SOUTH AFRICAN DEFENCE EXPENDITURE IN THE 20TH CENTURY

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ABSTACT

In an economic sense defence expenditure is normally exogenously determined, that is economic forces do not play the leading role in determining the level of defense expenditure. Adam Smith, in his writing *An Inquiry Into the Nature and Causes of the Wealth of Nations* states that "It is only by means of a standing army therefore that the civilization of any country can be perpetuated or even preserved for any considerable time" (Canon, E., ed, 1976). A country can thus not supply defence, i.e. defence expenditure is a given to any national economy. South Africa is no exception. The levels of defence expenditure in South Africa were mainly determined by political and security factors up to the last decade of the 20th century, where after economic and social factors increasingly became more important than political an security factors in determining the level of defence expenditure. It also stands to reason that South African defence expenditure had an overall neutral effect on the South African economy with positive and negative effects over different time periods.

1. INTRODUCTION

Every country has to provide a certain minimum level of defence. This minimum level is normally spelled out in a Government White Paper.[1] The question to ask is not whether a country should supply defence or not, but the quantity of defence that must be supplied. The real issue at hand, thus, is to correctly quantify the level of defence that must be provided.

Defense expenditure data provides an easily identifiable measure of the scale of resources absorbed by defence activities, i.e. the level of defence supplied. Determinants of the level of defence expenditure includes internal and external political and security factors. Economic realities do play a role but only as far as a government budget constraint. A situation can thus occur where economic growth is negative, but defence expenditure is increasing. This does however not necessarily mean an inverse relationship between economic growth and defence expenditure. The level of defence expenditure is however constrained by the government's ability to channel resources to the defence budget, i.e. the availability of funds for defence.

In the South African experience defence expenditure levels fluctuated around the political decision making process. South Africa, especially from the 1960s till the end of the 1980s, experienced numerous internal and external instability, violence and conflicts, which contributed directly to the level and cyclical behaviour of defence expenditure.

It is very difficult to make a clear-cut case about the influence of defence expenditure on an economy. Do we, for example, only look at the effect of defence expenditure on economic growth or do we make it a broader concept/analysis. By this we mean taking into account the training of people, humanitarian aid, assisting other state departments and the private sector in times of disasters, etc. and the stability/insurance factor that a defence force represents.

Benoit (1973, 1978) uncovered a net positive association between defence expenditure and economic growth for forty-four less developed countries. The results of a study by Atesoglu and Mueller (1990) reveal that there is a positive and significant relation between defence spending and economic growth. But, their findings also indicate that the responsiveness of economic growth to changes in defence spending is small. Roux, A. (1995) concluded that defence expenditure in South Africa had a negative effect on economic growth between 1960 and 1990. Deger (1986) concluded that defence expenditure had a positive direct and a negative indirect effect on growth in 50 Less Developed Countries (LDCs), but that the net effect is negative. Looney (1989) argues that an increase in defence expenditure has a negative impact on economic development and growth. Ward and Davis (1992) and Scheetz (1991) support this argument. The literature thus does not supply us with an obvious and distinct answer to the relationship between defence expenditure and economic growth.[2]

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[1] See the South African White Paper on Defence, South African Government, Department of Defence

[2] Standler and Hartley provide us with a review of the literature on growth and defense.

The aim of this paper is, firstly, to analyse the level of defence expenditure in South Africa in the 20th century and to give some explanation of the fluctuations that occurred. Secondly, are a defence expenditure function estimated, after which the magnitude and impact of defence expenditure on economic growth and the converse are estimated with the aid of appropriate techniques.[3]

2. DEFENCE EXPENDITURE 1910 TILL PRESENT[4]

The Union Defence Force (UDF) was established in 1912, which signified the coming into being of an official defence budget. Prior to 1912 each of the Boer Republics and the British Colonies developed their own military system.

The start of World War 1 (1914) effectively implied the use, for the first time, of the defence budget to reflect the level of defence expenditure. The involvement of the UDF in the war caused the UDF budget to increase quite drastically (graph 1). After the war the defence budget slowly decreased to levels prior the start of the war.

From 1919 to 1938 defence expenditure only marginally increased due to the establishment of the SAAF and the miners' strike of 1922. In real terms expenditure was however not adequate and led to the disbanding of the Naval Service in 1934.

The outbreak of World War II caused a rapid expansion and the re-equipment of the UDF. Defence expenditure increased roughly by 400% and kept increasing as the war effort increased (graph 1). This was a very expensive war and was defence expenditure levels roughly the same as at the beginning of the1970's. After the war the UDF again suffered major budget cuts and expenditure decreased to levels marginally higher prior the start of the war. This represents a cut of roughly a 400%, which dramatically influenced the South Africa economy.

After the war the UDF increasingly became a low-funded, peace-time organisation. Only when the UDF got involved in the Korean War did the defence budget increased. The Korean War (1950 – 1953) saw the participation of the SAAF as part of a United Nations Force. Defence expenditure did increase but only marginally, because of the limited involvement of the UDF. After the war defence expenditure again declined to levels prior the start of the war.

It is evident from graph 1 that defence expenditure stayed relative stable and at very low levels from 1912 to 1960. Defence expenditure only increased with the outbreak of wars and decreased directly after the end of these wars. It can thus be said that defence expenditure was not influenced by economic factors over this period.

The UDF became the South African Defence Force (SADF) in 1957 and effectively changed the complexity, magnitude and use of the defence budget. Defence expenditure also became a very important variable in the economy and increased directly as a result of the internal problems faced by the government. Initially the economy was very strong and thus conducive to the increases in defence expenditure. The military was also

[3] Real Gross Domestic Product (GDP1) will be used as a proxy for economic growth.

[4] This section draws from various Department of Defence annual reports, Sass B, "The Union and South African Defence Force - 1912 to 1994" In Cilliers & Reichardt and Lombard & Stadler, "Die Ekonomiese Stelsel van Suid-Afrika".

increasingly being utilized to stabilize the country, this directly contributing to the strength of the economy.

The Sharpville shootings occurred in 1960, which led to a declaration of a national state of emergency and the first call-up since WWII of major elements of the part time forces. This political turbulence lead to a permanent increase in the level of defence expenditure.

South Africa became a Republic on 31 May 1961 and withdrew from the British Commonwealth, a move that had a dramatic and lasting effect on the country and in particular the SADF. The SADF was now on its own in terms of defence procurement of weapons and systems, to name but a few. The SADF also decided, with the support of the government, to become totally self-sufficient.

On 16 December 1961 the ANC established its armed wing which forced the SADF to change from a conventional force to an armed force of a state under siege. The internal political situation emphasised the importance of the SADF, which ensured increased budget allocations to satisfy political aims and to up hold the status quo.

Assistance to the neighboring Mozambique Angola and the then Rhodesia (Zimbabwe today) in 1965 as well as a general expansion and improvement in training and equipment ensured higher levels of defence expenditure during the late 1960's.

From 1973 the SADF started deploying soldiers in South-West Africa (Namibia). South Africa invaded Angola in 1976, which increased defence expenditure to record high levels. Defence expenditure at present is at this level, which give some indication of the extremely low levels of defence expenditure at present.

The Soweto uprising (1976) and the related labour unrest's caused great internal instability and was a real threat to the political regime. The only way the government could enforce its political will/power and to suppress the masses was to use the security forces, which meant that resources were available to the SADF. This happened during a time where the economic climate was less than favorable for sustaining high levels of defence expenditure.

Whereas the previous decades were years of relative economic growth and development the 1970's were not. The South African economy was characterized by political and economic instability, which caused a huge outflow of capital. Sanctions ware also introduced as a result of apartheid policies.

The SADF was, from the early 1970's, deployed in Namibia and South Africa became involved in the Angola civil war in 1975. Military spending peaked at 5% of GDP1 and over 18% of government expenditure in 1977/78. This was in response to the 1976 Soweto uprising, the SADF purchase of large amounts of weapons prior to the imposition of a mandatory US arms embargo and the governments implementation of the "Total Strategy" to combat the "Total Onslaught".

