
STRUCTURAL SLUMPS

The Modern Equilibrium Theory of
Unemployment, Interest, and Assets

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Preface

THE rise in recent decades of a modern economic theory, centered on the effects of a number of informational limitations within firms and markets, has had a liberating influence on macroeconomic thought. A diverse body of research has resulted, *one belonging to neither the neoclassical nor the monetary schools*, that adopts a radically different perspective on the determination of the level of economic activity. Movements in the unemployment rate, not in the size of the labor force, are the stuff of slumps and booms. The shifts and long swings in unemployment are an equilibrium phenomenon, not a matter of *misperceptions or misforecasts* and consequent wage-price misalignments. Behind the equilibrium path of unemployment are nonmonetary factors working through nonmonetary mechanisms: the propensity to quit or shirk, hysteresis effects of idleness, insider-outsider relationships, welfare-state subsidies, rent-seeking unions, balance-sheet factors in financial markets, and the *institutional substructure*. Despite their kindred spirit, however, the existing formulations do *not offer a usable intertemporal general-equilibrium theory*. The emerging school has lacked a unifying core model to which all the above mechanisms could ultimately be hooked up.

This book sets out what I hope will become the *main paradigm of this school*. The equilibrium path of the unemployment rate always approaches *the natural rate, as before*. But something has been added. The natural rate moves! I build a family of modern equilibrium models in which the natural rate, conceived along the lines I suggested in 1968, is seen to be a function of the real structure of the economy (and the corresponding structure overseas). The analytical task has been to determine exactly how *the natural rate depends on this structure*—on real sectoral demands, factor supplies and technology, rates of taxation, subsidies, and tariffs.

Believing does not make it so, of course. Hence the theory is followed by an econometric investigation of the empirical effects of these same determinants of the unemployment rate. The findings, as I see them, unmistakably support the paradigm here against its chief rivals, the Keynesian schools and the real business cycle school, though more evidence will be needed to convince their most loyal adherents. It will be enough, however, if this investigation reopens the subject of employment determination. Undoubtedly a great many secrets of prosperity and depression remain to be unlocked.

In turning from the monetary channels of Keynes back to real mechanisms, this theory resembles the real business cycle school. But in its modern view of employee incentives and resulting unemployment, and its view of industry in disaggregate and imperfect-market terms, it is obviously unlike that neoclassical school. Neither is this new theory always at odds with Keynesian doctrine. One of the surprises is the number of times a Keynesian proposition is obtained from a theoretical setting devoid of money, the essence of the Keynesian system.

That said, I feel a need to say a few words on the work's motivation and its relation to past work of mine and others'.

Why study slumps? This book and the other recent arrivals on unemployment come after a period when, in the New Classical theory then receiving attention, a long stretch of high unemployment did not fit, and there was nothing pathological about unemployment in any case. Yet, their theoretical inconvenience notwithstanding, long elevations of unemployment are a social problem, since much of what we measure as unemployment reflects job rationing, hence is involuntary and imposes private and social net burdens; the fact (if it is a fact) that there are some industries in which the wage moves to clear the market makes little difference. Furthermore, the vulnerability of Western economies to long stretches of high unemployment—to slumps—is again evident. The postwar streak of prosperity was broken with the stubborn decline suffered in the 1970s. The unusual slump over three continents in the 1980s was by far the deepest since the 1930s, and this Second World Depression was longer for some countries than the first one, still called the Great Depression. The 1990s have begun with another decline, also rather uneven, and increasingly this slump looks to be an extension of the preceding one, punctuated by a bubble in the late 1980s. On the now extensive postwar record, one would have to concede that the unemployment rate is capable of wide swings of decadal length or more, and that a series of structural shifts and develop-

ments have pushed the equilibrium path to new heights. The challenge of uncovering the structural changes behind these big swings and the worsening trend of the past twenty years has been the impetus for the present work.

Conceivably, this book might nevertheless have attempted to interpret the recent slumps by means of the antecedent theories. Twice in my career, in fact, I thought the missing "micro" element in the monetary approach to employment determination was finally in place so that we had at last a macroeconomics that could satisfactorily explain a preponderant part of unemployment fluctuations. In the latter half of the 1960s some of us introduced a microeconomics of expectations-based wage and employment decisions, and with it we sought to explain employment fluctuations in terms of disequilibrium (incorrect-expectations) deviations of the unemployment from the equilibrium (correct-expectations) steady-state level—the level that became known as the natural rate. In the latter half of the 1970s, the profession having revealed a preference for the rational-expectations version of the earlier models, some of us set out to build upon the idea that wage-setting is scheduled in a staggered fashion over the year, so that the employment effect of demand shocks and supply shocks is long-lasting—the return to the natural rate slow—and monetary stabilization policy can regulate the speed of recovery to the natural rate.

The Keynesian, monetarist, and New Keynesian schools all adopted the natural rate. But it was drafted into service when still underdeveloped. The earliest essays on the natural rate, such as my model based on labor turnover, touched on its causes but did not make it determinate. By default, the natural rate of unemployment was treated as a sort of constant: It might ebb and flow with time but it was conveniently independent of the usual macroeconomic shocks. The traditional "macro" shocks under analysis were taken to be neutral for the equilibrium unemployment-rate path.

Unfortunately, it now seems difficult to maintain that the monetary approach of these schools, with its premise of a fixed natural rate, is adequate for understanding the lengthy boom and the two major slumps of postwar history. Some years ago, after decades of research, much of it on the monetary approach to unemployment determination, I became aware that I was unable to explain persuasively why the unemployment rate was so remarkably low in most countries for more than two decades after the war, why unemployment remained high for so protracted a period in the 1970s, years after the first of the oil price shocks, and, most glaringly, why unemployment in many countries rose so stubbornly well into the mid-1980s despite vigorous recovery in other countries. The Keynesian schools

predicted that the fiscal stimulants finally taken in the United States would boost European employment, not drag it further down; so, by the way, did the real business cycle school.

