used to guide the resource allocation between the two regions.

For a longer time horizon that takes into account a transitional period of five years, the economy requires to invest about 26.4% of its GDP. Southern Sudan's required investment rate is about 157% of its GDP, while the investment rate for the North is about 20% of its GDP. One again it is important to note that the share of Southern Sudan in the overall investment to be undertaken in the country is about 28 percent (amounting to 7.4% of overall GDP) leaving the remainder of 19% of GDP to be

invested in the North. Again, this is a benchmark that can be used to guide the resource allocation between the two regions.

Be the above as it may, it is possible to argue that these required investment rates are fairly high and exceed by a wide margin those recorded by the country over the recent past. Indeed according to the World Bank (2002: 22) gross domestic investment averaged 16% of GDP per annum for the period 1974-1984 (the Addis Ababa peace period), 13.2% of GDP during the second half of the 1980s and 14.2% of GDP during the 1990s. Similarly, recently released time series estimates by Sudan's Central Bureau of Statistics show that the investment rate over the 1990s averaged 18.1% of GDP. Using this official, and higher, estimate and comparing it to the required investment rates it is perhaps clear that the country will face a resource gap that varies from a high of about 16 percentage points of GDP to a low of 8 percentage points of GDP depending on the time horizon over which poverty is to be reduced by half. These gaps define the extent of the effort that needs to be exerted by the international community to "guarantee the peace".

VI. Concluding Remarks on Policy Implications:

The above financing requirements for a country emerging from a long civil war, and aiming at reducing poverty by half within a reasonable time horizon, imply that development policy needs to be anchored on a long-term comprehensive development strategy. The major challenge for the design of relevant development policy in the context of such a strategy is obviously that of increasing the current, rather modest, investment rate. Such policies would require enhancing the domestic saving capacity of the economy, attracting foreign direct investment, and mobilizing foreign assistance. But the design of relevant policies will also need to recognize the constraints, or opportunities, already agreed to in the context of the various agreements and protocols signed in the context of the peace process. In some of these agreements guiding principles for the formulation of economic policies have been explicitly stated.

Thus, for example, articles (3.1.3) and (3.1.4) of FAWS require that due attention be given to establishing an "enabling environment for the flow of foreign direct investment by reducing risks associated with uncertainties regarding the outcome of the referendum on self-determination at the end of the Interim Period"; and to preserving a "stable macroeconomic environment that emphasizes stability of the petroleum sector".

Articles 6, 7 and 8 of FAWS address the revenue side of the fiscal structure. Articles (6.1), (6.2), and (6.3) detail the revenue sources of the National Government, the Government of Southern Sudan, and states and regions respectively. Article (7.3) requires the National Government to "allocate fifty percent (50%) of the national non-oil revenue collected in Southern Sudan to the GOSS to partially meet the development cost and other activities during the Interim Period"; while article (7.5) provides that the "states/regions and the Government of Southern Sudan shall retain and dispose of such other income raised and collected under their own taxing powers"¹².

¹² In addition to a peace dividend increased oil production presents an opportunity for increased public

Article (14) of FAWS is on “monetary policy, banking, currency and borrowing”. A dual banking system, one Islamic the other conventional, is envisaged to operate during the Interim Period. The Central Bank of Sudan (CBOS), appropriately restructured, shall be responsible for the conduct of monetary policy. “The primary responsibility and mandate of the CBOS shall be ensuring price stability, maintaining stable exchange rate, sound banking system and issuance of currency. The monetary policy shall be carried out accordingly relying primarily on market-based instruments instead of administrative allocation of credit” (article (14.5). Articles (14.6) and (14.7) provide for the autonomy of CBOS by stating that the “CBOS shall be fully independent in its pursuit of monetary policy”; and that the “Governor of CBOS and his/her two deputies shall be appointed by the Presidency. The Governor of CBOS shall appoint in consultation with his/her two deputies other senior officers within the Central Bank”.