Military spending then declined quite dramatically between 1977/78 and 1980/81, but began to increase again during the 1980's as a result of South Africa's increasing internal problems. The situation in Angola, Namibia and Mozambique also deteriorated. Military spending peaked again in 1989/90 at 4% of GDP1 and 13% of total government expenditure.

The international security situation changed dramatically after the fall of the Berlin Wall in 1989, which effectively meant the end of the Cold War. The South African government also ordered the withdrawal of the SADF from Namibia. International defence expenditure since then declined dramatically.

The South African defence budget decreased between 1989 and 1997 by more than 50% in real terms. Defence spending as a share of total government spending declined to less than 6% and as a share of GDP1 to less than 2%. By 1996/97 military spending was at the same level as it had been during the early 1970's and is there no reason to believe that defence expenditure will increase in the near future.

The SA economy experienced its most severe depression, since the great depression of the 1930's, between 1989 and 1993 with GDP growth averaging less than one percent per annum in real terms. This period also experienced a severe decrease in defence expenditure.

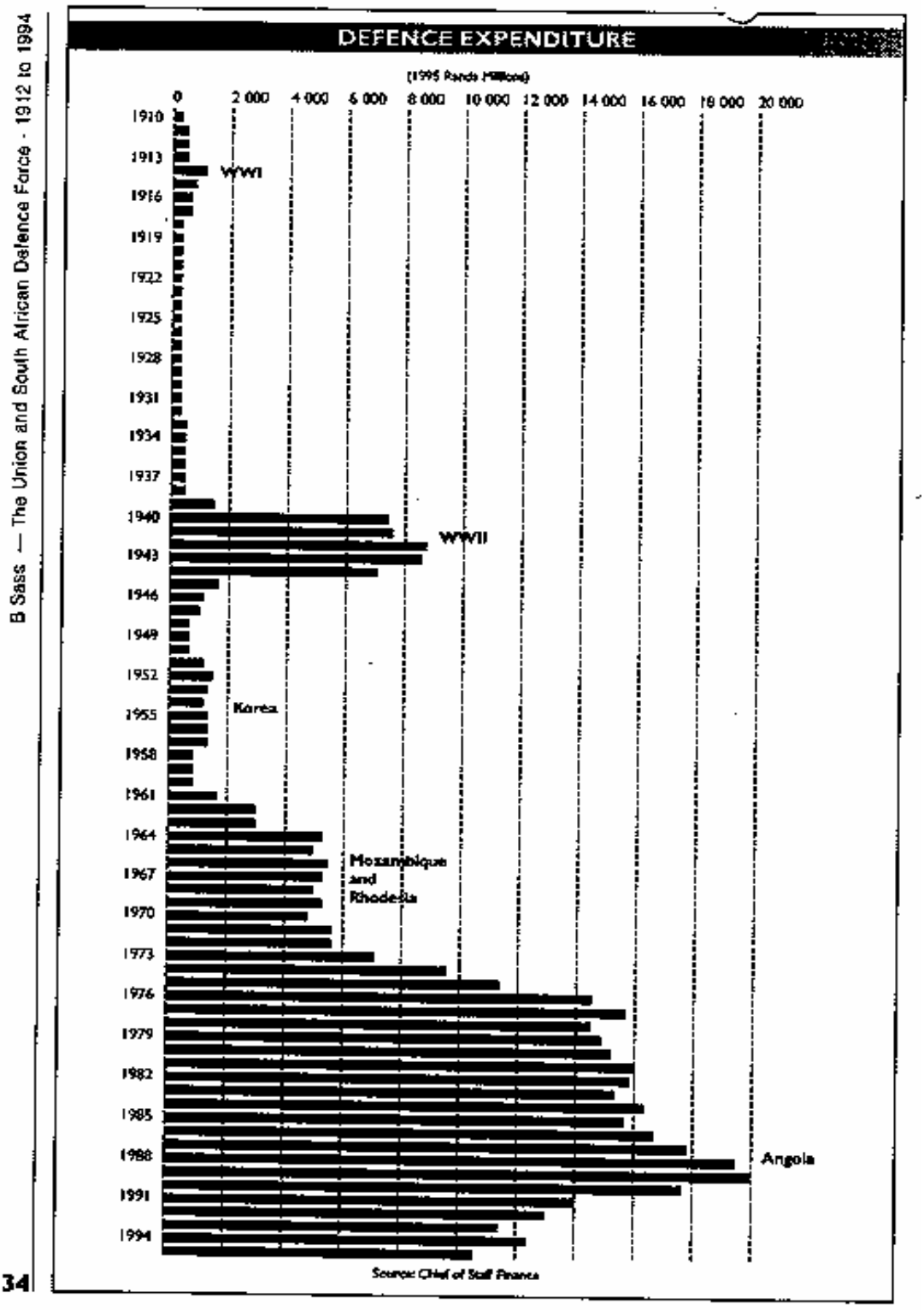
Since 1993 the SA economy has experienced positive GDP1 growth. GDP1 growth averaged 2,6% between 1993 and 1996. Inflation is also under control, interest rates have declined and exports have increased.

The major events that influenced defence expenditure in South Africa in the 20th century can be summarized as follows:

a. The outbreak of WW I.
b. The outbreak of WW II.
c. The involvement of the UDF in the Korean War.
d. South Africa becoming a Republic in 1961 and the implementation of the Afrikaner ideologies and policies.
e. Sharpville shootings and the banning of the liberalization movements.
f. The commencement of the armed struggle in 1963 after Mandela was sent to jail.
g. The imposition of the first arms embargo in 1964.
h. South Africa's involvement in Namibia in 1970.
i. The internal unrest's that began in 1970.
j. Start of the Bush War in 1975.
k. Soweto uprising in 1976.
l. Introduction of the Total Strategy to combat the Total Onslaught in 1977.
m. Involvement of South Africa in Angola, Namibia and Mozambique.
n. Rubicon Speech of PW Botha in 1985.
o. Fall of Berlin Wall and subsequent end of the Cold War in 1988.
p. Speech of FW de Klerk freeing Mandela and the end of the Bush War in 1990.
q. First Democratic elections in 1994 and the emphasis on the social needs of the people.

Graph 1 presents a broad outline of defence expenditure from 1912 to 1994, clearly indicating that the level of defence expenditure followed political and security factors, i.e. defence expenditure was an exogenous variable in the economy.

Graph 1: Defence Expenditure in 1995 constant prices[5]

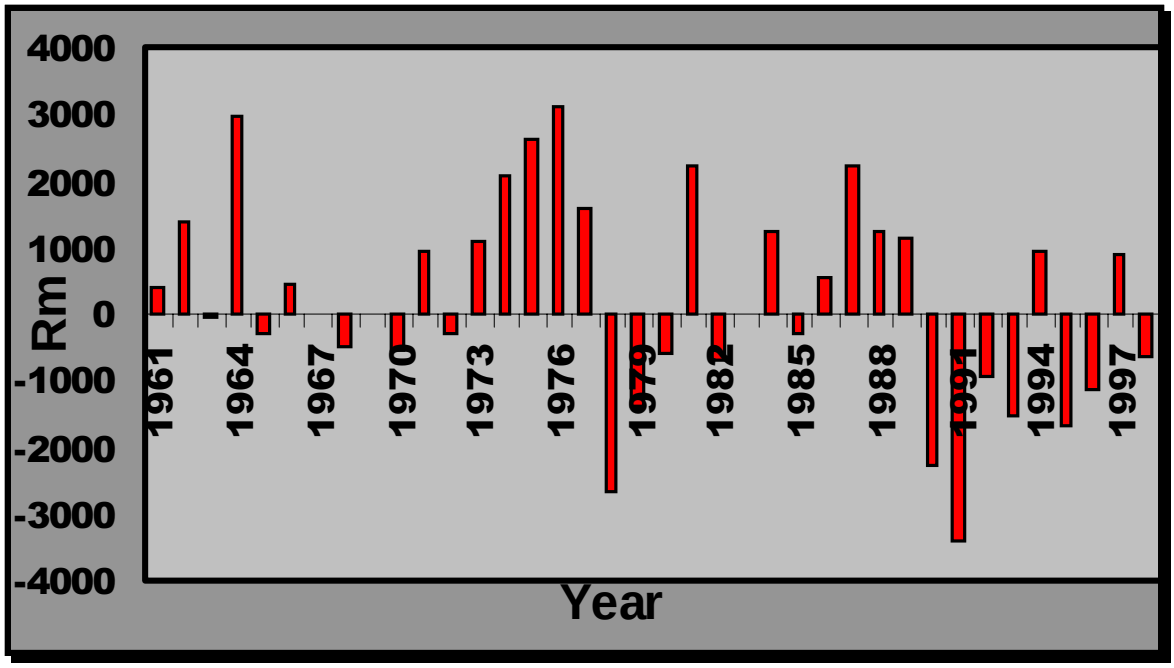


[5] Bill Sass in Cilliers, J and Reichardt, M. from the Institute for Defence Policy.

