



A Publication of the Economic Growth Center, Yale University

---

ECONOMIC DEVELOPMENT  
OF TAIWAN, 1860–1970

SAMUEL P. S. HO

---

New Haven and London, Yale University Press, 1978

Copyright © 1978 by Yale University.  
All rights reserved. This book may not be  
reproduced, in whole or in part, in any form  
(except by reviewers for the public press),  
without written permission from the publishers.

Designed by Sally Sullivan Harris  
and set in Monophoto Times Roman type  
by Asco Trade Typesetting Limited, Hong Kong.  
Printed in the United States of America by  
Vail-Ballou Press, Binghamton, New York.

Published in Great Britain, Europe, Africa, and  
Asia (except Japan) by Yale University Press,  
Ltd., London. Distributed in Latin America by  
Kaiman & Polon, Inc., New York City; in  
Australia and New Zealand by Book & Film  
Services, Artarmon, N.S.W., Australia; and in  
Japan by Harper & Row, Publishers, Tokyo Office.

Library of Congress Cataloging in Publication Data

Ho, Samuel P S

Economic development of Taiwan, 1860–1970.

(Publication of the Economic Growth Center, Yale  
University)

Bibliography: p.

Includes index.

1. Taiwan—Economic conditions. I. Title. II. Series:  
Yale University. Economic Growth Center. Publications.  
HC430.5.H6 330.9'51'249 77-5555  
ISBN 0-300-02087-2

## Foreword

---

This volume is one in a series of studies supported by the Economic Growth Center, an activity of the Yale Department of Economics since 1961. The Center is a research organization with worldwide activities and interests. Its purpose is to analyze, both theoretically and empirically, the process of economic growth in the developing nations and the economic relations between the developing and the economically advanced countries. The research program emphasizes the search for regularities in the process of growth and changes in economic structure by means of intercountry and intertemporal studies. Current projects include research on technology choice and transfer, income distribution, employment and unemployment, household behavior and demographic processes, agricultural research and productivity, and international economic relations, including monetary and trade policies, as well as a number of individual country studies. The Center research staff hold professorial appointments, mainly in the Department of Economics, and accordingly have teaching as well as research responsibilities.

The Center administers, jointly with the Department of Economics, the Yale master's degree training program in International and Foreign Economic Administration for economists in foreign central banks, finance ministries, and development agencies. It presents a regular series of seminar and workshop meetings and includes among its publications both book-length studies and journal reprints by staff members, the latter circulated as Center Papers.

Hugh Patrick, Director

## Preface

---

The record of Taiwan's economic performance in the twentieth century is an enviable one. The economy, except for the period of World War II, has grown steadily, and indeed in the past two decades it has ranked among the fastest growing economies in the developing world. The rise in per capita income has been accompanied by dramatic changes in the structure of the economy. The evidence further suggests that in the last quarter of a century income distribution has become more equal. Apparently, economic growth in Taiwan, in contrast to what has happened elsewhere in the developing world, has been unusually egalitarian. Because of this performance, there exists considerable interest among development economists and policymakers in the Taiwan experience.

The purpose of this volume is to describe and to explain the economic development of Taiwan from about the 1860s to the 1970s, with particular emphasis on the period since 1900. It is generally recognized that the pace and pattern of economic development are influenced by political and social as well as economic forces, i.e., development has both an economic and a noneconomic dimension. Therefore, a full understanding of any economy would require the examination of both the economic and the noneconomic issues. Although a number of the major noneconomic forces, e.g., the Japanese occupation of the island, are explicitly remarked and taken into account in the analysis, the focus of this volume is primarily on the economic aspect of development. Thus, this study offers only a partial picture of Taiwan's development.

Economic progress in Taiwan during the twentieth century has been attained largely through the growth of peasant agricultural production made possible by the intensive application of modern inputs. In the



early part of the century most of the increased agricultural output was exported. Industrialization began gradually in the 1930s and accelerated after World War II, a process that has been facilitated by the continuing growth in agricultural productivity. An important dynamic element in Taiwan's economic development has been the government, which has played a central developmental role in the colonial period as well as during the period since independence. Government investments in material and human capital and the economic policies of the government have affected all aspects of Taiwan's economic development. In crucial periods the government also played a critical entrepreneurial role. This study concentrates on three sectors of supreme importance: peasant agriculture, manufacturing, and government. Fortunately, data are also relatively more accessible and of better quality in these areas. By focusing on these sectors, the study inevitably underplays the other aspects of the economy, in particular the commercial and financial sectors and the other services.

