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EQUILIBRIUM, EXPECTATIONS AND INFORMATION

A study of the General Theory, the neo-classical synthesis and modern classical macroeconomics

by

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CONTENTS

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CHAPTER 1 - INTRODUCTION

It is now nearly 50 years since the appearance of Keynes's General Theory of Employment, Interest and Money and the stream of articles and books on what Keynes really meant or didn't mean shows no sign of abating. In part, this dissertation is a contribution to this voluminous literature, but what follows is hardly an attempt to provide an exhaustive interpretation. Instead the General Theory is examined from a certain angle, with the title "Equilibrium, Expectations and Information" providing the framework for the investigation. That the title has been borrowed from G.B. Richardson's 1959 Economic Journal article is no accident. Richardson's work has been unduly neglected and his trichotomy serves as a convenient platform from which to analyse Keynes's method and those of his interpreters, in particular the approaches stemming from the work of Clower and Leijonhufvud. The information structure of the Walrasian type of general equilibrium model is also examined as the latter forms the basis of both the neo-classical interpretation of Keynes's contribution and the rational expectations approach that will be discussed. Finally Richardson's framework is applied in an analysis of two modern classical schools of thought, namely the rational expectations approach headed by Lucas, and the neo-Ricardian school amongst which Garegnani, Eatwell and Milgate, for example, are prominent.

In a sentence, therefore, what follows is an examination of the General Theory and certain interpretations thereof as well as an analysis of modern classical macroeconomics, with the equilibrium-expectations-information framework providing the unifying theme. As will become apparent, the framework does not consist of three watertight compartments. For example, whether a system is in equilibrium or not will depend on whether the expectations of those who have the ability to effect change are realised. The specification of which agents have this power will depend on the information with which the model builder endows the agents in the model. In discussing this, attention is drawn to Keynes's important distinction between an entrepreneur economy and a cooperative economy. The distinction between the information available to the model builder and that with which he endows the agents in the model is also emphasized. The equilibrium-expectations-information trichotomy is now discussed in greater detail.

EQUILIBRIUM In what follows equilibrium will be regarded as a state of rest, rather than a situation in which (say) supply is equal to demand. A model which generates a state of rest in which markets do not necessarily clear can therefore be regarded as an equilibrium approach. Fixprice general equilibrium models, for example, although initially regarded as disequilibrium economics, still fall within the ambit of equilibrium analysis. As in the case of the flexprice generation, these fixprice models

require a recontracting or tâtonnement device to prevent trades not compatible with the equilibrium solution. The latter can therefore depict a state of rest even though markets are not clearing. When equilibrium is regarded in this light, it becomes vital to distinguish between those who have the power to effect change and those who do not [Chick, 1978, 1983]. This distinction will be discussed in more detail in the section on information, since the specification of which agents have the power to bring about change depends on the information supplied to the agents in the model by the model builder.

If those who have the ability to effect change are satisfied with the status quo, the system will be in a state of rest whether those parties who do not have this power are satisfied or not. This illustrates the important link between equilibrium and expectations - the system will be in a state of rest when the expectations of those in the driving seats are satisfied. If we may be allowed to continue the metaphor, the expectations of the passengers is irrelevant as far as altering the state of rest is concerned. Of course it may be the case that the passengers do have some influence over the drivers - this merely illustrates the importance of specifying which parties in the system have the ability to bring about change. In Keynes's approach, the entrepreneurs set the pace with the household sector playing a rather passive role. Keynes refers to such an environment as an entrepreneur economy. If a supply and demand framework is employed in the labour market, the entrepreneurs and workers

cooperate to establish a mutually acceptable solution - Keynes regards this as an example of a cooperative economy [Collected Writings, XXIX].

In the General Theory, the state of rest is generated by the principle of effective demand. This states that if those involved in the production of consumption goods do not spend their entire incomes (including profits) on consumption goods, expenditure from elsewhere (i.e., exogenous expenditure) will be required if entrepreneurs are to sell their goods at a remunerative price. In this exposition there is no mention of a labour supply and demand framework. The state of rest is generated independently of what is happening in the labour market. There is therefore no assurance that everybody who is able and willing to work will be able to find employment.

In an approach incorporating a supply and demand framework for the labour market, the demand curve represents the intentions of entrepreneurs and the supply curve those of the workers. The state of rest which emerges from such a framework must be one which satisfies both entrepreneurs and workers since both have the ability to bring about change within such a framework. Involuntary unemployment is therefore not on the cards. Keynes's indictment against such an approach is that the workers have no control over the real wage - i.e., the workers lack the ability to effect change.

Attempts to generate Keynesian features within a labour supply and demand framework can be classified as spanner-in-the-works Keynesianism. In such an approach, the potential state of rest is dictated by the intersection of the labour supply and demand curves, and it is only the presence of some or other spanner in the works (for example rigid wages or a liquidity trap) which prevents this position from being obtained. Even the Clower-Leijonhufvud interpretation of the General Theory can be regarded as an example of such spanner-in-the-works Keynesianism. In their approach, firms and households are on an equal footing. Although the (notional) demand and supply curves of and for labour depict a potential state of rest at full employment, what prevents the latter from being obtained is the so-called communication problem existing amongst firms and households. (Leijonhufvud [1981] refers to such communication or coordination failures as effective demand failures.) Firms would like to offer more employment if only they could be sure of selling more goods. Workers would buy more goods if only they could be sure of obtaining employment. The inability of the households and firms to communicate their intentions to each other results in the system getting stuck at a position of less than full employment. The principle of effective demand does not, however, require such information failures in order to generate involuntary unemployment. In chapter 5 a simple model will be introduced in which such communication failures are absent, but where the principle of effective demand nevertheless generates involuntary unemployment.

The impression should not be gained that the General Theory is devoid of supply and demand apparatus. When Keynes discusses the bond market, the system is brought to a state of rest by the divergent opinions of the bulls and the bears. Sometimes the bulls might have the upper hand, and sometimes the bears, but in general both suppliers and demanders have the power to effect change. In such an environment Keynes does employ a supply and demand framework. The state of rest that obtains under these conditions will be discussed in more detail in the section on expectations.

When the modern classical approach of the neo-Ricardians is discussed in chapter 7, it will become apparent that the state of rest which this school has in mind is a long-run centre of gravitation dictated by a uniform rate of profit. The Ricardians argue that if entrepreneurs are free to move in and out of ventures as they wish, the system will converge upon a long-run centre of gravitation characterised by a uniform rate of profit.

The reason for classifying equilibrium as a state of rest rather than a situation in which supply is equal to demand should now be apparent. At least four types of equilibria have been identified so far. While each may be regarded as a state of rest, not every one represents a situation in which supply is equal to demand. The various types of equilibria may be listed as follows:

(1) The equilibrium dictated by Keynes's principle of effective demand

(2) The bulls and bears equilibrium

(3) The long-run centre of gravitation of the modern Ricardians

(4) Supply and demand equilibrium.

Types (1) and (3) require an entrepreneur environment for their employment. Types (2) and (4) require a cooperative environment. (1) and (2) appear in the General Theory. The neo-classical synthesis and the Clower-Leijonhufvud interpretation of Keynes attempt to generate involuntary unemployment with the aid of (4). (It should be noted that Clower and Leijonhufvud argue in favour of employing effective as opposed to notional demand schedules.) Modern Ricardians attempt to combine (1) and (3). Since the Ricardians are anxious to avoid the indeterminacy introduced by divergent expectations, they have to argue that (2) is not an essential feature of the General Theory. Economists who stress the importance of expectations would no doubt argue that this smacks of Hamlet without the prince. Lucas employs (4) in suggesting that all unemployment is voluntary. These issues will be developed at greater length in the following chapters when the models of Keynes, Clower and Leijonhufvud, Lucas, the general equilibrium theorists and the modern Ricardians are analysed. As the above classification of equilibria has indicated, it is important to establish just what kind of equilibrium the model builder in question has in mind.

EXPECTATIONS When equilibrium is regarded as a state of rest, care must be taken to specify which parties have the ability to effect change. Those who have this ability will not wish to bring about change if their expectations are realised. This illustrates the link between expectations and equilibrium.

While expectations play a role in determining whether the system is in a state of rest or not, we shall adopt the viewpoint that expectations which are generally realised are, in a sense, not really expectations at all. This is an important point and requires some discussion even if the issues involved appear to be largely terminological.

Astronomers may expect that there will be a partial eclipse of the sun, say one year from now. Bullion dealers may expect the price of gold to be $500 in a year's time. It is unlikely that different astronomers will entertain different expectations about the appearance of the eclipse. It is unlikely that different bullion dealers will entertain similar expectations about the future price of gold. When expectations about the future are based on apparently immutable laws of nature, they are in a sense hardly expectations at all. It is for this reason that we hesitate to regard expectations which are generally realised as expectations at all, but rather part of existing knowledge. As the above examples illustrate, however, the term expectations can be applied within the context of situations in which people entertain similar views of the future and within situations in

which different expectations are held. For this reason we shall refer to divergent expectations when describing a situation in which different people hold different views of the future, and speak of convergent expectations in cases where different people entertain reasonably confident views of the future based on an apparently unchanging structure. The work of Lachmann and Shackle is of particular importance in this regard. When Lachmann and Shackle speak of expectations, they are invariably referring to divergent expectations. (See Kregel [1977].)

The presence of divergent expectations does not necessarily constitute a disequilibrating phenomenon. In fact, in the General Theory it is the opposing views of the bulls and bears that brings the bond market to a state of rest, precarious as the latter might be. Whenever there is a movement to a convergence of opinion in such a speculative market, the market will no longer be in a state of rest and the price will continue to move upwards (downwards) for as long as this convergence of opinion continues. The price will thus continue to move until the expectations of those who think the price will go up are counterbalanced by those who think its future movement is downwards.

There are therefore at least two types of equilibria living in uneasy harmony within the pages of the General Theory. On the one hand we have the equilibrium dictated by the principle of effective demand. On the other hand we have the bulls and bears equilibrium of the bond market. Both types may be regarded as

states of rest, although the bulls and bears equilibrium may be easily disturbed.

At times Keynes lays great emphasis on the principle of effective demand and the state of rest associated with it. In order to illustrate this principle, Keynes in fact usually assumes that the short-run expectations of entrepreneurs are realised. At other times he emphasizes the importance of taking into account the fact that the future is fundamentally uncertain. The latter inclination reaches its climax in Keynes's 1937 QJE article. Here Keynes notes the sense in which he is employing the term uncertainty, and proceeds to give examples. All the examples provided (for example, the price of copper twenty years hence or the prospect of a war) are situations in which divergent expectations will be present. Keynes also provides a number of examples of the type of uncertainty he is not talking about. All the examples he then gives represent situations in which different people are likely to hold rather similar views. In the QJE article Keynes emphasizes that we live in a world of fundamental uncertainty. In the very same year, however, Keynes outlined his so-called static model in which the state of long-run expectations is given and the short-run expectations of entrepreneurs are always realised. He employed this tactic to indicate that the principle of effective demand applied even when entrepreneurs correctly anticipate sales.

Differences of opinion as to whether Keynes regarded expectations as important or not are therefore hardly surprising. Those who wish to emphasize the importance of fundamental uncertainty will no doubt continue to refer to Keynes's 1937 QJE article. Those who wish to argue that expectations and uncertainty play a relatively minor role in Keynes's work will no doubt continue to refer to his 1937 static model [Eatwell, 1979, p.40].

The distinction between convergent and divergent expectations is of use when the approaches of the so-called modern classical schools are investigated. The one modern classical approach, namely the rational expectations school of Lucas and his followers is basically anti-Keynesian in spirit. Although these economists emphasize the importance of expectations, the type of expectations that they have in mind are expectations linked to the relevant economic theory which is considered to reflect the underlying economic structure. The expectations at issue here are therefore convergent. The other modern classical school, that of the neo-Ricardians, argues that expectations are rather unimportant, and should be left out of the analysis, unless such expectations are tied to the underlying economic structure! The similarity between the two modern classical schools with regard to their attitude towards expectations becomes more comprehensible once the distinction between convergent and divergent expectations is made. The rational expectations approach is actually emphasizing the importance of convergent expectations. Modern Ricardians argue that expectations are unimportant unless

they are convergent. Both schools shy away from the divergent expectations of Keynes, Shackle, Lachmann and Davidson.

INFORMATION For a system to be in equilibrium, the expectations of those who have the power to bring about change must be realised. The specification of which agents in the model have this power is tied up with the information that the model builder endows upon the agents in the model. In analysing the information aspect, a distinction should be made between the information available to the model builder and that with which he endows the agents in the model. There is not necessarily a one-to-one correspondence between these two sets of information. (The rational expectations approach suggests that there should be.) For example, in the textbook version of perfect competition, the firms in the model are led to believe that they can sell any amount of their product at a given price. The model builder knows that this is not true in general.

In a society inhabited by entrepreneurs and workers, it can be argued that there is no hard and fast distinction between the functions of entrepreneurs and workers - in fact it can even be argued that each individual is a self-employed artisan, i.e., each individual performs the roles of both entrepreneur and worker. This is the view adopted in the rational expectations approach of Lucas [1977, p.16]. Since Lucas argues that a modern industrial society can be adequately represented by a model inhabited by self-employed artisans, the absence of involuntary

unemployment in such an approach is hardly surprising. Alternatively, it can be argued that while the distinction between entrepreneurs and workers is not completely watertight, such a distinction is of importance. This is the view adopted by Keynes and his neo-classical interpreters. What distinguishes Keynes from the neo-classical approach (amongst whom we include those economists whom Keynes criticised, although he referred to them as classical economists) is the fact that in the General Theory it is the entrepreneurs that set the pace, with the workers playing a relatively passive role. In the neo-classical approach, however, the entrepreneurs and workers are on an equal footing as far as bringing about change is concerned.

In an early draft of the General Theory [Collected Writings, XXIX], Keynes introduces what he terms a cooperative economy in which firms and households are on an equal footing. A modern industrial society, on the other hand, is an example of what Keynes refers to as an entrepreneur economy. Here the entrepreneurs set the pace, and if their expectations of demand are realised, the system will be in a state of rest whether the household sector is satisfied or not. Keynes's principle of effective demand (which generates the state of rest for the system) therefore operates in an environment in which entrepreneurs (and not workers) have the power to bring about change.

Keynes's important distinction between entrepreneur and co-

operative systems helps to illustrate why an attempt to elicit Keynesian features within a system which includes a supply and demand framework for the labour market is an irrelevant exercise. The employment of such a supply and demand framework presupposes a cooperative system. One may, of course, disagree with Keynes on this score, and argue that appearances notwithstanding, a modern industrial society may be regarded as a cooperative economy. As noted, this is the approach adopted by Lucas [1977]. Those, who wish to preserve the spirit of the General Theory, however, should present the action in an entrepreneur rather than a cooperative environment. To employ the principle of effective demand in a cooperative economy is rather like putting Hamlet through his paces on a blasted heath instead of the court of Denmark.

It makes a great deal of difference whether the agents in the model are endowed with the information that they are to behave as self-employed artisans or whether the model builder distinguishes between the roles of entrepreneurs and workers and does not allow the latter to have a say in the determination of the state of rest. This might appear a rather innocuous point, but in our opinion it lies at the heart of the controversy over whether the economic system gravitates (naturally) to full employment or not. That the real source of disagreement has been obscured by miles of computer printouts has not helped matters. A society inhabited by self-employed artisans is a particular type of the cooperative model criticized by Keynes. If a self-employed artisan experiences difficulty in selling his labour services to somebody else, he can

always hire himself. One can appreciate that a self-employed artisan would suffer a certain amount of emotional angst as he weighs up the advantages and disadvantages of toiling in the hot sun or lazing in the cool shade, but the choice is basically his.

Nobody would deny that a capitalistic society has its share of self-employed artisans. The question raised by the contributions of Lucas and his followers is whether any valuable insights into a modern industrial society can be gleaned from a model inhabited solely by self-employed artisans.

Taking his cue from Hayek, Richardson emphasizes the important distinction between the information available to the model builder and that which the latter makes available to the agents in his model. We have already seen that if, for example, the model builder envisages the economic system as consisting largely of self-employed artisans, the agents in the model will obviously be required to behave as self-employed artisans. As far as this aspect of information is concerned, the model builder supplies the agents in the model with the same information that he has. On other matters relating to information, however, there may not be a one-to-one correspondence between the information available to the model builder and that which he makes available to the agents in the model. For example, an economist employing a simple supply and demand model can observe the intersection of the curves and argue that it provides the state of rest for the system, but there is no assurance that the creatures in the model are aware of this.

A feature of the rational expectations approach is that the agents in the model do have access to the information possessed by the model builder.

The distinction between the information available to the model builder as opposed to the information he makes available to the agents in his model will be of particular use when the question of microfoundations for Keynes's aggregate expected demand function is investigated. In constructing such a function, the model builder will in general have to make some or other distributional assumption. Keynes, for example, suggests employing the assumption that there is a certain distribution of labour amongst firms. With such an assumption, the model builder is specifying that if any particular firm hires more (less) labour, so too will the other firms, the relationship between the various employment levels being given by the distributional assumption. Without this type of assumption, a unique aggregate curve cannot be obtained. If such an assumption is employed, however, the question that arises is whether the agents in the model should be endowed with similar information. Firm i would be more sanguine about expanding employment if it knew that (all) other firms were acting likewise, since demand for its products depends on employment opportunities in other firms, rather than on employment in firm i. It will be shown that different aggregate curves can be obtained depending on whether we consider only the information available to the agents in the model or whether we consider the information known to the model builder as well. If the model builder and his

agents have access to different information, there will not be a simple correspondence between the situation at the microlevel and the aggregate function constructed by the model builder.

The above remarks illustrate how the information-equilibrium-expectations framework will be employed to provide the unifying theme in investigating the General Theory, interpretations thereof and modern classical schools of thought. In chapter 2 Keynes's treatment of equilibrium, expectations and information is discussed. This is followed in chapter 3 by an investigation of possible microfoundations for Keynes's aggregate supply and expected demand functions. Here the importance of the distinction between the information available to the model builder as opposed to that made available to the creatures in the model is stressed. In chapter 4 the information structure of general equilibrium models is discussed, and compared to that of the General Theory. The discussion of the general equilibrium approach is also a prerequisite for understanding the rational expectations school of Lucas and his followers (discussed in chapter 6), since this school imposes rational expectations upon a general equilibrium model. In chapter 5 the effective demand failures of Clower and Leijonhufvud are introduced and it is indicated that involuntary unemployment can be generated even when communication failures amongst entrepreneurs and workers are absent. This illustrates the importance of specifying whether the action is to take place in a cooperative or entrepreneur environment. In discussing the modern classical approach of Lucas, we emphasize the distinction

between convergent and divergent expectations and conclude that the rational expectations approach can hardly be talking about divergent expectations. In chapter 7 the other modern classical school - that of the modern Ricardians - is investigated. The Ricardians employ the principle of effective demand in an entrepreneur rather than a cooperative environment, and can be classified as Keynesians on this score. At first sight the modern Ricardian attitude towards expectations seems to be totally at variance with that of the rational expectations approach, since the latter appears to be embracing the expectations that Ricardians are anxious to avoid. Once the distinction between convergent and divergent expectations is made, however, it becomes apparent that both classical schools have rather similar attitudes towards expectations. The clue to this lies in the fact that both approaches regard Keynes's attitude towards (divergent) expectations as ill-conceived.

CHAPTER 2 - EQUILIBRIUM, EXPECTATIONS AND INFORMATION IN THE GENERAL THEORY

A system may be in a state of rest even if not all the parties involved are satisfied with the status quo. Those who have the power to effect change may not wish to do so and those who would like to change matters may not have the means at their disposal.

