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**Abstract**

The paper seeks to assess the impact of adjustment reforms on Sudan taking the current account balance as policy performance indicator. The paper shows that the government own reforms were more effective than those imposed by the IMF or the World Bank. It further illustrates that both policy and non-factors are responsible to the same degree in deriving current account deficit in the long run specifically inefficiency in exchange rate policy and structural and demographic factors.

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# Adjustment Policies and the Current Account Balance: Empirical Evidence from Sudan

## 1. Introduction

Sudan adopted stabilisation and adjustment policies in 1978. These programmes of reforms started after the government requested IMF financial assistance to tackle its internal and external macroeconomic balances. However, the seeds for the Sudan's poor macroeconomic performance in the 1980s and 1990s appeared to have been sown in the early 1970s when the government attempted to boost the economy through nationalisation and substantial low-productivity investment financed by foreign borrowing.

During the 1980s, the programmes of reform were implemented with the IMF/World Bank support. However, Sudan's economic performance deteriorated sharply and the average current account deficit was about 10 percent of GDP in this decade. In the 1990s, the government adopted the reforms without external assistance. The economic performance improved and the current account deficit has been reduced to less than 2 percent of GDP by the end of the 1990s (IMF, 2000; World Bank, 1992).

The paper acknowledges the dearth of studies on these reforms and seeks to critically evaluate their economic impact on the Sudanese economy, taking the current account balance as policy performance indicator. The paper will also investigate the role of policy ownership and the sources of current account deficit in the medium-to-long term.

The paper will begin, in the second section, with objectives and methodology. In the third section, we explain some theoretical and empirical aspects of adjustment programmes and the current account balance, followed by a brief description of Sudanese government policies for the period (1956-2000) and an empirical literature review of Sudan's SAPS (Structural Adjustment Programmes) effectiveness. In the fourth section we give qualitative analysis and descriptive statistics on the current account balance in Sudan to highlight its position and check the size and sustainability of the current account deficit. Then we analyse the behaviour of some of the factors

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that influence its movements before, during and after the SAPS adoption. In the last section, an econometric model is specified and estimated.

## 2. Objectives and Methodology

The paper addresses the impact of economic reforms on the external balance to fill a gap in the literature. In this context, the study departs from previous studies by using different techniques of analysis, a longer period (most of the previous studies use a short period for evaluation.), fresher data (most of the studies on Sudan were before-and-after analysis conducted in the 1980s)[1] and quantitative assessment of the effects of non-policy factors.

Furthermore, there appear to be few in-depth country specific studies in Sub-Saharan Africa addressing the long-run determinants of the current account using the saving-investment balance. The paper will investigate the long-run policy and non-policy determinants of the Sudan's current account, a country counting among the African countries with the highest deficit. The paper will also assess whether policies aimed at domestic objectives are compatible with sustainable external balance.

In recognition of the strengths and weaknesses of different methodologies in evaluating effectiveness of adjustment reforms, we employ two methodologies in our analysis. In particular, the before-and-after approach[2] is employed because it provides useful information about the economic situation before and after the programme (see section four). Moreover, we will use econometric modelling to quantify the impacts of reforms on the Sudanese economy. We will specify an econometric model and run regression on it using "Microfit" statistical packages. We will conduct a time series analysis for the data on the Sudanese economy for the period 1960-2000, and by employing the 'error correction model' technique, we can capture both the long-run and short-run effects of the reforms.

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[1] Some of cross-country studies assessing the effectiveness of the adjustment reforms find the outcome in the 1990s in contrast to the previous findings of the 1970s and 1980s (see for example Killick (1995)).
[2] These include the studies of Reichmann and Stillson (1978), Connor (1979), Killick (1984), Zulu and Nsouli (1985), Pastor (1987), Cornia (1991), Jespersen (1992), Schadler et al (1993) and Killick et al (1995). This type of analysis is associated with the question: "Do the stabilisation and adjustment programmes result in an improvement on the initial situation of the programme country?" The results of the earlier studies are generally not encouraging showing no improvement in the balance of payments and mixed results on inflation and growth. Some of the recent results showed positive effects to the stabilisation and adjustment programmes.

We will rely on data from various national and international sources, including the World Bank, the IMF, the Bank of Sudan, the Department of Statistics, and the Ministry of Finance.

**3.1 Adjustment Policies and the Current Account Balance in Theory**

Current account balance is a key leading indicator of the health of a country's economy. Movements in this macroeconomic variable convey information about actions and expectations of all market participants in an open economy. In particular, the behaviour of the current account balance provides useful insights about shifts in the stance of the macroeconomic policy and other autonomous shocks (Knight and Scacciavillani, 1998). We will provide an empirical analysis on the long-run determinants of Sudan's current account and find out the impact of adjustment policies upon it. The analysis is based on the fact that a better understanding of the factors affecting the current account is central for assessing whether policies aimed at domestic objectives are compatible with a sustainable external balance.

Alternative theoretical models have different predictions about the factors underlying current account dynamics and about the signs and magnitude of the relationships between current account fluctuation and these determinants. Using economic theories of saving and investment as a guide, the analysis investigates the role of macroeconomic policies in determining the current account position in the long-run. In this sense, the current account is regarded as the outcome of the variations in the policy and non-policy factors that influence the saving-investment balance[3].

However, the current account balance as a performance indicator is criticised from the point of view that a reduction in the current account deficit does not necessarily tell us anything about the underlying strength of the balance of payments situation. In this sense, governments facing a foreign exchange crisis with exhausted reserves have to find ways of limiting the current account deficit to whatever money is expected to be

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[3] See, for example, Chinn at al (2000); Obstfeld and Rogoff (1995) and Debelle and Faruqee (1996) for studies using saving-investment balance to investigate the long-run current account determinants.

available to finance it. They often also do so by means of severe import cut, which are liable to have adverse effects on economic performance including ability to the export (Killick, 1995).

Nevertheless, the current account balance remains a popular performance indicator in the assessment of the effectiveness of the Fund's programmes. Moreover, the study investigates the nature of different shocks (policy and non-policy shocks) on the current account to see whether the effect of these shocks dies out as the time passes, allowing the current account variable to revert back to some long trend following these shocks, or not. In other words, we will look at the fundamental determinants of the current account and examine both the short-run and the long-run policy effects on it.

By examining the current account performance we can assess the likely impacts of adjustment programmes on one of the most important economic variables.

**3.2 The Sudanese Government Economic Policy for the Period (1956-2000)**

**Demand-Side Policies**

Here we review the Sudanese government's demand-side policies for the period 1956-2000. This period can be divided into five distinctive sub-periods, as follows:

- (1956 – 1970), early expansionary policies to transform the backward economy and the Ten-Year Plan.

- (1970 - 1978), massive expansionary policies and resulting fiscal and monetary imbalances.

- (1978 – 1985), IMF/World Bank involvement in the Sudanese economy and the Economic Recovery Programmes.

- (1985 - 1992), period of economic and political instability.

- (1992 - 2000), liberalisation policies and the Sudanese government's adjustment programmes under IMF monitoring.

