LABOR MARKETS, UNEMPLOYMENT, AND MINIMUM WAGES: A NEW VIEW

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INTRODUCTION

The standard approach to labor markets is illustrated in Figure 1, which shows labor demand as a negative function and labor supply as a positive function of the wage. If the market is competitive and wages are flexible, outcomes will be characterized by full employment of L∗, with an equilibrium wage of w∗. Unemployment emerges only if wages exceed w∗.

According to this view, "high and rigid" wages are the cause of unemployment, a view that has come to dominate both microeconomic and macroeconomic explanations of unemployment. This paper presents an alternative theory of unemployment that redirects attention away from "wage rigidity" toward the "structural characteristics" of labor exchange. The model emphasizes the distinction between employment (number of jobs) and hours and shows that minimum-wage regulations can actually increase employment.

UNEMPLOYMENT IN A "JOBS" ECONOMY

This section presents a theoretical model of a jobs economy based on Pleasner and Yitzhaki [1963]. Its key is the distinction between employment (jobs) and hours. Firms can change the level of labor input either by increasing the level of employment holding hours constant, or the reverse. This introduces a margin of choice for the firm, over hours and jobs, largely ignored in the literature. Initially, the model is explored with a single type of worker, and this assumption is subsequently relaxed to explore the effects of heterogeneity among workers.

The Demand for Jobs and the Supply of Hours

Worker behavior is characterized by two behavioral functions determining each individual worker's supply of hours and the number of workers participating in the labor market:

\[ h^* = \begin{cases} 0 & w < w_{min} \\ h(w) & w > w_{min}, h > 0 \end{cases} \]
Figure 1
Demand and Supply Model of Labor Markets

\[ N^* = N_{\text{res}} \]

where \( N^* \) = per worker supply of hours,
\( N_{\text{res}} \) = reservation wage,
\( N^* \) = supply of workers.

The supply of hours per worker depends positively on the real hourly wage, but supply of hours is zero as long as \( w < w_{\text{res}} \). Worker participation is a step function with no workers participating in labor markets when \( w < w_{\text{res}} \). The assumption of a single type of worker means that all workers participate once the hourly wage exceeds this reservation level. The inverse of the hours supply function can be written as

\[ w = w(h) \quad w_h > 0. \]

The sign of the partial derivative implies that the supply price of hours (the hourly wage) is a positive function of hours.

The Supply of Jobs and the Demand for Hours

Firms maximize profits by choosing over employment and hours. This determines the supply of jobs and the demand for hours from individual workers. The representative firm’s maximization program is given by

\[ \text{Max } V(N, h) = f(N, h) - wN \]

subject to

\[ w = w(h), \]

where \( V \) = profits,
\( N \) = employment,
\( h \) = hours,
\( w \) = real hourly wage rate.

In \( f(N, h) \), the production function, employment and hours are imperfect substitutes; both display positive but diminishing marginal products. Employment and hours are imperfect substitutes in production because they interact differently with capital. If employment increases, holding hours constant, there are fewer machines per worker; if hours increase, holding employment constant, workers are subject to exhaustion. The constraint (4a) implies that firms have some monopoly power with respect to hours provided by their existing workforce. The logic behind the assumption of monopoly power is that workers face some transactions costs to shifting jobs.4 The solution of this program yields the supply of jobs and the demand for hours at a given wage.

The Determination of Jobs and Hours

The operation of the labor market is as follows. Each employed worker is on his hours supply schedule. However, since firms simultaneously choose hours and employment, and the wage rate needed to elicit a given number of hours may also elicit an excess supply of workers, unemployment may result. Such an outcome is understandable in terms of Tinbergen’s (1952) targets and instruments approach to macroeconomic policy; effectively, there are two targets (employment and hours), but only one instrument (the hourly wage).

