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The Effects of Political Instability on Economic Growth: A Case for Sub-Saharan Africa

Gregory Wayne Willis
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THE EFFECTS OF POLITICAL INSTABILITY ON ECONOMIC GROWTH:
A CASE FOR SUB-SAHARAN AFRICA

An internship report submitted in partial fulfillment of the requirements for the degree of
Master of Science

By

Gregory Wayne Willis
B.A., Wright State University, 1988

1990
Wright State University
I HEREBY RECOMMEND THAT THIS INTERNSHIP REPORT PREPARED UNDER MY SUPERVISION BY GREGORY WAYNE WILLIS ENTITLED THE EFFECTS OF POLITICAL INSTABILITY ON ECONOMIC GROWTH: A CASE FOR SUB-SAHARAN AFRICA BE ACCEPTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE.
ABSTRACT


The countries of Sub-Saharan Africa have experienced both poor economic performance and substantial political instability since their independence. There have been numerous studies investigating the possible relationship between political instability and economic growth. The common approach to investigating this relationship is to measure the effect of economic growth on the probability of political instability. This paper takes the opposite approach by investigating the effects of political instability on economic growth. We believe that political instability disruptions the economic system causing a reduction in growth. We measure this effect using regression analysis to estimate two models we have developed. The first model is a single equation model where we have expanded a neoclassical growth model to include a measure of political instability. The second model is a simultaneous model where in addition to the single equation above, we have added a second equation to estimate an investment variable used in the first equation. We found the estimated coefficients for political instability in both models are negative with the political instability coefficient for the simultaneous model some 18.7 percent larger than for the single equation OLS model. Given whatever model is used, the results that we have found supports the theory that political instability reduces economic growth. Therefore, any policy action taken by decision makers in Sub-Saharan Africa concerning economic growth, would have to address the problem of political instability.
ACKNOWLEDGEMENT

I wish to thank Dr. Kwabena Gyimah-Brempong for his guidance without which this paper could not have been possible. I am however, solely responsible for any errors.
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INTRODUCTION

It has long been known that individuals are separated by those who have and those who do not. Like individuals, countries are also divided according to their relative wealth. On one end of the spectrum are the industrialized countries who possess great wealth and income, and often engage in conspicuous consumption. On the other end of the spectrum exist the poor nations of the Third World, where incomes are so low, consumption is often only for subsistence. These wealthier countries have been referred to as the developed countries, whereas the poorer countries have been labelled the less-developed countries (LDCs).

There have been numerous studies to determine why some countries develop and others do not. The results of these studies often find as many reasons as there are studies. However, there have been some generally accepted conclusions made from these studies, but no all encompassing theory for explaining differences in levels of development among nations has come forth.

Different schools of thought have stressed different factors in explaining the differences in growth across countries. Neoclassical economists stress the importances of factors of production such as labor and capital, assuming that the institutional framework within which the factors of production work exists. Institutional economists on the other hand stress the importance of the availability of efficient and stable economic, social, and political institutions without which factors of production cannot do any good. Indeed Reynolds
(1983) argues that political stability is the single most important factor that explains differences in the long term economic growth among nations. The dependency school attributes lack of development in LDCs to the unequal relationships between LDCs and developed countries (DCs).

Though there seems to be contradiction among the various schools of thought, it is easy to reconcile the apparent contradictions. Each school of thought seem to emphasize one aspect of factors that influence economic development. It is clear that without the proper institutional structures that set up the parameters within which exchange, production, and consumption takes place, there can be no long term development. Dependency theories stress how international linkages distort institutions in LDCs, thus making it harder for them to achieve long term economic growth. Any reasonable model of economic growth should therefore include both the institutional and "technological " aspects: This paper will attempt to do that.

The purpose of this study is to determine the effect of political instability on economic growth in Sub-Saharan Africa. It is our belief that political instability creates a sense of short-term uncertainty. This uncertainty causes a destabilizing effect in the functions and actions of institutions and economic agents within an economic system. It does this by creating additional risk and breaking down the cohesiveness of workers. The addition of risk and the breakdown of unity disrupts the normal economic process, thus
causing a decline in economic growth. A look into Sub-Saharan Africa's past economic performance and political instability would seem to suggest that a possible relationship exist between the two.

**SUB-SAHARAN PERFORMANCE**

It seems that in Sub-Saharan Africa no matter what measure of development one uses, the result is underdevelopment. Sub-Saharan Africa had great hopes for growth and development after gaining independence from colonial powers in the 1960s. These hopes still remain only hopes. Morawetz reported that growth in LDCs between 1950-75 was greater than in the DCs for the same period. Thus, the gap between developed and developing countries had narrowed. Unfortunately, Sub-Saharan Africa did not share in this growth; the gap between DCs and Sub-Saharan Africa widened over the period.

Some basic indicators of development have shown Sub-Saharan Africa to be among the poorest of all LDCs (see Table 1). Average annual growth rate of GNP per capita for Sub-Saharan Africa was only 0.6 percent for the period 1965-87. This was the lowest growth rate of all LDC groupings. The LDC region with the next lowest GNP per capita growth rate was South Asia, which had a substantially higher rate of 1.8%. East Asia lead all LDC groupings with a 5.1% growth rate for the period.

GNP per capita in 1987 dollars showed Sub-Saharan Africa to have the second lowest of the groupings. South Asia's $290 just beat out Sub-Saharan Africa's $330 for that honor. The highest GNP per
capita values reported were those for the Europe, Middle East and North Africa, and Latin America and Caribbean.

Another important measure of "development" stressed has been a country's life expectancy. Sub-Saharan Africa has the lowest life expectancy of all LDC groupings. Life expectancy in Sub-Saharan Africa was only 51 years of age in 1987. The next lowest life expectancy in LDCs was 57 years of age for South Asia. The highest life expectancy of the LDC groupings is in East Asia, where a person is expected to live until 68.

The growth rate of investment in Sub-Saharan Africa has been up and down since the 1960s. From 1960-65 investment growth was 7.9 percent, about average for the LDC groups. The greatest growth in investment for this period occurred in South Asia. This group of countries achieved a growth rate of 11.1 percent for the period. From 1965-1980 investment in Sub-Saharan Africa showed some improvement from the previous period. Sub-Saharan Africa in this period had the second highest growth rate of all LDC groupings. Only East Asia's growth rate of 11.3 percent was greater than Sub-Saharan Africa's 9.3 percent.

After improving investment in Sub-Saharan Africa between 1965-80, things turned sour. During the period from 1980-87 the growth rate of investment was a negative 8.3 percent. Though all LDC groups, except East Asia, experienced a decline in the growth of investment from the previous period, Sub-Saharan Africa's decline was the most dramatic.
The need for improvements in agriculture has also been suggested as necessary for LDCs to achieve economic growth. Agriculture productivity in LDCs is low and food output is often for personal consumption only. Improvement in agriculture is assumed to imply not only increases in output, but also increases in income of farm households. Many economists point to the need for the agriculture output to increase to support the developing manufacturing sector. Increased output would not only be used to feed the manufacturing sector, but also provide increased income to allow farmers to buy newly manufactured goods. Even if agriculture is not used to support the manufacturing sector, it is still important to feed the population so as not to run up large deficits in trade due to importing food.

