

CHAPTER ONE **Overview**

What have we learned so far from the labor market response to the Great Recession of 2008–2009? Should we modify our way of teaching labor economics in light of these developments? Surprisingly enough, these questions are rarely addressed in our profession. Although many state that “this time is different” and that “nothing will be like before,” there has been so far little innovation in the teaching. Everything looks very much like before.

It was, no doubt, a crisis that developed outside the labor market, and yet it heavily invested the markets where labor services are exchanged for pay. The job death toll was on the order of 30 million. Youth unemployment was still on the rise worldwide five years down the road. In the United States unemployment almost doubled from peak to trough, within one and a half years: every quarter about one million jobs had disappeared. There were, at the same time, very important cross-country differences in the responsiveness of unemployment to output falls. In Germany unemployment actually fell, in spite of a very severe recession, involving a cumulative 7 percent decline in gross domestic product (GDP), almost twice as bad as in the United States. Since the recession was global, it gave us the opportunity to evaluate differences in the way in which labor markets respond to shocks originated elsewhere. There is potentially a lot to learn from this: the differences are indeed quite striking, even when account is made of cross-country variation in output fall, as shown in figure 1.1. A GDP fall of the same magnitude is accompanied in some countries by a huge rise in unemployment, while in others unemployment hardly changed from peak to trough.

Looking at figure 1.1 through the lens of the macro-labor literature developed in between the mid-1990s and the Great Recession, one is tempted to attribute entirely to labor market institutions the huge cross-country variation in the responsiveness of unemployment to output changes. A large body of academic papers and policy reports had examined the effects of labor market institutions on economic performance before the Great Recession. This literature was summarized in the initial paragraphs of the first edition of this book, as it offers a wealth of facts and theoretical insights on the relationship between institutions and labor markets, deeply affecting our way of thinking about labor market institutions. This literature was inspired by cross-country analyses. The focus was on transatlantic comparisons of employment and unemployment performance: the most influential policy report—the Organisation for Economic Co-operation and

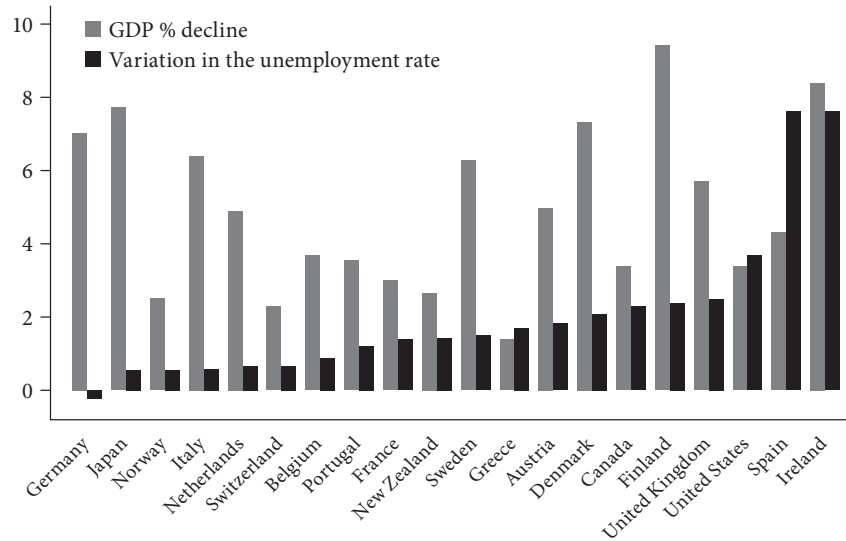


FIGURE 1.1 Changes in unemployment rates and GDP decline, 2008/2009 peak to trough

Development (OECD) (1994) report commissioned by the G7 (the intergovernmental group of—at the time—the seven largest economies in the world: Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States) in the early 1990s and completed in 1994—is an attempt to explain the dismal employment/unemployment performance of Europe vis-à-vis the U.S. “jobs miracle.” The key message provided by this report, as well as by many subsequent cross-country studies, is that there are institutional “rigidities” in Europe that prevent the labor market from creating as many jobs in the private sector as it does in the United States. Many academic researchers followed the same route in analyzing various dimensions of the so-called *Euroclerosis*, for example, Bean (1994), Alogoskoufis et al. (1995), Snower and de la Dehesa (1996), Nickell (1997), Nickell and Layard (1999), Blanchard and Wolfers (2000), Nickell et al. (2005), and Blanchard (2006).