The market outcome is determined by solving the firm’s maximization program in conjunction with the worker participation and hours supply functions. The first order conditions are

\[ dV/dN = f_N - wh = 0, \]

\[ dV/dh = f_h - wN - hNw_h = 0. \]

If \( N^* < N \) there is unemployment. Rearranging (5a) and (5b) and expressing them as a ratio, yields the marginal rate of technical substitution (MRTS):
creases employment (jobs). The effect of a binding minimum wage can be incorporated by replacing (4a) with

\begin{equation}
\frac{w}{w_{min}}.
\end{equation}

In this case the first-order conditions are given by

\begin{align}
\frac{dV}{dh} &= f_N - w_{min}N = 0, \\
\frac{dV}{dN} &= f_h - w_{min}h = 0.
\end{align}

The MRTS is then given by

\begin{equation}
f_h/f_N = h/N < h/N(1 + E_{w,a}).
\end{equation}

The fact that the MRTS with minimum wage regulation is less than without indicates that firms move along their isocounts and decrease the optimal hours/jobs ratio. This means that employment (jobs) may actually increase.

The economic logic behind this possibility is that minimum-wage regulations raise the relative cost of hours, thereby providing firms with an incentive to increase the mix of jobs relative to hours. Whether total employment increases is ambiguous. On the one hand, the substitution toward jobs has a positive impact on employment, but the higher real wage reduces the profit-maximizing level of output and has a negative effect. This provides a theoretical explanation for the empirical finding of employment neutrality of minimum wages recently reported by Card and Krueger [1994].

Lastly, note that the assumption of monopsony is critical to the above result, since in its absence the MRTS would be \( f_h/f_N = h/N \) in both cases. The conventional labor market model with monopsony imposition of a minimum wage slightly above the existing wage leads to greater employment. However, the conventional model has a single measure labor input. In an hours-jobs economy there are two inputs, so that there is an important margin of substitution. Regulating the hourly wage, as with minimum wage legislation, induces a shift away from hours but raises jobs. This is a subtly different effect since use of the regulated input (hours) actually falls. The two models also have different implications for prices. In the conventional monopsony model prices will fall as a result of minimum-wage regulation, since the firm increases employment and output, and must lower product prices to sell this additional output.

In the hours-jobs model, the change in prices is unclear since the firm cuts back on hours and increases jobs. Whether output has decreased or increased is therefore ambiguous. This can explain why Card and Krueger [1994] found no significant price differences across firms that were and were not subject to the minimum wage.

HETEROGENEOUS WORKERS

In the above model workers were homogenous. This section examines the implications of heterogeneity. With two types of workers the respective hours supply and worker participation functions are given by
The worker participation function is now a step function with steps at \( w_{a1} \) and \( w_{a2} \), where \( w_{a1} < w_{a2} \). These worker types can be identified with primary (type 1) and secondary (type 2) workers in a standard household.

The firm’s problem now involves choosing an hours-wage combination subject to a potential employment constraint. If desired employment is less than \( N_e \), then firms base the marginal cost of hours on the hours supply schedule given by \( h^* \). If desired employment is greater than \( N_e \), then firms base the marginal cost of hours on the hours supply schedule given by \( h^* \), since type 2 workers represent the marginal workers. Consequently, firms must make a discrete comparison of profits under a regime in which both type 1 and type 2 workers participate in the labor market, and a regime in which only type 1 workers participate. However, in both cases the demand for workers (supply of jobs) need not be an exact match with the level of worker participation, and unemployment can result.

Full employment will be automatic only if each worker constitutes a unique type, with only one worker per type. In this case, every time the firm wants an additional worker, that worker’s hours supply schedule becomes the marginal cost of hours schedule on which firms predicate their hours-wage decision. However, with more than one worker per type, additional workers of the marginal type may not secure employment.