The expansionary fiscal and monetary policies led to an increase in aggregate demand, and hence inflation and balance of payments difficulties that forced the government to respond to the IMF/World Bank's policy recommendations.

The period 1978-1985 witnessed the adoption of the IMF/World Bank adjustment programmes. The outcome was a failure, indicated by a dramatic decline in all economic indicators (see table 1).

The period 1985-1991 was a period of economic and political instability. Economic performance was generally poor during the period. The IMF suspended its support for Sudan's balance of payments during this period.

The period 1992-2000 saw the implementation of the government's own adjustment programmes. IMF staff started monitoring the programmes in 1998. During this period, a major transformation of fiscal adjustment and structural reforms took place. The economy responded positively to these liberalisation reforms and most economic indicators showed significant improvement, e.g. GDP growth increased to about seven percent, inflation fell from more than 100 percent to 12 percent in the year 2000 and the exchange rates (official, parallel, and black market rates) were unified into one rate. It worth mentioning that the period witnessed the exportation of oil in August 1999. Oil revenue accounted for quarter of total government revenue in 2000.

**Supply-side Policies**

Here, we will review the pricing policies, the tax policy, the private investment policies, and the exchange rate.

The World Bank assigned a major role for the wrong pricing policies as a cause of the crisis in Sudan in the 1980s. Agricultural product pricing was introduced in 1954. Despite its objective of promoting producers to increase production, the urban consumer and the government revenue maximisation remained the main policy targets while the rural producer was neglected. The government policy towards industrial products was to protect domestic products which were subjected to price controls justified by preventing monopolistic pricing by a limited amount of local producers in Sudan. Public services were distorted by imposing low prices which failed to cover the public enterprises' running costs causing increases in the budget deficit.

The World Bank's attempts to correct the above-mentioned distortion during the Economic Recovery Programme (ERP) was not successful. During the liberalisation

policies of 1992-2000, price controls were eliminated and all traded goods reflected international prices except for electricity. The economy responded positively to this policy change.

The tax system in Sudan is highly distorted by widespread exemption and weak tax administration. This distortion continued to undermine all attempts to remove macroeconomic imbalances. Important attempts to review the tax system were undertaken during the periods (1978-1985) and (1992-2000). However, very little was achieved during the first period due to the high growth of unrecorded underground economy and availability of foreign finance from abroad, which reduced pressure on the government to adopt tax reforms.

Private investment in Sudan started to grow rapidly during the British Administration in Sudan. This was followed by successful private investment in the period 1956-1970, especially in the large-scale mechanised rain-fed agricultural sub-sector. In 1970, the socialist government adopted a policy of nationalisation and confiscation that frustrated private investment for many years despite a later retreat from this policy in the 1970s. During the 1980s and early 1990s, private investment was further frustrated by political and economic instability. Private investment during that period was low and concentrated on real estate, trade and financial speculation, transport equipment and hotels. Private investment started to recover after liberalisation policies in late 1990s, mainly in the oil sector.

Exchange rate policy in Sudan is characterised by inconsistency in objectives, confusion, loss of control over foreign exchange and payments, and the remittance of Sudanese Working Abroad (SWA) that tended to play a major role in shaping exchange rate policy. Moreover, there has been a lack of supportive financial policies.

However, the government was able to stabilise the exchange rate value in the late 1990s. The stability was based on successful demand management and the implementation of a wide range of structural reforms. In 1998, different types of exchange rate were unified in one free market rate.

**3.3 Empirical Literature Review on Sudan's SAPS Effectiveness**

It is hard to find an empirical study that focuses exclusively on the effects of the adjustment policies on Sudan's current account balance. However, we will review some of the studies that give an assessment of Sudan's adjustment policies effectiveness.

One of the early and most influential studies that criticised the IMF/World Bank proposed devaluation (which was central for reforms) in 1977 was prepared by Hassan (1977) who was an advisor to the Ministry of Finance. The main thrust of this criticism was the price elasticity of demand for Sudan's exports and imports (the Marshal-Lerner condition). His calculation for these elasticities yielded very low values (the weighted price elasticity for exports was found to be (-0.7507) and that of imports elasticity was as low as (-0.11258). He concluded that the argument for devaluation of the Sudanese pound no longer stood. At best, the results rendered the devaluation proposal dubious. He also argued against the assumed supply response to devaluation stating that:

"The numerous rigidities that characterise the economy of Sudan, together with the highly inelastic nature of the supply of the agricultural products which dominate Sudan's exports mitigates against an immediate or even medium term increase in exports". (Cited in Ali, 1985).

He added: "The demand for imports is likely to be inelastic in the short term, as imports have already been reduced to essentials by quantitative restrictions; and hence the devaluation of the exchange rate to manipulate imports prices is not likely to produce the desired results in terms of reduced imports volume."

However, it could be argued that the government intervention to reduce import volume has created a great distortion in the economy. The problem of appropriate import structure was not addressed. The government subsidies for imported input, particularly oil and machinery, led to bias towards imported input and against local inputs and hence the choice of the wrong type of technology for production.

Hassan's (1977) alternatives for devaluation included (some sort of structuralists' package): reviewing tax on cotton, curtailing government expenditure, downwards adjustment for wages and salaries in the public sector, imposition of new import duties, and reducing central government budgetary transfers to the local government.

In defence of their position, and as a means of determining the appropriate level of devaluation required, the IMF/World Bank relied on a number of studies deriving and comparing indices of the relative competitiveness of Sudan's main crops. Most notable in this regard was the work of Nashashibi (1980), who set out to determine the appropriate real exchange rate adjustment to promote exports, and to complement other IMF/World Bank-sponsored supply side measures that had been proposed for Sudan in 1978; the so-called 'supply side approach' to exchange rate determination. Using data for 1972/73 and 1976/77, Nashashibi found that competitiveness of the Sudan's exports had deteriorated from a weighted average of US $ 2.68 to US $ 2.44, per unit of domestic resources used. On the bases of these calculations, he concluded that a devaluation of the Sudanese pound from Ls1=US $ 2.5 to Ls 1=US $ 2.00 (namely, of 20 percent) in 1978 had been justified. He argued that this was not only imperative to increase the supply of the Sudan's exports, but it would also have the effect of stimulating the output of all other goods in the economy (Brown, 1992).

Both Hassan's (1977) study and the IMF/World Bank study reflected important factors affecting the Sudanese economy. On the one hand, Hassan (1977) pointed to the structural rigidities that undermined the ability of the economy to respond effectively to price incentives. On the other hand, the IMF/World Bank studies stressed the overvaluation of the Sudanese pound as damaging export performance.

In theory, the elasticity approach which was used on the above analysis was criticised for focusing exclusively on the trade balance and ignoring the likely effects on the domestic economy of the exchange rate devaluation. Moreover, for the devaluation policy to be effective, a nominal devaluation would have to bring about real devaluation which was a question needing further empirical investigation. For the structuralists, even if the devaluation improves the balance of payment, it would tend to have contractionary effects on the economy.