During the course of the preparation of a study such as this, one accumulates a long list of individuals and institutions to whom one is deeply indebted. One of the great pleasures of seeing the study published is the opportunity it provides to express publicly one's gratitude. Most of all, I am grateful to the Economic Growth Center at Yale University for affording me the opportunity to undertake this study and to the Joint Commission on Rural Reconstruction in Taiwan for providing me a base of operations during my period of field research in 1965-66.

In the past decade I approached many individuals and institutions in Taiwan for data and assistance. I am grateful to them for their courtesy and cooperation. I am especially indebted to the following: T. H. Shen, Y. C. Tsui, Y. T. Wang, T. H. Lee, I. G. Chen, Y. E. Chen, Myrna Lee, and Gary Lu of JCRR; M. H. Hsing of the Institute of Economics, Academia Sinica; T. K. Tsui and W. H. Yeh of the Council for International Economic Cooperation and Development; S. C. Pan of the Bank of Taiwan; C. E. Meng of the Central Bank of China; N. T. Lu of the Land Bank of Taiwan; C. C. Lee and C. L. Chang of the Directorate-General of Budgets, Accounts, and Statistics; and the Taiwan Provincial Library.

At one stage or another of my research I received valuable advice and suggestions from Thomas Birnberg, Raymond Goldsmith, Simon Kuznets, Ramon Myers, Hugh Patrick, Gustav Ranis, William Speidel, and Lloyd Reynolds. I am also grateful to the two anonymous referees

who read the first draft of this study and made valuable comments upon it.

The main financing for travel and research was provided by the Economic Growth Center. I also received financial support from the University of British Columbia Committee on Research and the UBC–Canada Council Small Grants Committee. The final version of this study was written during 1975–76, when I was on sabbatical leave, which was in part financed by a Canada Council leave fellowship. I would like to express my appreciation to the Canada Council for its generous support.

Portions of chapters 4 and 12 appeared in the *Journal of Economic History* and *Pacific Affairs*, respectively. I am grateful to the editors of these journals for permission to use material that originally appeared in their publications.

A large share of the cost of preparing a book inevitably falls on one's spouse. I cannot begin to speak of what I owe to my wife's affection and good-natured support.

## Abbreviations

---

AID	Agency for International Development (United States)
BOT	Bank of Taiwan
CBC	Central Bank of China
CIECD	Council for International Economic Cooperation and Development (Republic of China)
CUSA	Council on U.S. Aid (Republic of China)
DGBAS	Directorate-General of Budgets, Accounts, and Statistics (Republic of China)
ESB	Economic Stabilization Board (Republic of China)
GDP	gross domestic product
GNP	gross national product
JCRR	Sino-American Joint Commission on Rural Reconstruction
LDC	less developed country
MOEA	Ministry of Economic Affairs (Republic of China)
MOF	Ministry of Finance (Republic of China)
NT\$	New Taiwan dollars
OT\$/T¥	Old Taiwan dollars/Taiwan yen
PBAS	Provincial Bureau of Accounting and Statistics
PDAF	Provincial Department of Agriculture and Forestry
PDCA	Provincial Department of Civil Affairs
PDOF	Provincial Department of Finance
PDOR	Provincial Department of Reconstruction
PFB	Provincial Food Bureau
ROC	Republic of China



## Contents

---

List of Tables	ix
Foreword	xv
Preface	xvii
Abbreviations	xx
1. Introduction	1
2. The Traditional Economy	7
<i>Early Settlements. Taiwan's Economy in the Ch'ing Dynasty.</i>	
3. Economic Development under Colonialism	25
<i>Economic Trends and Mode of Operation. The Agent of Growth.</i>	
4. The Making of Modern Agriculture	41
<i>Rural Framework. Production and Sources of Growth. Technology and Agricultural Transformation. Agricultural Productivity and Agricultural Surplus.</i>	
5. The Industrial Enclave	70
<i>Extent and Pattern of Industrialization. Sources of Industrial Labor and Capital.</i>	
6. Colonial Development and the Taiwanese	91
<i>Real Wage. Per Capita Consumption.</i>	