In what follows equilibrium will be regarded as a state of rest rather than a position in which supply is equal to demand. The equilibrating forces associated with supply and demand may be weak or non-existent, and the state of rest may be dictated by other forces. While it is possible for supply and demand forces to determine a state of rest, this is not necessarily the case, so that equilibrium as a state of rest is a broader concept than supply and demand equality. [See Chick, 1978, and Davidson, 1967, and compare with Chipman, p.342.] Trevithick and Mulvey [p. 28] note that "...Keynes defined equilibrium in respect of the laws of motion of the economic system. An economy in which markets persistently fail to clear may be regarded as being in a state of rest and hence in equilibrium." While the General Theory is not devoid of supply and demand apparatus, it constitutes a denial that supply and demand forces in the labour market tend to bring the economic system to a state of rest. Keynes's denial that the rate of interest could be regarded as an equilibrator of savings and investment can also be seen as an attack on the supply and

demand framework [Garegnani; 1976; 1978; Keynes, Collected Writings, XIV, pp.212 & 471].

As noted, those who are dissatisfied with the conditions existent in the state of rest may lack the power to bring about change. Brown may wish to travel to the sea for the week-end whereas Smith may wish to stay at home. If Smith is the owner of the means of transport, Brown may have to wait until it suits Smith to go to the sea. Of course it may be within Brown's power to persuade Smith to go to the sea, in which case some sort of co-operative arrangement might be found. If Brown possesses persuasive powers and/or can offer Smith various incentives, a cooperative solution might exist in which both are satisfied. Then, too, Brown might be able to make use of alternative transport, in which case (as in the situation where Brown is able to offer Smith incentives) both Brown and Smith have the power to effect change. The example illustrates that if equilibrium is to be regarded as a state of rest, we must specify which participants in the economic process have the power to effect change.

Whether a system is in a state of rest or not will depend upon whether expectations are disappointed or not. Only the expectations of those who can bring about change are relevant as far as the state of rest is concerned. If Brown has neither the ability to influence Smith's decision nor the means to make use of alternative means of transport, the system may be be in a state of rest with Smith satisfied but not Brown. Chick [1983, pp.21-2]

notes that:

> There will be disequilibrium if and only if the party whose expectations are falsified has power to effect change... [E]xpectations play a major role in determining equilibrium: when expectations are falsified there is a desire for change. Where that desire is combined with the power to effect changes we have disequilibrium.

The intentions of those whose expectations are disappointed might be crystal clear to those whose expectations are realized. If the latter but not the former can effect change, such signalling, although quite apparent, will not alter the state of rest. Brown, may, for example, be signalling quite clearly to Smith that he wishes to go to the sea for the day, and may even be prepared to offer Smith some sort of reward. If Smith is quite content to stay at home, however, Brown's signals (although they may be quite apparent) are simply irrelevant as far as affecting the state of rest is concerned. Moreover, it may not be within Brown's power to vary the incentives offered to Brown. Keynes argued that while labour may wish to signal its intentions to work for a lower real wage in order to entice firms to hire them, it may not be within their power to do so [General Theory, p.13]. Keynes accordingly denied that the labour supply curve was at all relevant in determining the state of rest for the economy. [See Ranson, p.94.]

The identification of which participants in the economic process

have the power to effect change lies at the heart of the dispute over the question of involuntary unemployment which has recently resurfaced. The rational expectations approach led by Lucas argues that it is misleading to label unemployment as involuntary. Lucas points out that since there are voluntary and involuntary elements in all unemployment, it is not useful to distinguish between the two. His model of the business cycle accordingly rules out such a distinction:

> ...it will be helpful to consider as an example a "representative" agent. Imagine a single worker-producer, confronted each period with a given market price for a good which he then makes to order, at a fixed rate of output per hour. That is, he comes to his place of work, observes his current selling price, determines how many hours to work that day, sells his produce, then goes home to relax. [Lucas,1977, p.16]

Lucas suggests that it might be interesting (1) to distinguish between the functions of entrepreneurs and workers, (2) to consider the labour and goods markets separately, (3) to differentiate between wages and prices and (4) to investigate the information available to firms as opposed to that available to workers. He adds, however, that "None of these questions is without interest, but all are, in my opinion, peripheral for business cycle theory." [Lucas, 1977, p.17] Lucas thereby implies that the essential economic features of a modern industrialized society can be captured in a model which is inhabited by self-

employed artisans.

Involuntary unemployment cannot arise in an economy inhabited by self-employed artisans [see Weitzman, pp. 791,793]. The possibility that a SEA might be unable to sell his product is not mentioned. In referring to the problem of deficient demand, Leijonhufvud [1968, pp.90-91] notes that:

> In an economy of self-employed artisans our problem simply cannot appear. If it does appear in a posited system, say, of big farmers "higgling and haggling" with prospective farmhands over the room and board and other direct material benefits that are to constitute the real wage, it will be most smoothly solved in a thoroughly Walrasian manner.

In discussing the generation of a business cycle, Lucas [1972,1977] assumes that SEAs are unable to distinguish between nominal and relative price movements. If, as a result of an increase in the money supply, a SEA notices that the price of his product is rising, he chooses to work longer hours and produce more goods in the belief that the price of his product has increased relative to the prices of other products. Ackley [p.10] points out that if workers are to be enticed to work longer hours, they must believe that the real wage has risen, whereas if entrepreneurs are to hire more labour, they must believe that real wages have fallen. (A schizophrenic SEA would no doubt be able to entertain both beliefs simultaneously.) Ackley adds that "It was

a nice enough trick to be able to fool each yeoman about his own real price; but it is an even nicer trick to fool both employers and workers - in opposite directions - about the movement of the real wage paid by one and received by the other!"

Lucas's model of a SEA economy is not materially different from the world according to Say [Ackley, p.9]. It is also reminiscent of a world of guilds:

> ...the guild workman had no intermediary between himself and the market. He generally sold a product, not his labour, and therefore controlled both product and work process. .... What we have to account for is why the guild division of labour evolved into the capitalist division of labour, in which the workman's task typically became so specialized and minute that he had no product to sell, or at least none for which there was a wide market, and had therefore to make use of the capitalist as intermediary to integrate his labour with the labour of others and transform the whole into a marketable product. [Marglin, pp. 16-17]

Lucas's approach may be compared to one in which the distinction between entrepreneurs and workers is important - where in fact workers have to wait until it suits entrepreneurs to hire them [Robinson and Eatwell, p.102]. It is revealing that Keynes originally entitled chapter 2 of the General Theory "The distinction between a co-operative economy and an entrepreneur

economy" and chapter 3 "The characteristics of an entrepreneur economy" [Collected Writings, XXIX, pp. 76,87]. Chapter 3 was subsequently to become "The principle of effective demand" - a principle which indicates that the entrepreneurs set the pace. Chapter 2 ultimately became "The postulates of the classical economics" which depicts a world in which entrepreneurs and workers are on an equal footing, cooperating to establish a solution voluntarily chosen by both groups.

The state of rest generated by the principle of effective demand will be discussed presently and in chapter 3 problems related to the appropriate microfoundations will be investigated. What must be emphasized at this stage, however, is the importance of specifying the type of environment in which economic events are to take place. Presumably no economist believes that a modern industrial society is inhabited only by SEAs. However, if an economist (such as Lucas) regards the distinction between households and firms as largely irrelevant, he may put his model through its paces in an environment in which everybody is regarded as a SEA. In an economy of SEAs, however, the principle of effective demand is irrelevant and involuntary unemployment is impossible, unless a SEA regards himself as involuntarily unemployed because he is unable to persuade himself to offer himself a job. That Keynes regarded involuntary unemployment as irrelevant in a cooperative society but not in an entrepreneur economy is evident from the following passage:

> In a ...co-operative economy there is no obstacle in

> the way of employment of an additional unit of labour if this unit will add to the social product output expected to have an exchange value equal to 10 bushels of wheat, which is sufficient to balance the disutility of the additional employment.... But in ...[an] entrepreneur economy the criterion is different. Production will only take place if the expenditure of £100 in hiring factors of production will yield an output which it is expected to sell for at least £100. [Collected Writings, XXIX, p.78]

Failure to specify whether events are to take place in a cooperative or an entrepreneur environment has led to unnecessary complications in the literature. For instance, the neoclassical synthesis sought to capture Keynesian results in what was basically a cooperative environment. One has only to look at undergraduate macroeconomic textbooks with an IS-LM framework plus a labour market complete with supply and demand curves to observe this. In the IS-LM framework the principle of effective demand appears to be in force. Here aggregate demand consists of consumption and investment expenditure and since those involved in the manufacture of consumption goods do not spend their entire incomes on consumption goods, expenditure from elsewhere is necessary if the entrepreneurs are to be able to sell their goods at a remunerative price. So the state of rest appears to be dictated by the principle of effective demand. When, however, this IS-LM diagram is linked via a production function to the

labour market [see for example Perlman, pp. 66, 71] certain anomalies present themselves. As far as the labour market is concerned, the state of rest is dictated by the intersection of the supply and demand curves. In such a presentation, therefore, there are two possible states of rest, one determined by the principle of effective demand and the other by supply and demand forces in the labour market. Overdetermination can be avoided by introducing a real balance effect so that the intersection of the IS and LM curves can occur at a level of income compatible with full employment. The state of rest for the economy is thus dictated by supply and demand forces in the labour market, rather than the principle of effective demand. A vital Keynesian element is thus lacking in any approach which considers the suppliers and demanders of labour to be on an equal footing. Involuntary unemployment cannot arise in a model in which the parties involved cooperate to establish a mutually satisfactory solution. [See Lekachman, p.74.]

In a framework in which the state of rest is governed by supply and demand forces in the labour market, both firms and households have the ability to bring about change. If the economic system is therefore stuck at a position of less than full employment, it must be because of some or other rigidity in the system (such as for example inflexible wages). Moggridge [p.183] observes:

> ...[A] myth accompanying the development of Keynesian economics developed during the establishment of the neo-classical synthesis. It saw Keynes in the <u>General</u>

> Theory simply making the special assumptions of rigid wages and a liquidity trap and thus made it possible to accommodate him as a special case in the consensus over economic theory. This myth still dominates most undergraduate textbooks.

Patinkin's famous chapter 13 provides another example of the difficulties that can arise if it is not clear whether it is the principle of effective demand that dictates the state of rest or whether the latter arises because of supply and demand forces in the labour market. Here we find Patinkin referring to insufficient demand as the force majeure [Patinkin, p. 322], and yet also arguing that the supply and demand forces in the labour market determine the state of rest [pp. 314-15].

In a cooperative economy, it may be within the power of an unemployed person to offer his labour services at a lower real wage. If he refuses to do so, he cannot be regarded as involuntarily unemployed. When the cooperative economy is inhabited largely by SEAs, there may of course be some people employed by others. If they are fired, however, there is nothing to prevent them from hiring themselves. The argument that unemployment arises because of a recalcitrant worker refusing to accept a lower real wage should therefore be distinguished from the idea of a recalcitrant worker being unemployed because he refuses to employ himself. These two issues thus raise the following questions: (1) Are the unemployed in a modern

industrial society in a position to offer their services at a lower real wage? (2) Are the unemployed in a modern industrial society in a position to become SEAs, i.e., to join the ranks of the entrepreneurs? As is well known, Keynes answered no to the first question:

> ...the classical theory assumes that it is always open to labour to reduce its real wage by accepting a reduction in its money-wage. ... There may exist no expedient by which labour as a whole can reduce its real wage to a given figure by making revised money bargains with the entrepreneurs. ... We shall endeavour to show that primarily it is certain other forces which determine the general level of real wages. [General Theory, pp. 11, 13]

Keynes did not specifically address the second question, although his distinction between an entrepreneur and a cooperative economy constitutes a denial that a modern industrial society could be viewed as consisting of SEAs.

Even if critics of the idea of involuntary unemployment were to concede that it is not within the power of workers to alter the real wage (i.e., even if they were to agree with Keynes on the answer to question 1 above), they could always fall back on the argument that an unemployed worker can always employ himself. This opportuntiy is ipso facto always available to a SEA.

An unemployed factory worker could presumably start selling candy floss at a circus or perhaps even get employed as a clown. In this example the unemployed person is offering his services to somebody else. If the circus is unwilling to hire him, then if he is a SEA he can presumably start manufacturing his own candy floss, or start a new factory, or even start a new circus in which he could hire himself as a clown. It is easy enough to recount tales of unemployed persons taking on rather strange jobs from time to time. The question that should be answered, however, is whether all the unemployed in a modern industrial society are in a position to become entrepreneurs. Lucas and his followers would presumably answer yes, and Keynes would presumably have answered no, since the principle of effective demand operates in an environment in which firms and households are not on an equal footing.

In Keynes's view employment is largely in the hands of entrepreneurs. If their short-run expectations of demand are realised, the economy will be in a state of rest whether the workers are satisfied or not. In such an economy it is possible to conceive of involuntary unemployment. If we wish to discover what workers would like to do, we are not, of course, precluded from deriving a supply curve for labour, but it is another question whether they have the power to implement their plans [Chick, 1983, p.141]. That they had such power was denied by Keynes.

Robinson and Eatwell [p.102] point out that:

> ...industrial workers, unlike peasants, do not have access to means of production (in the model, machines) which they could use to meet their own needs, but have to wait until it suits the requirements of profit-seeking firms to employ them.

The argument that all unemployment is voluntary appears in many guises. For example, Leijonhufvud analyses the labour market with the aid of search theory. This has the effect of making all unemployment voluntary [see Bharadwaj, 1983, p. 8]. In the process the idea of entrepreneurs and workers being on an equal footing reappears.

The distinction between an entrepreneur and a cooperative economy can also be viewed from a different angle. Critics of the neoclassical synthesis have made much of the fact that the neoclassical approach does not take time seriously [see Hicks, 1976]. In a general equilibrium model trading at false prices is disallowed - a price vector must be established in which everybody is on his or her supply or demand curve. Once the auctioneer has discovered this equilibrium price vector, the agents are permitted to trade with each other. In this way, economic events are determined <u>simultaneously</u>, with both firms and households capable of bringing about change. Alternatively we may say that the entrepreneurs and workers <u>cooperate</u> in establishing a mutually acceptable solution. This is the cooperative view of the

economic system that Keynes attacked. In opposition to this approach is the idea that events in the General Theory occur in historical rather than logical time. In this view the production process follows a particular sequence, rather than being determined simultaneously. Chick [1978, pp.6-7] presents the following sequence of events. In the first period firms determine how much labour they require on the basis of their cost structure and the anticipated demand for their goods. Thereafter the labour market opens, with firms determining the amount of employment. The labour market then closes, even if there is substantial unemployment. Since the labour market is now closed, the households cannot recontract with firms in order to establish a more satisfactory solution. (In a Walrasian model, firms and households could, as it were, go back to drawing-boards during the tâtonnement process and work out an agreement acceptable to both.) When the goods market opens, firms may discover that their price and output decisions have been inopportune. Since recontracting is not permitted, this can lead to new decisions only in the subsequent period. If there is an excess supply of labour in a Walrasian model, there must be a corresponding excess demand elsewhere in the system. In the process envisaged by Chick, however, it makes no sense to look for a missing excess demand, for the labour market has closed and Walras's Law does not apply.

In a cooperative economy, therefore, events are determined simultaneously, while in an entrepreneur economy the sequential nature of events must be taken into account.

In Keynes's approach, entrepreneurs form expectations about the demand for their products and if these expectations are realised, the system will be in a state of rest whether the workers are satisfied or not. At different times in the General Theory Keynes makes different assumptions about whether the short-run expectations of those who have the power to effect change (the entrepreneurs) will be realised or not and whether any disappointment will affect the state of long-run expectations. Kregel [1976] has accordingly identified three different models in the General Theory, namely the models of static, stationary and shifting equilibria. In all three models the state of rest will be one in which the short-run expectations of the entrepreneurs are realized. The expectations of the workers are not relevant in determining the state of rest. In the static model the short-run expectations of the entrepreneurs are always realized. The possibility of disappointed expectations constituting a disequilibrating force is thereby ruled out. In the stationary model short-run expectations may be disappointed, but this is not permitted to alter the state of long-run expectations. If, for example, a farmer's expectations regarding wheat sales are disappointed, such disappointment does not affect the farmer's demand for tractors.

In the model of shifting equilibrium, the disappointed short-run expectations of entrepreneurs can affect the state of long-run expectations. When expectations regarding wheat sales are disappointed, the farmers' demand for tractors is affected. Since

the General Theory suggests that it is the state of long-run expectations that dictates the state of rest, the equilibrating forces are therefore continuously being interrupted by the forces of change. Hence although the state of long-run expectations determines a potential state of rest, the latter may never be obtained:

> It follows that, although expectation may change so frequently that the actual level of employment has never had time to reach the long-period employment corresponding to the existing state of expectation, nevertheless every state of expectations has its definite corresponding level of long-period employment. [General Theory, p. 48]

Now that we have specified the environment in which the principle of effective demand is to operate, let us examine the principle in greater detail.

In the final draft of the General Theory Keynes unfortunately considered it unnecessary to distinguish between an entrepreneur economy and a cooperative economy. In chapter 2, however, where he discusses "The Postulates of the Classical Economics" it is nevertheless clear that those economists whom he regards as classical postulate a world in which both the entrepreneurs and workers have the power to effect change. A necessary feature of an approach which incorporates supply and demand curves of and for labour is that both parties are on an equal footing as far as

bringing about changes is concerned. Keynes's fundamental objection [General Theory, p.13] to the classical supply curve of labour hinges on the argument that workers ultimately have no control of the real wage. In other words, workers do not have the power to effect change. Although Keynes omits references to cooperative and entrepreneur economies in the General Theory, within the first three pages of chapter 3 entitled "The Principle of Effective Demand", Keynes introduces his aggregate supply and demand curves, and both curves are presented from the viewpoint of the entrepreneurs. The aggregate supply curve (Z) represents the amount of proceeds that entrepreneurs require if they are to hire various amounts of labour. The aggregate demand curve indicates the proceeds which entrepreneurs expect to receive if they hire various amounts of labour. Although Keynes refers to this curve as the D function, it will be more convenient to label it the D^e function or aggregate expected demand function in order to indicate that it reflects the expectations of the entrepreneurs [see Wells, 1962, 1973, 1977, 1978]. The variable D will be reserved for the sum of actual consumption (C) and investment (I) expenditure, i.e., D will denote the aggregate demand function. as opposed to the aggregate expected demand function (D^e).

In chapter 3 of the General Theory, Keynes discusses the combination of consumption and investment expenditure from the viewpoint of the expectations of the entrepreneurs (see in particular, General Theory, p. 29). When, however, Keynes

discusses consumption and investment in Books III and IV, consumption is related to income, and investment to the rate of interest, and the fact that aggregate demand was originally introduced in Book I in terms of the expectations of entrepreneurs is almost forgotten. Thus whereas in Book I Keynes looks at aggregate demand in terms of the expectations of the suppliers of consumption and investment goods, in Books III and IV he jumps to the decisions of the buyers of consumption and investment goods. The key to this jump is in Book II.

In Book II Keynes distinguishes between short-run and long-run expectations. Short-run expectations are related to the sales expectations of entrepreneurs irrespective of whether the goods being manufactured are regarded as consumption or investment goods [General Theory, p.46; Collected Writings, XIV, p.395; XXIX, p.74]. Hence, an entrepreneur producing tractors has short-run expectations regarding the sale of the tractors, just as the producer of bread has short-run expectations regarding bread sales. Long-run expectations are related to the demand for investment goods, (e.g., the demand for tractors). These expectations are "...concerned with what the entrepreneur can hope to earn in the shape of future returns if he purchases (or, perhaps, manufactures) 'finished' output as an addition to his original equipment." [General Theory, p.47]

Keynes usually assumes that the short-run expectations of entrepreneurs are realised. Under these conditions, the

expectations of those supplying consumption and investment goods will coincide with the actual decisions of those buying the goods. (This is no way presumes that the demanders of consumption goods are satisfied with the status quo.)