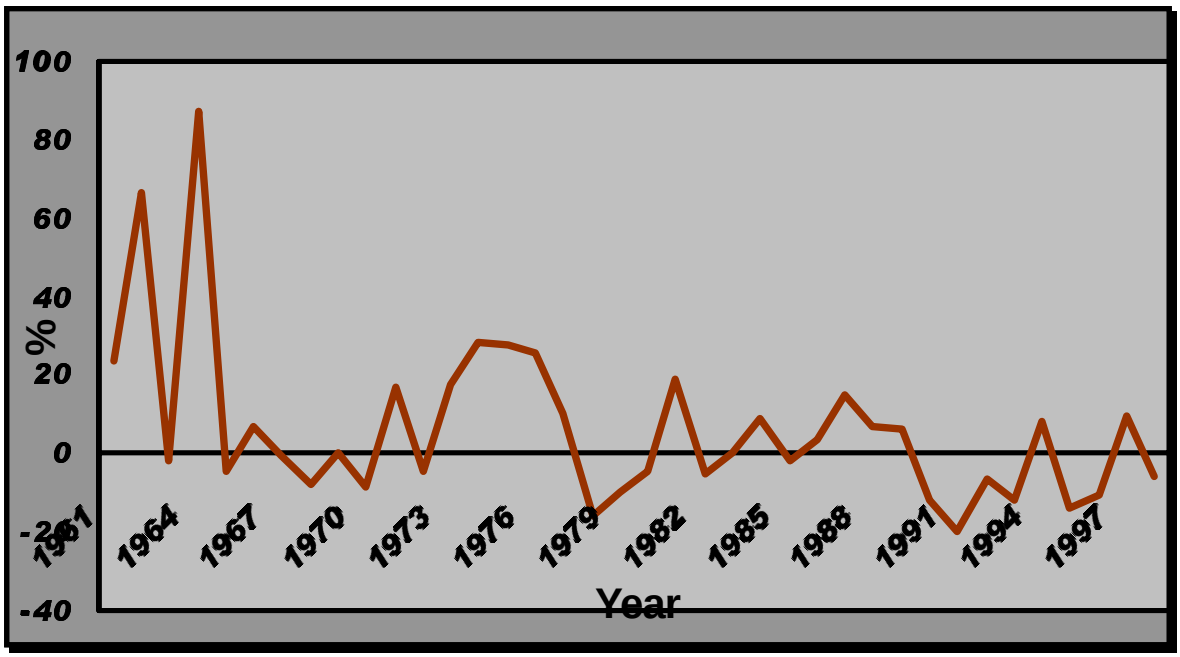
3. DEFENCE EXPENDITURE DYNAMICS

The availability and quality of defence expenditure data prior to 1960 are unfortunately not good and reliable. We will therefor conduct our investigation only from 1960 to 1999. Graph 2 to 3 provides us with some characteristics of defence expenditure in South Africa from 1960 to 1999.

Graph 2: Yearly Change in Defence Expenditure



Graph 3: Real Growth Rate of Defence Expenditure.



The above two graphs indicate the big fluctuations that occurred in defence expenditure, which must have had some implications for the military and the economy. Defence expenditure increases (till 1990) occurred more often than defence decreases and the magnitudes of the increases were also greater than the magnitudes of the decreases, thus clearly indicating the expanding role played by the military in South Africa till the end 1980's. This situation dramatically changed after the late 1980's, clearly indicating the decrease in resource allocations to the military.

Defence expenditure per capita reached a high of R439.40 per person in 1990 after a steady increase from 1960. This situation also drastically changed after 1990 and is estimated to be about R244.40 per person at present (end of 1999).[6] Defence Expenditure per capita was at a record high of about R657.90 per person in 1940, directly as a result of South Africa's involvement in WW II.

Graph 4: Defence Expenditure per Capita^

YEAR	Population	Sandf	Sandf/capita
1910	5.9	500	84.7
1920	6.9	610	88.4
1930	9.58	700	73.1
1940	11.4	7500	657.9
1950	12.67	1000	78.9
1960	16	1695.25	106.0
1970	21.45	5516	257.2
1975	25.5	11958.26	469.0
1980	30.65	12022.7	392.3
1990	39.51	17359.3	439.4
1995	42.1	10697	254.1
1999*	45	11000	244.4

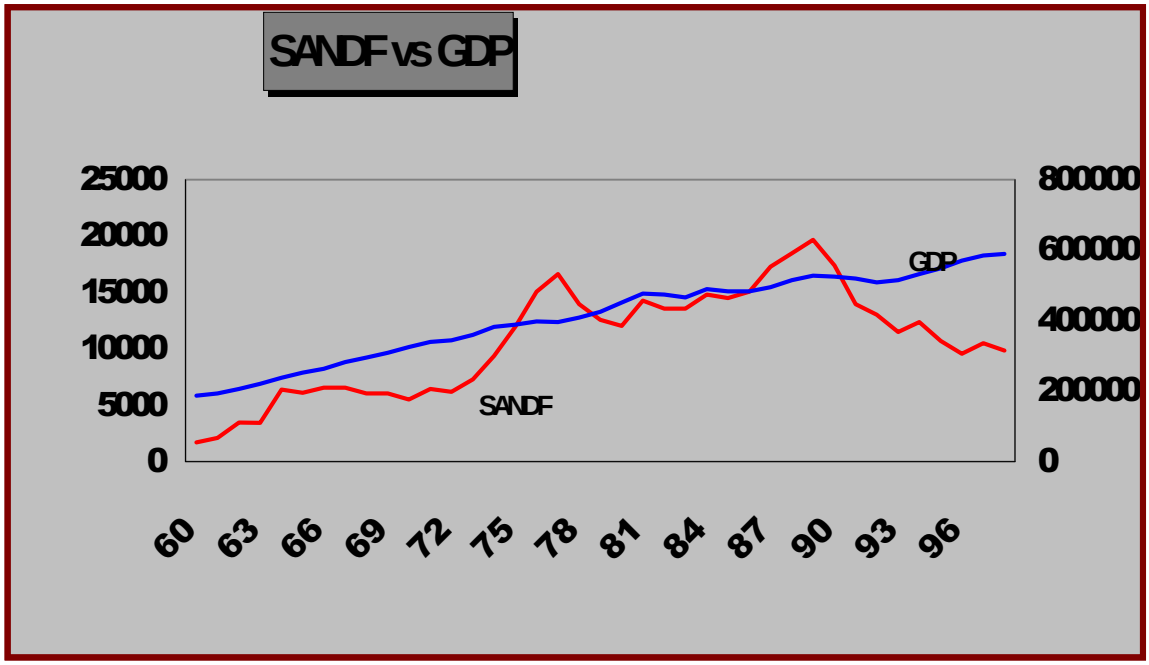
^ Figures are in Rand per person.
* Population estimate at end of 1999.

[6] Population figures as indicated in various population census surveys and October household surveys. Figures are only estimates and thus are not a hundred percent correct. It however demonstrates the point that we want to make.

