

Unemployment and Labour Markets

Supervision 2

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Question 1

The assumptions of McCall's search model are as such:

- An unemployed worker receives a job offer paying w in each period
- w is a random variable drawn from the distribution $F(w)$
- A worker who rejects a job offer receives unemployment benefits b , and has to wait until the next period to receive a new offer
- The job separation rate is 0 to simplify the model as in Section II of McCall's 1970 paper (Section III generalizes the result to include the length of employment)

Given this, a worker who accepts a job paying some w receives a utility of

$$\sum_{t=1}^{\infty} \beta^{t-1} w = \frac{w}{1-\beta}$$

and assuming the worker is risk-neutral, rejecting a job yields a utility of

$$U = b + \beta E \left[\max \left\{ U, \frac{w}{1-\beta} \right\} \right]$$

which is essentially the unemployment benefits, plus the discounted expected value of the best course of action in the next period. This could either be to stay unemployed, yielding U , or to accept a job offer, yielding $\frac{w}{1-\beta}$. U is thus defined recursively.

It is assumed there is some reservation wage w_r such that the worker is indifferent between accepting the job offer and rejecting it, such that

$$U = \frac{w_r}{1-\beta}$$

Substituting this into the other expression for U ,

$$\frac{w_r}{1-\beta} = b + \beta E \left[\max \left\{ \frac{w_r}{1-\beta}, \frac{w}{1-\beta} \right\} \right]$$

It is apparent that $\max \left\{ \frac{w_r}{1-\beta}, \frac{w}{1-\beta} \right\}$ means choosing the former when the wage offered is below w_r and the latter when the wage offered is above w_r . Therefore

$$\begin{aligned} E \left[\max \left\{ \frac{w_r}{1-\beta}, \frac{w}{1-\beta} \right\} \right] &= \int_0^{w_r} f(w) \frac{w_r}{1-\beta} dw + \int_{w_r}^{\infty} f(w) \frac{w}{1-\beta} dw \\ &= \int_0^{w_r} \frac{w_r}{1-\beta} dF(w) + \int_{w_r}^{\infty} \frac{w}{1-\beta} dF(w) \end{aligned}$$

and the equation for U now reads

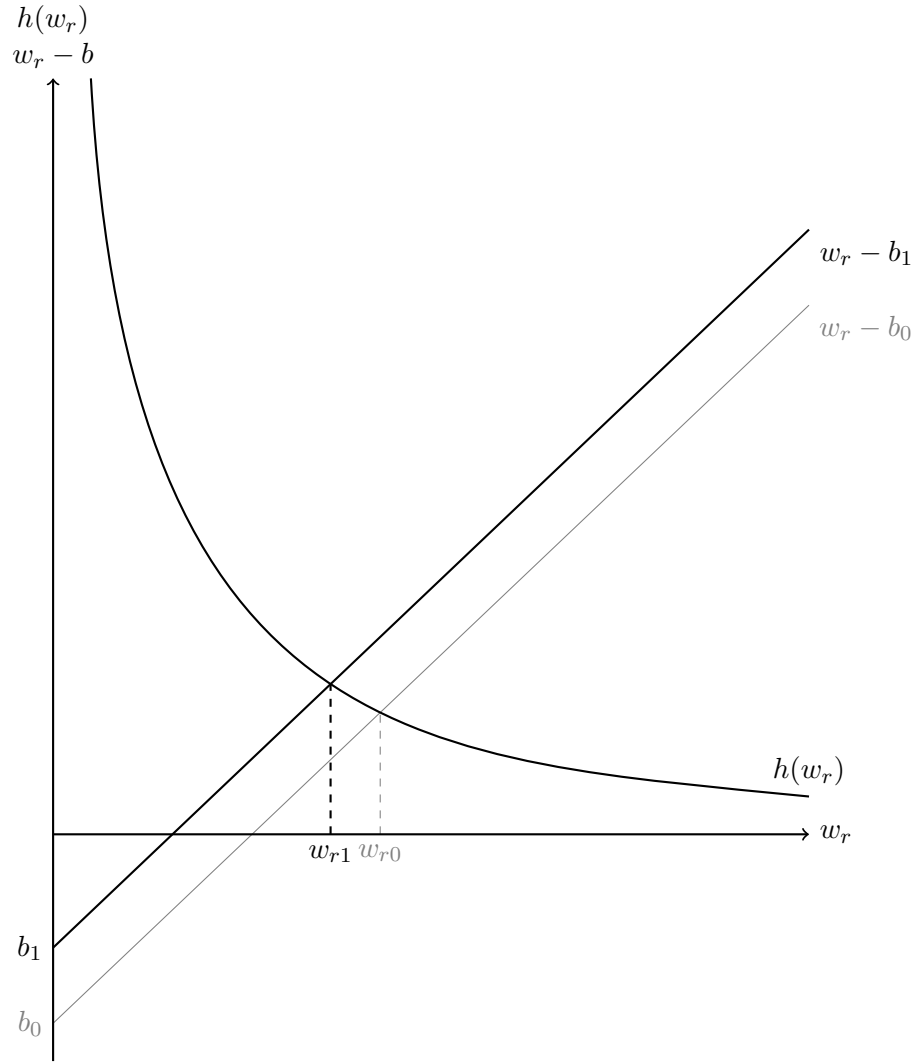
$$\begin{aligned}
\frac{w_r}{1-\beta} &= b + \beta \left(\int_0^{w_r} \frac{w_r}{1-\beta} dF(w) + \int_{w_r}^{\infty} \frac{w}{1-\beta} dF(w) \right) \\
&= b + \beta \left(\int_0^{\infty} \frac{w_r}{1-\beta} dF(w) - \int_{w_r}^{\infty} \frac{w_r}{1-\beta} dF(w) + \int_{w_r}^{\infty} \frac{w}{1-\beta} dF(w) \right) \\
&= b + \frac{\beta}{1-\beta} \left(w_r + \int_{w_r}^{\infty} w - w_r dF(w) \right) \\
w_r - b &= \frac{\beta}{1-\beta} \int_{w_r}^{\infty} w - w_r dF(w)
\end{aligned}$$