If the short-run expectations of demand of entrepreneurs are disappointed, the intersection of the D^e and Z curves cannot be regarded as a state of rest since those whose expectations are disappointed have the power to effect change. Hence, by associating the intersection of the D^e and Z curves with the principle of effective demand [General Theory, p. 25], Keynes is making the implicit assumption that the short-run expectations of entrepreneurs are realized. In other words Keynes is here employing what Kregel [1976] refers to as the static model. To postulate that entrepreneurs always anticipate demand for their products correctly, was for Keynes merely a simplifying assumption. He did not of course believe that they were always correct, and in what Kregel [1976] terms the stationary model he allows for the disappointment of short-run expectations. In the stationary model the potentially disequilibrating events (disappointed expectations) are presumed to be overshadowed by the forces bringing the system to a state of rest.

The intersection of the D^e and Z curves will now no longer necessarily occur at a level of employment at which the economy is at a state of rest, since the short-run expectations of those who have the power to effect change may be disappointed. For this

reason it will be convenient to refer to the intersection of the D^e and Z curves as the point of effective supply rather than the point of effective demand, since it is associated with the output that entrepreneurs would like to supply [Kregel, 1979].

As noted earlier, Kregel [1976] has also identified a third model in Keynes's writings, namely the model of shifting equilibrium. Here short-run expectations may not only be disappointed, but if they are, they affect the state of long-run expectations. Once again the intersection of the D^e and Z curves, i.e., the point of effective supply, no longer necessarily constitutes a state of rest.

We have mentioned that if the short-run expectations of entrepreneurs are realized, the system will be in a state of rest, but have yet to explain why. The answer is bound up with the principle of effective demand.

The principle of effective demand argues that since those involved in the production of consumption goods do not spend their entire income (including profits) on such goods, consumption expenditure from elsewhere will be required if the entrepreneurs of consumption goods are to be willing to continue production.

> The central point of the theory of effective demand is that the sales value of goods that are <u>available</u> to be sold to the public (our corn) is determined by expenditure out of the incomes earned in producing

> non-available output (our machines). Since less than the whole income (including profits) derived from available goods is spent on those goods, expenditure from other incomes is necessary to maintain profitable sales. [Robinson and Eatwell, pp. 106-7]

With the aid of the principle of effective demand Keynes sought to provide an answer to the paradox of unemployment existing side by side with idle capacity. Failure to recognise this may lead one to believe that unemployment is arising because existing capacity is inadequate. Keynes presumed that if the existing capital equipment was fully utilized, the entire labour force would be employed [Garegnani, 1978, p.337].

The principle of effective demand seeks to explain the level of employment. Hence, the latter is an endogenous variable. (Although Keynes was primarily interested in the the relationship between consumption and employment, he found it more convenient to regard consumption as a function of income. This presumes a unique relationship between real income and employment [General Theory, p.90].) Demand for consumption goods depends on exogenous and endogenous factors. The principle of effective demand states that given the endogenous relationship between consumption and employment, the equilibrium level of employment will be dictated by exogenous factors. This definition is broad enough to cover both Keynesian and Kaleckian versions of effective demand. In this broad definition we have avoided specifying whether the exogenous component consists, for example, of investment,

government expenditure, the external sector, or some combination thereof. Even if these particular components are left out of the analysis, however, the broad definition can still be applied. This may not seem very important at this stage. As we shall see later, however, there have been certain interpretations of effective demand in which the only good produced is a consumption good [Barro and Grossman, 1971]. It is then useful to consider whether such a model is compatible with the principle of effective demand.

Keynes provides several definitions of the principle of effective demand. For example he states that:

> ...given what we shall call the community's propensity to consume, the equilibrium level of employment, i.e. the level at which there is no inducement to employers as a whole either to expand or to contract employment, will depend on the amount of current investment. [General Theory, p.27. See also Collected Writings, XIII, p.516, XXIX, p.160.]

The question of whether supply will be equal to demand is left open. The principle of effective demand dictates a level of employment that is equivalent (when short-run expectations are realised) to the employment level at which Keynes's aggregate supply and aggregate demand functions intersect. But while aggregate supply and demand as defined by Keynes are equal at the equilibrium level of employment, there is no presumption that

supply is equal to demand in individual markets. Keynes's attention is, of course, focussed on the labour market, but it is important to consider other markets as well. Suppose that a factory is not working at full capacity. Under these circumstances the supply and demand model becomes a slippery tool. Kregel [1975, p.60] notes that:

> For manufacturing industry, where stocks can be run down or built up to meet changes in demand at given prices, or the level of capacity utilisation can be increased or decreased to meet changes in sales at given prices, market-clearing prices or supply and demand determined prices have little meaning.

In this chapter we have attempted to show that Keynes put the principle of effective demand through its paces in an entrepreneur economy. When, as in the neo-classical synthesis, the principle of effective demand is applied in a cooperative environment, the state of rest is dictated by supply and demand forces in the labour market, and involuntary unemployment can be explained only by introducing some or other rigidity into the system, such as (for example) communication failures amongst firms and households. This will be discussed at greater length in chapter 5.

CHAPTER 3 - MICROFOUNDATIONS FOR KEYNES'S AGGREGATE SUPPLY AND DEMAND CURVES

Keynes's distinction between an entrepreneur and a cooperative economy has been emphasised in the previous chapters. Since a supply and demand approach presupposes a cooperative environment, which is the approach criticized by Keynes, the appearance of the terms supply and demand in the title of this chapter requires an explanation. While Keynes employs aggregate supply and demand functions in order to arrive at the point of effective demand, both functions are presented from the viewpoint of the entrepreneurs. The aggregate supply function represents the proceeds that entrepreneurs require if they are to hire various amounts of labour. The aggregate (expected) demand function reflects the proceeds that entrepreneurs expect to receive from various employment levels. The action is therefore taking place in an entrepreneur environment. These two functions are now examined in greater detail.

3.1 THE AGGREGATE EXPECTED DEMAND FUNCTION

In this section some of the problems involved in establishing microfoundations for Keynes's aggregate expected demand curve will be investigated under the assumption that entrepreneurs do not necessarily correctly anticipate the demand for their products.

When Keynes introduces the aggregate demand function, it is cast in terms of the expectations of entrepreneurs:

> ...let D be the proceeds which entrepreneurs expect to receive from the employment of N men, the relationship between D and N being written D = f(N), which can be called the aggregate demand function. [General Theory, p.25]

Aggregate demand is thereafter divided into "...D_1, the amount which the community is expected to spend on consumption, and D_2, the amount which it is expected to devote to new investment." [General Theory, p. 29]

Let us now introduce some terms that will prove of use in analyzing the expected demand curve. As noted in chapter 2, we shall refer to the aggregate expected demand function as the D^e curve. What is of importance is to establish just whose behaviour the D^e curve is meant to represent. i.e., whether it is meant to represent the behaviour of the agents in the model, or their behaviour as viewed from the vantage point of the model-builder. It will accordingly be useful to distinguish between the information assumed known to the agents in the model (whom we shall refer to as AIMs) and that possessed by the model builder. Hayek points out that:

> The confusion about the concept of a datum is at the bottom of so many of our difficulties ... Datum means, of course, something given, but the question which is left open, and which in the social sciences is capable of two different answers, is to whom the facts are

> supposed to be given. ... [The question that arises is] ...whether the facts referred to are supposed to be given to the observing economist or to the persons whose actions he wants to explain...
>
> There seems to be no possible doubt that these two concepts of "data," on the one hand, in the sense of the objective real facts, as the observing economist is supposed to know them, and, on the other, in the subjective sense, as things known to the persons whose behavior we try to explain, are really fundamentally different and ought to be carefully distinguished.

[Hayek, p. 39. See also Richardson, 1960, p.40; Laidler, p.27 and Loasby, p.187.] Leijonhufvud [1970, p.3] remarks that:

> As economists, we are wont to put ourselves in the role of outside observers, who, knowing the demand and supply functions, are able to calculate the equilibrium values for price and output. But we should not permit ourselves to assume that the inside observers - the actual market participants - possess and act on this knowledge.

The rational expectations approach will be discussed in chapter 6. We may note in passing, however, that the rational expectations hypothesis may be viewed as a denial of the proposition that a distinction needs to be made between the information known to the model builder and the AIMs.

Let us regard an assumption concerning the distribution of labour amongst firms as an IGA (interfirm guesswork assumption). It will

also be useful to distinguish between inside and outside employment. From an individual firm's point of view, the labour employed by it will be regarded as inside employment, whereas labour hired by other firms will be called outside employment.

Keynes's aggregate expected demand function (D^e) links the employment levels of all firms to the total proceeds that can be expected from such employment levels. When investigating its microfoundations, we can imagine the model builder asking the AIMs to complete a questionnaire. The latter consists of a blank graph with inside labour measured along the horizontal axis and expected proceeds along the vertical. Each firm is asked to complete the graph, i.e., to plot the proceeds it expects to receive from hiring various amounts of inside labour. (In the real world firms would presumably be able to respond to such a questionnaire, and there is no immediate reason why a firm should view expected proceeds as a positive function of inside employment. We shall be returning to this point presently.) Having obtained the questionnaire responses, the model builder can aggregate the graphs to arrive at the D^e curve. In general, some type of IGA will be required if the model builder is to arrive at an aggregate function rather than a correspondence [Casarosa, 1982, p. 73 - see also Casarosa, 1981, p.189; General Theory, p.45 and S. Weintraub, p.28]. This can be illustrated as follows. Suppose there are two firms in the economy and that their questionnaire responses have different slopes. If one considered only firm 1, the aggregate curve would of course be this firm's

expected proceeds and similar remarks apply to firm 2. In between these two extremes are various ways of combining the firms' expected proceeds. For example, one could suppose that half the labour force works for firm 1 and the other half for firm 2, whatever the total level of employment is. Countless other combinations are possible - the point is simply that the shape of the D^e curve will depend on the IGA chosen. An IGA will not be required if the questionnaire responses are all horizontal. If they are linear with identical slopes, the shape of the D^e curve will be the same whatever the distribution of labour amongst firms.

To arrive at a D^e curve, therefore, the model builder will (in general) have to employ some or other IGA. As in the above example, he could specify a link between employment in the firms under consideration. This, in effect, is what the IGAs suggested by Casarosa, Keynes and Weintraub do - they preserve a specified relationship between inside and outside employment whatever the total level of employment might be. In what follows we shall consider only this type of IGA. (See Asimakopulos, p. 25 for different types of assumptions that can be employed.)

Although the model builder might employ an IGA in constructing a D^e curve, the AIMs need not be endowed with such an IGA. An IGA employed by the model builder will accordingly be referred to as an IGA_m, and if the AIMs are permitted to entertain an IGA, this will be written as IGA_a. (If the latter is identical to the IGA_m,

we shall refer to an IGA_{ma}.) Whether an author is employing an IGA_a, an IGA_m or an IGA_{ma} is not always clear. For example, Wells notes that: "The expected proceeds function has been drawn with some positive slope to reflect the fact that higher levels of employment make for more robust markets and hence more optimistic expectations." [Wells, 1978, p. 319; see also Wells, 1977, p. 98.] These remarks might suggest that an IGA_a is being employed, i.e., the AIMs regard expected proceeds as a positive function of inside employment because outside employment is changing pari passu. On the other hand it might only be the model builder who is entertaining this belief (IGA_m). A further possibility is that both the model builder and his AIMs share this view (IGA_{ma}).

If an entrepreneur hires more (inside) labour, he can produce more goods along the lines dictated by the production function, but it is another matter whether he can expect greater proceeds. That, in general, would depend on outside employment. A production function employed as an expected proceeds function requires (inter alia) the AIMs to believe that everything produced can be sold. If this is assumed, it can be argued that the questionnaire responses will be dictated by the shape of the production function (multiplied by a scale factor, the expected price of the commodity in question). [See Casarosa, 1981, p. 189; 1982, pp. 69-70.] The model builder might not share the optimimism of the AIMs regarding unlimited sales possibilities. If he is employing an IGA_m, however, inside and outside employment move in step, and from the model builder's viewpoint, expected proceeds can be

regarded as a positive function of inside employment. (There is no assurance that such upward sloping curves will be identical to those obtained from the questionnaire responses, since the IGAs employed in completing the questionnaires need not be identical to the IGA_m.) Under these circumstances an upward sloping D^e curve is not simply depicting the behaviour of the AIMs as indicated on their questionnaire responses, but is also reflecting the viewpoint of the model builder. If the AIMs all submit horizontal responses to the questionnaire, the resulting horizontal D^e curve clearly depicts the behaviour of the AIMs, since no IGA_m is required in its construction. The model builder receiving these horizontal responses may, however, be employing an IGA_m. The latter ensures that inside and outside labour move pari passu, in which case expected proceeds may be regarded as a positive function of inside labour. Despite receiving horizontal responses from the AIMs, therefore, the model builder obtains upward sloping curves, which may be aggregated with the very IGA_m employed in their construction. The D^e curve obtained in this fashion will be upwards sloping. This example illustrates that two different D^e curves can be obtained, depending on whether we aggregate the questionnaire responses or employ an IGA_m. If an IGA_{ma} is employed, a unique D^e curve can be obtained, but Casarosa [1981,1982] regards such an assumption as a violation of the conditions for perfect competition.

An entrepreneur does not automatically believe that the simple expedient of hiring more inside labour will generate greater

proceeds. (We are assuming that inside labour's purchase of firm i's product is negligible.) Once we deny the AIMs the belief that they have unlimited sales opportunities, their questionnaire responses will indubitably be related to outside employment conditions. Under these circumstances the questionnaire responses must contain some or other implicit link between inside and outside employment, i.e., some sort of IGA_a. (This need not, of course, be an IGA_{ma}, and if it is not we are back at the problem of whose behaviour the D^e curve is meant to represent.) Even a horizontal response could contain an IGA_a, since such a response could indicate that a firm sees no connection between inside employment and expected proceeds because of recessionary conditions in the economy. If a firm submits an upward sloping response, the proximate reason is that it believes that it can sell all that it can produce. But if we were to investigate further, this belief will be linked in some way or other to outside employment. A firm producing bricks during a building boom may quite correctly suppose that it can sell all the bricks it is able to produce, but a questionnaire response may not reflect such optimism during a building recession. The diffusion index illustrates that even near the lower turning point of the business cycle, there will be certain firms expanding their operations, and even near the upper turning point some firms experiencing a decline in sales. In other words there will always be some firms submitting positively sloped returns even if the majority are pessimistic about sale proceeds, and there will always be some submitting horizontal returns even if the majority of firms are

optimistic. These examples do not alter the fact that inside and outside employment are linked - they merely illustrate that the link may be an inverse one. The introduction of the foreign sector complicates matters without affecting our argument. A supplier of raw materials to the outside world may expect greater proceeds from the employment of more inside labour if the overseas country is experiencing a cyclical upswing, even though local outside employment conditions may be depressed. This is yet another example that the link between inside and (local) outside employment may be inverse.

In Casarosa's approach entrepreneurs are endowed with the belief that they can sell any amount of the product they produce at a given price. This raises the question of whether Keynes employed such an assumption. Keynes's decision to inhabit the General Theory with a large number of small firms was an attempt to meet his critics on their own parade ground - if he had employed a small number of large firms, it could always have been claimed that involuntary unemployment was a result of monopolistic elements. On the other hand, could Keynes have regarded his theory as general, were it not able to deal with the situation, prevalent at the time of writing, that thousands of firms could not sell everything they produced? Keynes accordingly populated the General Theory with a large number of small firms, but there is convincing evidence in chapter 19 that these firms do not believe that they have unlimited sales opportunities. This issue has been discussed at some length by Chick [1983, chapters 2-5].

Although Keynes provides little information as to how firms form expectations, he does note that "...it is sensible for producers to base their expectations on the assumption that the most recently realised results will continue, except in so far as there are definite reasons for expecting a change." [General Theory, p. 51] Our brickmaker is unlikely to believe that he can sell all the bricks he can produce if the most recently realised results have indicated otherwise. Keynes's remarks contain an implicit IGA_a - when history enters the picture it becomes difficult to argue that entrepreneurs have no knowledge of the business cycle. A firm taking outside employment (or some proxy therof) into account is, however, employing precisely the kind of IGA_a that Casarosa regards as illegitimate. While Casarosa's IGA_m incorporates a link between inside and outside employment, the AIMs are assumed to be unaware of it.

If the model builder sends out the above mentioned questionnaire to his AIMs, with the additional information that inside and outside employment are in tandem, the AIMs would be provided with a reason to submit upward sloping graphs independently of any other information at their disposal. Casarosa is unwilling to provide his AIMs with such additional information. Since he employs an IGA_m, however, the relationship between inside and outside employment remains the same whatever the total level of employment. Under the circumstances, the D^e curve should slope upwards whatever (other) microfoundations the model builder might have in mind.

A firm may of course believe that it can sell everything it is capable of producing - we do not wish to suggest that firms never entertain such optimistic thoughts. What we should like to suggest, however, is that a firm's opinion regarding future sales prospects are affected in one way and another by the state of business confidence. Such an opinion contains an implicit IGA_a.

The rational expectations school would presumably argue in favour of an IGA_{ma}, since this approach argues that the expectations of the AIMs should be the same as the expectations of the model builder. Although the employment of an IGA_{ma} makes it easier to interpret the D^e curve, such an approach implies that there is no real difference between the micro and macro levels as far as the D^e curve is concerned. The employment of an IGA_m which is not an IGA_{ma} means that the D^e curve is not simply a reflection of the firms' responses to the questionnaires.

The questionnaire that we set up to investigate microfoundations for the D^e curve had inside labour on the horizontal axis and expected proceeds on the vertical. In Casarosa's approach, the AIMs believe that they can sell any amount of their product at a given price. Casarosa is, in effect, implying that the questionnaire responses submitted by the AIMs are a reflection of the production function (multiplied by a scale factor, the expected price of the commodity in question). Casarosa's (micro) expected proceeds function might also be seen as the response to a different type of questionnaire. In the latter the vertical and

horizontal axes of our original questionnaire are reversed. Expected proceeds is now measured along the horizontal axis and inside labour along the vertical. Each firm is now asked to plot the amount of inside labour it would employ as a function of expected proceeds. If the axes are thereafter reversed, one would presumably have a graph reflecting the production function, but that does not mean that the simple expedient of hiring more inside labour will lead to greater proceeds. In the construction of his D^e curve, Casarosa allows entrepreneurs to suppose that expected proceeds are a positive function of inside labour, since entrepreneurs are led to believe that everything produced can be sold. Although Casarosa is unwilling to allow the AIMs to employ an IGA_a, his aggregation procedure requires the use of an IGA_m.

3.2 MICROFOUNDATIONS FOR KEYNES'S AGGREGATE SUPPLY FUNCTION

Aggregate schedules are usually derived by investigating microfoundations first, and thereafter applying some or other aggregation procedure. As in the case of the demand side, however, Keynes presents his aggregate supply function first. Random clues regarding possible microfoundations are scattered around in subsequent chapters.

Towards the end of chapter 4 the close association between the aggregate supply curve and the ordinary (Marshallian) supply curve is revealed. The latter, of course, is drawn in price-output

(PO) space. Since Keynes wished to proceed to the macrolevel, and because the prices and quantities of different goods are non-additive, he presented his micro supply curve in proceeds-employment (PO-N) space. In this way the proceeds and employment levels of different firms could be added together. The expected proceeds are not the same as expected sales unless the latter refers to final goods. Intermediate transactions are netted out by subtracting user cost from both the aggregate supply and demand curves [General Theory, p. 24]. The expected proceeds are therefore the sum of value added, or the expected sales value of final goods [Tarshis, pp. 370-71].