There has been debate among economists who have suggested the need of producing export crops and those who suggest food crops in Sub-Saharan Africa. Those who favor export crop production believe that not only will income from these crops pay for the imports of food but will produce enough surplus of funds to be used in purchasing other needed goods and services. Those who support the production of food crops raise the question of the risk involved in export production. Since Sub-Saharan African countries are so dependent on world economic conditions, any recession would likely affect exports, hence income. In times of recessions, these countries would be unable to feed themselves. Even though the export crops
may have returns far greater than those of food crops, the risk of starvations is too great.

Agricultural growth in Sub-Saharan Africa between 1960 and 1965 was neither high nor low compared with those of other LDC groupings. Agriculture grew at a rate of 2.3 percent, not as high as East Asia's 4.6 percent yet not as low as South Asia's 1.1 percent growth. From 1965-80 Sub-Saharan Africa's growth in agriculture was the worst of all LDC groups. The growth rate fell to 1.7 percent.

In the 1980-87 period, growth of agricultural output fell even farther in Sub-Saharan Africa. Growth in this period was only 1.2 percent compared with the exceptional growth rate of 5.9 percent that East Asia experienced.

Export growth in Sub-Saharan Africa has been for the most part average when compared with other LDCs. From 1960-65 exports grew at a rate of 5.9 percent. In the period from 1965-80, Sub-Saharan Africa's exports grew even higher at a rate of 6.6 percent.

Sub-Saharan Africa experienced a substantial decline in the growth rate of exports in the period from 1980-87. The growth rate of exports was a negative 1 percent. All other LDC groups experienced an increase in their growth of exports for this period.

If the educating of the population is considered a sign of development, Sub-Saharan Africa is severely lacking. Education levels in Sub-Saharan Africa have improved since 1965, but are still much lower than other developing regions. The total percentage of the school age population in Sub-Saharan Africa enrolled in primary
school in 1965 was 41 percent. Sub-Saharan Africa increased their enrollment figure to 66 percent in 1987.

Secondary enrollment in Sub-Saharan Africa grew from only 4 percent in 1965 to 16 percent in 1986. Yes, this is a 400 percent increase, but it should be kept in mind that only 16 percent of the population in enrolled in secondary schools. Sub-Saharan Africa's 16 percent enrollment rate is only half the next lowest LDC groups' enrollment rate.

The main thrust of education in Sub-Saharan Africa seems to be to provide primary education. Education participation rate after primary schooling drops dramatically. Providing secondary and post-secondary education to the masses may seem to be inefficient to LDCs because many of the jobs in their countries involve low skill levels. Their manufacturing involves labor intensive technologies in which a primary education is probably enough to perform these tasks.

Because it may not be efficient to provide post-secondary education to a few students, many countries subsidizes students who travel to DC universities to get their education. Of course in some instances there has been cases of "BRAIN DRAIN". Foreign students often find life in DCs to be very appealing.
### TABLE 1
PAST ECONOMIC AND DEVELOPMENT STATISTICS

<table>
<thead>
<tr>
<th></th>
<th>Sub-Saharan Africa</th>
<th>South Asia</th>
<th>East Asia</th>
<th>Middle East, N. Africa &amp; S. Europe</th>
<th>Latin America</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. growth rate GNP per capita 1965-87</td>
<td>.6</td>
<td>1.8</td>
<td>5.1</td>
<td>2.5</td>
<td>2.1</td>
</tr>
<tr>
<td>GNP per capita 1987 dollars</td>
<td>330</td>
<td>290</td>
<td>470</td>
<td>1940</td>
<td>1790</td>
</tr>
<tr>
<td>Life expectancy in 1987</td>
<td>51</td>
<td>57</td>
<td>68</td>
<td>64</td>
<td>66</td>
</tr>
<tr>
<td>Growth of gross domestic investment:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1960-65</td>
<td>7.9</td>
<td>11.1</td>
<td>8.6</td>
<td>-3.1*</td>
<td>4.5</td>
</tr>
<tr>
<td>1965-80</td>
<td>9.3</td>
<td>4.6</td>
<td>11.3</td>
<td>9.0</td>
<td>8.3</td>
</tr>
<tr>
<td>1980-87</td>
<td>-8.3</td>
<td>3.7</td>
<td>12.1</td>
<td>.</td>
<td>-4.5</td>
</tr>
<tr>
<td>Growth of agriculture:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1960-65</td>
<td>2.3</td>
<td>1.1</td>
<td>4.6</td>
<td>1.6*</td>
<td>3.6</td>
</tr>
<tr>
<td>1965-80</td>
<td>1.7</td>
<td>2.7</td>
<td>3.3</td>
<td>3.5</td>
<td>3.2</td>
</tr>
<tr>
<td>1980-87</td>
<td>1.2</td>
<td>1.4</td>
<td>5.9</td>
<td>.</td>
<td>2.2</td>
</tr>
<tr>
<td>Growth of exports:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1960-65</td>
<td>5.9</td>
<td>4.6</td>
<td>7.2</td>
<td>1.3</td>
<td>6.1</td>
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<tr>
<td>1965-80</td>
<td>6.6</td>
<td>1.7</td>
<td>9.7</td>
<td>.</td>
<td>-2.1</td>
</tr>
<tr>
<td>1980-87</td>
<td>-1.0</td>
<td>4.8</td>
<td>10.1</td>
<td>.</td>
<td>3.0</td>
</tr>
<tr>
<td>Education % enrolled:</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary:</td>
<td></td>
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<td>1987</td>
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<td>Secondary:</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td>4</td>
<td>29</td>
<td>23</td>
<td>32</td>
<td>19</td>
</tr>
<tr>
<td>1987</td>
<td>16</td>
<td>32</td>
<td>45</td>
<td>56</td>
<td>48</td>
</tr>
</tbody>
</table>

* represents where Southern Europe was not used in calculating these figures

All data for this table was compiled using World Bank statistics.
**POLITICAL INSTABILITY**

Political instability seems to be common among Sub-Saharan Africa. Mbaku (1988) has stated that there have been 56 coups between 1 Jan. 1956 and 30 April 1984. As of 1984, only six countries had not experienced coups, attempted coups, or plots. They were Botswana, Cape Verde, Djibouti, Lesotho, Mauritius, and Swaziland. The question why is political instability so widespread in Sub-Saharan Africa may be found in why these six countries have had none. McGowen and Johnson (1984) have offered a possible explanation of why these six countries are free of elite instability. The reason given for Lesotho, Botswana, and Swaziland not having instability was its relationship with South Africa. South Africa is thought to be a protector of the present regimes of these countries for their own security. McGowen and Johnson have suggested that the other three countries are simply too small in size, and insignificant in economic and political power.

Political instability is often defined as a deviation from accepted patterns of political behavior such as a challenge to the present political authority that is not through constitutional means. Many authors may only include "violent" challenges to the political system, but this would leave out "peaceful" challenges such as strikes and demonstration which can cause political disruption.

Mbaku (1988) list three types of political instability, Elite, Communal, and Mass. Elites are those persons who hold high
positions in institutions which allocate resources. Elite instability, therefore, is the forceful removal of these persons by other members of the elite. The type of challenge common to Elite instability includes coups, attempted coups, and plots.

