

# Part III

## A Critique of Self-adjusting Full Employment

### Main Points

#### Chapter 8: Neutrality and Full Employment

1. The various versions of the neoclassical macro model reach almost identical conclusions, many of which are counter to common perception.
2. To justify a non-interventionist public policy, the neoclassical macro models must sustain two conclusions: an automatic tendency to full employment and the neutrality of money. If these conclusions are valid, economies gravitate to a unique full employment outcome that public intervention would block or distort.
3. If money is not neutral, then the full employment solution is not unique, and some may be more socially desirable than others. Public intervention is the mechanism to select among them.
4. Walras' Law creates a contradiction at the heart of the macro model: it seeks to explain the level of output and employment, but is value only for full employment.
5. The essentially ideological nature of the model is demonstrated by considering whether capital, like labor, can be idle ("unemployed").

#### Chapter 9: Expectations and Full Employment

1. Walrasian adjustment assumes that economic actors have full knowledge of the general equilibrium, full employment outcome, the "perfect foresight hypothesis" (PFH). The PFH assumes the impossible, that the future could be known.
2. New classical economics offered an allegedly more credible alternative, the rational expectations hypothesis (REH), which suffers from the same theoretical objections as the PFH.
3. The anti-interventionist policy ideology of the neoclassical model are based on non-scientific treatments of expectations.

#### Chapter 10: Multi-commodity models

1. The demand for labor in neoclassical labor market derives from an aggregate production function that has only one product/commodity, produced by labor and capital. This labor market model yields the apparently powerful conclusion that increases in employment require a lower real wage.
2. The inverse relationship between employment and real wages cannot be generalized beyond the one product case. In general, an increase in employment would be consistent with a lower and a higher real wage, as a result of the phenomenon known as "re-switching among techniques".

#### Chapter 11: Disequilibrium

1. A group of critics, the "disequilibrium Keynesians", demonstrate that unemployment is possible if all wage bargains are struck at the general equilibrium money wage rate.

2. In this vein, Liejonhufvud showed that unemployment need not arise from the labor market, but is derivative from the money market.
3. Complementary to this critique, Stiglitz and co-authors associate wage and price flexibility with macro instability, not adjustment to equilibrium.
4. Valid though these critiques are, they tend to abandon macroeconomics for multi-market analysis.

## 8 Neutrality and Full employment

### 8.1 Logic of the models summarized

In the previous three chapters four versions of the neoclassical macro model were presented with a running critique. In this chapter I provide a synthesis of the critiques by focusing upon the neutrality of money and full employment. The discussion is more easily followed by referring to Table 8.1, which has a summary of the central features of the models.

The differences among the four models can be briefly stated. Only in the first is there a strict dichotomy between real and monetary variables. The dichotomy is logically false because of the clash of Walras' Law and the quantity theory of money over the excess demand for money when the model is not in general equilibrium. In the second model this inconsistency is eliminated, but the introduction of the real balance effect results in no autonomous real solution. Money is strictly neutral, so the values of real variables are not altered in full employment equilibrium by a change in the nominal money supply alone. Unlike in the False Dichotomy variant the nominal money supply enters directly to determine the value of each real variable. Real and nominal variables cannot be partitioned. The model is of heuristic interest only. Central to its operation is the wealth-holding of agents, but no interest-bearing assets are included.

The third model solves the problem of the inconsistency between Walras' Law and the Quantity theory in a different way. Here interest-yielding bonds are introduced, so the demand for money is interest-elastic. Again there is no separation between real and monetary variables, though money is strictly neutral for full employment equilibria. Due to the possibility of an inconsistency between saving and investment and the liquidity trap, full employment is a special case in this model. In the final model the logical barriers to full employment are eliminated, but the introduction of the wealth effect renders money non-neutral. There is no autonomous real solution.

In Table 8.2 the summary of the neoclassical models continues, with selected predictions listed down the left-hand side, followed in subsequent columns by analytical commentary. The predictions assume that "other things are equal"; i.e., the parameters of all functions remain the same and exogenous variables, supply of money and bonds, do

not change. As pointed out above, the neoclassical model predicts that an increase in employment is associated with lower real wages, lower money wages, a lower price level, and a lower interest rate. These predictions are contingent upon the assumptions of single commodity production, which ensures a negatively sloped demand for labor, and an exogenous money supply.

Casual empiricism suggests that these predictions are rarely realized in practice (see final column of the table). Experience and an inspection of short-run economic statistics published by governments suggest that when employment rises, real wages, money wages, the price level, and the interest rate all tend to rise, not to fall. Keynes stressed these empirical relationships when counseling against money wage cuts as a solution to unemployment in the 1930s (Keynes 1936, Chapter 19). That casual or even systematic observations do not correspond to the predictions of a theory does not in itself represent a refutation of that theory. As Marx wrote, were it possible to deduce correction explanations from observation alone, economic and social theory would be unnecessary.

However, the divergence of economic outcomes from what are predicted to occur is troublesome for neoclassical analysis for two reasons. First, when considering competing economic paradigms neoclassical writers are quick to apply the test of empiricism. For example, in histories of economic thought by neoclassical writers one finds the assertion that Marx's theory can be judged false because it predicts a falling standard of living for the working class as capitalism develops and this has not occurred; that it predicts the profit rate to decline secularly and this also has not occurred; that labor cannot be the sole source of value because this would imply that labor-intensive industries would be more profitable than capital-intensive ones, which is not systematically the case; and so on. It would be equally valid for a critic of neoclassical theory to assert that IS-LM analysis is wrong, because in general expansions of employment are associated with upward pressure on prices and wages, while the theory predicts the opposite.

Second, the test of empiricism has a particular sting to it for neoclassical theory because the concepts which the theory employs are counter-empirical, bearing little relation to observed economic categories. Two of these, homogeneous output and the

money supply, were discussed at length. Neoclassical practitioners would perhaps argue that as abstract and ideal as their concepts may be, they are constantly subjected to empirical test. The mainstream journals are full of empirical studies, not to mention hundreds of books and monographs published every year. However, the method of these empirical studies is to first formulate a model incorporating neoclassical concepts, then to see if the subsequent statistical results sustain the predictions of the model. This procedure is not a test of the validity of the model, but an exercise to see if there exists a formulation of the model which certain empirical evidence will not contradict. To take an analogy, the Ptolemaic model of a geocentric planetary system was repeatedly altered by its adherents to be consistent with the observed movement of the planets, moon, and sun in the sky. This was possible because the Ptolemaic system enhanced with epicycles can be made into a mathematical analogue of a heliocentric system. Notwithstanding its "empirical validity", the geocentric model of the solar system is wrong.

While all theories must have an empirical analogue, this analogue does not establish their validity. Key to establishing validity is the nature and adequacy of the concepts the theory employs, and the logical consistency of the conclusions reached from those concepts. The preceding chapters challenged the basic neoclassical concepts on grounds of internal consistency. In this chapter I take the process further and consider the two key conclusions based upon those concepts.

## 8.2 The Significance of Neutrality

After considerable treatment of standard neoclassical models, it was established that the clearing of markets with instantaneously flexible price, wage, and interest rate results in a full employment equilibrium if the model includes a wealth effect. However, inclusion of a wealth effect renders money non-neutral. Only in a model with no financial assets other than money can neutrality be consistent with full employment. One might at this point legitimately say, "so what?" The central issue is whether a capitalist economy tends automatically to full employment. If this can be demonstrated, surely the neutrality question is icing-on-the-cake; a bit more than a curiosity, but not much more.

However, at issue is more than a minor point. While the major issue is whether a capitalist economy has a natural tendency to full employment, this is inseparably linked

with the neutrality of money. Within the debate over neutrality, arcane and esoteric as it may seem, lurks a powerful ideological message. The neutrality of money is central to the fundamental question of whether public intervention in a capitalist economy is justified.

That money is neutral with respect to real variables is the keystone of what might be called the "naturalistic" view of capitalist society. Always implicit and frequently explicit in neoclassical theory is the assertion that economic life is governed by laws which have the status and in exorability of the laws of physics and chemistry. These laws are timeless and objective; i.e., they exist independently of whether one perceives and understands them. Central to this naturalistic view of economic phenomena is the dichotomy between real and monetary variables, and, therefore, the relationship between a barter economy and a money economy.

To develop the argument, assume that the real world of economic relations is characterized by (1) an automatic tendency towards full employment through market clearing, with no exceptions; and (2) that money is neutral. If this is the case, there exists a combination of real variables at full employment that is unique.<sup>1</sup> Being unique, it is the only set of real variables for which output/income and employment will be at a maximum. All other sets of real variables will result in lower output/income and employment.

Ignoring distributional effects and assuming more output/income is desired compared with less, the full employment solution is not only unique, it is also desirable (optimal) above all others. If there is a tendency for unregulated markets<sup>2</sup> to bring about this unique and most desirable set of real variables automatically, then there is no place for state intervention. At best, the state can attempt to do what the process of market clearing would bring about automatically. At worst, and considerably more likely by this line of argument, intervention by the state will prevent market clearing from generating the optimal result.

In this unique and optimal full employment solution, public intervention is characteristically referred to as creating "distortions", defined as arbitrary conditions that "distort" the economy from its natural, optimal equilibrium. These distortions may take many forms. Excessive public borrowing will create "crowding" in money markets,

transferring credit from the private to the public sector. Public expenditures will redistribute resources from private hands to the public sector. If the government limits its actions to the minimum, and at the same time have a purely neutral impact on private decision making, its behavior will not reduce the general welfare.

A necessary but not sufficient condition for this anti-interventionist argument is that money be neutral. If money is not neutral, then the full employment solution is not unique. In the real wealth effect model of the previous chapter full employment output/income and employment itself may be unique; i.e., there may be no other level of employment and output for which the labor market is cleared.<sup>3</sup> But these values are consistent with an infinitive variation in the other real variables. Put another way, there is no real solution as such. By changing the money supply, "the monetary authorities" can produce an infinite variation on the full employment theme, none of which can be singled out as preferable to others without explicit value judgments. The free market does not produce the most desired result; indeed, without government action it produces no result since the government determines the money supply.

For example, a government might wish to achieve a higher rate of economic growth, and could do this by increasing the money supply, which would drive down the rate of interest and increase investment absolutely and relatively to consumption.<sup>4</sup> As alternative, a government might seek to change the functional distribution of income between wages and profits (the latter not distinguished from interest in the neoclassical model). This could be done by acting upon the interest rate and the money wage via the money supply.<sup>5</sup>

When money is not neutral, all full employment equilibria are arbitrary. Each is unique only with respect to a given money supply and a given supply of bonds. Public intervention via the money supply or supply of bonds is one of the defining characteristics of an equilibrium. Non-neutrality of money renders the debate over the desirability of public intervention moot. The relevant issue becomes, what form of intervention and to what extent?

The argument that the natural forces of markets generate an optimal solution which governments distort at the cost of: the general welfare rests upon the presumption of the neutrality of money. Neutrality is a thin thread by which to hang such an

ideologically powerful message. Granting all assumptions, neutrality could not be justified in the simple classical model because of the inconsistency between Walras' Law and the quantity theory (see Chapter 4). Once the money market includes the interest rate, the theorist is forced to choose between a guaranteed employment solution and neutrality, the one excluding the other.

In this context one might recall that Patinkin claimed that the real balance effect was the *sine qua non* of all monetary theory. Neoclassical economists have tended to reject this as a grandiose assertion. Yet, there is a sense in which Patinkin was correct, for the narrowly defined real balance effect that includes only money produces the only model in which neutrality and full employment can be unambiguously combined. This is an excellent example of the cliché, "the exception that proves the rule". A model with no bonds is too restrictive to be taken as more than a heuristic exercise, even among neoclassical theorists.

### 8.3 Full Employment Further Investigated

The standard properties of the textbook version of the neoclassical model are the neutrality of money and an automatic tendency to full employment in the absence of "arbitrary" constraints such as inflexible money wages. Previous chapters demonstrated that the two are not theoretically compatible. In the Chapter 7 most attention focused upon states of full employment equilibria. At this point a critical eye is turned to the concept of full employment itself; or rather, that concept as it manifests itself in neoclassical analysis.

As shown with the introduction of the wealth effect, it is possible within the synthesis paradigm to reach a value judgment that unemployment of a portion of the labor force must always be "voluntary". Unemployment of labor can only occur if money wages do not fall to clear the labor market. Because employers would not oppose lower wages, the cause for wages being too high must come from the implicit or explicit actions of workers, individually or collectively. Workers must accept the "blame" for their unemployment.

While the logic of the neoclassical model seems to grind inexorably to this conclusion, it is not as logically strong as it may seem. First, it is open to question

whether the neoclassical model can reach any logical conclusions about unemployment. The difficulty might be called "the case of the missing excess demand". If we look back to the "complete Keynesian model" with rigid money wages (Chapter 6), we note that less than full employment equilibrium is associated with equilibrium in the commodity market and the money market. Saving equaled investment and the demand for money equaled the supply, with the bond market in equilibrium by implication. Therefore, rigid money wages yielded a solution in which excess supply characterized the labor market, but the excess supplies and demands in all other markets were zero, in sum and individually.

One uncleared market is inconsistent with Walras' Law, which requires that the sum of excess demands and excess supplies be zero for the system as a whole. It would appear that even "voluntary" unemployment, employment resulting from rigid money wages, is logically inconsistent with the neoclassical market clearing mechanism, Walras' Law, which is so central to the entire theory. This logical difficulty has preoccupied some neoclassical economists, provoking a search for the missing excess demand to match the excess supply of labor.<sup>6</sup> While *ad hoc* solutions to this difficulty can be produced, the result has the appearance of being forced upon the theory by necessity rather than arising from its logic.

The basic difficulty is that the model *presupposes* full employment. This presupposition arises from the nature of Walras' Law, which should now be briefly reviewed. At one level Walras' Law is the salvation of the neoclassical model by ensuring that the clearing of individual markets is consistent with aggregate market clearing. The elimination of excess demand and excess supply in one market does not in itself move the neoclassical model toward general equilibrium. On the contrary, the clearing of one market can make full employment impossible to achieve as explained in the discussion of false trading in Section 3.4. Walras' Law avoids this difficulty. As counterfactual as the mythical auctioneer may be, no systematic tendency to full employment is logically possible without the Law, no matter what other assumptions are made.

On another level, Walras' Law is a curse upon the neoclassical model, for it cannot be applied to any stable equilibrium except one of full employment. If the labor

market is not cleared due to rigid money wages, then the Law requires that some other market also not be cleared. *But only in the labor market is non-clearing consistent with a stable solution.* Should it be the commodity market which is nominated to balance the excess supply in the labor market with an excess demand, then the situation is logically inconsistent. An excess demand for the single commodity, provoking a rise in price and output/income, implies that the money wage is too low, a labor shortage, contradicting the initial situation of excess labor supply, and rendering the downward inflexibility of the money wage irrelevant. The commodity market must be rejected, for the only possibility there consistent with unemployment is supply excess which makes the logical difficulty worse, two unanswered excess supplies instead of one.

The only other candidate is the money market, but disequilibrium there would seem inconsistent with equilibrium in the commodity market. If the commodity market is in equilibrium, then both output/income and the interest rate are in equilibrium unless disturbed elsewhere. Since the nominal supplies of money and bonds are exogenous and the demands for money and bonds are set by the variables rendered stable in the commodity market, the interest rate and level of income/output, the compensating excess demand cannot be the financial markets.

The fundamental sources of the difficulties reflected in the logical problem of Walras' Law at less than full employment are two. First, in the neoclassical model the labor market is only formally linked to the other markets. As long as the demand for and supply of labor are specified in terms of the commodity ("real") wage, the positions of these schedules must be independent of what happens in all other markets. This first source of difficulty arises from carrying forward a labor market analysis appropriate to a barter economy into models in which "real" solutions either are no longer relevant or do not exist at all.

The second source of difficulty arises from the treatment of the commodity which workers sell. Formally, the commodity workers sell is no different from the other commodities in the model. However, only in the labor market can an arbitrary limitation upon the value of the price variable prevent market clearing. Consider the consequences of rigidity of the other two price variables in the model, the price of the single commodity and the interest rate. If price is inflexible downward, the commodity market will clear

(saving will be equated to investment) by a change in the level of output/income, which will also imply a change in the interest rate (movement along the IS curve). The money market will be cleared in the same manner. If the interest rate is inflexible, income will again equilibrate the commodity and money markets. While an inflexible price or inflexible interest rate will produce excess supply or excess demand in the labor market, neither can result in a stable situation in which there is excess supply or demand in the commodity or financial markets.

The discussion so far has been somewhat complex, but the fundamental difficulty can be stated clearly. In a system governed by Walras' Law, equilibrium is achieved by the adjustment of price variables to notional full employment supplies and demands. No points on demand and supply schedules except those of full employment are ever achieved even in theory because false trading is prohibited. In contrast to this, a less than full employment equilibrium, even reached according to strict neoclassical rules, is a non-Walrasian position, for it is by definition a position of false trading. It is invalid to conclude from the neoclassical model that unemployment is "voluntary", or to assign blame to workers for demanding excessive money wages. These judgments are invalid because the neoclassical model, firmly grounded in Walras' Law, has no analysis of unemployment at all, be it voluntary or involuntary.<sup>7</sup>

The basic problem can be traced back to the nature of Walras' Law itself. It is singularly inappropriate for the purpose assigned to it in the neoclassical model, though absolutely necessary. Walras formulated his law for a market "period" during which no production occurred; i.e., commodity supplies are given throughout the trading-period. By contrast, the neoclassical macro model purports to analyze a situation in which the output of the single commodity is a decision variable. In the original Walrasian system agents were precluded from manifesting their disappointment by varying the quantity of commodities they brought to the market. In the neoclassical macro model firms come to the market with nothing, because laborers must be hired and set to work before there is anything to sell.