4. DEFENCE EXPENDITURE IN COMPARISON WITH REAL GROSS DOMESTIC PRODUCT (GDP1), REAL GOVERNMENT EXPENDITURE (GC1) AND POLITICAL/SECURITY FACTORS (DUMMYPOL)

It does not seem, if looking at graph 5, that the movements in defence expenditure and real GDP exhibit similarities, except that both variables increased from 1960 to 1990. The two variables also do not share the same turningpoints and the magnitude of the fluctuations in the variables does not appear to be similar. The only excepting might be from 1980 to 1987 where the movements of both time series tend to be the same, i.e. there seem to be a positive relationship between the two variables. When looking at the movements of the two variables from 1990 to 1996 one can make the deduction that the decrease in defence expenditure corresponds to an increase in real GDP, i.e. the existence of a negative relationship.

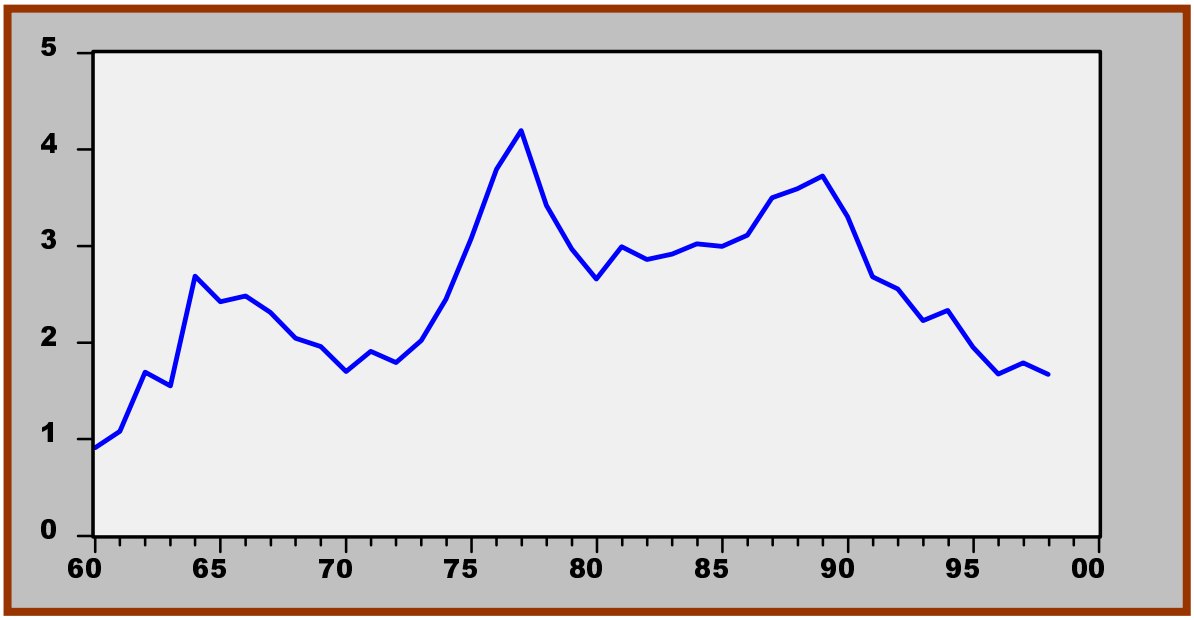
Graph 5: Long run movements of defence expenditure and real GDP*



* Both variables are in 1995 constant prices

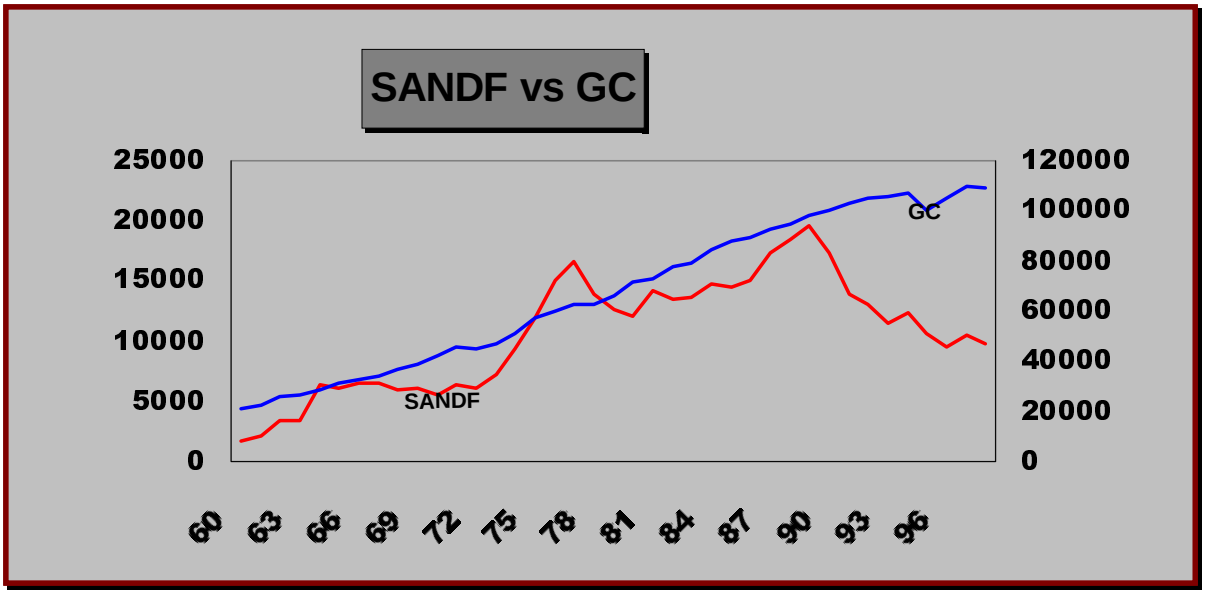
Defence expenditure as percentage of real GDP reached a high of over 4% in the middle of the 1970's and stayed at these high levels as a result of the internal and external problems faced by South Africa (graph 6). The start of the 1990's heralded a new era for South Africa and the world with adverse effects on defence expenditure; i.e. world peace caused defence budgets to decrease. Graph 6 also indicates that defence expenditure as a percentage of real GDP at present are roughly the same as 1970 level, thus a major decrease in defence expenditure.

Graph 6: Defence expenditure as percentage of real GDP



The relationship between defence expenditure and real government expenditure are unclear when looking at graph 7. The turningpoints and the magnitude of the fluctuations do not appear to correspond, which seems to suggest that increases in defence expenditure were financed by government budget reallocations. Meaning that the South African government could not increase its expenditure because of revenue and resources availability constraints. Resources were thus channeled to the military via budget reallocations.

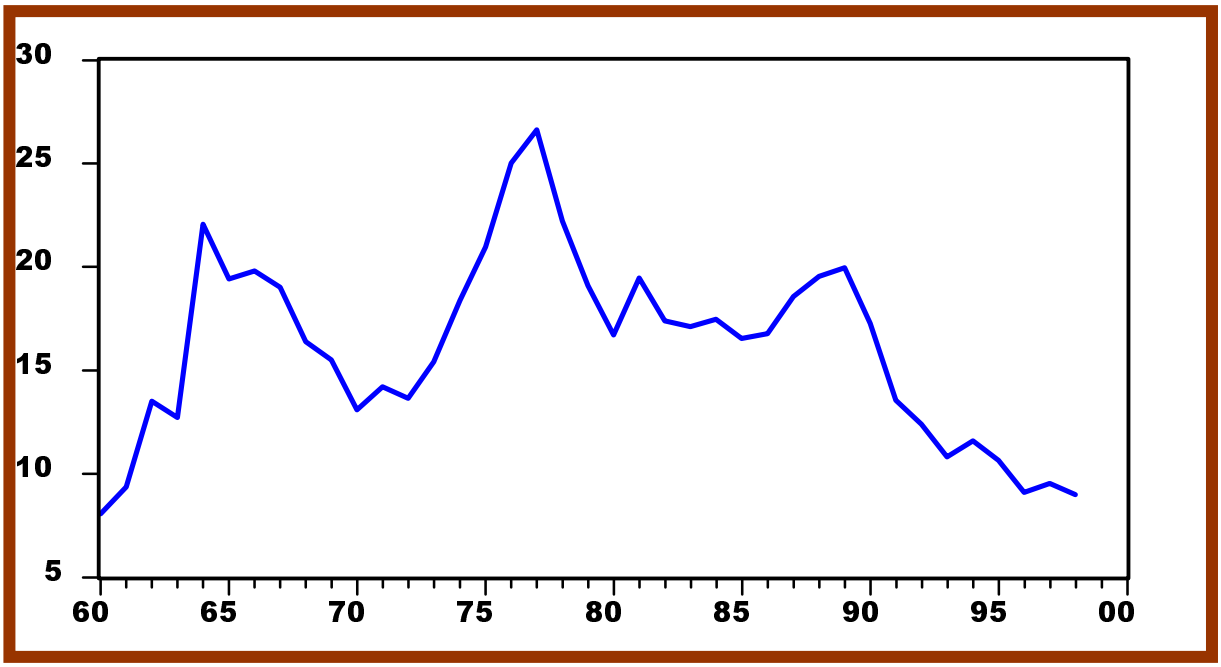
Graph 7: Long run movements of defence expenditure and real government expenditure*



