



UNIVERSITI PUTRA MALAYSIA

**EFFECTS OF STRUCTURAL ADJUSTMENT
PROGRAMS ON SAVING, INVESTMENT AND GROWTH:
A CASE STUDY OF SUDAN**

AHLAM ABD ELHADI HASSAN

FEP 2003 1

**EFFECTS OF STRUCTURAL ADJUSTMENT PROGRAMS ON SAVING,
INVESTMENT AND GROWTH: A CASE STUDY OF SUDAN**

AHLAM ABD ELHADI HASSAN

DOCTOR OF PHILOSOPHY

UNIVERSITI PUTRA MALAYSIA

2003



**EFFECTS OF STRUCTURAL ADJUSTMENT PROGRAMS ON SAVING,
INVESTMENT AND GROWTH: A CASE STUDY OF SUDAN**

By

AHLAM ABD ELHADI HASSAN

**Thesis Submitted to the School of Graduate Studies,
Universiti Putra Malaysia, in fulfillment of the requirement for the Degree of
Doctor of Philosophy**

April 2003



**DEDICATED TO MY MOTHER, MY FATHER
MY BROTHERS AND SISTERS
THOSE WHO HAVE CONTRIBUTED SOMETHING INTO MY LIFE**



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirements for the degree of Doctor of Philosophy

EFFECTS OF STRUCTURAL ADJUSTMENT ON SAVING, INVESTMENT AND GROWTH: A CASE STUDY OF SUDAN

By

AHLAM ABD EIHADI HASSAN

April 2003

Chairman: Professor Mohd. Ghazali Mohayidin, Ph.D.

Faculty: Economics and Management

Sudan economy has experienced a prolonged period of internal and external imbalances. Inappropriate policies have caused misallocation of resources and the lowering of productivity and employment. Macroeconomic instability placed further strain on growth by reducing investors' confidence in the economy. To cope with the situation, Sudan, by the end of fiscal year 1978, has resorted to international borrowing which ushered in the Structural Adjustment Programs (and stabilization): the reform measures required by the International Monetary Fund and the World Bank as a condition for their loans.

The Structural Adjustment Program is an economy-wide, all embracing, and comprehensive set of policy reforms aimed at expanding and strengthening the role of the market forces for efficient allocation of resources. The main objective of the study is to examine the effects of the Structural Adjustment Programs on the Sudanese economy. In particular, the study analyzes interactions between structural reform and selected macroeconomic variables including saving, investment and growth. Annual data covering the period 1955 to 1998 was used.



A six-equation model with six variables was used in the study. A dummy variable was included as an exogenous variable to capture the effects of a Comprehensive Strategy Structural Program, which was implemented in Sudan.

The results of this study indicate that there was a positive correlation between growth, investment, and savings and show the important role of structural reform in determining all three variables. The structural programs in the Sudanese economy had positive effects on saving and investment, but its impact on the growth rate was negative in the short run. The findings tend to confirm the predominant view that sound macroeconomic policies and structural reforms are crucial for saving, investment and growth .

To improve the productivity of investment, the Sudanese government should identify and undertake investments that have positive net returns. Increased emphasis on education and the adoption or maintenance of outward oriented policies, for example removal of export taxes, and improvement in investment policies, in all fronts, are needed. These are capable of stimulating investment and spurring sustainable long-term economic growth.

Coordination and better targeting of foreign assistance resources on specific projects that can create the conditions for trade and saving, are required; knowing that foreign assistance can be used strategically to foster reforms.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia Sebagai
memenuhi keperluan untuk ijazah Doktor Falsafah

**KESAN PROGRAM PENYESUAIAN STRUKTUR TERHADAP
TABUNGAN, PELABURAN DAN PERTUMBUHAN: KAJIAN KES SUDAN**

Oleh

AHLAM ABD ELHADI HASSAN

April 2003

Pengerusi: Profesor Mohd. Ghazali Mohayidin, Ph.D.