7. Postwar Development: Problems, Strategies, and the Role of Foreign Aid	103
<i>Problems and Strategies. Foreign Aid and Development.</i>	
8. Economic Growth and Structural Changes, 1952–1972: A Quantitative Record	121
<i>Output and Aggregate Productivity. Changes in Economic Structure. Demographic Changes. Income Distribution.</i>	
9. Postwar Growth and Structural Changes in Agriculture	147
<i>Trends in Output, Input, and Productivity. Population Growth, Farm Size, and Rural Underemployment. Land Reform and Agricultural Development. Government Policy and Agricultural Development.</i>	
10. Postwar Industrialization: Record and Policy	186
<i>Development Strategy and Industrial Growth. Inputs and Industrial Growth.</i>	
11. Consumption and Investment in Postwar Taiwan	224
<i>Consumption and Living Standards. Investment. The Financing of Investments.</i>	
12. Lessons and Prospects	247
<i>Lessons from the Past. Prospects for the Future.</i>	
Statistical Appendix	261
<i>National Income Statistics. Historical and Benchmark Data.</i>	
Selected Bibliography	427
Index	443

## Tables

---

2.1	Chinese Population and Cultivated Land in Taiwan	8
2.2	Value of Major Export Commodities as a Percentage of Value of Total Export, 1868–94	14
2.3	Value of Major Import Commodities as a Percentage of Value of Total Import, 1868–94	15
2.4	Production and Export of Sugar, 1865–99	19
2.5	Tea Export, 1866–98	22
3.1	Selected Indicators of Economic Development during the Colonial Period	27
3.2	Composition of Exports and Imports, 1900–39	30
3.3	Functional Distribution of Total Expenditures of the Government-General, Selected Years	34
3.4	Fixed Capital Formation of the Government-General Distributed by Use	36
3.5	Total Investment in Irrigation Facilities over Five-Year Periods	37
4.1	Fitted Growth Rates of Agricultural Production, Various Periods	46
4.2	Agricultural Output and Inputs, 1910–42	50
4.3	Indexes of Agricultural Productivity	54
4.4	Estimated Annual Rates of Productivity Increase, $\lambda$ , for Alternative Sets of $\alpha$ 's	55
4.5	Per Unit Area Consumption of Fertilizer, Annual Averages	60
4.6	Agricultural Surplus, 1911–40	67
5.1	Fitted Annual Compound Growth Rate by Industry	72
5.2	Index of Labor Productivity in Manufacturing and Mining, 1920–39	76
5.3	Estimated Handicraft Employment: 1915, 1920, 1930, 1940	79

5.4	Occupational Composition	82
5.5	Share of Dividends in Net Profit in Joint Stock Companies	85
5.6	Distribution of Paid-up Capital of Companies by Type of Organization and by Nationality of Ownership, 1929	86
6.1	Average Real Wages by Industry, 1910–38	92
6.2	Per Capita Food Availability, 1910–44	94
6.3	Availability of Selected Consumer Goods	99
7.1	Burden of National Defense, Selected Less Developed Countries	109
7.2	United States Economic and Military Assistance to Taiwan, Net Obligation and Loan Authorizations	110
7.3	Allocation of United States Economic Aid to Taiwan, by Sector of the Economy	118
8.1	Economic Indicators, 1951–73	122
8.2	Average Rate of Growth of GDP for Taiwan, Other Developing Countries, and Developed Countries	124
8.3	Indexes of Real GDP and Factor Inputs, 1952–72	125
8.4	Sources of Output Growth	126
8.5	Annual Growth of Real GDP by Industrial Origin	128
8.6	Industrial Structure, Selected Years	129
8.7	Labor Deployment, 1940–74	131
8.8	Composition of Exports and Imports, Selected Years	134
8.9	Changes in Fertility Rates: Selected Years, 1960–72	137
8.10	Size Distribution of Personal Income, and Gini Ratios, Selected Years	141
9.1	Average Annual Rates of Growth in Agricultural Production by Major Components	148
9.2	Indexes of Agricultural Outputs and Inputs	152
9.3	Estimated Consumption of Fertilizer Nutrients per Unit of Cultivated Area	154
9.4	Sources of Agricultural Output Growth, 1951–70	155
9.5	Extent of Off-Farm Economic Activity by Farm Size, 1960	157
9.6	Extent of Land Reform	163
9.7	Effect of Land Reform on the Income of Tenant-Cultivator, 1948–59	169
9.8	Agricultural Financing by Source of Funds, FY 1961	176
9.9	Composition of Fixed Capital Formation in Agriculture, 1952–59	177

