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A Neo-Classical Theory of Economic Growth

J. E. Meade

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First published in 1960, this seminal work illuminates the interrelations of the various approaches to the theory of economic growth. Professor Meade seeks to understand the factors which determine the speed of economic growth and outlines the ways in which classical economic analysis may be developed for application to the problem of economic growth.

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PREFACE

There is already an extensive literature on the theory of economic growth and the publication of yet one more work on the subject needs some explanation. This book falls essentially into two parts, (i) the main text, and (ii) the long Appendix II; and these two parts serve rather different purposes and demand, therefore, rather different justifications.

The main text makes little, if any, claim to originality. It is merely a systematic exposition of how a straightforward classical economic system would behave as it grew through time as a result of population growth, capital accumulation, and technical progress. These chapters are written in such a way that they should be intelligible to any serious student of economic theory; they demand no elaborate mathematical techniques.

I have thought it worthwhile to publish these chapters because most of the systematic works which have been published recently on the theory of economic growth depart essentially in one way or another from these classical assumptions. And this is apt to have an unfortunate effect upon the mind of the student, who is thereby tempted—if not positively compelled—to use the classical set of tools when he is considering problems in comparative statics (for example, problems concerned with the allocation of resources as between different uses) and a quite different set of tools when he is considering rates of growth in the economy.

Yet such a dichotomy can at least in part be avoided. There is no essential difficulty in setting a classical system to grow. A number of distinguished economists—I mention the names of Solow, Samuelson, Little, Hicks, and Swann—have made important contributions in showing how a classical system would grow. These contributions are important separate pieces of a general picture; and it is simply this general picture which I have tried to draw. Of course, in fact economic growth has much to do with conditions which I have scarcely discussed—economies of large-scale production, external economies, market forms other than the perfectly competitive, and so on. Such a picture as I

have drawn needs modification and expansion in many ways to make it relevant to many of the problems of growth in the real world. But I greatly hope that it may serve for the serious student of economic theory as a useful bridge between classical economic analysis and modern theories of economic growth.

As soon as one tries to outline the way in which a classical economic system would behave in the process of economic growth, one comes up against a central problem, namely what would happen to, and what would be the effect of changes in, the prices of one product in terms of another and, in particular, the price of capital goods in terms of consumption goods. This issue I have tried to explore systematically and with the aid of some mathematics in my long Appendix II. I hope that in that Appendix I may have advanced a little our understanding of this central problem.

It is impossible to enumerate all the persons who, in addition to those I have already mentioned, have by ideas expressed in writing or conversation influenced my way of thinking on this subject. But as is the case with all writers on this subject, I owe much to the pioneer work of Harrod and Domar, as will, I think, be obvious from a reading of this book.

I owe another very special debt of gratitude to my immediate colleagues. It is impossible to study economics in present-day Cambridge without being affected by the ferment of ideas on this subject; and the fact that I have come to work in Cambridge is the immediate cause of this attempt to present a bridge between classical theory and the modern interest in the theory of economic growth. This ferment of ideas centres round the well-known work of Mrs Robinson, Mr Kaldor, Mr Champernowne, Professor Kahn, and Dr Sen. To these I am indeed in debt; for they have all read and commented on part or the whole of my work at one stage or another. Mrs Robinson in particular has been an indefatigable, severe, but friendly critic of what I have done. It is so clear that they will not like my classical system, that it is hardly necessary for me to add the conventional remark that they must not be held responsible for any errors which I have committed. My thanks are due also to Professor Stone for reading my manuscript. He has himself been independently constructing a system very similar to mine; and it is reassuring to know that we confirm each other's results.

Finally, I would like to thank my colleague Dr Roy for performing for me the integrations on pages 122 and 127 of my Appendix II, which—as the reader will realise—constitute the basic steps towards the conclusions of that Appendix.

J. E. MEADE

Christ's College
Cambridge
December, 1959

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CHAPTER 1

Introduction

The purpose of this book is limited. It is designed to show the way in which the simplest form of classical economic system would behave during a process of equilibrium growth. Until recently most classical systems have been designed to answer problems in comparative statics—that is to say, in order to compare two economies in static equilibrium which are identical except in one respect, so that the ultimate effect of this specified change in the basic conditions of the economy on the static equilibrium values of the other relevant variables can be examined. In this book an extremely simple classical model of an economic system will be examined in such a way as to observe the process of change in the variables over time instead of for the purposes of comparing two static positions.

No elaborate attempt will be made in this book to persuade the reader of the realism or utility of the very simplified classical economy here examined. But the author would in fact claim that this analysis has a real usefulness. There is presumably in any case some limited usefulness in bringing out the implications for economic growth of the type of classical analysis with which economists are all so familiar. It may, in the author's opinion, be argued further that in the social studies there is a special merit in continuity of tradition and method—that there is positive virtue in putting new wine in old bottles if the bottles are strong enough. And in this case, in the author's opinion, the bottles will stand the strain. An economy can grow for three reasons: first, because net savings are being made out of current income so that the stock of capital instruments of production is growing; second, because the working population is growing; and, third, because technical progress allows more and more output to be produced by a given amount of resources as time passes. There is nothing in the nature of things which prevents one from examining the way in which a classical model of an economic system (e.g. with perfect atomistic competition) would behave over time if real capital were being

accumulated, the working population were growing, and technical progress were taking place. One can then subsequently attempt to bring the results nearer to reality by modifying the classical assumptions of this growing classical economy (e.g. by allowing for the effects of certain forms of imperfect competition). There is no reason in the author's opinion why this should prove to be an unprofitable procedure; but the purpose of this book is limited to the production of the model and does not attempt to demonstrate its utility.