According to this institutional perspective, it is in particular the strict employment protection legislation in Europe that is the smoking gun responsible for the asymmetric responses to the global shock of 2008–2009 on the two sides of the Atlantic. High costs of dismissals typically involve lower labor market volatility. This means, during a recession, a slower growth of unemployment. However, the countries with the strictest employment protection legislation, like Spain, this time experienced the largest increase in unemployment. Output fall in Spain was half as large as in Denmark, the land of flexicurity, where layoffs are fairly inexpensive for employers and there are instead generous unemployment benefits (UBs), a mix that is supposed to give rise to relatively large unemployment inflows during downturns. However, Denmark during the Great Recession experienced a much lower rise in unemployment than did Spain (figure 1.1).

One should therefore go beyond the cross-country analysis of labor market institutions to understand these asymmetric and largely unprecedented develop-

ments. To start with, it is important to acknowledge the nonuniformity of labor market institutions. National regulations allow for significant within-country variation in labor market institutions. For instance, the levels of the minimum wage differ across age groups, if not across industries or regions. Even when regulations do not allow for within-country variation, they are often not enforced uniformly. There is often a sizable informal sector, where most regulations are weakly enforced or not enforced at all. Thus, considering an institution at the country level may conceal significant within-country variation, and the coexistence of, say, “rigid” and “flexible” segments in the same labor market may involve nontrivial interactions between the two. An explanation for the strong rise in unemployment in Spain during the Great Recession is that its labor market is characterized by a dual structure, with a flexible temporary fringe alongside a rigid stock of regular contracts. This dualism could have increased labor market response to adverse business conditions precisely in those countries displaying the strictest employment protection provisions for regular contracts.

Another key factor behind the asymmetric response of labor markets to the Great Recession is likely to be in the nature of the shocks that led to the global output fall. In particular, one should look at the interactions between labor and financial markets, where the crisis originated and became global in the aftermath of the Lehman bankruptcy in the fall of 2008. Financial markets and the banking sector experienced a credit crunch well into 2009. Such a global credit crunch is likely to have played a key role in labor market adjustment during the downturn, if not the recovery. A different exposure to financial shocks may help explain the transatlantic differences in the rise in unemployment in 2008–2009, which are well characterized on the right-hand side of figure 1.2. Over a few quarters, U.S. unemployment, which previously had been virtually one-half of the average European Union (EU) unemployment, rose above European levels. One of the key differences between the two sides of the Atlantic is the degree of financial deepening. A simple empirical measure to account for this difference is the stock market capitalization as a percentage of GDP. While the size of the financial shocks, measured in terms of *changes* in stock market capitalization, appear very similar in terms of timing and size, what is striking is the fact that the *level* of financial deepening is very different. Whereas in the U.S. stock market capitalization amounts to some 100 percent of GDP, the same ratio in Europe is about 75 percent. Similar comparisons can be made by looking at the volumes of credit to the private sector on the two sides of the Atlantic.

Perhaps we did not need a Great Recession to understand the importance of the interactions between labor institutions and macroeconomic shocks. It would have been sufficient to have a bit longer memory. The focus of the institutional literature of the mid-1990s was differences in labor market performance of Europe vis-à-vis the United States over the decade. However, the institutions that were deemed to bear the brunt of blame for the poor employment performance of Europe had also been there some 30–40 years before, when the fate of labor markets was the other way around. Consider again figure 1.2 and look at it this time along the timeline from the left-hand corner. Clearly, it was only in the mid-1980s, after two oil shocks (the first two vertical lines in the figure), that unemployment in Europe