The second type of political instability is Communal. Communal groups consists of members who share common characteristics, such as ethnicity, religion, language, territory or combination of these traits. Behaviors usually associated with Communal instability are civil wars, rebellions and ethnic violence. From these activities it is easily seen that most Communal instability is violent.

The final political instability category, Mass instability, involves the attack on leaders of the present political system by members who are joined together by common goals and objectives. Mass instability members differ from Communal groups by being based on goals and objectives rather than common social traits.

Some examples of political instability that have taken place in Africa are:

13 Jan. 1963. TOGO: Members of the army assassinate President Sylvanus Olympio in front of the U.S Embassey, and hand over to Nicholas Grunitzky.
24 Feb. 1966. GHANA: While President Kwame Nkrumah was out of the country, military units led by Col. Kofoka placed retired Major-General Joseph Ankrah as Head of State.
19 Nov. 1968. MALI: The army led by Lieutenant Moussa Traore overthrew the civilian regime of President Modibo Keita in a bloodless coup.

13 Jan. 1972. GHANA: While Prime Minister Kofi Busia was abroad, the military led by Colonel Ignatius K. Acheampong seized power.

1 Sept. 1981. CENTRAL AFRICAN REPUBLIC: The army under the leadership of General Andre Kolingba overthrew the regime of President David Dacko.

3 Apr. 1984. GUINEA: Three days after the funeral of President Ahmad Sekou Toure, the military led by Colonel Lansana Conte took over the Government in a bloodless coup to prevent a power struggle among Toure's civilian successors.

Given the poor economic performance and a high degree of political instability that has occurred in Sub-Saharan Africa in the past, many researchers have found the relationship between the two occurrences to be important enough to investigate a possible relationship between the two. The studies done on the subject have for the most part been dominated by political scientists. It is their view that poor economic performance leads to political instability. They believe poor performance of the economy causes the population to become unhappy with decision makers. This displeasure can cause either the population to take action or it may give other specific groups an excuse to take action.
The empirical results from these studies support this view. Researchers have found that poor economic performance increases the probability of political instability.

This study focuses on the effects of political instability on economic growth. This is in no way an attempt to refute the results suggesting that economic problems do have effects on political instability, but to investigate the possibility that the causation flows from political instability to economic stagnation. We feel that both theories of causation can exist simultaneously. All we are saying is that given the cause of political instability, political instability will in turn cause a decline in economic growth.

It is perhaps the belief that the two theories refute each other that is responsible for the lack of work done in determining the effects of political instability on economic growth. Many researchers may feel it is not necessary to investigate the effects of political instability on economic growth given the findings for the reverse. It is our hope that this study will add to the literature by investigating the effects of political instability on economic growth.

To measure the effects of political instability on economic growth, we have developed two models; one using a single equation and the other using simultaneous equations. The single equation model is based on a neoclassical growth model with the addition of a measure of political instability. The simultaneous equation model uses the same equation as above, with the addition of an equation to estimate an investment variable in the original equation. The simultaneous
equation model will not only allow for measuring the direct effect of political instability on economic growth, but the indirect effect through investment.

To estimate our model, we will use cross-national time-series data from a sample of 41 Sub-Saharan African states from the period 1970 to 1983.
LITERATURE REVIEW

McGowan and Johnson (1984) investigated the relationship between African military coups and underdevelopment in their cross-sectional study of 39 Sub-Saharan countries. They regressed the dependent variable total military involvement score (T.M.I.S.) on a number of independent variables. T.M.I.S. is a simple weighted sum of coups, attempted coups, and plots. These three activities were measured for each country from 1 Jan. 1956 to 30 Apr. 1984. Coups were arbitrarily given the value of 5, attempted coups received a score of 3, and a value of 1 was assigned to plots. The T.I.M.S. was scaled in such a way that the most serious received the highest value and the least serious received the lowest.

When the variable T.M.I.S. was regressed on the average growth of GNP per capita, the results were; T.M.I.S. (1956-4/84) = 9.318 - 2.99 (average GNP per capita growth 1960-81) with a R square of .234. The results show that there is indeed a negative relationship between T.M.I.S. and economic development. McGowan and Johnson have interpreted these results as suggesting that economic growth is the key to reducing political instability.

We are somewhat critical of McGowan and Johnson's study, in that they failed to report any t-values for their coefficients. Without such t-values it is impossible to determine if the economic growth variable is statistically significantly different from zero. McGowan and Johnson also modeled T.M.I.S. against time (a so called proxy for political and economic processes) and found that time accounted for
47.1% of the total variation in T.I.M.S. We believe they may have found a correlation rather than a causal relationship, since they provide no economic or political theory suggesting the reason for using time to proxy economic or political processes.

Mbaku (1988) investigated the relationship between elite instability and economic development. His study was a cross-national analysis of 35 African states with elite instability being measured for the period from 1956-1985. He modelled the dependent variable, elite instability, against the independent variables average change in GNP per capita (1960-81), GNP per capita for 1981 (in U.S. dollars), percent of labor force in industry in 1980, the Physical Quality of Life Index, average annual percent change in population 1960-81, average annual percentage change in urban population 1970-81, natural logarithm of population 1981, and military expenditures as a percentage of GNP 1981. Mbaku developed his model to examine the relationship of both economic development and socioeconomic change to elite instability. The socioeconomic change variables are those dealing with population and the military expenditures as a percentage of GNP.

Mbaku found that variables which reflect economic growth or development had a negative relationship with elite instability. The coefficients for these variables were for the most part statistically insignificant at any reasonable level of significance. The exception was Physical Quality of Life Index which reported a t-value of 1.58. The variable representing industrialization had a positive
relationship, but was statistically insignificant with a t-value of only 1.08.

Mbaku's socioeconomic variables show a positive relationship for both the growth of population for 1960-81 and the natural logarithm of population 1981. But again, his t-values were too low for the coefficients to be statistically significant. Military expenditures and the growth in urban population coefficients point to a negative relationship existing with elite instability. Their respective t-values were 1.27 and 1.20.

In Mbaku's study, he failed to give any rationale for the inclusion of so many variables measuring economic growth or development. The same holds true for the use of the population variables. We can only assume that he could not choose among the wide selection of variables and decided to include them all. The price he paid for doing this was multicollinearity. The cause of his low t-values were probably due to multicollinearity among the like variables. He did achieve a relatively high R-square (.35), but this is not surprising considering the number of variables used.

O'Leary and Coplin (1975) have attempted to predict political instability by showing its relationship to numerous variables. They regressed elite and communal instability against population size, ethnic pluralism, social mobilization, urbanization, national integration, interest-group, size of Government, economic performance, political party unity, and external support. O'Leary and Coplin found poor economic performance to have an influence on
political instability. But they found that standardized coefficients showed economic performance to be less important in explaining political instability than such variables as population size, interest-group size, ethnic pluralism, and social mobilization. The two main problems with O'Leary and Coplin's study are the fact that they fail to report t-values for individual coefficients and the regression method used.