Any hope of accounting for the major swings in economic activity since the war, I decided, would require abandoning the simplification of a natural unemployment rate invariant to nonmonetary (not just monetary) macro shocks in favor of models making the equilibrium rate an endogenous variable determined by a variety of nonmonetary forces. The longer slumps and booms, at any rate, must be explained largely as *displacements of the equilibrium path of unemployment itself*, not as deviations of unemployment around an impervious equilibrium path. For me this goal became a personal imperative, as I could hardly leave macroeconomics knowing that my previous work on the natural rate had missed so promising an opportunity. It became necessary to return to the natural rate to try to realize its true potential.

But how, if at all, can structural shifts drive the natural rate? The conceptual challenge has been to hit upon and to model the nonmonetary mechanisms through which various nonmonetary shocks may plausibly have important effects on the path of equilibrium unemployment. It was gratifying finally to see that the conception of the natural rate I had proposed in the late 1960s, in which firms cause unemployment by driving up the economywide wage in their efforts to discourage quitting, and the sister conception of wage-setting intended to combat shirking could be used for this purpose. I am not the first to work out the determination of the natural rate, conceived that way, in a proto-general-equilibrium model—Steven Salop was, later Joseph Stiglitz. Their models were not broad enough, though, particularly with regard to the role of assets and interest, to generate much of importance in the way of comparative-static effects on the effects of relevant shocks. I am fortunate to have come in on the general-equilibrium research program in time to construct models that overcome two crucial difficulties that were blocking acceptance of the new theory.

Most previous models suffer the absurd implication that if (as in the Shapiro-Stiglitz model) a technological advance reduces the natural rate of unemployment, ongoing secular technical progress goes on reducing it—contrary to historical evidence that unemployment is (or was) trendless; if (as in the Salop model) secular progress is neutral for the natural rate, so is a permanent supply shock. The solution here is the construction of a theoretical model in which, though the natural rate may be disturbed when a productivity advance pulls up wages and incomes, the response of

the natural rate is entirely transient. Thus formulated, the theory averts any implication that secular productivity growth puts the equilibrium unemployment rate on a trend while preserving for technological or natural-resource shocks a short-term role.

The other problem to be met was to release the demand side of the labor market from the marginal productivity straightjacket of the neoclassical aggregative school. Here I have taken a good deal of inspiration from the rustic parables of Austrian capital theory. Nearly all employment is governed by considerations of the future, so what firms will pay for labor generally depends importantly on real asset prices and thus on real rates of interest—and this is true even in the models omitting physical capital. Some of the illustrative models here lead to unexpected findings: some kinds of product demands actually lower interest rates, so the structure of demand matters. The resulting theory thus points to a panoply of nonmonetary forces—the configuration of real demands as well as supply conditions—capable of driving the natural rate.

It is far too soon to be sure that this theory is true. Yet it is, I believe, the only existing theory to show how certain structural shifts and mechanisms in the global economy may lie behind the major swings and worsening trend in business activity of recent decades. The monetary approach and the real business cycle approach cannot claim the same explanatory power.

Although I have tried hard not to claim too little for this theory—a fundamentally new approach needs all the boost it can get—I should also be wary of claiming too much. These days economics seems subject to a monistic tendency to imagine that one theory will triumph over the others, or ought to. The truth is that every one of the extant theories has something to tell us about some of the effects of some shocks over some time frame. The structuralist theory propounded here will, if it succeeds, push back the domain of some of the other theories, not eliminate any of them. The structuralist theory will gain a place at a pluralist table in recognition, if I am right, of its value in illuminating the areas it was designed to explore.

It is a pleasure to acknowledge the financial support and personal help provided to me over the five years of research for this volume.

A continuing association with the University of Rome, Tor Vergata, and its economic research arm, CEIS, has provided me with support and facilities for this research every summer since 1987. I owe a large debt of gratitude to Luigi Paganetto, dean of faculty and chairman of CEIS, for

his commitment to this position for me in the faculty and center he has created.

Another association developed around the same time at the Institut d'Études Politiques, in the University of Paris, and the related Observatoire Français des Conjonctures Économiques (OFCE) where I have received recurrent financial support and research assistance. The International Policy Evaluation Group at OFCE, to which I was appointed when it was formed in 1990, provided more assistance to this project in financing the econometric tests of my theory; Chapter 17 is one of the products of these tests. I am much indebted to Jean-Paul Fitoussi, professor at "Science Po" and president of the OFCE, for his steady support at these attractive institutions.

This book, in fact, grew out of the work Professor Fitoussi and I began in late 1985 on the external real interest shock to Europe in the 1980s. I had argued earlier that the apparent fiscal stimulus overseas would drain Europe of its capital, but I had not figured out how to refute the Keynesian and neoclassical views that total employment and exports would nevertheless be expanded by the stimulus—the rising tide that lifts all boats. The three two-country models he and I developed in our book, *The Slump in Europe*, showing that European employment could instead contract—the Fitoussi-Phelps thesis—suggested the three models in the present volume. The value added here is to demonstrate that the lessons of the mixed monetary/real Fitoussi-Phelps models survive in the nonmonetary-equilibrium environment of the present models, and that unexpected imbalances arise from the closed-economy versions of applicability to the world as a whole.

Among my debts I must also mention a grant from the National Science Foundation that made possible the exploration of some early modeling and statistical work in 1987 and 1988. The research department of the International Monetary Fund offered its hospitality to what must have seemed a very alien enterprise for some time in the spring of 1988.