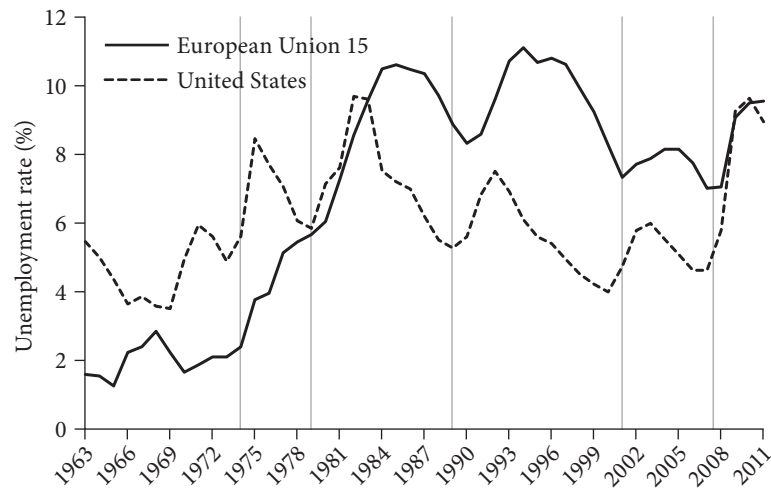


FIGURE 1.2 U.S. and European Union unemployment rates
Note: The European Union 15 (EU-15) is the group of countries belonging to the EU before the Eastern Enlargement: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

started rising above U.S. levels, and it took another global shock at the end of the 1980s (the interest rate hike) to create a sizable gap in unemployment between the two sides of the Atlantic. The dot-com crisis (2001) reduced the gap; the Great Recession closed it. The same “rigid institutions” considered in the mid-1990s responsible for European unemployment were pointed out by the U.S. literature as one of the main factors behind the European success story. For instance, in 1964 U.S. policymaker Robert Myers (1964) wrote in a report that he was “looking enviously at our European friends to see how they do it” and invited everybody to take a look at institutions on the other side of the Atlantic: “it would be short-sighted indeed to ignore Europe’s recent success in holding down unemployment.” It took another 45 years and the Great Recession to have a new celebration in the United States of European institutions. This time it was Nobel Prize winner Paul Krugman writing in the widely read *New York Times* op ed (dated November 12, 2009):

Germany’s jobs miracle hasn’t received much attention in this country—but it’s real, it’s striking. . . . Germany came into the Great Recession with strong employment protection legislation. This has been supplemented with a “short-time work scheme,” which provides subsidies to employers who reduce workers’ hours rather than laying them off. These measures didn’t prevent a nasty recession, but Germany got through the recession with remarkably few job losses.

The Great Recession told us after all that labor market institutions are so important that they should be handled with care. It is of fundamental importance to understand how they operate. We need to know the institutional details and identify which of them are most important from an economic perspective to be able to

shed light on their impact on labor market performance. It is also of paramount importance to understand how these institutions operate when the economy is under strain. Do institutions operate symmetrically over the business cycle? How do they interact with shocks coming from the product or the financial market? Who is most affected by them, and who is protected or penalized by these institutions? What type of redistributions do they involve?

A problem with much institutional literature predating the Great Recession is that it is not fair to labor market institutions. It often fails to explain why these institutions are in place to start with. Institutions are described as something that distorts the work of the market mechanism and prevents the attainment of efficient outcomes. It is assumed that if a government could remove these institutions, it should do so without further ado. It is an offense to the rationality of citizens and of their democratically elected governments that most of these institutions still exist.

This book aims at providing a comprehensive treatment of labor market institutions while introducing the key concepts and frameworks of labor economics. In this initial chapter we start by offering a few definitions that are crucial to understand what we are talking about. Next we discuss what makes the labor market taken as the reference in standard textbooks—the competitive labor market—so much different from the labor markets that we observe every day. Going beyond the competitive labor market paradigm to frame *imperfect* labor markets is essential to properly understand why labor market institutions exist. At the same time, the imperfections of labor markets together with shocks from other markets also explain pressures for change in these institutions and why institutional reforms are often asymmetric. It is better to be aware from the start that in this book we cover institutions that are changing over time. Rather than being an immanent feature of the country we live in, like the Thames River or the Alps, institutions are changing at relatively high, often unexpectedly high, frequencies. We shall see this in section 1.4, which is devoted to an analysis of institutional reforms.