**EFFECT, HOURS, AND JOBS**

The above model focuses on the important distinction between employment and hours. A second distinction, developed within the efficiency wage literature [Solow, 1979; Akerlof and Yellen, 1990], concerns the difference between employment and worker effort. The core insight is that firms are interested in obtaining labor force workers, and the amount of labor obtained depends on both the number of employed workers and their level of effort.
CONCLUSION

This paper presents an alternative microeconomic framework explaining unemployment in terms of the structural characteristics of labor exchange. The framework is accompanied by a simple diagrammatic apparatus. The key analytic insight is that the wage is the single instrument, so that it cannot simultaneously clear the markets for jobs, hours, and effort. Unemployment can therefore arise even when wages are flexible and labor markets competitive because the wage rate is used to determine hours rather than clearing the job market. Moreover, minimum wage regulation can actually increase employment. This interpretation departs from the standard model of labor markets which maintains that unemployment is the result of high and rigid wages.

NOTES

1. Throughout the paper the term wage refers to the real wage.
2. Public understanding of the problem has similarly changed, most likely because of exposure to the standard model. This transformative effect of economics teaching is confirmed by Frank, Gilovich, and Regan (1993) who provide important empirical evidence on how exposure to economic theory changes attitudes.
3. These transaction costs can be diverse in character and can include explicit expenses of job search and moving homes, as well as psychological costs of leaving a familiar workplace and losing friends.
4. In principle, both the hours supply schedule and the worker supply schedule would depend on the (non-deterministic) determined rate of unemployment. In both cases, unemployment would likely enter with a negatively signed partial derivative, reflecting a "reserves army" effect on the hours supply function, and a "disenfranchised worker" effect on the worker participation function.
5. This schedule depends on the level of employment, and is drawn therefore, for N = N*.

REFERENCES


SHORT-TERM FOREIGN ASSETS AND PORTFOLIO RISK

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INTRODUCTION

It is well established that international equity diversification lowers portfolio risk because of the low correlation of returns between national equity markets [Adler and Dumas, 1983; Errunza, 1983; Ibottson, Carr, and Robinson, 1982; Joy et. al 1976; Solnik, 1980]. Solnik [1980] shows that the addition of foreign equities to a purely domestic portfolio can reduce risk to less than half that of a purely domestic portfolio of equal size and that maximum risk reduction occurs with as few as forty stocks spread equally over the world's major equity markets. In addition to the equalization of relative product and factor prices, risk reduction through the international diversification of equity portfolios is another gain from international exchange [Gruen and Fadner, 1971]. An interesting aspect of internationally diversified equity portfolios is that although returns are subject to exchange-rate movements, such exchange-rate movements, as Gruen and Fadner [1971] show, may decrease or increase the gains from international diversification. For equities, Raymond and Weil [1990] find that from 1976 to 1979, exchange-rate changes reduced but not completely offset the benefits from diversifying internationally.1

The issue addressed in this study is the effect of exchange-rate changes on the risk of holding domestic versus foreign short-term assets in a two-period portfolio model. In a two-period model, the nominal return on short-term assets can be considered non-stochastic, so the question of diversification benefits due to the correlation between nominal returns does not arise. It is generally thought, therefore, that foreign short-term assets must have greater risk than domestic assets because of the risk of exchange-rate changes. Many textbooks indirectly reinforce this idea by providing an explanation of how the forward market can be used to eliminate exchange risk [Kessen, 1994; Yarbrough and Yarbrough, 1994]. Although the use of the forward market (covering) can eliminate the uncertainty of exchange-rate changes, a covered foreign short-term asset does not always, as such explanations indirectly imply, have less total risk than a foreign short-term asset that is exposed to exchange-rate changes. Although the forward market will eliminate the risk due to exchange-rate movements, it is total portfolio risk that is relevant. This study disputes the view that covering in the forward market necessarily produces lower total portfolio risk than taking a speculative position in foreign short-term assets. It will be shown, first, that if returns are measured in real terms, then a foreign covered short-term asset will have the same total risk as a domestic short-term asset, and second, that a diversified portfolio containing both domestic and