The right-hand side of the equation is a strictly decreasing function in w_r . Denoting the right-hand side expression as $h(w_r)$,

$$\begin{aligned}
h'(w_r) &= \frac{\beta}{1-\beta} \frac{\partial}{\partial w_r} \int_{w_r}^{\infty} w - w_r dF(w) \\
&= \frac{\beta}{1-\beta} \int_{w_r}^{\infty} -1 dF(w) \\
&= -\frac{\beta}{1-\beta} (1 - F(w_r)) < 0 \\
h(0) &= \frac{\beta}{1-\beta} \int_0^{\infty} w dF(w) = \frac{\beta}{1-\beta} E(w) > 0 \\
\lim_{w_r \rightarrow \infty} h(w_r) &= 0
\end{aligned}$$

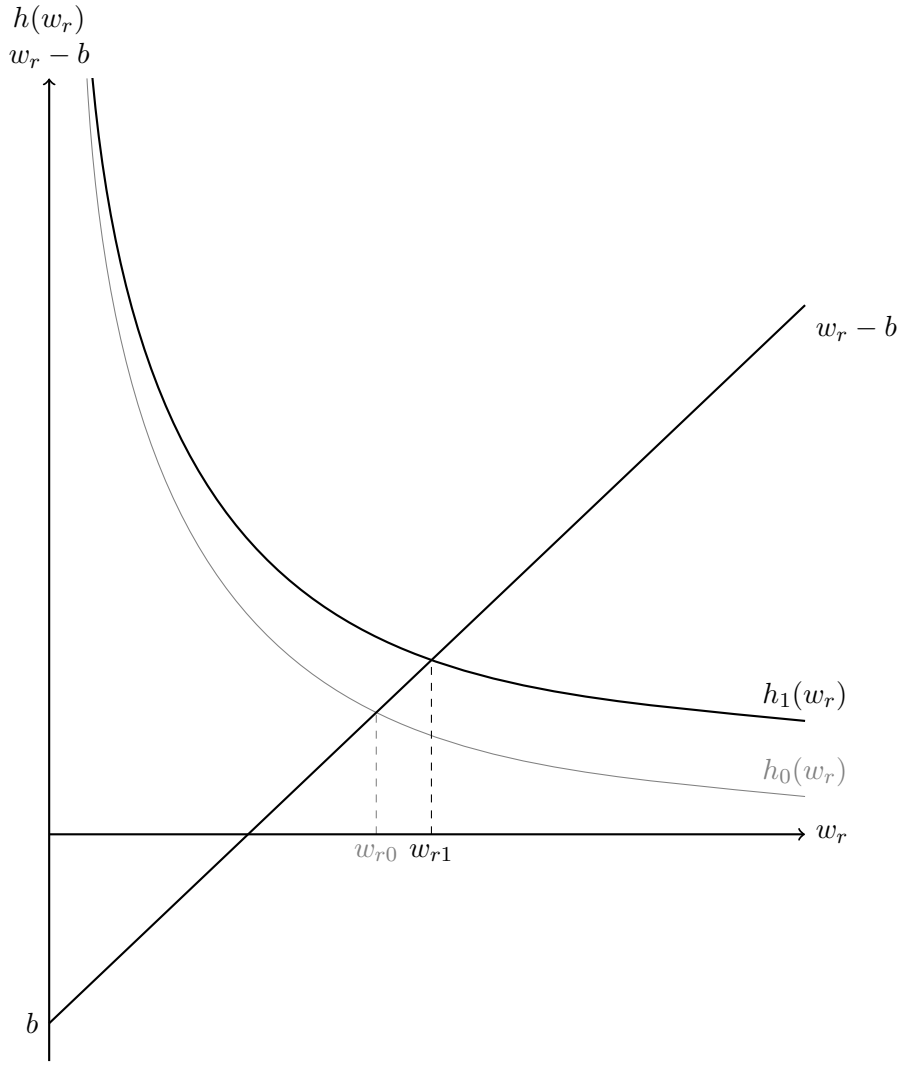
Since $h(0) > 0$, $h'(w_r) < 0$, and $\lim_{w_r \rightarrow \infty} h(w_r) = 0$, there is a unique equilibrium where $w_r - b = h(w_r)$.