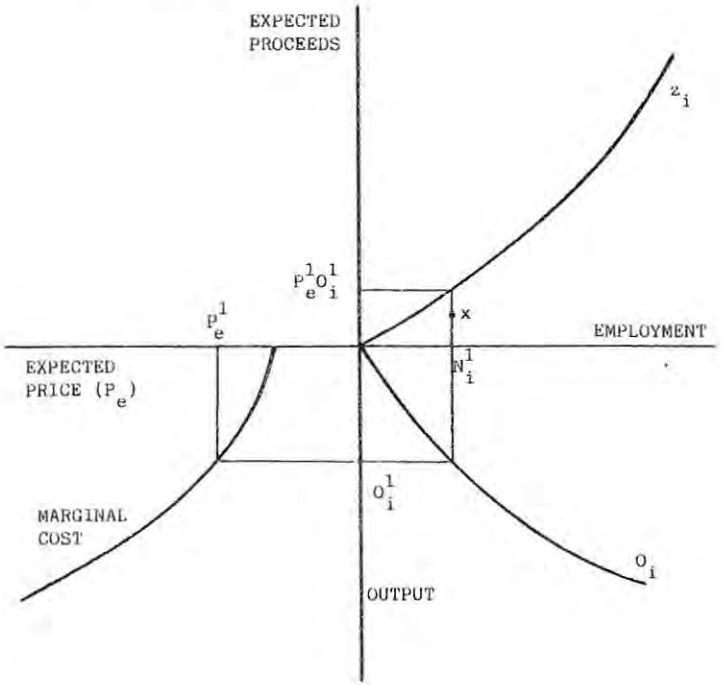

Figure 1

In Figure 1, Keynes's microproduction function [General Theory, p. 44] is presented in the south-east quadrant. (This diagram is based on that of E.R. Weintraub, p.41.) Here the output of the i^{th} firm (O_i) is given as a function of the labour employed by this firm (N_i). In the south-west quadrant expected price (P_e) is equated with marginal cost, where both are to be interpreted as net of user cost. If the expected price is P_e^1, the firm would want to produce an output of O_i^1, which would require the employment of N_i^1 units of labour. The expected proceeds ($P_e^1 O_i^1$) required to induce the entrepreneur to hire N_i^1 units of labour is plotted in the north-east quadrant, and by continuing the exercise for other values of P_e, Keynes's micro supply function $z_i = \phi_i(N_i)$ is obtained [General Theory, p. 44].

Apart from presenting his supply curve in PO-N space, and apart from his remarks about user cost, Keynes stressed that he was here marching to the beat of a Marshallian drum.

The micro supply function z_i in Figure 1 indicates the proceeds that firm i requires to receive if it is to hire various amounts of labour. A point such as x lying below the z_i curve is simply not feasible - to hire N_i^1 units of labour, the firm requires proceeds of at least $z_i^1 = P_e^1 O_i^1$ in order to cover its costs and make a profit. Naturally the firm would be happy to receive more than z_i^1 if it were hiring N_i^1 units of labour, but it would be to the firm's advantage to hire more than N_i^1 units of labour if more than z_i^1 were forthcoming [Tarshis, p.372]. Hence points lying

above the z_i curve are not positions of profit maximization.

Keynes chose to present the z_i curve in PO-N space because the proceeds and employment levels of different firms can be aggregated. As noted in 3.1, however, an IGA will be required if the micro supply curves of different firms are to be added together. If we take the micro supply curves of two firms (z_1 and z_2) we can obtain an aggregate supply curve (Z) if we assume (for example) that labour is distributed 50-50 between the firms. A different Z curve will be obtained if it is assumed that firm 1 always employs twice as much labour as firm 2.

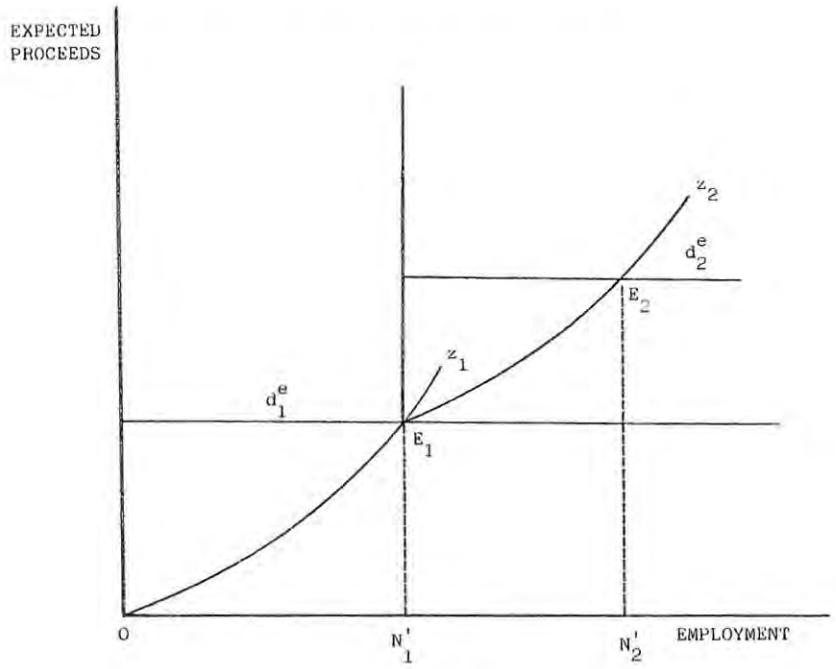

Figure 2

One way of getting around this problem is simply not to work with aggregate curves at all, but rather to collect the points of profit maximization for each individual firm. This requires the combination of the micro supply and expected demand curves, and is illustrated in Figure 2.

In Figure 2, the micro supply curve for firm 1 is z_1. The line d_1^e constitutes firm 1's response to the hypothetical questionnaire discussed in 3.1. In other words d_1^e represents firm 1's response to a request to plot the proceeds it expects to receive if it hires various amounts of inside labour. We have simply taken the type of response one might expect from a small firm under recessionary conditions. The firm does not expect to receive greater proceeds if it hires more inside labour. The height of d_1^e reflects its recent experiences regarding sales. The z_1 curve intersects the d_1^e at E_1. As noted previously the firm requires the proceeds given by z_1 if it is to hire various amounts of labour. If the expected proceeds forthcoming are given by d_1^e, firm 1 will hire N_1' units of labour.

Since the proceeds and employment levels of different firms can be aggregated, E_1 now becomes the origin for firm 2. Firm 2's supply curve is z_2 and its expected demand curve or questionnaire response is given by d_2^e which we have also assumed to be horizontal. Maximum profits are to be made at E_2, with firm 2 hiring $N_1'N_2'$ units of labour.

Total employment in the system is thus given by ON_2' . This result has been obtained without resorting to the construction of aggregate curves. Point E_2 could also have been obtained by constructing $d^e = d_1^e + d_2^e$ and Z where the construction of the latter requires an IGA reflecting labour distribution between the two firms. If this IGA is not compatible with the levels of employment dictated by profit maximization, the model will be overdetermined. Another way of looking at this to examine the instructions being given to the AIMs. They are on the one hand being required to observe profit maximization. On the other hand they are being asked to obey a certain distribution of labour as reflected in the IGA. If the latter contradicts profit maximization, the agents will be confused as to which instruction to follow, in other words the model will be overdetermined.

Since the model builder requires an IGA which is compatible with the profit maximizing rule in order to construct the Z schedule, the construction of aggregate schedules is, in a sense, redundant. (Because the questionnaire responses are horizontal in the above exercise, no IGA was required to construct them.) There is therefore in this example a one-to-one correspondence between events at the microlevel and the situation at the macrolevel.

In this exercise there is no assurance that the proceeds expected by firms 1 and 2 will turn out to be the proceeds actually realised. That would depend on the actual consumption patterns of

the households. Accordingly we suggested earlier that a point such as E_2 in Figure 2 be called the point of effective supply, rather than the point of effective demand. The point of effective supply thus determines what Casarosa [1981, p. 190] refers to as the "daily" equilibrium of the system. The point of effective supply is not necessarily a state of rest, however, because it may be a position in which the short-run expectations of entrepreneurs are disappointed. In the stationary model Keynes allows for such disappointment. He nevertheless assumes that the forces bringing the system to a state of rest dominate the potentially disequilibrating forces unleashed by disappointed expectations. In a letter to Hawtrey, he notes that:

> You are usually concerned with the higgling of the market, the short-time lags lasting a few weeks during which everybody is discovering what the demand really is; whereas I am concerned with the forces determining the demand, i.e. the forces which are pretty soon discovered by the higgling of the market, and I am not much interested myself in the brief intermediate period during which the higgling of the market is discovering the facts. [Collected Writings, XIV, p.27]

With each firm selecting the intersection of the z_f and d_f^e curves as the positions of profit maximization, the daily equilibrium for the system as a whole is established. The employment opportunities arising from this situation generate actual

consumption expenditure. With the aid of indifference curves Chick [1978] constructs individual consumption functions. These may then be aggregated. (The aggregation procedure will require some or other distributional assumption, similar in effect to the IGA employed when constructing the D^e curve.) The position of the consumption function does not depend on the amount of employment actually offered. In other words the consumption function will not, for example, shift upwards if more employment were offered. The consumption function is derived without taking into account whether workers will in fact be able to sell all the labour they would like to. In other words the consumption schedule is a notional or unconstrained function, as opposed to the effective or constrained consumption function of Clower.

With the household sector viewed as playing a relatively passive role, the employment opportunities offered by firms determine a point on the consumption function. If firms decide in the subsequent period to offer more employment, the consumption function does not shift, for its position is invariant with regard to job offers [Chick, 1983, p. 109]. The new offers of employment simply determine a new point on the consumption function. This important point will be discussed in greater detail in chapter 5. Failure to realise its importance may lead to the incorrect conclusion that involuntary unemployment arises because of communication failures amongst firms and households.

When the short-run expectations of entrepreneurs are realised, the point of effective supply will be generating a level of employment which is the same as that dictated by the principle of effective demand.

CHAPTER 4 - INFORMATION AND EQUILIBRIUM IN A GENERAL EQUILIBRIUM MODEL

The neoclassical synthesis sought to present Keynesian ideas within a general equilibrium framework. The latter amounts to the type of cooperative economy that Keynes criticized. In this chapter the information structure of such a general equilibrium model will be discussed in greater detail. This will not only be of use in the comparison of the information structure of the General Theory with that of the general equilibrium approach, but will also be of assistance when we discuss the rational expectations approach of Lucas in chapter 6, since this approach is an attempt to impose expectations onto what is basically a general equilibrium model.

To start off it will be useful to examine the three ways in which an economic society can "resolve" the economic problem. These are by means of tradition, command and the market system [Heilbroner, pp. 9-17].

While illustrations of the economic problem being resolved by means of tradition may be observed in any society, the examples normally given are from more "primitive" communities. The essential feature of these examples is the resolution of the economic problem by means of individuals continuing to do whatever they are their forefathers did. Writing of his experiences amongst the Eskimo, Stefánsson [pp.62-3,362]

observes:

> I know now that the Eskimo temperament is that they never expect to find anything in any place where no one has found it before, so far as they know, and never having heard of any one catching fish in Smith Bay they had felt sure there would not be any. ...This was a valuable lesson to me, and has on many occasions encouraged me to go into districts that the Eskimo considered devoid of game and in which I have usually found plenty. ... Temperamentally it seems difficult for Eskimo to imagine that things can change. Natkusiak had found plenty of foxes on Cape Parry in January, 1910, and he could not see why there should not be plenty also in January, 1912.

Apart from tradition the economic problem can also be solved by means of the command system (for example, a socialistic or feudal system) and the market system. Whatever the combination employed, the problem of information dissemination is an important issue, and any model attempting to portray the economic system has to employ some device whereby information is conveyed. Hayek [p.78] regards the problem as fundamental, and remarks that: "The various ways in which the knowledge on which people base their plans is communicated to them is the crucial problem for any theory explaining the economic process..." Lachmann [1956, pp.vii-viii] refers to the need to "emphasize the transmission of knowledge, the interaction of minds, as the ultimate agent of all

economic processes."

The ways in which knowledge is conveyed will, of course, differ. If floods wipe out half a coffee crop in one area, coffee producers and middlemen who read newspapers and listen to the radio react accordingly. But a coffee middleman who has a violent aversion to the communications media (except for news about coffee prices) need neither know nor care whether there has been an earthquake in Brazil or whether evidence has been produced that the drinking of tea causes gout. Hayek [pp. 86-87] and Arrow [p.4] have remarked on the economy of information required by a market system.

The question of information dissemination needs to be seen in a broader context than the mere analysis of market signals, be they of a price or quantity variety. Individuals do not simply react robot-like to signals; they have to be decoded, and interpretations may differ, in which case divergent expectations will be present. Attempts have been made to introduce information into general equilibrium models as yet another commodity for which supply and demand curves can be derived. As in the case of money, however, it can be argued that information possesses characteristics fundamentally different from other items in the system. Lachmann [1976b, p. 127] points out that:

> Knowledge ... is an elusive concept wholly refractory to neoclassical methods. It cannot be quantified, has no location in space, and defies insertion into any complex of functional relationships.

To appreciate the role of prices in market economies, it is instructive to refer briefly to the role of prices in a command economy. In a pure command economy, prices are mere accounting devices, rather than transmitters of information. Nove [pp.348,357] remarks that:

> ...the Soviet official view is hostile to the underlying concept of market socialism and is not prepared to recognize the logic of 'active' information-carrying prices... Such prices as these [i.e., prices in a command economy] are useless as indicators of economic behaviour. They do not transmit information.

In general equilibrium models, the AIMs are in effect required to furnish their supply and demand schedules to an auctioneer or central trade coordinator who discovers the price vector which clears all markets. It may help to imagine all the AIMs gathering in a huge market-place [Negishi, pp.605-608]. The auctioneer announces a price for each market. The first vector of prices is selected at random, whereupon the auctioneer collects information from the agents concerning the amounts that would be supplied and demanded at these prices. The auctioneer will then cry out a new vector of prices, his rule being to raise (lower) prices on markets where there is excess demand (supply). The performance continues until a price vector has been obtained which ensures zero excess demands in all markets. No trade is permitted until this state of rest has been established, and trade

may take place at only these equilibrium prices. The anthropomorphic device of the auctioneer, introduced by Walras to epitomize the market process, thus discovers the equilibrium vector by means of the famous tâtonnement (groping) process. The reincarnation of the invisible hand neither requires nor demands a reward for discovering the equilibrium vector. Edgeworth's recontracting device also seeks to eliminate trade at non-equilibrium (false) prices by allowing traders to recontract out of any agreements which are "later" discovered to be at false prices.

One of the alleged virtues of the general equilibrium approach is that it suggests (under appropriate conditions regarding competition, externalities and returns to scale) that an optimal allocation of resources is possible in a dencentralized market economy. The AIMs in a general equilibirium model appear to be reacting to price incentives, at least during the tâtonnement process. But far from having the resolved the economic problem by means of the market system, the tâtonnement device is nothing if not a command performance.

But that is not all. In a static general equilibrium model, the AIMs simply continue to do whatever they did before. Laidler [p. 28] remarks that: " ...one interpretation of static general equilibrium is that the same exchanges take place time and time again between the same agents." We are reminded therefore of life amongst the Eskimo.

There is, of course, a strong element of tradition in the General Theory as well. For instance, Keynes notes that:

> ...it is sensible for producers to base their expectations on the assumption that the most recently realised results will continue, except in so far as there are definite reasons for expecting a change. [General Theory, p. 51]

The picture thus emerges of a general equilibrium model, avowedly representing a market economy, actually resolving the economic problem by a combination of command and tradition. A further anomaly is that general equilibrium practioners often extol the virtues of flexible prices which, as Loasby [p. 163] points out, is illogical, since:

> the theory is formally concerned with stable prices in a stable situation, and can certainly give no formal guidance whatever on the desirable responses to unforeseen change.

Richardson [1956, p. 121] in fact refers to the advantages of stable prices as far as information dissemination is concerned.

One of the reasons why anomalies start arising when we examine information dissemination in a general equlibrium model is because the auctioneer is, in effect, the personification of perfect foresight. It has often been pointed out that money is important only in a world of uncertainty, but similar remarks

apply to prices as well [Laidler, pp. 27, 32]. The very existence of communications media should be considered eccentric in a world of perfect foresight [Morgenstern, p. 180]. The AIMs in general equilibrium models would no doubt be as surprised as the Eskimo to hear of our inability to look into the future:

> When I showed ... the Eskimo ... my binoculars that made far-away things seem near and clear, they were of course interested; when I looked to the south or east and saw bands of caribou that were to them invisible, they applauded, and then followed the suggestion: "Now that you have looked for the caribou that are here to-day and found them, will you not also look for the caribou that are coming to-morrow, so that we can tell where to lie in ambush for them?" When they heard that my glasses could not see into the future, they were disappointed and naturally the reverse of well impressed with our powers, for they knew that their own medicine-men had charms and magic paraphernalia that enabled them to see things the morrow was to bring forth. [Stefánsson, 1913, p.184]

The auctioneer may be viewed as a colourful way of describing the operation of market forces. Or he can be seen as the personification of perfect foresight. It will be useful in what follows to regard the auctioneer concept as a device to prevent the potentially disequilibrating forces in a model from interrupting the equilibrating forces.

An equilibrium approach requires the belief that the equilibrating forces in the system dominate the disequilibrating ones [Lachmann, forthcoming]. The action of the equilibrating variables should, moreover, not introduce shocks that might seriously impede the movement to equilibrium. An example of such endogenously generated shocks are the income effects that arise when trade takes place at false prices. The tâtonnement and recontracting assumptions may be viewed as devices to preclude the appearance of this type of shock. In other words these assumptions prevent the endogenous variables (prices) from affecting the exogenous variable (income). The model will not provide a determinate solution if the endogenous and exogenous forces are confounded. Without an implicit tâtonnement assumption, for example, it is not possible to distinguish movements along a supply or demand curve from shifts in the curve.

Just as trade at false prices must be disallowed in a general equilibrium model, so too must trade at false expectations, i.e., expectations not compatible with the equilibrium conditions of the model. If, for example, trade is permitted when supply is not equal to demand, some expectations will be disappointed, and the intersection of the supply and demand curves no longer provides an equilibrium position [Robinson and Eatwell, p. 163]. The model builder may of course assume that such potentially disequilibrating occurrences arising from income effects or disappointed expectations are of minor importance and dominated

by the equilibrating forces [Lachmann, forthcoming]. An equilibrium approach does not require such endogenously generated shocks to be absent; it requires rather the assumption that the equilibrating forces in the system dominate the disequilibrating ones. We should also note that the presence of expectations does not necessarily constitute a disequilibrating force. As noted in chapter 1, the bulls and bears type of equilibrium requires different people to entertain different views of the future if the market is to be in a state of rest. In this type of equilibrium divergent expectations play an equilibrating role. If everybody held similar views of the future, the market will not be in a state of rest. Other states of rest, on the other hand, might require everybody to have similar (convergent) expectations. Whether expectations are equilibrating or not therefore depends on the type of equilibrium one has in mind [Lachmann, forthcoming].

A number of writers, arguing from widely divergent viewpoints, have maintained that the equilibrating forces of a supply and demand approach are not strong enough to provide the system with a centre of gravitation.

Garegnani [1976, p.38] notes that:

> Even if this equilibrium could be formally shown to be stable, the same impermanence of causes which ... imposed consideration of its changes over time, would seem to prevent it from being conceived as a centre of gravitation of the economic system: the forces

> generating it would lack the persistence necessary to distinguish them from those other accidental forces which, at any given time, are likely to keep the economy out of this short-period equilibrium.