A number of studies adopted the structuralists' approach to criticise the IMF/World Bank policy in Sudan, in particular, the orthodox presumption that a devaluation typically improves international competitiveness and expansionary. The structuralists' arguments that short-, medium-, and long-term effects must be distinguished, and that devaluation may lead to an increase in unemployment and stagflation in the short-run; these arguments are found in the studies of Hussein (1985a; 1985b), Hussein and Thirlwall (1984), Ali (1985a, 1985b) and Branson and Macedo (1989).

However, El Badawi's (1992), study on the equilibrium real exchange rate in Sudan for the period (1970-1989) has found that "a high though sustainable total domestic absorption or a well-maintained restrictive foreign trade regime run the risk of trapping an economy into a lower level of competitiveness". Moreover, his interpretation for the short-run effect of domestic absorption is that "a 100 percent devaluation will lead to a 26 percent real depreciation in the short-run" (see El Badawi 1992).

Other studies explaining the extent, nature and results of IMF/World Bank involvement in Sudan include Ali (1985), Brown (1988), Hussein (1988), Wohlmuth and Hanshom (1987) and Hassan (1994). The authors cite a long list of economic indicators attesting for the worsening of the economic crisis in Sudan despite the implementation of the stabilisation and structural adjustment programmes. However, these studies tend to use short periods for their analysis and focus on the effects of one or perhaps a few reform measures, the devaluation issue in particular.

Hassan et al (1995), conducted an empirical investigation into the effect of the entire reform package on economic growth, investment, industrialisation and export and export growth. His work was based on the simultaneous equation model developed by Salvatore (1983) to investigate the relation between trade, industrialisation and liberalisation for Sudan. Hassan et al (1995) found that the IMF/World Bank programmes in Sudan had favourable effects on investment and industrial production, but at the same time, had negative effects on economic growth. The study suggested that reform policies that do not carefully evaluate the country's productive capacity have the potential of distorting efficiency thereby inhibiting rather than promoting growth. They concluded that "the evidence reported in this paper suggests that general

policy prescription as appears to be the norm with the IMF and the World Bank can create disastrous results".

It appears that the study has gone beyond the general critique against the IMF/World programmes in Sudan that focused on the deficiency and superficiality of the programmes' design [4] and argued that the IMF/World Bank package could be disastrous to the economy. However, the study did not isolate explicitly the influence of the exogenous non-policy factors, such as weather and terms of trade, from that of the programme.

El Hassan's (1993) study assessed the IMF adjustment programmes undertaken by Sudan during the period 1978-1985. Using regression analysis, before-and-after, relative, as well as target-versus-actual tests were applied to detect the effects of the programmes on the policy targets. The results showed that the IMF policies have had a negative, albeit insignificant, effect on both balance of payments and economic growth and significant negative effect on inflation. His test results were, in general, supportive of the structuralist claims against the IMF programmes.

In brief, with the exception of a few, the studies on Sudan SAPS's effectiveness showed that these programmes either failed to improve the economic situation or made it worse.

Other related Sudanese studies include Henley et al (1980), Abuel Nur (1981) and Farzin (1988). Most of the earlier studies concentrated on the effect of the foreign capital flow on domestic savings. These studies include Henley et al (1980), Abuel Nur (1981) and Farzin (1988). Generally, the studies tend to suggest that aid should be suspended either because it had not supplemented domestic savings at all or because it substituted a proportion of them. However, some of these studies used a misspecified model due to the misspecification in Griffin's model itself [5]. Yet none of the above studies have tried to link aid effectiveness to the IMF/World Bank policy package associated with it. In our evaluation of the policy effectiveness, aid effect is

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[4] By concentrating on the modern sector as opposed to the traditional sector and on large scale industries as opposed to small scale industries the programmes neglected the labour and credit market structure in Sudan (the traditional agricultural sector and the small-scale industries can create more forwards and backwards linkages because they use domestic inputs and produce for local markets and exportation).

[5] See Mukherjee et al (1998) who explained the misspecification in Griffin's model.

not considered explicitly but assumed to be captured by the changes in macroeconomic policy indicator.

## 4. Adjustment Policies and the Current Account: Descriptive Analysis
## 4.1. The Size and Sustainability of the Current Account Deficit

Here we answer the question: 'Has there been any desirability for running a large current account deficit before the introduction of adjustment policies?
Or has there been a policy problem requiring a correction?

The current account in Sudan (excluding public transfers)[6] has been in permanent deficit throughout the last three decades. The last time the current account registered a surplus was in the early 1970s (about 1.2 percent in 1972).

Table (2) shows the average current account balance for the last forty years[7], (see also Figure (1). In the 1960s, the current account was in a deficit of 3.4 percent, then it increased to 4.6 percent in the 1970s and further widened to an average of about 10 percent and 8 percent in the 1980s and 1990s respectively.

When we compare Sudan with other African countries, we find that Sudan is among the countries with the highest current account deficit in Africa for the period 1975-1995 (registering about 6.5 percent of GDI). The other countries with similar deficits for this period are Zaire (8 percent of GDI), Madagascar (7.6 percent of GDI), Central Republic of Africa (7.2 percent of GDI) and Ghana (6.2 percent of GDI)[8].
However, when we compare current account deficit in the 1980s with that of the 1990s we find that the deficit was reduced in the last decade by almost a quarter. The figure also shows improvement in the 1990s. This could be attributed to the policy

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[6] Current account balance in all our analysis is excluding public transfers.
[7] Before 1960, the current account was in surplus. However, development expenditure was very little compared to total government expenditure.
[8] SSA had the world's highest current account deficit in recent years, amounting to more than 5 percent of GDI. The growth rate of the region has been dismal (Easterly and Levine, 1997), the reliance on foreign aid has been very high (World Bank, 1998), public and private savings have been very low, the concentration of exports on single primary products continued to be significant, and the distortion in the economy (indicated by the black market premium) have been very large (Calderon et al, 2001). The Sudan is suffering from most of these problems.

ownership in the 1990s. However, the deficit of 7.4% of GDP is still unsustainable. The figure (1) shows that the deficits have been reduced sharply in the year 1999 and 2000 after Sudan's started oil exportation.

In general, a country experiencing a current account deficit may not necessarily be indicative of structural or policy problems. A temporary increase in government expenditure, investment or a decline in productivity can generate a current account deficit and in this case there is no need on the part of the government to initiate policy measures to correct such a deficit. A similar situation occurs when the deficit reflects consumption smoothing of private economic agents or indicates a need for the economy to accelerate growth in the future in order to be able to repay the borrowed foreign savings. Nevertheless, external imbalance, in many cases, forces the government to adopt some costly adjustment measures to avoid destabilising shifts in market sentiment. Unfortunately, this is the case for many developing countries and Sudan is no exception.