What then are the basic assumptions upon which the model in this book is constructed? It will be assumed throughout that we are dealing with a closed economy without any economic or financial relationships with other economies; that there are no State or governmental economic activities involving taxation or State expenditure; and, unless it is stated to the contrary, that all economic activity is carried out in conditions of perfect competition (with its corollaries of prices equal to marginal costs and net factor rewards equal to the value of their marginal net products), and that there are constant returns to scale in the sense that if, in any given state of technical knowledge, all the factors of production in any one industry were increased by x per cent then the output would also be increased by x per cent.

We shall assume further that there are only two commodities produced in our economy, namely a consumption good and a capital good. The consumption good satisfies all ultimate human needs for food, clothing, shelter, etc., while the capital good is used as an intsrument of production to assist the production of a further output of consumption goods or capital goods. The capital good is, therefore, both the output of one of our two industries and also an instrument of production used in both of our two industries. To ease the exposition, when we are thinking of the current output of the capital-good industry we shall talk of 'capital goods'; but when we are considering the stock of capital goods available at any moment of time to aid in the production of further output we shall talk of 'machines'. Machines constitute the only form of capital. Working capital in the form of goods in process of production is neglected. Besides machines there are two other factors of production in our economy, namely land and labour. We have then a certain amount of land, labour, and machines being used at any one time to produce a certain output

of consumption goods; and we have at the same time the remaining available amount of land, labour, and machines being used to produce a certain output of capital goods, which will themselves be being used to replenish the existing stock of machines.

We desire to watch this system grow through time as the existing stock of machines grows, as the size of the working population increases, and as technical progress raises productivity. But in this book we shall confine ourselves to watching this process of growth on the assumption that the growing system remains in equilibrium. We must explain at some length what is meant by this; and this explanation can perhaps best be made in terms of the monetary system which we shall be assuming.

Although we are assuming that there is no governmental budget —no taxation and no State expenditure—we are not assuming that there is no central monetary authority. On the contrary, we shall assume that there is a banking system with a central bank and that the rate of interest is thereby always set at such a level as to preserve a constant cost-of-living index, i.e. a constant money price of our single consumption good. The mechanism must be of the following type. If the price of the consumption good tends to fall, the rate of interest is lowered (or more generally the terms on which monetary funds can be acquired by our private entrepreneurs for expenditure on investment in new machines are eased) so as to increase the incomes of those producing capital goods and, through the multiplier, the incomes of those producing consumption goods to the degree necessary to increase monetary expenditure on consumption goods to the extent necessary to prevent any fall in their money price. This easing (or tightening) of monetary conditions must be imagined to be carried out with such foresight and precision that there is never in effect any appreciable fall (or rise) in the money price offered for a consumption good.

Against this background of a constant money selling price for the consumption good we assume that full employment of labour and land available at any one moment of time is achieved by the adjustment of the money wage per worker and the money rent per acre of land. The wage per worker is always low enough to give entrepreneurs (who are faced with a constant price at which they can sell the final product of labour) an incentive to employ the whole available labour force, and the wage per worker is never so low as to cause the demand for labour by entrepreneurs to

exceed the available supply. And similarly with the money rent per acre. Once more we must assume that these adjustments of factor prices are carried out with perfect foresight and precision so that there is never any excess supply of, or excess demand for, labour or land[1].

We thus have in our model of equilibrium growth a constant money price of consumption goods and full employment of labour and land. Presumably we also need some similar assumption to ensure the continuous full employment of the available stock of our third factor, machines. But this is in fact already implied in our monetary assumptions. An entrepreneur will wish to employ another machine if the interest which he will have to pay on the employment of an additional machine is sufficiently below the profit which he can hope to earn on an additional machine. If in any given circumstances the rate of interest is set too high by the monetary authorities, entrepreneurs will have little or no incentive to invest in more machinery; and expenditure on investment in new machines will be zero or very low so that a deflation of money incomes and of the money price of consumption goods will not be avoided. On the other hand if the rate of interest is set too low by the monetary authorities, entrepreneurs will have an incentive not only to employ all the existing stock of machnies, but also to add to their stock of machines at a very high rate; but this will involve an excessive level of expenditure on investment in new machines so that an inflation of the price of the consumption good would not be avoided. In other words if we assume that the money wage per worker and the money rent per acre are always at the level required to ensure full employment of labour and land and if we further assume that the rate of interest is set at a level which ensures that the flow of money expenditure on investment in new machines is sufficient to prevent any rise or fall in the money price of consumption goods, we are in effect also assuming that the existing stock of machines is fully employed.

If we are assuming that, no matter what the amount of land may be or how quickly the population is growing or the stock of machines is accumulated, there is always full employment of all

[1] These assumptions in fact mean that we are ignoring all the dynamic problems involved in ensuring that our economy does not leave the path of equilibrium growth.