The Walrasian model of Walras never pretended to consider the question of what portion of the population might be gainfully employed. Walras sought a solution to the relative prices of commodities in a many commodity system in which the supplies of

these commodities were given. By the criterion of logic, Walras can be judged to have provided a determinate answer to the question he posed, though it is difficult to conjure up an actual situation which corresponds to his solution. Neoclassical theorists assign a quite different task to the hypothetical Walrasian market day and to Walras' Law. Ignoring the central issue posed by Walras, relative commodity prices, by presuming a one commodity world, they attempt to apply Walrasian analysis to a situation in which the quantity of the single commodity is variable. It is hardly surprising that Walras' principles prove inconsistent in all cases except when the supply of the single commodity is in effect fixed; i.e. at a unique point of full employment equilibrium.

None the less, does it not remain the case, with or without Walras' Law, that an excessive level of money wages will result in unemployment? A commonsense argument would seem to serve as well as the esoteric of Walrasian general equilibrium: if money wages are high, labor costs to firms are high, and this induces firms to hire less labor than they would were money wages lower. But once one abandons a Walrasian world, it is not at all obvious that lower wages would increase employment. Causality as it appears to the individual capitalist may not be valid for all capitalists taken together. Lower wages reduce the demand for commodities, and if all markets do not clear simultaneously the level of employment could fall. In the absence of the strict discipline of the Walrasian auctioneer, the impact of lower wages on employment is an empirical question, about which no general theoretical conclusion can be drawn.

While neoclassical analysis can produce a formally elegant model of full employment, it has no theory of unemployment. This conclusion seems startling for an analysis which offers such definitive prescriptions for economic policy; none the less it is true. The absence of a theory of unemployment is why neoclassical theory, like its "classical" forerunner is a special case, and why Keynes by dealing with situations of less than full employment contended that his was the general theory of employment, interest and money.

#### 8.4 The "Unemployment of Capital"?

Even should we ignore the logical difficulties associated with Walras' Law, the synthesis treatment of unemployment presents a troubling anomaly. As shown in

Chapter 2, neoclassical theory treats output/income as generated by the combination of capital and labor. These two inputs into the production/value added function are treated as being strictly equivalent, their only difference being in the units in which they are measured. The analytical similarity is emphasized by use of the terms "capital services" and "labor services", each of which is seen as flowing from assets, physical and human capital. In the neoclassical macroeconomic model the strict similarity between capital and labor as inputs breaks down in a dramatic way. In the short run model labor can be unemployed but capital apparently cannot. Investigation of this apparent anomaly provides insights into the synthesis model, as well as anticipating the post-Keynesian critique of the neoclassical model which follows in Chapters 10 and 11.

By unemployment of capital I do not mean under-utilization of capacity, which is a non-neoclassical concept. Capacity utilization refers to the degree that a given collection of buildings, machinery and equipment is utilized. Under-utilization of capital is a situation in which part of plant and machinery lie idle. For example, a factory which normally operates five days a week for eight hours a day is under-utilized if its management reduces operations to three days. The definition of "normal" utilization varies by production process, usually determined by reference to the level of operation that is sustainable

In real economies the typical cause of under-utilization is a lack sufficient demand for the product of the enterprise. However, because of the neoclassical assumption of substitution between capital and labor under-utilization of capacity is excluded by definition. It is not possible for demand conditions to induce an optimizing capitalist to use less than all of the available capital stock in a neoclassical world. In the short run, capital costs are fixed. Any level of anticipated unit costs of output will be minimized by minimizing variable (labor) costs, which with a given wage rate implies minimizing the labor input. Competition among identical firms, requiring each to sell at lowest achievable unit cost, ensures that the entire capital stock will be utilized by the labor hired.

On the basis of this optimization process, I shall attempt to treat labor and capital in strictly analogous manner. One would expect that if a real wage above the full employment equilibrium rate results in the unemployment of labor, then a rate of return

on capital above the equilibrium level would result in unemployment of capital. This possibility is illustrated in Figure 8.1. In part 8.1a are drawn the production isoquants, contour lines each representing a constant level of output in the two-dimensional capital-labor space. The capital stock is fixed at  $k^*$  and the labor supply at  $n^*$ . If the labor market clears, equilibrium full employment output is  $e^*$ . The top left-hand quadrant shows the "demand curve for capital", with the marginal product of capital equated to the rate of return,  $r$ . Because maximizing behavior implies  $MP_k = r$ , just as it implies  $MP_n = w$ .

Figure 8.1d shows the labor market, which is familiar from previous chapters. Finally, in Figure 8.1c is the ratio of the commodity wage to the rate of return, the "factor price ratio". Equilibrium with full employment of labor and of capital is associated with  $r_e$  and  $w_e$ . The first point to note is the sense in which capital is fixed and labor is variable. Because I make the standard assumption that the labor supply is invariant with respect to its only determining influence, the commodity wage, both factors are fixed in the sense that their potentially available quantities are given. If both have invariant supplies, in what sense is capital fixed and labor variable?<sup>8</sup>

This question can be answered by proceeding in the attempt to treat capital and labor in a strictly analogous manner. Assume that the equilibrium money wage is  $W_e$  and workers as a group refuse to sell their services for less than  $W_0$ , which is greater than  $W_e$ . As shown in the previous chapter, with a fixed the money supply,  $W_0$  will imply a commodity wage,  $w_0 = W_0/p_0$ , which is higher than the full employment equilibrium commodity wage,  $w_e$ . These two commodity wage levels are shown in Figure 8.1d. With employment lower at  $n_0$ , the marginal product of capital schedule shifts inwards, and the rate of return falls. All of the values noted by "0" indicate the situation when rigid money wages result in the unemployment of labor while capital remains fully used.

Let the situation be reversed, indicated by values with the number 1. In this case, capitalists demand a certain rate of return,  $r_1$ , the consequence of which is to leave part of the capital stock "unemployed",  $k^*$  to  $k_1$ . With the employment of capital at level  $k_1$ , the marginal product of labor shifts towards the origin, and full employment of labor is achieved at a lower commodity wage than before,  $w_1$ . This particular "thought

experiment" in which capital is not completely used is not treated in neoclassical theory. Neoclassical theorists are quite correct to ignore it, because the "experiment" is nonsensical. In attempting to treat labor and capital as strictly analogous and parallel factors of production, one reaches a nonsensical result because the two factors are not analogous and parallel. It is worth repeating that the logic of unemployed labor in the short run, on the one hand, and the logic of capital being unemployed in the short run, on the other, has nothing to do with the available quantity of one factor being fixed and the other being variable.

In the model being analyzed, the supplies of both factors are exogenously given. This is the same treatment as in the previous chapter, where there was no difficulty producing conditions under which part of the fixed labor supply was unemployed, if we ignore the nagging problem of Walras' Law being violated out of full employment. Analyzing labor as partially unemployed makes sense, but doing the same for capital does not because the nature of competition among workers is different from the competition among capitalists. If capitalists combine to administer a fixed market price, for example, individual capitalists who are initially a party to this agreement can gain by violating it. By underselling the fixed price, the maverick can expand his or her market share and gain a larger profit than operating within the agreement. Competition among capitalists tends to make coalitions unstable. However, a worker who is employed and a member of a trade union that has negotiated a fixed wage can only lose by underselling the capacity to work, not what he or she produces. This difference between competition among capitalists and among workers reflects capitalist relations of ownership.

Neoclassical theory reaches a profound truth when it ignores the possibility of unemployed capital, though for the wrong reason. The neoclassical reason for treating capital as fully employed is that in the short run rational capitalist behavior will dictate utilizing the existing capital stock with whatever labor is available. The basic truth of this assertion arises from the absence of an exchange for capital to be employed, while employment of labor requires a successful sale and purchase.

Full understanding of the capital-labor relation requires that we move from imaginary models to the actual world of economic and social relations. The machinery and equipment available for use at any moment is the property of capitalists. It has been

exchanged and is in place; for this reason it is called the capital *stock*. The output resulting from the capital stock must be sold profitably to justify continued use of machinery and equipment. However, the "services" of capital associated with a given output are not for the most part exchanged, except implicitly as cost entries on a ledger.<sup>9</sup>

By contrast, labor services are not a "stock". They must be repeatedly exchanged, sold to capitalists. Unemployment results because workers do not own the means by which production is carried out. Therefore, workers must sell their ability to work ("labor services") in order to participate in the production process. Their motivation for the sale is that they lack the means to produce. They cannot directly provide themselves and their families with food, clothing, and other necessities. In other words, workers can be unemployed because they must work for others (non-workers), and they must work for others because they lack the means which would enable them to work for themselves.

The relevance to the neoclassical macro model is that it indicates the fundamental cause of unemployment. Workers do not have direct access to the means by which production is carried out. Workers must first sell before they can work. The property relations of a capitalist society are the fundamental cause of the idleness of part of society's resources. The use of the term "capital services" tends to obscure this basic cause of unemployment by suggesting that labor and capital are strictly analogous in production and exchange, which they are not.

The property relations of a capitalist economy imply that the labor market is fundamentally different from other markets. In every developed country the history of the labor movement has been the struggle to reduce competition among workers. By contrast, commodity and money markets are inherently competitive. Neoclassical economists, particularly the more conservative, take a skeptical view of arguments alleging systematic price fixing through collusion by capitalists. Their argument is that such arrangements tend to break down under the pressure of competition from disgruntled sellers in the market or potential competitors who are eager to enter when profits are high. This argument has considerable empirical support as well as a sound basis in Ricardian and Marxian theory (see Weeks 1982, 6).

The asymmetry between capital and labor, which implicitly manifests itself in the synthesis macro model has not gone unnoticed by critics who accept the general

neoclassical paradigm. Leijonhufvud, whose critique is treated in Chapter 11, refers to the asymmetry as the "transactions structure" of a money economy (Leijonhufvud 1981, 90). His argument is that in a money economy characterized by self-employed craftsmen and farmers, unemployment would be impossible. Without employers there are no employed people, thus no unemployed. The point is a profound one, rarely made explicit in mainstream economics. Unemployment exists because labor is a commodity. Labor is a commodity because workers do not have ownership of the means by which they can produce.

Table 8.1 Summary of the characteristics of the neoclassical model

Category/model	1 False dichotomy	2 "Classical" with RBE	3 "Complete Keynesian"	4 Keynesian with WE
Commodity market	$c = c(y)$ $i = i(r)$	$c = c(y, M^*/p)$ $i = i(r)$	$c = c(y)$ $i = i(r)$	$c = c(y, q)$ $i = i(r, q)$
Money market	$M_s = M^*$ $M_d = vpy$	$M_s = M^*$ $M_d = vpy$ $+ f[M^*/p]$	$M_s = M^*$ $M_d = vpy$ $+ [h - jr]$	$M_s = M^*$ $M_d = vpy$ $+ M(r, q)$
Automatic full employment?	<b>No</b> Inconsistency i & s	<b>Yes</b> RBE acts on c	<b>No</b> Inconsistency i & s, liquidity trap	<b>Yes</b> q acts on c, i and $M_d$
Neutrality of money?	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>
Comments	Logically invalid, WL & QT clash	Heuristic value only, no bonds, requires "outside" $M^*$	Not to be confused with the model of the <i>GTEIM</i>	Requires $M^*$ and bonds to be "outside"

Notation:

RBE - real balance effect

WE - wealth effect

WL - Walras' Law

*GTEIM* - *General Theory of Employment, Interest and Money*

Table 8.2 Theoretical predictions of the neoclassical model (from an initial position of less than full employment)

<u>The model predicts:</u>	<u>Necessary conditions</u>	<u>Casual empiricism</u>
1. Real wages fall when employment rises	Diminishing returns with a one product production function (see note below)	Real wages rise when employment falls
2. Money wages fall when employment rises	As above, and exogenously given money supply	Money wages rise or remain constant when employment rises
3. Price level falls when output rises (nominal value of output can fall in models 3 & 4, Table 8.1)	Diminishing returns, one product, exogenous M	Price level rises or constant when employment rises
4. Interest rate falls when output rises	Interest-elastic investment, exogenous M (r-elastic in $M_d$ in models 3 & 4)	Interest rate rises or is constant when output rises

Note: The law of diminishing returns requires a single product aggregate production function for reasons given in Section 2.1, and also implied by the Capital Controversy (Chapter 10).

## 9 Expectations and Full Employment

### 9.1 Perfect, Static and Adaptive Expectations

In the 1970s a new and in the view of some a revolutionary element was added to the neoclassical macroeconomic model, the rational expectations hypothesis (REH), based on the work of John Muth a decade earlier. Closely associated with the REH was the "new classical economics", which is treated in this chapter. While it was the members of the new classical school who were instrumental in introducing the REH into economics, its influence was not limited to them. In order to appreciate the implications of the REH, it is necessary to consider neoclassical treatments of expectations that predated the REH.

Except in the presentation of Keynes's treatment of the demand for money, I made little explicit reference to expectations in the previous chapters. However, present throughout was the assumption of "perfect foresight". The simultaneous clearing of all markets required a ban on false trading, because all exchanges had to be at general equilibrium prices. The creation of an imaginary auctioneer to oversee trades served to enforce the prohibition against false trading. If the auctioneer were taken away, then market clearing requires that each trader enforce herself or himself not to buy or sell at equilibrium prices. A trader can avoid "false" prices by knowing the general equilibrium prices which will prevail when all trades are complete. This means that traders must know without error what will happen in the future. Assuming an omniscient auctioneer is formally equivalent to traders knowing the future, perfect foresight. Implicitly or explicitly pre-Keynesian general equilibrium analysis and much neoclassical analysis subsequent to Keynes assumed perfect foresight.

There are many objections to the perfect foresight hypothesis (PFH). In the neoclassical literature one frequently finds the argument that the PFH is unsatisfactory because it is inconsistent with utility maximization. It is argued that perfect foresight requires more information than a rational agent would ever choose to acquire. Gathering information has a cost, and like any other commodity it will be purchased (by money, time or both) up to the point at which its marginal benefit equals its marginal cost.

More important, the PFH cannot be considered an intellectually serious argument because even if information were costless, the hypothesis presupposes an impossibility, that with enough information one could know the future. The fundamental difference between the past and the future is that the past has occurred and the future has not. The only way to be sure of what will happen tomorrow is to wait for it to occur. Were this not the case, languages would have no need for the word "accident". Perfect foresight is not a hypothesis in the strict sense, but an invocation of the impossible.

As an alternative, one could adopt the static expectations hypothesis (SEH), which assumes that agents act as if the future will be like the present. This hypothesis at least meets the minimum test of credibility. An example is the Cobweb solution to market clearing in comparative static partial equilibrium analysis. Because it allows for false trading, the SEH would not serve for general equilibrium models.

A variation on the SEH is the adaptive expectations hypothesis (AEH), according to which agents determine their expectations of the future on the basis of experience of the past. Expectations are "adaptive" because as each period passes predictions of the future are adjusted in light of most recent experience. Previous experience is discounted on the basis of its distance from the present. As should be obvious, the AEH results in less volatile models than the SEH. If a dramatic change occurs in the economy, an agent governed by the SEH will respond with an equally dramatic adjustment, on the belief that the change will persist. An agent acting on the AEH will move more cautiously, with behavior governed by past trends and fluctuations. The AEH literally "smooths things out". A well known example of use of the AEH was Milton Friedman's argument that monetary policy is ineffective in the long run.<sup>1</sup>

## 9.2 The Rational Expectations Hypothesis

The rational expectations hypothesis swept away all before it. In contrast to the other hypotheses which postulated stylized behavior of economic agents within the context of formal models, the REH purported to specify the actual behavior of agents in real market circumstances. Specifically, it sought to establish a relationship between agents' expectations and empirical outcomes of the economic system. As a result of the allegation that it arises from actual behavior, the REH must be assessed against criteria

different from those used for the other hypotheses. In the case of the first three, it is not appropriate to demand that they satisfy the test of realism because they are logical exercises. In the case of the REH its own assumptions demand it to stand or fall on the test of realism.

The REH can be simply stated: 1) if economic and social relations are deterministic;<sup>2</sup> 2) if all aspects of these deterministic relations are known by economic agents; 3) if economic agents form their predictions of the future on this complete knowledge;<sup>3</sup> then 4) the predictions (expectations) formed in this manner will be correct on average and any divergence between anticipated and actual outcomes will be the result of random influences. The full and complete knowledge assumption was sometimes called the “formal model” of the economy,

There are three serious difficulties with the REH. First, it presupposes a strict dichotomy between systematic and random influences which at best is a naïve and simplistic approach to causality. It asserts that what is known represents the sum of systematic influences and all unknown influences are random events. This places an unbearable burden of identification upon the theoretical analysis. Only if the theory has completely and correctly specified all relevant behavioral relationships, and estimated them with accurate data in an unbiased specification can the unexplained residual be considered purely random.