(a)



A reduction in the unemployment benefit from b_0 to b_1 reduces $w_r - b$, that is, the utility in unemployment. With the recursive definition of $h(w_r)$ and the fact that $h'(w_r) < 0$, this means the equilibrium w_r falls from w_{r0} to w_{r1} . This is an expected result; a reduction in the unemployment benefit increases the opportunity cost of rejecting a job offer, thus lowering the reservation wage.

(b)



$h(w_r)$ is increasing in β over $0 < \beta < 1$ since β appears only in the coefficient $\frac{\beta}{1-\beta}$. When workers become less impatient, $h(w_r)$ becomes higher for every given level of w_r . Thus there is an upward shift from $h_0(w_r)$ to $h_1(w_r)$, and the reservation wage increases from w_{r0} to w_{r1} . Essentially workers become patient enough to wait for a better offer; future earnings are important enough to the worker for him to keep searching for a higher wage.

Question 2

(a)

Hysteresis is when the equilibrium of a system depends on the history of the system. In this context it refers to the possibility that periods of high unemployment may increase the natural rate of unemployment or non-accelerating inflating rate of unemployment (NAIRU). Some explanations for hysteresis include the "insider-outsider" theory, long-term unemployment, and capital scrapping.

The insider-outsider theory views the labour market as composed of 'insiders': those in employment, and 'outsiders': those not employed. Insiders are said to have greater bargaining power over

employers due to their firm-specific knowledge (or human capital). The rational decisions of insiders do not account for their effects on outsiders. Following a negative demand shock, unemployment increases because real wage cuts are difficult to implement. When demand recovers, insiders immediately bargain for higher wages; the increase in unemployment has reduced the bargaining power of outsiders more than that of insiders. Therefore there is a persistent increase in unemployment even though the demand shock was transitory. The more formal statement of this theory essentially has unions maximize wages (w) when employment is above some level (the number of workers represented by the union), and wages and employment ($w \cdot e$) when employment is below that level.

The long-term unemployment explanation of hysteresis also views the labour market in two components: the long-term unemployed and short-term unemployed. The long-term unemployed are in effect withdrawn from participation in the labour market because of a loss of skills and discouragement. Thus they are poor substitutes for those in work and exert little competitive pressure in the labour market. This means that the higher the proportion of long-term unemployed in the total pool of unemployment is, the less impact any given level of unemployment has on wage setting. Sustained periods of high unemployment then have the effect of increasing this proportion of long-term unemployed, raising the equilibrium unemployment rate.

The capital scrapping argument is that a fall in demand may induce firms to scrap capital or reduce their investment. This lowers the marginal product of labour and reduces labour demand, leading to a persistent increase in the equilibrium unemployment rate.

(b)

Røed (1997) provides a survey (albeit somewhat dated) of the theoretical and empirical literature on hysteresis. Steadily increasing European unemployment rates had "nurtured the idea that the equilibrium rate of unemployment, at least to some extent, tracks the actual rate", whereas no such trend was spotted in the US labour market. Lever (1995), also a survey into the empirical literature, concludes that there is "no strong evidence in favour of the insider-outsider hypothesis, but that methodological difficulties suggest a careful interpretation".

