

Markets & Macro- economics

Scott Moss

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*Macroeconomic Implications
of Rational Individual Behaviour*

SCOTT MOSS

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To
Adolph Lowe
whose work inspired crucial aspects of my
macroeconomic analysis and who has long
been my model of scholarly integrity and
personal courage; and
to
Alfred Chandler
whose work has been a source of inspiration in
developing my microeconomic analysis and
whose encouragement greatly eased the
burden of working alone for long periods
of time.

I am grateful to them both.

work. This makes it possible to drop the assumption that markets are maintained by auctioneers and the like. Moreover, the abandonment of long-run equilibrium makes it possible to rely on these non-convexities to deduce the properties of *allocatively efficient* markets. I hope that readers will stop at this point to consider who else among modern economists has considered allocative efficiency *inside* markets. Even Okun (1981), whose analysis of exchange was published simultaneously with my own theory of markets (in Moss, 1981), considered efficiency only on each side of the market. Indeed, not even Okun defined the market. I believe mine to be the first economic definition in modern times.

I have been exceptionally fortunate while writing this book to have had encouragement and constructive criticism from eminent economists of widely differing views. Early drafts of the first five chapters were read and commented upon by Mark Casson, George Yarrow, Jan Kregel and Denis O'Brien. All of them were most encouraging. Later drafts were read in whole or part by Meghnad Desai, Michael Artis and Ian Steedman. Professor Desai read the whole manuscript in detail. He forced me to consider how best to make the reasons for my approach clear to mainstream economists by explaining what they would find difficult to accept by virtue of their training and commitment to received ideas and analytical techniques. His criticism led me to specify my rational markets hypothesis and my generalized Lucas critique. Michael Artis provided the same kind of criticism, in particular with respect to the policy analysis in chapter 9. Ian Steedman read an earlier draft of chapter 6 and pointed out a fundamental error in my analysis of joint production.

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Yvonne Thomas and Philippa Abbott word-processed several drafts of the manuscript. They were efficient and good-humoured throughout, thereby easing my task.

The errors and omissions are, of course, my responsibility.

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1

The Issues

1.0 INTRODUCTION

The assumption that individuals behave rationally is common to all schools of economists. Indeed, without the rationality assumption it is hard to see how general theoretical statements could be made about any social processes. For this reason, the assumption of rationality as the guiding force of individual behaviour should be given pride of place among all of the assumptions on which economists rely. Whenever other assumptions conflict with the assumption that individuals are rational, logical consistency dictates that those other assumptions be abandoned – no matter how much they simplify analysis or appeal to intuitive or other preconceptions.

It will be shown in this book that all of the mainstream schools of economists – particularly macroeconomists – rely on assumptions that are logically consistent with the fundamental rationality assumption only in special and empirically implausible conditions. Taken by itself, of course, this result can be dismissed as unimportant by appeal to the aphorism that theories are tested by their predictive power and not by the ‘realism’ of the assumptions. Although such aphoristic methodology is philosophically and economically dubious, I will not take issue with it here. Instead, I will demonstrate that strict adherence to the fundamental rationality assumption leads to the adoption of auxiliary assumptions which are consistent with and possibly are implied by rational individual behaviour, and which, in addition, are more general and descriptively accurate than the auxiliary assumptions of the various mainstream theories. Moreover, the resulting collection of realistic and general assumptions yields a more general, simple and powerful theoretical structure. In particular, this structure resolves the controversies over the microeconomic foundations of macroeconomics and provides a theoretical basis for

policy prescriptions that are richer than any provided by previous theories.

Unless assumptions that are special and empirically implausible are for some reason to be preferred to assumptions that are general and descriptively accurate, the theory reported here is an unambiguous advance over previous theories of microeconomic and macroeconomic processes.

The importance of the rationality assumption makes it imperative that it be stated clearly at the outset. Our formulation of the assumption must be sufficiently strict that it actually guides our analysis, while, at the same time, it must be wide enough to avoid closing off possible avenues of enquiry. I shall therefore adopt a definition which, by virtue of its generality, includes as special cases all of the particular behavioural assumptions made by economists. We shall say that an individual is rational if he formulates well defined objectives and refrains from acts that he believes will frustrate the attainment of those objectives.