As we have seen, the common approach to economic growth and political instability is to measure the effect of economic growth on political instability, thus inferring that poor economic performance is a determinant of political instability. The studies that have investigated the effect of economic growth on political instability have, for the most part, reached the conclusion that poor economic performance increases the probability of political instability (namely coups). Studies such as those by McGowan and Johnson, O'Leary and Coplin, and Mbaku have all reached the conclusion that a negative relationship between economic growth and political instability exists, where economic performance is a determinant to political instability. However, there have been few studies that reverse the direction of causation, where political instability leads to economic stagnation.

Londregan and Poole (1990) investigated the relationship between economic performance and political instability with the possibility that both political instability and economic growth affects each other. They modelled political instability with economic growth as a determinant, and in turn modelled economic growth with
political instability as an independent variable. Their sample consisted of 121 countries for the period from 1950-1982.

Londregan and Poole modelled the effect of economic growth on political instability by using a Probit Model. The model was to measure the effect of a set of variables on the probability of a Coup d'Etat. The set of variables were comprised of recent coups (within the last six years), past coups (beyond the last six years), log of last period's per capita income, last periods growth rate of per capita GDP, and dummy variables for Africa, Europe and north America, South America, Central America and Carribean, and Oceania.

Using this model, Londregan and Poole concluded that income variables had an inhibiting effect on coups. Specifically, last periods log of GDP per capita had a statistically significant negative coefficient. They found that a doubling of per capita income would lead to a 37.4 percent reduction in the probability of a coup. These results confirm the conclusions of other researchers that poor economic growth increases the possibility of coups. They also found that both measures of coups had a positive effect on the probability of a coup, with recent coups (coups within the last 6 years) having a stronger coup inducing effect than past coups.

Londregan and Poole used ordinary least squares regression to estimate the effect of coup d'etat on economic performance. They used the same sample as was used in their probit model. They also used the same set of independent variables as the probit model, but
they regressed them on the dependent variable percent change in per capita GDP.

From their model they found that recent coups had a positive coefficient of .004, but that is was statistically insignificant with a t-value of (.2666). Past coups reported a coefficient of -.003 which was statistically significant with a t-value of (3.00). They could give no reason as to why past coups effect was negative or for that matter why it would be positive. Last period's log of per capita GDP had a negative coefficient of -.007 and was statistically significant at a 10 percent level of significance. Last period's per capita growth rate showed a positive relationship with this periods growth rate of per capita GDP with a statistically significant coefficient of .118.

We do not feel comfortable with Londregan and Poole's conclusions about the effect of political instability on economic performance due to the method that they used to arrive at these conclusions. It is our belief that their model was mispecified, therefore their conclusion are not accurate since they were based on the results from the model. The first thing about the model that should be questioned is the use of the same set of independent variables for determining both coups and economic performance. What is the likelihood of both coups and economic performance having the same determining factors? Another problem we see is the use of last period GDP per capita growth rate as a determinant for this period's. Last periods growth rate has no economic basis for saying anything about this period's growth rate.
Another problem we see in their model is the measurement of coups. The effects that we believe they were trying to measure with recent and past coups were the short and long-term effects. The problem is that recent and past coups are measured in a way that the short and long-term effects are merged. It is our opinion that the short-term effect of coups should be measured for coups happening at least within the past 2 years, if not the past year. Their measurement of recent coups is for coups within the last 6 years, while past coups are measured as coups that occurred more than six years ago. This would seem to merge the short and long-term effects of coups. Since the short and long-term effects of coups may be different, the coefficient from this variable may be biased.

Given the finding of previous studies and the fact that the effects of political instability on economic growth has been little researched, we have chosen to investigate whether political instability has an effect on economic growth. We are not trying to disprove the role of economic performance in determining the occurrence of political instability. We are only saying that political instability, whatever its causes, will cause poor economic performance. Even if poor economic performance causes political instability in the first place, the political instability will cause even poorer performance. Therefore, we feel that finding a reverse relationship between economic growth and political instability will not contradict previous findings.

Our study will differ from Londregan and Poole's by improving both the growth model and the measurement of political instability.
The growth model will include other "inputs" instead of just past output as determinants to economic growth. The political instability variable will only be to measure the short-term effects on economic growth. The effects of the political instability variable we use here will measure the effects of political instability within the past year.
MODEL

Since our study focuses on the short-term effects of political instability on economic growth, it is necessary to include a measure of political instability in an economic growth equation. The neoclassical approach to modeling economic growth has stressed the importance of assets such as land, labor, capital, and entrepreneurship. These assets or factors of production have been broken down to more specific areas of importance for economic growth in LDCs in general and Sub-Saharan Africa specifically. Economists have pointed to the need for improvements in the specific areas of investment, foreign trade, and human resource development.

A net investment in capital is considered a primary source of economic growth. This investment may be in items such as machinery or infrastructure projects, both having the potential impact of expanding the production capacity of a country. Considering that capital is an input to production, any addition to the capital stock of a country through investment would increase output if the productivity of to capital, at least, remained constant. The hope is that new capital will have an increased level of technology that will not only increase the capital stock but increase the productivity of capital, thus decreasing the capital-output ratio.

Given the role of investment as an input to production, most economist call for an increase in investment. It should be noted that it is not only the quantity of investment that matters, but the
appropriateness and quality of investment also matter. There are instances where LDCs have spent valuable resources on increasing their capital stock only to find that new capital makes the production process less efficient. Energy sources in LDCs are often scarce and expensive, thus if new capital requires large amounts of energy it may be inefficient to use. Also, in Sub-Saharan Africa, like many LDCs, capital goods often go unused due to a lack of spare parts. The high initial cost of capital goods may be met by LDCs, but they are often unable to pay for the high cost of spare parts that keep the capital goods functioning. Therefore, if new capital results in a decrease in the return to capital, output may decrease or increase depending on whether the addition to the capital stock offsets the decrease in capital’s productivity.

Faber and Green (1984) have suggested that investment in Sub-Saharan Africa should be on updating previous investments instead of investing in new projects. They point to the fact that new projects have been undertaken while the existing infrastructure is decaying. The possible reason they give for this is that it is often easier to secure aid or loans for new projects than it is for updating old projects.

In our model we assume that an increase in investment will result in an increase in the capital stock. We also assume that with an addition to the capital stock, the productivity of capital will remain constant or increase. Therefore, an increase in investment will result in an increase in output.
The second factor given for economic growth involves the improvement of foreign trade. The ideas in improving foreign trade most often stress export expansion. Exports are thought to be linked to a country's ability to acquire inputs for production and production efficiency. Also, because of competition, export sector is more efficient than the non-export sector. This efficiency spills over to the non-export sector as exports expands.

Export expansion policies have been pursued to obtain needed foreign exchange. Since most LDCs rely on capital goods produced in DCs, it is essential for LDCs to obtain foreign exchange to import such capital. Foreign aid has not been enough to cover all import needs, therefore, LDCs have implemented aggressive export growth policies to obtain the needed foreign exchange. Most exports in LDCs consist of primary goods or highly labor intensive manufactured goods. For example, in 1987, 88 percent of exports in Sub-Saharan Africa were composed of primary products.

