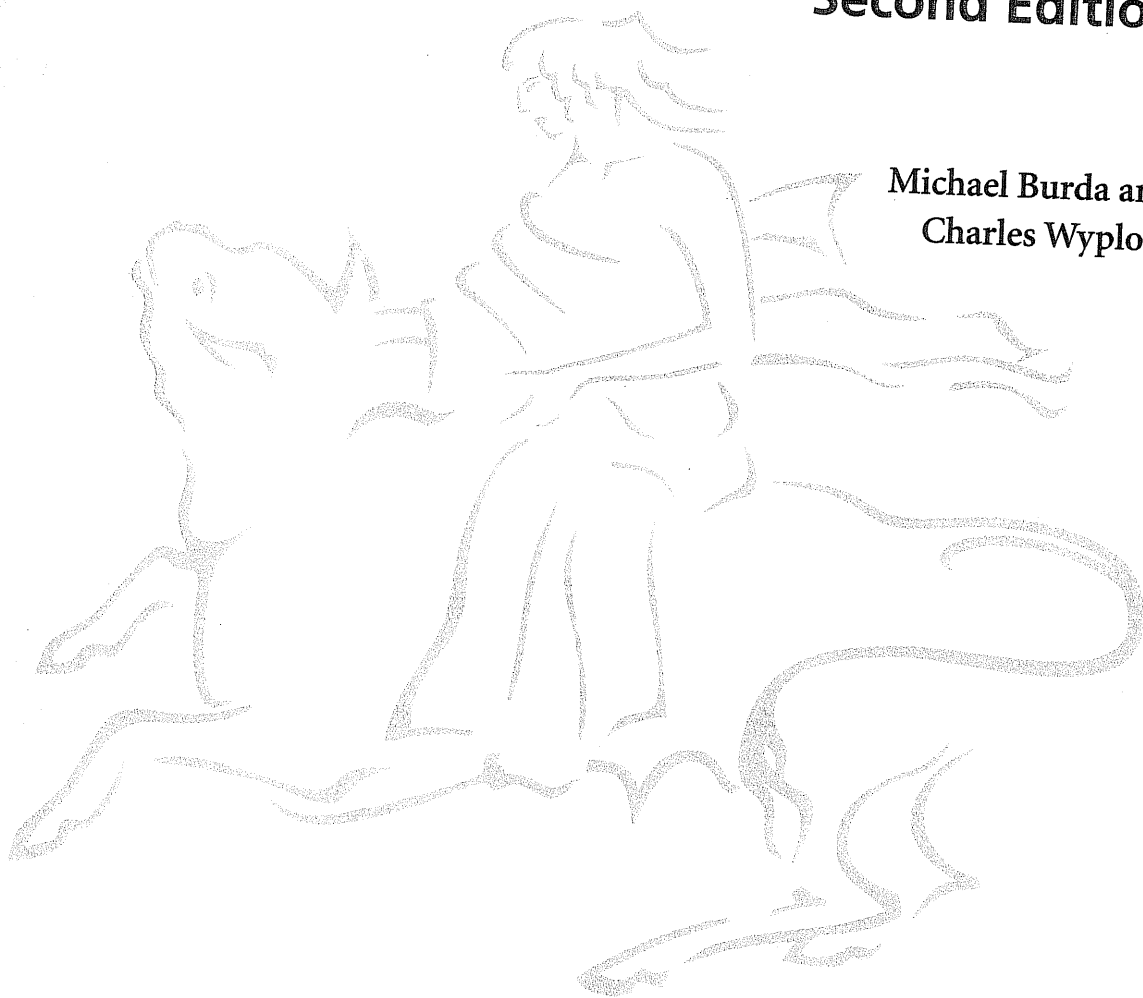


Macroeconomics

A European Text

Second Edition

Michael Burda and
Charles Wyplosz



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Labour Markets and Equilibrium Unemployment

6.1. Overview

6.2. Demand and Supply in the Labour Market

- 6.2.1. Labour Supply and the Labour-Leisure Trade-off
- 6.2.2. Labour Demand, Productivity, and Real Wages
- 6.2.3. Labour Market Equilibrium
- 6.2.4. The Interpretation of Unemployment

6.3. A Static Interpretation of Unemployment

- 6.3.1. Involuntary Unemployment and Real Wage Adjustment
- 6.3.2. Collective Bargaining and Real Wage Rigidity
- 6.3.3. Social Minima and Real Wage Rigidity
- 6.3.4. Efficiency Wages and Real Wage Rigidity

6.4. A Dynamic Interpretation of Unemployment

- 6.4.1. Labour Market States and Transitions
- 6.4.2. Stocks, Flows and Frictional Unemployment
- 6.4.3. Job Finding and the Duration of Unemployment

6.5. The Equilibrium Rate of Unemployment

- 6.5.1. The Concept
- 6.5.2. The European Experience
- 6.5.3. Actual and Equilibrium Unemployment
- 6.5.4. Equilibrium Employment and Equilibrium Output

6.6. Summary

Appendix

Labour is the source of all value.

Karl Marx

In our present day complicated economic life we are likely to be confused by the many industrial operations and money transactions. But net income remains exactly what it was to primitive Robinson Crusoe on his island—the enjoyment from eating the berries we pick, so to speak, less the discomfort or the labor of picking them.

Irving Fisher

6.1. Overview

In the last chapter, available output was determined by the endowment of capital and technical sophistication. The supply of labour was simply taken as given, regardless of the wage or other variables. At any moment of time, therefore, the economy relied on what history had left, i.e. capital, labour, and knowledge. In practice, however, income is not derived just from fixed endowments. Even in storybooks, life is not so simple: Robinson Crusoe had to expend time and effort to gather and transport the fruits that he would eventually consume. Indeed, most people are able to choose whether or not they will work, and sometimes how much they will work or at least how much effort they will put in their work. Households work so that they can consume, but they also desire to spend some time *not* working, which is called leisure or free time. The *supply* of labour is presented as a trade-off between consumption and leisure. Labour must also be in *demand*. For that, it must have value to firms. How the markets value labour and how demand and supply interact is the subject matter of this chapter.

This chapter deals with an important market. Marx had a point when he viewed labour as the most important factor of production. Everything we use stems from labour. Raw materials are drawn from the earth by human hands; equipment used in this process is produced from labour and previously manufactured equipment, itself the output of labourers and capital

in a more distant past. Even the knowledge embodied in people—sometimes called ‘human capital’—comes from our own efforts at mastering skills and techniques, as well as the time our teachers spend in trying to educate us.

As before, we begin the analysis by studying the behaviour of a representative household that supplies labour. Next, we look at demand by a representative firm. This naturally leads into the standard confrontation of demand and supply. Yet, the labour market is not a standard ‘market’. Workers are not identical, and the quality of labour services is difficult to ascertain and harder to monitor. Unlike machines or raw materials, workers can decide whether they would like to work for a particular employer and under which conditions to render labour services. In fact, the employment relationship involves explicit and implicit contractual arrangements with durable features such as personal bonds or firm-specific competence and knowledge. The labour market is also characterized by unique institutions, such as labour law or collective bargaining, and is the object of complex legal and customary rules. Finally, the labour market is a dynamic market, with suppliers of labour entering and exiting unemployment at a remarkable rate. We show how these interactions help understand the concept of equilibrium unemployment, which may differ from actual unemployment.

6.2. Demand and Supply in the Labour Market

6.2.1. Labour Supply and the Labour–Leisure Trade-off

In order to consume, most households need income. In modern societies, earning income means working, or supplying labour to firms in return for a wage or salary. Supplying labour is something that millions of families do every day. Labour has a cost too: every hour worked is an hour less of free time. Because households value both consumption and leisure, they balance the two, just as they balance consumption of goods today against saving and goods tomorrow. As we focus on the **consumption–leisure trade-off**, we ignore the intertemporal aspects which were considered in Chapters 3, 4, and 5. In the now-familiar parable, Robinson Crusoe in this chapter is assumed to consume all that he earns during each period.

6.2.1.1. Preferences

Crusoe's preferences with regard to consumption and leisure are shown in Figure 6.1 using indifference

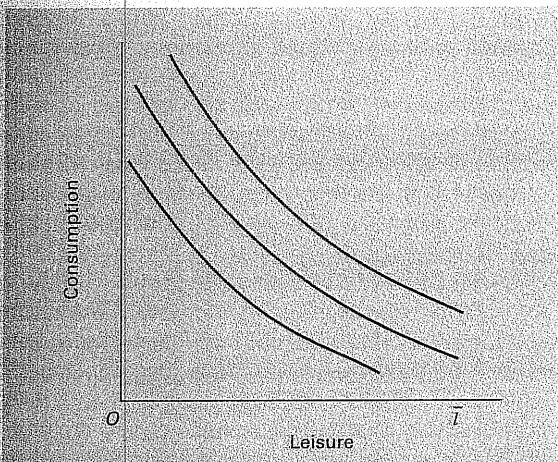


Figure 6.1. Household Preferences

An indifference curve shows the rate at which a representative household substitutes consumption for leisure, holding utility constant. Higher curves correspond to higher levels of utility. The maximum amount of time available is $\bar{\ell}$ hours.

curves.¹ Each indifference curve shows how readily Crusoe substitutes consumption for leisure, holding constant his level of utility or satisfaction. The shape of the indifference curves reflects a decreasing marginal rate of substitution: the greater a household's consumption relative to its leisure, the more consumption it is willing to give up for an additional unit of leisure, or the higher is the marginal rate of substitution of consumption for leisure. As always, higher indifference curves correspond to higher levels of utility.

6.2.1.2. The budget constraint

Crusoe's 'budget constraint' is fixed by the total amount of time, denoted $\bar{\ell}$, available over any given period (a day, a month, a year, or more). Time is a scarce resource and it has a price. The price of an hour of leisure is its opportunity cost: how much can be earned from working instead. Equivalently, the price of leisure is measured in terms of the consumption goods that cannot be consumed for lack of earned income: the price of leisure is then called the **real (consumption) wage**. In practice, it is measured as the ratio of nominal wages (W) to the consumer price index (P).

With $\bar{\ell}$ hours at his disposal and facing an hourly real wage $w = W/P$, the value of Crusoe's total time endowment in terms of consumption is $\bar{\ell}w$. The budget constraint states that this endowment can be allocated between consumption, with value C , and ℓ hours of leisure, with value ℓw :²

$$(6.1) \quad \bar{\ell}w = \ell w + C.$$

Alternatively, the budget constraint can be expressed in terms of 'cash flow' (more accurately, coconut flow). When Crusoe spends ℓ hours of leisure, he works $\bar{\ell} - \ell$ hours and earns $w(\bar{\ell} - \ell)$ coconuts. Since Crusoe does not save, this income $w(\bar{\ell} - \ell)$ is spent on consumption; so

$$(6.2) \quad w(\bar{\ell} - \ell) = C,$$

which is the same as (6.1). The budget constraint is shown in Figure 6.2 as AB . Its negative slope ($-w$)

¹ This is the same idea as in Ch. 4, except that here we look at two 'goods' in a given period, rather than at different points in time.

² The nominal budget constraint is $\bar{\ell}W = \ell W + PC$. To write it in terms of consumption goods as in (6.1), we simply divide by P , the price of consumption goods.

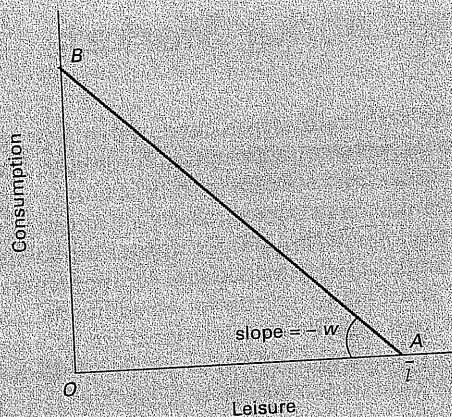


Figure 6.2. The Household Budget Constraint
The household has \bar{l} hours at its disposal (measured by the distance OA) for either leisure or work. For every unit of leisure that it gives up, it can earn a quantity w of consumption goods. The real wage w determines the slope of the budget line AB .

measures the trade-off of consumption for leisure offered by the market: how much consumption must be given up to get an additional unit of leisure. The distance OA is Crusoe's endowment of time, or the fixed number of hours he has at his disposal. The distance OB measures the value of that endowment in terms of consumption goods. It is the total amount of consumption attainable when leisure is zero. If Crusoe had inherited some initial wealth, the budget constraint would be shifted vertically by that amount, which he could consume without having to work at all. If the real wage changes, the budget line rotates around point A , which measures his time endowment \bar{l} . With a wage increase, for example, more consumption can be afforded (OB increases) and the budget line rotates clockwise. If instead the real wage falls, OB declines, and the line turns in a counter-clockwise direction.