I recognize fully that, as it stands, this definition is too wide to provide much guidance for our subsequent analysis. More particular assumptions about the rationality of entrepreneurs will be developed in chapter 2 and, though the theory reported here does not depend on it, I shall not reject the standard choice theoretic assumption that households maximize utility. If individual entrepreneurs are not rational in the meaning of this general definition, they cannot rationally maximize profits or growth or anything else. This is all that we shall require here.

The purpose of this chapter is to resolve an expositional difficulty. The difficulty stems directly from my strict reliance on the fundamental rationality assumption. We shall find that certain key presumptions and concepts which are crucial to all of the various mainstream economic theories turn out to be so special as not to be worth serious consideration because, in the world as we know it to be, they either imply or depend upon irrational behaviour. But giving up these concepts and presumptions necessarily changes the meanings of important words; for the analytical attitudes and concepts that underlie the exposition of my argument are, in important cases, simply different from the attitudes and concepts underlying previous theories.

In an attempt to avoid the problems associated with the holding of different analytical frameworks, I shall describe two main results derived formally in the substantive sections of this book and prove a special case of a third result. To do so will have the added advantage

of sign-posting the general direction of the arguments pursued in subsequent chapters. The density of those arguments and the complex relationships among them makes an outline of the main points and the relationships among them especially desirable.

The three results stand out in importance.

1 Long-run equilibrium cannot in general prevail in economic systems comprising rational households and rational entrepreneurs (or, equivalently, rationally managed firms). However, special conditions can be adduced that make long-run equilibrium compatible with individual rationality.

2 Even if the conditions for the existence of long-run equilibrium are satisfied, the set of markets that can exist in economies composed of rational individuals will not be complete because they cannot be both profitable and allocatively efficient. As a result, market signals to direct individual economic agents collectively to full employment of labour or full utilization of capital equipment will not be generated. There can be Keynesian and structural unemployment even if all markets that do exist are cleared continuously by flexible prices.

3 Keynesian economic policy prescriptions are neither necessary nor sufficient to achieve or maintain either full employment or full capacity utilization in the short run or the long run. If demand management is to be a tool of public policy, it must be supplemented by industrial and other policies that have well specified effects on the supply side of a decentralized market economy. The general characteristics of efficient and effective industrial and other policies are implied by the theory reported here.

The validity of each of the first two results is independent of the validity of the other. Together they lead to the third result and to a conceptual foundation for the analysis of long-run economic processes in conditions of uncertainty.

1.1 INDIVIDUAL RATIONALITY AND THE NECESSARY CONDITIONS FOR LONG-RUN EQUILIBRIUM

Long-run equilibrium in Walrasian and most Keynesian theories is defined by the simultaneous maximization by all agents in the economy of long-run variables subject to long-run constraints. The long-run maximand of each firm could be growth, but, more generally, it is assumed to be profits or the discounted value of a long – possibly infinite – stream of profits arising either in successive short-

run equilibria or in a single equilibrium covering a long sequence of trading dates. Households maximize intertemporal utility subject to income and wealth constraints.

The crux of the *logical* objection to this conception of long-run equilibrium is that, for strictly mathematical reasons, some or all of the long-run constraints must be exogenous, but the very exogeneity of long-run constraints is generally incompatible with the assumption that individuals are rational maximizers.

Rational maximizers will always seek to shift binding constraints in order to increase the attainable values of their maximands. Indeed, such constraint-shifting is always the purpose of investment by firms and the education and training demanded by households. It is, of course, common ground in economics that firms will seek to shift constraints on the scale and scope of their activities whenever the benefits from such shifts exceed the costs of the requisite investments. It is also well known that replication of existing capacities by the firm would, on technological grounds alone, enable outputs to be increased without limit at constant average cost. In competitive conditions, therefore, there would be nothing to limit the size of the firm.

The usual way round this obvious problem is to assert that there are diminishing returns to the scale of the organization. However, there is no dearth of evidence to show that, when organizational forms are devised to shift that constraint, the particular forms devised depend upon the particular problems faced by each firm. That is, when the binding constraint on the firm's maximizing propensities is its organization, a new organizational form is devised and implemented to shift the organizational constraint so that it is no longer binding. In practice, the same phenomenon occurs when there are supply or demand constraints faced by the firm. Technical changes are developed so that innovative investments shift the binding constraints. These organizational and technological innovations are often developed either by the firms whose maximizing propensities are constrained or at their behest. The objective of these innovations is to change the benefits of constraint-shifting relative to the costs. It follows that the process of constraint-shifting is endogenous in the long run.