10.1	Average Annual Growth Rates of Industrial Production, 1949–73	188
10.2	Import as a Percentage of Supply, Selected Commodities	188
10.3	Import Coefficients by Manufacturing Industry: 1954, 1961, 1966	190
10.4	Comparison of Domestic Prices and Import Costs of Selected Manufactured Commodities, 1953	192
10.5	Export Performance, 1952–72	199
10.6	Export as a Percentage of Production, by Industry	201
10.7	Composition of Manufacturing Sector and Allocation of Change	202
10.8	Contribution to Real GDP by Early, Middle, and Late Industries	204
10.9	Employment in Manufacturing Industries according to the First, Second, Third, and Fourth Commercial and Industrial Censuses	207
10.10	Census Value-Added per Employee and Total Asset in Operation per Employee by Industry, 1966	209
10.11	Exports by Major Commodity Groups	210
10.12	Composition of Employed Persons in Manufacturing, by Occupation and Skill: 1954, 1961, 1971	212
10.13	Persons Engaged in Industry, by Education, 1943 and 1966	213
10.14	Gross Fixed Capital Formation in Manufacturing	216
10.15	Distribution of Product and Employment in the Manufacturing Sector: 1954, 1961, 1966	217
10.16	Selected Principal Machinery and Equipment by Industry and by Years of Use, 1961	219
10.17	Production as a Percentage of Productive Capacity for Selected Manufactured Products	222
11.1	Distribution of GNP by Final Use, 1951–73	225
11.2	Per Capita Consumption and Other Standard-of-Living Indicators	227
11.3	Distribution of Government Consumption by Purpose	230
11.4	Composition of Gross Domestic Capital Formation	232
11.5	Distribution of Gross Fixed Capital Formation by Economic Sector	234
11.6	National Savings and the Financing of Gross Domestic Capital Formation	236
11.7	Structure of National and Foreign Savings	237

11.8	Long-term Foreign Credits and Loans Received, by Major Source	238
11.9	Structure of Taxes, Selected Years	241
11.10	Deposits of All Banks by Type, and Time and Savings Deposits by Maturity	245
12.1	Annual Growth Rate of Prices	254
A1	National Income Estimates, 1911–44	284
A2	Gross National Expenditure in Constant 1934–36 Prices	286
A3	Gross National Income and Product Account, 1951–72	287
A4	Personal Income Account, 1951–72	290
A5	Government Revenue and Current Expenditure Account, 1951–72	293
A6	Gross Domestic Capital Formation Account, 1951–72	296
A7	External Transactions Account, 1951–72	299
A8	Industrial Origin of Gross Domestic Product at Factor Cost, 1951–72	302
A9	Real Expenditure on Gross Domestic Product, 1951–72	305
A10	Population at Census Dates by Nationality	312
A11	Total Year-end Population and Vital Rates, 1905–73	313
A12	Age-Specific Mortality Rate: 1955, 1960, 1965	315
A13	Total Population at Census Dates by Age and Sex	316
A14	Year-end Population of Five Major Municipalities, 1925–70	319
A15	Registered Medical Personnel, Selected Years	320
A16	Daily Per Capita Nutrient Availability, 1935–64	320
A17	School and University Enrollment by Type of Academic Institution, Selected Years	321
A18	Number of Teachers by Type of Academic Institution, Selected Years	322
A19	Ability of Taiwanese to Speak, Read, and Write Japanese: Census Years, 1905–40	322
A20	Literacy of the Population, Age 12 and Over	323
A21	Occupied Males Distributed by Occupation at Census Dates: 1905, 1915, 1920, 1930	324
A22	Occupied Persons by Industry, Census Years	326
A23	Employment in Manufacturing and Utilities, 1914–41	327
A24	Labor Force, Employment according to the Labor Force Surveys, 1963–75	331
A25	Employed Persons by Industry according to the Labor Force Surveys, 1964–74	332

