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PREVIEW

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ECONOMETRIC MODEL OF DEVELOPMENT STRATEGIES IN IRAQ: 1951-1980

The University of Nebraska - Lincoln

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PREVIEW

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Econometric Model of Development

Strategies in Iraq: 1951-1980

by

Adil Hasan Mouhammed

A DISSERTATION

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The Graduate College in the University of Nebraska-Lincoln
In Partial Fulfillment of Requirements
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Major: Economics

Under the Supervision of Professor Harish C. Gupta

Lincoln, Nebraska

November, 1984

TITLE

Econometric Model of Development Strategies

in Iraq: 1951-1980

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UNIVERSITY OF NEBRASKA

ECONOMETRIC MODEL OF DEVELOPMENT STRATEGIES
IN IRAQ: 1951-1980

Adil H. Mouhammed, Ph.D.

University of Nebraska, 1984

Advisor: Harish C. Gupta

This study is a statistical analysis on the theoretical foundations of the identification of development strategies of Iraq for the 1951-1980 period.

Two approaches of isolating development strategies--the investment allocation and the structural change--were developed and compared statistically.

The allocation approach shows the actual investments in major economic sectors under the various development plans. The conclusion, derived by this approach, is that the first two development plan strategies (1951-1958) were primary oriented, i.e., their essential feature was to develop the agricultural sector. In contrast, the third development plan (1959-1962) was social overhead capital oriented, because it allocated a high proportion of the total investment funds to expand the basic infrastructure of the economy. The remaining three development plans (1965-1980) were shown to be industrial oriented.

To test the best orientation of these development strategies, the "canonical correlation" was used, and it turns out that the best strategy would have been to develop

agriculture, the distribution system, the services, the mining and then the manufacturing sector.

Since this approach was essentially related to development planning, the planning mechanism was described and critically analyzed. It was concluded that development planning was poorly performed, and was an obstacle to economic development of Iraq, because it was a grossly imperfect substitute to the market mechanism, and not complementary as it should be.

With respect to the structural change approach, the basic propositions of structural changes in terms of output, international trade, employment, and income use were tested statistically. It is found that the economy witnessed structural change in all these aspects except exports because it continued to depend upon the export of one primary product, oil.

The structural changes were estimated by constructing a complex econometric model to investigate the orientations of the various development plan strategies. The finding is that all development plan strategies were primary oriented.

The results obtained from using these approaches were analyzed and attributed to three basic problems embodied in the backwardness of the industrial sector; poor performance of the related sectors, and to the inequitable distribution of income.

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I dedicate this work to my wife Majda, our sons Mouhammed and Hayder, my mother Wajeehah, and my brother Ali for their patience during all the years of my graduate study.

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CHAPTER I

INTRODUCTION

To achieve a set of given objectives and to transform an economic system from a backward to an advanced state of development, new development strategies may be needed.

Development economics offers various kinds of development strategies, which require different economic conditions and policies to be implemented successfully.

Industrialization strategy aims to build up a technical base for an economy, which can bring about structural changes and increase per capita income. This strategy may take two different forms.

(1) Promotion of industrial exports through providing incentives to induce producers to expand exports. This policy, adopted by Taiwan and Korea, allows for greater capacity utilization, exploitation of economics of scale, technological improvement, increased employment, and allocation of economic resources according to comparative advantage. Iraq, to my knowledge, has never tried this form of industrialization.

(2) The other form is the import substitution strategy. This form is not unique; it can be found within other types of development strategies. It may be loosely defined as the process of producing domestically goods which were previously imported. This strategy has been adopted by most

Latin American countries and in Iraq as well, specifically in the development plans for 1970-1974 and 1976-1980 which tried to develop imports--replacing fertilizer, textile, petrochemical, steel and aluminum industries, among others. The common results of this strategy are misallocation of resources, high inflation, technical inefficiency, and decline in agricultural exports because of high domestic prices compared with world market prices.

Another type of development strategy is based upon the export of primary products. This requires expanded production and export of primary commodities.