Lachmann [1979, p.7] argues that:

> General demand and supply equilibrium cannot serve as a "centre of gravity" ... A planet whose composition and mass are undergoing continuous transformation could not exert a gravitational force of constant strength. If so, how can it be asserted that economic equilibrium forces, necessarily of varying strength over time, will always overwhelm and outlast all other forces?

Richardson [1959, p. 223] remarks that:

> ...the familiar "general equlibrium of production and exchange" cannot be properly regarded as a configuration towards which a hypothetical perfectly competitive economy would gravitate or at which it would remain at rest.

Richardson [1960, pp. 30-1] refers to information related to the tastes of consumers and the production possibilities facing firms as <u>technicial information</u>. It is convenient to assume that consumers and entrepreneurs have perfect technical information. Such information is not enough, however, to enable an entrepreneur to know how much to produce. Information related to the expected activities of other agents in the system is regarded

by Richardson as market information. Lack of market information prevents the intersection of the supply and demand curves from being anything but an optimal position. The model builder drawing supply and demand curves observes the intersection of the curves and from his point of view this constitutes an equilibrium situation. Such market information is not, however, known to the AIMs. Richardson accordingly emphasizes the importance of distinguishing between the information known to the AIMs and that known to the model builder and refers to:

> ...the failure to distinguish clearly enough between the point of vision of the model-builder himself and that of his creatures within the model. For the creator there is no problem of knowledge, for the objective facts about the system appear as postulated data from which could be deduced (or so it was believed) the equilibrium configuration. [Richardson, 1960, p.40]

Garegnani and Lachmanns' reasons for rejecting the supply and demand intersection as a centre of gravitation are remarkably similar. Both argue that the disequilibrating forces in such a model are stronger than the forces of equilibrium. The supply and demand forces cannot therefore provide a centre of gravitation for the system. In arguing that supply and demand forces are too ephemeral for this purpose, Garegnani argues in favour of the forces associated with a uniform rate of profit which make for a long-run centre of gravitation. This neo-Ricardian approach will be investigated in chapter 7. In Lachmann's view, the argument

which leads to the rejection of general supply and demand equilibrium as a centre of gravitation apply to the long-run as well. In the long-run, no less than the short-run, disequilibrating forces will continuously be interrupting the forces of equilibrium.

We have discussed the presence of the auctioneer within the context of general equilibrium models. Let us now examine what kind of auctioneer is required in the General Theory. It may come of something of a surprise to hear that Keynes's approach also requires an auctioneer of sorts. (After all, Leijonhufvud [1968, p. 48] contends that Keynes dispensed with the auctioneer in the General Theory.)

Equilibrium models are concerned with equilibrium situations and can have little or nothing to say about what might happen out of equilibrium. In fact the little that can be said about disequilibrium must be confined to the tâtonnement process when, in fact, no trade is permitted. These remarks apply to any equilibrium model, and as such apply for example to Keynes's static model as well. Let us examine this in greater detail.

If a determinate model consisting of say two functions is set up, the value of the endogenous variable at which the two functions are equal provides the equilibrium position. It would in fact be rather eccentric to set up such a model only to argue subsequently that the solution to the model does not occur at the value of the

endogenous variable for which the two functions are equal. If trade were permitted at a point which is not compatible with the equilibrium solution, the functions would shift, which would raise the question of why such functions were selected in the first place.

In Keynes's static model the state of rest occurs at the level of employment at which the aggregate supply and demand curves intersect. If trade were permitted at a different level of employment, expectations would be disappointed and the Z and D curves would shift. In order to prevent this the model requires that such disequilibrium trading be disallowed - in any event in the static model entrepreneurs' expectations are, by definition, always realised. The equilibrium solution of the static model occurs at the intersection of the Z and D curves and being an equilibrium model, very little or nothing may be said concerning other positions in the diagram. Naturally the model builder may not believe that short-run expectations are always realised. If, however, he believes that the equilibrating forces in the system dominate the disequilibrating forces (such as disappointed expectations) he may nevertheless suppose that short-run expectations are always realised.

In section 3.2 it was mentioned that the equilibrium level of employment could be obtained by collecting all the points at which individual firms are in equilibrium. Firm 1, for example, will hire the amount of empoyment given by intersection of its d_1^e and

z_i curves - this may be regarded as the point of effective supply at the microlevel. In employment-proceeds space, this point of effective supply may now be taken as the origin for establishing firm 2's point of effective supply, with the latter in turn becoming the origin for the next firm, and so on. Let us now suppose that each firm submits its point of effective supply to an auctioneer. It should be emphasized that the latter does not receive information regarding individual supply and demand curves from households and firms. What he does receive is information regarding employment levels already decided upon by the firms. In other words each firm calculates the intersection of the d_i^e and z_i curves without the aid of the auctioneer. And having done so, each firm informs the auctioneer what amount of labour is to be employed. We can now imagine the auctioneer informing the workers what the employment decisions are, and asking them what consumption would be forthcoming from such an amount of labour. The firms are thereafter informed whether their expectations have been met or not.

The point of this hypothetical exercise is that the auctioneer, such as he is, does not establish a mutually acceptable solution for firms and households. Moreover, no recontracting between firms and households is permitted [Chick, 1978, pp. 6-7]. The auctioneer is informed of the total level of employment being generated in the system, informs the household sector of this and thereafter informs firms whether their short-run expectations have been realised or not. (They always are realised in the static

model.) The auctioneer must nevertheless permit only those trades which are compatible with the principle of effective demand. Although he refuses to compromise on this issue, the auctioneer permits no recontracting between firms and households. He is, as it were, very much on the side of the entrepreneurs - after all, he is operating in an entrepreneur economy.

By way of contrast, the auctioneer in the cooperative environment of a general equilibrium model does not receive points of equilibrium already established by firms - he receives schedules of intent from firms and households. With the aid of these supply and demand curves he establishes a cooperative solution.

CHAPTER 5 - INFORMATION AND EQUILIBRIUM IN THE CLOWER-LEIJONHUFVUD INTERPRETATION OF THE GENERAL THEORY

A belief has recently emerged that insufficient aggregate demand arises because of communication failures amongst firms and households. This idea is associated with the interpretation of the General Theory offered by Clower and Leijonhufvud. Briefly, the argument is as follows. Unemployed workers would like to buy more consumption goods, but since they are unable to find jobs, they do not have the ability to make their demands effective. Firms would like to hire more workers, but are unwilling to do so since they are already experiencing difficulties with sales. The system is thus racked by communication or coordination failures and Leijonhufvud [1981, p. 119] refers to such occurrences as effective demand failures. In this chapter we shall introduce a simple model in which such communication failures are absent but in which involuntary unemployment can nevertheless arise. Communication failures are therefore not a necessary condition for involuntary unemployment. This simple static model will also be of use in illustrating Keynes's static model in which the short-run expectations of firms are always realised. In order to illustrate that involuntary unemployment does not necessarily arise because of coordination failure, we introduce the artificial assumption that workers in firm i spend their entire income on firm i's product. Even under these conditions there is a limit to the amount of labour that an entrepreneur will want to

hire, and that limit is prescribed by the principle of effective demand.

In the following model there are C-sector firms which make consumption goods (wheat) and I-sector firms making investment items (tractors). Let each worker employed in the C-sector produce one bag of wheat in the period under discussion, and let the wage rate per worker per period be R1. If the entrepreneurs' costs per bag of wheat consist only of labour costs, he will want to sell a bag of wheat for more than R1. For convenience, assume that the mark-up over labour costs is 1,5 so that entrepreneurs require proceeds of R1,50 if they are to hire a unit of labour. Workers are permitted to buy fractions of a bag of wheat.

I-sector workers are also paid R1 per period. Workers in both the C- and I-sectors spend their entire income on C-sector goods. Let us depict the consumption pattern of a worker as follows. If we write N_{CC}, it will mean that a worker employed in the C-sector spends his income on C-sector goods. N_{IC} will represent the behaviour of a worker who earns his income in the I-sector and spends it in the C-sector. (If we were to write N_{II} it would mean that a worker in the I-sector spends his income on I-sector goods, - this is the very assumption that we are not making.) Entrepreneurs in both the C- and I-sectors know that workers' consumption patterns are given by either N_{CC} or N_{IC}.

To make matters even simpler, suppose that there are two firms (firms 1 and 2) in the C-sector and one in the I-sector. Firms 1 and 2 know that consumption demand of n will be forthcoming from the I-sector. (There are n workers in the I sector earning R1 per period and they spend their entire incomes on C-sector goods.) Let us suppose that of this exogenous demand, an amount of a is spent on firm 1's product, with n-a being spent on firm 2's product. To begin with we shall suppose that a = 1/2 n.

Although firms 1 and 2 know that 1/2 n will be spent by I-sector workers on their output, what they do not know is whether their employees will spend their income on their product or on that of the other firm. Let us therefore write N_{ij} if workers in firm i spend their incomes on firm j's product. (We are here dealing only with firms in the C-sector.)

To begin with, let us employ an N_{ii}. The expected demand curve arising from inside labour will thus be the same as the the line depicting the firm's wage bill.

The picture so far is reflected in Figure 3. The section to the left of the origin (O) represents the consumption of workers employed in the I-sector. Since we are employing an N_{IC}, these I-sector workers spend all their income on consumption goods. The number of workers in the I-sector (n) is given and reflected in the distance O'O. Since half of the income earned by I-sector workers is spent on firm 1's product and the other half on firm 2's, OG

(which is half of OH) represents the exogenous consumption of I-sector workers on firm 1's product. GH represents exogenous consumption of firm 2's product. The line OE depicts the wage bill of firm 1. It also represents consumption arising from inside employment. The total consumption function facing firm 1 is GK. (The slopes of OE and GK are equal.)

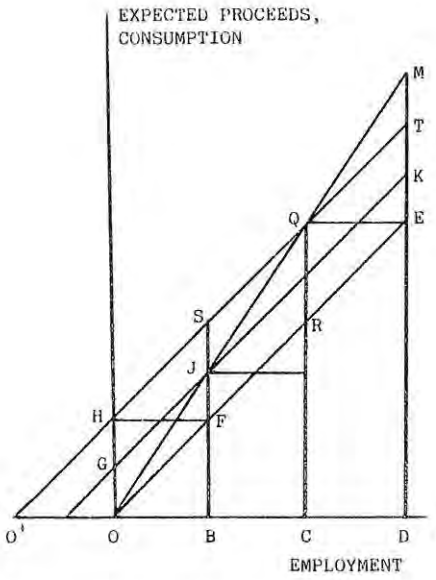

Figure 3

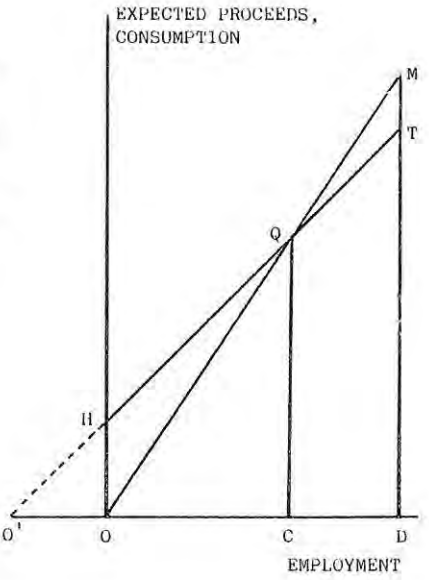

Figure 4

If GK is the demand for firm 1's product, what amount of inside labour should be employed? The proceeds required to induce firm

1 to hire say 100 units of labour must include a profit. With a mark up of 1,5 the line OM represents the proceeds required by a firm if it is to hire various amounts of inside labour. Thus if firm 1 is to hire OC units of inside labour, it requires proceeds of CQ, where CQ = 1,5 times CR. Although Figure 3 is drawn from a Kaleckian viewpoint, OM can be regarded as Keynes's micro supply function since it represents the proceeds necessary to induce the entrepreneur to hire various amounts of labour. A line such as OM will accordingly be referred to as firm i's supply curve or z_i. GK is the consumption function facing firm 1 as well as its expected proceeds curve. Firm 1 will obtain maximum profits if it hires OB units of inside labour. This can be illustrated as follows.

The firm must operate somewhere along the consumption function GK. Points lying below the line OM are not feasible for the simple reason that the firm requires proceeds indicated by the line OM if it is to hire labour at all. Points to the left of OJ are feasible, but the firm can improve its position by moving towards J, since the vertical distance between OM and OE is an increasing function of employment. Profits are maximised at J where the level of profits (JF) is at its maximum. (As argued above points to the right of J along GK are not feasible even though they appear to indicate greater profits.) Beyond an employment level of OB the firm will discover that part of the output that it is producing is not sold - this is because the combination of endogenous and exogenous consumption is not great enough to generate the

proceeds which the firm requires if it is to operate at that level of employment. Hence even if an N_{ii} is employed a firm will not necessarily believe that it has unlimited sales opportunities.

Figure 3 illustrates the dual nature of wages, in that wages constitute a cost to the firm as well as being a source of demand expenditure. There is in fact a one-to-one relationship between the cost and demand elements for the C-sector firms since an N_{ii} is being employed. If money wages in both the C- and I-sectors were to be cut by half, monetary demand for firm i's product would fall by half. Chick [1983, p.109] points out that:

> ...production costs must be covered by sales to consumers/workers, who now are to the full both firm's prime cost and the market for their output. The inherent contradiction is obvious: producers want cheap labour but rich consumers. The balance is struck at the point of effective demand.

As in Figure 2, it is convenient to regard point J (the optimum position for firm 1) as the origin for firm 2. The wage bill for firm 2 and consumption by firm 2 workers on firm 2's product is JK. JM represents the proceeds that firm 2 requires if it is to hire various units of inside labour. The markup is presumed to be the same as for firm 1, so that JM is an extension of OJ. As noted earlier, exogenous consumption by workers in the I-sector on firm 2's product amounts to HG which is equal to SJ, so that the

consumption function facing firm 2 is given by ST. The proceeds required by firm 2 to induce it to hire various levels of employment is thus given by JM, and the expected proceeds or consumption function is ST. The position of maximum profits for firm 2 is at Q.

The I-sector has been duplicated in the north east of Figure 3, with Q as the origin. QE = O'O. The I-sector requires proceeds over and above its wage bill line (QT) if it is to produce at all. The markup is the same as that in the C sector. The triangle QTE is thus a duplication of O'HO, and when the markup line QM is added , it becomes a continuation of OQ. The total level of employment in the C- and I-sectors is given by OD of which OC is in the C-sector and CD in the I-sector.

In Figure 3 the state of rest for the system has been obtained without constructing aggregate curves. The point of profit maximization for firm 1 is at J. With J thereafter taken as the origin for firm 2, the latter obtains maximum profits at Q, which gives total employment in the C-sector of OC. Point Q is then taken as the origin for the I-sector firm and total employment in the system is OD.

Since both the consumption functions and z_i curves in Figure 3 are straight lines, it is a simple matter to construct the aggregate curves. In fact the OM line in Figure 4 (which is the aggregate Z curve) is identical to the OM line in Figure 3.

In Figure 4 OH represents consumption arising from the I-sector and the line HT which is the aggregate consumption function is identical to HT in Figure 3. The aggregate supply curve (OM) and the aggregate demand curve (HT) intersect at Q.

The principle of effective demand thus dictates that OC units will be employed in the C-sector and this is added to the CD units of employment in the I-sector to give the total level of employment (OD). In Figures 3 and 4 the distance CD depends on the state of long-run expectations. If the latter were to change, the principle of effective demand would dictate a different level of employment. Figure 4 thus reflects Keynes's remark that "My solution, put in a sentence, is that, given the propensity to spend, demand is a function of the amount of investment." [Collected Writings, XIII, p. 516]

The procedure involved in constructing the aggregate supply and demand curves is as follows. Let x_1 and x_2 represent the number of workers in firms 1 and 2 respectively. Consumption expenditure on the products of firms 1 and 2 is given by y_1 and y_2. The consumption functions facing firms 1 and 2 are then given by:

$$y_1 = a + x_1$$

$$y_2 = n-a + x_2$$

As noted previously, a represents consumption on firm 1's product arising from workers employed in the I-sector. Since workers spend a total of n rand on consumption, n-a represents the consumption of I-sector workers on firm 2's product.

Let b be the markup applied over labour costs. (It was 1,5 in Figures 3 and 4.) Let y_1^r be the proceeds that firm 1 requires if it is to hire x_1 units of labour. The proceeds required by firm 2 are given by y_2^r. For firms 1 and 2 we have therefore that:

$$y_1^r = bx_1$$
$$y_2^r = bx_2$$

By setting $y_1^r = y_1$ and $y_2^r = y_2$, we obtain the points of effective demand for firms 1 and 2. Solving for x_1 and x_2 we obtain values of $x_1^e = a/(b-1)$ and $x_2^e = (n-a)/(b-1)$. (The e superscipts denote equilibrium values.)

The aggregate demand curve (y) is obtained by adding y_1 and y_2. Total employment (x) is given by $x_1 + x_2$. We thus have:

$$\begin{aligned} y &= y_1 + y_2 \\ &= a + x_1 + n-a + x_2 \\ &= n + x_1 + x_2 \\ &= n + x \end{aligned}$$

The aggregate supply curve y^r is given by:

$$\begin{aligned} y^r &= y_1^r + y_2^r \\ &= bx_1 + bx_2 \\ &= bx \end{aligned}$$

The aggregate functions take on these simple linear forms because the individual functions from which they are derived are not only linear, but also have identical slopes. Because of the N_{ii} assumption, firm 1 can estimate demand for its product without worrying about employment in firm 2. It is nevertheless worth

considering the relationship between inside and total employment in the above example. As far as firm 1 is concerned, the ratio of inside and total employment is given by $x_1/(x_1 + x_2)$. In equilibrium this ratio takes on a particular value. Since $x_1^e = a/(b-1)$ and $x_2^e = (n-a)/(b-1)$, it follows that in equilibrium, $x_1/(x_1 + x_2) = a/n$. In other words the relationship between inside and total employment will be given by the ratio of exogenous consumption on firm 1's product (a) and total exogenous consumption (n).

If we look at the aggregate picture in Figure 4, it is impossible to tell what the relationship between inside and total employment is. Figure 3, however, reveals that it will be determined by a/n. Suppose for example that workers in the I-sector spend their entire incomes on firm 1's product. In this case, $x_1/(x_1+x_2) = n/n = 1$. In other words employment in firm 1 is the same as total employment, and it is not profitable for firm 2 to hire any labour at all. The reason is that in this particular example consumption <u>not</u> arising from inside employment is equal to $n-a = n-n = 0$. The expected demand curve facing firm 2 is therefore identical to the wage bill line. This is JK in Figure 3. Now JM represents the proceeds that firm 2 requires if it is to hire various amounts of labour and since JK lies below JM, it is not profitable for firm 2 to hire labour. Under these circumstances the aggregate supply curve in Figure 4 (OM) and the aggregate demand curve (HT) are simply the curves of firm 1. If we suppose that the relationship between employment in firms 1 and 2 is 50-50, $x_1/(x_1+x_2) = a/n =$

1/2, or a = 1/2. This is what was assumed in the Figure 3 exercise, but there is no way of knowing this simply by studying Figure 4, which can incorporate any distribution of inside and total employment consistent with the condition that $x_1/(x_1+x_2) = a/n$.

The shapes of the aggregate functions in Figure 4 do not therefore depend on the relationship between inside and total employment. This results from the fact that the functions being aggregated have identical slopes. If this were not so, the shape of the aggregate functions would depend on the $x_1/(x_1+x_2)$ relationship. In general, therefore, the construction of the aggregate curve is dependent on the relationship between inside and total employment, as was indicated in section 3.1.