6.2.1.3. Optimal choice: the individual labour supply schedule

Crusoe maximizes his utility by choosing the highest possible indifference curve without violating his budget constraint. This is achieved at point R in Figure 6.3, where the indifference curve is tangent to the budget line. At this point, given the going market wage w , he cannot make himself better off by further trading leisure against consumption: the marginal rate of

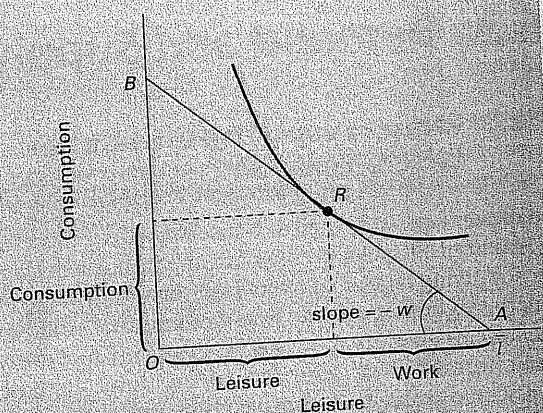


Figure 6.3. Optimal Choice

Given the budget constraint, the highest possible utility is achieved at point R , where an indifference curve is tangent to the budget line.

substitution of consumption for leisure and the wage are equal.

In the first panel of Figure 6.4, an increase in the real wage changes Crusoe's consumption-leisure choice from R to R' . It is useful to distinguish two effects. First, Crusoe faces a higher opportunity cost of leisure in terms of consumption goods. Work has become relatively more attractive and a rational Crusoe responds by choosing less leisure and more consumption. This is the **substitution effect**. The second effect works in the opposite direction. An increase in the wage allows Crusoe to enjoy both more consumption and more leisure: this is the **income effect**. For this reason, moving from R to R' , Crusoe's consumption increases, but the effect on leisure (and work) is ambiguous.

The right-hand side panels of Figure 6.4 show how the relative strengths of the income and substitution effects translate into different individual labour supply curves. The labour supply curve shows how much labour an individual is willing to supply at each level of the real wage. In panel (a) the income and substitution effects exactly cancel: leisure—and labour supply—remain unchanged. This is the 'benchmark' case where labour supply is inelastic, or unresponsive to the real wage. If the substitution effect predominates, Crusoe responds to higher real wages by reducing his leisure time: labour supply is elastic (panel (b)). In panel (c) the income effect dominates: both consumption and leisure increase. In this case labour supply is

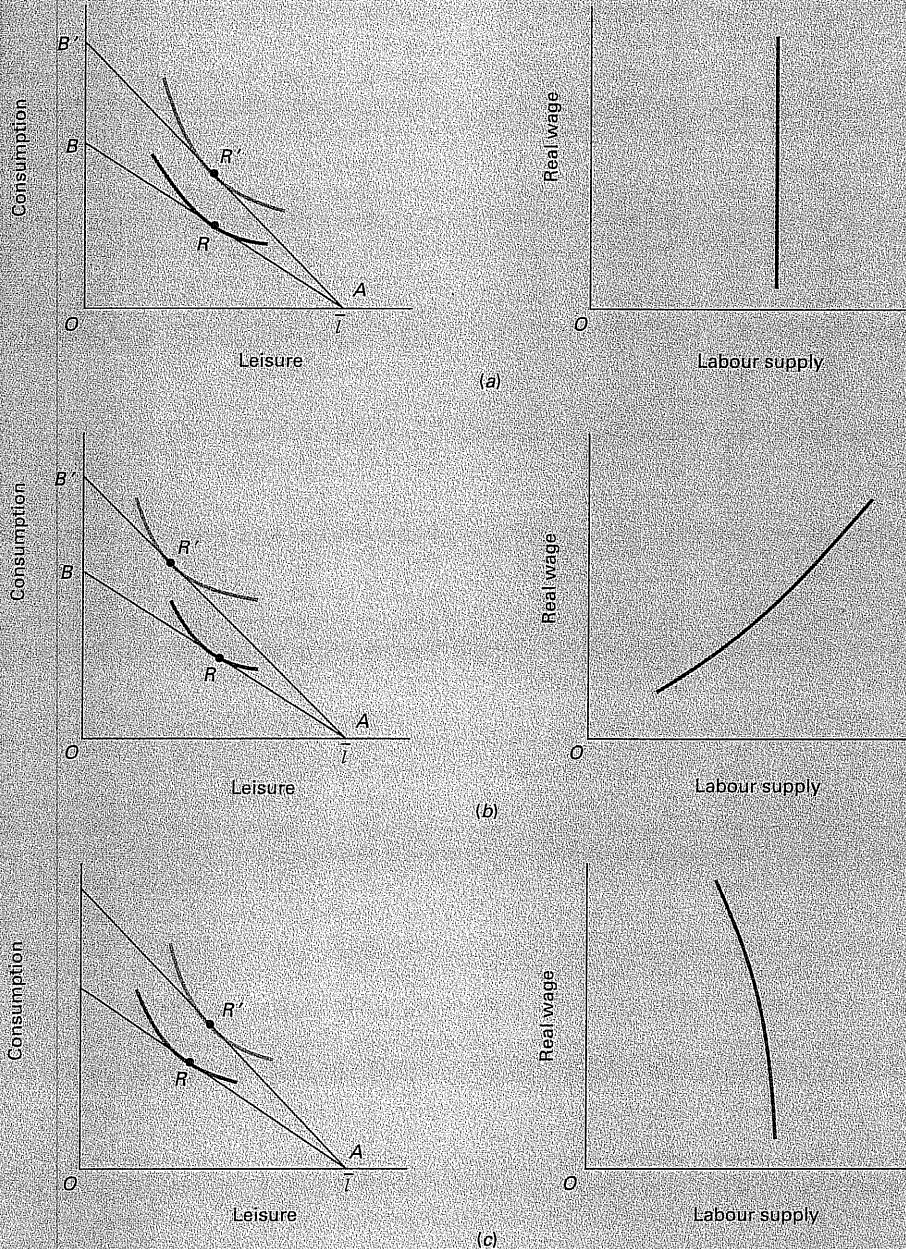


Figure 6.4. Labour Supply

When the real wage increases, the budget line rotates around point A (the endowment of time remains unchanged) and becomes steeper, because a unit of leisure is exchanged for more units of consumption. This allows both consumption and leisure to increase at the same time (income effect). Because leisure is more expensive, however, some is given up (substitution effect). In case (a) income and substitution effects exactly cancel in the left-hand panel and labour supply, shown in the right-hand panel, is vertical. In case (b) the substitution effect dominates, leisure is reduced, and the labour supply schedule is upward-sloping. In case (c) the income effect dominates, leisure increases, and labour supply is backward-bending.

Table 6.1. Annual Total Hours Worked and Average Wages, 1870–1987

	1870	1913	1938	1987
Annual hours worked per person				
France	2945	2588	1848	1543
Germany	2941	2584	2316	1620
UK	2984	2624	2267	1557
USA	2964	2605	2062	1608
Sweden	2945	2588	2204	1466
Real wage (index: 1870 = 100)				
France	100	205	335	1358
Germany	100	185	285	1227
UK	100	157	256	589
USA	100	189	325	643
Sweden	100	270	521	1439

Sources: Hours worked are from Maddison (1991); wages are from Mitchell (1978, 1983) and OECD, *Main Economic Indicators*; German wage data from 1913–38 are approximated using average labour productivity growth

backward-bending as increases in the real wage actually reduce the supply of labour.

In practice, the response of labour supply to a change in wages depends on the time horizon under consideration. In the short run, individuals do not seem to react much to changes in the real wage (the inelastic case). In the next section, it is shown that aggregate labour supply is generally more elastic than individual supply in the short run. In the long run, labour supply is backward-bending. This is what Table 6.1 shows. Over the last 100 years, real wages have increased by five- to fifteen-fold, while working hours have declined by one-half.

The evidence from Table 6.1 has to be interpreted carefully, though, as labour supply varies according to sex. For men, the average work-week, the retirement age, and the rate of labour force participation (the proportion of working-age people working or registered as unemployed) have fallen secularly since 1900. For women, labour force participation and hours per week have clearly risen. One possible interpretation is that the income effect of higher wages dominates for men, whereas the substitution effect dominates for women. At the same time, changing customs and sociological factors, as well as publicly supplied services such as child care and schooling, must also play a key role in these developments.

6.2.1.4. The aggregate labour supply curve

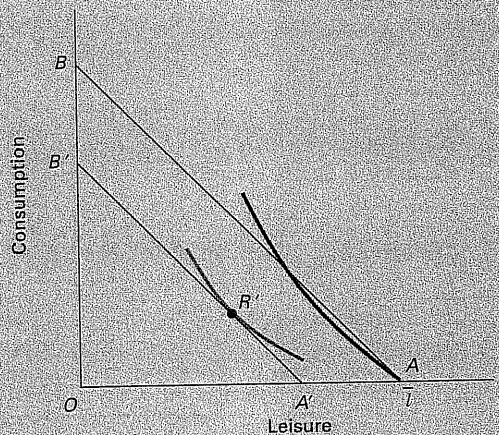
In practice, there is an important difference between individual and aggregate labour supply. The individual decision has been described as deciding how much time to spend working. In many instances, individuals cannot vary the hours of work that they supply; at best, they can choose between working or not working at all. Most labour contracts specify a standard working time (length of the work-week, days of leave per year). It is a matter of 'take it or leave it'. Box 6.1 presents two cases where a worker actually prefers not to work at all. In both cases, wage increases are not enough to motivate him to take up a job, although large ones would do so.

The aggregate labour supply curve is the sum of many individual decisions (to work or not work, and how many hours to work). While individual labour supply is measured in hours (for example per year), aggregate supply is measured in man-hours, the total amount of hours supplied by all workers (men and

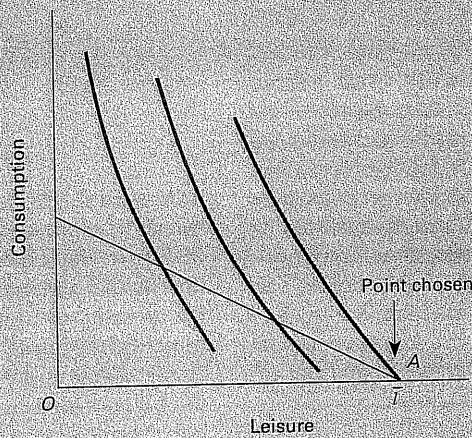
BOX 6.1. LUMPINESS IN THE LABOUR SUPPLY DECISION

In Figure 6.5(b), Crusoe-the-Hermit is not willing to give up much leisure (lonely contemplation) for consumption. His indifference curve is too steep (his marginal rate of substitution of consumption for leisure is too high) for him to work at all at the going wage. He chooses corner point A. In panel (a) Crusoe has to commute to get to work, which costs him a quantity AA' of unpaid leisure. In this example, Crusoe chooses not to work unless the wage is sufficiently high. In both cases, there is a wage

rate high enough to coax Crusoe out of his decision not to work. If the actual labour force consists of a mixture of workers of the types displayed in Figures 6.4 and 6.5, an increase in real wages will bring some individuals into work, while those already working may not vary their labour supply. A flatter aggregate supply curve will emerge from vertical or near-vertical individual supply curves.



(a)



(b)

Figure 6.5. Crusoe Stays Home

Crusoe may decide not to work at all, choosing point A. In panel (a), going to work costs him AA' (time and transportation). If he stays home, only A is feasible; if he goes to work, his budget line is $A'B'$, in which case R' is the best choice. He is better off at point A than at point R' . In panel (b), the real wage is simply too low to compensate his preference for leisure given by his indifference curves.

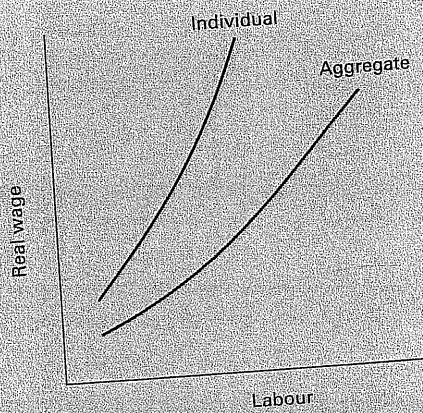


Figure 6.6. Individual and Aggregate Labour Supply

The aggregate labour supply curve is less steep than the individual one because new workers choose to enter the labour force as wages rise.

women, of course).³ When wages rise, even if those who already work do not modify their supply of labour (the benchmark case), others who had preferred not to work now decide to join the labour force. Figure 6.6 shows how it is then possible for a steep or even vertical (inelastic) individual supply curve to coexist with a flatter aggregate supply curve.

6.2.2. Labour Demand, Productivity, and Real Wages

6.2.2.1. Labour demand and the extended production function

The analysis of labour demand has already been discussed briefly in Chapter 5. It is virtually identical to the analysis in Chapter 4 of the optimal stock of capital, in which a representative firm takes employment as given. Here, the capital stock is given and we study the optimal demand for labour. When the capital stock is constant, the firm can change the amount of output produced by adjusting the amount of labour (man-

³ Aggregate employment is sometimes measured as the number of people who have a job. Generally, we will use the first definition (man-hours), and make explicit mention when referring to the number of employed workers. Under any definition, when more workers enter the labour force, the labour supply curve shifts to the right independently of the wage level.