A26	Occupation of Employed Persons, Census Years	333
A27	Employed Persons by Employment Status: Census Years 1956, 1966, 1970	333
A28	Industrial Employment according to Industrial Censuses	334
A29	Male Laborers by Level of Skill and by Nationality, 1943	335
A30	Indexes of Money Wages, 1910–42	336
A31	Indexes of Money and Real Wage by Major Economic Sector, 1953–70	339
A32	Agricultural Production Indexes, 1946–74	340
A33	Indexes of Agricultural Production, 1901–64	341
A34	Agricultural Price Indexes, 1952–74	347
A35	Utilization of Registered Land, Selected Years	348
A36	Number of Owner-Families by Size of Holding: 1920, 1932, 1939, 1952	349
A37	Number of Farm Families by Size of Cultivated Land: 1920, 1932, 1939, 1949	351
A38	Number and Area of Farm Holdings by Size of Culti- vated Land and Mode of Operation, Dec. 31, 1960	352
A39	Cultivated and Irrigated Area and the Multiple Cropping Index, 1901–70	353
A40	Land Cultivated by Owners and Tenants, Survey Years	354
A41	Number of Farm Households by Tenure System: Selected Years, 1922–70	355
A42	Crop Area of Major Crops: Selected Years, 1901–68	356
A43	Production, Acreage, and Yield for Rice, Sweet Potatoes, and Sugar Cane, 1901–70	357
A44	Estimated Consumption of Farm-Produced Fertilizer by Major Varieties, 1910–64	358
A45	Estimated Consumption of Purchased Commercial Fer- tilizer, 1901–48	360
A46	Chemical Fertilizer Distributed, by Nutrients, 1932–64	362
A47	Price of Rice, 1924–72	363
A48	Local Wholesale Prices of Selected Agricultural Pro- ducts, 1960–71	364
A49	Indexes of Industrial Production, 1912–46	365
A50	Indexes of Industrial Production, 1946–62	368
A51	Indexes of Industrial Production, 1961–72	371
A52	Index Numbers of Prices of Industrial Products, 1952–69	372
A53	Availability of Main Building Materials, Selected Years	374
A54	Power Consumption by Industry	375



A55	Overland Transportation: Freight Carried	376
A56	Manufacturing Establishments by Size of Work Force	377
A57	Manufacturing Enterprises by Number of Workers Engaged, Census Years	378
A58	Export and Import Volume Indexes, 1868-94	379
A59	Import and Export Volume Indexes, 1900-42	380
A60	Old Export and Import Volume Indexes, 1952-62	386
A61	New Export and Import Volume Indexes, 1961-73	387
A62	General Export and Import Price Indexes, 1952-74	389
A63	Taiwan Export and Import Classified according to SITC, Selected Years	391
A64	Distribution of Exports by Country: Selected Years, 1897-1968	392
A65	Distribution of Imports by Country: Selected Years, 1897-1968	393
A66	Major Changes in Official Exchange Rates	394
A67	Balance of Payments, 1924-39	397
A68	Balance of Payments, 1950-68	401
A69	Money Supply, 1900-42	408
A70	Money Supply and Its Components, 1949-74	412
A71	Selected Interest Rates, 1949-74	413
A72	Net Revenues and Net Expenditures, All Levels of Government: Selected Fiscal Years	414
A73	GNP Deflator and Its Components, 1951-72	415
A74	Wholesale Price Indexes for Major Cities, 1910-41	418
A75	Taipei City Retail Price Indexes, 1930-42	420
A76	Mizoguchi's Indexes of Consumer Prices, 1903-38	421
A77	Indexes of Wholesale Prices and Urban Consumer Prices, 1950-74	422
A78	Indexes of Prices of Industrial Raw Materials, 1952-68	423
A79	Indexes of Prices Received and Paid by Farmers, 1952-72	424

## Introduction

The island of Taiwan lies astride the Tropic of Cancer, between the Malay Archipelago and Japan, and is separated from mainland China by the Taiwan Strait. Its area of 35,855 square kilometers (13,840 square miles) is slightly larger than the Netherlands or about the combined size of the states of Connecticut, Massachusetts, and Rhode Island.<sup>1</sup> In terms of natural resources, Taiwan is only modestly endowed. Its most important mineral resource is coal, estimated at about 700 million metric tons, but because of the narrowness and the depth of most seams, only one-third of the reserve is economically recoverable.<sup>2</sup>

Taiwan's most important natural resource is its agricultural land, but this too is limited in quantity as well as in quality. Only one-fourth of its total area is arable, and after centuries of continuous intensive use, the natural fertility of its farmland is low and diminishing. Taiwan, which in 1974 had a population of more than 15.8 million, has a population density of around 440 persons per square kilometer, one of the highest in the world. Taiwan's chief agricultural advantage is its subtropical climate, which extends the growing season and allows the cultivation of several crops a year. The semitropical climate also provides Taiwan with the rainfall and humidity necessary for plant growth. However, rainfall varies both seasonally and geographically;

1. DGBAS, *Statistical Abstract of the Republic of China*, 1973, p. 26.

2. Willert Rhynsbarger, *Area and Resources Survey: Taiwan*, pp. 152-53. Taiwan, which lies in the same geological belt as the other important oil-producing areas in the Far East, is well endowed with all the essential requisites for the generation, accumulation, and retention of oil and gas. In recent years a small number of petroleum and natural gas reserves have been discovered, and most geologists concur in the belief that the prospect of finding additional oil and gas reserves in Taiwan or off its coast is good.