In the above diagrammatic exercise we made the strong assumption of an N_{ii}. Even so, the state of rest generated by the principle of effective demand was not necessarily one in which the workers were satisfied with the status quo. Moreover, there was a limit to the amount of goods which entrepreneurs thought profitable to produce. The analysis is conducted entirely from the viewpoint of the entrepreneurs. The total amount of employment dictated by the principle of effective demand is OD in Figures 3 and 4 and with ED workers employed the system is in a state of rest whether the workers are satisfied or not. Of importance in the above exercise is the fact that we employed an N_{ii} assumption and an N_{IC}. In other words each C-sector entrepreneur knows that every rand

paid out in the form of wages will be spent on his product, whereas the I-sector entrepreneur never expects his workers to buy tractors. The employment of the N_{ii} assumption illustrates that involuntary unemployment can arise even if there is no communication problem between C-sector workers and entrepreneurs. Eatwell [1979, p. 26] argues as follows:

> Suppose, for example, that in a capitalist economy in which all profits are saved unemployed workers guarantee to employers that they will spend all the wages they might earn on the goods they produce. The information is conveyed, but clearly no capitalist would offer employment for there would be no possibility of profit - the total increase in expenditure would be equal to the increased wage bill. If employment is to increase there must be an increase in investment.

Let us now relax the assumption that workers in firm i buy only firm i's product. Let us in fact go to the opposite extreme and employ an N_{ij}. (We are still assuming that workers spend their entire income on consumption goods.) As in the N_{ii} exercise, let us assume that half of the consumption arising from the I-sector is spent on firm 1's product and the other half on firm 2's. As far as the C-sector is concerned consumption on firm i's product will depend on employment in firm j. Let us therefore assume that there is a 50-50 relationship between employment in the two C-sector

firms. In other words firm i knows that if it hires, say 10 more units of labour, so too will firm j. This assumption is an example of what we referred to in 3.1 as an IGA (interfirm guesswork assumption). The particular IGA that we are employing here preserves the relationship between inside and outside employment whatever the total level of employment is.

Under the above circumstances, if firm i hires an extra unit of labour, it does so on the understanding that firm j will be doing likewise. Since workers in firm i buy goods from firm j only (the N_{ij} assumption), the consumption demand function facing firms 1 and 2 are in fact exactly the same as in the N_{ii} exercise. Hence even if we adopt an N_{ij} approach, the employment of an IGA produces exactly the same results obtained in the N_{ii} exercise, and the N_{ij} assumption together with the above IGA produces functions identical to those of Figures 3 and 4.

In general the slopes of the aggregate curves will depend on the IGA chosen. The IGA will, however, have to conform to the requirements discussed in the N_{ii} example, i.e., the relationship between inside and total employment will be dictated by the ratio a/n. The N_{ii} and N_{ij} exercises demonstrate the power of an IGA. When an IGA is employed the more realistic N_{ij} assumption produces exactly the same results as the patently unrealistic N_{ii}.

In this simple static model the expected demand curves of firms 1 and 2 have identical slopes. Accordingly, the shape of the

aggregate expected demand curve will not depend on the IGA employed for aggregation purposes. When this is no longer the case, there is no longer a simple one-to-one correspondence between the situation at the microlevel and that at the macrolevel. The employment of an IGA is one of the links between the micro- and macrolevels. If the model builder employs an IGA which is not known to the AIMs, the aggregate curve may be reflecting the model builder's views, rather than the behaviour of the AIMs.

The above static model was provided in order to illustrate the principle of effective demand. Let us now examine the interpretation of effective demand offered by Clower and Leijonhufvud.

Leijonhufvud [1981, p.119] defines effective demand failures as follows:

> The failure of markets to transmit messages about desired transactions from one side to the other is what we mean by the phrase "effective demand failure."

Clower in turn distinguishes between notional and effective demand functions. In this section we shall investigate whether the effective demand functions of Clower and the effective demand failures of Leijonhufvud are compatible with the principle of effective demand.

Keynes made no attempt to provide microfoundations for the consumption function apart from claiming that it incorporated a "fundamental psychological law" [General Theory, p. 96]. Clower's approach may be seen as an attempt to provide support for the principle of effective demand at the microlevel. Clower points out that in a general equilibrium model the supply and demand functions contain prices, but not quantities as arguments. (See, however, Chick, 1978, p.12, who disagrees on this issue.) He therefore had to show how income could enter the demand schedules of the households. In doing so Clower distinguishes between the notional and effective demand functions of households. If consumers cannot sell all the labour services that they would like to, Clower argues that their notional or unconstrained demand for commodities are irrelevant. What is relevant in determining their consumption patterns is the income they earn from the labour services they do manage to sell. The demand functions which arise once one takes into account the fact that households sense a constraint in the labour market are termed effective or constrained demand functions. Hence the consumption of households emerges as a function of the income they actually earn.

Whereas Clower examines the households perceiving a constraint in the labour market, Patinkin [ch. 13] examines the behaviour of firms when they discover that they cannot sell all the goods that they would like to. In other words, perceiving a constraint in the goods market, their demand for labour will be affected. A firm's

demand for labour is therefore not simply a function of the real wage; the firm has to take into account the sales constraint in the goods market as well. It was left to Barro and Grossman to combine the models of Patinkin and Clower. In the combined model, households experience a constraint in the labour market which affects their demand for goods. Firms perceive a constraint in the goods market with the result that their demand for labour is affected.

In the Barro and Grossman approach the state of rest is not determined by the intersection of the notional supply and demand curves. It is, however, dictated by the intersection of the effective (constrained) supply and demand curves, hence the type of supply and demand curves being employed in this fixprice approach are no longer the supply and demand curves of the flexprice general equilibrium model. The analysis nevertheless still takes place within a supply and demand framework. Although the rules of the game have been altered (prices are no longer free to clear markets) the approach is still an equilibrium one, despite the title of Barro and Grossmans' paper. The definition of equilibrium has been altered, but it is still an equilibrium approach. Grandmont [pp. 172-73] points out that although fixprice models no longer require a tatonnement on prices required in a flexprice approach, they nevertheless require a tâtonnement on quantities. In other words in the fixprice approach the auctioneer disallows any false trading at quantities not compatible with the intersection of the effective demand and

supply curves. Can the fixprice generation incorporate Keynesian features? E. R. Weintraub [p.126] remarks that:

> The assumption that neo-Keynesian disequilibrium, a theory of short-side rationing really, bears any relation to Keynes is, for Hahn, a barbarism perpetrated by the French sons of Walras.

In the fixprice approach of Barro and Grossman, the system gets stuck in a situation of less than full employment. It is instructive to examine why. In chapter 2 we presented a broad definition of Keynes's principle of effective demand which stated that given the endogenous relationship between consumption and employment, the equilibrium level of employment is determined by exogenous factors. Let us now investigate the model of Barro and Grossman with this in mind. In their model only one good, namely a consumption good is produced - there is in other words, no investment. Following Clower's suggestion, Barro and Grossman derive an effective demand curve for this good. The effective demand for it depends on the amount of labour services which households are able to sell. Hence in a diagram with employment measured along the horizontal axis and expenditure along the vertical, the effective demand curve appears as a positive function of employment, with a positive vertical intercept [Barro and Grossman, p. 90, Figure 4]. This vertical intercept is of some importance, since in the broad definition of effective demand given at the beginning of this paragraph, the state of rest is

dictated by the exogenous component. What determines the height of the vertical intercept in Barro and Grossmans' approach? Because of a real balance effect, the height of the intercept depends on the price level. They point out that if the price level were to fall, the effective demand schedule would shift upwards, and if the fall is sufficient, the effective demand curve will shift up by enough to ensure full employment [p. 90]. By implication, Barro and Grossman are suggesting that the system is stuck at a level of less than full employment because the price level is wrong. That was scarcely Keynes's intention.

Leijonhufvud [1968, pp. 390-95] points out that prices have both an incentive role and a coordinating role, and argues that while Keynes does not deny the incentive role, prices do not necessarily coordinate economic activities to everybody's satisfaction. A number of writers have accordingly laid the blame for insufficient aggregate demand on communication failures between households and firms. Leijonhufvud [1968, p.116] himself notes that:

> ...effective demand theory seeks to explain co-ordination failures that arise through faulty communication among transactors.

Morgan [p.129] observes that:

> Clower's analysis therefore points to the overriding problem as one of communication - the unemployed have a demand for work and also a <u>potential</u> demand for goods

> but they are unable to communicate these demands to employers, i.e. they are unable to make their demands effective.

In discussing Leijonhufvud's approach, Arestis and Karakitsos [p.115] argue that:

> ...if there is excess supply in the labour market excess demand in the goods market fails to appear. The reason is that there is no dissemination of information. ... This is so because the unemployed workers do not, in fact, transmit the information that in the future - after they have been re-employed - they would be demanding more output. One can easily see that if the employed workers asked not for money wages but for payment in the form of the product of the firm, the signal for increased output would automatically be transmitted.

The last sentence is particularly revealing, because as indicated earlier in this chapter, involuntary unemployment can arise even when entrepreneurs producing consumption goods know that every rand paid out in the form of wages will be spent on that firm's product. In other words there can be insufficient aggregate demand even if there are no communication problems between workers and entrepreneurs in the consumption sector.

Leijonhufvud [1968, p. 90] writes:

> The workers looking for jobs ask for money not commodities ... The individual steel-producer cannot pay a hired worker by handing over to him his physical product (nor will the worker try to feed his family on a ton-and-a-half of cold-rolled sheet a week). The lack of any "mutual coincidence of wants" between pairs of individual employers and employees is what dictates the use of a means of payment in the first place.

It should be noted that Leijonhufvud's example deals with the fact that I sector workers do not wish to buy I-sector goods. This is the N_{IC} assumption employed above, and it is in fact a very reasonable assumption to make. The steel producer's reason for refusing to employ a worker can hardly be that the worker will not consider buying the steel he helps to manufacture. The steel entrepreneur knows that his employees are hardly likely to buy the steel and the failure of an entrepreneur to hire an extra worker can hardly be blamed on a breakdown of communication unless the latter takes on a very broad meaning. Keynes's distinction between consumption and investment goods was based on the premise that different motives governed the decisions to buy consumption or investment items. To label the fact that a consumer refuses to buy a ton of steel from his employer a breakdown in communication is stretching the meaning of the word too far.

No entrepreneur in the investment sector can ever suppose that a large proportion of his (tractor) sales will be to workers making the tractors, unless, of course, every worker is potentially an entrepreneur, i.e., potentially a self-employed artisan. This illustrates yet again the importance of specifying the environment in which the model operates. In the General Theory there is a clear distinction between the entrepreneurs and the workers. Although it is always possible that some workers may become entrepreneurs and vice versa, the principle of effective demand would not be relevant in a society of self-employed artisans.

The situation in the C-sector is much the same. A firm in this sector can hardly suppose that a large proportion of the wages paid out to its workers will return in the form of payment for the goods the workers helped to manufacture. A businessman manufacturing hats is hardly likely to base his decision on whether to hire an extra worker on whether that worker is going to buy hats or not. Even if we do make this (N_{ii}) assumption, and remove in this fashion potential communication problems, involuntary unemployment can still arise. The state of rest generated by Keynes's principle of effective demand is one in which those who have the power to effect change (the entrepreneurs) do not wish to do so because their short-run expectations of demand are satisfied. They nevertheless know that if more employment were offered, more consumption expenditure would be forthcoming.

The picture that emerges from the Clower-Leijonhufvud approach is that the economy can be at a state of rest at less than full employment because of communication problems between households and firms. According to the principle of effective demand, however, involuntary unemployment arises neither from a recalcitrant household sector refusing to accept lower wages nor from a communication breakdown amongst firms and households. The principle of effective demand operates in an environment in which employment is largely in the hands of the entrepreneurs.

Once we put firms and households on an equal footing, a cooperative solution is possible and if it is not obtained, some or other spanner must be in the works of the supply and demand mechanism. In the Clower-Leijonhufvud approach the spanner is the inability on the part of firms and households to communicate their intentions to each other (effectively). In an entrepreneur economy, however, aggregate demand can be deficient even if we allow C-sector firms to know that everything paid out in the form of wages will be spent on their product. This was the whole point of employing the unrealistic N_{ij} assumption.

From our point of view the significant feature of the fixprice approach is that the model operates in an environment in which firms and households are on an equal footing. Hence a key feature of Keynes's principle of effective demand is missing. In Keynes's approach entrepreneurs set the pace - the workers

thereafter simply have the choice of accepting or rejecting the job offers that do materialise. In the General Theory the household's supply curve of labour is simply irrelevant as far as the state of rest of the system is concerned. In Barro and Grossmans' approach firms and households both perceive constraints, but neither party is, as it were, in the driving seat. In the fixprice approach a tâtonnement on prices has been supplanted by a tâtonnement on quantities. During such a process, the auctioneer must find a cooperative solution. Although the state of rest dictated by the intersection of the effective demand and supply schedules represents a constrained solution in the sense that firms and households would act differently in the absence of the perceived constraints, the solution is a cooperative one with both parties having the means at their disposal to effect change.

Leijonhufvud also creates the impression that both entrepreneurs and workers have the power to effect change. He analyses the labour market with the aid of search theory [1968, ch.2]. Bharadwaj [1983, p.2] points out, however, that:

> ...the explanation of unemployment in terms of a search procedure would seem to make the phenomenon appear to be voluntary. ... The view ignores that, in a Keynesian world, the number of men to be employed is decided by industrial firms.

While Leijonhufvud [1968, pp. 90-1] admits that problems of insufficient demand cannot arise in an economy of self-employed artisans, he lays the blame for insufficient aggregate demand on communication failures and the fact that the effective demand has to be expressed through the medium of money. In discussing the principle of effective demand, Robinson and Eatwell [p.102] introduce "an embryonic financial system" because "a private-enterprise economy could not operate without money in some form or other" [p.97], but they argue that it is not the presence of money but rather the structure of economic society that gives rise to fluctuations in employment.

If a model builder wishes to illustrate Keynesian features in what is basically a supply and demand framework, involuntary unemployment can only be generated by introducing some or other rigidity into the system. We have tried to point out that the information failures between firms and households which Clower and Leijonhufvud blame for the malfunctioning of the system are an example of such spanner-in-the-works Keynesianism. Ironically enough Leijonhufvud himself [1968, p. 395] provides a most vivid account of the spanner-in-the-works argument:

> This kind of Newtonian conception of what the economic system is like works very well in equlibrium economics. ... When the huge machine does not work as it is supposed to (one tends to infer) it must be either because someone has thrown a spanner in the works - "monopolists and unions fix prices" - or because the

> cogs are slipping someplace - "savers and investors do not respond to interest incentives."

That the principle of effective demand does not rely on communication failures between firms and households can also be seen with the aid of what may be referred to as Chick's invariance principle. Chick [1978; 1983, pp. 106-111] argues that it is not necessary to distinguish between notional and effective demand curves in order to obtain a micro consumption function. With the aid of indifference curves depicting leisure-labour and consumption-saving patters, she derives a consumption function by varying the real wage and allowing households to specify their consumption patters without taking into account whether they will in fact be able to sell their labour services or not. The consumption-income relationship obtained in this manner is a notional or unconstrained one in the sense that the household is not being asked to consider whether the firms want their labour services or not. Chick points out that the actual position on the household's notional consumption function depends on the hiring decisions of firms. Chick's analysis is therefore very much in the spirit of Keynes's entrepreneur economy, rather than in the tradition of the cooperative economy of the neo-classical synthesis.

The consumption function derived by Chick does not take into account whether workers will actually be able to find employment or not. It simply expresses in consumption-income space the

desires of the workers with regard to leisure and labour and consumption and saving. In particular, the consumption function does not shift if, as a mental experiment, we alter the wage rate, or change the number of jobs offered to labour:

> The theory of consumer choice states that the consumption-saving decision depends on income independently of its source in hours worked or the wage rate. [Chick, 1983, pp. 107-109]

In other words, a worker is not, as it were, saying to a firm, "If you hire me, I will buy more consumption goods and my consumption function will shift upwards." What he is in effect saying is, "If you hire me I will buy more consumption goods, but my consumption function will not shift - I will simply be moving to a different point on my consumption function." The obvious point that an unemployed worker will not in any event be promising to spend a substantial portion of his income on firm i's product should also be emphasized. Firm i will in any event not be basing its employment decisions on the consumption patterns of inside workers. The expected demand for firm i's product will depend largely on outside employment.

The idea that the position of the consumption function does not depend on the number of job offers made by firms is what we have referred to as Chick's invariance principle. Chick [1983, p. 109] remarks that "...the position of the consumption function is invariant with respect to the level of employment..." The invariance principle

can also be illustrated with the aid of Figure 3 (see p. 80). In Figure 3 it was assumed that workers in firm 1 spend their entire income on firm 1's product. The consumption function arising from inside employment is therefore OE and when consumption from outside employment is added to this, the total consumption function facing firm 1 is GK. With OM depicting the proceeds which firm 1 requires if it is to hire various units of labour, maximum profits will be made at J, with firm 1 hiring OB units of labour. Firm 1 knows that if more employment were offered, more consumption expenditure would be forthcoming - the section JK of the consumption function bears testimony to this. Chick's invariance principle implies that if firm 1 did offer more employment, the consumption function GK would remain fixed, i.e., GK would not shift upwards if firm 1 hired more workers. The section JK of the consumption function lies below the OM curve. Along JK, therefore, the proceeds which firm 1 requires in order to sell output at a remunerative price are in excess of the proceeds it knows it will receive were it to hire more than OB units of labour. Firm 1 knows that more demand would be forthcoming if it were to hire more labour. In other words there is no question of a communication failure between firms and households. Clower and Leijonhufvud imply that situations will arise in which firms are unwilling to hire more workers because they have no way of knowing whether the extra goods these extra workers produce will be sold. The principle of effective demand is more robust than this, however. It implies that even if firms do know that more demand for their products will be forthcoming were they to hire more labour, they may be unwilling to do since the extra demand forthcoming does not meet the proceeds they require if they

are to offer more employment.

The interpretation of effective demand offered by Clower and Leijonhufvud is yet another example of an attempt to apply the principle of effective demand in a cooperative rather than an entrepreneur economy. The principle of effective demand is still applicable if such communcation failures are absent, but in order to operate, the principle must be put through its paces in an environment in which firms and households are not on an equal footing.

CHAPTER 6 - EQUILIBRIUM, INFORMATION AND RATIONAL EXPECTATIONS

Since supply and demand curves reflect profit and utility maximizing activity, an attempt to impose other behaviour on the agents in the model (AIMs) runs the risk of confusing them. While it has been suggested (for example) that the speed at which price changes is proportional to the horizontal distance between the supply and demand curves, such a constraint is not linked in any obvious way to maximizing activity [Aoki and Leijonhufvud, p.258]. AIMs who are observing profit and utility maximizing rules may be flouting the speed restrictions and vice versa. Similarly, Patinkin's attempt to add the principle of effective demand to a Walrasian model [ch.13] has been criticised as ad hoc - Leijonhufvud [1974, p. 167] points out that "Patinkin seems not to perceive that the way in which the problem has been set up makes it overdeterminate."

According to the adaptive expectations hypothesis, the speed at which expectations are revised is proportional to the difference between expected and actual events. The rational expectations (RE) approach argues that the imposition of adaptive expectations is bound to confuse the AIMs - those obeying the speed restrictions may not be exhibiting maximizing behaviour and vice versa. In fact, as Mills [p.338] implies, the economist imposing an adaptive expectations function is the confused party, since such a function "...is determined independently of the way in

which the economist's theory tells him the variable is actually generated."

In the RE literature, the terms "model" and "expectations" are often used interchangeably [Radner, 1979, p.655] and it is convenient to suppose that a model of price determination reflects the model-builder's expectations regarding the formation of prices. If the model-builder wishes to avoid confusing the AIMs, he can specify that they form expectations about prices in the same way that he does - in other words the economist's model of price formation and the model of the AIMs are compatible. This, in effect, is what Muth [p.316] did when he argued that "...expectations, since they are informed predictions of future events, are essentially the same as the predictions of the relevant economic theory."