Although the evidence supports this contention, the argument is not empirical. It is logical. If the objective of firms' managers is to maximize some long-run variable, then to accept any constraint on the maximand without seeking to shift or eliminate that constraint is to fail to pursue the avowed objective. To treat organizational or

technological or any other relationships as being somehow sacrosanct is irrational behaviour. Either agents seek rationally to maximize, or they do not. If they do, then by any definition of the word 'rational' they will not treat binding constraints as being exogenous – a logical implication which extends equally to constraints on their abilities to shift constraints.

It must be recognized immediately that, if there really are no exogenous constraints, then the realized values of rational maximizers' objective functions will become infinite within an infinitesimal interval of time. And this is the crux of the usual objections to this line of argument. Something must limit either the size or the rate of growth of the firm. If it is not technology, it must be organization. If it is not organization, then what is it?

Once stated, the answer to this question is blindingly obvious to anyone who either teaches or develops new ideas or new applications of old ideas. It is an inherent characteristic of mortal man that the rate at which he learns is limited. Some learn more quickly and some learn more slowly. But no one can learn everything all at once. To assume that learning rates are limited is wholly compatible with the assumption that individuals are rational, and it explains why binding constraints cannot be shifted the moment they are encountered. If this assumption were not adopted, then we should require to assume that some other law of nature makes the shifting of some constraints physically impossible or, alternatively, that all agents always believe that the costs of shifting constraints – or finding out how to shift them – will always exceed the benefits. While both of these alternatives are patently unrealistic, they are not *logically* inconsistent with the assumption that individuals behave rationally. And if the concepts associated with long-run equilibrium are to be maintained, then so-far-unspecified natural laws, or the assumption that individuals hold peculiar (because empirically false) expectations about the costs and benefits of investments, must be retained in preference to the more natural (because obviously true) assumption that individuals learn at limited rates. The more natural assumption cannot be adopted in long-run equilibrium theory because it violates a necessary condition for the existence of general equilibrium where trading is an on-going activity.

This condition was first demonstrated by Radner (1966). He showed that, if agents learn at limited rates, then in the fullness of time the information acquired simply by engaging continuously in market exchange will exhaust these limits. Once that happens, agents will be unable to calculate their optimal responses to additional flows

of information even up to a subjective probability distribution. In consequence, no equilibrium predicated upon successful maximization by individual economic agents can exist. But the alternative, we have just seen, is to assume unlimited learning rates which themselves preclude the existence of long-run equilibrium of the individual unless supplemented by special, implausible assumptions.

This conclusion applies not only to Walrasian general equilibrium models but to all models incorporating the rational expectations hypothesis. For that hypothesis is predicated only partly on the assumption of individual rationality. It also requires the assumption that learning rates are effectively unlimited.

The specific way in which rationality is incorporated into the rational expectations hypothesis is by assuming that individuals will not formulate persistently and systematically falsified expectations. Although the formal specification of rationality in expectations – that errors be serially uncorrelated with zero means – turns out to be stronger than is required here, the essential insight that rational individuals will not willingly repeat the same errors time after time is both plausible and, we shall see, fruitful.

If information is scarce, then rational individuals would clearly seek to use that information so that none is wasted. Models incorporating the rational expectations hypothesis thus require some way of limiting the information that becomes available to individuals. Lucas and Prescott (1974/1981), for example, followed Phelps (1969) in assuming that individuals trade on islands at each date and the information available on each island is limited to that arising from markets located there. They do not have information about current events on other islands. Now, if scarcity has any meaning at all here, it must be that if more information were freely available it could and would be used in the formulation of expectations. But to say that more information could always be used is precisely to say that the capacity of individuals to use information always exceeds the information that is available. In particular, the rate at which individuals can learn from the past and the present about the future must never be a constraint.

Thus, it is not only Walrasian models but also Keynesian models incorporating the rational expectations hypothesis (e.g. Buiter, 1980) that cannot be predicated upon the assumption that individuals are constrained by the rates at which they learn. This result will be demonstrated mathematically in chapter 2 in the framework of a dynamic optimal control model. In the meantime, I simply note that nothing in this argument implies any difficulties at all for either