Several other contacts proved important. A paper presented by Jeffrey Sachs at the Brookings Institution in 1979, which I resisted at the time, was the first challenge I heard to the invariance of the natural rate to real shocks, and he was in turn the first to convert to the Fitoussi-Phelps elevation of the capital market over the goods markets. Notes that Pentti Kouri showed me in 1984 brought home the scope that real-wage rigidity would create for real demand shifts to alter employment. An exchange with Joseph Stiglitz in 1985 caused me to rethink whether, as I had imagined, the natural rate was as likely increasing in the real wage as decreasing. An

objection by Lawrence Summers expressed to me in 1986 that secular progress would soon undo contractionary disturbances led me to revise the models to include in them the incentive effects of employees' wealth. Conversations with Dennis Snower emphasized to me the importance of adding evidence in favor of the theory as against rival theories. Criticisms by Olivier Blanchard have helped me to see in the rise of stock markets in the 1980s a puzzle for the theory. I am not sure I have met these latter challenges, but I have responded.

Early on, a few econometric studies were important signs that I might be on the right course. A model by Andrew Newell and James Symonds had the first results I had seen on the contractionary effects of the world real interest rate. A study by Giuseppe Tullio rejected the Keynesian theory of the locomotive, which was antithetical to the theory here. Finally, a dissertation published by Dirk Morris confirmed the effect of various global fiscal variables on the world real rate of interest. These reports came as intergalactic emissions encouraging me to believe that there is in fact something out there.

A gratifying aspect of this project has been that it attracted the participation of three of the best students I have taught. This volume has benefited from their collaboration at some key points. Hian Teck Hoon, now at the National University of Singapore, developed with me the dynamic turnover model of the natural rate (Chapter 7) and helped to get the two-sector model under better control (Chapter 9). George Kanaginis, with Three Crown Capital Partners, worked with me on the neoclassical investigation of structural shifts (Chapter 16) that stands as the analogue in real business cycle theory of what is attempted here using some elements of modern theory. Gylfi Zoega, now with Birkbeck College following his work at OFCE and the World Bank, contributed importantly to the design and carried out the extensive statistical estimations in the econometric analyses (Chapter 17). My thanks also go to a succession of advanced graduate students at Columbia who took the time to study and comment upon this research as it unfolded in my annual seminar.

The publishers of several journal articles and conference volumes containing material of mine have granted permission to recycle those pieces in the present volume: the *American Economic Review* for Chapter 7; the *Quarterly Journal of Economics* for Chapter 8; the conference volume edited by Anthonie Knoester, *Taxation in the United States and Europe: The-ory and Practice* (Macmillan Ltd.), for Chapter 9; the *Journal of Economic Literature* for a portion of Chapter 10; the conference volume edited by Helmut Frisch and Andreas Wergoetter, *Open-Economic Macroeconom-*

ics (Macmillan Ltd.), for elements of Chapter 11; the *Rivista di Politica Economica* for the second half of Chapter 12; the conference volume edited by Anthony Atkinson, *Economics for the New Europe* (Macmillan Ltd.), for some elements of Chapter 13; the conference volume edited by Dennis Snower and Joseph Stiglitz, *Unemployment and Wages* (Cambridge University Press), for Chapter 15; the *Journal of Public Economics* for Chapter 16; and the Second Report of the Policy Evaluation Group of OFCE for Chapter 17.

I want to thank Michael Aronson for shepherding this project along so attentively at Harvard University Press. Kate Schmit did a splendid job overseeing the production of a complex book.

Finally, this book at several points brings back memories of the contributions to my thinking of the late Arnold Colclery. My second teacher in economics at Amherst, later a dean and then my colleague and chairman at Columbia, a deep economic theorist from whom I gained much, and throughout an extraordinarily generous friend, he was a long and benevolent influence on my life. I dedicate this volume to his memory.

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Structural Slumps

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Introduction

THE aim of this book is to uncover the nonmonetary mechanisms through which various nonmonetary forces are capable of propagating slumps and booms in the contemporary world economy. The approach is to synthesize out of some modern as well as neoclassical elements a theory of what could be called *structural unemployment* and its path through time. The theory is then tested against global data from the postwar period.

The theoretical sections are built around the *equilibrium* case in the expectational sense of the term: the case of *correct expectations* about the course of the economy. The product is therefore a theory of the equilibrium path of unemployment.

The prototype models of twenty-five years ago also possessed an equilibrium unemployment path. The equilibrium unemployment rate was shown to converge (gradually if it did not jump) to what was called the *natural* unemployment rate. In these models, though, the natural rate was treated as a constant or as a parameter that moves exogenously with time.

In a useful shorthand one may characterize the theory here as *endogenizing* the natural unemployment rate—defined now as the *current* equilibrium steady-state rate, given the *current* capital stock and any other state variables. (It is the unemployment rate that, if it were the actual rate at the moment, would make the current rate of change of the associated equilibrium unemployment rate path equal to zero.) In the new theory, then, the equilibrium path of the unemployment rate is driven by a natural rate that is a *variable* of the system rather than a constant or a forcing function of time. The endogenous natural rate becomes the moving target that the equilibrium path constantly pursues.

The theory here rests on a family of intertemporal micro-macro models, each of which revolves around a *distinct kind of asset* acquired by the firm

that is of importance for its hiring decisions: the trained employee, the customer, and fixed capital equipment. Collectively these models provide a “structuralist story” of how the equilibrium unemployment path is determined.

Seeing the natural rate and the associated equilibrium path of unemployment as endogenous, pushed by business forces as any other economic variable is, finally charms us into venturing a step further: to view actual unemployment as tending steadily and reliably to the equilibrium path described by the theory. With that step we arrive at a new paradigm in macroeconomics: *an equilibrium theory of unemployment movements*—hence a moving-natural-rate theory of movements in the *actual* rate of unemployment. Of course, the latter rate may not track the former rate at all closely; certainly a Keynesian would not suppose so. But it is plausible that the moving-natural-rate theory holds the solution to the mystery of what is behind the *shifts* and *long swings* of the unemployment rate.