In Muth's approach, agents are forming expectations about an endogenous variable by making forecasts about exogenous elements. In another version of the RE approach, the argument is reversed - if the AIMs know the relationship between endogenous and exogenous components, they form expectations about the latter by observing prices [see Grossman, 1981, p.546]. This is the interpretation offered by Lucas [1972], and it will be investigated in greater detail. The following examples are based on those of Radner [1979, 1982] and Radner and Jordan [1982].

Assume that there are two AIMs and two commodities (ice-cream and umbrellas). Since only relative prices are of interest here, let the price of ice-cream be p and that of umbrellas 1-p [Gale, p.62]. The utility derived from these goods depends on the quantities consumed and on whether it is cold (10 degrees) or hot (40 degrees) at the time of purchase, i.e., utility also depends on the state of nature (e). Initially both AIMs can obtain accurate inside information (at no cost) about whether it will be hot or cold. Demand functions for both commodities are derived and the equilibrium price obtained by setting excess demand equal to zero. In this way the price of ice-cream is obtained as a function of the state of nature, and this function is referred to as the price or forecast function. The equilibrium is called a full communication equilibrium or FCE [Radner, 1979, p.662].

Suppose now that only agent 1 can obtain inside information. Agent 2 forms expectations about e by multiplying each temperature by the probability of its occurrence and adding the products. (Call the value obtained in this way e*.) The price of ice-cream will now be a function of e and e*. The equilibrium is termed an unsophisticated equilibrium or USE [Radner, 1979, p.663] since agent 2 continues to form e* even though it may always be hot when the price of ice-cream is high and cold when it is low. The RE approach argues that agent 2 should display more ingenuity than this - that he should in fact infer the state of nature by observing prices. If he does so, the equilibrium concerned is termed a rational expectations equilibrium (REE).

If the AIMs are provided with a forecast function which reveals the state of nature, the equilibrium is termed a revealing REE [Gale, p.62]. Such a forecast function depicts a one-to-one (1-1) relationship between price and the state of nature.

A REE may also exist if prices do not reveal the state of nature, in which case the REE is termed non-revealing [Gale, p.62]. If the price of ice-cream is the same whether it is hot or cold, the forecast function depicts a one-to-two (1-2) relationship, i.e., for any particular price there are two possible states of nature. Although agent 2 is now unable to infer the state of nature from the equilibrium price, he knows this, and is in a sense displaying more ingenuity than someone who does not. His expectations are nevertheless the same as they were in the USE, and are given by e*. The forecast function derived under these conditions may be 1-2, in which case a non-revealing REE exists, since market-clearing conditions confirm agent 2's belief that he cannot infer the state of nature from prices. The forecast function may, however, be 1-1, in which case a REE does not exist, since existence would imply a contradiction. Here the model-builder is supplying agent 2 with a model telling him that the price when it is hot is never the same as it is when it is cold. With these expectations the agent is supposed to arrive at the conclusion that the price of ice-cream is the same whether it is hot or cold.

Allen [1982b, p.21] remarks that "strict rational expectations equilibria need not exist, even for examples which would

otherwise be considered to be quite well behaved." She also refers to the "...convincing nature of the counterexamples..." [1982a, p.245], and Anderson and Sonnenschein [p.262] observe that "...the most striking results have been counterexamples to the existence of equilibrium." Allen [1982a, p.245] argues, however, that "Despite the reasonableness of counterexamples to existence, the situation is not hopeless." Her approach is to investigate "approximate equilibria" in which supply and demand are not strictly equal. Another line of attack has been to prove that the non-existence of equilibrium requires highly unlikely combinations of parameters. If such non-existence is possible, but improbable, the existence of a REE is regarded as "generic" [Radner, 1979, p.656].

In a REE, price determination and information acquisition take place simultaneously [Gale, p.63]. Strictly speaking, therefore, the AIMs do not learn from prices - they learn from equilibrium prices. A REE may exist even if agent 2's "initial" intuition about the link between prices and the state of nature turns out to be incorrect. Suppose, for example, that agent 2 is initially displaying unsophisticated behaviour and that the price of ice-cream is high when it is hot and low when it is cold. If he is now required to infer the state of nature by observing prices, he may discover that it is cold when the price is high and hot when it is low.

Early practitioners emphasized that the RE approach was concerned with equilibrium positions and left unexplained the process whereby equilibrium might be achieved [Lucas and Prescott, p.660; Townsend, 1978, p.481]. Cyert and DeGroot [p.521] argue that such a process must be specified if the RE approach is to be regarded as something more than a religious belief. (See also [DeCanio, p.48].) An attempt to outline such a process is concerned with the stability of the system [Townsend, 1978, p.481].

During the movement to equilibrium, the expectations of AIMs may not be compatible with the model's equilibrium properties, in which case their expectations are not rational. This problem may be viewed in the light of the two major approaches to stability that have been identified in the literature [Blume, Bray and Easley].

In the one approach it is argued that in non-equilibrium situations AIMs do not know the correct relationship between prices and the state of nature. They must therefore be supplied with an "incorrect" model, but as Bray [p.329] points out, "a learning method can eventually yield rational expectations even if it is based upon a misspecification of the model in the situation when agents are learning." This approach accordingly entails a relaxation of the assumption that AIMs entertain rational expectations [Bray, pp.319,330; Radner, 1982, p.942], and, as might be expected, exposes itself to the criticism that it is ad hoc [Cyert and DeGroot, p.522]. In the other approach

AIMs are equipped with the correct reduced form of the model, but are ignorant of the values of the parameters. A learning process is introduced whereby the AIMs extract information from prices and revise their estimates of the parameters in Bayesian fashion. Here the AIMs are acting rationally in that they are employing the same model as the model-builder, but as Blume, Bray and Easley [p.314] point out, this approach is "extraordinarily demanding in terms of the information, understanding, and calculating ability of agents."

While stability analysis is by nature concerned with non-equilibrium situations, observations about non-equilibrium events should be regarded as tâtonnement or recontract experiments during which trade at false prices or false expectations is disallowed. We can imagine an auctioneer calling out a set of prices which are employed in forming expectations about the state of nature. If the prices are not clearing all markets, the inferences drawn from them will not be correct. Trade at false expectations is therefore disallowed, since if it were permitted, the structure of the model would change:

> Unless all agents at all times form rational expectations, the "structure" determining the realizations of the forecast variable will evolve over time as the forecasting sophistication of the agents changes. This point is similar to Lucas' ... observation that shifts in policy will change the

"structural" parameters of the economic system depending on how agents react to the policies. [DeCanio, p. 55. See also Bray, p.319.]

6.1 COSTLY INFORMATION AND SPECULATION

Until now it has been assumed that inside information is free. If it is not, there is no incentive to pay for information which is reflected in prices. But if nobody is prepared to purchase inside information, prices can hardly reflect the latter, in which case there will be an incentive to purchase it. Although each AIM believes that his actions will leave prices unaffected, market prices will reveal such behaviour, and AIMs are once again in the position where it would be irrational to pay for information that can be obtained by observing prices. Under these conditions, therefore, a competitive equilibrium will not exist [Grossman, 1978; Grossman and Stiglitz, 1976, 1980].

The Grossman-Stiglitz paradox arises because the informational role of prices is incompatible with the incentive role. Grossman and Stiglitz accordingly argue that there must be enough noise in the system to cover the acquisition costs of those purchasing inside information. They introduce noise by assuming a fixed supply of the risky asset [1976, p.247]. The price system then becomes a somewhat inaccurate thermometer - a high price reading for ice-cream may be indicating a hot day, but the thermometer is also inclined to give a high reading if the supply of ice-cream is

low. In equilibrium there will be an endogenously determined fraction of AIMs who have chosen to acquire inside information. The thermometer is faulty enough to cover the costs of the latter. By specifying a fixed supply of the risky asset, Grossman and Stiglitz have exposed themselves to the charge that this requires certain agents to exhibit irrational behaviour since their supply of the asset is independent of the market price [Tirole, p.1168].

Tirole denies there is any scope for speculation in a pure RE environment. In his model the AIMs exploit the link between equilibrium prices and the state of nature. The AIMs are risk averse, prior probabilities are known to all, and the market is not used for insurance purposes. If AIMs are to engage in speculative activity, their expected monetary gain should be positive, but such a belief is incompatible with the market-clearing requirement that nobody can expect a monetary gain. Speculation therefore "...relies on inconsistent plans and is ruled out by rational expectations." [Tirole, p.1163]

Empirical support for Tirole's results has been provided by Plott and Sunder. In their study students were required to buy and sell securities under laboratory conditions. The students were exposed to the stochastic process generating the state of nature, and some were provided with inside information. Plott and Sunders' results suggest that agents were exploiting the link between prices and the state of nature. Under the circumstances the absence of price bubbles or explosions is not surprising.

Although Plott and Sunder argue that their results provide little evidence of the presence of Keynesian speculative activity, one suspects that different results would have been obtained had the state of nature not been selected by drawing a ball from "...a bingo cage containing thirty-six balls numbered one through thirty-six." [Plott and Sunder, p.693]. These results illustrate that one should not look for bubbles in a vacuum, and leave open the possibility that bubbles will occur in the face of uncertainty over and above that generated by known probability distributions.

Tirole points out that speculative activity can be introduced by relaxing any of his four assumptions. As we have seen Grossman and Stiglitz waive the requirement that all the AIMS entertain rational expectations. The requirement that they all have identical priors can also be relaxed. Furthermore, if the AIMs are not all risk averse, those who are in initially risky positions may use the market for insurance purposes [Tirole, p.1168]. The behaviour ensuing from the relaxation of these assumptions is similar to the behaviour one might expect from AIMs who are confronted with uncertainty over and above that generated by known probability distributions. In an environment of fundamental uncertainty, AIMs may be unaware of any link between equilibrium prices and the state of nature. Furthermore it is unlikely that all AIMs will be risk averse under these conditions. They will also not have identical priors (prior probabilities may not even exist) and there will be many wishing to use the market

for insurance purposes. It is also inevitable that the AIMs will entertain different expectations of the future when any of these assumptions is relaxed. This leads to a discussion of the difference between convergent and divergent expectations [see Lachmann, 1977, p.187; 1976a; Kregel, 1977].

6.2 CONVERGENT AND DIVERGENT EXPECTATIONS

Suppose that on a certain island the profits of fishing firms depend on their knowledge of tide movements. Over time a theory of tides (enshrined in a list of tide tables) comes into being. The theory is not infallible since intermittent squalls and hurricanes lash the island and even on halcyon days the tables may be a few minutes out as the theory contains an error term. The average value of the latter is, however, equal to zero. Under these circumstances fishermen whose beliefs regarding tide movements is not linked in some way with the relevant tide theory could be regarded as eccentric. We should in fact find (as the RE approach suggests) that the "...expectations of firms...tend to be distributed, for the same information set, about the predictions of the theory..." [Muth, p.316]. Although rational fishermen will not make systematic mistakes, they will be wrong from time to time. Such mistakes will not, however, affect the relevant tide theory - the movements of the tide are impervious to the hopes and fears of the fishermen. If the underlying structure were more flimsy, fishermen might be expected to re-assess their beliefs each time their expectations were

disappointed. In this example the expectations of the fishermen are not of great importance. What is of importance is that there appear to be laws of motion which have generated tide movements in a certain way in the past and will presumably continue to do so, barring cataclysmic cosmological changes. Whether expectations associated with known laws of motion should be regarded as expectations at all is perhaps a matter of taste. Grinder [p.19] remarks that "...inasmuch as expectations are conjectures about the future, it is presumptuous to graft expectations onto equilibrium models where the final position is predetermined by conditions stated at the outset." When, as in the above example, different people are entertaining similar ideas about the future, based on apparently stable laws of motion, we shall refer to the presence of convergent expectations: As Lachmann [1977, p.187] remarks:

> In a stationary world it is possible to appeal to the constancy of the "data" and the continuous recurrence of events to justify the belief that all members of such a society will sooner or later become familiar with them and their expectations will converge on the recurrent pattern of events.

Convergent expectations can also be present when the outcome of a certain event is less certain - for example dice players will entertain similar expectations about the probability of a two occurring when an unbiased dice is thrown. The presence of convergent expectations is neither a necessary nor a sufficient

condition for a system to be in a state of rest. It is not a sufficient condition because time may reveal that everybody's (similar) expectations, based on past recurring events, were incorrect. It is not a necessary condition since a system can be in a state of rest with different people entertaining different expectations.

If different people hold different views on the future, we shall refer to the presence of divergent expectations. Divergent expectations are unlikely to be present if there is a stable, underlying structure, impervious to disappointed expectations, as in the example of the tides. They are likely to be present when there is fundamental uncertainty about the likelihood of a certain event, i.e., uncertainty over and above that generated by a known probability distribution. Arrow [p.6] argues that with different people having access to different observations, "...it is reasonable to infer that they will never come into agreement as to probabilities of future prices." Keynes's remarks are worth recalling in this context:

> By 'uncertain' knowledge, let me explain, I do not mean merely to distinguish what is known for certain from what is only probable. The game of roulette is not subject, in this sense, to uncertainty; nor is the prospect of a Victory bond being drawn. Or, again, the expectation of life is only slightly uncertain. Even the weather is only moderately uncertain. [Collected Writings, XIV, p.113]

In these examples individuals are likely to entertain convergent expectations. Keynes goes on to explain, however, that

> The sense in which I am using the term is that in which the prospect of a European war is uncertain, or the price of copper and the rate of interest twenty years hence, or the obsolescence of a new invention, or the position of private wealth owners in the social system in 1970. About these matters there is no scientific basis on which to form any calculable probability whatever. We simply do not know. [Collected Writings, XIV, pp. 113-14]

In the presence of such fundamental uncertainty (over and above that generated by a known probability distribution) individuals are likely to entertain divergent expectations.

Let us investigate a speculative market in which divergent expectations are present. In such a market the price of a commodity depends partly on the price that it can command in the future. What type of equilibrium could emerge in the presence of divergent expectations? Shackle argues that:

> The price can come to rest. But it will only do so by convincing enough members of the market that the prospects are now for a rise. The necessary condition for its coming to rest is a suitable division of opinion concerning the movement of the price in the coming days or months. [Shackle, p.199]

> The market cannot solve the problem of expectation. The only price it can distil, for a storable, non-perishable good, is one which divides the potential holders of that good into two camps, those who think its price will rise and those who think its price will fall. For at the moment when all are agreed on the direction of the next movement, that movement, paradoxically, will prove to have already taken place. [Shackle, pp.83-84]

These remarks indicate that it is from a divergence of opinion about the future price that an equilibrium emerges. In other words, divergent expectations are playing an equilibrating role here [Lachmann, forthcoming]. Were the market participants to hold similar views of the future, the market would no longer be in equilibrium, so that in this example convergent expectations constitute a disequilibrating force. While the equilibrium that Shackle has in mind is a state of rest, it is a very precarious equilibrium - in fact Shackle [1972, p.200] observes that "The market seethes and eddies, it does not move towards anything that, in more than the most ephemeral sense, can be called a dependable equilibrium..." Presumably this is not the kind of equilibrium that the RE approach has in mind.

The example about the tides belongs more to the field of the natural sciences than the social sciences. Let us now consider the RE model of Townsend [1983] in which there are two islands.

While fish caught by firms operating from one island are not sold on the other, prices ruling on foreign markets are common knowledge. The number of fish caught by each firm is directly proportional to the number of boats employed.(Townsend actually assumes that output is directly proportional to the value of the boats. This raises the question of how the latter are to be valued - Garegnani's critique of the neoclassical theory of capital will be discussed in chapter 7. For convenience it is assumed here that the total value of boats is directly proportional to the number of boats.) The demand for fish is subject to two kinds of shocks, namely shocks common to both islands (common shocks) and local shocks affecting the islands independently. Firms draw conclusions about the common shock by observing local shocks and foreign prices. In doing so they must not only form estimates of the number of foreign boats, but must also forecast the forecasts of foreigners. Unlike the one island example in which there was one way traffic between the laws of motion of the sea and the formation of expectations, there now appears to be two way traffic - Townsend points out that "The general problem is that laws of motion are needed for the inference problems, but the inferences in turn determine the laws of motion." [1983, p. 569] The supposed laws of motion emerging from such two way traffic may be referred to as expectations augmented (EA) laws of motion. As in the case of the one island example, fishermen whose behaviour is not linked to the (EA) laws of motion are eccentric from the RE viewpoint. And just as the movement of the tides was considered to be impervious to

disappointed expectations, so too disappointed expectations are not permitted to affect the (EA) laws of motion in the two island model. Firms may incorrectly estimate demand for fish. They may incorrectly estimate foreign firms' estimates of the demand for fish. They may incorrectly estimate how many foreign boats are operating. But such disappointed expectations affect neither their day to day fishing habits nor their demand for fishing craft. In other words, the RE approach allows expectations to be disappointed,but such disappointment is not permitted to affect subsequent behaviour, since if it did, the laws of motion would change.

If the RE approach is to be as applicable to the social sciences as it is to oceanography, the relevant economic theory must reflect laws of motion on a par with the laws governing tide movements. In Townsend's example, such laws are presumed to exist even when individuals are estimating what other individuals are estimating. If immutable laws of motion, impervious to disappointed expectations are to be found anywhere, they are to be found in the natural, rather than the social sciences:

> The pseudo-analogy with the physical sciences leads directly counter to the habit of mind which is most important for an economist proper to acquire. ... One has to be constantly on guard against treating the material as constant and homogeneous. It is as though the fall of the apple to the ground depended on the apple's motives, on whether it is worth while falling

> to the ground, and whether the ground wanted the apple to fall, and on mistaken calculations on the part of the apple as to how far it was from the centre of the earth. [Keynes, Collected Writings, XIV, p.300]

A reader studying the RE literature may be forgiven if he comes away with the impression that despite all the song and dance about expectations, expectations are, after all, rather unimportant. Aoki and Canzoneri [pp. 59,69] note that:

> Rational expectations models are difficult to analyze because rational expectations are hard to handle directly and there appears to be no convenient proxy for a rational expectation. The standard respose to this problem is somehow to eliminate the troublesome expectations and work with the resulting reduced form. ... By a 'reduced form' we simply mean any representation of the model that contains no expectation terms.

We have remarked earlier that the RE approach may be seen as an attempt to ensure that the model of the model builder and the model that the AIMs employ are compatible, and that the words "model" and "expectations" are often used interchangeably. As Muth [p.316] remarks, "...expectations, since they are informed predictions of future events, are essentially the same as the predictions of the relevant economic theory." In this sense the expectations of the AIMs are rather unimportant - what is of vital importance, however, is the model-builder's view of the economic

system. The expectations of the AIMs must thereafter simply conform to this view. In the case of the RE approach headed by Lucas, Sargent and Wallace, the relevant economic theory is a general equilibrium model which generates a natural rate (NR) of unemployment. The combination of the NR and RE has been referred to as the new classical economics [Buiter, Stein, Tobin, 1980a, 1980b], the so-called classical properties being the natural tendency towards full employment and the ineffectiveness of stabilization policies [Forman, p. 38]. These new classical economists espouse what will be referred to as the NRE approach, the acronym reflecting the idea that this school is not concerned solely with RE, but rather with the combination of the NR and RE. The idea that the economy gravitates to a natural rate of unemployment does not follow from the RE approach per se - there have, after all been attempts to impose RE upon Keynesian models [Begg, 1982]. As noted in chapter 2, Lucas considers it appropriate to regard economic society as consisting of self-employed artisans. A self-employed artisan can hardly entertain the expectation that he might be involuntarily unemployed.