Ram (1988) has stated that export growth leads to; (a) increases in specialization, (b) greater economies of scale due to enlarged market size, (c) higher capacity utilization rates, (d) more rapid transfer of technology.

According to Gyimah-Brempong (1991), exports not only allow for specialization and scale economies to take place through increased market size, but also provides governments a source of revenue from export taxes. This revenue can be used to finance development projects where private investment is unable.
Therefore, increases in exports will result in increases in the availability of funds for development projects such as building up needed infrastructure.

Given the positive role of exports on economic growth, economic growth has been hampered by trade barriers that DCs place on LDCs. Trade barriers have been estimated to cost LDCs between 2.5 and 9 percent of their respective GNP (Nafziger 1990). Less-developed countries have been looking for better trade relations and in some instances have received favorable trade status with DCs. But due to the economic power that DCs exert, LDCs are at the mercy of DCs generosity.

Another area given as important to economic growth is human resource development. It has been suggested that low labor productivity in LDCs is not solely due to their low capital ratio, but due to poor health and lack of educated and skilled workers. Poor health care is no doubt a barrier to reaching a higher level of labor productivity. Many workers in LDCs lack basic health care such as a balanced diet of nutritional food. The old saying "An army marches on its stomach" has merit here. Workers, like soldiers, need proper nutrition to function at their jobs. Not only is a worker's diet of importance, but health care such as availability of doctors and prevention of disease are important to labor productivity. Workers must stay healthy if they are to perform to their full capabilities.

Like health care, education and training in LDCs are considered important to economic Growth. The educating and training of the
work force results in better productivity of workers by giving them better management and organization skills when employing the factors of production. Workers also need to learn new "technical" skills that workers of DCs have if LDCs are to compete with DCs in an international market. Education is also thought to improve economic growth in the future by "producing" workers who are innovative. The problem is that many LDCs do not have the facilities or finances to educate or train their respective populace. Even when LDCs spend large percentages of their Gross National Product (GNP) on education, it should be kept in mind that this may not be enough to educate and train the work force properly since GNP in these countries itself are so low.

To operationalize the importance of investment, human resource development, and exports into neoclassical economic growth theory, we have chosen to use a variation of a model used by Ram (1987). Ram's model expands on the simple production function model by including exports as an "input" (equation 1). The idea of exports as an additional input to a production function model has been developed by researchers such as Chenery (1979), Krueger (1980), and Feder (1983). The output equation is given by:

$$Y = f(L, K, X)$$  \(1\)

where \(Y\) is aggregate real output, \(L\) and \(K\) are labor and capital inputs respectively, and exports are represented by \(X\). Taking the growth
rate of these variables, we obtain the growth rate of output as a function of the growth rate of the explanatory variables. We choose a linear functional form of the growth rate equation for estimation purposes. The estimated equation is given in (2):

\[ \dot{Y} = \beta_0 + \beta_I \dot{L} + \beta_k \dot{I} + \beta_x \dot{X} + u \]  

where the dot over the variables indicates growth rates for the variables, \( I \) is the growth rate of investment, \( u \) is a stochastic error term. The signs of all of the coefficients estimated in equation (2) should be positive since they are inputs.

The neoclassical model of economic growth may be a necessary but not sufficient condition to achieve economic growth. This model assumes the existence of an institutional framework that allows production and exchange to take place. Though the role of economic institutions is not disputed, they are often overlooked due to the belief that they are naturally available. Therefore, many economist do not emphasize economic institutions when discussing economic growth. Reynolds (1983) on the other hand, re-emphasized this connection between economic growth and economic institutions in explaining why some country's economic performance is better than others, given differences in factor endowments. He has mentioned that those countries which have had better economic performance have also been shown to have the more effective institutions, especially political institutions. He thus suggests their inclusion as
some of the determining factors of economic growth. Reynolds argues that political instability is perhaps the most important factor that explains the differences in economic growth across nations and through time. Sub-Saharan Africa, like many LDCs, have limited economic and political institutions both in numbers and effectiveness compared with DCs. The economic institutions that they do have are often still at an early developmental stage, and therefore their fragility makes them susceptible to changes in the economic, social, and political environment. This fragility is most evident in Sub-Saharan Africa, where independence was only recent. Because of the short time that has past since independence, along with the high degree of political instability, institutions in Sub-Saharan Africa's are extremely fragile.

The basis for our study's inclusion of a political instability variable as a determinant to economic growth lies in an institutional approach to economic growth. An institutional approach looks at an economic system as a set of institutions. An economic system is made up of economic, social, and political institutions. These institutions are responsible for the acquisition, accumulation, distribution, and implementation of the factors of production as well as output. Therefore, an economic system, hence economic performance, of a country is dependent on its institutions. The institutional approach to economic growth differs from that of the neoclassical approach by not only stressing the importance of the stocks and flows of the factors of production, but the economic agents
and institutions which guide, manage, and direct these factors (Fei and Paauw).

Economic institutions within the economic system are institutions dealing with economic activities in the areas of finance, labor, trade, and agriculture. Social institutions in the system are responsible for passing on knowledge and skills from one economic agent to another. Political institutions in an economic system provide such things as law and order which allows economic exchange to take place by providing norms of economic behavior. Political institutions also allow for the distribution of resources and the unity economic agents need for the success of national economic goals. Political institutions are also involved in the creation, maintenance, and protection of other institutions. As Reynolds has suggested, where such institutions do not exist, their absence could impede economic growth.

Given the role of political institutions in an economic system, a shock, such as political instability, to a political institution(s) would likely affect other institutions in the system. Political instability may or may not cause the collapse of a political institution(s), but in any circumstance, it will create uncertainty about the institution(s) in the short-run. Due to the influence of political institutions on other institutions in the economic system, the uncertainty would likely spread to these other institutions. Therefore, political instability will have the effect of creating uncertainty not only in political institutions, but within all the institutions that form an economic
system. This uncertainty in the other institutions within the economic system would likely have an effect on the economic performance of a country.

The short-term effect of uncertainty of a political institution on economic growth is likely to be negative. Uncertainty will cause the risk associated with any economic activity to increase. An increase in risk will disrupt the institutions responsible for the acquisition, accumulation, and distribution of the factors of production. Economic institutions such as those dealing with finance, agriculture, and labor would likely be negatively affected. Political instability may cause panic in the banking industry due to the uncertainty of savings accounts. The borrowing of funds from banks may also decrease. Investors would likely reduce their investments in a country were the stability of political institutions were uncertain. Risk may also cause agricultural institutions to cut back on extending credit to farmers, thus reducing output. The possible effect of political instability on labor institution may be the reduction in the labor force itself or the productivity of labor. Labor force participations may be affected if workers feel that their safety may be compromised due to violent political instability, they may refuse to leave the safety of their homes.

Political instability would not only affect the acquisition, accumulation, and distribution of the factors of production, but how these factors are used by economic agents. It is our belief that political instability causes the inefficient usage of the factors of
production by disrupting the motivation of capitalists and workers alike.

Fei and Paauw have stated that for economic growth to occur nationalism must be present. Nationalism is a cohesive bond that unites people based on national interests. It is associated with unity and political concensus. Nationalism is essential to economic growth in the sense that it allows for economic goals to be defined at a national level and it coordinates economic agents in reaching these goals. It subsumes factional and regional interests to a national interest. The unity associated with nationalism is also essential in getting economic agents to work together.