Possibilities that the large current account deficit in Sudan before the introduction of adjustment policies reflected a consumption smoothing by private agents or that it was desired by policy makers for economic objectives could easily be ruled out. On the one hand, consumption smoothing by private agents depends on unrestricted access to borrowing from financial markets and this is not the case for Sudan. On the other hand, taking the risk of running a large current account deficit in country like Sudan with a weak economic structure, undeveloped banking system and large external liabilities is undesirable. In fact, even if the current account deficit appeared to be sustainable, there would be a case for reducing it in order to lower the risks arising from such factors. Yet both macroeconomic policy and structural weaknesses contributed to the large current account deficit in Sudan.

Generally, two concepts are used in the literature to judge whether an external position of a given size is a problem or not. These concepts are intertemporal solvency and the sustainability of a given path of external deficit. The first approach requires that all external debts should ultimately be repaid for a country to be technically solvent in the very long-run. The sustainability approach adds on to the notion of solvency the idea that policies remain constant for the indefinite future.

Sudan began to assume an external crisis in the 1970s and deficit was more than 6 percent of GDP in 1978, which was the first year of the IMF's involvement in Sudan. Yet the country was still able to pay the debt service. However, the deficit widened to more than 10 percent after the introduction of the IMF/World Bank programmes and the country's current account position failed to satisfy the solvency and sustainability requirements due to failure to repay or even serve debt charges particularly the Fund's debts. Consequently, Sudan defaulted with both institutions in the early 1990s and was threatened with expulsion from these two institutions. It was only after the success of the government's adjustment programme in the 1990s that the Fund began monitoring the reforms in 1998. This also confirmed the importance of the policy ownership.

## 4.2. The Composition of Sudan's Current Account Balance

For a given current account deficit, large and persistent trade deficits may indicate structural competitiveness problems, while large and negative net foreign factor incomes may be the historical remnant of foreign debts incurred in the past. For a country to remain solvent, the ratio of external liabilities to the GDP should be stabilised. Stabilisation of debts requires trade surpluses (Adedeji, 2001; Milesi-Ferretti and Razin, 1997). The accumulation of debts cannot be ruled out as a factor affecting the current account position in Sudan.

Figure (2) shows that the trade balance in Sudan has recorded a growing deficit since the early 1970s. The reason for this is sluggish export performance and escalating import growth. The figure shows that the trade balance and the current account take the same trends, indicating that the trade deficit was a main driving force of the current account deficits. It also indicates a clear problem with Sudanese export competitiveness[9]. However, adjustment policies failed to correct this situation, and the deficit remained large in both the current account and the trade balance. The slight

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[9] The exports as a proportion of GDP fell from 14 percent in 1970/71 to mere 7 percent of GDP in 1977/78 and then remained at an average of 7- 8 percent for the period 1977/78 – 1997/98 with slight improvement in 1999 to about 8.6 percent. In retrospect, Sudan's export grew at an average level of 4.5 percent for the period 1960-1974, then the government took a critical decision in 1974 of diversifying the productive structure by altering crop pattern away from cotton (the main exported item) and towards wheat and groundnut in order to gain self-sufficiency in these crops. Export-led strategy was adopted in 1978.

improvement in the trade balance in late 1989-1992 was due to massive import controls.

## 4.3. Gross Domestic Savings and Private Consumption Performance

Looking at two fiscal indicators, namely the gross domestic savings and private consumption performance will reflect the limited success of the adjustment reforms during the 1980s. Figure (3) shows the relationship between the current account balance and gross domestic savings for the period (1970-1989)[10]. The figure shows a clear downward trend in both variables. Both variables decline rapidly. Gross domestic savings declined from more than 15 percent in 1970 to about 2 percent in 1989. This is attributed to high levels of the government expenditure and the stagnated nature of revenues due to the lack of tax reform. This indicates that adjustment policies have failed to stop the deterioration in savings performance.

Moreover, excessive private consumption was one of the main factors identified by the World Bank as causing external crisis. However, little has been done to control it. Figure (4) shows that private consumption grew rapidly during the 1970s and 1980s. This is a clear addition to areas in which policy was to be blamed for the external crisis for its failure to cut excessive private consumption.

## 4.4. Non-Policy Factor

We will finish our descriptive analysis by using simple statistics to examine the relationship between the current account and the terms of trade as a non-policy factor (a formal test will follow in the next section).

Terms of trade movements are described by Table (3). The mean values of the terms of trade are similar before and after the introduction of adjustment policies. The 1960s witnessed favourable terms of trade which were reversed in the 1970s due to the oil prices' hikes and low cotton prices. This made the overall terms of trade effect before the SAPS similar to that after the SAPS. However, terms of trade are still slightly

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[10]Data are not available beyond 1989 in the World Bank sources.

higher in the period before the SAPS introduction, as indicated by the mean value in Table (3).

In terms of volatility, term of trade were more volatile in the period before the SAPS introduction than the period after it (see the standard deviations in Table 3). When we compare the volatility of terms of trade to that of the current account, we find that the variation is higher in the current account. This is indicated by the large standard deviation of the current account in Table (3). This could be attributed to the fact that the current account is prone to a number of types of shocks other than that of terms of trade (e.g. supply shocks such as drought). Yet it could also indicate a policy failure of stabilizing external balance.

The volatility of terms of trade is result of primary agricultural commodity exportation and the less diversified export base. When we compare the ratio of the standard deviation of terms of trade to the standard deviation of the current account before and after the SAPS introduction, we find the ratios to be (0.07 and 0.04) respectively. This implies that terms of trade variability was more important to the current account in the 1960s and 1970s than afterwards.

### 5. Regression Variables

A number of factors can affect the current account position in the long and short-run. These factors can be divided into macroeconomic policy variables (such as the fiscal balance), structural features of the economy (such as the stage of development) and external factors (such as terms of trade).

By and large, deficits are more likely to be persistent if they are derived from large trade deficits due to weakness in competitiveness.

In this section we describe our proxies for these factors and their likely effects on the current account balance. In particular, we describe two proxies for the macroeconomic policy stance (GDP growth and the changes in black market exchange rate), exogenous non-policy variable (terms of trade) and a proxy for economic structure (GDP percapita).

**GDP Growth**

GDP growth can be perceived as an indicator of internal macroeconomic performance reflecting macroeconomic policy stance and hence could be used to investigate consistency between internal and external policies. However, the theory does not suggest a clear-cut relationship between this variable and the current account. The variable could influence both investment and saving.

As regards savings, the relationship depends largely on the implication of the GDP growth rates as perceived by households for their permanent income. If increases in GDP growth rates are viewed as being transitory, this would tend to raise savings rates. By contrast, saving rates would fall if the increases in GDP growth are regarded as permanent.

The high rate of GDP growth presumably also reflects high rates of productivity growth and would, therefore, be expected to be associated with higher levels of investment and, presumably, inflows of capital in search of higher rates of return. Again, the net effects of these influences on current account balances are not obvious. In addition, the higher a country's GDP growth rate, the greater the current account imbalance it can sustain without increasing its external debt to GDP ratio. Also, high (actual and expected) GDP growth may reflect sustained accumulation rates driven by expectations of high profitability. If the growth rate exceeds the real rate of interest on external debt, then the addition to total GDP is greater than that of external debt. Economic growth thus becomes an important variable in assessing the external position of a country's economy (Adedeji, 2001; Chinn and Prasad, 2000).