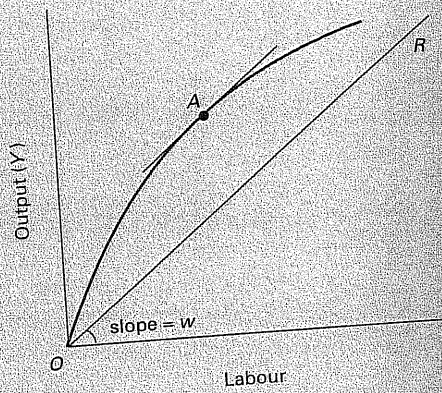


Figure 6.7. The Production Function

When more work is added, output increases but at a declining rate. This additional output is the marginal productivity of labour (MPL). The ray OR represents the cost of using L hours of work when the hourly real wage is w . The distance between the production curve and the cost line represents the firm's profit. It is at a maximum at point A , where the curve is parallel to OR , i.e. where $MPL = w$.

hours) used. The link between output Y and employment L is captured by the production function shown in Figure 6.7. The slope of the production function measures the **marginal productivity of labour (MPL)**, the quantity of additional output obtained when one more unit of input (an hour) is used. The shape of the curve reflects the principle of decreasing marginal productivity; the MPL is declining as the amount of labour employed increases.

In deciding how much labour to employ, the firm looks for the highest possible profit given the hourly real wage w . The line OR represents the cost of labour to the firm: its slope is w since L hours of work cost wL . For each level of employment, profit is measured as the vertical distance between the curve depicting the production function and the labour cost line OR . It is at a maximum at point A , where the curve is parallel to OR and the MPL is equal to the real wage. If the MPL exceeds the real wage, hiring one more hour of work raises profits by MPL and costs by only w , implying an increase in profits. The firm would therefore hire the extra hour and would continue doing so until the MPL has declined to the point where it is equal to the real wage. In the opposite case, in which the real wage exceeds the MPL, the firm can increase its profit by reducing its demand for labour. Because

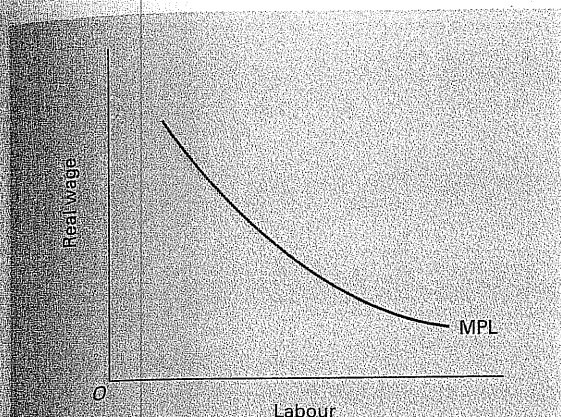


Figure 6.8. Labour Demand Curve

The firm maximizes profits when $MPL = w$, so its demand for labour is given by the declining marginal product of labour (MPL) curve.

it is optimal to set labour such that $MPL = w$, the MPL schedule in Figure 6.8 is also the labour demand curve.

6.2.2.2. Wage and profit shares

The portion of GDP that goes to workers is called the *wage share* and is given by wL/Y . The rest, the *profit*, or *capital share* ($1 - wL/Y$), goes to firm owners.⁴ Obviously, these two shares move in opposite directions. But what is the effect of an increase in wages on the labour share? At the given employment level L , labour costs (wL) rise because an hour of work (w) costs more. With higher wages, however, total employment (L) is reduced as firms move down their labour demand schedules. The effect on the numerator of the labour share is therefore ambiguous. At the same time, a decline in employment generally means a decline in output, and therefore a decline in the denominator. If the demand for labour is not very elastic, neither labour demand L nor output Y change much in response to an increase in the real wage. Then both total labour costs and the labour share increase, while the profit share declines.

Changes in the labour share are important for two reasons. First, the distribution of income between capital and labour has political elements that can affect the behaviour of governments. Second investment responds to profitability, which is related to the profit

⁴ This is not quite accurate: in fact, rental income, patent and royalty payments, and other minor factor incomes have been ignored.

share. Investment, in turn, affects growth.⁵ When labour demand is rather inelastic, therefore, exogenous wage increases may reduce profitability, Tobin's q , investment, and the standard of living.

6.2.2.3. Shifts in the demand for labour

Now consider the effects of an increase in the capital stock K , which was assumed constant so far. Figure 6.9(a) shows that this normally raises MPL—the production function becomes steeper at every level of production. The labour demand curve shifts out in panel (b). A technological improvement that shifts out the production function produces a similar effect.⁶ This helps account for the fact that wages have grown secularly over time.

6.2.3. Labour Market Equilibrium

We now have the building blocks for understanding the labour market: a supply curve derived from household behaviour, and a demand curve derived from firm behaviour. The interaction of supply and demand for labour is depicted in Figure 6.10. Equilibrium occurs at the intersection of the two curves (point A). At wage w^* the market clears (there is no excess demand or supply): L^* is the number of hours firms want to hire and households want to work. Both the real wage rate and employment are endogenously determined in the labour market.

This simple characterization of the labour market will serve as the benchmark for the rest of the chapter. Figure 6.11(a) provides an example of its usefulness. It depicts an increase in labour productivity, which has occurred over centuries as the result of capital accumulation and technological advances. The labour demand curve shifts outward; the supply curve is unaffected. The effect is an increase in living standards as real wages increase. If the labour supply curve is perfectly vertical, employment remains unchanged and labour income wL rises proportionally to the real wage. If the supply curve is backward-bending, employment

⁵ The inverse relationship between real wages and the profit share is illustrated in Ch. 1, Fig. 1.4. The link between investment and profits is studied in Ch. 4. The growth effects were analysed in Ch. 5. The Appendix presents a formalization of this section.

⁶ Ch. 5 discussed technical change. An exception would be a *labour-saving* technical change, such as robots, which would reduce the demand for labour at any wage and shift back the demand for labour.

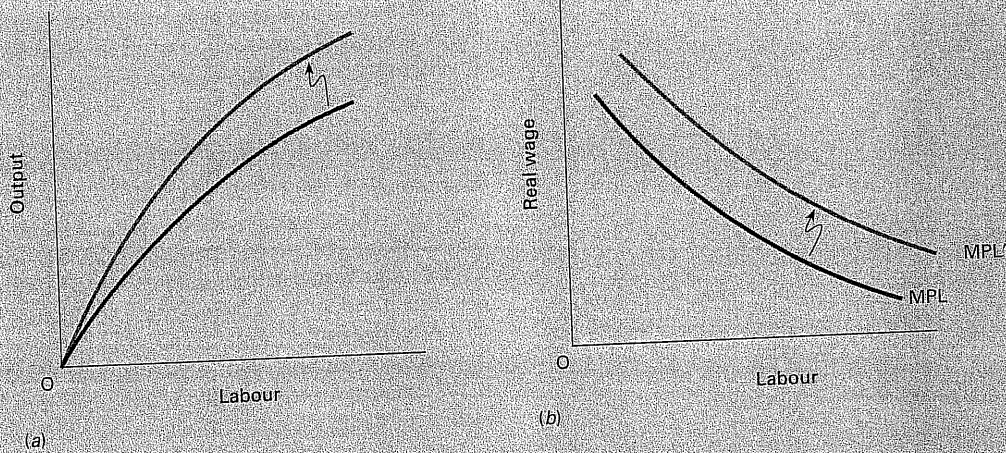


Figure 6.9. An Increase in Labour Productivity

Labour becomes more productive either because more capital is put in place or because of technological progress. In panel (a), at any level of labour input, more output is produced and the production function is everywhere steeper. The MPL increases and the demand for labour schedule shifts up in panel (b).

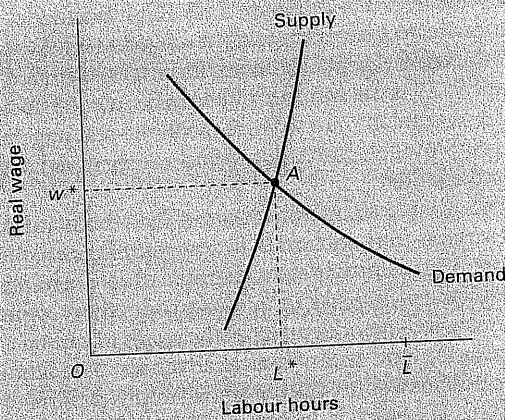


Figure 6.10. Equilibrium in the Labour Market

Labour market equilibrium occurs at point A where demand and supply are equal. The real wage w^* clears the market at employment level L^* . If total labour endowment is \bar{L} , the distance $(\bar{L} - L^*)$ is voluntary unemployment.

(man-hours) declines while real wages increase. Table 6.1 seems to indicate that this has been the case over the past century. The second panel of Figure 6.11 shows that an exogenous increase in the supply of la-

bour leads to an increase in employment in the short run, but also to a reduction in real wages.⁷

6.2.4. The Interpretation of Unemployment

While the supply-and-demand apparatus allows us to evaluate the effect of various changes on equilibrium employment and real wages, it is disappointing in one crucial respect. At point A in Figure 6.10, labour supplied is equal to labour demanded. Any unemployed resources correspond to voluntary decisions of households and firms. If total available labour supply is \bar{L} , unemployment (measured as hours of work not hired) is measured as $\bar{L} - L^*$. Since point A is on the labour supply curve, it corresponds to the optimal behaviour of households. The interpretation of Figure 6.10 is that the equilibrium real wage w^* is too low to persuade all workers to give up leisure: some may wish to work only part-time, others may not want to work at all.

It might be disturbing to think that unemployment could be chosen freely. Yet **voluntary unemployment** is an important phenomenon. It is not only the very

⁷ Ch. 5 gives a longer-run perspective on the effects of exogenous increases in the working population.

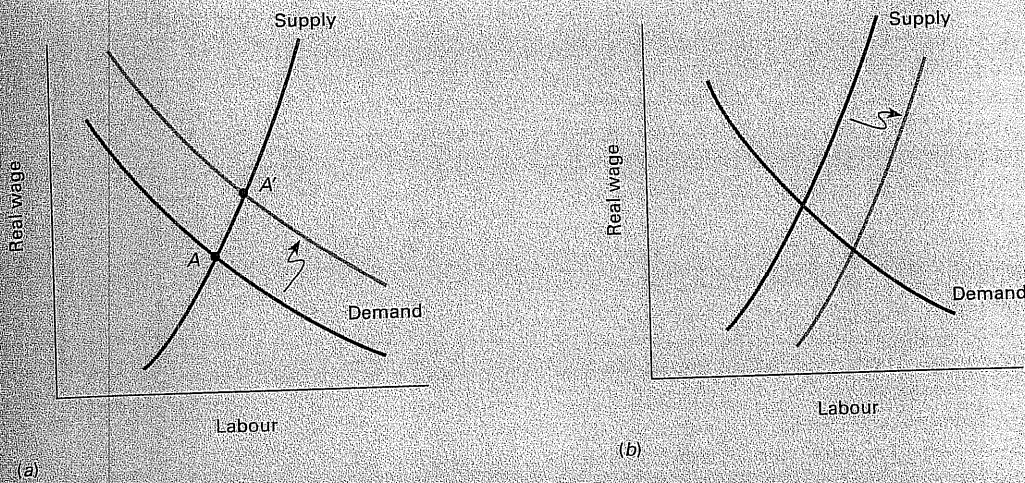


Figure 6.11. Shifting Labour Demand and Supply

When labour demand increases (panel (a)), for example because of additional capital or technological progress, the real wage and the employment level both increase. When labour supply increases instead (panel (b))—because of new entries into the labour force, for example—employment rises but the real wage declines.

wealthy who can afford not to work: those who receive an income from other sources (from a spouse or from the state, for example) may also find that the net wage they can earn does not compensate for lost leisure or nonmarket activities, including working at home or raising children. Voluntary unemployment is likely to be more widespread among low-skilled people who cannot hope to earn much, or in countries where taxes are so high that working yields little net gain.

Box 6.2 shows that it may actually be costly to take up a paid job. The most obvious costs are faced by families with children. The cost of child care—or sim-

ply the unavailability of such services—explains why two-earner families are not as common in some countries as in others. Table 6.2 presents the proportion of women of working age in the labour force, whether employed or not (the participation rate), the female unemployment rate, and the proportion of women of working age actually employed. The variation of these proportions is quite substantial across countries, and points to differences in both cultures and institutions. Female participation in the labour force is very high in countries like Denmark and Sweden, which have a highly developed and subsidized child care system.

BOX 6.2. HOW CAN A JOB COST MONEY?

