

Capital Utilization in Manufacturing

**Colombia, Israel,
Malaysia, and the Philippines**

**Romeo M. Bautista
Helen Hughes
David Lim
David Morawetz
Francisco E. Thoumi**

A World Bank Research Publication

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PUBLISHED FOR THE WORLD BANK
Oxford University Press

Oxford University Press

NEW YORK OXFORD LONDON GLASGOW
TORONTO MELBOURNE WELLINGTON HONG KONG
TOKYO KUALA LUMPUR SINGAPORE JAKARTA
DELHI BOMBAY CALCUTTA MADRAS KARACHI
NAIROBI DAR ES SALAAM CAPE TOWN

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for Reconstruction and Development / The World Bank
1818 H Street, N.W., Washington, D.C. 20433 U.S.A.

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Bank, to its affiliated organizations, or to any
individual acting in their behalf.

Library of Congress Cataloging in Publication Data

Main entry under title:

Capital utilization in manufacturing.

Bibliography: p.

1. Capital. 2. Capital productivity. 3. Industrial capacity. I. Bautista, Romeo M., 1941-
II. World Bank.

HD39.C367

332'.041

81-9526

ISBN 0-19-520268-6

AACR2

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Glossary

Terms

CBS	Central Bureau of Statistics (Israel)
DANE	Departamento Administrativo Nacional de Estadística (Colombia)
ECAFE	Economic Commission for Asia and the Far East, now
ESCAP	Economic and Social Commission for Asia and the Pacific
GDP	Gross domestic product
GNP	Gross national product
ILO	International Labour Office
ISIC	International Standard Industrial Classification
MIC	Malaysian Industrial Classification
NEDA	National Economic Development Authority (Philippines)
n.e.c.	Not elsewhere classified
SITC	Standard International Trade Classification
UNIDO	United Nations Industrial Development Organization

Principal Symbols

A	Age of plant
β_2	Second-shift wage premium (afternoon and evening)
β_3	Third-shift wage premium (night)
β_4	Weekend wage premium
β_5	Overtime wage premium
CP	Continuous process
d	Percentage annual rate of depreciation
E	Total employees
E_p	Production employees (blue-collar workers)

g	Subsidy to capital through differential income tax provisions
IM	Imported inputs as a percentage of total inputs
IU	Inputs not available at times
K	Fixed capital
KIB	Kibbutz-owned plant
L	Daytime crew size
LOC	Location of plant
LS	Legal status
M	Competing imports as percentage of total supply
MC	Market concentration
NT_f	Foreign ownership
P_k	Cost of owning capital during one year
P_m	Cost of capital stock
PER	Perishability of output
r	Annual real rate of interest
s	Rate of subsidy on interest rate
su	Subsidy on price of capital
S_{va}	Scale, value added
S_k	Scale, capital
S_e	Scale, total employees
S_{ep}	Scale, total blue-collar workers
S_s	Scale, sales
T_k	Tariff rate on imported capital goods
U_1	Actual time utilization of capital
U_2	Actual time and intensity utilization of capital
U_3	Actual capacity utilization
U_4	Ratio of actual time utilization of capital to actual capacity utilization
U_5	Desired time utilization of capital
U_6	Actual time utilization as a proportion of desired time utilization
U_e	Electricity utilization
UW	Unweighted utilization
V_i	Price variations of nonlabor inputs
V_q	Seasonal variations in output
V_s	Seasonal variations in demand
W	Gross wages (including fringe benefits)

W_n	Net wages
WS_1	Wage payment on monthly basis
WS_2	Wage payment on piecework basis
X	Exports as a percentage of domestic production
Z	Exchange rate applicable to imports of capital goods

Preface

This study of capital utilization was conceived late in 1972, based in part on Gordon Winston's insights into the problems of capacity utilization in developing countries. The fieldwork was carried out during 1973–74, but ensuing changes in the world economy and other commitments by the authors delayed its completion. Some eight years later the issues and findings still seemed relevant to the problems of development, and the authors decided to prepare the work for publication. The project developed with so much mutual interaction that individual attribution is not possible except for the chapters on individual countries.

