

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

**AN ECONOMETRIC ANALYSIS OF
THE DETERMINANTS OF GROWTH
IN THE KINGDOM OF TONGA
1970-1998**

**A Research Thesis submitted in partial requirement for the degree of
Master of Applied and International Economics at Massey University**

Siosaia Tupou Faletau

**School of Applied and International Economics
Massey University**

1999

STATEMENT OF SOURCES

The work presented in this study is the original and independent work of the author, except where otherwise stated or acknowledged. No part of this work has been previously submitted to this, or any other university, for the attainment of a formal qualification.



SIOSAIA TUPOU FALETAU

ACKNOWLEDGEMENTS

Firstly, I would like to praise God for everything that I have achieved and thank for the love and blessings.

My greatest appreciation is to my supervisor, Dr. Rukmani Gounder, for her invaluable guidance, patience and understanding throughout the study. I know that I would not have completed this study if it were not for your support - Bula Vinaka Rukmani.

I would also like to thank Vilaphonh Xayavong for his invaluable assistance, Lesley Davies, and Robin Loomes for their help in proof-reading this thesis, and Suetusi for her encouragement and support. My sincere thank is extended to the staff of the Tonga Statistics Department especially, Feleti Wolfgramm and my sister Tufui for assisting in collecting the data from Tonga.

I am indebted to the Tongan Government and New Zealand Government through the provision of the New Zealand Overseas Development Assistance (NZODA) Postgraduate Scholarship and giving me the opportunity to undertake this study.

Last but not the least, this thesis is dedicated to my family. I am deeply grateful for their prayers and encouragement. Malo 'aupito ho'omou tokoni moe lotu.

ABSTRACT

The importance of determining the factors that contribute to economic growth is vital in the case of Tonga because of the benefits and advantages it provides for the people and their future development. The main objective of this study is to analyse and investigate empirically the macroeconomic factors that promote economic growth and development in Tonga. Economic theories and various studies have presented the variables that may affect growth. These include investment (domestic and foreign), labour force, exports and imports, fiscal policies, tourism receipts, private remittances, foreign aid and its various components. Foreign resources such as aid and private remittances play an important role in the development of small island economies and Tonga's heavy reliance on these factors may also explain their contribution to growth.

The study uses a neoclassical production function to examine the relationships between economic growth in Tonga and the proposed determinants listed above. The cointegration method of Auto-Regressive Distributed Lag is utilised in the analysis. The empirical evidence indicates that factors making a positive contribution to economic growth in Tonga are the growth in exports, tourism receipts, openness to trade, government consumption expenditure, bilateral aid, grant aid and imports. The loan aid, multilateral aid, technical co-operation grants and private remittances, while significant in most cases, show a decline over time. Natural disasters and external market shocks have a strong adverse effect on Tonga's growth rate.

The issue of macroeconomic management is stressed in this study as the key role to be played by the government in order for the available resources to be allocated to the productive sectors of the economy. This can be undertaken through setting stable macroeconomic environment, introducing and maintaining growth-oriented policies and structural reforms in some of the key sectors of the economy. Research should be concentrated on high value niche products and promoting technological development to support the diversification in the export and tourism sectors. Measures should also be adopted to monitor the effectiveness of utilising foreign aid projects, as current aid flows show a decline.

TABLE OF CONTENTS

Statement of Sources	i
Acknowledgements	ii
Abstract	iii
Table of Contents	iv
List of Tables	vi
List of Figures	vii
List of Abbreviations	viii
Chapter 1 Introduction	1
1.1 Aims and Objectives	1
1.2 Data and Methodology	3
1.3 Chapter Outline	4
Chapter 2 Literature Review: Economic Growth and Development	5
2.1 Introduction	5
2.2 Theoretical Evidence of Economic Growth	6
2.2.1 Neoclassical Growth Theory	6
2.2.2 Endogenous Growth Theory	9
2.2.3 Role of Aid in Developing Countries' Economic Growth	14
2.3 Empirical Evidences and Critiques of Growth Models	16
2.4 Contribution of Foreign Aid to Island Economies' Economic Growth	19
2.5 Macroeconomic Policy Issues in Tonga	21
2.6 Summary and Conclusion	22
Chapter 3 Economy of Tonga: An Overview	24
3.1 Introduction	24
3.2 Overview of the Kingdom of Tonga	26
3.2.1 Country Context	26
3.2.2 Macroeconomic Performance of the Economy	27
3.2.2.1 National Accounts	28
3.2.2.2 External Sector	38
3.2.2.3 Private Sector Development	41
3.3 Factors Contributing to Growth in Tonga	42
3.3.1 Investment	42