The REH assertion that there exists full and complete knowledge of the working of an economy is quite astonishing.<sup>4</sup> The assertion is that there exists “the economic agent who fully understands how the economy actually operates” (Shaw 1984, 52), who obtained this knowledge from the discoveries of economic science. This claim, that economics has revealed the true and complete operation of the capitalist economy, is a manifestation of hubris that appears in no other intellectual discipline be it a social or a physical science. The physical sciences, where new discoveries continuously challenge the existing body of accepted truth, are considerably more humble in their claims.<sup>5</sup>

The literal omniscience of neoclassical economic theory is asserted, that at any moment it has discovered all that need be known about the economy. A cynic might say that the enthusiasm with which the profession has embraced the REH might in part be explained by the pleasing effect of the hypothesis upon the professional egos of

economists. While the perfect foresight hypothesis postulated the impossible achievement of knowing events prior to their occurring, the REH posits the naive incredibility of complete knowledge. If it were the case that economic science in the second half of the twentieth century reached the sublime state in which it correctly and completely modeled the capitalist economy, economists did not agree upon what that correct and complete model might be.<sup>6</sup> Relevant is the cliché that if all the economists in the world were laid end-to-end, they would fail to reach a conclusion. Thus, on many grounds, scientific method,<sup>7</sup> state of knowledge, and the intense controversies within the economics profession, it is not credible to presume that a correct and complete model of the capitalist economy exists as a reference for economic agents.

When suggesting behavior on the part of people which is *prima facie* incredible, neoclassical theory frequently seeks to establish credibility through an "as if" statement. For example, in consumer theory it is argued that the analysis does not require that people know their utility functions and to maximize them subject to their budget constraint, only behave "as if they did". A similar argument is advanced in the case of cost-minimizing firms. The "as if they did" treatment has been applied to the REH.<sup>8</sup> In the case of consumer theory the "as if" can be justified on grounds that the assumption of utility maximization is tautological. All behavior is consistent with utility maximization, because one can always argue that the person in question would not have selected a particular action in the market had it not brought him or her the maximum marginal gain. In the case of the theory of the firm, one might argue that cost minimization is forced upon capitalists by competition, and those who do not behave in this manner are driven out of operation.

Neither of these justifications applies to the REH. Assuming that people have complete knowledge of the economy is not tautological, because the REH itself concedes that even under the best of conditions some people will not behave as the REH predicts. Further, it is not correct to assume that mistakes in forecasting will lead people to close in on the correct model by trial and error, though some authors argue this.<sup>9</sup> The argument that failing all else people can arrive at the correct model by trial and error is the last line of defense of the REH. This final defense assumes what it seeks to prove and is theoretically invalid.

First, consider the proposition that a rational agent could "close in on" the correct model by noting discrepancies between his or her predictions and actual outcomes. To do this, first assume the world to be strictly deterministic and that the hypothetical agent *does* know the correct model. In such circumstances, that each chronological event is unique, individual behavior never repeats itself in precisely the same circumstances, would create no problem. A change in the tax rate on households, for example, would be correctly anticipated as having the same impact whether prices were rising or falling. If, however, an agent has the wrong model in mind, the "other things constant" assumption does not apply. The agent with the wrong model might sometimes generate the right prediction by accident or for the wrong reason.

With the wrong model an agent would be unable to distinguish between which forecasting errors were the result of wrong specification of the model, and those which were the result of random influences displacing predictions made on the basis of a correct model. This problem with the "trial and error" argument can be put another way. The REH itself implies that people's predictions will inaccurate more often than they will be correct. The hypothesis states that predictions will be correct on *average*, with a normal distribution around the average. In order that a person reformulate his or her model on the basis of inaccurate predictions, it must be known which deviations of the predicted from the actual outcomes are systematic modeling errors and which are random errors.

If the errors are systematic, then the model must be changed to correct them. If the inaccurate outcomes are random deviations from the true mean, no change should be made to the model. Without the ability to distinguish between the two error sources, the REH agent could spend time reformulating a correct model or resting complacently in the mistaken belief that systematic errors were only random "noise".<sup>10</sup> In summary, an agent can successfully use trial and error as a method of establishing the correct model only if the agent knew the correct model prior to attempting to use it.

Closely related to the above, *even in theory* each prediction made by the REH agents is a unique, "one-off" exercise. The REH agent is in effect operating with an econometric model estimated from historical data,<sup>11</sup> and also incorporating key information about the future such as government policy changes. An elementary principle of econometrics is that the unbiased probability distributions of the estimated

parameters of a model refer to *hypothetical* outcomes, because there is only one actual outcome, except in science fiction stories involving parallel worlds. No competent econometrician would argue that a quantitative model could be constructed through trial and error. On the contrary, the whole body of econometric theory denies such an *ad hoc* approach. We know in theory that there are no alternative outcomes for the rational agent to observe. Yet it is such a theoretically invalid approach that is defended in the REH literature.

Using the REH in economic models involves what Coleridge called "willing suspension of disbelief", which is a pleasant ingredient when reading fiction but of questionable appropriateness when constructing economic models. To give some spurious verisimilitude to the REH, its practitioners tend to employ extremely simplistic models and equally simplistic "thought experiments", notwithstanding the assertion that agents are supposed to have complete and full knowledge of how the economy operates, and not merely some simple analogue. The policy implications of the REH, particularly those reached by the new classical economists, almost invariably follow from extremely simple and sometimes logically flawed False Dichotomy models.

### 9.3 The New Classical Economics and the REH

Pre-Keynesian "classical" economics was characterized by its faith that capitalist economies tended automatically to adjust to full employment equilibrium in some chronological "long-run" period with money strictly neutral. The new classical economics took the same full employment, money neutral position, but argued that it applied to the *short run*. In other words, the new classical argued that deviations from full employment equilibrium *in practice* will tend to be minor.

A favorite "thought experiment" generated with the REH hypothesis involved a assumption of aggregate money wage bargaining between capital and labor in which the only change is in an autonomous money supply.<sup>12</sup> The typical model had only three equations, an IS curve, an LM curve, and an aggregate supply of output curve (see Akerlof 1979). The last of these was specified in terms of a single commodity.<sup>13</sup> That most workers might not know the "true" model was brushed aside by the contention that their trade union representatives did the homework to arrive at full and complete

knowledge.<sup>14</sup> On the other side of the hypothetical negotiating table, capital was presumed to have the same model linking nominal variables in the economy to real ones. Let us suspend disbelief, for example, ignore that economists cannot agree on precisely how the economy operates, and inspect how this simplistic model might be used in the hands of the new classical economists.

Assume an aggregate wage bargain in which both sides possess the same unique and complete formal model of the economy. Further assume that all prices are flexible, so that at the time of the wage bargain the commodity market and labor market are in equilibrium. This assumption of equilibrium involves the introduction of a concept central to the new classical economics, "the natural rate of unemployment" and its close companion "the natural rate of output".

These two concepts represent the naturalistic tendency of neoclassical economics in its most blatant manifestation. By whatever definition, unemployment is not "natural" and use of the term is purely ideological. As explained in Chapter 8, the necessary condition for unemployment is that workers do not own the means by which production is carried out. If they did, they would have no need to offer their services for sale. One may think that capitalism provides the best of all worlds, but workers without property is no more natural and ordained by nature than slavery was.

Second, by the definition used in the new classical economics unemployment cannot be natural. The "natural" rate is defined as the rate of unemployment which prevails when the labor market is in equilibrium.<sup>15</sup> Because equilibrium is an ideal state which the actual economy only approximates, equilibrium unemployment is also an ideal concept. Third, the empirical manifestation of unemployment cannot be natural if "natural" means generated by forces of nature without human agency.

As an empirical category, the "natural rate of unemployment" is supposed to refer to those people who voluntarily chose to be without employment. The "natural rate" hypothesis explains such a choice by people on the basis of optimizing behavior. For example, a person may chose not to work at the prevailing wage because the cost of relocating to take an available job may be too great, or the prevailing wage may lie below the worker's customary wage, either making it rational to wait in hope of a better offer. However, such decisions are influenced by the institutions of society, for example the

level and duration of unemployment compensation, access to retraining programmes, and discrimination on the basis of sex, age and ethnicity. Indeed, the new classical economists point to unemployment compensation as being in part the cause of "voluntary" unemployment. These factors can be changed by legislation and government decree. It makes no sense to call a rate of unemployment "natural" when it can be altered by passing a law or winning a class action in a court.

It might be thought that much is being made out of a purely semantic matter. However, there is a fundamental theoretical issue here. The term "natural rate of unemployment" as used by the new classical economists is nothing other than full employment equilibrium. To call it what it is, full employment equilibrium, identifies it as an ideal concept. It is a product of an abstract economic model that incorporates a number of extremely problematical concepts, such as the aggregate production function and an exogenous money supply. Full employment in the sense of there being no one who wishes to work at the going wage but cannot find employment may not exist outside of the arcane models of neoclassical economists. It is a hypothesis.<sup>16</sup> Invoking the word "natural" reflects an attempt to repackage an extremely dubious concept to make it more acceptable. The repackaging has been a success. The term has gained wide respectability within the economics profession despite the objections of a number of prominent neoclassical theorists.<sup>17</sup>

I shall accept the "natural rate of unemployment" and investigate the new classical economics wage bargaining story. To avoid misrepresenting the story, I follow closely a standard presentation from the early days of the REH and the new classical economics. Recall that the correct and complete model of the economy is assumed to be known by both capital and labor. The story goes as follows,

[T]he equilibrium expected real wage at the date of the nominal wage bargain is made is assumed to be set in the expectation of clearing the labor market. . . . Thus I assume that nominal wages are set each period to produce an expected real wage which is expected to generate unemployment at the Natural Rate. . . (Begg 1982, 37)

The story begins with the assumption of full employment, and the postulated situation bears no resemblance to what occurs in any actual economy. Very few capitalist economies have aggregate wage bargaining, and in most Western capitalist

countries the majority of wage and salary earners are not organized into trade unions. In the United States, for example, less than a ten of the workforce is covered by effective bargaining units. Second, the assumption is made that the parties to the wage bargain seek a nominal wage which will clear the labor market. This is an arbitrary assumption, and a strange one for a new classical economist. For decades neoclassical economists argued that trade union leaders tended to be most influenced by their direct constituency, the dues paying members, and showed little concern for the non-union employed, much less the unemployed. It is unclear what prompts the new classical economics to attribute such selfless motives to trade union leaders throughout the capitalist world. The assumption that a wage is set to clear the labor market is nothing other than the Walrasian auctioneer disguised in a blue collar and cloth cap.

Third, the assumption is implicitly made that there is no conflict of any significance between capital and labor, because both parties to the bargain seek the wage which will clear the labor market. The story involves no bargaining at all. Since by the REH both capital and labor know with certainty the true model of the economy and both seek to establish the full employment real wage, it would be a waste of time for them to meet. The trade union leaders could leave wage setting to the capitalists (and *vice versa*) because both parties have the same information and seek the same result. Completely ignored is the possibility that the wage bargain might involve a struggle over the distribution between wages and profits.

If for some the story has more superficial realism than the general equilibrium parables in previous chapters, it is no closer to reality. It is that same general equilibrium thought experiment disguised as a real world process, and the REH is incidental to the story. It must be stressed that this story is not merely an exercise in abstract model building, but has pretensions to explain actual events. In its attempt to do so, it begins by assuming that the labor market is in equilibrium. This assumption requires that all markets have cleared according to Walrasian rules. Walrasian market clearing requires the assumption of perfect foresight to avoid false trading, either in the form of the PFH or a mythical auctioneer. Rather than replacing the PFH, the REH is introduced *in addition* to the presumption of perfect foresight. The assumption of perfect foresight is required to

ensure the market clearing that establishes full employment each market period,<sup>18</sup> and the REH does no more than provide a spurious link between one market period and the next.

The implicit necessity for the PFH can be demonstrated with another “thought experiment”. Assume that at the outset of a market period agents establish their predictions on the basis of a complete and correct economic model. If able to do so a large number of times, they will on average predict the general equilibrium outcome. However, in any specific case, random influences will result in the actual outcome differing from general equilibrium, and false trading will occur. Further, each prediction exercise is a unique event which can never be repeated in practice. Hypothetically there exists an average of the many outcomes which is equal to the general equilibrium outcome. Because each market period is unique the theoretical existence of a zero mean for deviations from general equilibrium is of no help to avoid false trading once the argument refers not to an abstract model but to the real world.<sup>19</sup>

Even were it the case that the REH yielded general equilibrium for one-off events, the approach is unsatisfactory. As shown in previous chapters, full employment general equilibrium is a theoretically fragile concept requiring a number of problematical assumptions and concepts. Pre-REH neoclassical theorists for the most part felt it necessary to demonstrate the existence, uniqueness, and stability of general equilibrium. The new classical economics takes full employment equilibrium as its starting point.

## 9.4 The New Classical Economics and Policy

With these critical comments in mind, we can turn to what were considered the policy conclusions of the new classical economics story. Perhaps the most remarkable aspect of these policy conclusions was that they were taken seriously by anyone. Recall that the wage bargain was been struck in the context of full employment with both parties seeking a money wage which will preserve that full employment in the next time period. To continue the story,

Under Rational Expectations, the remarkable implication. . . is that, no matter how we define the rest of the model and no matter which systematic parts of the [government economic] policy rule are altered, the effect on the path of real output will be nil.<sup>20</sup>

The story apparently has the following moral: if agents act according to the REH rules, no matter what the characteristics of the formal model of the economy, no systematic government economic policy will have any effect upon real output and, therefore, employment during the life of the wage contract. This statement is false. To understand why it is false, first we investigate the conditions under which it would be true. Assume that the government plans to increase the money supply during the period when the wage agreement applies. If the increase is based upon some reasonable and systematic policy guidelines, then it will be anticipated by the parties to the aggregate wage bargain. In anticipation of the implementation of the policy rule, the bargainers will agree on a nominal wage that clears the labor market with the specific policy in mind.

For example, if the government plans to increase the money supply by ten percent, the bargainers will set a market clearing nominal wage consistent with this change in the money supply. On the assumption that the wage bargainers do this, under what circumstances will there be no effect upon real output? *This will result if and only if money is strictly neutral.*<sup>21</sup> In other words, application of the REH tells one nothing that economists have not known for at least two generations: if the economy is at full employment equilibrium and money is neutral, a change in the money supply will leave all real variables unchanged. The "remarkable" REH conclusion is the neutrality condition and nothing more. It differs from the same story told in traditional Walrasian market theory by the replacement of the all-knowing auctioneer with all-knowing wage bargainers. The economic policy nihilism of the new classical economics was a repackaging of the economics of Pigou, Keynes's famous theoretical adversary.

The quotation is wrong in the first instance because there are many specifications of how the economy operates in which money is not neutral. If we allowed non-neoclassical specifications, there are the models of the neo-Ricardians, neo-Keynesians and Marxists. But even if respectability is granted to neoclassical models alone, it was shown in Chapter 7 that introduction to the wealth effect can render money non-neutral.<sup>22</sup> If money is non-neutral, then the hypothetical ten per cent increase in the money supply will alter the rate of interest, directly affecting real investment and consumption. If the

supply of labor is sensitive to the interest rate, then the market clearing level of employment will change.

Second, even on the assumption that money is neutral, it is not true that changing systematic policy rules will have no effect upon real output, for there exist fiscal policy rules which even if unchanged would affect real output. If the tax structure is progressive, then a rise in nominal wages and prices will increase tax revenue more than proportionately to the rise in money income. In a neoclassical world a higher average tax rate for the economy would affect the work-leisure trade-off and shift the supply of labor schedule (Hahn 1980, 2).

Pre-Keynesian classical economics was forced to retreat before the attack of Keynes, and remained largely an undercurrent during the heyday of the neoclassical synthesis. Its two central messages, the neutrality of money and automatic full employment equilibrium, were treated with considerable skepticism by policy oriented economists. The new classical economics changed this, and the believers in full employment and neutrality again seized the high ground of economic theory, using the REH.

Under close inspection the REH resolves none of the theoretical problems which plagued both the old classicals and the neoclassicals; rather, it added additional logical problems of its own. Its popularity in the profession was largely a political phenomenon. With the election of right-wing governments in the United States and the United Kingdom in the 1980s, the new classical economics was a doctrine whose time had come, its theoretical failings notwithstanding.

## 9.5 Evaluating the New Classical Economics

Having been quite critical of the new classical economics and its rational expectations medicine, we must give it its due. While many liberal and progressively minded neoclassical economists were appalled at the right-wing policy nihilism of the new classical economics, the latter can with some justification claim to have been the true standard bearer of the neoclassical synthesis tradition.

For at least thirty years after the end of the Second World War there existed a strong consensus among mainstream economists with regard to macroeconomics. In the

realm of high theory, a successful counter-attack was launched against *The General Theory*. It was accepted in the profession that Keynes had done little more than demonstrate that rigid money wages would prevent achievement of full employment.<sup>23</sup> This theoretical victory of the pre-Keynesian paradigm appeared of little importance, because the other part of the consensus was that money wages were rigid in practice.