The World Bank provided the basic funding for the study through its research budget. Supplementary support was provided by the Fundación para la Educación Superior y el Desarrollo in Colombia; by the Falk Institute for Economic Research in Israel and the Eshkol Institute for Economic, Social, and Political Research and the Hebrew University in Jerusalem, Israel; by the University of Malaya in Malaysia; and by the National Economic Development Authority and the University of the Philippines in the Philippines. Part of the Israeli research was supported by a grant from the Ford Foundation received through the Israel Foundations Trustees. We owe a particular debt for the time and resources busy public servants made available to us in all four countries, and to the equally busy manufacturers who took the time to be interviewed.

Each country study represents the work of a team. In the case of the Colombia study, we wish to thank José Francisco Escandón, who organized and undertook much of the survey work, and Orffa Libia Montoya and Deborah Millican, who helped with the data processing.

In Israel we wish to thank Galilia Plotkin of "Otot" Surveys, Tel Aviv, and Yaakov Winer, who did a painstakingly thorough job in coordinating the field work; and Moshe Nordheim, Yaakov Shimoni, Yoav Nardi, Yaakov Kalberman, Ezra Darvish, Arie Iserless, and Miriam Herman, who helped with data collection and processing.

In Malaysia we wish to thank Henry Tan for coordinating and carrying out a significant proportion of the fieldwork and the many students who

helped with various aspects of the data collection. We would also like to thank Ramesh Chander and G. K. Nair of the Department of Statistics for assistance in establishing the sampling framework and Choong Koi Yoon of the computer center of the University of Malaya for help in processing the data.

In the Philippines R. Bacani, R. Carrion, B. Diokno, R. Fabella, M. Fernandez, S. Hamoy, and C. Padua assisted in the survey of interviews and data processing.

Finally, a number of our colleagues encouraged us to persist throughout the study's many vicissitudes. Gerardo P. Sicat's active support was essential to the Philippine component of the study; C. L. Robless, Paul Clark, and Gan Wee Beng were extremely helpful in Malaysia.

We are grateful to Roger R. Betancourt, Christopher K. Clague, Robin Marris, and several anonymous readers for comments and helpful suggestions.

We owe Greg Zafros particular thanks for undertaking the processing of the comparative analysis of countries and generally for dealing with computer problems in Washington. Naimeh Hadjitarkhani worked on the project for most of its duration, facing its many maddening difficulties with intelligence, painstaking care, and a smile. Nira Goyal assisted the authors in 1978-79, and Marie Boudier helped with some final regressions in 1980. Whitney Watriss and Komola Ghose edited the manuscript, and Jane Carroll prepared it for publication. S. A. D. Subasinghe prepared the figures, Harry Einhorn read and corrected proof of the book, and James Silvan and Ralph Ward provided the index.

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Chapter 1

Introduction and Summary

Much of the capital-intensive bias in the development policies of the 1950s and 1960s can be attributed to the emphasis on capital accumulation as the principal determinant of economic growth. It was argued that increments in capital would lead to increases in productivity, output, saving, and investment; the more capital there was, the faster development would be. The outcome was a strong trend toward capital-intensive industrialization as the spearhead of development.

By the mid-1960s, actual experience with development was throwing increasing doubt on so narrow a view. Countries which had chosen a labor-intensive approach to production were doing well, providing food, clothing, shelter, education, and basic health services to the bulk of their populations. The People's Republic of China was the prime example. In contrast, underemployment with pockets of acute poverty was endemic in most countries that had chosen capital-intensive industrialization strategies. Balance of payments difficulties accompanied relatively low, long-term growth rates. Not surprisingly, the role of capital in development began to be reexamined. A new focus emerged, with the emphasis on choosing an appropriate mix of products and production techniques, on the possibilities of capital-labor substitution, and on the intensiveness with which capital is used.

Intensity of capital utilization has several aspects. One is the proportion of time—of a day, a month, or a year—a piece of equipment or a building is in use in production. However, intensity is also determined by how well a plant is laid out, how efficiently equipment is integrated in the production process, that is, how well operations are matched, how intensively machines are operated, the length and frequency of downtime, the management of maintenance operations, and similar issues. Entrepreneurs refer to this aspect as production engineering, and in a growing economic literature these characteristics of production efficiency are given such rubrics as “learning by doing” and “X efficiency.” If the level of capital