* Both variables are in 1995 constant prices

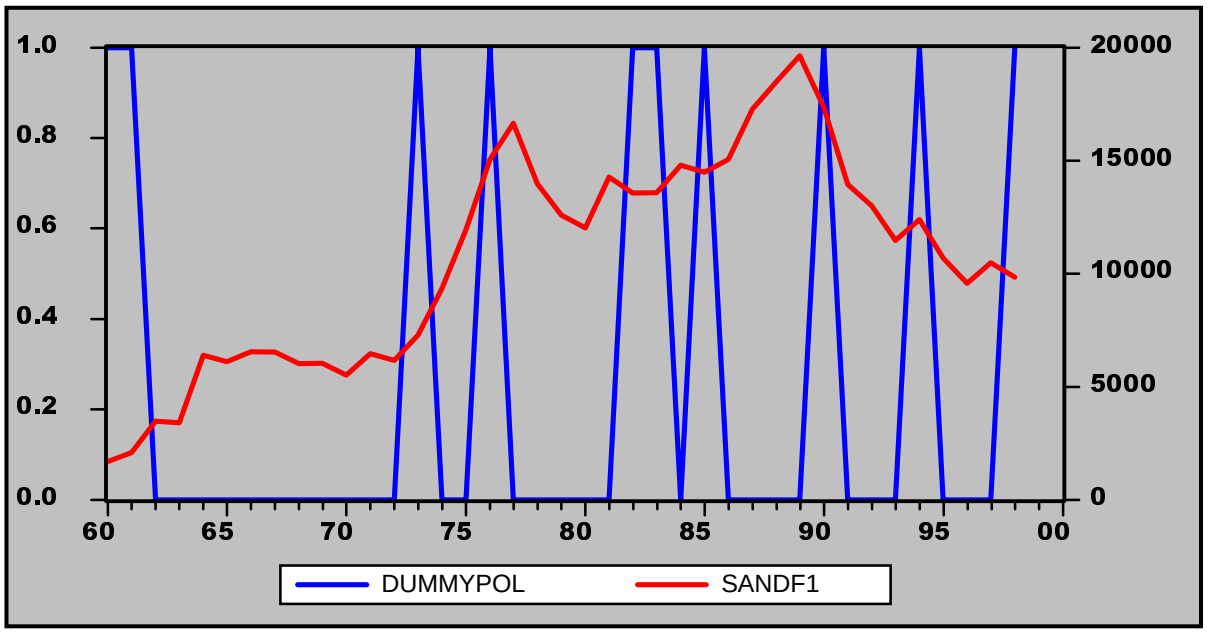
Defence expenditure represented a big share of total government expenditure till 1989 (graph 8). Defence expenditure as percentage of government expenditure reached a high of over 25% in 1976, which clearly is an unhealthy situation that representes a drain on the available resources for the use on education, health and public investment. Defence expenditure as a percentage of government expenditure is at present at levels corresponding to 1960 levels. This reflected the huge budget reallocation that occurred after 1990 in an effort to satisfy social priorities, while at the same time decreasing the budget deficit.

Graph 8: Defence expenditure as a percentage of real government expenditure



Political and security factors played a very important role in the level of defence expenditure. Defence expenditure followed these important factors as can be seen from graph 9. We use dummy variables to model political and security factors/events, i.e. 1 = political and security events. The major events/factors that we included are the Sharpville shootings, the start of the SADF's involvement in Namibian, the Soweto uprising, the Rubicon speech, the end of the Cold War and the two democratic elections. Events before 1990 are synonymous with increases in defence expenditure, while events after 1990 with decreases in defence expenditure.

Graph 9: Relationship between defence expenditure and selected political and security factors/events



5. ESTIMATION OF A REGRESSION EQUATION AND RELATIONSHIP FOR DEFENCE EXPENDITURE

It is very important that we test for the stationarity of the different time series before we can continue with our analysis and estimation procedures. We must first ensure that the time series are stationary, after which we will make use of the Ordinary Least Squares and cointegration methods to estimate and specify a function and relationship for defence expenditure. This is by no means a bulletproof method, but can be useful as a starting point for our analysis. It is important to note that the aim of this paper with regards to this section is only to give some food for thought and are further analysis and research necessary/essential to get more precis results. The regression function that we obtained is displayed in table 1.

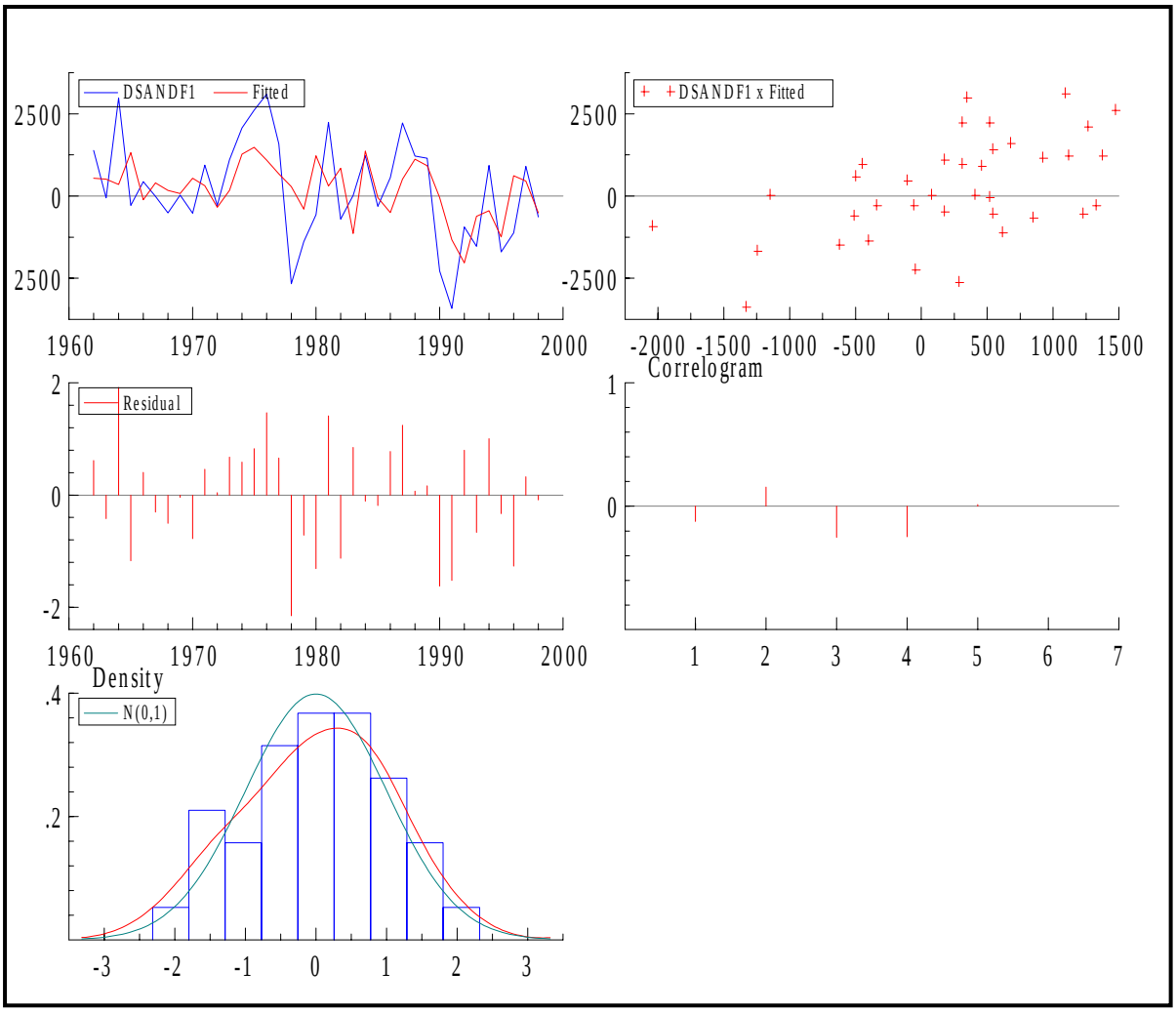
Table 1: Regression function for defence expenditure

```
EQ( 4) Modelling DSANDF1 by RLS  (using sandf.XLS)
The present sample is:  1962 to 1998

Variable     Coefficient    Std.Error  t-value  t-prob PartR^2
Constant         -847.91       406.75   -2.085  0.0449  0.1164
DSANDF1_1        0.33214      0.14849    2.237  0.0322  0.1317
DGC1             0.22081      0.10649    2.073  0.0460  0.1153
DGDP1           0.042916     0.023590    1.819  0.0780  0.0912

R^2 = 0.28122  F(3,33) = 4.3037 [0.0114]  \sigma = 1370.13  DW = 2.23
RSS = 61949468.99 for 4 variables and 37 observation
```