Those who held to the pre-Keynesian paradigm were left to pursue their interest in the analysis of full employment equilibria if they wished. Practitioners of economic policy and macroeconomic empirical studies devoted themselves to situations of less than full employment and developing rules for interventionist policies of governments. With the exception of a few graduate schools, young economists-in-training were required to learn the intricacies of full employment solutions as something to master before moving to the serious work of analyzing what could be done to correct situations of unemployment. Walrasian general equilibrium theory was frequently restricted to a topic within advanced courses in microeconomics (which, one can note, is where Walras himself had located it).

The decline in influence of what Keynes had called classical economic theory reflected the political environment of the post-war period, an environment generated by two traumatic events in the developed countries, the Great Depression of the 1930s and the Second World War. The most developed capitalist country, the United States, suffered the greatest economic decline during 1929-1933, and another highly developed capitalist country, Germany, unleashed organized barbarism on a historically unprecedented scale on own population and its neighbors. One did not have to be a communist or even a social democrat to believe that modern capitalism required government intervention to control its more flagrant economic and political abuses (see Rothschild 1946).

However, the pragmatists of less-than-full employment had few theoretical differences with the general equilibrium idealists, especially in the United States. Further, the so-called frontier of macroeconomic theory was dominated by Walrasian methodology. For thirty years a split personality characterized mainstream macroeconomics. It swore theoretical allegiance to Walras, but unceremoniously abandoned him when treating policy issues. Economists such as Joan Robinson on the

Left and Milton Friedman on the Right pointed out the contradictions between the discipline's theory and practice, but made little headway in obtaining a consensus for rendering the two consistent. Perhaps like the Catholic Church during certain historical periods, the profession flourished on the basis of rigid doctrine in the Vatican and heterodoxy among the clergy.<sup>24</sup>

While the dominance of the mainstream by the new classical economics was brief, this nihilism left a profound impact on the mainstream.<sup>25</sup> By the mid-1980s, the theoretical core of economics was again general equilibrium. The new classical economics united theory and practice. If theory tells one that the natural working of the market mechanism will produce full employment, and that the government is a burden upon the economy, and if that theory is accepted as the collective wisdom of the profession, an economist should treat the world accordingly.<sup>26</sup> Neoclassical theory found its purest expression in the new classical economics, where it could run its course to its logical and practical conclusion.

## 10 Full Employment and Multi-commodity Production

### 10.1 Introduction

At a number of points in previous chapters I referred to critiques of the neoclassical aggregate supply of output function. I now treat that issue in some detail, especially those objections that have come from writers who feel that the neoclassical synthesis is a serious distortion, even a perversion, of Keynes's contribution to economic theory. The purpose is not to cover all critiques arising from writers who considered themselves as correct interpreters of Keynes. The discussion restricts itself to those who address the implications of the neoclassical macro modeling of the supply side.

Keynes explicitly accepted marginal productivity theory,<sup>1</sup> but at a number of points in *The General Theory* he made arguments and comments that contradicted the concept of a neoclassical production function (see Annex on Keynes at the end of Part I),<sup>2</sup> either aggregate or at the firm level. One group of economists which defined itself in the tradition of Keynes judged his acceptance of marginal productivity theory to be a fatal compromise. Central to their critique of the neoclassical synthesis was an attack upon the aggregate production function. This group of writers, among whom Joan Robinson was the most distinguished, I shall refer to as the "neo-Keynesians".<sup>3</sup> A brief word on varieties of Keynesians is necessary, for there is a second group critical of the neoclassical model, some of whose members share the skepticism about the aggregate production function. However, this second group, including Robert Clower and Axel Leijonhufvud, centers its critique of the synthesis model on the general equilibrium analysis of Walras' Law. This approach I name "disequilibrium-Keynesian" and is treated in the next chapter.<sup>4</sup> Both groups might be called "post-Keynesian", a catch-all category better avoided.

The neo-Keynesians sought to reconstruct the analysis of *The General Theory* in terms of a macro analysis that discarded the concept of an aggregate production function. In their approach, the neoclassical treatment of capital-labor relations as a harmonious one determined by purely technical influences (the production function and factors supplies) is rejected in favor of placing the distributional struggle between capital and labor at the centre of the theory.<sup>5</sup>

## 10.2 Switching Techniques and the Factor Price Frontier

A basic conclusion of neoclassical theory is that holding other things equal, more employment can only be achieved at a lower real wage. If neoclassical economics can be said to have behavioral “laws”, this is one of them. It carries a powerful ideological message, that attempts by workers to improve their conditions of pay, if successful, will be self-defeating by generating unemployment.<sup>6</sup> If the labor market is left to operate freely without interference, full employment will result. Intervention results in the employed gaining at the expense of an increased number of the unemployed. Further, society as a whole loses, because unemployment implies that total output is below its maximum level. This argument, that there is a trade-off between the level of the real wage and the level of employment, derives directly from the aggregate production function.

To clarify the importance of the debate over the aggregate production function, a detailed investigation of how the real wage-employment trade-off is supposed to occur is necessary. On the supply side of the macro model, neoclassical theory begins by assuming that the total production of the economy can be treated as a single product. It then postulates that at any moment there exists a known range of techniques that can be used to produce this single commodity. This range or set of techniques can be called "the state of technology".

All of these techniques are part of the same production function, and differ from each other by the ratio in which capital is combined with labor. There will be some capital-labor ratio at which each technique will produce the single commodity at the lowest cost, given the wage rate. The aggregate production function represents a locus of many techniques, all of the possible capital-labor combinations which are economically efficient. Capital-labor substitution results in the full use of the capital stock, because it is always rational for capitalists to do so whatever might be the labor input (see Chapter 8).

As one moves along a production function, as in the stories told in Chapters 5 to 7, one is substituting labor for capital (or *vice versa*) by *switching* techniques. No neoclassical economist argues that a given production process (technique) allows a wide range of capital-labor ratios. It may be that some processes do, but this is an empirical

issue and cannot be the theoretical basis of capital-labor substitution. The theory of capital-labor substitution asserts that there exists a book of blueprints of many possible alternatives techniques. When the ratio of wages to the profit rate changes, optimizing capitalists switch to a different technique.

Technique switching in response to changes in factor prices is illustrated in Figure 10.1, which shows three manifestations of the aggregate production function. A map with four techniques available for the production of the single commodity, with a given capital stock of  $k$ , is represented in Figure 10.1a. A small  $k$  is used because the capital stock is measured in units of the single commodity. Each of these techniques, A, B, C, and D, is characterized by fixed coefficients. When using technique A, capital and labor can be combined only in the ratio  $k^*/n_a$ . Additional input of labor (adding amount  $[n_a - n_b]$  for example) has no impact on the level of output when technique A is used. The straight lines from the origin in Figure 10.1a are called activity vectors.

As drawn, equal increments outwards from the origin along any activity vector yield equal increases in output (constant returns to scale). When points of equal output on different vectors are joined, the result is an isoquant (only the level of output  $y_1$  is shown). The isoquants in this diagram differ from those in Figure 8.1 because here they are made up of straight-line segments. Were we to include more activity vectors (techniques) between the existing ones, the isoquants would progressively begin to approximate smooth curves. Even were we to do this, the curves would be constructed on the basis of discrete techniques, each characterized by fixed coefficients of production.

Figure 10.1b shows the production function in the output-labor space, again with a series of straight lines whose slopes diminish with respect to the level of employment. Finally, Figure 10.1c presents the implied marginal product of labor schedule, measured in units of the single commodity, though on a different vertical scale.<sup>7</sup> The marginal product schedule takes the form of a step-function, with the operative portions of each technique shown as solid lines. The purpose of this diagram is to demonstrate that the theoretical process by which labor is added to a given capital stock (or, more generally, labor substituted for capital) involves a switch from a fixed coefficient technique with a higher capital-labor ratio to one with a lower capital-labor ratio.

The next diagram, Figure 10.2, is a variation on the one before, in which the *factor price frontier* is derived using all four quadrants. In Figure 10.2a the isoquants are presented as before, with four fixed coefficient techniques. In the quadrant below (Figure 10.2b), the marginal product of labor schedule is derived. In this part of the diagram, one can find the real wage associated with each technique, measured on the vertical axis in units of the single commodity. In Figure 10.2c, the relationship between the capital stock and the rate of return is shown, with  $r$  rising as techniques are chosen for which the capital-labor ratio falls. Here there is only one marginal product schedule (as a series of straight lines), because the capital stock is held fixed. Figure 10.2c has a series of shifting vertical marginal product of capital schedules, because labor varies with capital constant.

The shape of the curve in Figure 10.2d is explained by use of algebra. Because output is equal to wages plus profits, one can write for any of the four techniques,  $y = wl(i) + rk^*$ . Using technique A as an example,

$$y(a) = wl(a) + rk^* \qquad y(a) = wl(a) + rk^*$$

$$w = \frac{y(a)}{n(a)} - r \frac{k^*}{n(a)} \qquad (10.1)$$

and

$$r = \frac{y(a) - wl(a)}{k^*}$$

In this equation, only  $w$  and  $r$  vary because there is only one ratio in which capital and labor can be productively used, namely  $k^*/n(a)$ . Further, the average product of labor,  $y(a)/l(a)$ , is unique when the entire capital stock is employed. This equation is the factor price frontier for technique A and it is linear. It shows the unique rate of return that is associated with any commodity wage (and vice versa). A factor price frontier can be derived for each technique, and these are shown in Figure 10.2d. As the capitalist producer switches to techniques with more labor relatively to capital, the vertical intercept,  $y/n$ , crawls toward the origin, so each successive factor price frontier intersects the previous one at a lower commodity wage and a higher rate of return.<sup>8</sup>

The result of constructing these various factor price frontiers is easily interpreted. If the commodity wage is  $w_a$ , then technique A will be chosen by capitalists because it yields the highest rate of return. At some point below  $w_a$  technique B begins to offer the highest rate of return. Therefore, when the commodity wage declines toward  $w_b$  capitalists will switch from technique A to technique B. Where techniques A and B cross is a "switch point". Similarly, when the commodity wage continues to decline capitalists will switch to technique C, and to technique D. We now have the explicit theoretical foundation of the less-than-full-employment stories of Chapters 5 to 7. Assume that the supply of labor is  $n_c$  in Figure 10.2a. If the money wage is flexible and markets clear according to Walrasian rules, then nominal variables will adjust so that commodity wage moves into the region in which technique C is most profitable and labor is fully employed. If, however, workers combine to hold the money wage above the market clearing level, the commodity wage would increase, to a level where technique B is most profitable. The total capital stock is converted to technique B, and the maximum level of employment would be  $n_b$ , resulting in unemployment.

The moral of the story told in Figures 10.1 and 10.2 is neat, compact, and politically powerful. However, it is a moral based upon a world created by the storyteller. It is not a tale of any actual economy, nor is it a story relevant to any economy. The logical argument in its entirety requires a one commodity system, in which the output of the production process is identical to the input which serves as the capital stock. This story of aggregate capital-labor substitution in response to a change in the economy-wide ratio of the commodity wage to the rate of return is, strictly speaking, a parable, "[a] narrative setting forth something in terms of something else, fictitious story told to point a moral...[an] allegory" (Fowler and Fowler 1964, 572). The narrative told in Figures 10.1 and 10.2 is fictitious: economies are not one product systems, no matter how convenient it may be to presume that they are. It is certainly sets forth something in terms of something else, for the actual capital stock of any economy is not homogeneous, nor is it identical to the output it generates.

That economies have more than one product, and that capital inputs and consumption outputs are not the same thing, do not in and of themselves invalidate the

parable. However, the allegorical nature of the aggregate production function requires that its users demonstrate that the conclusions derived from it are not contradicted when one considers a system with more than one commodity. If it can be demonstrated that the capital-labor substitution story survives the minimal theoretical test of a multi-commodity model, then its judgment on wages and employment can be taken seriously. To be explicit, the theoretical hurdle is not that the aggregate production function should stand the test of realism or even casual empiricism, but that it survive in a model no different from the general synthesis model with the exception that there are two products rather than one. The Neo-Keynesian critique demonstrates that the aggregate production function cannot survive this simple test.

### 10.3 The Neo-Keynesian Critique

Before proceeding to a presentation of the Neo-Keynesian critique of the aggregate production function, a brief digression is required. Readers familiar with what has been called the "Cambridge Controversy"<sup>9</sup> might be surprised to find it in a treatment of macroeconomics, especially a treatment of macroeconomics which is restricted to short-run models. As it developed, the debate over the logical consistency and generality of the neoclassical aggregate production function focused almost entirely upon issues of distribution, determination of wages and profits and choice of technique in response to changes in factor price ratios.

The critics used their attack upon the aggregate production function primarily as a vehicle to discredit the neoclassical theory of distribution and marginal productivity analysis *inter alia*. The ability of the critique to achieve these formidable tasks is open to question. What is not open to question is the relevance of the critique to short-run adjustment mechanics in the neoclassical macro model. As Hahn pointed out,<sup>10</sup> it is strange that the critics did not pursue more vigorously the powerful short-run implications of their attack upon the aggregate production function.

The analysis begins with a very simple two commodity system in which there is one output, one input, and the input is completely used up each period; i.e. capital has a life of one period. I also assume that the system keeps to the same level of production each period, so an amount of the input is produced that is just sufficient to produce the

output. Keeping with the approach used in the one commodity parable, I assume that there exists a range of fixed coefficient techniques for capitalists to choose among. Unlike before each technique now involves two products, the input and the output. First, a typical technique A will be defined for one unit of output. The output is designated by the number 1, and the input by the number 2. The price of each product can be defined as follows:

$$p_2 k_{a1} + p_{a1} w n_{a1} + (\text{profit})_{a1} = p_{a1}$$

$$p_2 k_{a2} + p_{a1} w n_{a2} + (\text{profit})_{a2} = p_{a2}$$

where  $p_j$  is the price of each commodity,  $n_{a_i}$  is the labor input required to produce one unit of each commodity,  $k_{a_i}$  is the amount of input (capital) required to produce one unit of each commodity, and  $w$  is the wage measured in physical units of the output.

I assume that competition results in the same wage and rate of return for each commodity. The rate of return is defined as  $r = rk/k$ . In this simple case in which capital has a life of only one production period, the rate of return can be written as price minus cost divided by the input cost. For the output the rate of return is

$$r = [\text{price} - \text{total cost}]/[\text{capital cost}]$$

and, capital cost = input cost

$$r_{a1} = [p_{a1} - (p_{a1} w n_{a1} + p_{a2} k_{a1})]/[p_{a2} k_{a1}] \quad (10.1)$$

As a further step in simplification, the technique will be defined for relative ("normalized") prices, so  $p_a = p_{a2}/p_{a1}$  is the price of the input, and the price of the output is unity. Because I assume a constant level of production, it is convenient to define one unit of the input to be that which is produced and used up in a time period, or  $[k_{a1} + k_{a2}] = 1$ . Finally, because I shall deal with only one technique, the notation "a" is unnecessary. With these assumptions, the summary of the technique can be rewritten in the usual form that the reader would encounter in the literature.

$$p k_1 + w n_1 + r p k_1 = 1$$

$$p k_2 + w n_2 + r p k_2 = p \quad (10.2)$$

or

$$[1 + r] p k_1 + w n_1 = 1$$

$$[1 + r]pk_2 + wn_2 = p \quad (10.3)$$

The "factor intensity" of the input or the output is defined as  $k/n$ . If  $[k_2/n_2] > [k_1/n_1]$ , then the input is more "capital-intensive" than the output. As will be shown below, comparing the factor intensities of different techniques is less straightforward than comparing the factor intensities of the two products within one technique.