The social systems of most countries share two institutional features. First, poor people receive transfers—income maintenance programmes—from the state. Second, income taxes are progressive: the rate of taxation increases as income rises. Taking up a job implies receiving a salary, but also paying taxes if the salary is high enough, and losing eligibility for income maintenance programmes. It is conceivable then that people can be finan-

cially worse off by taking a job, not to mention incurring a loss of leisure, and possibly some activity in the underground (shadow) economy. Implicitly, these people face an effective marginal tax rate—considering the overall effect of work on their income—in excess of 100%. A study in Britain in 1986 reveals that 2% of households faced a marginal tax rate of 60% and above, in some cases above 100%.

Table 6.2. Female Labour Force Participation Rates, Unemployment Rates, and Employment Ratios, 1993

	Participation rates	Unemployment rates	Employment ratios
Belgium ^a	54.1	9.5	46.4
Canada	65.3	10.5	58.4
France	59.0	13.8	50.9
Germany ^{b, c}	58.2	6.4	54.5
Ireland ^b	39.9	15.4	35.1
Luxemburg ^b	44.8	2.8	43.9
Netherlands ^a	55.5	7.3	50.6
Portugal	61.3	6.5	57.2
Spain	42.8	28.9	30.5
Sweden	75.7	6.6	70.7
UK	65.3	5.4	55.0
USA	69.1	6.5	64.6

^a 1992 ^b 1991 ^c West Germany only
Source: OECD Labour Force Statistics

6.3. A Static Interpretation of Unemployment

Our first attempt at defining unemployment in the last section was somewhat unsatisfactory. Unemployment is more than simply labour voluntarily withheld from the market. The International Labour Organization (ILO) or the Organization for Economic Cooperation and Development (OECD) define an individual as unemployed if he does not have a job during the reference period *and* is actively looking for one *and* is ready to work.

The labour force is then defined as the part of the population (N) that is either working (L) or unemployed (U). The labour force mainly excludes young people in school, the retired, and those who do not wish to work. Thus we can write:

$$(6.3) \quad N = L + U$$

labour force employment unemployment

The rest of this chapter sets out to examine alternative reasons for unemployment as well as its implications for the well-being of society.

6.3.1. Involuntary Unemployment and Real Wage Adjustment

One interpretation of unemployment is the failure of markets to clear. In contrast with the assumption that

real wages adjust to clear the labour market, Figure 6.12 considers the case where the real wage is fixed at w' , which is higher than the market-clearing level w^* . At w' firms are willing to hire a quantity L' of labour, while workers supply L'' . Since firms cannot be forced to hire more than they wish, actual employment is L' , and $L'' - L'$ is labour supplied but not demanded by the market. If the real wage were to decline to w^* , demand would increase, supply would decrease, and full employment be restored at L^* .

In Figure 6.12, it is the failure of the real wage to decline that creates unemployment. **Involuntary unemployment** occurs when an individual is willing and able to work at the wage w' but cannot find a job, no matter how hard he or she tries. This is a key result: the existence of involuntary unemployment must be explained by real wage rigidity, which we examine next.

6.3.2. Collective Bargaining and Real Wage Rigidity

For sustained real wage rigidity to occur, market processes must be prevented from running their course. Somehow, involuntarily unemployed workers must be

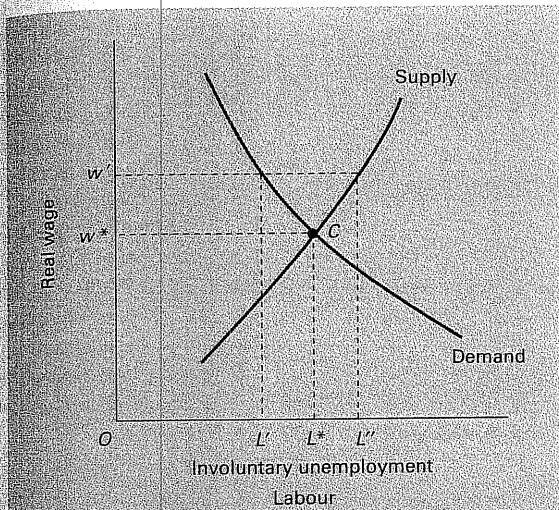


Figure 6.12. Involuntary Unemployment

At the real wage rate w workers supply L'' of labour but firms demand, and hire, only L' . The quantity $L'' - L'$, which is supplied by households but not demanded by firms, represents involuntary unemployment. If the real wage were to adjust to the level w^* , the market would clear at point C.

unable to supply their labour services at wages below w^* , or firms must be unwilling to take up such offers, or be unable to make their own. What important institutional feature has been overlooked so far? Labour unions are one of the most fundamental and universal institutions that operate in modern economies. They are matched by equally powerful employers' associations, such as the CBI in the UK, the CNPF in France, the BDA in Germany, or the SAF in Sweden. The perfect-competition description of labour markets of Section 6.2 contrasts sharply with the bilateral bargaining commonly observed in Europe between employers and unions. We first characterize the economic role of trade unions to discover how unemployment can be voluntary from the perspective of trade unions and nevertheless be involuntary from the viewpoint of the individual household.⁸

6.3.2.1. Labour unions and their rationale

The employer-employee relationship has inherently conflictual aspects. One reason for this is the distribu-

⁸ It should be stressed that we limit ourselves strictly to the economic significance of trade unions. As the history of the labour movement amply demonstrates, unions have had an enormous influence on modern society which goes beyond economics.

tion of income; economic principles assert that income should be split according to marginal productivity, but marginal productivity is not easily measured, and economic principles are not always adhered to. Another more subtle reason is that firms need to monitor effort at work, a key element of productivity, which is under the control of each individual employee. Individual workers facing a large employer are in a poor bargaining position. They have little influence over their own wage rate and may not even feel safe discussing working conditions, fearing reprisals in the form of a salary cut or dismissal. They may also feel pressure from powerful employees to accept conditions that would not be acceptable under competitive conditions.

To resist such pressures, but especially to achieve higher pay levels and a voice in the day-to-day operation of the workplace, workers have organized themselves into trade or labour unions. As Table 6.3 shows, union organizations vary considerably from country to country. Scandinavian countries have a tradition of centralized unionization; Britain is organized according to craft; France, Italy, and Spain have unions with ties to political parties. These differences reflect social history as well as the costs and benefits associated with union membership. The costs are dues that members must pay. The benefits vary, ranging from higher wages and protection from arbitrary employer decisions to more specific advantages, including priority for certain jobs and income supplements when unions are on strike. In some countries, many advantages accrue to all workers, so there is little point in paying the union dues. This is the case in France, for example.⁹ In other countries, such as Belgium and Scandinavia, unions manage funds that hand out some social benefits. In the USA, some unions even issue credit cards and provide other services to their members.

6.3.2.2. The economics of labour unions

Unions have two major economic objectives: higher real wages, and more jobs.¹⁰ It is useful to think of their preferences in terms of indifference curves as shown in Figure 6.13. The slope of the indifference curve represents the willingness of the union leadership to trade off employment for wages. Panel (a) describes the average union which accepts a trade-off between employment and higher wages. A 'hard-line' union which

⁹ This is an example of the so-called free-rider problem. If no workers pay dues, the union disappears and no one is protected. So some workers must pay the dues for all to have a union.

¹⁰ This is a simplification, of course. Unions care for other things too, such as safety at work, working time, workers' say in working conditions and organization.

Table 6.3. European Trade Unions: Structure and Membership, 1970 and 1988

Country	Structure and principal unions	Union density ^a	
		1970	1988
Austria	Umbrella/industrial (ÖGB)	59.8	45.7
Belgium	Party, religious (FGTB, CSC, CGSLB, CNC)	46.0	53.0
Denmark	Umbrella (LO)	60.0	73.2
Finland	Umbrella (SAK)	51.3	73.3 ^b
France	Party, religious (CGT, CFTD, CFTC, GGC, FO)	22.3	12.0
West Germany	Umbrella/industrial (DGB, DAG)	33.0	33.8
Ireland	Mostly crafts in ICTU, fragmented	53.1	52.4 ^c
Italy	Party, religious (CGIL, CISL, UIL)	36.9	39.6
Neth.	Party, religious (FNV, CNV, RMHP, AVC)	37.0	25.0
Norway	Umbrella (LO, AF, YS)	50.6	57.1 ^a
Sweden	Umbrella (ILO, TCO, SACO/SR)	67.7	85.3
Switz.	Mostly plant-level (SGB)	30.7	26.0 ^b
UK	Mostly crafts (96 in TUC, fragmented)	44.8	41.5
memo: USA	Mostly local plant-level (AFL-CIO)	22.8	16.4 ^a

^a Union density is the percentage of employed workers who are union members. (Unemployed workers are not counted.)

^b 1989 ^c 1987

Sources: OECD, *Employment Outlook*, July 1991; Barnouin (1986); Roberts (1985)

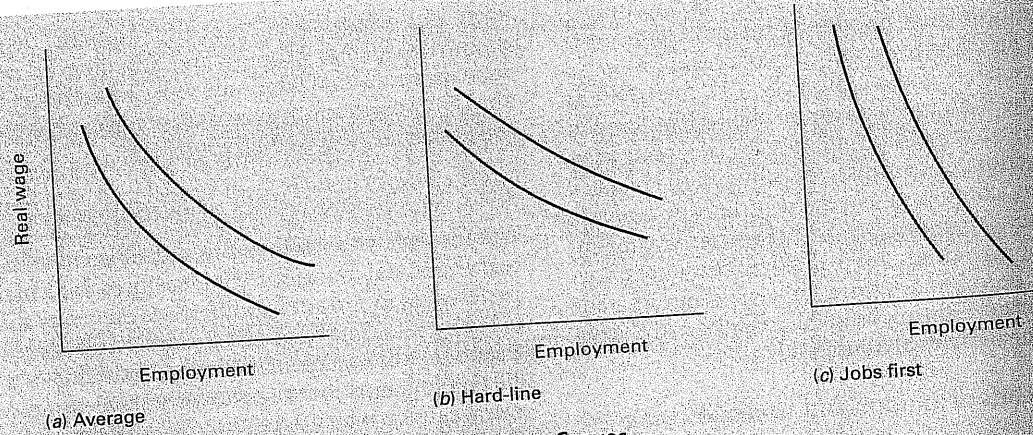


Figure 6.13. Trade Unions' Indifference Curves

When a trade union values both higher wages and more employment, its preferences are described by indifference curves. A 'hard-line' union is not willing to give up much in lower wages to raise employment. A union mainly preoccupied with employment is represented by steep indifference curves.

goes for high wages is represented in panel (b): here the curves are flatter as the union is not willing to give up much in terms of real wages for additional employment. A union that cares more about jobs than wages is characterized in panel (c) by steep indifference curves.

In contrast to Section 6.2, union indifference curves replace the representative individual's indifference curves, symbolizing the fact that the active agent in the labour market is not the individual, but his or her trade union—or, more generally, the collective bargaining process. The 'budget line' faced by the union is the demand for labour. From Section 6.2.2 we know that labour demand is given by the MPL (either a firm's

MPL, or that of an industry or the entire economy: if firms are all alike, their individual demand does not differ from the collective one defended by an employers' association).

The optimal choice for the union is the tangency point between the highest indifference curve and labour demand. When the demand for labour shifts out—as a result of capital accumulation or technological progress, for example—the successive tangency points map out a collective labour supply curve as represented in Figure 6.14. The curve describes the most desired joint evolution of real wages and employment from the union's viewpoint.