The subsequent empirical section of this work finds that the theory of equilibrium unemployment developed here succeeds to an important degree in explaining the two nearly global slumps in the 1970s and 1980s. (The view of the 1990s it offers is not far off the mark either.) Other nonclassical representatives of the equilibrium approach to unemployment nonetheless exist: the insider-outsider models (especially their nonmonetary versions) and the still embryonic models based on modern finance notions of credit rationing to firms and households. Apportioning the truth among the rival claimants within the broad structuralist school would be difficult with only the present data.

In aiming to redirect attention to the long movements of the unemployment rate, away from the high-frequency vibrations of so much current-day analysis, this book is not striking out in a novel direction but is actually returning to the main tradition of earlier business cycle theorizing, of which there is no greater example than Keynes’s *General Theory*.¹

It could also be argued that the function of the relatively formal body of microeconomic general-equilibrium modeling here is to provide theoretical support for relationships that several leading practitioners in macroeconomics, for more than a dozen years now, have been explicitly positing or implicitly assuming on intuitive grounds in their analyses of current macro disturbances.

The nonclassical elements in the theory make it a *modern* rather than a neoclassical theory. The most central of these is the relationship between the firm and the employee springing from their incentives in the modern

setting of asymmetric information. The resulting economics of incentive pay, or efficiency wages, plays a key role here, as it does in a growing number of models, in generating involuntary unemployment and shaping its equilibrium path. The theoretical structure is further strengthened if we use a modern treatment of the product market, though the general framework does not require it. The relevance of modern views of the capital market is also noted but they could not be imbedded into the framework on this occasion.

The *neoclassical* element is the role of interest rates determined in the capital market. In the general-equilibrium theory built up here, the path of the natural unemployment rate is intertwined with the path of the natural rate of interest. A correct analysis of the unemployment effects of any structural shift or other nonmonetary shock requires an understanding of the mechanism simultaneously determining them. Once their interaction is understood, and only then, one can see how a given structural shift or other nonmonetary shock pushes the economy toward slump or boom, in the equilibrium scenarios of the theory, and simultaneously sets in motion an adjustment process leading to complete or partial recovery.

The emerging general-equilibrium theory makes demand shocks as much as supply shocks the great movers and shakers of the economy’s equilibrium path. In the version constructed here, the theory sees shifts in profitability and thrift, and possibly shifts in productivity and population growth rates, as prime sources of disturbances. Adjustments of domestic assets and of wealth operate to amplify or ultimately to dampen or erase the early effect on unemployment.

The results obtained echo pre-Keynesian doctrine in sounding the theme of slump through “undersaving”: public debt and other fiscal stimuli to consumer spending are seen as contractionary. Yet the results have in common with Keynesian doctrine the theme of slump through “underinvestment”: in particular, government armaments purchases (and in all but special cases manpower buildups too), as occur in wartime, and more generally any government spending on goods produced by the capital-goods sector of the economy are implied to be expansionary—without any reference to the liquidity of a money economy, which is crucial to the Keynesian analysis.

Introducing country-specific demand stimuli in a multinational world adds further twists to the story. It is found to be theoretically possible for such stimuli to have an expansionary effect at home—a result more Keynesian than that obtained by some Keynesian models—while having

a contractionary effect abroad. This is the same “locomotive” in reverse, or “crowding out” at a distance, previously found in the partly monetary models of Fitoussi and Phelps.²

At some point, if only for working purposes, it becomes necessary to have a name for the theory. It might well be called the *structuralist* theory of unemployment movements: The object under its study is a kind of structural unemployment. It prepares us for long-persisting and even nonvanishing disturbances owing to permanent shocks, unlike theories of vibrations around a fixed trend path. It sees unemployment as (much of the time) an equilibrium phenomenon varying with real demand and supply rather than with the supply of money in relation to the temporary nominal wage or price level of the moment (which we don't think of as part of the deep structure of the economy). Finally, as just noted, the theory describes how unemployment responds to alterations in the structure of goods demands and of goods supplies; composition matters. Whatever we finally call the theory, however, it is not a reestablishment on different theoretical ground of the doctrine of Keynes or of any other monetary school. The occasional resemblance between a structuralist finding and a Keynesian one is purely coincidental.

Part I begins with a review and defense of the leading modern conceptions of the employer-employee relation—the turnover, or quitting, model and the supervision, or shirking, model. The discussion proceeds to the usual analysis of the equilibrium level of the incentive pay, or “efficiency wage,” that firms are driven to establish in their efforts to discourage quitting and shirking. The implied equilibrium wage curve in the (un)employment rate–wage plane is derived. This relationship and “labor demand” determine the equilibrium rate of unemployment. The treatment of labor demand, though, must also depart from the neoclassical treatment—must also be modernized—if it is to be compatible in spirit with the modern treatment of wage setting and if the whole apparatus is to have wide empirical applicability: The demand price of labor is a function of employment, the unemployment rate, and the real prices of assets, some of which exist because of modern elements in the economy.

Part II studies three working models corresponding to three distinct assets in which the firm invests: customers, functional employees, and physical capital. The focus here is the case of the closed economy in which the path of the unemployment rate is determined simultaneously with the real interest rate path. The first chapter takes up the model of turnover in

employees in whom the firm has invested firm-specific training. The next chapter treats in a parallel way an economy in which a firm's stock of assets is not its firm-oriented employees but rather its stock of customers. The last chapter here treats in the same way an economy in which a firm's stock of assets is its stock of capital, such as its accumulated plant measured in floor space. A summary chapter discussing the main results and informally tying the models together closes this part.