If the relevance of expressions 10.2 and 10.3 to the neoclassical macro model is not obvious, they are easily converted into the familiar income/value added aggregates. If production of the output is constant, corresponding to IS-LM equilibrium in the neoclassical model, then the production of the input is completely exhausted in the current period by the combination of its use as an input to produce the input itself and the output. Recalling that equations (10.2) and (10.3) are defined for one unit of output, the price of the input is equal to the value of its production in the current period.

$$p = pk_1 + pk_2$$

The price equation for the input (10.2) is,  $pk_2 + wn_2 + rpk_2 = p$ . I can make the following subtraction:

$$\begin{array}{r} [pk_2 + wn_2 + rpk_2 = p] \\ - [pk_1 + pk_2 = p] \\ \hline [pk_1 = wn_2 + rpk_2] \end{array}$$

In words, the input cost of the output equals the value added generated in the production of the input. Now, I can substitute for  $pk_1$  in the equation for the output.

$$\begin{aligned} wn_1 + wn_2 + rpk_1 + rpk_2 &= 1 \\ w[n_1 + n_2] + rp[k_1 + k_2] &= 1 \end{aligned} \quad (10.4)$$

Total wages and profits equal the production of the output, and value added equals the value of "final" products. On the assumption that this technique is characterized by constant returns to scale, equations in 10.4 can expand to the level of aggregate output/income ( $y$ ), and are equivalent to the neoclassical circular flow relationship that wages plus profits equal final output (Section 1.2). Note that  $[n_1 + n_2]$  is total labor utilized,  $[k_1 + k_2]$  the capital stock, and multiplying by  $p$  results in measuring the capital stock in units of the output. What I have called a "technique" is in effect one point on the aggregate production function. If I designate the capital stock in units of the

output as  $k$ , and  $y$  as the level of output, then the equations in 10.4 can be written simply as

$$y = wn + rk \tag{10.5}$$

and

$$r = [y - wn]/k$$

The discussion below treats techniques at a unit level of output, and is strictly equivalent to considering aggregate production on the assumption of constant returns to scale for each technique. This is appropriate, because the purpose of the exercise is to investigate whether techniques involving an input which is different from the output will produce a parable about wages and employment that is the same as in the one commodity macro model.<sup>11</sup> To investigate this, I derive the factor price frontier for the two commodity case, as was done previously for the one commodity case. I seek the factor price frontier for the technique as a whole, because the two parts of it, the input and the output, form a single indivisible system of production. To obtain this combined relationship, each element of the technique is solved for  $p$ , the price of the input. Then, the price of the input is eliminated by setting the two equations equal to each other.

$$p = \frac{[1 - wl(1)]}{[1 + r]K(1)} \quad p = [1 - wn_1]/[(1 + r)k_1]$$

$$p = \frac{wl(2)}{[1 - \{1 + r\}k(2)]} \quad p = wn_1/[1 - (1 + r)k_2]$$

The price term is eliminated by substitution.

$$\frac{1 - wn_1}{[1 + r]k_1} = \frac{wn_2}{1 - [1 + r]k_2}$$

This expression can be solved for the remaining variables,  $r$  and  $w$ . After some manipulation, one obtains the factor price frontier in the following form.

$$r = \frac{1 - wn_1}{k_2 + w[k_2n_1 - k_1n_2]} \tag{10.6}$$

This equation for the factor price frontier is considerably more complicated than the analogous expressions (10.1) and (10.5). In general it is not linear. The factor price expression (10.6) can be rendered equivalent to the case in which there is only one commodity. If the expression in brackets in the denominator of (10.6) were zero, then  $r = [1 - wn_1]/k_2$ . The bracketed term will be zero if

$$k_2 n_1 = k_1 n_2$$

or,

$$k_2/n_2 = k_1/n_1 \tag{10.7}$$

The two commodity case reduces to the one commodity case if both products of the technique are characterized by the same capital-labor ratio. This is hardly surprising, because two products with the same factor intensity are one product with respect to production. We can conclude that the two product technique will have a straight-line factor price frontier if and only if the two products are one. In the general case in which the capital-labor ratios of the input and the output are not the same, the factor price frontier will be non-linear. If the input is less capital-intensive than the output, then the factor price frontier will be bowed in towards the origin, and bulge outwards in the opposite case. These two general forms are shown in Figure 10.3, along with the one product factor price frontier. Some writers refer to the linear frontier as a special case of the two product economy, but this is incorrect. Linearity is the case of a one product system and of no other.

Figure 10.4 presents a two product economy with two available techniques, A and B. For technique A, the output has a higher capital-labor ratio than the input, and for B the input has a higher capital-labor ratio than the output. First, I investigate which *technique* is the more capital-intensive, using the capital-labor ratio. To do this it is necessary to derive a measure of the capital-labor ratio for a technique as a whole, considering both the output and the input used to produce the output. On the basis of equation (10.5), I can solve for the capital-labor ratio for the two techniques A and B.

$$[k_a/n_a] = [(y_a/n_a) - w]/r \tag{10.8a}$$

$$[k_b/n_b] = [(y_b/n_b) - w]/r \tag{10.8b}$$

In words, the ratio of the capital stock to the labor employed can be measured as the average product of labor minus the wage. When divided by the rate of return, this numerator is equal to capitalists' average profit per worker employed. Using this method of calculation, it is easily seen in Figure 10.4 which technique is the more capital intensive. At two points the two techniques enjoy the same wage and rate of return, differing by the value of the average product of labor ( $y/n$ ). In the diagram the vertical intercept of each technique marks the value of  $y/n$ . The diagram and the algebra imply

that technique A is the more capital intensive, because  $0a' > 0b'$ . This is the expected result: the technique for which labor is more productive is the more capital intensive one.

I used what most people would consider the basic definition of factor intensity, the capital-labor ratio. Neoclassical rules require that the capital intensive technique will be selected by capitalists when wages are high and the labor intensive alternative when wages are low. Inspection of Figure 10.4 reveals that this is not the case. For a commodity wage above level  $w_a$ , technique A offers the higher profit rate, as expected because A is more capital-intensive. When the commodity wage drops below  $w_b$ , technique B is the more profitable and capitalists will switch techniques. All is well until the commodity wage edges below level  $w_b$ . Below  $w_b$  technique A, which is capital intensive, reappears as the more profitable. This reappearance is called the "reswitching" of techniques. Reswitching implies an unexpected conclusion. Theory tells us that in general capitalists *will not* necessarily select more labor-intensive techniques when wages fall.

This result is a potential disaster for the neoclassical macro model and its parable about real wages and employment. The generally accepted definition of factor intensity breaks down when a one commodity world is abandoned. First, it is not the case that more capital-intensive techniques will always be chosen as the real wage rises. Second, and equally distressing for neoclassical analysis, the measured factor intensity of a technique is not determined by technology alone. Close inspection of Figure 10.4 demonstrates this. Consider technique A. Applying equations (10.8), when the commodity wage is  $w_a$ , the measured capital intensity of technique A is larger than its value at commodity wage  $w_b$ .<sup>12</sup>

This is a strange result. It tells us that with no unchanged technical coefficients of production, changes in the wage and the profit rate alter the factor intensity of a technique. This variability of the capital-labor ratio with respect to the distributional variables  $r$  and  $w$  throws into question a convention that I have employed throughout the first four chapters of this book. All discussion of the short-run macro model was based on the presumption of a given capital stock; and a fixed capital stock has been the defining characteristic of the short run. Now we discover that the capital stock is not

unique with respect to the distribution between wages and profits except in the case of a one commodity world.

This variation in capital value has nothing to do with whether the capital stock is homogeneous (for example, composed of Many identical machines). In the two commodity model represented in Figure 10.4, the capital stock is completely homogeneous. The conclusion in the two commodity model is bizarre in the extreme: there is only one form of capital equipment and the thought experiment assumes that the total input of this homogeneous capital equipment is given: for example, at level  $[k_{a1} + k_{a1}]$ . Never-the-less, the measured capital stock varies with the wage and the profit rate!

How is it possible for a capital stock fixed in physical units to vary with the wage and the profit rate? The paradox arises from the need to render the production of the output equal to total value added for the technique as a whole. Looking back at equations (10.4), we see that the materials cost of the final output is replaced in the distributional expression by wages and profits generated in the production of the input. However, these wages and profits have their origin in a certain amount of the input; that is, the measurement of value added includes an amount of a commodity that is not the final output. In order to add the wages and profits arising from the input to the wages and profits of the final output, both sets of wages and profits must be measured in units of the final output. The denominating of the input in terms of the output was achieved by defining the two commodity system in terms of relative prices,  $p = p_2/p_1$ .

Now it is clear that "dividing through" by  $p_1$  was not merely a step to simplify the mathematics of the solution to the factor price frontier, but necessary to aggregate value added for the technique as a whole. A side-effect of obtaining total value added was to measure the capital stock not as  $[k_{a1} + k_{a1}]$  but as  $p[k_{a1} + k_{a1}] = k$ . While  $[k_{a1} + k_{a1}]$  is invariant with respect to the wage and the profit rate,  $k$  is not. Because the factor intensities of the input and the output are different,  $p$ , relative prices, varies with the ratio  $w/r$ .<sup>13</sup> Knowing that the technical coefficients are invariant with respect to distribution is of no help to resolve the paradox of variable factor intensity in a two product system. There is no way to avoid measuring the capital stock as  $k = p[k_{a1} + k_{a1}]$ .

## 10.4 Full Employment and Reswitching

The implications of the reswitching analysis for short-run employment can now be demonstrated. When the capital stock is measured in terms of the relative price of the output, factor price frontiers will cross more than once (as in Figure 10.4), and the parable about real wages and the level of employment breaks down. To pursue the implications of reswitching, I return to the neoclassical analysis of the labor market.

The Walrasian process of labor market clearing has a clear logical sequence. If there is excess supply in the labor market, the result is a fall in the money wage. This fall in the money wage results in a fall in the commodity wage, which induces capitalists to switch techniques. The production techniques, like everything else are undetermined at the beginning of the market day, chosen as a result of the final equilibrium prices. The labor market clear if the lower commodity wage stimulates the choice of a technique that requires more labor for the given capital stock. It is no longer sufficient to say, "a more labor-intensive technique", because the analysis of the previous section demonstrated that the concept of "factor intensity" is ambiguous except in a one commodity model. Figure 10.4 demonstrates that a fall in the commodity wage may induce capitalists to choose a technique which employs *less* labor with the given physical capital stock.

The hypothetical adjustment process is clarified by Figure 10.5. Assume three techniques, A, B, and C, as drawn. With the given capital stock fully utilized, technique A generates a demand for labor or level of employment of  $n_{da}$ , technique B employment of  $n_{db}$ , and technique C employment of  $n_{dc}$ , where the letter "d" indicates that these are the notional demands for labor associated with each fixed-coefficient process, shown in Figure 10.5a. The factor price frontiers are found in Figure 10.5b, with one drawn as a straight line to keep the diagram as simple as possible. The supply of labor is assumed to be invariant and to coincide with the demand for labor implied by technique C when the short-run fixed capital stock is fully utilized. In the Walrasian general equilibrium parable, excess supply in the labor market results in a fall in the real wage, which provokes a slide down a smoothly-sloping, monotonic demand for labor schedule.

Now the story is quite different. Assume that the commodity wage is initially above  $w_a$ . The most profitable technique will be A, generating employment of  $n_a$  and

leaving part of the labor force unemployed,  $n_c$  to  $n_a$ . Unemployment will cause the commodity wage to fall, and when it drops below  $w_a$  capitalists will switch to technique B and employment level  $n_b$ , following a path such as  $a_1$  to  $b_1$ . There is still unemployment, of  $n_c - n_b$ , so the commodity wage will fall further. When it drops below  $w_b$ , "reswitching" occurs, as technique A reappears as the most profitable. As a result, employment will *fall*, back to level  $n_a$ , following a path shown by  $b_1$  to  $a_2$ . Finally, a drop in the commodity wage to below  $w_c$  will bring about full employment with technique C. With many techniques, the theoretical path by which full employment is reached involves a dizzy Yo-Yo-ing from levels of higher to lower employment. The auctioneer would have to be on his or her toes to ensure that the capitalists and workers did not become confused in such an erratic process.

The adjustment to full employment equilibrium in a multi-commodity world involves complications considerably more serious than merely erratic jerks between higher and lower levels of employment, as Figure 10.6 demonstrates. Here only the relevant portions of the factor price frontiers of two techniques are shown; i.e., only those portions for which any particular technique is the most profitable. This curve, of the most profitable segments for each technique, I name the economy-wide factor price frontier. As in Table 10.5, the factor prices frontier is to the right and the employ and wage space of the left (where arrows show possible adjustment paths from an initial wage of  $w_a$ )

In an multi-commodity world, the economy-wide factor price frontier is always downward sloping, but "wiggly" rather than smooth.<sup>14</sup> Assume that the commodity wage, now a composite of a number of final products, is initially at  $w_a$ , generating a level of employment of  $n_a$  when the fixed capital stock is fully utilized. At this wage and using technique A, there is an excess demand for labor of amount  $n_a$  to  $n_b$ . Because one knows that factor price frontiers cross in this multi-commodity world, assume that some technique B, the full employment technique, is most profitable at both  $w_{b1}$  and  $w_{b2}$ . This last assumption is not arbitrary, for with reswitching there will always be techniques which appear as the most profitable at wage levels both above and below the prevailing

wage. Figure 10.6 demonstrates that an adjustment of the commodity wage will indeed bring about full employment, either via a fall or a rise in the wage! A fall in the commodity wage results in full employment via the path  $w_a$  to  $w_{b2}$ , and a rise in the commodity wage has the same result from  $w_a$  to  $w_{b1}$ . Figure 10.6 produces the general theoretical conclusion that in a multi-commodity world both real wage increases and decreases eliminate unemployment.

There are two reasons why even in theory lower real wages are not the necessary condition to increase employment. First, and argued in the previous chapter, if money is not neutral, then the full employment equilibrium is not unique. Monetary policy alone can change the real wage at which full employment is secured, perhaps raising it (see Section 8.2). Now, there is a second qualification. In a multi-commodity world, the demand for labor is not necessarily downward-sloping for all ranges of the real wage. On the contrary, theory predicts that in general the demand for labor schedule will not be unique and monotonic.

In the introduction to this book a quotation from *The Times* was cited, which ventured the assertion that ". . . few economists would argue with the general proposition that lower real wages will mean higher employment. . ." If it refers to theoretically competent neo-classical economists, this statement is false. The correct statement would be, "no economist would argue with the general proposition that lower real wages will mean higher employment *for a one-commodity world in which money is strictly neutral*". However, there is a considerable doubt as to whether money is neutral in any actual economy and no debate that all economies are multi-commodity systems. Therefore, startling as it may seem to those inculcated in the neoclassical parable, no general conclusion can be drawn about what might happen to the level of aggregate employment in response to a fall in the real wage.

Faced with this unpalatable theoretical result, some neoclassical economists shrugged it off with the reply that reswitching of techniques is an "empirical" question. The implication is that until someone demonstrates empirically that the demand for labor is not uniquely monotonic, the real wage-employment parable stands (Ferguson 1969). This line of defense gives the game away. That the relationship between the level of real wages and the level of employment is an empirical question, about which no theoretical

generalization can be made, is all that the critics of the neoclassical macro model need to establish. By conceding that the issue is an empirical one, the neoclassical have posthumously accepted Keynes's argument that a falling money wage level is in general an unsound way of achieving full employment in a capitalist economy. In any case, the appeal to empiricism is a defense as empty as it is a surrender, for the wage employment parable cannot be tested in a meaningful way.<sup>15</sup>

An economist no less distinguished than Paul Samuelson fervently defended the concept of the aggregate production function, invoking the laws of thermodynamics in its defense (Samuelson 1972, 174). There can be no doubt considerations of the conservation of energy are relevant to the relationship between inputs and outputs. However, they do not imply that in the aggregate the demand for labor is single-valued and downward-sloping with respect to the real wage in a multi-commodity model, much less in the real world. We can conclude that when referring to actual economic outcomes, there is no theoretical basis for the generalization that lower real wages will stimulate more employment. The opposite conclusion has equal theoretical merit. The neoclassical parable, upon which so many policy prescriptions are based, is a false guide to real economies.

Neoclassical theorists frequently allege that the study of economics is subject to the same rigor and discipline as the natural sciences, citing the use of mathematics as evidence. Were that allegation true, economists would have abandoned the aggregate production function and its associated labor demand schedule in the 1950s when Robinson and others demonstrated its irreconcilable contradictions. It was not abandoned, because neoclassical economics is an exercise pursued according to its own rules of arcane mathematics that hide the underlying lack of rigor and intellectual discipline. Were the profession's rigor and discipline real rather than merely formal, it would be necessary to abandon the ideological commitment to the virtues of "free markets" along with the aggregate production function.