On borrowing, articles (14.13- 14.15) provide for the Government of Southern Sudan and states and regions to borrow money from various domestic and foreign sources based on their respective credit worthiness. “Neither the National Government nor the CBOS shall be required or expected to guarantee borrowing by sub-national governments”. However, foreign “borrowing by all sub-national governments shall be done in a manner that does not undermine national macroeconomic policies and shall be consistent with the objective of maintaining external financial viability. All sub-national governments’ borrowing transactions shall conform to the CBOS specifications” (article 14.6).

While the details of the required government expenditure to achieve the MDG on poverty will need to be worked out subsequently, and despite the fact that a peace dividend may eventually emerge, the signed protocols and agreements indicate that the early years of peace will witness a surge in government expenditure on account of the agreed upon principle that “there shall be a decentralized system of government with significant devolution of powers, having regard to the National, Southern Sudan, State, and Local levels of government” (article 1.5.1.1 of the Protocol on Power Sharing). For each of the three major levels of government, up to the State level, there shall be a legislature, an executive, and a judiciary in addition to a set of “institutions and commissions” created by the PPS and FAWS, and those to be created by the Interim National Constitution.

Examples of new institutions created under the PPS include: Council of States; the Presidency; the Special Commission on Rights of Non-Muslims; the Specialized Courts or Non-Muslims; the National Constitutional Review Commission; the National Judicial Service Commission; the Fiscal and Financial Allocation and Monitoring Commission (also under FAWS); the Government of Southern Sudan; and, Southern Sudan Constitutional Drafting Committee. In addition, FAWS also envisages the setting up of a number of new institutions that include, as examples, the National Land Commission; Southern Sudan Land Commission; National Petroleum

revenue. Recent evidence shows total revenue over the period up to 1999 hovered around an average of 8% of GDP. It increased substantially to 11.2% of GDP by 2000 (see, World Bank (2003: 70, table A6.3) and to 11.3% in 2001 and to 13.5% in 2002 (see, Bahl et al (2003: 26, table 3.5)).

Commission; Southern Sudan Reconstruction and Development Fund; and the Joint National Transition Team¹³.

From the above, rather cursory, review of economic and institutional content of the agreements and protocols it seems fair to conclude that development policy making during the Interim Period will be conditioned, if not constrained, by two major policy desiderata: (a) a stable macroeconomic policy framework; and, (b) an independent Central Bank to carry out a desired monetary policy. In the context of an economy emerging out of conflict the expectations on the salutary effects of these two aspects of policy is not a certainty. This needs to be borne in mind.

The two major policy desiderata are based on the results of a vast empirical economic growth literature that purported to show that “good policy” is “good for growth”. According to the World Bank (1998: 13) a “country with poor policies would be one with high inflation, large fiscal imbalances, and a closed trade regime”. A more comprehensive definition of good policy would be one that takes into account the various elements of what has come to be known as the Washington consensus. According to Fischer (2003: 6) “the policy consensus consists of four elements: policies to ensure macroeconomic stability; market-oriented microeconomic policies; integration into the global economy, particularly on the trade side; and a positive role for the government in establishing, monitoring, and developing the institutional framework of the economy, providing public goods including especially social expenditures, and conducting stabilization policies”¹⁴.

The proposition that “good policy is good for growth” is currently coming under increased scrutiny especially in the context of explaining long-term economic growth of nations (see, for example, Acemoglu et al (2003), Easterly and Levine (2003), and Rodrik, Subramanian, and Trebbi (2002)). For developing countries it has been established that the proposition is derived by extreme values for the policy indicators (i.e. extremely bad policies) implying that countries starting from moderate values for the policy indicators are not likely to see any improvement in their growth performance as a result of further improvements in their policy stance (Easterly (2003))¹⁵. Such findings caution against the pursuit of economic policy from a fundamentalist “stabilization perspective. Initial values of the macroeconomic policy

¹³ For these new institutions, as well as for older ones, it will be important to pay attention to the question of incentives to public servants. According to the World Bank (2003-a: 76) one “thing is clear: The government currently cannot find the resources in the budget to pay its civil servants a living wage, let alone a motivating one”. In 2002 the ruling pay scale ranged from the equivalent of US\$25 per month for workers (grade 14) to US\$61 for senior civil servants (grade 1) to US\$74 for those on the highest super-scale grade!!! With new levels of pay in the private sector, especially the oil sector, a major revision of government pay scale is already overdue and is certainly an important challenge for the Interim Period economic policy.