Part III takes up the nature of the economic interdependencies among national economies to which the structuralist theory points. Are the transitions positive or negative? For each kind of economy studied in Part II there is a chapter here on the case of the small open economy, meaning an economy so small as to take as given the world real interest rate, and on the international transmission mechanisms in a two-country model of two such economies. The analysis of these working models is again followed by a discussion of the main results of the theory thus far developed.

Part IV addresses the weakness of the working models—that they take for granted the nature of the behavioral functions, in particular the quitting and shirking functions that play a key role in the modeling of incentive wage setting, without any explicit microtheoretic underpinnings. A key concern here is the unwelcome implication of some previous microtheoretic formulations that secular progress in productivity and real wage rates generates a secular decline of the unemployment rate. The flaw of the previous microtheoretic formulations of incentive (efficiency) wages in this regard is their neglect of the effect of employees' wealth—or income from wealth—on their propensity to quit and to shirk. The first chapter here constructs an intertemporal model of shirking, in which the agents accumulate or decumulate wealth as described by a dynamic programming problem. With this intertemporal model in hand we proceed to explore the existence of conditions under which productivity increases are ultimately neutral for the equilibrium unemployment rate, thus escaping the implication that was to be avoided. The results in fact show the microtheoretic possibility that the propensities to shirk and to quit do indeed possess the “homogeneity” properties that they were assumed to have in the working models.

The previous working models are also vulnerable in their disregard of any possible effect on the propensity to shirk of the real rate of interest—other than its effect through wealth or the income from wealth. (Two key themes regarding the employment effect of higher real interest through certain demand shocks would fall to the ground if the propensity to shirk

and to quit were affected strongly enough in the "wrong" way.) A simulation analysis of the intertemporal model finally yields some reassurance on that real interest rate question.

Part V confronts the "structuralist" theory of unemployment developed over the course of the previous chapters with two kinds of empirical evidence. The first of the chapters here reports on some econometric findings, drawn from world time series as well as national series, bearing on the empirical validity of the structuralist theory, especially its emphasis on demand shocks. The second weighs the extent to which the structuralist theory serves to explain the historical record of unemployment over recent decades. This chapter speculates on a structuralist interpretation of the global history of unemployment, with emphasis on the period since the Second World War and the differing experience of the three main regions of the OECD countries.

Part VI contains the closing chapters, one on some precursors of the theory and the other a rumination on the sorts of policies toward structural disturbances to which the theory might lead.

I

CONCEPTS AND AGENDA

Modern Equilibrium Theory

SOME twenty-five years ago, a radically novel perspective on individual behavior began to invade economics. This quintessentially modern outlook brought into play assumptions about the costliness or existence of information quite foreign to (neo)classical theory.¹ The new slant on market transactions finally set in motion the development of a modern paradigm of market equilibrium to challenge the competitive equilibrium of neoclassical theory. This book, if successful, will help to carry that development toward maturity in the area of macroeconomics.

With the advent of the new paradigm, as Kuhn observed of paradigm shifts in all fields, even some of the terms of discourse have undergone a change of meaning. The term "equilibrium" is a case in point. Earlier, several theorists had come to mean by the term a state or path along which all markets (or the market in question) clear—where no buyer or seller is rationed, is involuntarily limited, in the quantity that may be bought or sold. Those of an econometric bent, on the other hand, tended to mean by the term a stationary state or a stochastic stationary state—with static-expectations equilibrium, rational-expectations equilibrium, and so forth all being admissible members of the class. In contrast, those working with the new paradigm have found it convenient to use the term as it had been employed by Marshall, Myrdal, Hayek, and several other major theorists in this century: *equilibrium* is a state or path along which *expectations* are in an appropriate sense *correct*, so that, absent an unanticipated shock, they will be ratified or fulfilled by experience. This volume will always use "equilibrium" in that expectational sense.

The pioneering contributions to the new paradigm were all analyses of what Marshall called *partial* equilibrium. Arrow, arguing that in the equilibrium of the insurance industry buyers cannot obtain as much insur-