The results that we obtain from our equation looks pretty good, with the only exception the squared multiple correlation coefficient (R^2). The coefficient indicates that only 28% of the changes that take place in defence expenditure can be explained by the changes in real Gross Domestic Product and Government expenditure, suggesting that economic growth played a minor role in determining the level of defence expenditure.

From the graphical evaluation its clear that the fit is not to good, which is directly a result of the low R^2. The values of the residuals are between the range of (-2, +2) suggesting no outlier problems with the equation.

Figure 1: Goodness-of-fit measures for partial adjustment model



The dynamic analysis commences with the long-run solution. The long-run coefficients and results are displayed in table 2. We null that the long-run coefficients are zero can be rejected, thus indicating that they are significant and meaningful. It emphasizes the fact that defence expenditure did not take cognisance of economic realities.

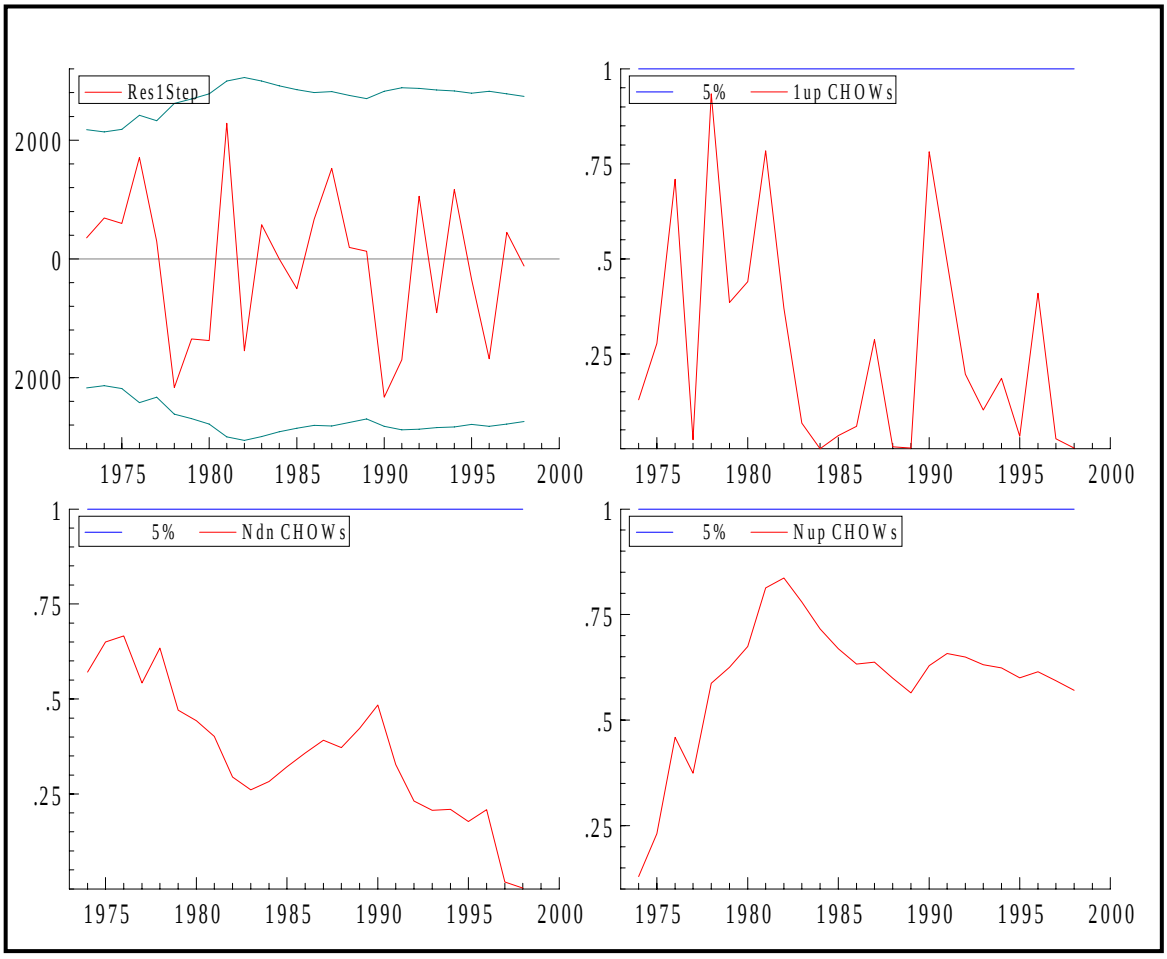
Table 2: Dynamic analysis of defence expenditure model

```
Solved Static Long Run equation
     DSANDF1 =     -1270             +0.3306 DGC1        +0.06426DGDP1
(SE)          (    703.4)          (   0.1796)          (  0.03819)

ECM = DSANDF1 + 1269.6 - 0.330622*DGC1 - 0.0642599*DGDP1;

WALD test Chi^2(2) = 5.7389 [0.0567]


Analysis of lag structure
        Lag        0        1        2        3        4        5   Sum
DSANDF1           -1    0.332        0        0        0        0 0.668
     StdErr        0    0.148        0        0        0        0 0.148
Constant        -848        0        0        0        0        0   848
     StdErr      407        0        0        0        0        0   407
DGC1           0.221        0        0        0        0        0 0.221
     StdErr    0.106        0        0        0        0        0 0.106
DGDP1          0.0429       0        0        0        0        00.0429
     StdErr    0.0236       0        0        0        0        00.0236

Tests on the significance of each variable
Variable    F-test           Value  Probability   Unit-root t-test
DSANDF1     F( 1, 33) =      5.0034 [0.0322] *        -4.4977**
Constant    F( 1, 33) =      4.3456 [0.0449] *
DGC1        F( 1, 33) =      4.2992 [0.0460] *         2.0734
DGDP1       F( 1, 33) =      3.3098 [0.0780]           1.8193

Tests on the significance of each lag
Lag         F-test           Value  Probability
 1          F( 1, 33) =      5.0034 [0.0322] *

Mis-specification test

AR 1- 2 F( 2, 31) =    0.94577 [0.3993]
ARCH 1  F( 1, 31) =   0.022216 [0.8825]
Normality Chi^2(2)=     0.5636 [0.7544]
Xi^2    F( 6, 26) =    0.19553 [0.9752]
Xi*Xj   F( 9, 23) =    0.18812 [0.9933]
RESET   F( 1, 32) =   0.053335 [0.8188]
```

The dynamic analysis (table 2) also suggests cointegration between the variables. The mis-spesification tests are also positive thus rejecting the null of autocorrelation, autoregressive conditional hetroscedasticity, non-normality of the distribution of the residuals, hetroscedasticity and functional form mis-spesification. The mis-spesification test outcomes are satisfactory, consistent with the equation being a congruent model.