Fakulti: Ekonomi dan Pengurusan

Ekonomi Sudan telah mengalami ketidakseimbangan dalaman dan luaran bagi satu tempoh yang berpanjangan. Dasar yang tidak bersesuaian telah menyebabkan penyalahgunaan peruntukan sumber serta penurunan tahap produktiviti dan pekerjaan. Ketidakstabilan makro ekonomi memberi tekanan yang lebih tinggi kepada pertumbuhan dengan mengurangkan keyakinan pelabur. Untuk mengatasi masalah ini, Sudan, pada akhir tahun belanjawan 1978, terpaksa menggunakan pinjaman antarabangsa yang mendorong terlaksananya program pelarasan struktura (dan penstabilan): cara pemulihan yang dikenakan oleh *International Monetary Fund* dan Bank Dunia sebagai satu syarat keatas pinjaman mereka.

Program pelarasan struktural adalah satu program menyeluruh yang merangkumi satu set dasar pemulihan yang komprehensif dan ia bertujuan untuk mengembang dan mengukuhkan peranan kuasa-kuasa pasaran demi kecekapan peruntukan sumber. Objektif utama kajian ini adalah untuk mengkaji kesan Program Pelarasan Struktural atas aspek-aspek terhad dalam ekonomi Sudan. Khususnya, kajian ini akan menganalisis interaksi antara pemulihan struktural dan angkubah-angkubah makro ekonomi termasuk tabungan, pelaburan dan pertumbuhan. Data tahunan bagi tempoh 1955 hingga 1998 akan digunakan.

Pembentukan satu set 6-persamaan dengan 6 angkubah telah digunakan untuk setiap model. Satu angkubah pepatan di sertakan sebagai satu angkubah luaran bagi mendapatkan kesan Program Struktural Strategi Komprehensif yang dilaksanakan di Sudan.

Hasil kajian ini menunjukkan terdapat korelasi yang positif antara pertumbuhan dengan pelaburan, dan tabungan dan menunjukkan peranan penting yang dimainkan oleh pemulihan struktural dalam menentukan ketiga-tiga angkubah. Program struktural dalam ekonomi Sudan mempunyai kesan positif atas tabungan dan pelaburan, tetapi dalam jangka masa pendek impak keatas kadar pertumbuhan adalah negatif. Temuan ini menyokong kebanyakan pendapat bahawa dasar makro ekonomi yang kukuh dan pemulihan struktur penting bagi tabungan, pelaburan dan proses pertumbuhan.

Untuk memulihkan semula ekonomi Sudan, kajian ini menyarankan cadangan-cadangan berikut:

Untuk mempertingkatkan produktiviti pelaburan, Kerajaan Sudan seharusnya mengenalpasti dengan lebih jelas jenis-jenis pelaburan yang memberi pulangan bersih yang positif.

Penekanan yang lebih tinggi terhadap pendidikan dan menerima pakai atau pemantapan dasar yang berorientasikan ke luar, dalam semua hal terkemuka, dijangka akan memainkan peranan yang penting bagi mendorong pelaburan dan mempergiatkan kelestarian pertumbuhan ekonomi jangka panjang.

Meletakkan sasaran yang lebih baik dan mengkoordinasikan sumber-sumber bantuan asing yang boleh mewujudkan syarat-syarat perdagangan dan tabungan, dengan kesedaran bahawa bantuan asing boleh digunakan secara strategik untuk menjalinkan pemulihan.

ACKNOWLEDGEMENTS

All praise due to Allah, the most Gracious and Merciful, for giving me the strength, and the determination to complete my study.

I wish to take this opportunity to express my deepest appreciation and gratitude to Prof. Dr. Mohd. Ghazali Mohayidin, my supervisor for his inspiration, encouragement at all times and words of wisdom during some desperate moments, and more also his confidence in my abilities to complete my education at University Putra Malaysia

My hearty thanks to Prof. Dr. Mohammed Yusoff, Deputy Dean of the department of Economics, University Putra Malaysia. His rich experience in this area of economics afforded me an opportunity to benefit from knowledge, which was translated to a better-written manuscript.