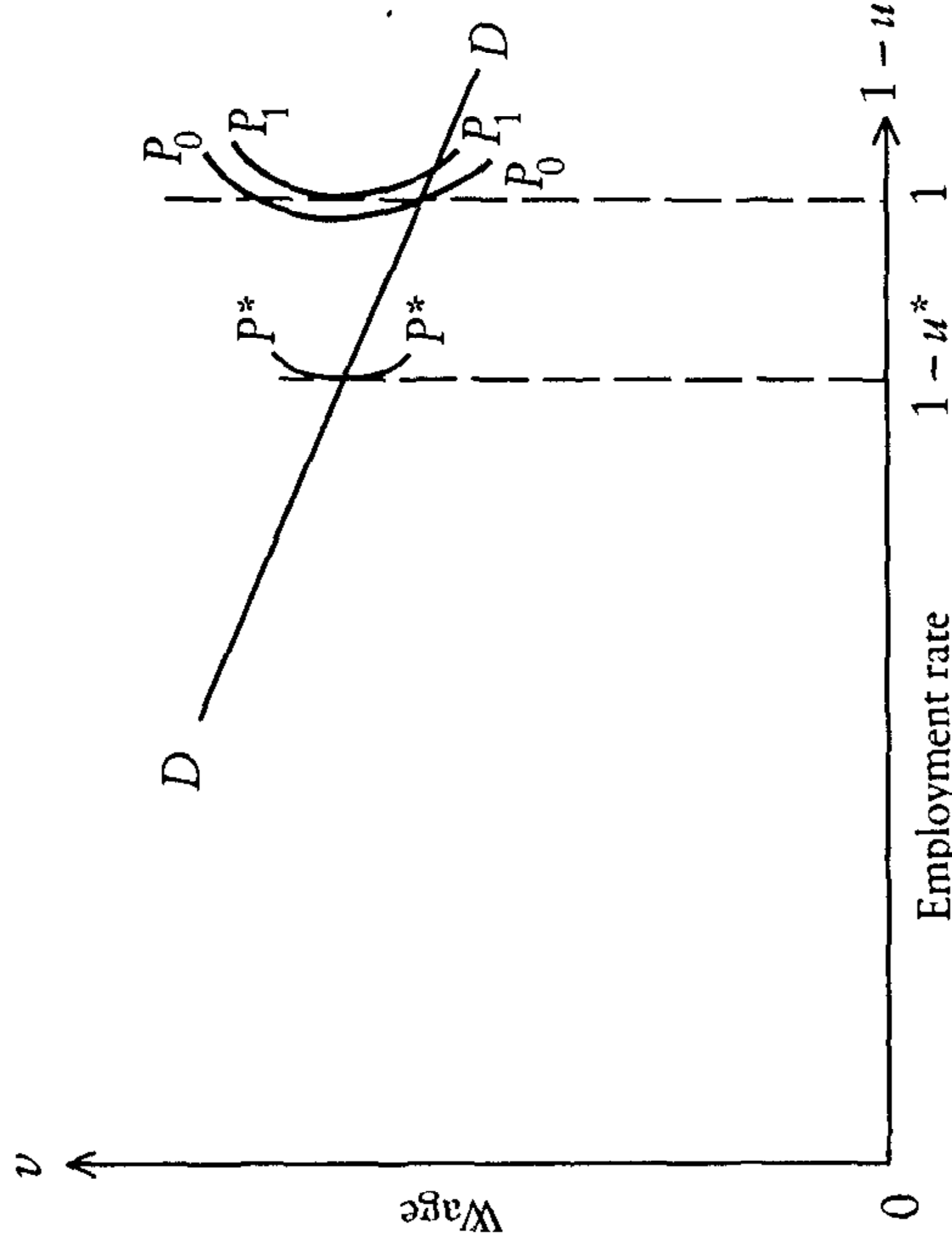


Figure 1.1 The property of equilibrium in the labor market

ment, processing, and training costs of replacing the departing workers (or choose some combination of these two losses). At [the] high quit rate corresponding to a [sufficiently] low unemployment rate, the firm will want to [establish] a differential between the wage it pays and the average wage paid elsewhere, on the ground that the savings from the lower turnover costs [thereby obtained] will more than pay for the extra wage bill. As all firms attempt to [establish] this differential, the general wage index rises.⁷

With all firms paying more in expectation of achieving the incentive effect of a wage differential and none gaining it, the firms will be in a state of disappointment—a state of disequilibrium. Only at a sufficiently large unemployment rate will each of the homogeneous firms find its quit rate small enough that it is willing to set its *wage* equal to the wage it assumes in its calculation the others will pay—to the *expected* economywide wage. Thus the equilibrium steady-state unemployment rate—or *natural rate* as it came to be called—is just large enough to make the turnover problem manageable in the sense that it does not drive firms to a futile attempt to outpay one another.

This basic property of labor-market equilibrium, some details aside, may be conveyed in a somewhat impressionistic way by the diagram of labor demand and labor force per firm shown in Figure 1.1. The labor market clears where the labor demanded equals the labor force. But at that market-clearing point, the individual firm's wage-employment iso-

ance as they would like, located certain information conditions leading to moral hazard as the source of the nonclassical phenomenon.² The implied equilibrium displays an undersupply of insurance, as less is provided than found in the neo-neoclassical equilibrium of a model without informational deficiencies. Vickrey, arguing that the government sector does not generally supply every project whose benefit exceeds the cost, saw the sand in the classical machine to be the incentive of each citizen to conceal the benefits that would accrue.³

The hallmark of these modern analyses is that they see in these situations the presence of asymmetric information, one or both parties being unable to detect whether the other is telling the truth or keeping his word about his preferences, intentions, or conduct. A consequence of these modern models is that, even in equilibrium, there is an "excess demand" for insurance and for public goods (other considerations aside), contrary to classical theory. Centuries ago Hume had written of moral hazard, and Marx had glimpsed the employee information problem of the capitalist firm, yet economics had resisted those early insights.

The new equilibrium paradigm reached the labor market later in the 1960s. In my 1968 paper on wage behavior and labor-market equilibrium—where, again, labor-market equilibrium is not defined by market clearing but simply means a state of correct expectations—there is a moral hazard in the association between the firm and the employee.⁴ The hazard faced by the firm is that an employee whom the firm has given firm-specific training so that he or she can function within the firm may quit and thus impose on the firm the investment-like costs of finding and training a replacement. The firm hopes that the employee will not quit except for cause (the employer paying less or demanding more than the industry standard) but knows that it cannot typically enforce such an understanding, and so it will aim to motivate reduced turnover by taking whatever steps are cost-effective.⁵ One such measure is to raise its wage above the market-clearing level, calculating that a small wage premium would be repaid by the *incentive* it created to quit less readily.

A consequence is that there will be involuntary unemployment—a pool of workers in excess supply, rationed out of a job.⁶ The equilibrium steady-state unemployment rate at each moment is just large enough that if the actual unemployment rate should happen to be lower, employees can find similar jobs at other firms so quickly and hence are so ready to quit their existing employers that the firms are thrown into a wage competition:

[T]he increase of [the firm's] quit rate will impose costs: The firm must either allow its output to decrease, thus losing profits, or incur the recruit-

wage as the others he would exhibit a lesser propensity to quit or to shirk than other employees with similar attributes are estimated to possess. The firm cannot observe his preferences, intentions, or character. The information on the quit behavior to which he would be willing to commit himself does not exist and cannot be produced. Similarly, the firm cannot observe the probability with which the employee shirks, it can only (hope to) observe instances of shirking and draw inferences accordingly or possibly act without any inferences as an object lesson to the others. From the perspective of the present theory, the wage-employment offers of the firms in the contrasting neoclassical equilibrium fail to be incentive-compatible, as they assume a willingness not to quit or not to shirk that is contrary to the actual and unobservable motives of the workers as long as firms behave classically.