In contrast, a social overhead capital (SOC) oriented strategy tries to develop irrigation, transport, and electricity, etc., as a base for future economic development. According to Hirschman,¹ this strategy is considered to be, in one part, as the starting point of development that leads to induced investments in "Directly Productive Activity" (DPA) until a balance between SOC and DPA is restored. This type of development strategy has been adopted in India (first plan) and Pakistan (development plans of 1955-1960 and 1960-1965) and in Iraq during the 1959-1962 period.

The last typology of development strategies is "big push" or "balanced growth", supported by Nurkse,² Lewis,³ and Rosenstein-Rodan,⁴ who advocate this approach because of its great potential for external economies. Such a development strategy would require a large investment and would

create an interactive process to develop an economy.

Iraqi government has criticized this strategy because, "It is an unrealistic approach to economic development in Iraq."⁵ This strategy never found "a room" to be implemented in Iraq because the limited absorptive capacity of the economy, on the one hand, and large investment requirements, on the other, do not allow it to be undertaken in Iraq.

As indicated above, Iraq has implemented different development strategies under various political regimes during the 1951-1980 period, starting from one in which the private sector was leader to one in which the public sector became the leader, and from a simple form of planning to a highly centralized planning to allocate the nation's economic resources.

Therefore, these development strategies ought to be analyzed and isolated and their economic consequences evaluated objectively. This is essential in order to propose a future development strategy for Iraq.

1.1 Objectives of the Study

The main objective of this study is to isolate and identify the development strategies of various economic development plans pursued by the Iraqi authorities during the 1951-1980 period. Furthermore, the study would measure the impact of each strategy upon the economic development in Iraq and specify which strategy had the most impact.

1.2 Significance of the Study

The significance of this work can be explained by the following points:

1. It is the first attempt to undertake such a study for less developed countries in general, but particularly for Iraq. Moreover, this study will complement the works of Fisher,⁶ Clark,⁷ Kuznets,⁸ and Chenery.⁹

2. The identification of development strategies would allow us to know the strategies actually pursued by Iraq, on the one hand, and on the other, to infer the expected behavior and growth of Iraqi economy in the future.

3. Iraq, like many other developing countries, has been changing her development strategies to achieve rapid growth and development. Therefore, identification of development strategies will allow us to investigate the effects of each strategy on economic growth and structural changes, and thus enable us to isolate the strategy (or strategies) which had the most impact upon the economy.

4. The importance of this study comes from the limitations of the existing literature.

Studies by Fisher,¹⁰ Clark,¹¹ and Kuznets¹² have tried to show the relative increase (or decrease) in such macro-economic variables (structural components) as changes in the relative sectoral importance as GNP rises.

Although these studies are important and are the basis of this study, their drawback lies in their restricted

nature, namely, that they do not go far enough to identify and isolate the development strategies of countries studied.

Chenery tried to accomplish this task for the less developed countries (LDCs). However, his model suffers from the following four major shortcomings:

(1) Chenery's model used cross-section analysis to isolate development strategies. This type of analysis, i.e., the cross-section analysis, does not allow a study of the structural changes in a country over a long period of time, and the dynamic nature of development. However, it does allow the investigation of development strategy at a given point of time, and the "point of time study" is not sufficient to isolate different development strategies pursued by a country over a long period of time. Moreover, the "point of time study" tells nothing about the structural changes in a country.

(2) Chenery's model used two indices, the trade and production orientation, to isolate the development strategies. These two indices are not sufficient to isolate all different strategies.

This work will use three indices in order to achieve a more accurate and precise identification of development strategies.

(3) Chenery's model only used one approach: the structural change approach. However, for more accurate identification of development strategies, one should use more than

one approach, and for this reason I will also use another approach - the investment allocation approach - in addition to the structural change approach.

(4) Chenery's model did not investigate the impact of each strategy upon the economic growth of LDCs. From our viewpoint, this is very important and should be undertaken to achieve accurate results.

This study, finally, will formulate a comprehensive model for identifying and isolating the development strategies of Iraq.