Greatest debt of gratitude also goes to Prof. Dr. Zakariah Abd Rashid, for his valuable input, especially his numerous suggestions regarding the structure and content that cumulated into a useful dissertation.

Much of the credit for this work goes to the Associate Professor Dr. Nasreelidin Abd Allah Hag Elamin, a staff of Food and Agricultural Organization (FAO), Rome Center, for providing me with countless words of encouragement and moral support in the completion of this dissertation. His depth ideas, attention to detail and above

all the time and energy spent to improve this dissertation were very greatly appreciated.

A special thanks goes to Prof. Dr. Polak Jacques Director of the Research Department of the IMF, for his suggestions and assistance in providing some valuable materials.

To Associate Professor Mohamed Nasir Hassan Department of Environmental Science UPM, Prof. Dr. Ghura Dhaneshwar special thanks for their support and encouragement.

Thankful to the financial support provided by the university of Gedaref who financed my entire education in the Ph. D. program.

To all staff member of computer unit, special thanks for providing me much of the computing assistance.

As is usually the case, I have left out a number of good friends both inside and outside UPM whose encouragement and moral support facilitated the completion of this work; I should mention few here like Kevin, Abdullahi, Dr. Indah and Amna.

Finally, I must express my heartfelt and deep thanks to my family, especially my mother, father, my sisters and brothers for their love, and patience during long and difficult ordeal time.

Also, my brother Hassan and his wife Rasha and the kid Ahmed whose encouragement and good humor sustained me throughout this period.

Furthermore to my friend Mahmouda whose patience and understanding constantly reminded me to do my best and leave the rest to Almighty God.

TABLE OF CONTENTS

DEDICATION	ii
ABSTRACT	iii
ABSTRAK	v
ACKNOWLEDGEMENTS	viii
APPROVALS	xi
DECLARATION FORM	xiii
LIST OF TABLES	xvii
LIST OF FIGURES	xix
LIST OF ABBREVIATIONS	xxi
CHAPTER	
1 INTRODUCTION	
1.1 Overview of the Study	1.1
1.2 Statement of the Problem	1.7
1.3 Objectives of the Study	1.11
1.4 Significance of the Study	1.11
1.5 Organisation of the Study	1.13
2 SUDANESE ECONOMY	
2.1 Introduction	2.1
2.1.1 Agricultural Sector	2.1
2.1.2 Industry	2.9
2.1.3 Service sector and others	2.10
2.2 Sudan's Macroeconomic Performance	2.16
2.2.1 Saving and Investment	2.16
2.2.2 Balance of Payments	2.20
2.2.3 Debts Situation	2.24
2.2.4 Economic Crisis	2.28
3 REVIEW OF LITERATURE	
3.1 Stabilization and Structural Adjustment	3.1
3.1.1 Definition and Origin of Stabilization and Structural Adjustment in Africa	3.1
	xiv



3.1.2	Objectives of Stabilisation and Structural Adjustment	3.7
3.1.3	Policy Instruments of Stabilization and Structural Adjustment	3.9
3.1.4	Some Criticisms of Stabilisation and Structural Adjustment programs	3.16
3.2	Theoretical and Empirical Literature	3.21
3.2.1	Stabilization Policy in Developing Countries	3.21
3.2.2	Review of Empirical Studies on Saving and Investment	3.54
3.2.3	Review of Empirical Studies on Growth and Other Macroeconomics Variables	3.64
4	MODELS SPECIFICATION AND METHODOLOGY	
4.1	Model Specification	4.1
4.1.1	Saving	4.3
4.1.2	Investment	4.8
4.1.3	Growth Rate	4.14
4.2	Time Series Properties of the Economic Variables	4.23
4.2.1	Non Stationary of Time Series Data	4.23
4.2.2	Unit Root Test of Stationary	4.24
4.2.3	Cointegration	4.25
4.2.4	Vector Error Correction Model	4.26
4.3	Vector Autoregressive (VAR)	4.27
4.4	The Causality Test	4.28
4.5	Impulse Response Function and Variance Decomposition Approach	4.29
4.6	Justification for Use of Single Equation in VECM System	4.30
4.7	Diagnostic Tests	4.32
4.8	Expected Signs for Coefficient	4.33
4.9	Data: Definitions and Characteristics	4.34
4.1	Caveates	4.37
5	RESULTS AND DISCUSSIONS	
5.1	Introduction	5.1
5.2	Estimated Results	5.2
5.2.1	Testing for Stationarity of the Series	5.2
5.2.2	lag selection	5.5
5.2.3	Cointegration	5.6
5.2.4	Granger Causality Results based on VECM	5.19