How well or badly, we may ask, has incentive-wage theory performed when compared with empirical observations? This is not the best place for an extensive evaluation of incentive-wage models. A brief commentary may forestall some objections, however.

It might be asked why, if these models are valid, it should be the case that unemployment rates are lowest among the best paid. Don't they quit and shirk too? The answer, it seems, is that there are such strong nonpecuniary penalties that owners can present to the upper echelons of a firm that there is not a proportional impulse to push up the rewards of such workers to hold down their shirking and quitting.¹⁰

Or it might be asked why incentive-wage theory should be applied to the simpler tasks that are typically performed by the least-skilled workers. Does McDonalds have to worry about quitting or shirking? This view stands opposite to that just considered in that it suggests the theory explains unemployment only among workers holding the most sophisticated or crucial jobs. The answer here, it seems, is that even McDonalds must concern itself with the department and reliability of its workforce. To be nearly certain the workers will not amuse themselves by inserting unpleasant ingredients into the burgers, the employer must give the workers something to lose in the event there is evidence warranting suspicion of such behavior. The tendency to see low-skilled jobs as essentially neoclassical, as perfectly and costlessly monitorable and measurable in every respect at all times, stems from a weakness of the imagination.

The more deleterious objections that have beset incentive-wage theory, curiously, have not been empirical so much as a priori, or methodological, in nature. Some of these are the subject of the next chapter.

profit contour (P_0P_0) that goes through it and takes the other firms' wage to be given at the market-clearing wage is not vertical—the firm can move to a better profit contour (the best being P_1P_1) by raising its wage; hence the point of market clearing is not an equilibrium. An equilibrium occurs up the labor demand curve at a point where the intersecting isoprofit contour (P^*P^*) that takes as given that the other firms stick to the higher wage corresponding to this new point is locally vertical—so the firm can do no better than to offer the same wage.

Another model deducing the non-market-clearing property of labor-market equilibrium, one appearing about a decade later, is based on another incentive problem faced by firms. This is the problem of shirking, or slacking, by employees, which was introduced into theoretical analysis of wages and employment by Calvo and Bowles.⁸ Continuous monitoring of every employee would be prohibitively expensive for the firm. The suggested solution is to motivate employees to shirk with reduced frequency by the same means that it motivates employees to quit with reduced frequency: by offering the employee incentive pay. By giving the employee more to lose in the event of dismissal, the firm will reason, the threat (certain or uncertain) of dismissal in the event the employee is caught shirking is made a stronger deterrent for the employee. Up to a point, then, raising the wage will generally gain more in output per man-hour than it will lose in wages per man-hour, with the result that the wage cost of producing a given output is decreased on balance.⁹

The logic of the shirking story parallels that of the turnover model: As each firm finds out that all the other firms in the economy have pushed up their wages as well in the same hope of reducing costs, each must now pay more just to stay even with its rival employers and still more if it would offer premium pay to discourage shirking. The result of the increased cost of labor is that firms' production managers cut output and employment. The equilibrium is reached when the general level of wages has risen just enough that the individual firm is content not to seek a wage higher than the wage it expects the other firms are going to offer.

According to either of these *incentive-wage* models, to use a term that will be used interchangeably with *efficiency wage*, labor-market equilibrium is marked by *job rationing*, thus involuntary unemployment. An unemployed person, both in labor-market equilibrium and generally in disequilibrium as well, has to wait passively until some firm, on reaching into the figurative fishbowl, finds that it has his number. The unemployed worker is helpless to underbid for a job because he cannot persuade any prudent firm, no matter how solemn his promises, that if hired at the same

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experience in his or her employment résumé, and the prospect of this black mark (or a sufficient number of them at any rate) would be a tolerably effective deterrent against such behavior.

The reply to that defense from the perspective of the modern theory is that it exaggerates the reliability with which employers can monitor the past employment relations of potential or actual employees. An applicant for employment at a firm can claim that the record has been lost or that a previous employer was retaliating for some grudge or that the previous employer was under a misapprehension in bringing the accusation. What seems like a workable device for enforcing good behavior by employees, if it were relied upon to the degree imagined, would require a costly institution to administer—a court system or some other public agency of third-party adjudicators to resolve the various issues in each worker's past employment record.

A second kind of defense of the neoclassical position, one receiving greater weight perhaps, argues that there is always some arrangement or institution by which any persons who are in the excess supply predicted by the modern analysis of equilibrium can reach an agreement with one or more employers for a mutual gain—for an Edgeworth improvement.⁴ A modified position is that such arrangements or institutions could exist at any rate and only legal prohibitions bar some of them from being put into practice.

The shirking model of efficiency wages, for example, invites the objection that the firm could deter standard performance by making it a policy to dock a worker's salary in proportion to the estimated shortfall from the stated norms of performance; if no more salary is due, the firm could demand return of past salary, and to guard against the infeasibility of collecting the firm could require that a security deposit be held in escrow during the employee's stay at the firm. It is not immediately obvious that there will not exist a labor-market equilibrium in which all firms follow such policies, no firm finding it in its self-interest to deviate along the modern lines of incentive pay. If it were replied that many workers, especially the young, would lack the wealth to put up such a security deposit, it could be answered that prospective workers could obtain funds from a bondsman in the same way that prisoners without vast wealth are able to put up bail to obtain freedom pending trial.

