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Agriculture and Economic Growth: Theory and Measurement

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to reduce the variability of after-tax income. However, producers bear much of the risk management responsibility with the assistance of commercial production and market-risk management instruments.

The book provides a good overview of contemporary agricultural risk management challenges and responses in OECD countries. Although there are occasional lapses, it is generally well written. Instructors for advanced undergraduate policy and risk management courses might use this book as a reference on the context and institutions for agricultural risk management. Researchers and extension educators may also find the book useful as a source of information on current agricultural risk management problems and policy responses. The book is heavily oriented towards western Europe, North America, Australia and New Zealand with little reference to experiences of other OECD members in eastern Europe, east Asia, Mexico, and Turkey. There is little discussion of the difference in policy objectives and responses between less developed countries with large agricultural sectors and more advanced economies where agriculture accounts for a smaller share of economic activity. While Morredu notes the relatively large share of non-farm income earned by farm households in many OECD countries, the book has little to say about the implications this has for farmers' risk management strategies and government policies to facilitate risk management. In spite of these limitations, the book will be of interest to those concerned with policy responses to income risk in agriculture.

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Agriculture and Economic Growth: Theory and Measurement
Yair Mundlak (Ed.), Harvard University Press, Cambridge, MA, 2000, 479 pp., US$ 55, ISBN 0-674-00228-8

The main theme of Mundlak's *Agriculture and Economic Growth* is the importance of studying agriculture in the context of the whole economy rather than in isolation. Within this general equilibrium context, the author emphasises the interdependence of agriculture and the economic environment, in particular, the influence of world prices and policies on technology choice, resource allocation and growth. He does so by identifying important issues in agricultural development in both rich and poor countries, using the tools of general equilibrium theory to formalise ideas about these issues, and by econometrically testing the implications of the analytical treatment.

The book is motivated in Chapter 1 by raising issues and presenting evidence on output growth, price growth and input use for a large set of countries. The chapter also provides general comments on the characteristics of agricultural supply and demand. Although there is interesting information in the graphs and summary data, the chapter closes without clearly identifying the main issue or questions to be answered.

The rest of the book is divided into four parts. Part I (Chapters 2–6) presents the two-sector general equilibrium framework that is the basis of the analytical approach in the remainder of the book. Chapter 2 presents a simple two-sector general equilibrium textbook model, without factor growth or technical change and with constant returns to scale and non-joint technology, in which one of the sectors is agriculture. The simpler, more general and newer Dixit and Norman dual approach to general equilibrium is mentioned in an appendix but not used in the text. Chapter 3 is a glossary of policies and Chapter 4 presents the comparative statics of this two-sector economy when input constraints are relaxed. The main trade theorems, Rybczynski, Stolper-Samuelson, Hecksher-Ohlin, etc. are restated. Chapters 5 and 6 introduce technical change with the last chapter addressing Mundlak's 'choice of technique' approach. This last chapter, which is original work by the author, presents a model to explain the coexistence of 'old' and 'new' techniques of production. It does so by hypothesising that producers choose the technique of operation based on the economic principle of equal marginal returns across techniques. The optimal choice is simultaneous with the choice of resource allocation and is driven by the same economic variables. This approach rests on the critical assumption of capital scarcity when the new technique is capital intensive relative to the old.

In an alternative and simpler approach, coexistence of different techniques of production could be justified by the presence of input quality differentials, including human capital, agro-climatic and geophysical differences in resources, where there is no need to assume a capital constraint.

Part II is dedicated to the dynamics of factor growth and its impacts on resource allocation. Chapter 7 restates the Solow model in a one-sector economy, and briefly refers to the endogenous growth literature. In Chapter 8, the short- and long-run behaviour of the two-sector economy is examined when efficiency conditions in factor markets do not hold across sectors, placing the economy inside the efficient production frontier. While perfect competition prevails within each sector, mobility restrictions or differential tax rates create factor price wedges. It is shown that under these conditions, some of the behavioural relationships established for the standard case might be reversed in the short run but preserved in the long run. Chapters 9 and 10 devote attention to the dynamics of labour and capital allocation, respectively, attributing the factor differentials across sectors to sluggishness in factor adjustments. Summaries are presented of models of occupational choice and migration, as well as studies of investment behaviour, and ad hoc models of dynamic capital adjustment. The highlight of this section is a very interesting discussion of empirical findings on investment and stocks of capital from a cross-country study by the author and colleagues.

Part III (Chapters 11–13) focuses on technical change. The first two chapters are devoted to production functions, estimation approaches, and estimation problems, with a very brief summary of work in this area by the others. The author examines the advantages and disadvantages of several estimators with emphasis on direct versus indirect estimators. The comparative study of direct versus dual estimators is of special interest because it is original work by the author. Even though his economic argument for the choice of direct over dual estimators is weak, his statistical argument seems powerful. Chapter 13 is an important chapter in this section and in the whole book. The author attempts to provide a theoretical and empirical interpretation of agricultural productivity using the 'choice of technique' framework and panel data estimation methods he developed earlier in his career. He argues that the proper coefficients to use in productivity

measurement and growth accounting are those obtained from regressing outputs on inputs and other state variables once the time and cross section variation is eliminated, referring to them as the coefficients of the 'core technology'. He attempts to establish the inappropriateness, for productivity measurement, of coefficients that are obtained from a panel regression that accounts only for fixed country effects, arguing that they do not allow differentiation of production techniques. Although his statistical approach seems consistent with his theoretical model, he does not succeed at establishing the theoretical or empirical superiority of this approach over simpler ones. In particular, the capital restriction that drives the choice of technique approach seems overly restrictive and in some cases unrealistic when agro-climatic differences, for example, are a sufficient reason for the co-existence of different techniques. His review of other cross-country productivity studies using different approaches is short and incomplete, stopping with his own 1982 study.

The fourth and last part of the book compares static versus dynamic behaviour emphasising responses to changes in the economic environment. Chapter 14 discusses the concept of agricultural supply and the importance of formulating it within specific conditions. In particular, this concept will depend on what is considered fixed and what is variable, including inter-sector factor flows. There is also a summary of dynamic duality studies. The last chapter shows how to use the approach in the book to study the growth performance of a country. The effects of policy distortions on growth are empirically illustrated by presenting a summary of results of a two-sector study on Argentina, where the inter-sector flows are accounted for and techniques are chosen based on economic variables. It is shown that sectorial and macro policy choices in that country resulted in a lower growth path. Simulations of policy reform show the potential effects on growth of alternative policies. There is also a loose connection between this approach and the endogenous growth literature.

In summary, the main contributions of the book are: (1) a departure from the partial-equilibrium, one-sector view of agriculture by inserting agriculture in the general economy to capture the importance of inter-sector factor flows; (2) an emphasis on the importance of empirics and a summary of agricultural

production relationships found in cross-country studies; (3) a restatement of the author's 'choice of technique' model and its implementation using panel data methods and (4) a restatement of his argument for the statistical superiority of the direct versus the dual estimation approach for production functions.

This is an important body of work for those interested in issues of agricultural development, as Mundlak attempts to integrate theory and empirical application with a general equilibrium flavour. As this book consolidates Mundlak's work, it is a welcome addition for those of us who have followed his work and have learned from him.

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