It appears from the recursive graphics (figure 2) that the residuals are inside the error bars. The 1-step residual and 1-step Chow test show the different shocks that have occurred in the time series defence expenditure as estimated by the model, for example the big increases in defence expenditure in the late 1970's and the middle of the 1980's.

Figure 2: Recursive least squares graphical constancy statistics



The dynamic analysis did suggest cointegration between the variables. We will in order to determine the cointagration rank and the associated cointegration vectors use the Johansen procedure. Cointegration tests are used to show if a significant relationship between variables exists, so accepting or rejecting theory. The stationary linear combination is called the cointegrating equation and may be interpreted as a long-run equilibrium relationship between the variables. The outcome of the cointegration analysis determines the rank as one (table 3).

Table 3: Cointegration analysis

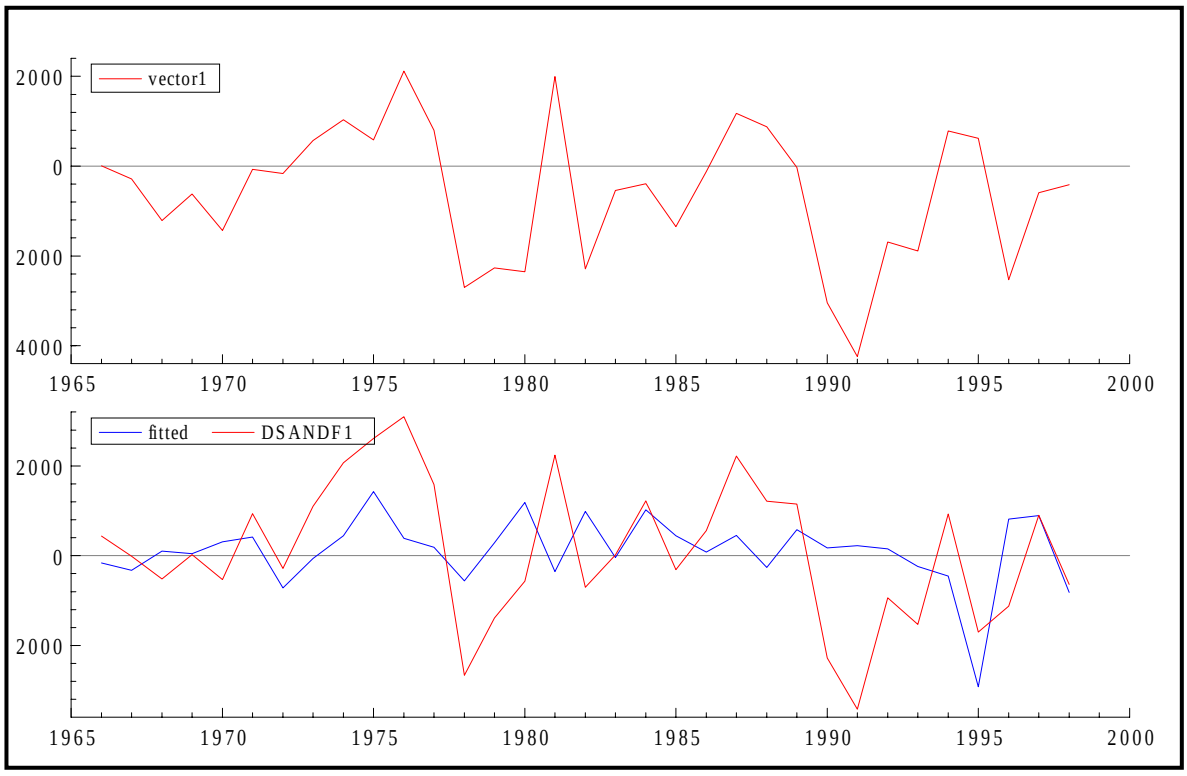
SYS(1) Cointegration analysis 1966 to 1998

eigenvalue	loglik for rank	
	-769.271	0
0.513285	-757.389	1
0.25834	-752.458	2
0.00148906	-752.433	3

Ho:rank=p	-Tlog(1-\mu)	using T-nm	95%	-T\Sum log(.)	using T-nm	95%
p == 0	23.76*	12.96	21.0	33.67*	18.37	29.7
p <= 1	9.863	5.38	14.1	9.912	5.406	15.4
p <= 2	0.04918	0.02682	3.8	0.04918	0.02682	3.8

Figure 3 shows that the cointegration vector look fairly stationary, i.e. confirming the existence of a stable long-run cointegration relationship.

Figure 3: Time series of cointegration vector



We shall, for the purpose of this paper, suffice with the regression equation as set out in table 1 and 2 and the fact that there exists a cointegration relationship between the three variables. Further analysis/research is however necessary to determine this unique

cointegration relation and to get a more precis and reliable model for defence expenditure.

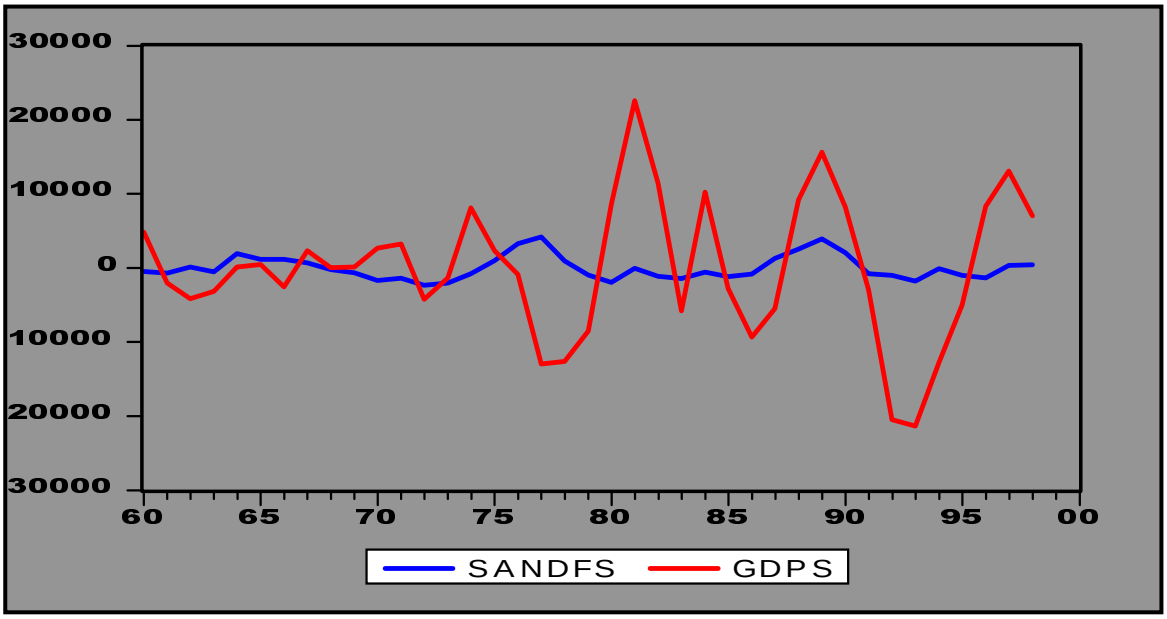
6. RELATIOSHIP BETWEEN DEFENCE EXPENDITURE AND ECONOMIC GROWTH IN SOUTH AFRICA

To determine the relationship between the defence expenditure and economic growth (GDP1) is very problematic because of the interrelationship of various economic variables, the influences of political variables and the existence of externalities. Certain assumptions must then be made, for example the non-existence of externalities. We will, in determining the relationship, look at the cyclical components of the two variables; i.e. we will first detrend the time series by using the Hodrick-Prescott filter, thus leaving us with the fluctuations that occurred in the time series, i.e. the deviations from its long-term trend.