The modernist's reply to this line of argument is that, if the initial conditions are taken to be the modern equilibrium, a firm attempting to strike such an agreement with a worker in excess supply would be met with suspicion by the worker: the employer is possibly a scoundrel who already

THE neoclassical theory regards the information problems on which the modern theory is centered, though real enough perhaps, as somehow surmounted by the participants in the market. On this premise it proceeds to show that equilibrium (in the expectational sense) implies market clearing: As long as the labor market does not clear, the argument goes, there are disappointed sellers or else disappointed buyers, hence disequilibrium. (In the modern setup, the unemployed expect that only a certain proportion of them will be lucky enough to be hired and in equilibrium the actual statistical experience bears out that expectation.) A thorough theoretical grounding of the modern view that equilibrium leaves many or all labor markets uncleared, with excess supplies, must therefore reply to the neoclassical objections. The present chapter is at least a small gesture in that direction.¹

Theorists defending the neoclassical paradigm, such as Stigler and Alchian, have often argued that the equilibrium it portrays is self-enforcing, successfully overcoming moral hazards in general and, by implication, excessive quitting and shirking in particular.² If the owner of a factory were to leave it in a condition in which the risks of fire, say, were excessive, in the sense that the willingness of those working there to pay for a lessening of those risks through a wage reduction would exceed the cost of lessening those risks, the actuarial experience accumulated in the marketplace would soon enough cause workers to exact a wage premium for working at the riskier factory; so the owner must comply with the interests of the workers to work in a safer factory or be forced out of business.³ Analogously, there is the argument that if an employee were to choose to quit without sufficient reason or to risk dismissal on the grounds of inadequate attention to duties, he or she would anticipate having to carry the evidence of this

the agreement because a worker might be able to claim that the firm harassed him into quitting as a means of taking the deposit.

How then to interpret the vision of equilibrium, with its market-clearing feature, presented by neoclassical theory? To say that the neoclassical system abstracts from the problems of information is one way, and well known. It is reasonable to understand the neoclassical system as describing a society in which all participants have a decent respect for a set of rights protecting people against deceptive dealing, fraud and theft of property. Institutions, including private firms, work only because there are people in them who would suffer a costly loss in their integrity if they did not adhere to the understandings in their implicit employment contracts.⁵

But while the notion that there exist mechanisms and utility functions serving to motivate prosocial behavior undoubtedly has an important role to play in permitting us to grasp why social cooperation is as widespread as it is in organizations and society, antisocial phenomena of uncooperativeness are also sufficiently widespread as to create a pattern to be explained. That the neoclassical paradigm takes us as far as it does is remarkable; it is the paradigm on which much of the success of economics rests. But if we are to address the shortfall of reality from the neoclassical paradigm, some room must also be made for the modern paradigm.

Another issue divides neoclassical and modern proponents. The neoclassicals can point to the fact that there is no quitting problem and no shirking problem at all in an important submarket for labor services—the self-employment submarket—so in that submarket there is no tendency for equilibrium to entail a wage above the market-clearing level. There is held to be a sense in which the labor market as a whole can be said to clear under conditions of equilibrium because, in equilibrium, the “wage” for selling apples on street corners must be sufficiently low that there is no excess supply for such services; any excess supply is strictly a disequilibrium phenomenon (resulting from incorrect expectations). Some models conjure up an entire “secondary” sector in which the wage is posited to clear the market; wages are above-clearing only in the “primary” sector, and those in excess supply there work in the secondary sector while keeping their names in the pool or their places in the queue for a job in the primary sector. In such models no involuntary unemployment results from the nonclearing of wages for incentive reasons in the primary sector.

A richer model of a market generally possesses advantages, of course, but it is not clear that for purposes of macroeconomic analysis the benefits of the two-submarket model are substantial enough to outweigh the costs

plans to make false claims against the worker once employed in order to defraud him of wages to which he will be entitled or defraud him of the security deposit he has made; or perhaps the employer will be normally prey to temptations to exaggerate claims or not to recognize extenuating circumstances or give the benefit of the doubt, and so forth. The worker would therefore have to anticipate the possibility or likelihood (with unknown probability) of costly litigation. Workers in excess supply may generally shy away from firms seeking to hire with these neoclassical personnel policies, therefore. Furthermore, many workers will be unable to finance the envisioned security deposit because bondsmen will know that for a worker so insured there would be a high degree of moral hazard, as the penalty for shirking would not be the employee's loss, so firms will likewise find it risky to count on the feasibility of compensation for employee underperformance. The kind of employment contract envisioned by neoclassical theory appears to be unenforceable or to make enforcement so costly and full of imponderables as to be unattractive to one or the other party or both.

The same conclusion could be reached by supposing instead that the initial conditions were somehow those of market clearing and arguing that in that situation, with its attendant legal costs and distrust, the adoption by some firms of a policy of incentive pay—the carrot, not simply the stick—would attract employees away from the other firms. Both lines of analysis will reach the conclusion that incentive wages will be endemic and that excess supplies will be a side effect. It might be remarked, however, that workers with large levels of wealth, since they can better finance, would have an advantage in that respect over the less wealthy; but their greater ability to pay litigation costs and more generally the “price” of shirking makes them prime candidates for early involuntary retirement.

The firm's task of motivating the employee not to quit except when the aggregate benefit to the two parties to the employment contract exceeds the cost is also problematic, perhaps more so, than motivating employees not to shirk. Here again the neoclassical theorists often speak of a scheme to combat excessive quitting in which, as a condition of being hired by the firm, a worker must post a refundable deposit to indemnify the firm against the cost it would suffer in the event he quit. But again such a scheme would be subject to abuse by the employer: in unprofitable conditions the employer could harass the employee into quitting with the objective of obtaining the deposit, so the employee might have trouble enforcing the terms of the deposit. In addition, the employer might not be able to enforce