5.2.5	Variance Decomposition	5.39
5.2.6	Impulse Response Function	5.48
5.2.7	Diagnostic Test of Residuals	5.58
6 SUMMARY AND CONCLUSION		
6.1	Summary	6.1
6.2	Conclusion	6.4
6.2.1	Saving	6.5
6.2.2	Investment	6.9
6.2.3	Growth	6.12
6.3	Policy Implication	6.19
6.4	Recommendations	6.25
6.5	Limitation of the Study	6.31
BIBLIOGRAPHY		R.1
BIODATA OF THE AUTHOR		B.1



LIST OF TABLES

Table	Page
1.1 Comparative Macroeconomic Performance SSA, East Asia and Latin America (medians)	1 3
1.2 Sudan Compared with Sub-Saharan Africa	1 5
2.1 Structure of the Sudanese Economy	2 2
2.2 Cropped Area, Output, and Yield of Major Crops, 1983/84-1997/98	2 7
2.3 Sudan: Selected Financial Indicators, 1990-2000	2 14
2.4 Selected Economic Indicators	2 18
2.5 Balance of Payment	2 22
2.6 Terms of Trade	2 23
2.7 External Public Debt	2 26
2.8 Dates of Devaluation	2 31
4.1 Definition of the Variables	4 22
5.1 Unit Root Test Results	5 4
5.2 Johansen Cointegration Test for Saving Model	5 9
5.3 Johansen Cointegration Test for Investment Model	5 9
5.4 Johansen Cointegration Test for Growth Model	5 10
5.5 Estimated cointegrated Vectors in Johansen for Saving	5 12
5.6 Estimated cointegrated Vectors in Johansen for Investment	5 14
5.7 Estimated cointegrated Vectors in Johansen for Growth	5 17
5.8 Temporal Causality Based on Vector Error Correction Model for Saving	5 22
5.9 Temporal Causality Based on Vector Error Correction Model for Investment	5 28
5.10 Temporal Causality Based on Vector Error Correction Model for Growth	5 35



5 11	Decomposition of Variance for Saving Model	5 42
5 12	Decomposition of Variance for Investment Model	5 44
5 13	Decomposition of Variance for Growth Model	5 46
5 14	Diagnostic Checking on VECM for Saving Model	5 59
5 15	Diagnostic checking on VECM for Investment Model	5 59
5 16	Diagnostic Checking on VECM for Growth Rate Model	5 59



LIST OF FIGURES

Figure	Page
2.1 Map of Sudan Showing the Study Area	2.3
2.2 The structure of the Sudanese Economy	2.15
3.1 A Schematic Representation of Structural Adjustment Policy	3.14
5.1 The Causal Relationship With Saving Variables	5.26
5.2 The Causal Relationship With Investment Variables	5.33
5.3 The Causal Relationship With Growth Variables	5.39
5.4 Impulse Response for Saving Model	5.49
5.5 Impulse Response for Investment Model	5.52
5.6 Impulse Response for Growth Model	5.55