¹⁴ The details of the components of the Washington consensus include: fiscal discipline; public expenditure priorities in education and health; tax reform; positive rates of interest; a competitive exchange rate; import liberalization; openness to foreign direct investment; privatization; deregulation; and, protection of property rights.

¹⁵ The ranges for moderate values of the policy variables used by Easterly are as follows: inflation rate and black market premium in the closed interval [-0.05, 0.35]; budget deficit [-0.12, 0.02]; overvaluation index [-0.4, 0.65] with an index above zero indicating overvaluation; and, trade less than 1.2 of GDP.

stance need to be carefully evaluated from the point of view of the overall development objectives of a country emerging out of conflict.

The autonomy of the central bank is an institutional innovation thought to impart credibility on macroeconomic policy especially as regards the exchange rate and the interest rate. The dominant historical tradition recommending such an institutional arrangement seems to be that of the USA's experience with the Federal Reserve System. While it is generally recognized that the quality of institutions is an important determinant of long-run growth of nations, as clearly demonstrated in Hall and Jones (1999) and the above noted works of Acemoglu et al (2003), Easterly and Levine (2003), and Rodrik, Subramanian, and Trebbi (2002), it is also generally appreciated that importing successful institutions from outside a given country does not automatically guarantee the replication of "good performance".

In addition to the above cautionary remarks on the policy desiderata included in the signed protocols and agreements, and their possible implications for the expected increased government expenditure during the Interim period, it should also be noted that a poverty reduction development strategy must face the issue of establishing safety nets to protect the poor through the transition to post-conflict development. Once again this may require increased government expenditure over and above that implied by the agreements. In this respect, it is perhaps important to note that contrary to previous concerns about the central importance of fiscal prudence in designing macroeconomic policy packages an emerging consensus sees setting-up effective safety nets for the poor as a long-term investment (see, for example, Ferreira, Prenzushi, and Ravallion, (2001)).

The new consensus is based on lessons drawn from past country experience. Two major, and related, lessons have been emphasized. The first lesson is that safety net mechanisms, when they exist, are too often inadequate. This is especially true in rural Africa where informal, family-based or kin-based, safety nets have been weakened by natural as well as man-made disasters (e.g. droughts and civil conflicts respectively). When formal safety nets exist their coverage is often limited, the resources available to provide assistance are very limited, the leakage of benefits is high, and the poor are too often residual claimants due to unawareness or lack of empowerment. The second lesson is that safety nets are best set-up during good times rather than at times of crises¹⁶.

In advocating safety nets as crucial to any rural development strategy that aims at reducing poverty it is recognized that the comparative advantage of these mechanisms is that they provide a more cost effective insurance for the poor against income losses. Traditional insurance mechanisms, by comparison, entail high costs to long-term progress of the poor especially in the struggle to escape poverty. In the context of a relevant development strategy public safety nets can easily be incorporated as an integral development component.

While countries are expected to decide the design of public safety nets according to their circumstances, experience has shown that two central elements of such mechanisms are public work programs and public transfer programs. Public work

¹⁶ Ferreira et al (2000: 10).

programs are expected to provide employment for those who are able to work, while the transfer programs are expected to provide support to those who can not, or should not, work.

The above set-up for social safety nets needs to be built as a permanent feature of the comprehensive development program of the country in such a way as to cater for the poor during normal times as well as times of crises. The implication for macroeconomic policy design is obvious in terms of budget requirements for additional resources.

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