Figure 10.1: The Production function as a range of discrete techniques

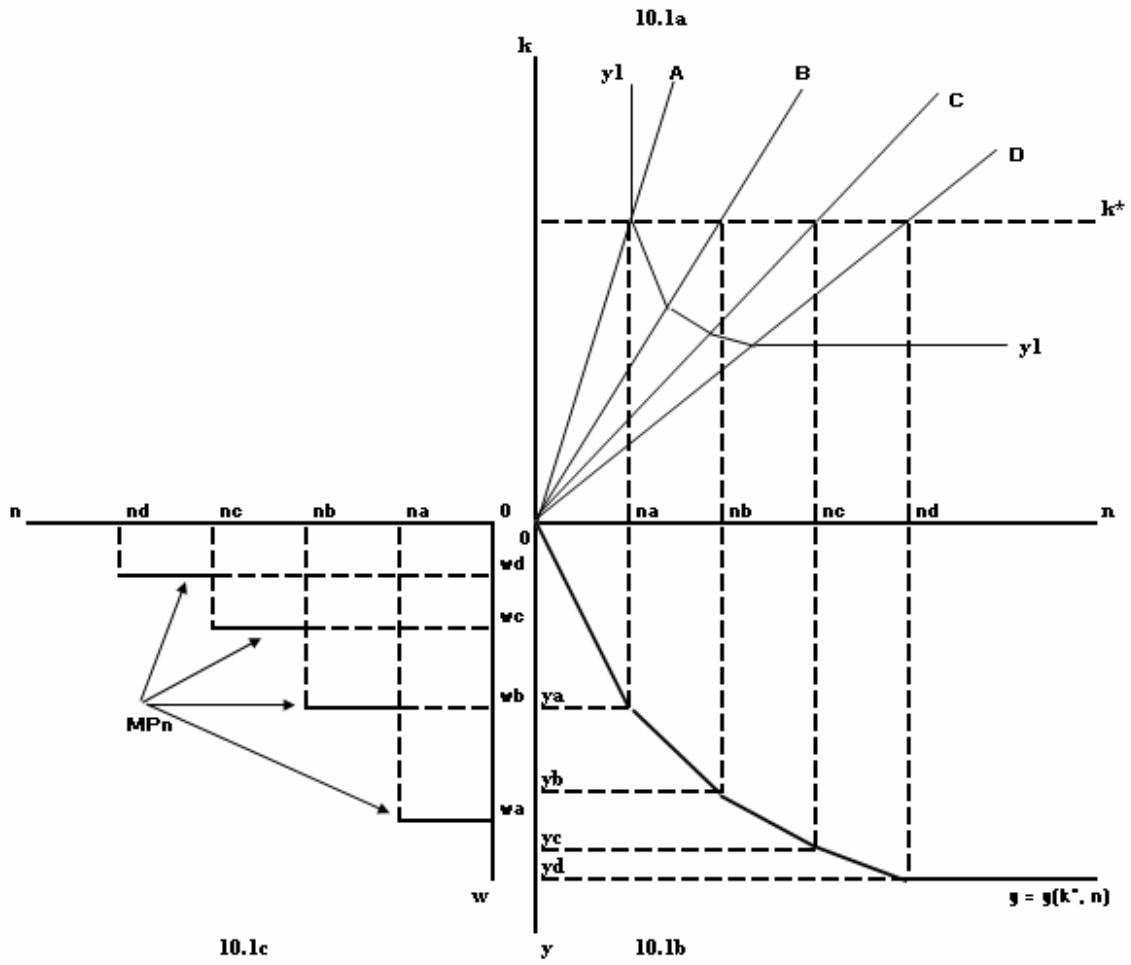




Figure 10.3: Factor Price Frontiers for a two commodity economy

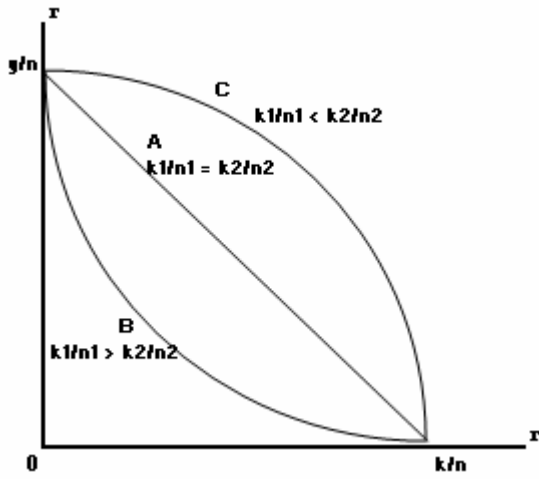


Figure 10.4: A two commodity economy with two available techniques

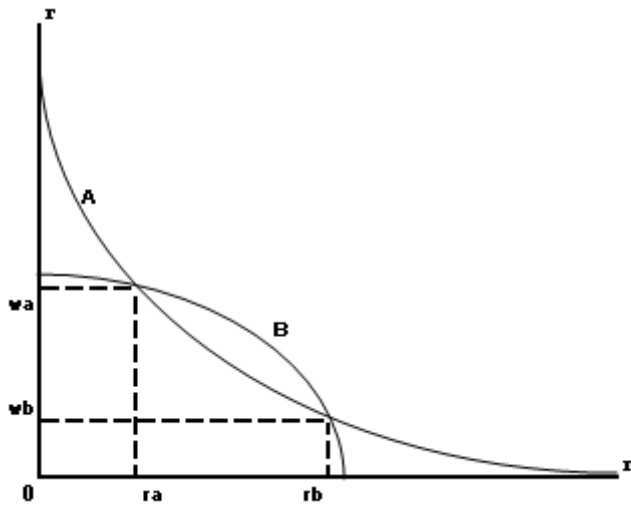


Figure 10.5: Labor market adjustment in a two commodity economy

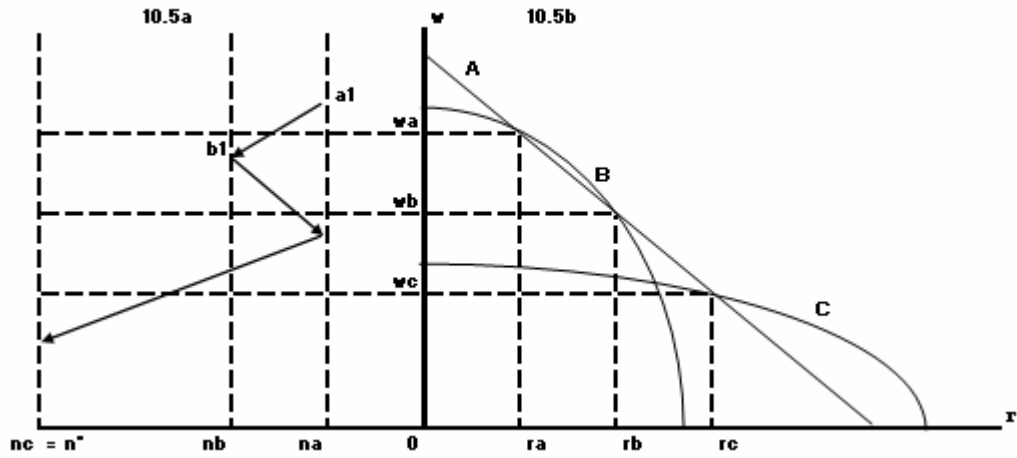
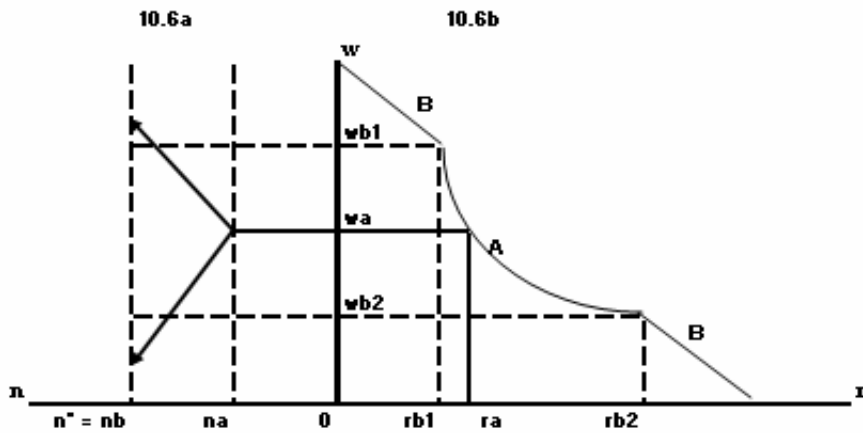


Figure 10.5: Labor market adjustment in a many commodity economy, Economy-wide factor price frontier



# 11 Full Employment and Disequilibrium

## 11.1 Effective Demand and the Multiplier

As explained in previous chapters, the effect of the synthesis of pre-Keynesian and Keynesian economics was to sanitize the model of any possibility of involuntary unemployment. This was achieved by (1) the introduction a pre-Keynesian labor market, an aggregate single commodity production function, (2) rejecting Keynes' view that expectations were inherently volatile, (3) the inclusion of a wealth effect, and (4) presupposing general equilibrium with Walrasian market clearing. From its beginning, the synthesis version of macroeconomics left many theorists discontent.

Prominent among these theorists was Clower, who in the 1960s took issue with the use of Walrasian general equilibrium theory. Clower objected to the neoclassical formulation of general equilibrium that limited its application to full employment outcomes.<sup>1</sup> As explained in Chapter 8, when the labor market does not clear due to rigid money wages, Walras' Law appears to breakdown. All other markets can clear, leaving an excess supply of labor without a compensating excess demand. Clower's critique involved an attempt to reformulate adjustment dynamics along non-Walrasian lines. The key to this argument was the distinction between *notional* and *effective* demand and supply, a distinction encountered previously in this book.

Notional demands are those for which the prices of commodities and services are the only variables considered by economic agents. In forming notional demands, agents take prices as given and consider how much they desire to buy or sell at those given prices. They do not consider that they might not be able to buy or sell the desired amounts. Notional demands are unconstrained by demand or income, only by price. The most important aspect of notional demand is the implication that income and, therefore, the amount of labor time offered for sale, is a decision variable.

Effective demand is the expenditure by agents based upon their *actual* incomes.<sup>2</sup> Effective demand represents what has been called "the extra constraint". In addition to prevailing prices, expenditure must conform to available or current income in the case of a household or to anticipated sales in the case of a firm. The question then arises, under what circumstances will the additional constraint be binding? The answer is quite

straightforward: in general, agent's decisions will be income or sales constrained if false trading occurs.

As briefly discussed in Chapter 3, trades at disequilibrium prices can be interpreted as the operation of the Keynesian multiplier process. Consider the case in which a firm sells its entire planned supply, but at a price below the Walrasian general equilibrium price. In this hypothetical example the market is cleared in that all output has been sold, but the revenue from the sale is inconsistent with full employment equilibrium. The firm in question will discover that the net revenue it gains does not justify maintaining the level of same output, so employment will be adjusted downwards in the next period. As a result, the income paid out by the firm will prove insufficient to make its required contribution to the general equilibrium demands in other markets. In principle one incidence of "false trading" can result in a cumulative movement away from full employment general equilibrium.

## 11.2 General Disequilibrium

An important implication of the Clower analysis is that unemployment can result even if all wage bargains are struck at the general equilibrium money wage rate. Leijonhufvud demonstrates this striking conclusion with an instructive example, which he interprets as Keynes's diagnosis of the fundamental maladjustment that perpetuated the Great Depression. Leijonhufvud reads Keynes as saying that the Great Depression, and depressions in general, resulted from the long-term rate of interest standing at too high a level, implying asset prices too low. With the rate of interest on long-term assets too high, the rate of investment is too low to generate the aggregate demand necessary for full employment equilibrium (Leijonhufvud 1968, Chapter V; and Leijonhufvud 1981, 56-8).

By this interpretation, false trading occurs in the capital market. The false trading at an interest rate above the general equilibrium rate is explained by Keynes-as-interpreted-by-Leijonhufvud as the result of depressed state of long-run entrepreneurial expectations.<sup>3</sup> This emphasis placed on a downwardly "sticky" interest rate produces Leijonhufvud's striking conclusion (Leijonhufvud (1968), 335-7):

The essence of Keynes' diagnosis [of depressions] is this: the actual disequilibrium price vector initiating the contraction differs from the appropriate, hypothetical equilibrium vector in one major respect - the general level of long-term asset prices is lower than warranted...Observing unemployment, the "Classical" economist [e.g. Pigou] draws the conclusion that wages are too high and "ought" to be reduced. In Keynes' theory, the maintenance of full employment depends upon the maintenance of a "right" relation between...asset prices and the wage...Keynes' point is that when the appropriate price relation does not obtain, it is in general not wages but asset demand prices that are out of line...

By this argument unemployment results from disequilibrium in the capital market which manifests itself as excess supply in the labor market, even though the money wage and perhaps the real wage are at their full employment general equilibrium level. Assigning the blame for unemployment to labor and prescribing a fall in wages to rectify the situation involves a false application of partial equilibrium analysis to a general equilibrium system.<sup>4</sup> In an extremely insightful comment Leijonhufvud (1968, 337) writes,

[Keynes's] diagnosis [of unemployment] is not based on the naive presumption that the causes of disequilibrium are to be found in the markets which at any time exhibit the most drastic symptoms of maladjustment. He approached the problem from a general equilibrium perspective.

Leijonhufvud makes a point well-recognized in scientific enquiry, that things are not always what they appear to be. Excess demand in the labor market is either a manifestation of general disequilibrium, or the result of some influence which prevents the money wage from adjusting to general equilibrium while all other markets are behaving properly along Walrasian rules. Assuming that the wage level is the problem is arbitrary. In order that all other markets adjust in a Walrasian fashion, false trading must not occur in any commodity or money market except when forced upon agents by a failure of the money wage to "properly" adjust. The cause of unemployment can be attributed to an inappropriate money wage only if all other markets function with Walrasian perfection.

There are persuasive theoretical reasons for predicting that false trading would be characteristic of all markets. In order to clarify this point, the analysis will proceed by considering the neoclassical macro model in its most logically-defensible (if least credible) form. Let it first be assumed that money is strictly neutral, so that the general equilibrium solution is not altered by changes in nominal variables. Second, assume that only one commodity so that the simplistic wage-employment parable holds. Third, recall that false trading is banished in general equilibrium theory by the intervention of the Walrasian auctioneer. This specification ensures simultaneous market clearing by eliminating time from the analysis, because all exchanges occur at the same instant. Walrasian general equilibrium theory is the analysis of an economy without a time dimension, as one of the most distinguished neoclassical economists of the theory made clear (Hahn 1984, chapter 4).

False trading is trading in chronological time. Once a model incorporates some concept of chronological time, that all actions are not simultaneous, false trading is implied in all markets. If exchanges are not simultaneous, then by definition some precede others. Unless one assumes perfect foresight, in which case simultaneity of exchanges has slipped in under a different name, it is arbitrary and not credible to proceed on the faith that a chronological sequence of transactions will produce the general equilibrium vector of prices. This is implicitly conceded in Walrasian general equilibrium theory, by use of the French word *tatonnement* to describe how equilibrium is reached, a word invariably translated to English as "groping". "Groping" in markets in chronological time is false trading. The "disequilibrium Keynesians" required no other defense of the superiority of their analysis over the traditional general equilibrium approach than to point out that chronological time is an inherent characteristic of all economic activity. General equilibrium solutions that exclude false trading are of no practical or policy significance, nor is there any theoretical justification for such an approach.<sup>5</sup>

One would have thought that the obvious limitations of Walrasian general equilibrium theory would have resulted in the "disequilibrium Keynesians" sweeping the field before them and winning a consensus around the view that disequilibrium is the general case and Walrasian market clearing the exceptional one. A disequilibrium

analysis that incorporates false trading has the potential to rescue the neoclassical macro model from its Walrasian vacuousness.<sup>6</sup> What occurred in the profession was quite the contrary. Notwithstanding that trading at non-equilibrium prices is implied by the placement of commodity exchange within chronological time, the burden of proof fell upon the disequilibrium Keynesians to explain why prices should not adjust instantaneously and, therefore, why false trading should occur. This was a strange demand, for it amounts to accepting an imaginary world, full employment general equilibrium, as the norm, and requiring the critics of that imaginary world to verify the existence of the real world.

Stranger still, the disequilibrium Keynesians for the most part accepted this definition of the debate, though Leijonhufvud was an exception (see next section).<sup>7</sup> Rather than incorporating some concept of time into their analysis, which would automatically imply "sticky" prices, the disequilibrium Keynesians sought to establish their critique within a Walrasian world only slightly modified from the traditional neoclassical one. Specifically, they considered Walrasian markets, "without the auctioneer". This led them to place heavy emphasis on the cost of gathering information. The argument is that in the absence of the auctioneer, the general equilibrium solution can be known only at a cost of information gathering which no rational agent would incur.

While a reasonable enough argument, proceeding on this basis concedes the basic argument to the general equilibrium theorists. As Hahn points out, placing stress upon information costs implicitly accepts the principle that if information were readily and cheaply available, prices and wages would be perfectly flexible and there would be no problem of involuntary unemployment.<sup>8</sup> Further, invoking lack of information as the cause of unemployment disequilibrium resuscitates the argument that unemployment is "voluntary". It could and has been argued that excess supply disequilibrium in the labor market is the result of workers choosing to wait for a more attractive offer which on the basis of information they suspect might come to them.

Precisely to eliminate such an explanation, "justification" is the more accurate word, for why some workers do not have jobs, Keynes excluded "search unemployment" from his definition of "involuntary unemployment" (Keynes 1936, 15). In any case,

placing emphasis upon information costs as the cause of unemployment renders the disequilibrium Keynesians particularly vulnerable to attacks from neoclassical economics armed with the rational expectations hypothesis. While the neoclassical mechanism by which agents acquire knowledge does not stand close scrutiny, it does offer a superficially compelling rejoinder to the information-cost disequilibrium analysis.

While one cannot offer a definitive explanation as to why the disequilibrium Keynesians were willing to construct their critique upon such disadvantageous grounds, the proximate cause is clear. Like the general equilibrium theorists, the Disequilibrium Keynesians wished to retain the mathematical and analytical simplicity of market models without time. They abandoned a fundamental justification of their approach when they do so. Once one enters a timeless world of the pure imagination, the general equilibrium theorists are quite within their rights to demand an abstract explanation for behavior which is an inherent characteristic of the real world.

Finally, a quite disturbing aspect of the disequilibrium Keynesian approach needs to be mentioned. Particularly in the work of Leijonhufvud, there is a powerful critique of the use of a single-commodity supply side in the neoclassical model. However, the argument that one must consider aggregate adjustment in a multi-commodity context, when combined with a modified Walrasian analysis of markets, results in a *de facto* abandonment of macroeconomics.<sup>9</sup> The disequilibrium Keynesian approach becomes one of considering "demand failures" with reference to specific markets, based upon the behavior of individuals.<sup>10</sup> This approach has more in common with the economics of the neoclassical microeconomics than with the macroeconomics of Keynes. By approaching their analysis along strict neoclassical rules of market clearing (without the auctioneer) in a multi-commodity context, the disequilibrium Keynesians perhaps earn the title "neo-Walrasians". What appeared as so promising and innovative in the early work of Clower and Leijonhufvud swept aside by the rational expectations counter-revolution in macroeconomic theory. This is in no small part because the methodology of the disequilibrium Keynesians discarded the most Keynes' most important innovation, macroeconomics itself.