The shape of the collective labour supply curve

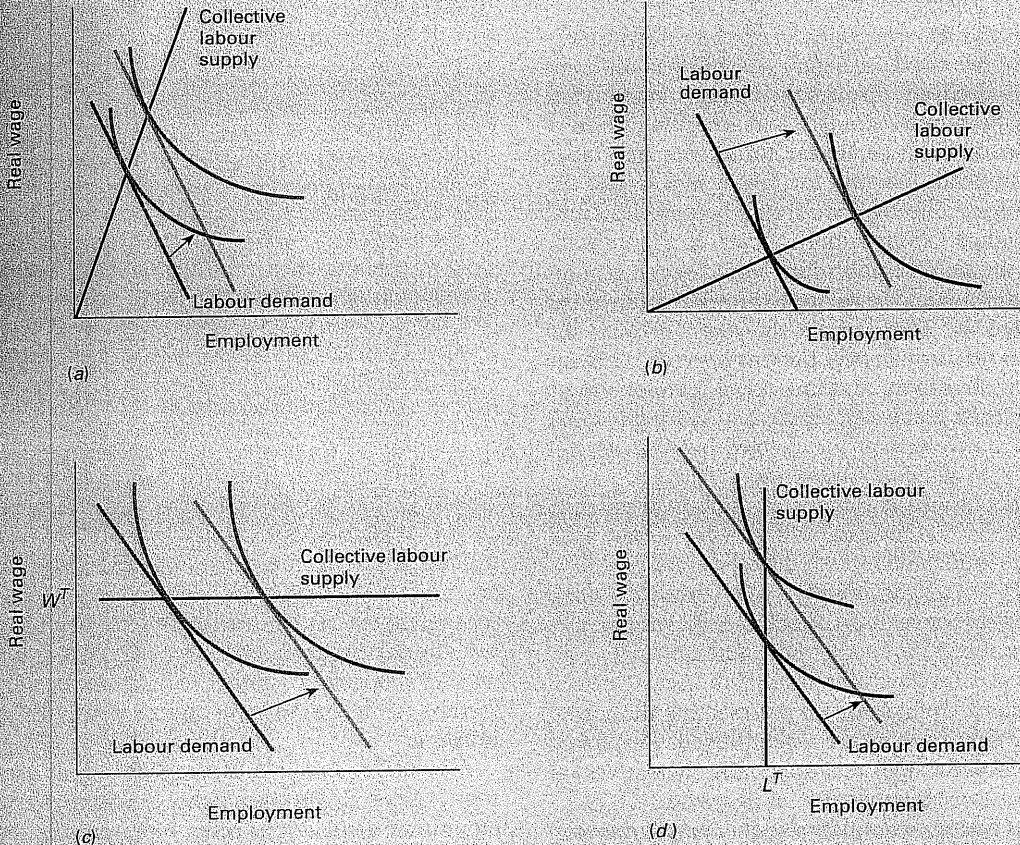


Figure 6.14. The Collective Labour Supply Curve

The collective labour supply curve is obtained by connecting the points of tangency between the indifference curves and a shifting labour demand schedule. Panels (c) and (d) respectively describe unions with a target wage level w^T and target employment level L^T . Panels (a) and (d) give rise to steep schedules, whereas (b) and (c) are associated with real wage rigidity and a more elastic supply of labour.

reflects the preferences of the union, as shown by the various panels of Figure 6.14.¹¹ Panel (a) is an example of a 'hard-line' union with a steep trade-off of wages for employment; panel (b) is the counter-example of a 'jobs-first' union requiring only moderate wage increases to supply more labour. Panel (c) shows a union with a well defined real wage target ready to accept a wide latitude of employment outcomes, yielding a flat collective labour supply curve at the target level. The other extreme is panel (d), which aims at a given level of employment, and is willing to set wages at whatever level is necessary to keep this group employed.¹² The appendix provides a formalization of these ideas.

6.3.2.3. Employment effects of collective bargaining

The collective labour supply curve resembles the individual supply curve of Figure 6.6, but has different origins. Collectively, through their unions, workers feel that they have more strength and accordingly aim at better outcomes. In particular, for a given amount of labour supplied, they ask for higher real wages: the union-driven collective labour supply curve lies above the individual labour supply curves. In Figure 6.15, without the union equilibrium would occur at point B: individuals would be willing to provide employment L_2 at wage w_2 . They cannot, however, because the wage w_1 is set through negotiations between the firms and the trade union, and individuals cannot simply underbid their employed colleagues. Unemployment ($L'_1 - L_1$) is involuntary for affected individuals, but voluntary from the union's point of view.

Why do unions enforce wage rigidity apparently against the will of unemployed workers? One reason is that the leadership is elected by the employed. Unemployed workers are always a small minority of the membership, even at record high unemployment rates of 10% or even 20%. Furthermore, unemployed workers often give up their membership or lose interest in union affairs. Unions end up representing those who work, not those who are unemployed. Employed workers look for high real wages (for themselves) at the cost of some unemployment (for others). Box 6.3 illustrates how the relentless rise of unemployment in Europe after the two oil shocks can be explained by this effect.

¹¹ A technical note: this is true only for a given shift of the labour demand curve. Here we consider only parallel shifts; one could imagine however, that other types of shifts would change both the position and the slope of the labour demand curve.

¹² This group may be the current union members, or the subset of the membership that is employed, or some core of so-called 'insiders', those members with sufficient seniority.

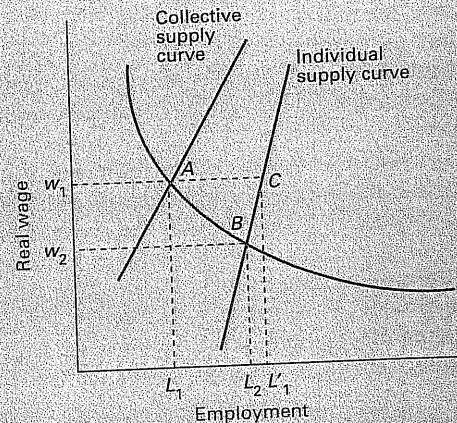


Figure 6.15. Labour Market with a Trade Union

When a labour union represents workers at wage negotiations, labour market equilibrium occurs at point A. If the union collective labour supply curve is above the individual labour supply curve, the real wage w_1 is higher and employment L_1 (hours or number of workers) lower than at point B, which would be the outcome if individuals were negotiating individually. The result is the existence of **union-voluntary, individual-involuntary unemployment** ($L'_1 - L_1$): it is the difference between actual employment L_1 and the amount of work L'_1 that workers are individually willing to supply at the real wage rate w_1 .

The split between unions and unemployed workers cannot go too far, though. After unemployment increased to high levels in Europe in the 1970s and 1980s, unions have become more employment-conscious and real wage growth has moderated. One reason is that members become worried that they too might become unemployed. Another is that the loss in membership revealed in Table 6.3 above has meant lower income for the union from dues as well as less overall influence.

It would be unfair to assert that unions are solely responsible for real wage rigidity. As mentioned above, employers' associations often represent the interests of firms. They provide a means for policing collective bargaining agreements reached with unions. In the end, employers' associations do not control the demand for labour: this is the prerogative of the individual companies. While it is in firms' interest to keep wages low, it is also in their interest to keep the wages of their competition high, or at least to prevent their competitors from hiring cheap labour. Thus, employers' associations also contribute to real wage rigidity.

BOX 6.3. THE HYSTERESIS EFFECT

The two oil shocks of the mid-1970s and early 1980s correspond to a significant inward shift of the aggregate labour demand curve in Figure 6.15, hence to less employment. If trade unions respond to a narrower membership by calling for higher wages, the collective labour supply curve shifts upward. Owing to the behaviour of the 'insiders' who have jobs, employment prospects for 'outsiders' are reduced. After the oil shocks are absorbed,

the employment level is permanently reduced. That such an effect—dubbed the 'hysteresis effect'—has been observed in several European countries is suggested by the step-wise increase in the unemployment rate following each oil shock (Figure 6.16). In contrast, in the USA and Japan, where unions may have been less 'hard-line', unemployment rates increased at the time of each oil shock but then reverted towards earlier levels.

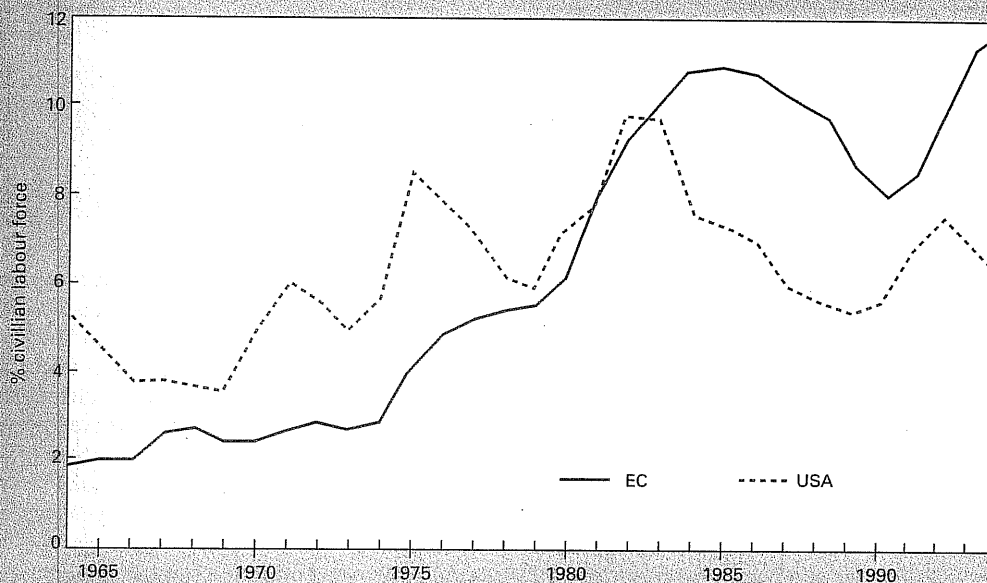


Figure 6.16. Hysteresis in EC/EU Unemployment, 1965–1994

The unemployment rate increased in both the EC/EU and the USA after the two oil shocks. In the USA the rate has since come down, to about where it was in the early 1970s. In the EC/EU, the unemployment rate seems to suffer from hysteresis, stabilizing wherever unexpected shocks move it.

Source: IMF, *World Economic Outlook*, October 1995

6.3.3. Social Minima and Real Wage Rigidity

Involuntary unemployment occurs when real wages are downwardly rigid. Beyond monopolistic behaviour by trade unions and employers' associations, several other institutional and economic factors contribute to wage rigidity. Among institutional factors frequently suspected are social minima, or minimum standards for income and earnings mandated by the government for reasons of social equity or protection.

Minimum wages prevent wages from declining below some level. Many countries legislated minimum wages long ago for a variety of reasons. One was to prevent employers with too much market power from depressing wages artificially. Another reason was to protect young people from exploitation. With schooling rudimentary and poverty endemic, for many youngsters on-the-job training was the only way to get started; unscrupulous employers would offer very low wages, sometimes below minimal survival needs. Social protection was and still is justified; but, paradoxically,

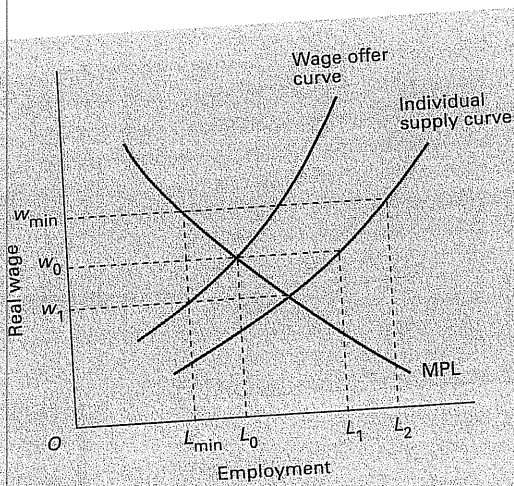


Figure 6.17. Minimum Wages

Minimum wages reduce the demand for labour below the level that would result with either union-negotiated wages or individual-supplied labour.

youth unemployment may be exacerbated by minimum wages. Their effect is to deter firms from hiring workers whose MPL is below the minimum wage rate. Those most likely to be hurt are poorly educated young people with no job experience and older workers with obsolete skills. The effect is quite widespread, because, once a floor is set, it pushes up the lower echelons of the wage pyramid, possibly affecting better qualified workers as well. The range of qualifications for which the MPL is below the real wage is wider than just the very lowest echelons.

Figure 6.17 illustrates the effect of minimum wages.

6.4. A Dynamic Interpretation of Unemployment

6.4.1. Labour Market States and Transitions

Any person can find herself in one of three situations: employed, unemployed, or out of the labour force. Figure 6.18 displays these three states and the various flows that describe how workers shift from one situation to another. A striking aspect of labour markets in developed economies is the size of these flows. Table 6.5 shows that the flow of individuals moving into and out of unemployment per year is almost twice the stock of unemployment at any given time. In contrast to the

To serve any purpose at all, the minimum wage w_{\min} must be higher than the wage w_0 that would obtain otherwise, and which is itself higher than what individuals would accept (w_1) if only to cover their part of the cost of investing in human capital. The result is unemployment ($L_2 - L_{\min}$) even higher than the level ($L_1 - L_0$) implied by the union-set wage. Some evidence on the effect of minimum wages is presented in Box 6.4.

6.3.4. Efficiency Wages and Real Wage Rigidity

Another reason why real wages may not decline in the presence of involuntary unemployment is that firms do not wish to reduce them. The phenomenon is often called *efficiency wages*, and it is related to the difficulty for firms to observe work effort. By paying a worker a wage in excess of his marginal productivity, firms may attempt to elicit more work. A worker who is dismissed for lack of effort is unlikely to obtain such a good deal elsewhere, especially if dismissals are interpreted as a sign of poor work effort. Firms may also pay efficiency wages to obtain a better selection of applicants and to keep workers from quitting too often.

In capital-intensive industries, where shirking could seriously disrupt the production process and where a high-quality work-force is of primary importance, firms have a strong incentive to offer efficiency wages. In this case, the function of real wages is not just to equate demand and supply in labour markets. As a result, wages will not generally be able to satisfy both functions. Real wages will tend to be rigid and may be set above the market-clearing level, as in Figure 6.15.

static picture painted in Section 6.3, labour markets are remarkably dynamic, even when unemployment is high and stable.