The expectations of the AIMs in RE models must conform to the relevant economic theory. If the AIMs are to entertain <u>divergent</u> expectations, the model builder will have to supply them with different models (expectations). This raises the question of why the model builder should wish to do so. If it is because of the presence of fundamental uncertainty, there is nothing, as it were, for rational expectations to bite onto.

CHAPTER 7 - EQUILIBRIUM, INFORMATION AND EXPECTATIONS IN MODERN RICARDIAN ECONOMICS

Although the rational expectations approach of Lucas and his followers has been referred to as the new classical economics, the term classical is not, of course, the sole prerogative of this approach. Another school also argues in favour of a return to classical modes of thought [see Bharadwaj, 1978, Harcourt, 1975, Levine, 1980b]. The classical scholars that this approach has in mind are Ricardo and Marx. For convenience they will be referred to as modern Ricardians, rather than Marxists, since the latter term casts too broad a net for present purposes. Sraffa is a standard reference, and Garegnani, Eatwell and Milgate, for example, are standard bearers. While modern Ricardians avoid expectations as far as possible and do not presume that the economy gravitates towards full employment, it should not be inferred that the two schools are engaged in acrimonious debate. Latter-day Ricardians have always seemed more intent on attacking Cambridge, Massachusetts than Chicago, and there is little evidence that Chicago has heard of Sraffa.

Although modern Ricardians and the NRE group appear at first sight to have diametrically opposed views on the importance or unimportance of expectations, we shall attempt to show that this is not in fact the case. If, at this stage, we may be permitted to provide a clue, both schools argue that Keynes's treatment of expectations was ill-conceived.

The equilibrium position or state of rest which Ricardians have in mind is referred to as a centre of gravitation (CG). This CG emerges from the assumption of a uniform rate of profit. If entrepreneurs are free to move in and out of ventures as they please, it is argued that in the long-run the system will converge upon an equilibrium in which there is a uniform rate of profit. In the literature the CG prices arising from a uniform rate of profit are called natural prices or production prices [Levine, 1980a; Ricardo, ch.4; Sraffa, p.9] and should be distinguished from supply and demand (SD) prices. Both CG and SD prices should in turn be distinguished from the prices actually observed in the market [Roncaglia, 1978, p.126]. Since Sraffa's 1960 approach is concerned with neither market prices nor SD prices [Roncaglia, 1978, pp.xvii,16], the condition of a uniform rate of profit does not guarantee that supply will be equal to demand in the long-run [Roncaglia, 1978, p.16]. The long-run CG is therefore not necessarily one of full employment. Garegnani has indicated that although Ricardo's model is open as far as the level of employment is concerned [1976, pp.42-3; 1972, p. 278], his analysis lacks a theory of effective demand. The combination of a uniform rate of profit with Keynes's principle of effective demand provides modern Ricardians with a CG that is not necessarily one of full employment [Eatwell, 1979, p.39]. Since the principle of effective demand requires that a distinction be made between the functions of entrepreneurs and workers, the creatures inhabiting modern Ricardian models are not all self-employed artisans.

As noted above, modern classicists of the NRE variety maintain that the relevant economic theory upon which RE should be imposed is a general equilibrium model. The latter was under suspicion before the RE rose to prominence [Fusfeld, p.19], although this seems to have escaped the NRE school's notice. Garegnani has provided the following critique of the neoclassical theory of capital. (A useful summary of his argument appears in Petri.) If one assumes (as Wicksell did) that the stock of capital is a given value, one is engaged in circular reasoning. If one assumes (as Walras did) that the stock of capital is a given vector of quantities, the model will not in general have a solution. Either way, therefore, a theory of capital based on supply and demand analysis is indeterminate. Perhaps the NRE approach would disagree, and argue (for example) that the Walrasian model does have a solution. Our point is simply that the NRE school has not responded to Garegnani's critique - as noted above, the two modern classical approaches seem to be unaware of each other's existence.

The Ricardians argue that theory should reflect the dominant or persistent forces in the system under consideration. Since the system will be buffeted by transitory occurrences, it is unlikely that the magnitudes actually observed from day to day (e.g., market prices) will coincide with the magnitudes posited by the theory (natural prices). The transitory or special occurrences are, however, dominated by the persistent forces and the magnitudes dictated by the latter provide the system with a CG

(natural prices) from which market prices will deviate from day to day. (See Eatwell, 1979, p.2; 1982, p.211; Harcourt, 1981, p.41.) Ricardians accordingly concentrate on the relations that would obtain under a uniform rate of profit, arguing that economic theory can have little to say about day to day fluctuations in market prices [Eatwell, 1979, p.3]. The CG should in fact be regarded as impervious to such transitory occurrences. In describing the transition to a long-run equilibrium, Petri [p.248] remarks that: "All this time, it will be noticed, the (theoretically defined) equilibrium does not change: it is the 'centre of gravitation to which the economy approaches closer and closer.' "

Eatwell [1982, p.222] points out that the short-run supply and demand equilibrium is actually a position from which the economy "would tend to move away" since the persistent forces making for a uniform rate of profit dominate the forces making for such a short-run situation. Hence even if the short-run equilibrium appears to be stable, it cannot serve as a CG:

> Even if the functions determining the equilibrium were such as to display mathematical stability (commodities were gross substitutes), the equilibrium would not be a centre of gravitation since those functions are based on data ... which profit-maximising behaviour would tend to change. The issue of stability in neoclassical analysis is not as easy to disentangle from existence

> as many of its practitioners have implied. [Eatwell, 1982, p.226]

It is because movements towards such short-run equilibrium can upset the equilibrium position that neo-Walrasian economists have to resort to tâtonnement or recontract assumptions [Petri, p.256]. The tâtonnement assumption pins, as it were, the supply and demand functions to the page during any discussion about stability. Petri's above remarks indicate that the CG is unaffected by what might happen on the way there.

The employment of a CG requires the belief that the persistent forces in the system dominate transitory or special occurrences. Modern Ricardians argue that such a belief is unwarranted in the case of supply and demand equilibrium since supply and demand forces are too ephemeral to be distinguished from disequilibrating forces, and the actions of the latter will in fact upset the equilibrium posited by supply and demand [Garegnani, 1976, p.38]. Similar sentiments have been expressed by others who do not share Ricardian beliefs [Lachmann, 1979, p.7; Richardson, 1959, p.223].

The Ricardian critique of intertemporal equilibrium boils down to the fact that such an equilibrium is unstable. An equilibrium cannot serve as a CG if it is unstable [Petri, p.248]. Instability thus represents a situation in which the equilibrating and disequilibrating forces are confounded with

the result that the system is as likely to move away from equilibrium as towards it, and, if it moves away, the posited equilibrium will in fact shift. A similar objection has in fact been levelled against the Ricardian CG. In Lachmann's view the argument which leads to the rejection of general supply and demand equilibrium applies to the long-run equilibrium of the Ricardians as well - in the long-run, no less than the short-run, the forces of change will continuously be interrupting the forces making for a uniform rate of profit [Lachmann, forthcoming]. Lachmann's criticism is reflected in Harcourt's [1981, pp. 49-50] remarks that:

> ...the dynamic nature of capitalist development with the embodiment of technical advances through investment expenditures is so rapid in most periods as not to allow sufficient historical time for centres of gravity of a lasting nature to be formed. ... The factors that we need theoretically to take as constant in order to allow the centres of gravity which they imply to be struck (for example, by the forces making for the formation of normal prices) are changing as fast or even faster than the outcomes that the relationships between them are intended to determine.

From this point of view there is no CG in either the short- or the long-run.

The assumption of a uniform rate of profit forms a vital yet weak link in the Ricardian system [Harcourt, 1972, p.169; Lachmann, 1973, pp.35-6]. As far as expectations are concerned, the concept of a uniform rate of profit is ambiguous if agents entertain expectations which are subsequently disappointed [Robinson and Eatwell, p.182]. The subjective nature of expectations is anathema to the Ricardians, although they do not deny that expectations will affect market prices - in this sense expectations are on a par with other accidental events [Petri, p.256]. Garegnani goes further than simply denying that expectations are important by arguing that if expectations are granted a prominent role, no unambiguous conclusions could be drawn [Garegnani, 1978, p.347; 1979a, p.72; 1979b, p.183]. Garegnani maintains that in the long-run, however, subjective expectations are insignificant when viewed in the light of objective factors [1979a, p.73].

During the capital controversy, Cambridge (England) seemed to present a united front against Cambridge (Massachusetts). But Harcourt [1976, p.41] has pointed out that while "...the critics of neoclassicism may be united against a common enemy, they are, in other respects, a heterogeneous collection, split into at least three camps - neo-Keynesian, neo-Marxian, and neo-Ricardian - with some members managing to have feet in more than one camp at the same time." One of the contentious issues between the Keynesian and Ricardian camps is the role to be accorded to expectations. In the afterglow of the capital controversy it is

apparent that while Robinson found it convenient to have her foot in the Ricardian camp when attacking neoclassical theory, her attitude towards expectations is Keynesian. In an obvious aside to the Ricardians she observes [1980, pp. 139-40]:

> Objection is sometimes raised to the emphasis on expectations as introducing an unduly subjective element into analysis. But if we cannot mention expectations, we cannot say anything at all. Any economic action, say, buying a bus ticket, is made with a view to its future consequences and is influenced by beliefs about what the outcome will be.

Ricardians try to avoid expectations as far as possible, arguing that the correct procedure to be adopted with regard to expectations is "...to relate them uniquely to objective phenomena, so as to bypass them and relate the facts explaining the expectations directly to the actions of the individuals." [Garegnani, 1976, p.39] Expectations linked to such objective phenomena can be regarded as "inescapable". If we were to apply this argument to the example of the tides provided in chapter 6, fishermen linking their expectations to the relevant tide theory are entertaining inescapable expectations.

Although the NRE approach appears to emphasize the importance of expectations, while the contrary is true of modern Ricardians, their treatment of expectations is rather similar. The NRE approach links expectations to underlying laws of motion

(generating a natural rate of unemployment) and calls such expectations "rational." Modern Ricardians link expectations to an underlying CG (so as to bypass expectations) and call such expectations "inescapable." Whether expectations associated with known laws of motion or an underlying CG should be regarded as expectations at all is perhaps a matter of taste.

Although modern Ricardians have links with the Post Keynesian school, their attitude towards expectations is un-Keynesian. The uneasy alliance between Keynesian and Ricardian elements in the Post Keynesian school [Harcourt, 1982, p. 4] has recently been in evidence. (See the Robinson [1979] - Garegnani [1979b] and Levine [1980a] - Roncaglia [1980] exchanges.) In presenting the Keynesian view, Davidson [1981, p. 159] remarks that "In a world where uncertainty and surprises are unavoidable, expectations have an unavoidable and significant effect on economic outcomes." The Ricardian view, however, is that "...the procedure by which unobservable, 'expected' quantities are used as determinants of the system runs the risk of depriving the theory of any definite results." [Garegnani, p.183]

Readers of the General Theory and Keynes's 1937 QJE article might express some amazement that in the modern Ricardian interpretation of the General Theory, expectations and uncertainty are of minor importance (see Eatwell, 1979, p.40). Keynes was inclined, however, to use expectations when they suited his needs, and disregard them when they did not [Lachmann, 1977, pp.

142,159], and expositions on the role of expectations in the General Theory often reveal more about the interpreter than Keynes.

In Lachmann's view, the indeterminacy introduced by expectations should cause no undue dismay,for it is intelligibility rather than determinateness that should be sought in the social sciences [Lachmann, 1977, p.68]. These are views that Lachmann shares with Keynes.

> ...you ought not to feel inhibited by a difficulty in making the solution precise. It may be that a part of the error in the classical analysis is due to that attempt. As soon as one is dealing with the influence of expectations and of transitory experience, one is, in the nature of things, outside the realm of the formally exact. [Collected Writings, XIV, p.2, emphasis added.]

Modern classical economists, whether avowing allegiance to Lucas or Sraffa, are confronted with the problem of indeterminacy raised by Keynes. Modern Ricardians avoid the indeterminacy introduced by expectations by avoiding expectations. The NRE approach avoids such indeterminacy by making expectations determinate.

CHAPTER 8 - CONCLUSION

Although several different schools of thought have been presented in the preceding chapters, we have attempted to provide a unifying theme with the aid of the equilibrium-expectations-information framework. In Keynes's approach the equilibrium position is dictated by the principle of effective demand. In the neoclassical synthesis and the NRE approach, the state of rest is governed by supply and demand forces in the labour market. The only state of rest which interests the Ricardians is a long-run centre of gravitation associated with a uniform rate of profit.

The type of equilibrium employed should be viewed in conjunction with the information made available to the agents in the model. Keynes puts the principle of effective demand through its paces in a world in which the state of rest is determined largely by the actions of the entrepreneurs. In the neoclassical synthesis, the state of rest requires a cooperative environment in which firms and households are on an equal footing as far as bringing about change is concerned. Such a cooperative economy may, of course, be deemed appropriate by the model builder, but it reflects the approach that Keynes criticized. To employ the principle of effective demand in a cooperative environment is therefore not an accurate representation of Keynes's views. The state of rest envisaged by those who combine rational expectations with a natural rate of unemployment requires a cooperative environment. Lucas goes so far as to suggest that the

essential features of a capitalistic economy can be captured in a model inhabited by self-employed artisans. The Ricardians apply the principle of effective demand in an entrepreneur environment. Since they have a long-run centre of gravitation in mind, however, their approach raises the question of whether the principle of effective demand can be accommodated within a long-run framework. (See Milgate [1983] and the book of readings in which Bharadwaj [1983] appears.)

The uneasy alliance between Keynesian and Ricardian groups within the Post Keynesian school is nowhere more in evidence than in their divergent attitudes towards expectations. The modern Ricardian approach is to avoid expectations as far as possible except insofar as they are tied to the long-run centre of gravitation; in which case they can hardly be regarded as anticipations of an unknown future. Whether such an attitude can be reconciled with chapter 12 of the General Theory and Keynes's 1937 QJE article is an open question.

Exponents of the rational expectations approach argue that expectations should be compatible with the relevant economic theory, which, in the case of the NRE approach, is a general equilibrium model. For such a combination to be applicable, general equilibrium theory should be on a par with theories such as those describing the movement of heavenly bodies, the fall of an apple to the ground, or the expected value of the toss of a dice. When, as in the preceding examples, there appear to be

unchanging laws underlying such occurrences, different people are likely to have similar "expectations." Such expectations are best regarded as convergent. The presence of divergent expectations, on the other hand is a reflection of our ignorance of a known underlying structure, or as Keynes [1937] remarks, "We simply do not know."

Battles have been fought in the past over the distinction between risk and uncertainty. While recent years have witnessed a renewed interest in the role of expectations, too little emphasis has been placed on Lachmann's important distinction between convergent and divergent expectations. In the presence of fundamental uncertainty, divergent expectations will be the order of the day. In situations where laws of probability can be identified, expectations will tend to be convergent. The presence of divergent expectations in a speculative market is not synonymous with market chaos. In fact, as Keynes's bulls and bears equilibrium indicates, a speculative market is brought to a state of rest by this very divergence of opinion.

At first sight the rational expectations and Ricardian schools appear to have totally different attitudes towards the importance of expectations. Once the distinction between convergent and divergent expectations is made, however, it is apparent that both approaches have convergent expectations in mind. The rational expectations approach argues that the expectations of the agents in the model should be in line with the expectations of the model

builder. If, therefore, the agents in the model were to entertain divergent expectations, this would be a reflection that the model builder is in at least two minds himself as to which economic theory is relevant.

At least four types of equilibria have been identified in the preceding chapters. Let us in conclusion investigate what meaning can be ascribed to the term disequilibrium.

A model which has an equal number of unknowns and equations and has a solution, specifies what will happen when all the equations are satisfied, but cannot say what might happen if they are not. In other words, equilibrium models are concerned with equilibrium positions and can have virtually nothing to say about disequilibrium situations, unless of course reference is being made to "events" taking place during the tâtonnement process, when in fact no events are allowed to take place! If the task of the auctioneer is to ensure that only equilibrium events may take place, all equilibrium models require an auctioneer.

When equilibrium is regarded as a state of rest, it is possible to regard a situation in which markets do not clear as an equilibrium position. Within a framework in which markets do clear, such non-market clearing positions appear to represent disequilibrium situations. Hence, from the vantage point of a flexprice general equilibrium model, fixprice models appear to constitute disequilibrium analysis, just as from the vantage point of

fixprice models, the flexprice solution appears to represent a disequilibrium situation. Use of the term disequilibrium in this sense requires two models, each specifying a different state of rest. Each approach, on its own parade ground, constitutes equilibrium analysis. When the term disequilibrium is used in this way, it may be more accurate to refer to relative disequilibrium.

Various writers have have argued that the General Theory constitutes disequilibrium analysis. This it may no doubt be, if, for example, the framework of reference is supply and demand analysis. Since the disequilibrium involved is a relative one, however, the argument can be turned on its head. In an entrepreneur environment, the principle of effective demand generates an equilibrium position, and within such a framework, the state of rest dictated by supply and demand forces in the labour market is a disequilibrium position. In other words, the neoclassical approach can be regarded as disequilibrium economics, relative to that of the General Theory.

The employment of an equilibrium approach requires the belief that the equilibrating forces in the system dominate the disequilibrating ones [Lachmann, forthcoming]. Alternatively, one may argue that economic theory should embody the persistent (as opposed to the transient) forces in the system [Milgate, 1983], the implicit assumption being that the persistent forces dominate transient or chance occurrences. In a flexprice general

equilibrium model, the equilibrating forces associated with supply and demand are assumed to overshadow any disequilibrating forces such as for example disappointed expectations, income effects and technological change. (It should also be noted that the equilibrating forces in one market - say the market for potatoes - may dominate the disequilibrating forces in that market, but that those forces which bring about equilibrium in the potato market, may be disequilibrating forces in another market [Lachmann, 1977, pp. 190-91].)

In Keynes's static and stationary models, the potentially disequilibrating forces are dominated by the forces moving the system to a state of rest. The persistent forces embodied in the principle of effective demand are presumed to overshadow any potentially disequilibrating events such as those arising from disappointed short-term expectations. The equilibrium position is dictated by the state of long-run expectations, and these are taken as given in these two models.

In what Kregel [1976] refers to as the model of shifting equilibrium, disappointed short-run expectations are permitted to affect the state of long-run expectations. It is the latter which (via the principle of effective demand) generates the state of rest for the system. Hence, the work of the equilibrating or persistent forces are continuously being interrupted by the forces of change, with the system moving towards an equilibrium it may never reach. Such a view of the economic system is also the one

emerging from Lachmann's writings:

> In a kaleidic society the equilibrating forces, operating slowly, especially where much of the capital equipment is durable and specific, are always overtaken by unexpected change before they have done their work, and the results of their operation disrupted before they can bear fruit. ... Equilibrium of the economic system as a whole will thus never be reached. Marshallian markets for individual goods may for a time find their respective equilibria. The economic system never does. What emerges from our reflections is an image of the market as a particular kind of process, a continuous process without beginning or end, propelled by the interaction between the forces of equilibrium and the forces of change. General equilibrium theory only knows interaction between the former. [Lachmann, 1976a, pp. 60-1]

Young expressed similar ideas in 1928:

> ...the counter forces which are continually defeating the forces which make for economic equilibrium are more pervasive and more deeply rooted than we commonly realize [Young, p.533].

We may hesitate to regard as equilibrium analysis an approach which suggests that the equilibrating forces never have time to complete their task. On the other hand it may be equally

misleading to consider it as disequilibrium economics. Such an approach is, in effect, casting doubt on whether the allegedly dominant or persistent forces are really dominant at all. Under such circumstances the employment of an equilibrium framework is inappropriate. There may be times when we are unable to identify any systematic or dominant forces. There may be times when we simply do not know.

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