### 11.3 Leijonhufvud on Disequilibrium Adjustment

In terms of its scholarship and the analytical depth of its critique of the neoclassical macro model, Leijonhufvud's 1968 book, *Keynesian Economics and the Economics of Keynes* was perhaps the most important work on aggregate economic analysis of the second half of the twentieth century. Partly due to Leijonhufvud's own emphasis in subsequent work on the lack of full information as the cause of disequilibrium and unemployment, the best insights of the book were lost. For a time after its publication the book was extremely influential, one of the key elements in what was called the "Reappraisal of Keynesian Economics", but it quickly came under heavy fire from both the orthodox neoclassical and the demand-side Keynesians.

As explained in the previous section, Leijonhufvud's attempt at reconstruction of aggregate analysis can be faulted on grounds that it tended to abandon macroeconomics all together. However, the opponents of Leijonhufvud, by focusing on his reformulation of aggregate analysis, missed the scientific content of his critique of the neoclassical macro model. The purpose of this section is to resurrect some of his arguments and to indicate their significance.

In previous chapters (2 and 8), I pointed out that unemployment is possible because of a particular institutional organization of production. On the one hand, there are those who own the means by which production is carried out and whose decision to use those means of production is motivated by considerations of profitability: On the other hand, there are those who in practice have no commodity to sell except their ability to work.<sup>11</sup> Unemployment is possible because the majority of "agents" must sell their ability to work to the minority of agents. Without a social division between employers and employees, a division based upon property relations, there is no labor market. With no labor market, there can be no unemployment. Leijonhufvud is one of the few theorists in the neoclassical tradition to recognize this, the social basis of unemployment.

[T]he dynamic properties of an economic system depend upon what I will call its "transaction structure". That labor services are sold for money and that households obtain their consumption goods in exchange for money is one aspect of the transaction structure in Keynes' system. In an economy of self-employed artisans [the problem of] unemployment cannot appear. (Leijonhufvud, 1968, 90)

Leijonhufvud has identified the class nature of production relations in capitalist society, an insight in the tradition of the nineteenth-century classical economists. Leijonhufvud's concept of the "transaction structure" is used in a more narrow way than Marx or Ricardo used the "social relations of production" in their analysis. None-the-less, it serves him as a powerful tool for considering the essentially monetary character of a capitalist economy. The transaction structure of a capitalist economy implies that all exchanges must be treated as monetary exchanges, and that "real" solutions and "real" calculations are not relevant to the theoretical analysis or actual operation of such an economy. Some writers have taken issue with Leijonhufvud at this point, interpreting him as arguing that it is the monetary character of capitalist economies that makes unemployment possible, and countering with the contention that unemployment is just as much a logical possibility in a multi-product barter model as in a model with money.<sup>12</sup> The argument for unemployment in a barter economy is not difficult to make. In a multi-commodity world without money, individual workers will not in general barter their labor services against the commodity they produce. Rather, the capitalist must pay his workers in units of that commodity, which the workers then would have to barter for food, clothing, etc. In such a model there is a labor market, so unemployment is possible (Chick, 1983, p. 141).

However, it is incorrect to interpret Leijonhufvud as arguing that it is the monetary character of exchanges which makes unemployment possible. His orthodox neoclassical critics interpret him in this way because social relations and classes are alien to them. Leijonhufvud's point is considerably more profound than the arid money-exchange/barter dichotomy. His argument is that it is the "transactions structure" (property relations) of an economy which makes unemployment possible, and a secondary consequence of the transaction structure is that the exchange between capital and labor is necessarily a monetary exchange.

One can conjure up imaginary examples of barter exchange between capital and labor. The relevance of such models to the problems of a money economy is not obvious (see Section 8.2). It reflects the scientific character of Leijonhufvud's methods that he wastes no time treating the metaphysics of barter models. Following this line of argument, that capitalist economies must be treated as money economies, Leijonhufvud is

particularly scathing in his critique of the neoclassical practice of "dividing through by the price level" to obtain a set of "real" variables. Like Keynes, he views "the general price level" as a vague and imprecise concept (Keynes 1936, 40-43), and that its use as a deflator in theoretical models is a transparent attempt to avoid treating money exchange. The intrinsic role of money in capitalist economies and the complexities created by money calculations are what led Leijonhufvud to conclude that the symptom of imbalance in an economy may not directly indicate the cause of that imbalance.

As explained in the previous section, the discordance between symptom and cause which Leijonhufvud stresses is the lack of clearing of the labor market. This is explained superficially by the orthodox neoclassical, as a result of an inappropriate real wage. Leijonhufvud finds the source of labor disequilibrium elsewhere: the long-run interest rate is too high. This argument fulfils Leijonhufvud's promise in his introduction to his book to interpret Keynes as integrating the theory of value (relative prices) with the theory of money. As shown in Chapters 1 to 7, no such integration is seriously attempted in the neoclassical macro model, for two reasons. First, the neoclassical approach raises the non-integration of value and monetary theory to the level of principle by constructing money-neutral models. Second, consistent use of one commodity models makes a theory of relative prices an unnecessary "fifth wheel" in the system.

In Leijonhufvud's analytical model there are at least two commodities, one for investment and one for consumption. The interest rate then becomes a true price variable, not merely the rate of transformation of present into future consumption. This approach has strong kinship with the method of the nineteenth-century classical economists. Central to the theories of distribution and growth (accumulation) of Ricardo and Marx was the analysis of the relative values of consumer and producer commodities. However, Leijonhufvud encounters a serious difficulty. While he is interested in treating this problem stressed by the nineteenth-century political economists, he operates with neoclassical tools ill-designed to investigate it. As long as one holds to an analysis based upon the behavior of individual agents, the analytical power gained from the division of output between consumer and producer commodities cannot be realized.

A final and extremely important characteristic of Leijonhufvud's book should be pointed out. One of the general conclusions of neoclassical economies, both micro and

macro, is that capitalist economies tend to full employment equilibrium automatically under conditions of perfect competition. Therefore, the only possible causes of unemployment, fluctuations, and instability are exogenous influences, monopoly power or state intervention in markets. Heaping ridicule upon such a sanguine view of *laissez-faire* ideology,<sup>13</sup> Leijonhufvud placed himself in the camp of the handful of twentieth-century economists, such as Veblen, Schumpeter and Keynes, who were bold enough to argue that capitalist economies are inherently dynamic and unstable, not equilibrium systems. It is a shame that Leijonhufvud's insights were lost in a largely trivial debate over information costs and the disequilibrium versus equilibrium analysis. It remains the case that his 1968 book was a classic of economic analysis.

#### 11.4 Stiglitz on Wage and Price Flexibility

As shown in previous chapters, the neoclassical synthesis reduced the macroeconomic insights of Keynes to the special case in which adjustment to full employment would be blocked by a rigid money wage, first formalized by Modigliani in 1944. Especially in the 1950s and 1960s, many who identified themselves as Keynesians accepted this interpretation. Despite the obviously reactionary political implications, that trade unions or governments cause unemployment, by avoiding a dispute over "micro-foundations" of Keynes, it appeared to facilitate a focus on monetary and fiscal policy.

As Leijonhufvud demonstrated, accepting the rigid money wage interpretation of Keynes conceded all important theoretical issues to the neoclassicals, a concession eagerly accepted by the latter. After Leijonhufvud, one of the few economists to recognize how much had been conceded was Joseph Stiglitz, who on his own and with co-authors formulated a Keynesian rescue package to extract macroeconomics from the rigid wage *cul de sac*. The rescue identifies the rigid wage hypothesis as a central link in macro analysis:

Different strands of research within new Keynesian economics have taken two broadly different approaches. The first argues that nominal price rigidities are the essential way in which market economies differ from the Walrasian Arrow-Debreu model. Without such rigidities...flexible prices would allow the economy to adjust quickly to whatever shocks it experiences, maintaining all the while full employment and economic efficiency.

The second strand of new Keynesian literature explores another path suggested by Keynes: that increased flexibility of wages and prices might exacerbate the

economy's downturn. This insight implies that wage and price rigidity are not the only problem, and perhaps not even the central problem. This view holds that even if wages and prices were perfectly flexible, output and employment would be highly volatile...It identifies incomplete contracts, and, in particular, imperfect indexing as central market failures...

The new Keynesian view that emphasizes price flexibility suggest an alternative and more complex perspective: first that natural economic forces can magnify economic shocks that may seem small, and second, that existing price rigidities may *reduce* the magnitude of the fluctuations, as Keynes argued. (Stiglitz and Greenwald 1993, 26-27)

Like Leijonhufvud's argument that the cause of employment does not arise in the labor market, the Stiglitz and Greenwald treatment of wages and prices is an example of the methodological distinction made by Marx between "exoteric" and "esoteric" analysis. The former refers to explanations based on the appearance of things, while the latter to explanations derived from the underlying causal relationships that are not directly observed. What Stiglitz and Greenwald identify as the first group represents a theoretical disagreement in which both the hypothesis (flexible wages and prices bring full employment) and the anti-hypothesis (wages and prices are not flexible) are superficial, producing no insight into economic relationships.

What Stiglitz and Greenwald call the "new Keynesian", that flexibility engenders instability, is not merely a third view. In formal logic it is the synthesis of two opposite positions. It is clear that the neoclassical thesis that flexibility brings general equilibrium full employment is wrong. The thesis cannot be sustained theoretical because the adjustment process is non-credible (the auctioneer). Nor can it be sustained empirically, because market economies suffer from repeated periods of unemployment. It is equally the case that the anti-thesis, wages are inflexible, cannot be sustained. At the theoretical level it is an assertion for which there is no explanation within the model. When put to empirical test, the inflexible money wage assertion proves inadequate because to achieve its predicted impact it must result in an inflexible real wage.<sup>14</sup> A constant real wage could not be sustained as a general empirical outcome, as well as requiring additional assumptions to justify theoretically. xx

The flexibility-engenders-instability argument is the synthesis because it accepts the neoclassical thesis that there are theoretical and empirical conditions that would result in flexible wages and prices, and the anti-thesis that this flexibility would not result in full

employment. The synthesis is achieved by an esoteric analysis in which the characteristics of the economy below the level of appearances convert wage and price flexibility into behavioral instability on the part of economic agents.

Stiglitz has explored the mechanisms by which flexibility induces instability in many papers, and ironically the prolific volume of output he has generated makes synthesizing his analysis a difficult task. He brought much of it together in a paper in 1999 with an introductory sentence that would have been an appropriate beginning for a twenty-first century *General Theory*:

This paper begins with the hypothesis that large economic fluctuations, the marked changes in the unemployment that characterize market economies, are a consequence of problems of adjustment to disturbances, especially adjustments of wages and prices... [It] focuses on the consequences of rapid changes, particularly in asset prices, in the context of markets with incomplete contracting (imperfect indexing) and imperfect capital markets. (Stiglitz 1999, 75)

The central element in the analysis is the impact of price fluctuations on the debt of risk-averse enterprises. A reconstruction of macroeconomics derived from the work of Stiglitz would also include his treatment of asymmetric information (major reason for his Nobel Prize), and his joint work on efficiency wages (Shapiro and Stiglitz 1984&1985, Greenwald and Stiglitz 1995). While the former plays a role in his 1999 summary paper, it also has clear implications for comprehensive reformulation of the theory of expectations, and the efficiency wage hypothesis demolishes the full employment conclusion even for one commodity models.<sup>15</sup>

Few economic students are likely to encounter this innovative work which has the potential to recast macroeconomics in a Keynesian mold, except in advanced and specialized courses. The absence these insights in intermediate and advanced textbooks is an indication of the impact of Nobel Prize winners in economics if they are left of center. The introductory textbook by Stiglitz and Walsh (2006), while considerably more sensible than its competition, provides few of the analytical insights treated in this section. Given his commitment to policy advocacy, which included being chief economist at the World Bank and chair of the US president's Council of Economic Advisors, it is unlikely that the new Keynesian macro textbook will be written by Stiglitz.

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<sup>1</sup>Uniqueness requires additional assumptions. For sake of argument, uniqueness is asserted.

<sup>2</sup> In this argument markets are "unregulated" and "free" in the absence of state intervention.

<sup>3</sup> The full employment values  $y_e$  and  $n_e$  need not be unique. As noted in the previous section (and discussed in Section 2.2), it would be reasonable to assume that the supply of Labor is influenced directly by the interest rate. If this were the case,  $n_e$  would no longer be unique nor would  $y_e$ .

<sup>4</sup> In the examples given we make the invalid but simplifying assumption that the state acts autonomously of economic agents.

<sup>5</sup> In the models developed in the previous chapters, no action by the "monetary authorities" can change the functional distribution of income. This is because the production function used, the Cobb-Douglas, implies constant factor shares no matter what the values of  $y$ ,  $w$ , and  $r$ . With a more general functional form, even of the Constant Elasticity of Substitution type (of which the Cobb-Douglas is a special case), a change in  $r$  would alter the distribution between wages and profits. This discussion of distribution refers to points of full employment equilibrium and ignores the impact of fiscal policy, particularly taxation.

<sup>6</sup> The problem of a dangling excess supply is not restricted to the Labor market. Recall that the demand for Labor schedule is constructed on the assumption that firms plan their supply with no demand constraint. This implies that the notional supply of output is full employment output. Thus at less than full employment equilibrium, there is a second unrequited excess supply, for the single commodity.

<sup>7</sup> This was recognized by the new classical economics school, which argues that deviations from full employment do not occur even in the short run. While this position is perhaps the most faithful to the logic of the neoclassical model, one is reminded of Oscar Wilde's observation that madness is anything carried to its logical conclusion.

<sup>8</sup> Now it is not justified to refer to  $r$  as "the interest rate". Indeed, it has not been valid throughout the discussion so far to proceed as if there were no difference between the rate of return and the interest rate. We have been following rather sloppy convention by doing so. In the factor markets, maximizing behavior involves the rate of return, while in the market for investment it is the lending rate which is relevant. In general the two are not the same in the short run, even in full employment equilibrium. Rather than showing this algebraically, one can demonstrate the divergence of the two with a "thought experiment". Assume that any of the models of the previous chapter are at less than full employment equilibrium in the short run (i.e. money wages are initially assumed rigid). Let money wages fall to clear the Labor market. Since employment will rise, the commodity wage must fall and the rate of return must rise. The latter must rise

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because more Labor combined with a given capital stock results in a rise in the average and marginal products for capital for any level of  $k$ . However, over in the other markets, the lending rate (interest rate) must fall, because the IS curve is downwardly sloped, greater output/income requires a lower interest rate. Only by coincidence will all of the functions of the model be such that the rate of return and the interest rate are the same at full employment equilibrium. Static general equilibrium analysis is not designed to treat this inequality of the rate of return and the interest rate. They are brought into equality by adjustment of the capital stock, which lies in the domain of growth theory. With the interest rate not equal to the rate of return, interpretation of the "adding up" equation becomes problematical ( $y = wn + rk$ , see Chapter 2). We make no attempt to tidy up this loose end of the neoclassical model.

<sup>9</sup> The point holds if dividend payments are interpreted as reflecting the flow of "capital services" and common stock shares as ownership of productive capital. What is "owned" in this case is a claim on income. No shareholder in IMB can identify his or her fragment of the company's plant and equipment, much less choose to hold it out of production.

<sup>1</sup> Friedman's argument is treated in many places (see Shaw 1984).

<sup>2</sup> The REH is a deterministic theory by the definition employed in the physical sciences. Max Born, the famous physicist, wrote, "*Determinism* postulates that events at different times are connected by laws in such a way that predictions of unknown situations (past or future) can be made". He distinguishes determinism from causality, defining the latter as follows, ". . . there are laws by which the occurrence of an entity B of a certain class depends on the occurrence of an entity A of another class, where the word "entity" means any physical object, phenomenon, situation, or event. A is called the cause, B the effect." He goes on to argue that causality does not imply predictability (determinism). The REH makes no reference to this fundamental distinction (Born 1949, 9).

<sup>3</sup> By neoclassical rules it may not be rational for all economic agents to form their expectations in this manner, because of information costs. The REH explicitly recognizes this point, but incorporating it into the analysis proves of no consequence. It is assumed that virtually all agents form their expectations rationally either from their own complete knowledge or via intermediaries. See discussion of wage bargaining below.

<sup>4</sup> And apparently it had existed for some time, since the new classical economists have used the REH to analyze the US Great Depression of the 1930s.

<sup>5</sup> The defenders of the REH might ponder the following statement by a mathematician:

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All science is full of statements where you put the best face on your ignorance, where you say: true enough, we know awfully little about this, but more or less irrespective of the stuff we don't know about, we can make certain useful deductions. Now, my view is that any theory which pretends to comprehend everything breaks down on this point. It will be a uselessly rigid theory because it won't have a place into which to put new things. . . . [W]e ought to so shape our theories that new discoveries won't upset *every* theory we have and for that purpose we must have plenty of *open* theories. (Bondi 1967, 11).

This view directly contradicts the neoclassical obsession with ensuring that all models are "closed", with no loose ends. Hahn takes the sensible and modest view that in economics understanding does not imply precognition. "It is plain that we can claim understanding of an event without claiming that we can predict it. Geophysicists, for instance, believe that they understand earthquakes but cannot predict them. . ." (Hahn 1984, 4).