There are three ways of becoming unemployed. First, new entrants to the labour market join the labour force before they have found a job but are unsuccessful, at least initially. Second are separations from jobs. Voluntary separations from the employee viewpoint (quits) account for roughly 50% to 66% of all separations from employment in the UK, and up to 70% in the USA. Yet quits rarely lead to unemployment: most workers who quit immediately take up

BOX 6.4. MINIMUM WAGES AND YOUTH UNEMPLOYMENT

It is striking that teenagers in the USA often work during the summer when their European counterparts go on vacation. One reason might be that wages that must be paid for young, unskilled labour are too high in Europe. The US minimum wage amounts to about a third of the average manufacturing wage, while in many European countries it exceeds 50%. This is one reason why filling station attendants and grocery shop assistants have all but disappeared in most European countries. Table 6.4 shows non-employment and unemployment rates for young people in a number of countries as well as the average minimum wage as a fraction of the average wage. In interpreting the table, it is important to note that Denmark exempts those below 18 from collective bargaining agreements. The UK does not have a minimum wage, and teenagers are generally not unionized.

It is especially noteworthy that in France, Belgium, the Netherlands, and Portugal, the minimum wage as a fraction of the median wage is high, meaning that a great many jobs are paid the minimum wage.

In France the minimum wage, called the SMIC (Salaire Minimum Interpersonnel de Croissance), is an important element of the collective bargaining system. It is set by a council on which both the government and unions are represented. Many government employees receive the SMIC. In 1987, roughly 8% of wage-earners in industry, commerce, and services were covered by the SMIC, a much higher proportion than in the USA (less than 4%).

While the minimum wage in general has a negative effect on youth employment, it may lead to a substitution of adults for youths, at the same time increasing the employment of the former.

Table 6.4. Youth Unemployment and Minimum Wages, 1990

	Minimum wage as % of:		Nonemployment ratio ^a		Unemployment rate
	Average wage	Median wage	Age 14–19	Age 20–24	Age 20–24
Belgium	—	66	94.1	46.6	13.0
Canada	34	—	45.2	21.4	11.7
Denmark	None ^b	—	47.9	29.2	14.4
France	49	61	91.4	46.0	18.5
Germany	None ^c	—	70.2	29.0	3.8
Italy	None ^c	—	86.3	50.6	26.6
Netherlands	56	72	68.7	31.6	8.9
Portugal	—	74	65.7	32.1	8.6
Spain	34 ^d	—	70.0	34.1	30.6
UK	None	—	49.3	29.3	13.1
USA	40	—	48.2	24.2	8.8

^a The nonemployment ratio is defined as the fraction of the population in the specified age bracket that is currently not employed.

^b Youths under 18 are exempted from union wage agreements.

^c Union agreements restrict employment of youths in industry and many service sectors.

^d 1990.

Sources: OECD Jobs Study (1994), Part II; S. Bazen and G. Benhayoun, 'Low Pay and Wage Regulation in the European Community', *British Journal of Industrial Relations*, 30 (1992): 623–38; Eurostat, *OECD Employment Outlook*, 1995; *Labour Force Statistics*, 1971–91

another job (transition from employment to employment) and most of those who do not get a new job leave the labour force, often for reasons of pregnancy, return to school, retirement, etc. Finally, job losers—those who are involuntarily separated—tend to flow into unemployment. Job loss may occur when short-term contracts expire (common in France and Spain), factories close or relocate, or because of layoffs (more common in the USA and Denmark).

6.4.2. Stocks, Flows, and Frictional Unemployment

The fact that no two positions and no two persons are the same means that finding a job is not always easy and may take time. It requires pairing a worker and an unfilled job opening or vacancy. The matching of skills, occupation, industry, and geographical location requires a large amount of information. The more

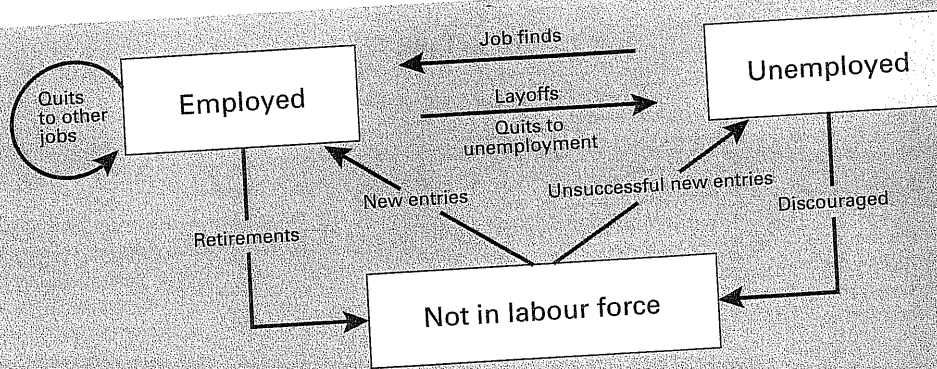


Figure 6.18. A Map of Labour Markets

Every individual is in one of three states: employed, unemployed, or out of the labour force. At any time, large numbers of workers are flowing from one state to another.

Table 6.5. Unemployment: Flows and Stocks in 1987 (millions)

	Unemployment flows		Unemployment stocks
	Into unempl.	Out of unempl.	
France	4.12	4.13	2.73
Germany	3.73	3.64	2.50
UK	3.03	3.48	2.70

Source: Burda and Wyplosz (1994)

efficient the labour markets are, the faster the match is achieved. In the mean time, **frictional unemployment** occurs. This is an unavoidable result of the dynamics of labour force movements, the normal process of job loss and creation.

In addition to the efficiency of the job matching process, frictional unemployment depends on the number of job separations and the number of vacancies. If we ignore the flows from and to 'Not in the labour force' in Figure 6.18, the number of workers who become unemployed (per month or per year) represents a fraction s , called the **separation rate**, of existing jobs (L). While unemployment rises by sL workers, it declines as unemployed workers find jobs. If we use f to denote the job **finding rate**, i.e. the fraction of the unemployed (U) who go into employment, the change in unemployment in a given period is given by

$$(6.4) \quad \Delta U = sL - fU.$$

Frictional unemployment can be understood as the stock U_f unemployment that is expected to occur, on average, when unemployment remains steady. Equality of flows into and out of unemployment occurs when $\Delta U = 0$ in (6.4), or when

$$(6.5) \quad U^f = \frac{s}{f}L.$$

It is convenient to express unemployment as a proportion of the labour force $N = L + U$. Then (6.5) shows that the frictional **rate** of unemployment is¹³

$$(6.6) \quad u^f = U^f/N = \frac{s}{s+f}.$$

Both separation and finding rates can be interpreted as probabilities: the average probability s of losing a job when currently employed, and the average probability f of finding a job when unemployed.¹⁴ Frictional unemployment is larger, the less frequent are job finds and the more frequent are job separations.

The separation rate s has two components: structural and cyclical. The structural aspect is linked to the ease with which firms dismiss workers. It is lower in countries where legal and social restrictions exist (as in most European countries) than in countries where redundancies are more acceptable (e.g. the UK and

¹³ Since $N = L + U$ (see (6.3)), $1 = (L/N) + (U/N)$. Dividing (6.5) by N , and substituting $L/N = 1 - u$ gives (6.6).

¹⁴ Naturally, as averages, these tend to obscure the large degree of heterogeneity: some individuals find a job readily after becoming unemployed, whereas others may have very low probabilities of exiting unemployment.

Table 6.6. Inflows into Unemployment and Unemployment Rates in the UK

	Inflow rate into unemployment (% per month)	Unemployment rate (% of relevant labour force)
By region: Britain, 1988		
South East	0.80	5.3
East Anglia	0.83	4.9
South West	1.03	6.2
West Midlands	0.97	9.0
East Midlands	0.97	7.5
Yorkshire/Humberside	1.20	9.7
North West	1.30	10.9
North	1.47	12.2
Wales	1.40	10.6
Scotland	1.50	11.7
TOTAL	1.07	8.0
By demographic group: UK, 1984		
Aged 16-19	3.33	22.1
Aged 20-24	1.33	16.9
Aged 25-54	0.74	8.8
Aged 55-64	0.47	8.3
White	0.92	10.4
Non-white	1.43	20.1
Male	0.78	11.2
Female	1.17	10.2
By skill: UK, 1984		
Professional/managerial	0.50	5.3
Clerical	0.88	8.0
Other non-manual	1.14	12.2
Skilled manual	1.02	12.6
Other manual	1.32	15.5

Source: Layard et al. (1991)

the USA). The cyclical aspect simply refers to the fact that during recessions the probability of losing a job rises and so, therefore, does frictional unemployment.

Table 6.6 shows that for a given country (the UK), job separation rates vary considerably across, age, region, and skill groups. Those specific labour force groups that exhibit higher separation rates of inflow into unemployment have higher frictional, and probably therefore overall, unemployment rates.

6.4.3. Job Finding and the Duration of Unemployment

The finding rate f depends on the effectiveness of the matching process. It depends on how hard unem-

ployed workers look for jobs, how many job openings are available, and how easy it is to spot an opportunity. It may also depend on incentives to remain unemployed, and unemployment insurance may therefore exert a perverse effect. Because unemployment often represents personal trauma, **unemployment benefits** or assistance respond to a widely perceived need for solidarity and social conscience. Table 6.7 shows that unemployment benefit systems vary considerably from country to country, with respect to eligibility criteria, income replacement, and the period over which they are paid.

At the same time, unemployment benefits have adverse side-effects. They may encourage unemployed workers in declining industries to wait for an unlikely recovery rather than to retrain and change sectors. They also act as a disincentive for looking for a job, or

Table 6.7. Unemployment: Conditions for Eligibility and Benefits

	Eligibility conditions ^a		Maximum duration ^b		Replacement rate ^c	
	Employment	Period	Benefit	Assistance	Single	Married
Austria	156 wks	5 yrs	30 wks	∞	41	44
Belgium	90 wks	27 mos.	∞	∞	60	60
Denmark	(d)	3 yrs	30 mos.	∞	64	64
Finland	(d)	4 yrs	2 yrs	∞	59	59
France	12 mos.	24 mos.	30 mos.	∞	59	59
Germany	3 yrs	4 yrs	12 mos.	∞	58	58
Greece	7 mos.	12 mos.	5 mos.	∞	50	50
Ireland	48 wks.	1 yrs	15 mos.	∞	29	43
Italy	1 yrs	2 yrs	6 mos.		15	15
Netherlands	3 yrs	5 yrs	38 mos.		70	70
Norway	(d)	2 yrs	80 wks		62	80
Spain	48 mos.	48 mos.	24 mos.		62	80
Sweden	5 mos.	12 mos.	60 wks		90	90
Switzerland	12 mos.	2 yrs	50 wks		70	70
UK	11 wks ^e	1 yrs	52 wks	∞	16	26
USA	20 wks	1 yrs	26 wks		50	50

Notes: Situation on 1 Jan. 1989 for a worker 40 years old. 'Married' refers to dependent spouse and no children.

^a Required period of employment during a reference period for maximum duration of benefits (e.g. to qualify an Austrian worker must have been working for at least 156 wks over 5 yrs before becoming unemployed).

^b Period of eligibility for maximum unemployment benefits and follow-up assistance.

^c Ratio of maximum benefits to previous earning (both before tax).

^d Denmark, Finland, and Norway use a rolling reference period system.

^e The criterion is a level of insurance contribution amounting to about 11 wks in most cases.

∞ = indefinitely.

Source: OECD, *Employment Outlook*, July 1991

as an incentive for being 'choosier'.¹⁵ If the benefits are generous, and particularly if they are long-lasting, some unemployed workers may require longer to find

¹⁵ Strictly speaking, this applies only to those who already qualify for benefits. In many European countries and the USA, prior work experience is required before one can draw unemployment insurance benefits. In this case, individuals will be more willing to accept the first job. This is often called the 'entitlement effect'.

a job that they are willing to accept. This is especially true for low wage-earners (see Box 6.2). As can be seen in Figure 6.19, there is a tendency for people to remain unemployed longer in countries where unemployment benefits are more generous, paying more income over longer periods. As the finding rate declines, frictional unemployment rises. This confirms an uncomfortable trade-off between social concern and economic efficiency.

5.5. The Equilibrium Rate of Unemployment

5.5.1. The Concept

If all unemployment were voluntary, it would hardly attract any attention. High and mostly involuntary unemployment means that labour markets do not function like other markets. A large number of imperfections, arising from both economic and institutional factors, forces us to qualify the pure-competition paradigm of Section 6.2 and to consider an alternative definition of equilibrium to the equality of demand for labour by firms and the supply of labour by households.

Labour market equilibrium occurs when the unemployment rate stabilizes. Because of imperfections, labour markets may be in equilibrium and yet unemployment may not be limited to voluntary unemployment.

Equilibrium unemployment can be viewed as the sum of frictional and structural unemployment:

$$(6.7) \text{ Equilibrium unemployment} = \text{frictional unemployment} + \text{Structural unemployment.}$$

Frictional unemployment occurs because it takes time for a match to occur between a worker seeking a job and a vacancy needing to be filled. It depends on the efficiency of the labour market, including the eagerness of both parties to find a match quickly. The frictional unemployment rate may well vary over time, not just because the market's efficiency changes but because economic conditions make it more or less likely for people to find jobs or to become unemployed.