LIST OF ABBREVIATIONS

IMF	International Monetary Fund
WB	World Bank
ERP	Economic Recovery Program
ECRP	Economic Recovery Program
ESAP	Economic Structural Adjustment Programs
SAA	Sub-Saharan Africa
Km	Kilometer
NESP	National Economic Salvation Program
ECRP	Economic Recovery Program
Km	Kilometer
JA	Joint Account System
IA	Individual Account System
IFIs	International Financial Institutions
FAO	Food Agricultural Organization
ISI	Import Substituting Industrialization
LDCs	Less Developing Countries
OECD	Organization for Economic Corporation and Development
LSDV	Least Square Dummy Variables
CPI	Consumer Price Index
ARMA	Autoregressive Moving Average
ADF	Augmented Dickey Fuller
PP	Philip Perron
VECM	Vector Error Correction Model
VAR	Vector autoregressive Model
ECT	Error correction Terms
UNCTAD	United Nations Centre for Trade and development
NIPA	National Income and Product Account
SDR	Special drawing Right
AIC	Akaike Information criterion
SC	Schwarz Criterion



CHAPTER 1

INTRODUCTION

1.1 Overview of the Study

Most of the developing countries have, in the post World War II years, followed what is generally described as "dirigiste policy prescriptions", where they had to assume a dominant and pervasive role in economic affairs. Following the oil price shocks of the 1970s and 1980s and a series of natural disasters that had stricken most of the Sub-Sahara African (SSA) countries during the same periods, many of the SSA countries embarked on a series of economic policy reforms in order to adjust to these shocks and restore sustainable economic growth. Available evidence tend to suggest that, for a number of reasons, these reforms have not resulted in tangible improvements. It is often claimed that the deleterious economic consequences of these policies in most cases outweighed the market failures they were meant to correct, and as such they have contributed to the low economic growth in SSA during the 1980s. During the last two decades, SSA had by far the worst economic performance among developing countries¹ (Table 1.1). In 1998, for instance, the region's average real per capita income was roughly unchanged from its levels in 1970. Overall, SSA has suffered a chronic failure of economic growth and Sudan's economy is not an exception in this respect. Moreover, saving and investment ratios to GDP are significantly lower in SSA than in other developing countries and too

¹ Among the Middle East and Europe region as well as Latin America, SSA experienced real per capita income growth of 1-2 percent a year on average during 1970-98. while in Asia. at 4 7 percent a



low to support a sustainable expansion in output. For example, the saving and investment in SSA during 1986–92 were 11.8 percent and 18.6 percent respectively, compared to 24.5 percent for saving and 25.7 for investment in developing countries in general (IMF, 1994)

The growth and performance of each Sub-Sahara African country varies with its ability to adjust to economic shocks to the system. For example,, when shocks like higher world interest rates and drought affect the economies of these SSA, budget imbalances become a common problem. These imbalances were being removed through massive infusion of foreign loans from the International Monetary Fund (IMF) and the World Bank. However, in the post-1980s borrowing from the international banks had become harder and harder for these poor countries. The shocks to interest rates and terms of trade reduced real incomes significantly and, therefore, adjustment meant severe cuts in consumption and government spending.

year. growth was well above the world average of 2.4 percent.



Table 1.1: Comparative Macroeconomic Performance: SSA, East Asia and Latin America (medians)

Period	SSA			Latin America			East Asia		
Year	Real GDP Growth (%)	Real Per Capita GDP (US\$)	Exports to GDP (%)	Real GDP Growth (%)	Real Per Capita GDP (US\$)	Exports to GDP (%)	Real GDP Growth (%)	Real Per Capita GDP (US\$)	Exports to GDP (%)
1970-79	4.37	425	24	4.27	1,333	21	7.81	555	28
1980-84	1.78	374	26	1.69	1,267	22.3	7.226	923	30.1
1985-94	2.68	361	23.1	3.43	1,372	23.7	7.95	1393	38.4

Source: African Economic Research Consortium Working Papers, 1998