1.3 Methodology of the Study

The methodology used in this study is largely empirical, but the various analyses are consistent with the existing theoretical constructions. Initially the effects of various income levels on economic structural components will be examined in a single equation model to test the hypotheses of Fisher, Clark, and Kuznets with respect to the Iraqi economy. Moreover, other statistical specifications, such as a macroeconometric model, will be constructed and estimated for the Iraqi economy.

Finally, mathematical specifications and statistical analysis will be the basic tools of this study.

1.4 Outline of the Study

The study is organized into seven chapters. Chapter II reviews the past studies which have used the allocations and

structural change approaches. In particular, this review will focus upon the empirical results of important studies and the structures of models employed. This discussion would serve as a point of departure for the present study.

Chapters III and IV will discuss the investment allocation approach for isolating the development strategies. Chapter III will outline Iraq's nine economic development plans for the 1951-1980 period and discuss their objectives and the planned allocation of resources. Chapter IV contains an analysis of the performance of each development plan in terms of actual development expenditures. Accordingly, the development plan strategies shall be isolated and identified on the basis of the allocation of investment to different economic sectors or activities. Moreover, this chapter will discuss the impact of each strategy on the economic development of Iraq.

In Chapters V and VI the structural approach will be analyzed. Chapter V contains an analysis of the structural features of the Iraqi economy as specified by the structures of output, international trade, employment, and income use. Furthermore, the relationship between income and other structural components shall be investigated.

Chapter VI will tackle the problem of isolating development strategies by constructing and estimating the macroeconomic model. These estimations will allow us to use the three indices to identify the typology of development strategies.

Chapter VII will compare the results of the two approaches and reveal whether they both give similar or different results and analyze the reasons thereof. This chapter will, also, present a summary and conclusions of this study.

PREVIEW

FOOTNOTES

1. Hirschman, A., The Strategy of Economic Development (New Haven: Yale University Press, 1958), pp. 62-63.
2. Nurkse, R., Problems of Capital Formation in Underdeveloped Countries (Oxford: Basil Blackwell & Mott, Ltd, 1953), pp. 10-11.
3. Lewis, W. A., The Theory of Economic Growth (Illinois: Irwin, Inc., 1955), pp. 276-77, 388-89.
4. Rosenstein-Rodan, P. N., "Problems of Industrialization of Eastern and Southeastern Europe," The Economic Journal, June-September 1943, pp. 204-7; and, "Notes on the Theory of the 'Big Push'," in Ellis, H. S. (ed.), Economic Development for Latin America (New York: St. Martin's Press, 1961), pp. 57-58, 60-62, 65-66.
5. The Arab Báth Socialist Party, The Political Report of the Eighth Regional Congress (Baghdad: Government Press, 1974), p. 131.
6. Fisher, A. G., "Economic Implications of Material Progress," International Labor Review, July, 1935, pp. 6-18; and The Clash of Progress and Security (New York: Augustus M. Kelley, 1966).
7. Clark, C., The Condition of Economic Progress, 2nd ed. (London: Macmillan, 1957).
8. Kuznets, S., Modern Economic Growth (New Haven, Yale University Press, 1967).
9. Chenery, H. and Syrquin, M., Patterns of Development, 1950-1970 (London: Oxford University Press, 1975).
10. See Ref. 6.
11. See Ref. 7.
12. See Ref. 8.

CHAPTER II

SURVEY OF THE LITERATURE

With respect to the investment allocation approach, A. N. Agrawal, commenting on the development strategy of India, wrote that "one can, however, draw inferences for an outline of a strategy from the picture of allocation of outlays to different sectors . . ."¹

For India's first five year plan, Agrawal found that the priority was given to the agricultural sector, social services, and communications and transport. Hence, he called the plan's strategy a strategy for rapid growth of national income consisting mostly of agricultural goods.

This study will utilize the investment allocation approach to show that national development strategies can be isolated and identified by looking at a nation's allocation of its investment funds to different sectors over a long period of time.

The second approach, "the structural change approach" shall be used together with the allocation approach to test if the outcome of two approaches is same or different.

The essential theoretical and empirical backgrounds for the structural approach originally emanated from Engel.

By studying household budgets, Engel was able to derive the well-known laws of consumption behavior as income rises.

Zimmerman² stated Engel's law clearly. He wrote, "As