Structural unemployment has many causes. The common thread is that the supply of labour is mediated by a number of institutions and regulations. Collective labour supply, which is brought into balance with labour demand in equilibrium, does not quite match individual supply behaviour. Some workers are involuntarily unemployed even when real wages equate the collective supply of labour with the demand of firms.

Estimates of equilibrium rates of unemployment are provided in Table 6.8. The contrast between Europe and North America is striking. The equilibrium unemployment rate was generally very low in Europe in the 1960s. Since then it has risen considerably while remaining stable in the USA. A comparison of Table 6.8 and Figure 6.16 shows that actual unemployment

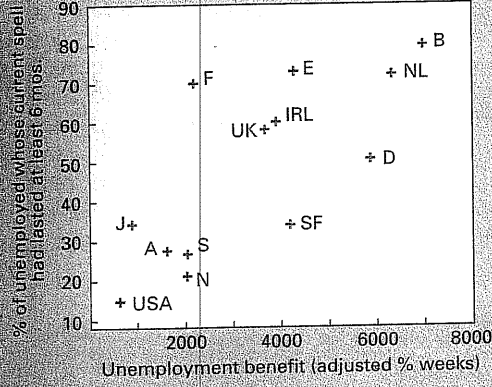


Figure 6.19. Long-term Unemployment Rates and the Generosity of Unemployment Insurance, 1985

The generosity of unemployment insurance systems is calculated as the maximum amount that someone who becomes unemployed can expect to receive. Generosity depends on the level of the benefits and on the period of time over which they are served. The diagram indicates that where the system is more generous the proportion of long-term unemployed in the total population of unemployed tends to rise.

Source: Burda (1988)

Table 6.8. Estimates of Equilibrium Rates of Unemployment

	1966-75	1976-85	1986-95
Germany	1.2	4.9	7.1
Italy	5.9	8.3	11.3
Japan	1.6 ^a	2.1	2.5
Spain	2.9 ^b	11.6	20.1
UK	2.6	7.1	8.4
USA	5.2	7.5	6.3

^a 1968-75; ^b 1967-75.

Source: OECD

BOX 6.5. THE EUROPEAN WAGE SHOCK AND EUROSCLEROSIS

The 1960s witnessed an increase in trade union militancy in several European countries. The May 1968 general strike in France was soon followed by labour unrest in Italy, Belgium, and Germany. In the UK, these were the years when Marxist-led unions exerted influence on the ruling Labour Party. 'Hardline' European unions succeeded in pushing real wages higher and increasing their downward rigidity. Figure 6.20 illustrates the effects of the wage shock by providing a comparison with the USA. The persistence of high unemployment despite improved economic conditions is a consequence of the limited job creation reported in the figure. This dismal performance

led to the depressing bout of 'Eurosclerosis' in the early 1980s.¹⁶ Facing an apparently unstoppable rising tide of unemployment, many leaders simply accepted it as structural, and therefore beyond policy influence. Yet unions cannot overlook completely the plight of the unemployed. Over the latter part of the 1980s, unions gradually bowed to market pressure and in some countries, such as Mrs Thatcher's UK, to political pressure too. As real wage growth has slowed down, employment has started to grow faster, allowing a decline in the rate of unemployment.

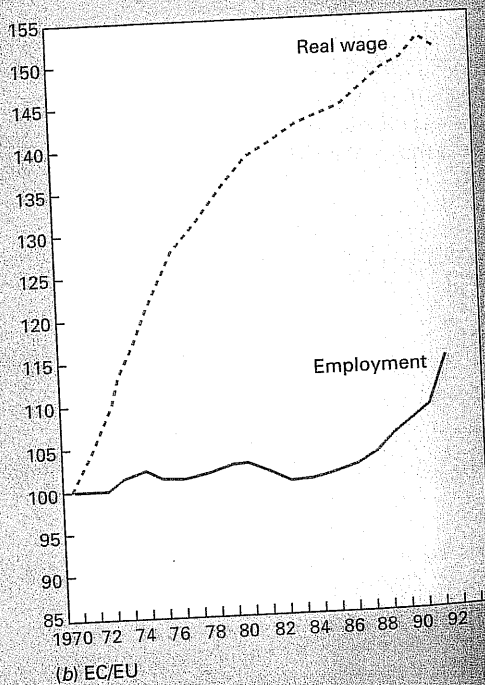
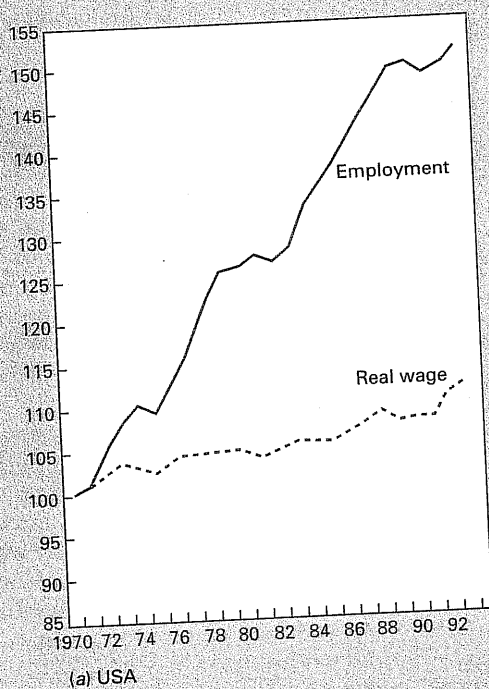


Figure 6.20. Employment and Real Wages: Europe and the USA, 1970–1992

Over the period 1970–92, real wages increased by more than 50% in Europe while employment stagnated. At the same time, as real wages stagnated in the USA, employment rose by 50%. (Real wages = total compensation per employee deflated by the GDP deflator.)

Source: OECD, *The OECD Job Study* (1994)

has followed the same pattern. To begin to understand this dramatic evolution, we return to the two components of the equilibrium rate of unemployment.

¹⁶ The term 'Eurosclerosis' was coined by German economist Herbert Giersch of the Kiel Institute of World Economics.

6.5.2. The European Experience

The evidence suggests that European unemployment rose when large numbers of workers lost their jobs at the time of the oil shocks. The expected subsequent return to pre-oil-shock levels has been thwarted in

many EC countries by a fall in the finding rate, so exit from unemployment has become increasingly harder. Is the development of the social safety net to be blamed for having provided workers with the incentive to wait out their unemployment? Circumstantial evidence—for example Figure 6.20—points in that direction when based on a comparison between Europe, where the safety net has become extensive, and the USA. Yet there is some disturbing counter-evidence. The social safety net is even more developed in Sweden and Norway, where long-term unemployment has remained lower. This implies that what really matters is not the safety net itself, but the disincentives that it may generate. Unemployment benefits, for example, provide an alternative to finding a job, and help transform temporary unemployment into permanent—structural—unemployment. Long-term unemployment has become increasingly widespread, and as workers gradually lose their human capital and contact with the active labour force, they become unsuitable for any vacancy.

The strikingly different evolution of the equilibrium unemployment rate across countries also points to the importance of institutions in shaping the levels of wages. This concerns the process of wage bargaining. The comparison between the EC and the USA in Box 6.5 shows that high unemployment in the EC is related to steep real wage increases, amounting to what has been dubbed the European 'wage shock'. Labour costs consist not only of wages: labour taxes (social security and retirement contributions) have also been allowed to rise steeply. Of importance too is the regulation of the use of labour (length of the work-week, dismissal procedures, part-time work, etc.).¹⁷

6.5.3. Actual and Equilibrium Unemployment¹⁸

It can take a long time, often years, before real wages actually adjust to their long-run values shown in Figures 6.10 and 6.15. In the meantime, actual unemployment can deviate from equilibrium unemployment.

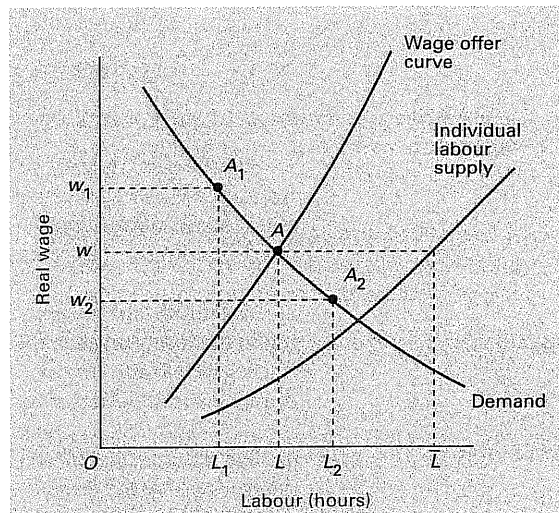


Figure 6.21. Actual and Equilibrium Employment

When unions negotiate on behalf of workers, market equilibrium occurs at point A , and equilibrium unemployment is $L - \bar{L}$. Actual employment and unemployment may differ if the real wage is slow to move to its equilibrium level w . If it is above the market equilibrium level ($w_1 > w$), firms reduce employment to L_1 , and actual unemployment exceeds equilibrium unemployment. Conversely, below-equilibrium real wages ($w_2 < w$) allow firms temporarily to find a way of connecting with structurally unemployed workers willing to work at lower wages than the union-set level. The resulting unemployment rate is lower than the equilibrium level.

Actual employment is below, and actual unemployment above, equilibrium when the real wage is above the equilibrium level, as at point A_1 in Figure 6.21. When the real wage is low, firms may be able temporarily to move away from the union-set collective labour supply curve towards the individual labour supply curve (point A_2), for example by using agencies specializing in temporary jobs or overtime work. Workers may have overestimated the real wage by underestimating the rise in the price level. Firms may be willing to hire more workers at the going wage. In such situations employment is above, and unemployment below, the equilibrium level.

¹⁷ Ch. 17 provides a more detailed exposition.

¹⁸ This section briefly presents an issue to be explored at length in Ch. 12.

6.6. Summary

1. Households trade off leisure against consumption (more generally, labour income). An increase in wages can induce more labour supply if the substitution effect dominates (elastic labour supply), less labour supply if the income effect dominates (backward-bending), or no change at all (inelastic supply).
2. Individual labour supply seems to be inelastic in the short run and backward-bending in the long run as real wage gains are taken partly in the form of additional leisure. Aggregate labour supply is more responsive in the short run as real wage increases draw new individuals into the labour force.
3. The demand for labour by firms depends on its (marginal) productivity which is determined by the available technology and the capital stock. Firms hire labour to the point at which the marginal productivity of labour is equal to the real wage. The labour demand schedule is shifted outwards by an improvement in technology or an increase in the capital stock.
4. Equilibrium employment and the wage level are given by the intersection of labour demand and labour supply. Improvements in technology or increases in capital will be reflected in higher wages if labour supply is inelastic, and in higher employment if labour supply is elastic.
5. Involuntary unemployment arises when real wages do not clear the market so that not all labour supplied by households is actually hired.
6. Labour unions care about real wages and employment. In determining their target wage, given the demand for labour firms, they ask for higher real wages than if the labour market were perfectly competitive. While the resulting unemployment rate is (optimal and) voluntary for unions, it may be involuntary for individuals.
7. Very centralized or decentralized wage negotiations deliver lower real wages and less unemployment than negotiations taking place at intermediate levels of centralization (industry by industry, or by craft).
8. Because firms cannot easily monitor work effort or wish to elicit lower turnover or improve worker quality, they may offer efficiency wages. This is yet another reason why real wages may be set above market-clearing levels.
9. Labour markets are also characterized by widespread government interventions. Minimum wages, designed to protect workers, can actually cause unemployment.
10. The labour market is characterized by a considerable amount of flow between its different states (employment, unemployment, not in the labour force). Search is an important aspect and results in frictional unemployment. Alongside structural unemployment, it is a source of equilibrium unemployment.
11. Search may be more or less efficient. It is affected by government labour market policies. Unemployment benefits, designed to make unemployment more bearable, provide disincentives to quickly finding a new job, thereby increasing frictional unemployment.

ployment. Other programmes, such as training and relocation subsidies, reduce frictional unemployment.

12. Because of distortions and regulations, equilibrium unemployment is never zero or entirely voluntary. Individuals may be willing to work at lower wages than those prevailing in equilibrium, but they cannot underbid. This is the sense in which real wages are downwardly rigid.

13. Real wages are slow to adjust to disequilibria, if only because they fulfil many other roles. As a result, actual and equilibrium unemployment may differ for long periods of time.

Key Concepts

- leisure
- consumption–leisure trade-off
- real (consumption) wage
- income effect, substitution effect
- labour supply: individual and aggregate
- labour force
- participation rate
- man-hours
- marginal productivity of labour (MPL)
- labour demand
- wage and profit shares
- voluntary and involuntary unemployment
- real wage rigidity
- trade unions, labour unions
- collectively voluntary/individually involuntary unemployment
- collective labour supply curve
- hysteresis
- minimum wages
- efficiency wages
- unemployment benefits
- unemployment stocks and flows
- separation and separation rate
- finding rate
- frictional unemployment
- equilibrium unemployment
- structural unemployment

Exercises: Theory

1. Suppose that the household in Figure 6.3 receives an inheritance. What is the effect on its decision to work and to consume? According to this result, do rich people work more or less than poor people?