For the purpose of this study in which we want to investigate policy impact on the current account, we will assume that the higher the GDP growth rate, the more likely that external imbalances will be sustained without leading to external crisis, i.e. the relationship between these two variables is positive. GDP growth can capture supply shocks that lower the country's real income. These shocks are likely to be of a more permanent nature than terms of trade shocks.

**Changes in Black Market Exchange Rate**

In the standard open economy (Mundell-Fleming) model, a depreciation of the real effective exchange rate will improve the current account position. However, a

significant effect for the black market rate would mean that the government has failed to unify the two rates. The variable is introduced to capture the inefficiency in the exchange rate policy in Sudan.

**Percapita Income**

Long-term inspection of the current account may require looking at structural features of the economy such as levels of economic development, demographic profiles and so on. These factors have an impact on the savings rate, and hence on the current account balance. As countries move from a low to an intermediate stage of development, they typically import capital and, therefore, run current account deficits. Over time, as they reach an advanced stage of development, countries run current account surpluses in order to pay off accumulated external liabilities and also to export capital to less advanced economies (see Chinn and Prasad, 2000; Obstfeld and Roldos, 1996). We introduce the GDP percapita to capture the stage of development of the economy. In this case we would expect the relationship to be negative.

Similarly, we introduce the percapita income to capture different aspects of non-policy demographic factors that affect domestic savings. A particular aspect of this demographic factor is the impact of the refugee influx in Sudan. The Sudan has been a host to millions of refuges during the last three decades. This is one of the factors identified by the World Bank as causing current account problems.

**Terms of Trade Shocks**

This variable is introduced as a proxy of external non-policy factors that affect the current account balance. However, the relationship between these two variables is theoretically ambiguous. An adverse transitory term of trade shock can induce either deterioration or improvement in the current account balance. The Harberger-Laursen-Metzler (1950) model suggests that it deteriorates because deterioration in the terms of trade will decrease real income and savings. However, the model is based on the assumption of a single good which is tradable across countries. By contrast, the three-good (importable, exportable, and non-tradable) model of intertemporality argues that the terms of trade effect depends on whether the resulting income effects are greater than or less than the resulting substitution effects.

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For the purpose of this study, we focus on the regularities of term of trade shocks, i.e. are they of permanent or a temporary nature? If the terms of trade are found to be of a permanent nature, we will follow Ahmed and Park (1994) and Otto (1995) in using the Structural Vector Autoregression (SVAR) model to identify the major source of economic shocks. In particular, we will specify a SVAR model consisting of three variables that are TOT (terms of trade representing external shocks to the economy); RY (rate of growth of real output representing supply shocks) and CA (current account as percentage of GDP representing demand shocks)[11].

This procedure will allow us to assess the major source of shocks to the current account and the feedback between these three types of shocks (demand, supply and external) and the resulting income and substitution effects.

If the terms of trade are found to be of a temporary nature, then their impact on the current account movements would be of more significance than that of the persistent shocks (which is the normal situation for the LDCS)[12]. However, temporary terms of trade shocks will only affect the current account in the short-run and will be excluded from the long-run equation. We will follow Svensson and Razin (1983), who argue that the Harberger-Laursen-Metzler model is valid in the case of temporary shocks, i.e. the terms of trade effect is on line with the Harberger-Laursen-Metzler model.

## 6. The Model

Here, we specify a model for the current account determinants as follows:

$$CAB = \beta_0 + \beta_1 GR + \beta_2 LTOT + \beta_3 LFRMEX + \beta_4 LPERCAP \quad (1)$$

Where (CAB) is the current account balance, (GR) is GDP growth, (LTOT) is the log of the terms of trade, (LFRMEX) is the change in the free market rate and (LPERCAP) is the log of the per capita income.

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[11] The model requires that all the three variables should be integrated of degree one I(1) and that there is no cointegration among variables in the levels. If the cointegration exists, a VAR in first difference will be misspecified (Cashin et al, 1998).
[12] see Adedeji (2001); and Calderon et al (2001)

All the variables have already been described. The variables are assumed to capture macroeconomic policy, economic structure and exogenous non-policy factors that affect the current account performance. As hinted earlier, the parameter $\beta_1$, is expected to be positive, $\beta_3$, $\beta_4$, are expected to be negative while that of $\beta_2$, can be positive or negative.

This means we assume that policies that increase GDP growth or lower the variation in the black market exchange rate will have positive effects on the current account balance. Moreover, a significant value for the parameters ($\beta_2$), and ($\beta_4$) (of terms of trade and percapita income) would mean that non-policy factors had had an important impact on current account balance movements in the past.

### 6.1. Unit Root Tests

Table (4a) shows that the null hypothesis of a unit root cannot be rejected for all the regression variables except for the terms of trade. However, for the growth rate series the unit root hypotheses can be rejected at five percent level but not at one percent level. Table (4b) shows the unit root tests for the variables' first difference. From this table, the null hypothesis of unit roots are rejected for all variables. This implies that the variables are difference stationary, i.e. integrated of order one I(1). However, the stationarity of terms of trade in levels would mean that there is no statistical sense in including it as part of a long-run relationship and hence will be excluded from the long-run equation and included in the short-run equation only.

We will give a brief interpretation of these results, particularly the implication of the existence of a unit root in the current account time series which, by theory, should normally be stationary[13].

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[13] The current account could be looked at as the difference between the aggregate supply and demand. It could also be looked at as a buffer through which private agents can smooth consumption over time in response to temporary disturbances to output, investment, and government expenditure as given by this equation:

$$CA^*_t = (Y_t - E_t \hat{Y}_t) - (I_t - E_t \hat{I}_t) - (G_t - E_t \hat{G}_t)$$

Where CA is the current account balance; Y is the gross domestic product, I is investment and G is government expenditure and $\hat{Y}$, $\hat{I}_t$, $\hat{G}_t$ are their equilibrium or permanent values respectively. The current account is the residual in the above equation that should be stationary for long-run relationship to exist. However, the current account may also contain consumption-tilting component if the rate of interest differs from the rate of time preference. Since this consumption-tilting is non-stationary, it introduces a trend into the current account. If the country is consuming more than its cash flow, then

The existence of a unit root in the current account time series implies that the deficit has been of a permanent nature and the time series continued to drift down or away from its previous level without showing signs of returning back to a constant mean. This could mean that the policies introduced in the 1980s and 1990s have failed to improve the current account position or even to bring it back to its level before the policy introduction.

The existence of unit roots in the other variables' time series is not unexpected, as the economic theory suggests units in the levels of these variables. In contrast, the stationarity of the terms of trade implies that these shocks to the current account are of a temporary nature and are significant in the short-run only. However, we would expect these transitory shocks to cause more damage to the current account than if they were of a permanent nature. This is consistent with theoretical and empirical work showing that terms of trade shocks are of a temporary nature in developing countries (see for example Cashin et al, 1998). Consequently, we will assume that the terms of trade effect is in line with Harberger-Laursen-Metzler and has income effect only.