<sup>6</sup> Hahn, for example, writes, "...[I]t is by no means the case that [economists] are agreed that the IS-LM cross is a generally accepted theory of the economy" (Hahn, 1980, 1). Shaw offers an ingenious solution to this problem.

If professional economists can disagree as to what should constitute the appropriate definition of the money stock, how does the proverbial man in the street determine whether a money supply change has occurred or not?...Unable to understand or fathom the all important changes occurring in economic variables, [people in the street] fall back upon the consensus of opinion [*sic!*] in the news media. (Shaw (1984, 54)

So while professional economists cannot agree, financial journalists can produce the correct model out of the controversy.

<sup>7</sup> In one important branch of science, quantum theory, the inherent indeterminacy of the material world is central to the analysis. Referring to the treatment of quantum theory by Heisenberg, Bohm wrote,

The fact that quantum theory implies that *every* process of measurement will be subject to the same limitations on its precision led Heisenberg to regard the indeterminacy relationships...as being a manifestation of a very fundamental and all-pervasive general principle, which operates throughout the whole of natural law. Thus, rather than consider the indeterminacy relationships primarily as a deduction from the quantum theory in its current form, he postulates these relationships directly as a basic law of nature and assumes instead that all other laws will have to be consistent with these relationships. (Bohm 1957, 83, referring to Heisenberg 1930, 3)

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The particular indeterminacy relationship referred to in the quotation is the problem of simultaneously measuring the position and momentum of sub-atomic particles.

<sup>8</sup> "Nor is it necessary for economic agents to know the true model of the economy. All that is required is for them to form their expectations in the aggregate *as if* they did know it." (Shaw, 1984, 57) Emphasis in original.

<sup>9</sup> "[The REH] does not imply that individuals should not make systematic errors. This does not imply that individuals invariably forecast accurately...[but] rather the assertion is that guesses about the future must be correct on average if individuals are to remain satisfied with their mechanism of expectations formation" (Begg, 1982, 29). Hahn was unimpressed by this learning-from-experience argument.

Rational Expectations themselves are justified by the argument that rational agents will learn what is the case. The argument is ill-founded in theory for it must be shown that agents could learn. Just as classical general equilibrium theory has never been able to provide a definitive account of how equilibrium prices come to be established, so rational expectations theory has not shown how, starting from relative ignorance, everything that can be learned comes to be learned. (Hahn, 1984, 82)

<sup>10</sup> The size of the difference between predicted and actual outcome is no guide to whether the prediction was correct but randomly displaced or a systematic error. According to the rules of the REH, random deviations from correct predictions will be normally distributed around a mean of zero, but the "tails" of the normal distribution have no upper or lower bounds.

<sup>11</sup> Shaw is quite clear about this, "Assuming [the REH agent] uses [his] information efficiently, his prediction or expectations will be identical to the mean value of possible outcomes generated *by the relevant theory*." (Shaw, 1984, 58, emphasis added.)

<sup>12</sup> Shaw wrote (1984, 55) ". . . much of rational expectations theory is concerned with the behavior of Labor in negotiating formal wage contracts", and this can be verified by reference to the seminal REH literature (see Sargent and Wallace 1975, and the original source, Muth, 1961).

<sup>13</sup> "New classical market clearing models gain greatly in elegance and tractability by assuming a one-product economy..." (Shaw 1984, 74).

<sup>14</sup> "...[T]he trade union leadership will pay very close attention to crucial economic variables in the economy. They will possess a highly sophisticated model of how the economy behaves and employ highly qualified economic advisors. . . Through the proxy of trade unions many economic agents are acting in accordance with the rational expectations postulate" (Shaw 1984, 55). This presumes that the true model is known and agreed upon by "highly qualified economic advisors".

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<sup>15</sup> "When we say that the Labor market clears, we do not mean that measured unemployment is literally zero. Rather, we mean that no individuals are voluntarily unemployed in the sense that they are prepared to work at the going wage, but cannot find employment. Friedman has termed this full employment rate of unemployment the *Natural Rate of Unemployment*" (Begg, 1982, 136, first emphasis added).

<sup>16</sup> Shaw, whose book is quite balanced in its judgment on the REH, explicitly recognizes the hypothetical nature of the "natural rate"

<sup>17</sup> Hahn called "the natural rate of unemployment" an "unproven assertion" (Hahn 1980 and 1982a).

<sup>18</sup> Shaw wrote, "The rational expectations thesis departs from the classical equilibrium framework [Walrasian general equilibrium] in one very important respect. It does *not* assume that all economic agents possess perfect knowledge of all market conditions" (Shaw, 1984, 67). This is incorrect, because the REH predictions are based on a "full model" of an economy.

<sup>19</sup> Begg demonstrates that the REH produces a solution that converges to general equilibrium which is formally equivalent to the PFH. The proof has no relevance for *actual* predictions of future variables, however, since it presumes that the parameters of the "correct model" remain unchanged over many time periods. This is a perfectly legitimate procedure for an abstract model, but will not serve to justify market-clearing in the real world in which each time period heralds a new and unique event.

<sup>20</sup> Begg (1981, 137). The last clause in the quotation is misleading. Since the story being told is about static equilibrium states, the precise statement would be, "the effect on the level of real output will be nil".

<sup>21</sup> It is no accident that REH-new classical economics stories are frequently told using the model of the simple quantity theory (see Shaw, 1984, 3-7). Such examples prove nothing, even in the abstract, because they incorporate the false dichotomy.

<sup>22</sup> The inclusion of the phrase, "no matter how we define the rest of the model", seems to be a slip of the pen on Begg's part. Elsewhere he argues cogently that introduction of the wealth effect cancels the "remarkable" conclusion of the new classical economists: "Provided there remains a real balance effect on consumption, systematic monetary policy will feed back through into the goods market, thereby affecting the level of investment required for market clearing," and "if monetary policy can alter the real steady state [full employment equilibrium] it will generally have real effects" (Begg 1981, 149, 147).

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<sup>23</sup> Even before the end of the Second World War, Modigliani provided the summary statement which would become the keystone of the neoclassical synthesis.

It is usually considered as one of the most important achievements of the Keynesian theory that it explains the consistency of economic equilibrium with the presence of involuntary unemployment. It is, however, not sufficiently recognized that. . . this result is due entirely to the assumption of "rigid wages"...(Modigliani 1944).

The thinly-veiled disdain here ("usually considered", "due entirely to", and "rigid wages" in quotes) indicates the low esteem in which Keynes's contribution was held by some even before he died in 1946.

<sup>24</sup> But there was much heterodoxy, at least in the United States. In the 1950s there were only two Marxist economists at a major American university, Paul Baran of Stanford and James Becker of New York University. After Baran's death Becker was the only one for several years.

<sup>25</sup> For an evaluation of the impact on the New Classics, refer to Kein Hoover, <http://www.econlib.org/library/Enc/NewClassicalMacroeconomics.html>

<sup>26</sup> The difficulty to maintain an interventionist policy position while accepting general equilibrium theory is treated in Milgate and Eatwell (1983).

<sup>1</sup> Keynes explicitly accepted what he called "the first classical postulate", which he summarized as follows, "the wage is equal to the marginal product of Labor" (Keynes, 1936, 5ff).

<sup>2</sup> The term "output/income function" was used to refer to  $y = y(k, n)$ . This term was used because in neoclassical models  $y$  equals total value added. In this chapter we revert to the conventional term, "aggregate production function", because the debate summarized in the next section is over whether  $y = y(k, n)$  can be treated as summarizing production relations.

<sup>3</sup> The terms became confused. Eichner and Kregel, for example, claim the "post-Keynesian" for an analytical model which derives its inspiration from Joan Robinson and Nicholas Kaldor (Eichner and Kregel, 1975). *The Journal of Post-Keynesian Economics* includes the Robinson-Kaldor school in its title. Before the term post-Keynesian came into general use, these two economists and like-minded theorists were referred to as neo-Keynesian. See Harcourt (1972).

<sup>4</sup> Some economists, particularly those disposed to the Robinson-Kaldor school, objected to the use of the word "Keynesian" to identify this second group. Brothwell (1976), for example, preferred calling them "neo-Walrasians", for reasons explained in the next chapter.

<sup>5</sup> In this respect, the neo-Keynesians had some aspects of their analysis in common with the "neo-Ricardians". The latter, however, place their analysis of distribution within a gross product

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framework (i.e. they consider intermediate costs as well as value added, Sraffa 1960). Those we later call disequilibrium Keynesians have little in common with the neo-Ricardians.

<sup>6</sup> Following closely on this conclusion is the argument that the distribution between profits and wages is technically determined, a position first worked out in detail by John Bates Clark in his 1899 book, *The Distribution of Wealth* (reprinted by Harvard University Press in 1988). If one takes as given the aggregate production function, the supply schedule of Labor, and the capital stock, and if money is strictly neutral, then the profit share and wage share are uniquely determined in full employment equilibrium, Aggregate distribution will not be treated here. For an excellent discussion of the implications of the Capital Controversy for the theory of distribution, see Fine (1980, 109-113).

<sup>7</sup> The production function and marginal product schedule are made up of line segments, and not merely four points, because at levels of employment in between points  $n_a$  and  $n_b$ , for example, a combination of techniques A and B can be used.

<sup>8</sup> The point of intersection corresponds to the commodity wage which is equal to the marginal product of the technique intersecting from the right in quadrant 10.2(d). It is to be recalled that for each technique the marginal contribution of Labor is constant (though lower for technique B than A, C than B, etc.).

<sup>9</sup> The debate is so called because its two sides tended to coincide with the two Cambridge's, Cambridge, England, and Cambridge, Massachusetts. This particular designation indicates that the protagonists represented the elite of the elite of the economics profession at the time.

<sup>10</sup> Hahn wrote, referring to the Sraffian version of the critique of the aggregate production function, "What is at risk is a simplified neo-classical comparative static equilibrium analysis and a simplified neo-classical dynamics. Sraffa's point was a fine technical insight into neo-classical economics but...[the critics] have not exploited it...[O]n the manner in which an equilibrium is supposed to come about, neo-classical theory is highly unsatisfactory...The remarkable fact is that neither [Sraffa] nor the Sraffians have made anything of this" (Hahn 1984, 383-384). This was first published as an article titled, "The Neo-Ricardians" (Hahn 1982b).

<sup>11</sup> What follows treats only one aspect of what is called "the Capital Controversy". The definitive work on the various ramifications and implications of the debate is Harcourt (1972), where it is presented with insight and wit. The core of Harcourt's analysis is found in Harcourt (1969), and reprinted in Hamouda (1986).

<sup>12</sup> For those familiar with trigonometry this is obvious. Equations (10.8) indicate that  $k_a/n_a$  is the tangent of the angle formed at the horizontal axis by a straight line beginning at point a' and

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passing through the relevant wage-rate of return coordinates. For example,  $k_a/n_a$  at  $w_a$  is measured by the tangent of the angle formed on the  $r$  axis by the extension of the line  $a'$  to  $a$ .

<sup>13</sup> In the Marxian and neo-Ricardian literature, the variation of relative prices with the profit rate is referred to as the transformation process, or transformation problem. See Weeks (1982 chapter III).

<sup>14</sup> The mathematics of an economy-wide factor price frontier for a multi-commodity system are complex and tedious. See Fine (1980, 101), where the shape of the curve is briefly discussed, and for a more detailed presentation, Harcourt (1986, 173ff).

<sup>15</sup> Any econometric test using time series data requires that the aggregate demand for Labor schedule be estimated with a production function specified to distinguish between returns to scale and technical change. As is widely recognized, this is not possible without assuming what is to be tested. Were this problem somehow solved, correct identification of the demand for Labor schedule requires simultaneous estimation of the demand schedule for capital, though this is hardly ever attempted. This part of the estimation encounters the problem that if factor price frontiers are not linear, then the value of the capital stock varies with the wage and profit rate and cannot be taken as an independent variable. Since the empirical test is for reswitching, it would be invalid to assume linear factor price frontiers, which exclude reswitching. Some writers have sought to test for reswitching in an indirect way, by looking at the factor intensity of commodities traded between two countries. This way of approaching the problem requires one to make a number of rather arbitrary assumptions specific to trade theory. It is interesting to note that some of these studies sustain the hypothesis that reswitching is a significant phenomenon. See Minhas (1962), Leontief (1964), and Ball (1966). The theoretical invalidity of empirical work on production functions is demonstrated elegantly in Shaikh (1974).

<sup>1</sup> Clower wrote,

Walras' Law, although valid as usual with reference to *notional* market excess demands, is in general irrelevant to any but full employment situations. Contrary to the findings of traditional theory, excess demand may fail to appear anywhere under conditions of less than full employment. (Clower 1965)

<sup>2</sup> To quote from Clower,

Walras' Law, although valid as usual with reference to *notional* market excess demands, is in general irrelevant to any but full employment situations. Contrary to the findings of traditional theory, excess demand may fail to appear anywhere under conditions of less than full employment. (Clower 1965)

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<sup>3</sup> In the later chapters of *The General Theory* one encounters suggestions of a "secular stagnation" thesis, with Keynes placing stress upon the alleged investment-depressing effects of slow population growth and a slow pace of technical change.

<sup>4</sup> "The traditional diagnosis of depressions which lays the 'blame' of unemployment on the obstinate behavior of Labor is based on a *partial* equilibrium analysis. . ." (Leijonhufvud 1968, p. 337).

<sup>5</sup> Hahn, sometimes a polemical defender of the usefulness of general equilibrium theory in economics, was quite clear in his warnings about the theory's improper use.

The most superficial acquaintance with game theory is enough to convince one that competitive instantaneous market clearing is not an axiom one wants to adopt. . . . What one must. . . not do is to claim that it comes from a deep "universal" of economics or that there are profound philosophical reasons for its employment. (Hahn, 1984, 13).

<sup>6</sup> Hahn (1984, p. 88) wrote,

The achievements of economic theory in the last two decades are both impressive and in many ways beautiful. But it cannot be denied that there is something scandalous in the spectacle of so many people refining the analyses of economic states which they give no reason to suppose will ever, or have ever, come about.

<sup>7</sup> Leijonhufvud (1968, 37) suggested the reform that the "strong assumption of instantaneous price adjustment" be relaxed.

<sup>8</sup> Again, from Hahn,

A consequence of [the use of general equilibrium theory in macro models] . . . has been. . . to designate all economic states with Keynesian features (e.g. involuntary unemployment) as disequilibria with the further implication that they will, if they exist at all, also soon disappear. Those who have been somewhat more sympathetic to Keynes. . . have none the less quite supinely agreed to having their endeavors called "disequilibrium economics". They have also much to their cost gone along with the vacuous proposition that there could be no Keynesian problems if prices and wages were "flexible" (Hahn, 1984, p. 9)

Hahn's accusation that the Disequilibrium Keynesians accept in principle the existence of a general equilibrium full employment solution finds support in the following passage from Leijonhufvud.

[R]econciling competition with unemployment appears as a "riddle" only when "competition" is implicitly equated with "perfect information". When a more realistic

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view is taken of the information problem...the emergence of unemployed resources is a predictable consequence of changes in demand. (Leijonhufvud, 1968, p. 102)

<sup>9</sup> Because of the neoclassical method of the disequilibrium Keynesians, their approach would seem to yield the same conclusion as that reached by a distinguished practitioner of general equilibrium theory, "Certainly, macroeconomics serves as a good 'simple' model which many economists feel is what we need. . . But how one is to give it a theoretical foundation, I do not know" (Hahn 1984, p. 193).

<sup>10</sup> Fine and Murfin argue that the disequilibrium Keynesians abandon macroeconomics and therefore should be considered as generalizing general equilibrium theory rather than as critiquing it (Fine and Murfin 1984, chapter 2).

<sup>11</sup> This was Marx's definition of the working class.

<sup>12</sup> "The idea that there would be no unemployment in a barter economy is grotesque" (Hahn 1984, p. 192.)

<sup>13</sup> On monopoly, he writes, "We have argued that Keynes' theory constitutes an attack on, not an elaboration of, those explanations of depressions which stress monopolistic restraints on the movement of prices". Warming to his topic, he goes on to say,

If the wealth distribution which the automatic working of the system brings about is accepted, behavior that interferes with the adjustment of relative prices is dysfunctional to the system and can be condemned on ethical grounds. Academic economists have been the high priests of this ethic. (Leijonhufvud 1968, pp. 107-8)

<sup>14</sup> Stiglitz and Greenwald provide a concise summary of the theoretical and empirical difficulties: ...[A]ttempts to provide a theoretical justification of these price rigidities have been largely unsuccessful. The early Keynesian and later fix-price literatures simply took them for granted, assuming that they were economic facts of life that could be assumed to hold. The problem with this approach is twofold. Theoretically, it has never been clear (especially in the fix-price literature) why economic agents, who are otherwise highly sophisticated, choose to ignore the possibilities of price or wage changes. Empirically, wages (and prices) do, in fact, change and over long periods of time change substantially. (Stiglitz and Greenwald 1989)

<sup>15</sup> These elements, along with other issues such as credit rationing, discussed together, thought not in a formal macro model, in Greenwald and Stiglitz (1987).