3.3.2	Trade	43
3.3.3	Labour Force	43
3.3.4	Foreign Assistance	43
3.3.5	Tourism Receipts	44
3.4	Summary and Conclusion	45
Chapter 4 Growth Models: An Empirical Investigation		46
4.1	Introduction	46
4.2	Economic Growth: Empirical Models	47
4.2.1	Neoclassical Model Extended to include Macro Variables	50
4.2.2	Neoclassical Model Extended to include Tourism Receipts	52
4.2.3	Neoclassical Model Extended to include Foreign Aid and Private Remittances	53
4.3	Estimation Procedures	54
4.4	Sources of Data	56
4.5	Summary and Conclusion	58
Chapter 5 Empirical Results for Tonga		60
5.1	Introduction	60
5.2	Empirical Results for Tonga's Growth Models	61
5.2.1	Neoclassical Model	63
5.2.2	Neoclassical Model Extended to Include Macroeconomic Variables	68
5.2.3	Neoclassical Model Extended to Include Tourism Receipts	75
5.2.4	Neoclassical Model Extended to Include Foreign Aid (ODA)	77
5.2.5	Neoclassical Model Extended to Include Private Remittance	81
5.3	Policy Implications for Tonga	83
5.4	Conclusion	87
Chapter 6 Conclusion and Future Research		89
6.1	Introduction	89
6.2	Conclusion	89
6.3	Future Research	92
Appendix A		94
Appendix B		95
Bibliography		99

LIST OF TABLES

Table 3.1.	Selected Indicators on some Pacific Island countries, 1994	25
Table 3.2.	Tonga: National Account Indicators, Selected Years 1970-80 (average) to 1996/97	30
Table 3.3.	Population and Labour Statistics of Tonga, Census Years, 1966-1996	37
Table 3.4.	Tonga: Balance of Payment, 1992/93 to 1996/97	39
Table 5.1.	Testing the existence of a long-run relationship: critical value bounds of the F-statistic	62
Table 5.2.	Empirical Results for Tonga's Growth Model: Neoclassical Model, 1970 to 1998	67
Table 5.3.	Empirical Results for Tonga's Macroeconomic Growth relationship: The impact of Government Consumption to GDP Ratio, 1970 to 1998	70
Table 5.4.	Empirical Results for Tonga's Macroeconomic Growth Relationship: The impact of Government Revenue to GDP Ratio, 1970 to 1998	72
Table 5.5.	Empirical Results for Tonga's Trade Orientation - Growth Relationship, 1970 to 1998	74
Table 5.6.	Empirical Results for Tonga's Tourism Growth Model, 1970 to 1998	76
Table 5.7.	Empirical Results: Tonga's Growth Model Extended to include Foreign Aid and its various components: 1970 to 1998	79
Table 5.8.	Empirical Results for Private Remittance - Growth Relationships: 1970 to 1998	83