2. Suppose Robinson Crusoe is paid a higher wage ('overtime') if he works more than 8 hours a day, but only has 16 hours at his disposal.
 - (a) Draw his budget constraint in this case.
 - (b) Does the existence of overtime necessarily make him better off?
 - (c) Show Crusoe's optimal behaviour for 'normal' indifference curves. Under which conditions will he choose to work overtime? Under which conditions will he refuse?
3. Normally Crusoe sleeps eight hours a day. Suppose it were possible for him to stay awake an extra hour per day without any impairment of his abilities. What would the effect be (a) on his consumption? (b) on the amount of leisure taken? How much would he be willing to pay for this innovation?
4. How should the equilibrium rate of unemployment respond (a) to an exogenous decrease in investment over several years? (b) to an exogenous increase in productivity? How does your answer depend on the institutions of wage determination?
5. What is the effect on the labour market of a minimum wage that is actually lower than the equilibrium wage? Show in your graphical answer the new equilibrium wage and the level of employment.
6. A new labour tax is imposed which is proportional to wages. Individuals care about after-tax wages.
 - (a) Draw the old and new individual supply curves.
 - (b) What is the effect on the equilibrium wage and employment levels?
 - (c) What is changed if wages are set through negotiations with a trade union which also cares about after-tax wages?
7. Many countries have housing rent control; i.e. rent increases are tightly controlled below levels that would prevail in a free market. How might this affect equilibrium unemployment? (*Hint*: think about labour mobility and mismatch.)
8. What is the effect on wages, employment, and unemployment of a wave of immigration:
 - (a) in the absence of minimum wage legislation?
 - (b) in the presence of minimum wage legislation?
9. How should Figure 6.13 be redrawn if unemployment benefits are generally available and provide a floor under which wages cannot fall? (*Hint*: the trade union would never accept wages lower than the unemployment benefits.) What is the implication for the collective labour supply curve?

Exercises: Applications

1. One of the immediate consequences of opening the borders between East and West Germany was the potential for migration between the two regions. Because of a more productive capital stock and more know-how, wages in the West were about three times as much as those in the East. Consequently many East Germans moved to the West. What are the consequences for this migration for real wages (*a*) in West Germany? (*b*) in East Germany? (*c*) for employment in the two regions? Can you explain why West German trade unions were eager to organize their comrades in the East?
2. It is often said that unemployment insurance in Europe was always generous and thus cannot be responsible for the present high unemployment on the Continent, which has emerged only since the mid-1970s. Examples are Germany, France, and Belgium. Evaluate this statement.
3. In Japan the bonus system is widespread. Workers often receive 30% of their pay in the form of a profit-contingent payment, which can go up or down depending on the fortunes of the enterprise in which they work. What are the implications of such a system for real wage rigidity and equilibrium employment?
4. It is a fact that in fishing communities and tourist areas the average rate of unemployment over long periods of time is higher than in highly industrialized regions. How could our concept of frictional unemployment explain this fact?
5. Many newly industrializing countries, such as Korea, have underdeveloped or repressed trade union movements. These countries also have a very low wage share, and thus a high rate of return on physical capital. How might this be explained?
6. Youth employment is very low in Germany, at least in comparison with other European countries. It is often asserted that this is because training for youth is subsidized by the state. Is this a good use of public money?
7. It is often the case that unemployment benefits are paid out of a fund financed by taxes levied on the firms proportionately to their wage bill. How might this affect equilibrium unemployment?
8. It is sometimes suggested that the massive influx of women into the labour force is a cause of unemployment.
 - (*a*) Draw the effect on the labour market as described by Figure 6.10. What does it mean for real wages and employment?
 - (*b*) Using Chapter 4, note that more available labour raises the MPK. Assuming that, as a result of more investment, the capital stock increases: how does your answer to (*a*) change?

Suggested Further Reading

Two textbooks provide further analyses:

- Ehrenberg, Ronald, and Smith, Robert (1988), *Modern Labour Economics*, 3rd edn., Scott Foresman, Glenview, Ill. and London.
 Layard, Richard, Nickell, Stephen, and Jackman, Richard (1991), *Unemployment*, Oxford University Press.

High European unemployment has been studied in detail. A survey is:

- Bean, Charles (1994), 'European Unemployment: a Survey', *Journal of Economic Literature*, 32: 573-619.

See also the special issue of the *Swedish Economic Policy Review*, 1 (1-2), Autumn 1994 (articles by Lars Calmfors, Jorgen Elmeskov, Charles Wyplosz, Patrick Minford, Rudiger Dornbusch, Jacques Drière and Henri Sneessens, and Richard Jackman).

Some interesting contributions are

- Bentolila, Samuel, and Dolado, Juan (1994), 'Labour Flexibility and Wages: Lessons from Spain', *Economic Policy*, 18: 53-100.
 Blanchard, Olivier J., and Summers, Lawrence H. (1986), 'Hysteresis and the European Unemployment Problem', *NBER Macroeconomics Annual*, 1: 15-77.
 Blanchflower, David, and Oswald, Andrew (1994), *The Wage Curve*, MIT Press, Cambridge, Mass.
 Burda, Michael (1988), 'Wait Unemployment in Europe', *Economic Policy*, 7: 391-426.
 Calmfors, Lars, and Driffill, John (1988), 'Bargaining Structure Corporatism and Macroeconomic Performance', *Economic Policy*, 6: 13-62.
 Lindbeck, Assar (1993), *Unemployment and Macroeconomics*, MIT Press, Cambridge, Mass.
 Saint-Paul, Gilles (1993), 'On the Political Economy of Labour Market Flexibility', *NBER Macroeconomic Annual*, 8: 151-86.

A controversy on the effects on minimum wages has arisen: see

- Card, David, and Krueger, Alan B. (1995), *Myth and Measurement: the New Economics of the Minimum Wage*, Princeton University Press.
 Machin, Steven, and Manning, Alan (1994), 'Minimum Wages, Wage Dispersion and Employment: Evidence from the UK Wage Councils', *Industrial and Labour Relations Review*, 47 (2): 319-29.
 Kennan, John (1995), 'The Elusive Effects of Minimum Wages', *Journal of Economic Literature*, 33: 1949-65.

Appendix: Labour Supply and Demand, and the Collective Labour Supply Curve

Household Labour Supply

Robinson Crusoe maximizes his utility function defined over consumption C and leisure ℓ :

$$(A6.1) \quad U = U(C, \ell),$$

subject to the budget constraint

$$(A6.2) \quad w\bar{\ell} = w\ell + C,$$

Where w is the real (consumption) wage and $\bar{\ell}$ is Crusoe's time endowment. The first-order condition is found by substituting C from (A6.2) into (A6.1) and maximizing with respect to ℓ :

$$(A6.3) \quad U_\ell/U_c = w.$$

The ratio of the marginal utilities *vis-à-vis* leisure (U_ℓ) and consumption (U_c) is the marginal rate of substitution and the (absolute value of the) slope of the indifference curve. This measures the ratio of the changes in leisure and consumption that keep the utility level unchanged. At the optimum, the amounts substituted are such that this ratio is equal to the real wage rate.

The individual labour supply curve is the (implicit) function household labour supply L as to real wage w defined by (A6.3):

$$(A6.4) \quad L^{\text{individual}} = L^s(w),$$

where the wealth argument has been suppressed. Aggregation over many households results in

$$(A6.5) \quad L^s = L^s(w, \bar{L}),$$

where \bar{L} is the number of individuals of working age.

The Demand for Labour by Firms

Since capital is fixed, we can write the production function simply as $Y = F(\bar{K}, L) = F(L)$. Express the firm's profit in terms of units of output, or as

$$(A6.6) \quad \Pi = F(L) - wL.$$

Choosing employment to maximize (A6.6) gives

$$(A6.7) \quad \text{MPL} = F'(L) = w.$$

The inverse of relationship (A6.7) determines the demand for labour;

$$(A6.8) \quad L = L(w) = F'^{-1}(w), \text{ with } L'(w) < 0.$$

Wages and the Labour Share

The wage share is $s = wL(w)/F(L)$. What is the effect of an increase in the real wage on s ? Differentiating this expression yields

$$(A6.9) \quad \frac{\partial s}{\partial w} = \frac{L}{Y} \left[1 + \frac{wL'}{L} - \frac{wF'L'}{Y} \right].$$

Define two elasticities as

$$\eta_{Lw} = \text{elasticity of labour demand to the real wage} \\ = -\frac{dL}{dw} \frac{w}{L} = -\frac{wL'}{L}$$

$$\theta_{YL} = \text{elasticity of output with respect to labour} \\ = \frac{dY}{dL} \frac{L}{Y} = \frac{F'L}{Y}.$$

(A6.9) can be rewritten as

$$(A6.10) \quad \frac{\partial s}{\partial w} = \frac{L}{Y} [1 - \eta_{Lw}(1 - \theta_{YL})].$$

Since $F' = w$, θ_{YL} is also labour's share in value added and $(1 - \theta_{YL})$ is the profit share. Thus, the condition for the wage share to be increasing when the real wage rises is that $\eta_{Lw} < 1/(1 - \theta_{YL})$, or that the elasticity of labour demand be less than the inverse of the profit share. This is the more likely to happen the smaller is the profit share and the less elastic is the demand for labour, i.e. if the demand for labour does not decline 'too much' in response to an increase in real wages.

Collective Labour Supply

Consider a labour union that has utility given by $U(w - \bar{w}, L - \bar{L})$. In this formulation (sometimes known as a Stone-Geary specification), utility is dependent on the excess of wages and employment above exogenous reference levels, here \bar{w} and \bar{L} . We assume that $U_w > 0$, $U_L > 0$ while $U_{ww} < 0$, $U_{LL} < 0$, and $U_{wL} > 0$. We consider only the case of a monopoly labour union, which sets the wage unilaterally.¹⁹

The union maximizes utility subject to the labour demand curve (A6.8), by choosing the real wage w that maximizes $U(w - \bar{w}, L(w) - \bar{L})$. The first-order condition is

$$(A6.11) \quad \frac{U_w}{U_L} = -L'(w),$$

¹⁹ For more sophisticated treatments of the collective bargaining process, which allow for bargaining between unions and employer associations, see an advanced textbook, e.g. Booth (1995).

where the derivatives are evaluated at the optimum value. Equation (A6.11) has an interpretation similar to that of (A6.3): the union picks a wage such that the marginal rate of substitution of employment for wages is equal to the slope of the labour demand curve. This corresponds to points of tangency in the various panels traced out in Figure 6.14.

We can solve this condition by considering a specific form of the utility function:²⁰

$$(A6.12) \quad U(w - \bar{w}, L - \bar{L}) = [\alpha(w - \bar{w})^{1/\rho} + (1 - \alpha)(L - \bar{L})^{\delta\rho}]^{1/\rho},$$

with $1 > \rho > -\infty$. First consider the case $\gamma = \delta = 1$. It can be shown that the elasticity of substitution between adjusted employment and wages is given by $(1 - \rho)^{-1}$. As ρ approaches 0, the function assumes the form

$$(A6.13) \quad U(w - \bar{w}, L - \bar{L}) = (w - \bar{w})^\alpha (L - \bar{L})^{(1-\alpha)},$$

whereas the case $\rho \rightarrow -\infty$ gives

²⁰ This form exhibits constant elasticity of substitution between isoelastic functions of 'normalized' employment and wages.

$$(A6.13') \quad U(w - \bar{w}, L - \bar{L}) = \min[(w - \bar{w}), (L - \bar{L})],$$

and $\rho = 1$ yields the linear form

$$(A6.13'') \quad U(w - \bar{w}, L - \bar{L}) = \alpha(w - \bar{w}) + (1 - \alpha)(L - \bar{L}).$$

An alternative class of union preferences arises when $\rho = 1$ with γ or δ less than unity:

$$(A6.14) \quad U(w - \bar{w}, L - \bar{L}) = \alpha(w - \bar{w})^\gamma + (1 - \alpha)(L - \bar{L})^\delta.$$

Panels (a) and (b) of Figure 6.14 correspond to the case $\bar{w} = \bar{L} = 0$. The union in panel (a) places relatively high weight on wages, whereas the union in panel (b) places more weight on employment. In panels (c) and (d), the reference level for wages and employment are nonzero, and $\rho = 1$ is assumed. In (c) $\gamma = 1$, $\delta < 1$, $\bar{w} = 0$, but $\bar{L} > 0$ would lead to vertical collective labour supply curves. $\bar{L} > 0$ could be understood as the 'membership' or reference group. In panel (d), $\gamma < 1$, $\delta = 1$, $\bar{L} = 0$, but $\bar{w} > 0$; this implies a horizontal collective labour supply curve, where \bar{w} can be thought of as the 'target wage' for the union.