Given that nationalism may be needed to bring economic agents together to work for the success of common economic goals, anything that causes a breakdown in this cohesiveness or results in the uncertainty as to the continuation of this cohesiveness would affect the success in reaching economic goals. Since political instability involves conflict among groups or individuals, its existence is proof that not all groups or individuals are unified. If the populace is not unified, different goals may emerge. These goals may contradict one another resulting in poor economic performance. Also, this conflict among economic agents may cause them to become at odds with one another. As a result, economic decisions may become based on emotions rather than on concerns for efficiently reaching common goals. Even if only a small percentage of economic agents are experiencing conflict with one another, it may leave doubt in the
minds of other economic agents about the cohesiveness of the country. If these economic agents feel that there is not enough unity to carry out national economic goals, apathy may set in. Therefore, they may lack interest in using resources efficiently since they believe that goals will not be met anyway.

Due to the short-term effect that political instability has on the roles of economic institutions and economic agents, hence economic growth, we feel that a political instability variable should be included in our model of economic growth. To investigate this aspect, we add to the production function model (equation 2), a political instability variable to get equation 3 (model A):

$$\dot{Y} = \beta_0 + \beta L \dot{L} + \beta I \dot{I} + \beta x X - \beta_p \Pi + \mu$$

where the PI variable is the measure of political instability and all other variables remain the same as defined above (equation 2). The sign of the political instability coefficient should be negative.

As we have mentioned above, it is likely that the occurrence of political instability would affect investment. Investors would see uncertainty that is created by political instability as an added risk. Since investors are risk adverse, the growth of investments would decline. Therefore, the investment variable in equation (3) would be endogenous. If indeed this variable is endogenous and we use equation (3) to estimate the effects of the independent variables on economic growth, the investment coefficient would be biased.
Therefore, we propose that a simultaneous equation model be used here (model B). Along with equation (3), there should be another equation to explain investment. Not only would this equation keep estimates from being biased, the equation will also allow us to measure the indirect effect of political instability through investment on economic growth. The investment equation is given as:

\[ I = \beta_0 + \beta_V V - \beta_{PI} PI + u \]  

where all variables, except "V" are defined above. The "V" represents a set of variables which are determinants of investment. The set of "V" variables consist of DeltaQ, Deltaid, and DeltaM. DeltaQ is the change in output, Deltaid and DeltaM are the changes in foreign aid and imports. DeltaQ is to represent what entrepreneurs were expecting demand to be when determining how much investment was needed to produce this level of output. The Deltaid variable is thought to be a source of additional investment funds from external aid to allow for investment. Since investment often involves the use of imported capital, changes in imports should reflect changes in investment. The signs of our Delta variable's coefficients in equation (4) should be positive.

We will test the political instability variable's stability in model A by dropping out each of the input variables one at a time. If the political instability variable's coefficient keeps the same sign the
coefficient of political instability can be concluded that it is stable and hence is not dependent on the specification of the model.
DATA

The data used for this study was compiled by the Rand corporation and printed in the working draft of DEFENSE AND DEVELOPMENT IN SUB-SAHARAN AFRICA: THE DATABASE AND CODEBOOK. The data is for 41 Sub-Saharan African states from 1970 to 1983.

The political instability variable is made up of different conflict events that have occurred in Sub-Saharan African countries between the period from 1970 to 1983. The categories of conflict are assassinations, guerrilla warfare, major government crises, purges, riots, revolutions, and anti-government demonstrations.

Assassination are politically motivated murder or attempted murders of high ranking government officials.

Guerrilla Warfare is any armed activity carried out by independent bands or irregular forces aimed at the overthrow of the present regime.

Major Government Crises are any rapidly developing situation that threaten to bring the downfall of the present regime that is not through constitutional means (excluding revolts).

Purges are the elimination of political opposition members by jailing or execution.

Riots are any violent demonstration of more than 100 citizens involving the use of physical force.
Revolutions include any illegal or forced changes in the top government elite, successful or unsuccessful.

Anti-Government Demonstrations includes any peaceful public gathering of at least 100 people to oppose government policies or authority.

We have assigned values to these conflict events to represent their degree of disruption, with the highest value being the more severe. The value of 5 was given to revolution. A value of 4 was given to guerrilla warfare. A value of 3 was assigned to both assassinations and major government crises. The value of 2 was given to both riots and purges, and a value of 1 given to anti-government demonstrations.

The growth of output variable is measured as the growth rate of real gross domestic product. The growth rate of labor variable is measured as the growth rate of population. Due to an insufficient data on labor characteristics in Sub-Saharan Africa, we were forced to use population as a proxy variable.

The growth rate of investment variable is measured as the real growth rate of gross domestic investment. Gross domestic investment is measured as the outlays for the addition of reproducible capital goods to the fixed assets of private and public enterprises, private nonprofit organizations, the general government, and the value of net increases and decreases in inventories. This includes all domestically produced items and those produced abroad. Government outlays for construction and durable goods for military
purposes were excluded. This variable was used to exclude those expenditures on durable military goods because of their lack of production capabilities.

The growth rate of exports variable is measured as the real growth rate of exports. Exports are measured as the goods and services included in the general exports of merchandise plus exports of services and purchases from abroad. Transfers of gifts and personal effects between households are also included. Exports are valued f.o.b. Imports are defined the same as exports except they are valued c.i.f.

Aid is the total official development assistance, ODA, provided by OECD/DAC members, multilateral agencies, and OPEC countries.

All variables defined are measured in real terms using the implicit GDP deflator.

**SUMMARY STATISTICS OF DATA**

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>OBSERVATIONS</th>
<th>MEAN</th>
<th>STD. DEVIATION</th>
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<tbody>
<tr>
<td>Y</td>
<td>467</td>
<td>3.330</td>
<td>8.93752</td>
</tr>
<tr>
<td>X</td>
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<td>5.833</td>
<td>28.2720</td>
</tr>
<tr>
<td>L</td>
<td>420</td>
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<tr>
<td>I</td>
<td>452</td>
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<td>76.2507</td>
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<tr>
<td>PI</td>
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<td>2.885</td>
<td>5.91034</td>
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<tr>
<td>DELTAQ</td>
<td>467</td>
<td>3626.5</td>
<td>20952.5</td>
</tr>
<tr>
<td>DELTAID</td>
<td>464</td>
<td>365.9</td>
<td>3253.38</td>
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ESTIMATION AND RESULTS

ESTIMATION PROCEDURE

The statistical techniques we will be using for our analysis is Ordinary Least-Squares and Two Stage Least-Squares regression. Regression analysis is the study of the dependence of one dependent variable on the one or more explanatory variables, with the view of estimating the population mean of the dependent variable given the known values of the explanatory variables.

Ordinary Least Squares (OLS) regression will be used for estimating the single equation models since it is the best linear unbiased estimator (BLUE) with minimum variance.