LIST OF FIGURES

Figure 3.1.	Tonga Real Annual Growth Rate of Gross Domestic Product and Agriculture Output, for the years 1981/82 to 1997/98	31
Figure 3.2.	Sector Shares in Real Gross Domestic Product, 1996/97	32
Figure 3.3.	Tonga's Annual Inflation Rate, Imported and Domestic Inflation Rate, 1971 to 1998	36
Figure 3.4.	Tonga's Merchandise Exports and Imports, for the year 1970/71 to 1997/98	40
Appendix B	(Figure A – I) Graphical Representation of the Regression Variables, for the year 1970/71 to 1997/98	
Figure A.	Tonga's Growth in Real GDP (1970/71-1997/98)	95
Figure B.	Tonga's Population Growth Rate (1970/71-1997/98)	96
Figure C.	Tonga's Growth in Exports and Imports (1970/71-1997/98)	96
Figure D.	Tonga's Total Investment to GDP Ratio (1970/71-1997/98)	96
Figure E.	Tonga's Annual Inflation Rate (1970/71-1997/98)	97
Figure F.	Tonga's Growth Rates of Tourism Receipts (1970/71-1997/98)	97
Figure G.	Ratio of Government Revenue and Government Consumption Expenditure to GDP for Tonga (1970/71-1997/98)	97
Figure H.	Ratio of Private Remittances, Foreign Aid and Foreign Direct Investment to GDP (1970/71-1997/98)	98
Figure I.	Various Components of Foreign Aid Flows to Tonga (1970/71-1997/98)	98

LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AIDAB	Australian International Development Assistance Bureau
ARDL	Auto-Regressive Distributed Lag
BOP	Balance of Payment
CIF	Cost including Insurance and Freight
COLA	Cost of Living Allowance
CPI	Consumer Price Index
EIU	Economic Intelligence Unit
FID	Foreign Direct Investment
GDE	Gross Domestic Expenditure
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GNP	Gross National Product
HDI	Human Development Index
IMF	International Monetary Fund
ODA	Overseas Development Assistance
OECD	Organisation for Economic Co-operation and Development
R&D	Research & Development
SIC	Small Industry Centre
SPARTECA	South Pacific Regional Trade and Economic Agreement
UK	United Kingdom
UNDP	United Nations Development Programme
US	United States
WTTC	World Travel and Tourism Council

CHAPTER 1: Introduction

1.1 Aims and Objectives

The South Pacific Island nations have diverse physical environments and rich traditional cultures with overall aims and objectives of development growth policies and success for its population. They face a unique set of development challenges, which is reflected in their sluggish growth rates, despite high levels of per capita development assistance flowing into these island states. These problems are largely attributable to their small size, dependence on a narrow range of export commodities and vulnerability to external shocks. Natural disasters have also adversely affected growth in most of the island economies at one time or another (World Bank, 1996). Furthermore, the impact of political disturbances negatively affected growth. The two military coups in Fiji in 1987 provide an example of the detrimental effect that domestic political upheaval can have on economic performance (Gounder, 1999).

The Kingdom of Tonga is a small island nation in the South Pacific that shares most of the economic constraints faced by other Pacific Island countries. The economy is dependent on agriculture and fisheries although the tertiary sector has become more important in recent years. Tonga's level of development is relatively high compared to other South Pacific Island countries, except for Fiji (UNDP, 1994). Tonga has been classified by the World Bank as a lower middle-income country, which has an average per capita income of US\$1,909 in 1996/97 (Tonga Ministry of Finance, 1997) and a human development index (HDI) of 0.72 (UNDP, 1994).

Tonga's growth rate has been erratic over time. This is largely due to its dependence on a few agricultural products concentrated on one market, remittances from Tongans abroad

and foreign grants and loans used to finance its development projects and balance of payment deficits. Tonga also faces difficult socio-economic problems, due to its vulnerability to external market forces and natural disaster, geographic isolation and loss of skilled labour through emigration (ADB, 1996).

The production and export of agricultural products has contributed significantly to Tonga's economic growth. However, the volatility observed in this sector over the last three decades has had serious consequences and major changes on the performance of agricultural production and consequently economic growth. For example, the massive 50 percent decline in the price of copra caused the proportion of total export earnings accounted for by the coconut industry to fall from 70 percent in the 1960s and 1970s to 20 percent by the end of 1980s (Sturton, 1992). The production of bananas, which was Tonga's second biggest export earner, has virtually ceased during the late 1980s due to natural disasters and quarantine restrictions. The recovery of the economy in the early 1990s was due to the emergence of squash and the vanilla bean, contributing to the high growth of the economy.