### 6.2. Cointegration Tests

Provided that all the variables in the model are non-stationary and integrated of order I(1), (except the terms of trade which will be excluded at this stage), we will employ Engle and Granger's (1987) as well as Phillips and Hansen's (1990) approaches to cointegration. The latter has the advantage of eliminating the inefficiency of the standard ordinary least square estimates and the test based on it is asymptotically normal.

In applying Engle and Granger (1987), we estimated equation (1) by OLS estimation and conducted ADF-test for the residual from this estimation. The results of the OLS estimation are shown in Table (5a). The ADF test for the residuals gives the value of (-3.5) which is larger than (-2.95 which is 95 percent critical value) and hence the unit

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the country is tilting consumption towards the present and not to the future. We would expect the Sudan to be tilting consumption towards the present and away from the future.

root hypothesis can be rejected which means that there is, indeed, cointegration and existence of a long-run relationship between the variables in equation (1).

## 6.3. Long-run Results

The OLS estimation indicates that the current account balance is related negatively to the GDP growth and the level of percapita income and related positively to changes in black market rates. The estimation has passed the diagnostic tests (see Table 5b).

According to Engle and Granger (1987) and Stock (1987), the parameters of the OLS estimation are consistent as long as the cointegration between variables exists. But in general the asymptotic distribution of the OLS estimator that involves unit root distribution is not standard; and hence, carrying out inferences on parameters using the usual t-tests in the OLS regression may not be valid. The Phillips-Hansen FM-OLS (Fully-Modified Ordinary Least Squares) estimator takes account of all these correlations in a semi-parametric manner. However, the validity of this estimation depends on the assumption that the explanatory variables are integrated of degree one I(1) and are not integrated among themselves[14]. The data satisfy the assumptions.

Table (6) shows the Fully-Modified Philips-Hansen Estimates. The results confirmed the previous OLS estimates. From these results, there is a negative and significant relationship between the current account balance and GDP growth in the long-run (although the coefficient is small). This could imply that policies that have been followed internally to increase GDP growth have brought about a negative impact on the current account in the long-run, i.e. there is a lack of consistency between internal and external policy targets.

The table also shows that there is a positive and significant relationship between the current account balance and in the changes in the black market rate. The result contrasts with our previous expectation that the relationship was negative. However, this could imply a policy failure that made the black market rate affect the current

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[14] We have shown in Table (3) that all the variables are integrated of degree one I(1). To test for the existence of cointegration among the explanatory variables, we employed the ADF tests for the residuals and the test gave the value of (-1.80 against the critical value of –2.95) which implies that there is no cointegration between the explanatory variables and hence the Phillips-Hansen test can be applied to our data.

account balance significantly, particularly the policy failure to unify different types of exchange rates (official, parallel, and black market rate)[15].

In essence, one of the prime objectives of the exchange rate policy in Sudan is to attract the Sudanese Working Abroad (SWA) remittance (which equals double the export value in magnitude). The government created a special rate for the SWA remittance. Consequently, a positive effect for the black market rate on the current account balance could mean that high values of this rate would put pressure on the government to depreciate the parallel market rate to increase foreign exchange inflow from SWA and hence reduce the current account deficit. This would indicate a loss of control over the black market rate. The situation has improved over the last few years.

Table (5a) and (6) also show also a negative and significant relationship between the current account balance and percapita income levels. This implies that structural and demographic factors are two of the main causes behind current account deterioration in the long-run. The coefficient of this variable is similar to that of the black market rate. This implies that both policy and non-policy factors are responsible for the current account deterioration to the same degree during the period of the study (1960-1997).

### 6.4. Short-run Results

Table (7a) shows the short-run parameter estimation. It indicates that the variables that affect the current account balance in the short-run are changes in the GDP growth and changes in terms of trade lagged one year. The other variables are not significant, possibly due to multicollinearity. The changes in the black market rate are marginally insignificant. However, the error correction term is highly significant with the correct sign with a coefficient of (0.78), which indicates that adjustment to the equilibrium is quite fast. The GDP growth lagged one year and the percapita income lagged one year are not significant, and are omitted to improve the performance of the model. The estimation passed the diagnostic tests.

The changes in terms of trade lagged one year are one of the most important factors affecting the current account balance in the short-run. The negative sign means that

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[15] The parallel market rate is a depreciated rate created by the government to attract the Sudanese Working Abroad (SWA) remittance.

external shocks have an adverse impact on the current account balance, but after a time lag due to some rigidities in the economy.

The insignificance of the black market rate in the short-run could be attributed to the fact that some of the SWA might not respond promptly to the changes in the exchange rate and prefer to hold their foreign exchange for speculation, i.e. waiting for the exchange rate to be depreciated again.

## 7. Conclusion

The objective of this paper is to assess whether the adjustment policies have succeeded in improving the current account position. Moreover, we aim to identify the factors affecting the current account balance in the long-run and assess whether the policies aimed at domestic objectives are compatible with sustainable external balance. The analysis are based on the economic theory of saving and investment as a guide to determine the factors affecting the current account in the medium-to- long-run.

The analysis began with a descriptive statistic. This analyse showed that adjustment policies introduced in 1980 did not improve the current account position; rather, the deficit doubled. Moreover, Sudan's current account position failed to satisfy solvency and sustainability requirements in the late 1980s and the country was defaulted by the IMF and the World Bank in the early 1990s. However, the government's own SAPS succeeded in reducing the deficit by about 25 percent from the previous period. This indicates that policy ownership matters.

We examined the composition of the current account to investigate whether the deficit was due to structural competitiveness problem in Sudan's exports or historical remnant of foreign debt. While the last factor can not be excluded, the analysis showed that the large persistent trade deficit was a clear indicator of a problem with Sudan's export competitiveness. Moreover, the deterioration of gross domestic savings and the excessive private consumption were among the factors that caused external crisis in Sudan. The IMF/World Bank programmes of the 1980s had limited success in solving these problems.

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Our econometric model for determinants of the current account included: GDP growth as a proxy of macroeconomic policy performance, changes in black market rate as a proxy of the inefficiency in the exchange rate policy, level of percapita income as a proxy of effect of stage of development and demographic factors, and terms of trade shocks as a proxy of external non-policy factors.

The ADF tests showed that the unit root hypothesis can not be rejected from all the variables except the terms of trade. The existence of a unit root in the current account time series implies that the deficit has been of a permanent nature and the time series continued to drift down or away from its previous level without showing signs of returning back to a constant mean. This could mean that adjustment reform did not improve the current account position or even to bring it back to its level of before the reforms introduction. In contrast, the stationarity of the terms of trade implies that these shocks to the current account are of a temporary nature and have significance in the short-run only.

Both the OLS and the Fully Modified Phillips-Hansen OLS (FM-OLS) were used to estimate the long-run parameters. The results indicated that there is inconsistency between internal and external policy targets indicated by the negative of the GDP growth (proxy of internal policy targets). The results also shows that the inefficiency in the exchange rate policy (created by the policy failure to control black market rate due to the failure to unify the different types of exchange rates (official, parallel, and black market rates)) as well as non-policy (structural and demographic factors) are the main causes behind the current account deterioration in Sudan. However, the Fully Modified Phillips-Hansen OLS (FM-OLS) showed that the value of the equation's long-run coefficients for both policy and non-policy factors are similar indicating that they have been affecting the current account to the same degree during the period of the study (1960-1997).