The method of Two Stage Least-Squares (2SLS) regression was chosen for its ability of estimating simultaneous equations. The process of 2SLS was developed by Henri Theil. Two stage least-squares is used when equations contain an endogenous variable as an explanatory variable. Endogenous only means the the variable is not predetermined in the model, or in other words it has its own set of explanatory variables. If the endogenous variable is used as a explanatory variable, it will result in the disturbance term being correlated with the endogenous explanatory variable, and hence results in biased estimates.

A durbin-watson statistic for the model showed that there were no problems with auto-correlation. We also checked for multicollinearity among the independent variables using Pearson
correlation coefficients. Here again, we found no evidence that the independent variables are highly correlated with one another.

We did run into a problem with the specification of the simultaneous model. The second equations used to predict the growth rate of investment with the independent variables DeltaQ, Deltaid, DeltaM, and PI resulted in coefficients which were not as expected given the theory, which in turn caused coefficients in equation (3) to be biased. We assume that this problem was due to equation (3) of the model not being specified to account for the variation in investment across countries. To solve this problem we had to model for cross-national and time-series data. We did this by using a Least Squared Dummy variable model for equation (3) which uses country dummy variables. This technique allows for differences in investment among the countries by allowing for different intercepts for these countries. We could not use all of the country dummies because some were linear combinations. After dropping out some of the dummies, the specification problem was solved.6

RESULTS

The regression results for model A are presented in Table 2. Using an F statistic to test the coefficients of the model together to determine if the coefficients are statistically significant from zero, we see that the F-value of 28.87 allows us to reject the hypothesis that all coefficients are equal to zero. The set of independent variables in model A accounted for an adjusted R-square of .2159. In other words, 21.59 percent of the variation in the model was account for
by the set of independent variables. Considering that our sample is of a cross-sectional nature along with the fact our coefficients all resulted in expected signs, we feel that the model is a "good fit".

The estimated coefficients for model A are also presented in Table 2. Here we see that the estimated coefficient for the growth rate of exports is .10818. This translates into an increase of .10818 percentage points in growth of GDP with each percentage point increase in the growth rate of exports. The estimated coefficient for growth of population is .439725. The growth rate of investment resulted in a .037709 percentage point increase in the growth rate of GDP with each percentage point increase. The coefficient for the political instability variable shows that a negative relationship exist between political instability and the growth rate of GDP. Specifically, we see that the coefficient for political instability is -.196958. Therefore, with each increase in political instability point the growth rate of GDP would decline by .196959 percentage points.

A t-test for the significance of individual coefficients shows that the growth of exports and investment are both statistically significant from zero at the 5% level. The growth of population variable was not statistically significant. The coefficient for political instability did prove to be significant from zero. The t-value of 3.274 for the political instability coefficient is statistically significant at any reasonable level of significance.

The signs of the coefficients for the single equation (3) model were as expected. The "input" variable's coefficients were positive,
and the sign of the political instability coefficient was negative. Therefore, this supports our belief that political instability has a negative effect on economic growth.

The results of the simultaneous equation model can also be found in Table 2. Model B used simultaneous equations due to our belief that the growth of investment was endogenous. The second equation of model B regressed the dependent variable, growth of investment, on the independent variables change in aid, change in output, change in imports, political instability, and the dummy variables for the different countries. The estimated coefficient for the change in aid is -.001242. The coefficients reported for the change in output and imports are .000228 and .000261 respectively. The coefficient for the political instability variable is -1.058758. From these results, we see that the effect of political instability is to reduce the growth of investment by 1.058758 percentage points for each one point increase in the political instability value. According to these results investors are highly sensitive to political instability.

A test for individual significance shows that only the change in aid and political instability variables are statistically significant at a 5 percent level of significance.

Using the predicted values from our growth rate of investment equation, we estimated the growth rate of GDP equation (3). An F statistic of 25.28 allows us to reject the hypothesis that all coefficients are equal to zero when tested together. The adjusted R-
square for the model is .1942. Thus, the total variation explained by the independent variables in the model is 19.42 percent.

The coefficient for the growth rate of exports in this model is very similar to the one reported for in model A. The coefficient for exports reported here is .108707. The growth rate of population coefficient for model B dropped substantially to only .307167. According to the estimated coefficient of growth rate of investment, each percentage point increase in investment resulted in a .14239 percentage point increase in the growth rate of GDP. The coefficient for political instability in model B is much lower than the one reported in model A. In model B, the coefficient for political instability is -.091382. Therefore, according to this coefficient, the direct effect of a one point increase in political instability would be to reduce the growth of GDP by .091382 percentage points. When testing for individual significance we see some changes from our results in model A. Like model A, growth of the population is insignificant and both the growth of exports and investment are statistically significant at a 5 percent level of significance. In model A the political instability coefficient was statistically significant at any reasonable level. In model B, we see that the political instability coefficient is no longer significant at even a 10 percent level, though it does just miss being significant at a 10 percent level of a one tail test.

In the growth rate of investment equation (4), we see that the variables political instability, change in output, and change in
imports have the expected signs. Only the negative sign for the change in aid coefficient was a surprise. We had thought that aid was given to invest in projects. Therefore, increases in aid would mean more investment. A possible reason why a negative relationship exist between changes in aid and the growth rate of investment may be that aid is used to offset poor investment years. Therefore, increases in aid may be associated with years of poor investment growth and where the aid is not enough to fully offset poor investment growth.

The signs in the growth rate of GDP equation were all as expected. The "input" variables all showed to be positive influences on the growth rate of GDP. We were also not disappointed in the sign of the political instability sign. The model confirmed our contention that political instability has a negative effect on the growth rate of GDP.

To measure the total effect of political instability on the growth rate of GDP, we have to take into account both the indirect and direct effects instability. The indirect effect is measured by political instability's effect on investment (equation 4) and the effects of investment on economic growth. Since investment is a determinant to economic growth, any effect on it would therefore affect economic growth. The direct effect is measured by the political instability coefficient in the growth rate of GDP equation (3). The total effect of
political instability is measured by the following equation:

\[
\frac{dY}{dPI} = \frac{\partial I}{\partial PI} \cdot \frac{\partial PI}{\partial I} + \frac{\partial Y}{\partial PI}
\]

where the first set of partial derivatives account for the indirect effect, and the last partial derivative measures the direct effect.