This study is an inquiry into the causes of economic growth, and contains a country-specific econometric analysis of macroeconomic variables, using time series data from 1970-1998 to determine the key factors that promote economic growth and development in Tonga. The literature review examines those macroeconomic variables influencing growth, including investment (domestic and foreign), labour force, exports and imports, government consumption and revenue, tourism receipts, private remittances, foreign aid and its various components. The features and implications of the neoclassical and endogenous growth models will also be examined to determine the existence of short-term and/or long-term relationships to explain Tonga's growth pattern.

The results obtained from this study should provide empirical and policy implications about the effectiveness of macroeconomic variables on economic growth in Tonga. This will assist the Tongan government to allocate its resources more efficiently by setting

development strategies for the economy, and adopting monetary and fiscal policies that will promote macroeconomic stability and long run economic growth.

Section 1.2 introduces the methodology utilised in this study and the sources of the data employed in the analysis. Section 1.3 lists the chapter outlines of this study.

1.2 Data and Methodology

The growth models utilised in this study are based on the Solow-type neoclassical growth model. This is further extended to incorporate tourism receipts, fiscal variables, foreign aid and its various components, and private remittances. Time series data have been employed to estimate these growth models, and so this analysis uses the finite Auto-Regressive Distributed Lag (ARDL) methodology, which applies time series procedures to avoid spurious correlation in the regression analysis. The ARDL procedure has an advantage over other methodologies in that it avoids the pre-testing requirement of the classification of the order of integration.

The data employed in this study are obtained from four different sources. They are from the Tonga Statistics Department, Tonga Ministry of Finance, Asian Development Bank (ADB) and Organisation for Economic Co-operation and Development (OECD). The lack of a longer, consistent and reliable time series pertaining to the Tongan economy makes any empirical macroeconomic analysis difficult. Therefore these sources have been used simultaneously in order to acquire a complete data set for the analysis undertaken here, i.e. for the period 1970 to 1998.

Data provided by the Tonga Statistics Department were collected from their Provisional National Account (1999), Balance of Payment (BOP) Account report (various years), Population Census reports (1966, 1976, 1986, and provisional 1996 census), Consumer Price Indices Report (various years), Labour Force Survey Report (1990, 1993) and Tonga Statistical Abstract (various years). The data from Tonga's Ministry of Finance,

on the other hand, were obtained from the Budget Statement (1997/98) and the Audited Public Accounts (various years). The ADB data were acquired from the *Key Indicators for Asia and Pacific Countries* (various editions). Data on foreign aid and its various components: multilateral, bilateral, loan, grant and technical co-operation is obtained from OECD's *Geographical Distribution of Financial Flow to Development Countries* (various years).

1.3 Chapter Outline

This thesis contains six chapters. The first chapter introduces the aims and objectives of this study, and describes the structure of the thesis. Chapter 2 reviews the literature on economic growth. The first part of Chapter 2 focuses on the theory of growth models, especially the features and implications of the neoclassical and endogenous growth theories, and the empirical testing of them. The second part surveys the literature on the impact of foreign aid on Pacific Island economies and examines foreign aid's contribution to economic development and growth. Chapter 3 provides an overview of the Tongan economy, with a description of its historical background, and an analysis of its macroeconomic performance. An emphasis is placed on the proposed factors contributing to economic growth in Tonga, examining their respective impact on the economy. Chapter 4 presents the methodologies utilised in the econometric analysis and is divided into three parts. The first part develops the growth models based on the Solow-type neoclassical growth model. The second part explores the estimation method where the finite cointegration method of ARDL estimation was selected. The third part addresses the sources and the data employed in this study. Chapter 5 is devoted to the empirical results of the study. An investigation of the policy implications of the results is added to assist policy makers in promoting long-term economic growth for Tonga. Chapter 6 is the conclusion and discusses future research possibilities arising from this research work.