The short-run parameter estimation indicated that the variables that affect the current account balance in the short-run are changes in the GDP growth and changes in terms trade lagged one year. The rest of the variables are not significant due to multicollinearity.

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**List of tables**

Table 1. Key economic indicators for the period 1970-1986

| Indicator | 70/71 | 73/74 | 76/77 | 77/78 | 78/79 | 79/80 | 80/81 | 81/82 | 83/84 | 84/85 | 85/86 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GDP,81/82 Prices | 5239 | 5191 | 6871 | 6764 | 6062 | 6116 | 6248 | 6721 | 6681 | 5716 | 6248 |
| GDP growth rate | | 10 | 15 | -2 | -10 | 1 | 2 | 8 | -4 | -14 | 9 |
| Exports %GDP | 16 | 13 | 11 | 8 | 10 | 12 | 9 | 9 | 13 | 11 | 9 |
| Imports %GDP | 18 | 17 | 17 | 16 | 19 | 24 | 23 | 27 | 23 | 19 | 17 |
| Trade deficit %GDP | -2 | -4 | -6 | -8 | -9 | -12 | -14 | -18 | -10 | -8 | -8 |
| Curr. A/C as % GDP | 2 | -4 | -5 | -6 | -7 | -10 | -12 | -17 | -11 | -9 | -11 |
| T.O.T 81/82 =100% | 171 | 145 | 160 | 164 | 151 | 139 | 130 | 100 | 128 | 106 | 102 |
| For.debt (mill.US$) | 337 | 602 | 1809 | 1952 | 2330 | 5008 | 6169 | 6885 | 8466 | 8929 | 9568 |
| Debt service ratio | 8 | 14 | 22 | 29 | 33 | 53 | 70 | 95 | 137 | 162 | 244 |

Source: World Bank 1983,1985,1987; and Hassan (1994).

Table 2: Sudan's Current account balance: descriptive statistics

| Period | Mean | SD | Period description |
|---|---|---|---|
| 1960-1969 | - 3.4 | 1.3 | Ten year plan |
| 1970-1979 | -4.6 | 3.8 | Expansionary policies |
| 1980-1991 | -10.4 | 2.7 | SAPS Period |
| 1992-2000 | -7.6 | 3.2 | Government SAPS |
| 1960-1979 | -4.0 | 2.9 | Before SAPS |
| 1980-2000 | -9.2 | 3.3 | SAPS |
| 1960-2000 | -6.7 | 4.0 | Whole period |

Source of data: IMF (1999, 2000) and World Bank (1992)

Table 3: TOT simple statistics (1980=100)

| Period | Mean | SD | Period description |
|---|---|---|---|
| 1960-1997 | 4.70 | 0.25 | Whole period |
| 1960-1980 | 4.86 | 0.19 | Before SAPS |
| 1981-1997 | 4.50 | 0.13 | SAPS period |

Source of Data World Bank

Table 4a: Unit root test for regression variables (1960-1997)

| Variable | ADF (without trend) | ADF (with trend) |
|----------|---------------------|------------------|
| CAB | -2.33 | -3.14 |
| LPERCAP | -1.50 | -2.04 |
| GR | -4.20 | -4.14 |
| LFRMEX | -2.04 | -3.62 |
| LTOT | -3.12* | -4.31* |

95% critical value for the ADF statistics (without trend) is (-2.95).
95% critical value for the ADF statistics (with trend) is (-3.53).
99% critical value for the ADF statistics (without trend) is (-4.24).
99% critical value for the ADF statistics (without trend) is (–3.63).


Table. 4b:Unit roots tests for variables' first differences (1960-1997)

| Variable | ADF (without trend) | ADF (with trend) |
|----------|---------------------|------------------|
| ΔCAB | -6.00* | -5.96* |
| ΔLPERCAP | -3.29* | -3.53* |
| ΔGR | -5.99* | -5.89* |
| ΔLFRMEX | -5.75* | -5.69* |
| ΔLTOT | -6.95* | -6.83* |

95% critical value for the ADF statistics (without trend) is (-2.95).
95% critical value for the ADF statistics (with trend) is (-3.53).
* Means significant at 5 % level.

Table 5a: OLS Estimation: (1960-1997)
Dependent variable is CAB (current account balance):

| Regressor | Coefficient | SE | T-value (prob) |
|-----------|-------------|------|----------------|
| Intercept | 13.61 | 4.50 | 3.03 (0.01) |
| GR | -0.14 | 0.07 | -2.03 (0.05) |
| LPERCAP | -3.46 | 0.84 | -4.13 (0.00) |
| LFRMEX | 4.93 | 1.47 | 3.36 (0.00) |

R-square=0.66              R-Bar square =0.62
F-stat   F(3,32)=20.34(0.00)              DW =1.43


Table 5b: Diagnostic tests:

| Test statistic | LM version | F version |
|----------------|------------|-----------|
| Serial correlation | CHSQ(1)=2.97(0.10) | F(1,31)=2.79(0.11) |
| Functional form | CHSQ(1)=0.173(0.68) | F (1,31)=0.149(0.70) |
| Normality | CHSQ(2)=0.393(0.82) | N/A |
| Heteroscedasticity | CHSQ(1)=0.438(0.51) | F(1,34)=0.418(0.52) |

Table 6: Fully-modified Philips-Hansen Estimates (1960-1997)
Parzen weight, truncation lag=1, non-trended case, dependent variable is CAB (current account balance):

| Regressor | Coefficient | SE | T-value (prob) |
|---|---|---|---|
| Intercept | 15.35 | 4.21 | 3.64 (0.00) |
| GR | -0.13 | 0.06 | -2.04 (0.05) |
| LPERCAP | -3.84 | 0.78 | -4.90 (0.00) |
| LFRMEX | 3.9 | 1.37 | 2.84 (0.01) |

Table 7a: Short-run estimation by using OLS technique:
Dependent variable $\Delta$CAB; 35 observations from 1963-1997

| Regressor | Coefficient | SE | T-Value (prob) |
|---|---|---|---|
| Constant | -0.18 | 0.40 | 0.45 (0.65) |
| $\Delta$CAB(-1) | -0.17 | 0.18 | 0.98 (0.34) |
| $\Delta$GR | -0.24 | 0.06 | -4.01 (0.00) |
| $\Delta$LPERCAP | 4.12 | 2.64 | 1.56 (0.13) |
| $\Delta$LPERCAP(-1) | 0.17 | 2.73 | 0.06 (0.95) |
| $\Delta$LFRMEX | 2.74 | 1.46 | 1.88 (0.10) |
| $\Delta$LFRMEX(-1) | -0.91 | 1.76 | -0.52 (0.61) |
| $\Delta$LTOT | -1.66 | 2.45 | -0.68 (0.51) |
| $\Delta$LTOT(-1) | -4.62 | 2.30 | -2.01 (0.05) |
| ECM(-1) | -0.78 | 0.21 | -3.66 (0.00) |