Calculating the indirect effect, we see that political instability reduces the growth rate of GDP through investment by .15076 percentage points with each additional one point increase. Combining this indirect effect with the direct effect the total effect on the growth of GDP by an increase in the political instability variable is .24214 percentage points. The total effect of political instability on economic growth, when measured with the single equation model, shows that a decrease of .19696 percentage points in the growth rate of GDP with each one point increase in political instability. From this, we see that the single equation model underestimates the total effect of political instability by 18.7 percent compared with the simultaneous model.
## TABLE 2
REGRESSION RESULTS FOR MODEL A AND MODEL B

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<tr>
<th>Coefficients:</th>
<th>Intercept</th>
<th>X</th>
<th>L</th>
<th>I</th>
<th>PI</th>
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<tr>
<td><strong>Model A</strong></td>
<td>1.96412</td>
<td>.10818</td>
<td>.43972</td>
<td>.0377</td>
<td>-.19696</td>
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<tr>
<td>(t-value)</td>
<td>(1.859)</td>
<td>(8.559)</td>
<td>(1.283)</td>
<td>(4.6)</td>
<td>(-3.274)</td>
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<td>Adj. R square</td>
<td>.2159</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Simultaneous equation model B:**

(Equation 3) -.09138 1.4105 .10871 .30716 .14239
(t-value) (1.118) (7.224) (.752) (5.887) (-1.218)
Adj. R square .1942

<table>
<thead>
<tr>
<th>Coefficients:</th>
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<th>DeltaI</th>
<th>DeltaM</th>
<th>PI</th>
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<td>(Equation 4)</td>
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<td>(t-value)</td>
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<tr>
<td>R square</td>
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</tbody>
</table>

NOTE: with the no intercept option the R-square definition is changed to: 1-(residual sum of squares/uncorrected total sum of squares).
* represents all the dummy variables used for the different countries.
STABILITY TEST
AND COMPARISONS

We tested the stability of the coefficients of the political instability variable by dropping a single variable among the "input" variables in model A. The results were that in each case the sign of the political instability coefficient remained negative (see Table 3). Only the absolute magnitude of the coefficient changed. The most significant change occurred when the investment variable was dropped from the model. The political instability coefficient increased by 19 percent when this happened. This is not surprising since we have indicated that political instability may affect the growth rate of investment, as well as directly affecting economic growth.

Theoretically, we have stated that political instability is likely to affect both the accumulation, distribution, and the usage of the factors of production. To measure these effects, we added a political instability variable to a neoclassical growth model. Since political instability may affect investment, we added another equation to the model to measure this effect. This leaves us with deciding which model is best, the single equation model or simultaneous equation model.

The results we obtained in the second equation of the simultaneous model have strengthened the case for using such a model.
CONCLUSION

The data used for this study was a combination a cross-national and time-series for 41 Sub-Saharan African states from 1970 to 1983. The purpose of this study was to determine if political instability had a negative short-term effect on economic growth in Sub-Saharan Africa. As stated before, we believe that political instability causes a disruption in the ability of institutions and economic agents to perform their economic functions. Thus political instability disrupts the accumulation, distribution, and usage of the factors of production, and hence economic growth. To measure this disruptive force of political instability, we developed two models. The first model was a simple production function model with the addition of an export and political instability variable. This model was estimated using OLS techniques. The second model was a simultaneous equation model. Along with the growth equation, we added a second equation to measure the indirect effect of political instability on economic growth through investment. The reason for this equations stems from the thought that political instability induces uncertainty which investors translate into risk. Therefore, any added risk will cause investors to cut back on investments.

Our regression results for both models have shown that indeed there is a negative relationship between political instability and economic growth. We feel, however, that the use of the simultaneous equation model, where political instability's effect is measured both
directly and indirectly, is the proper model to use. According to our simultaneous equation model's coefficients, the total effect of political instability is to reduce the economic growth rate by .24214 percentage points with each one point increase in its value. This would imply that a coup, which has a value of 5, would decrease the economic growth rate by 1.2107 percentage points. Using a single equation OLS model, we find that a point increase in political instability results in a .19696 decrease in the economic growth rate. It can be seen that political instability can severely affect the economic growth of an African state regardless of whether we use a simultaneous equation model or a single equation OLS model.

A comparison of our results with the results of others is almost impossible due to the different approaches taken on the subject. The common approach to the relationship between economic growth and political instability is to treat economic growth as determining political instability. The researchers who have taken such an approach have almost unanimously found that economic growth does inhibit political instability.

The one study that we found that takes the same approach to the subject as we do, found no short-term statistical significant effect on economic growth. This study by Londregan and Poole had some short cummings though. We did not agree with their specification of their model or their measurement of a short-term effect. Therefore, a direct comparison of their results with ours would not benefit either study.
We should state that even though we found political instability to have a statistically significant negative effect on economic growth, this does not contradict the findings of other researchers who found that economic growth has a negative effect on political instability. Both theories of causation can exist simultaneously. All our findings show is that whatever causes political instability, political instability has a negative effect on economic growth. If poor economic performance causes political instability, it will in turn cause poorer economic performance.

There are a wide range of factors that have attributed to Africa's poor economic performance, such as climate, diseases, and outside constraints on economic trade. Besides these uncontrollable factors there are also internal or controllable factors which have been pointed to by researchers. Besides the disruption from political instability, other controllable factors such as forced industrialization and heavy government involvement in the markets have been pointed to as responsible in part to slow development. It would be irresponsible to suggest that by reducing internal political conflict in Africa the economic performance problems would be solved, but not to recognize the adverse effects of political instability would be equally irresponsible. In this sense, we only suggest that political instability in Sub-Saharan Africa be considered as a barrier to economic development. Therefore, any policy action to stimulate economic growth would have to address the problem of internal conflict along with any other problems Sub-Saharan Africa faces.
This paper, at least, focuses on the need to investigate the relationship between political instability and economic growth in LDCs generally, and Sub-Saharan Africa in particular.
1) These are a sample of coups which appeared in McGowan and Johnson's 1988 article "African Military Coups d'etat and Underdevelopment; a Quantitative Historical Analysis".


3) A few notes to clarify the meaning of uncertainty. Uncertainty is always common since people are unable to see into the future. But here, we refer to uncertainty as being in addition to the normal level of uncertainty. Where the probability given to the occurrence of an event is severely affected. Another idea relating to the spread of uncertainty from political institutions to other institutions within the economic system should be clarified. One would likely point to political instability in the DCs to show that little if any uncertainty had spread to other institutions. The above scenario for political instability was not meant to be for all countries. We only suggest that this happens in LDCs due to the infancy of their institutions. The institutions in the DCs have become more developed, thus stronger, enabling them to withstand all but the most severe instances of political instability.

4) We should note here that conflict is common to all countries, but in most nations conflict does not grow to the point of being classified as political instability. The reason why conflict in LDCs may have a
tendency to develop into political instability may be due to the lack of institutions to resolve such conflict.

5) The list of countries which were included in this sample were:
   - ANGOLA
   - BENIN
   - BOTSWANA
   - BURKINA FASO
   - BURUNDI
   - CAMEROON
   - CENTRAL AFRICAN REPUBLIC
   - CHAD
   - CONGO
   - DJIBOUTI
   - EQUATORIAL GUINEA
   - ETHIOPIA
   - GABON
   - GAMBIA
   - GHANA
   - GUINEA
   - GUINEA-BISSAU
   - IVORY COAST
   - KENYA
   - LESOTHO
   - LIBERIA
   - MADAGASCAR
   - MALAWI
   - MALI
   - MAURITANIA
   - MAURITIUS
   - MOZAMBIQUE
   - NIGER
   - NIGERIA
   - RWANDA
   - SENEGAL
   - SIERRA LEONE
   - SOMALIA
   - SUDAN
   - SWAZILAND
   - TANZANIA
   - TOGO
   - UGANDA
   - ZAIRE
   - ZAMBIA
   - ZIMBABWE

6) The countries that had to be dropped from the model were:
   - ANGOLA
   - CENTRAL AFRICAN REPUBLIC
   - CHAD
   - GUINEA
   - GUINEA-BISSAU
   - MALI
REFERENCES