Graph 10 demonstrate these fluctuations that have occurred in the two variables from 1960 to 1998. The movements and turningpoints of the variables give us some information about the relationship between the two variables. At first glance it does not look if there exists a relationship except for the late 1980's. The movements of the variables over this period seem very similar, thus reflecting a positive relationship. It is however very difficult to determine the causality of this relationship if only looking at the graph.

The fluctuations in the two variables seems to suggest that defence expenditure is mostly following GDP and that the relationship is not very stable, meaning that the magnitude en type of relationship (positive or negative) changes over time.

Graph 10: Cyclical behaviour of defence expenditure and real GDP*



*Rand millions

We shall, in order to determine causality, make use of cross-correlograms. This will give as some information about the strength and direction of the relationship. Table 5 indicates a very weak relationship and might also be interpreted as a non-existing relationship, suggesting that economic factors did not influence the level of defence expenditure. It also suggest that defence expenditure had a neutral effect of economic growth from 1960 to 1999, suggesting that the current decreasing and low levels of defence expenditure will not harm current or future economic growth. Table 5 also indicates that real GDP did not have a significant effect on the level of defence expenditure, thus conformation of our view of the exogineity of the level of defence expenditure in South Africa.

Table 5: Cross correlation between defence expenditure and real GDP from 1960 to 1999

Date: 10/08/00 Time: 12:09
Sample: 1960 2000
Included observations: 39
Correlations are asymptotically consistent approximations

SANDFS,GDP1S(-i)	SANDFS,GDP1S(+i)	i	lag	Lead
. |* . |	. |* . |	0	0.1376	0.1376
. |* . |	. *| . |	1	0.1278	-0.0791
. | . |	.**| . |	2	-0.0043	-0.2439
. *| . |	.**| . |	3	-0.0557	-0.1873
. *| . |	. *| . |	4	-0.0893	-0.1198
. | . |	. | . |	5	-0.0018	-0.0260
. |* . |	. | . |	6	0.1431	0.0469
. |*** |	. |**. |	7	0.2565	0.2024
. |*** |	. |* . |	8	0.2812	0.1455
. |* . |	. | . |	9	0.1012	0.0108
. *| . |	. *| . |	10	-0.1030	-0.0650
***| . |	. *| . |	11	-0.2945	-0.0456

We hypothesized that defence expenditure had an overall neutral effect on economic growth, but with positive and negative effects over different time periods. Table 6 indicates the correlation between defence expenditure and real GDP for the period 1960 to 1969. The relationship is also weak for lag length 0, but we see a more significant relationship at lag length two and three, suggesting a more significant long run relationship. Defence expenditure had a positive, but weak, relationship with real GDP three periods in the future. Real GDP on the other hand had a negative and quite significant relationship with defence expenditure three periods in the future. This seems to suggest that real GDP had a more significant influence in defence expenditure visa vis and that this relationship was negative.

Table 6: Cross correlation between defence expenditure and real GDP from 1960 to 1969

Date: 10/08/00 Time: 13:07
Sample: 1960 2000
Included observations: 10
Correlations are asymptotically consistent approximations

SANDFS,GDP1S(-i)	SANDFS,GDP1S(+i)	i	lag	lead
. | . |	. | . |	0	0.0232	0.0232
. ****| . |	. |*** . |	1	-0.3532	0.2948
. ****| . |	. |** . |	2	-0.3948	0.1877
.*****| . |	. |**** . |	3	-0.4829	0.3791
. |* . |	. *| . |	4	0.0730	-0.0771
. |* . |	. |* . |	5	0.1069	0.0676
. |**** . |	. *| . |	6	0.3658	-0.0620
. |*** . |	. *| . |	7	0.2928	-0.1123
. *| . |	. | . |	8	-0.0447	-0.0366

There seems to be a significant relationship between defence expenditure and real GDP from 1970 to 1979. Graph 7 indicates that defence expenditure had a significant negative relationship with real GDP and that the negative relationship was of a long-term nature. GDP however did not have a very significant relationship with defence expenditure.

Table 7: Cross correlation between defence expenditure and real GDP from 1970 to 1979

Date: 10/08/00 Time: 13:44
Sample: 1960 2000
Included observations: 10
Correlations are asymptotically consistent approximations

SANDFS,GDPS(-i)	SANDFS,GDPS(+i)	i	lag	lead
. ****| . |	. ****| . |	0	-0.4242	-0.4242
. |* . |	********| . |	1	0.0996	-0.8070
. |*** . |	*******| . |	2	0.3083	-0.7150
. |** . |	. ****| . |	3	0.2318	-0.3608
. | . |	. | . |	4	0.0342	-0.0302
. | . |	. |*** . |	5	0.0470	0.2810
. |*** . |	. |*** . |	6	0.2601	0.3378
. |** . |	. |*** . |	7	0.1956	0.3254
. | . |	. |** . |	8	-0.0044	0.1812

Defence expenditure over the period 1980 to 1989 had a positive but weak relationship with real GDP; which on the other hand had a big negative relationship with defence expenditure. This relationship occurred when the level of defence expenditure peaked and the economy was very weak. This situation is clearly demonstrated in Table 8.

Table 8: Cross correlation between defence expenditure and real GDP from 1980 to 1989

Date: 10/08/00 Time: 14:01
Sample: 1960 2000
Included observations: 10
Correlations are asymptotically consistent approximations

SANDFS,GDPS(-i)	SANDFS,GDPS(+i)	i	lag	lead
. |*** . |	. |*** . |	0	0.3109	0.3109
. ***| . |	. |** . |	1	-0.2871	0.1877
******| . |	. |* . |	2	-0.6199	0.1554
.*****| . |	. |*** . |	3	-0.4638	0.2588
. ***| . |	. |* . |	4	-0.3392	0.0603
. *| . |	. |* . |	5	-0.1150	0.1039
. *| . |	. |* . |	6	-0.0553	0.0573
. |**** . |	. | . |	7	0.3819	0.0486
. |**** . |	. *| . |	8	0.4062	-0.0476

Defence expenditure, when looking at the 1990's, initially had a significant positive relationship with real GDP, but this relationship changed into a significant negative relationship. This seems to suggest that the decreasing level of defence expenditure had a positive effect on economic growth. Real GDP also had a positive effect on defence expenditure albeit of a shorter nature.

Table 9: Cross correlation between defence expenditure and real GDP from 1990 to 1999

Date: 10/08/00 Time: 14:14
Sample: 1960 2000
Included observations: 9
Correlations are asymptotically consistent approximations

SANDFS,GDPS(-i)	SANDFS,GDPS(+i)	i	lag	lead
. |******. |	. |******. |	0	0.5820	0.5820
. |**** . |	. |* . |	1	0.3655	0.1320
. |* . |	. ****| . |	2	0.1435	-0.3487
. | . |	. *****| . |	3	0.0448	-0.4704
. | . |	. ****| . |	4	0.0017	-0.4142
. ***| . |	. ***| . |	5	-0.2742	-0.2819
. **| . |	. |* . |	6	-0.2050	0.1150
. |* . |	. |*** . |	7	0.0598	0.2823

7. CONCLUSION

There is virtually no country in the wold that does not have a defence force. Defence expenditure is a part of any economy and by implication have an influence on economic activities. The literature does not supply us with a clear-cut answer to the question of the influence of defence expenditure on economic growth. It is very obvious and clear that defence expenditure decisions did not take cognisance of economic considerations in South Africa. The level of defence expenditure was thus an exogenous variable to the economy. Political factors dominated economic realities up to the beginning of the 1990's which saw economic and especially social realities playing an ever increasing role in determining the level of resources availability to the military. The effect of defence expenditure on economic growth in South Africa has been positive in certain periods and negative in others, implying a net neutral effect from 1960 to 1999. The reduction in defence expenditure will thus contribute to economic growth; which in return will result in higher and sustainable levels of defence expenditure.

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