On the other hand, there is some support for the long-term unemployment argument for hysteresis. Studies that test for duration dependence in the employment probability have found negative duration dependence in the UK, France, and the Netherlands. Again, the methodological difficulties make it difficult to draw a strong conclusion, since there is probably endogeneity in terms of what causes someone to be unemployed for long durations in the first place. Still there seems to be more support of this theory than the insider-outsider theory.

More recent papers have also found support for hysteresis, although it has been difficult to ascertain which form of hysteresis has dominated. An example is Ball (2011), which finds that large increases in the natural rate of unemployment are associated with disinflations, and large decreases with run-ups in inflation.

Question 3

(a)

The term has also been used to mean many other things, but generally involuntary unemployment is where workers are willing to work at the prevailing wage rate but nevertheless remain unemployed, as opposed to voluntary unemployment where workers do not work because the prevailing wage rate is below their reservation wage.

One way of explaining involuntary unemployment in models of imperfect competition is through the process of wage-setting. When a job-seeker and employer have been matched, losing the employee is costly for the firm and losing the employer is costly for the job-seeker, creating a sort of bilateral monopoly. In essence, every seller (be it a firm or a household) has a monopoly over the good (or labour) they sell although their monopoly power is limited by the existence of imperfect substitutes. In this case wages are likely to be determined by bargaining.

Unions may bargain for or dictate high wages to benefit union members, while causing firms to employ less workers even though there are workers willing to work at the high wage or slightly lower. Diagrammatically, the wage-setting curve lies above the labour supply curve under imperfect competition.

(b)

An efficiency wage argument could explain how involuntary unemployment arises even in price-taking labour and product markets. If worker effort depends on wages, firms across the board may find it profitable to raise wages such that there is involuntary unemployment in order to raise the productivity of their workers. Institutional factors such as minimum wages and labour market frictions can also explain some of the involuntary employment.

(c)

Nominal wage rigidity can lead to involuntary unemployment in response to adverse demand shocks. A negative shock to demand reduces output prices. If nominal wages cannot decrease, the unit cost of labour increases and firms have to lay off workers to remain profitable. In this case there are workers still willing to work at the prevailing wage rate, starting from the workers who were retrenched, for one.

Question 4

The 'trade-off' between inflation and unemployment started as an empirical observation by A.W. Phillips to which little theoretical significance was initially attached (although Phillips (1958) did propose, very tentatively, a hypothesis about the link between inflation or "rate of change of money wage rates" and unemployment). Data from the UK between 1861 to 1957 showed a clear negative association between inflation and unemployment. Samuelson and Solow replicated the result for the US using data between 1900 to 1960.

Some took this to mean that countries could 'choose' between different combinations of unemployment and inflation; a country could have low unemployment by tolerating higher inflation. It is often said that macroeconomic policy from the 1960s ended up operating on such beliefs, up until around 1970 where the relation broke down with both high inflation and unemployment being observed.

A new relation appeared, but this time as a relation between unemployment and the change in inflation or acceleration in prices (though it is also often called "accelerating inflation").

One explanation for why there was a relationship between inflation and unemployment is that price expectations initially remain constant even though there is inflation. This means wages are still set at the same nominal level as before. Firms notice that the unit cost of labour has fallen accordingly, and decide to hire more labour until the real wage is equal to the marginal product of labour again, hence the negative relationship between inflation and unemployment.

The usual explanation for the breakdown of the original relationship is that, over time, wage setters incorporated expectations about inflation into their wage bargains. Inflation was expected to be well predicted by the previous period's inflation, and this pushed wage bargains up and changed the relation between unemployment and inflation to one of unemployment and acceleration

In more recent times there has been some debate over 'which' Phillips curve actually applies. Post-2008, some economists including Blanchard and Krugman have argued that there is evidence against some natural rate of unemployment below which inflation will accelerate. Evidence from the slump in the early 1980s fit well with the 'accelerationist' theory; unemployment soared for some time before returning to where it started while inflation continued to decrease by about 5%. However, in the 2008 recession, unemployment also soared before returning to initial levels while inflation hardly moved. Krugman suggests that "what the data actually look like is an old-fashioned non-expectations Phillips curve", and suggests that this could be due to downward wage rigidity even in the long run expectations.