R-square=0.67          R-Bar square =0.55
F statistic  F(9,25)=5.52   (0.00)       D.W. =1.75

Table 7b: Diagnostic tests:

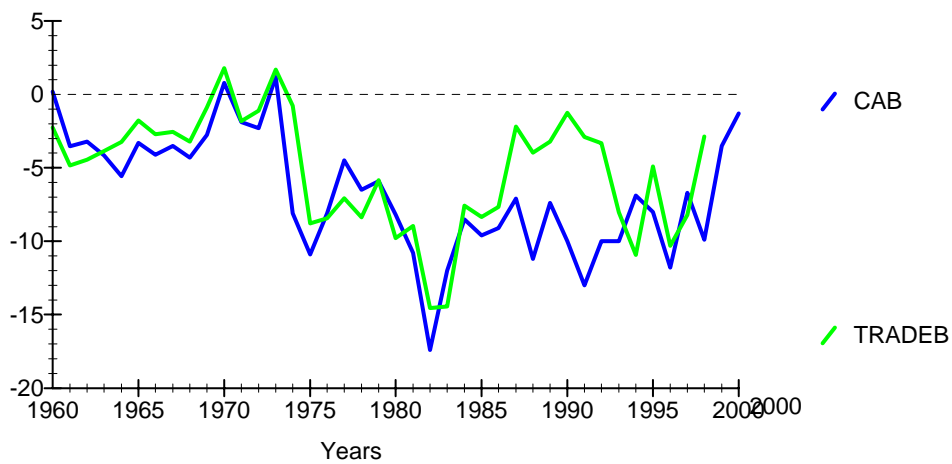| Test statistic | LM version | F version |
|---|---|---|
| Serial correlation | CHSQ(1)=1.4(0.23) | F(1,24)=1.03 (0.32) |
| Functional form | CHSQ(1)=0.45(0.50) | F(1.24)=0.313(0.58) |
| Normality | CHSQ(2)=0.382(0.83) | N/A |
| Heteroscedasticity | CHSQ(1)=0.178(0.67) | F(1,33)=0.169(0.68) |
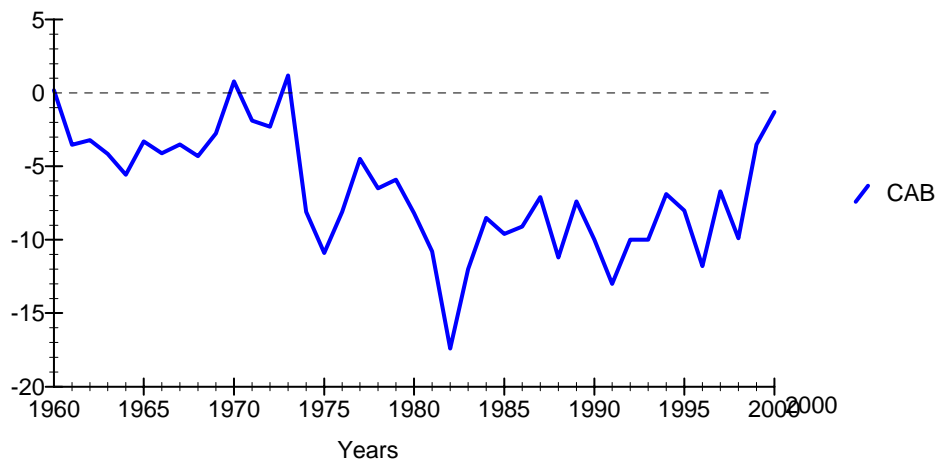
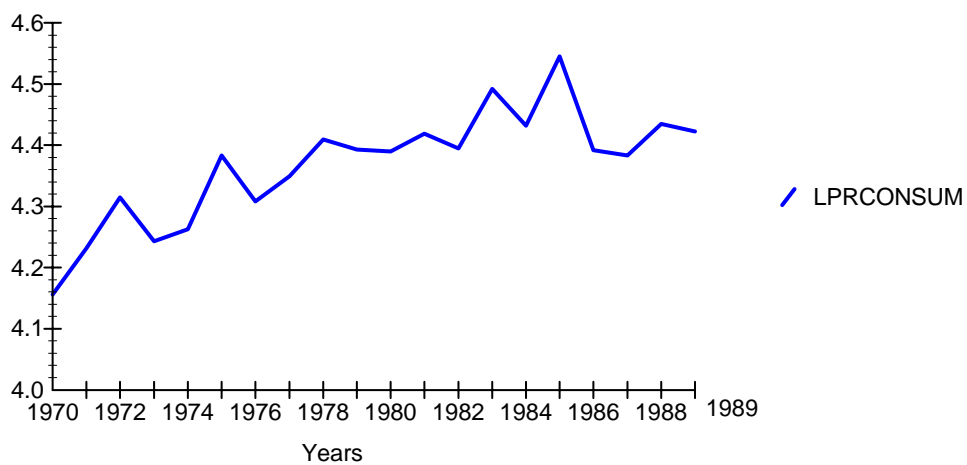(Where CAB is the current account balance)

Where CAB is the current account balance and TRADEB is the trade balance.

Figure 3: Current account and the gross domestic savings (1970-1989):
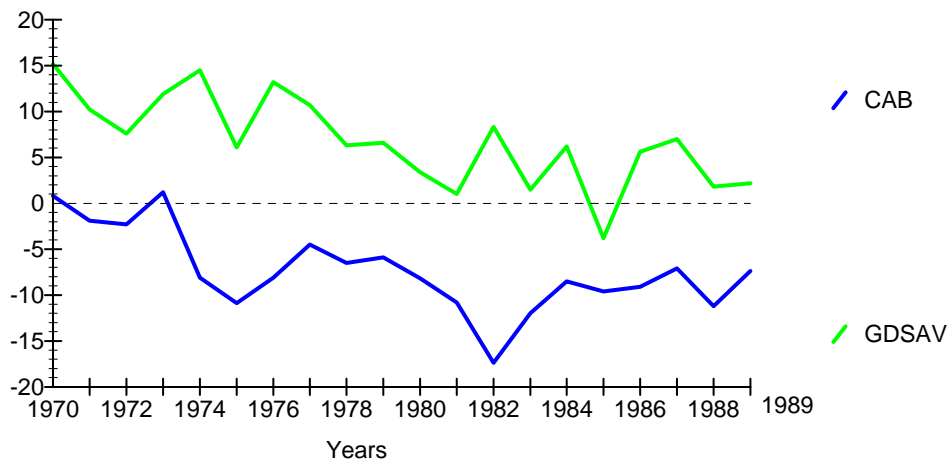


Where CAB is the current account balance and GDSAV is the gross domestic savings.

Figure 4: Private consumption as percent of GDP (1970-1989):



Where LPRCONSUP is the logarithm of the private consumption as percentage of GDP.