1.1 A Few Key Definitions

It is useful to start with a few key definitions that will be used henceforth:

- A *labor market* is a market where a quantity of labor services L , corresponding to tasks specified in an *unfilled* assignment or job description (*vacant job*), is offered in exchange for a price or remuneration, called *wage* w . Not all labor services offered by an individual are paid. For instance, the time we devote to cleaning our own apartments is not paid. It becomes market work only if we hire a house cleaner. To be in the labor market, there must be an exchange of a labor service for a wage.
- According to internationally accepted OECD–International Labour Organization (ILO) definitions, the entire population of working age (15–64 years) can be classified in three main labor market states: employed, unemployed, or inactive:
 1. An *employed individual* is someone in the armed forces or who has worked for pay (in cash or in kind) for at least 1 hour during the reference period

- (a week or a day) or has a formal attachment to a job but is temporarily not at work (e.g., because of an illness, a holiday, or maternity leave).
2. A person of working age is classified as an *unemployed individual* if that individual is willing to work at the going wage. To be classified as unemployed the following five conditions need to be fulfilled:
 - (a) The person is currently not working.
 - (b) The person has looked for work in the 4 weeks before the survey.
 - (c) The person has looked for work actively (e.g., sending applications to employers or contacting a private placement agency or a public employment office).
 - (d) The person is willing to work.
 - (e) The person is immediately available for work, meaning that the person can start a job within 2 weeks following the interview.
 3. *Inactive individuals* are persons who are neither employed nor unemployed according to these definitions. This residual group consists of a highly heterogeneous population, including people who are voluntarily inactive and individuals who are disabled.

Let U be the number of unemployed workers, L the number of employed workers, and O measure inactivity:

- The labor force LF is given by employment plus unemployment:
 $LF = L + U$.
- The working-age population adds up the three mutually exclusive categories of employed, unemployed, and inactive individuals: $N = LF + O$.

Clearly comparing these numbers across countries with different sizes of the working-age populations is meaningless. In this book we adopt several widely used (but not always well understood) *normalization rules*. Here are the most important:

- unemployment rate $u = \frac{U}{LF}$
- employment rate $e = \frac{L}{N}$
- participation rate $p = \frac{LF}{N}$

These indicators are clearly not independent of each other, as $e = p(1 - u)$.

- If the labor force is fixed, the *steady state* (dynamic) equilibrium is defined by the equality of inflows into and outflows from unemployment. If δ is the rate at which workers lose their jobs and μ is the rate by which unemployed workers find jobs, the steady state equilibrium is defined by $\delta L = \mu U$. From this we may derive that the unemployment rate $u = \frac{\delta}{\mu + \delta}$. In other words, the steady state unemployment rate is defined by the job separation rate and the job finding rate.
- The *value of a job* y is the value of the labor product obtained when a firm and a worker engage in production. One can think of it as the revenues from the job, that is, the product of the quantity of output produced by that job

and the price of this output. Both the value of a job and the price of the good produced by this job may not be fixed but may vary with the quantity of jobs and output. Thus we typically refer to the value of the *marginal* product of labor, that is, the price of the good multiplied by the increase in output made possible by hiring an additional worker.

- The *worker's surplus* or *rent* is the difference between the wage actually earned by the worker and that worker's *reservation wage* w^r , that is, the lowest wage at which the worker is willing to accept a job offer. The reservation wage is defined as the wage that makes the worker indifferent between working and not working. Any wage earned above this level represents a net gain over the option of not working, or a *surplus* from the standpoint of the worker. Formally, the worker's surplus is given by $(w - w^r)$.
- Similarly, the *surplus (or rent) of the firm* is the difference between the value of a job (the revenues from the job) and its costs, notably the wage paid to the worker engaged in that job, that is, $(y - w)$.
- The *total surplus* from a job is the sum of the firm's and the worker's surplus: $(y - w) + (w - w^r) = y - w^r$. Notice that the wage, the value of a job, and the reservation wage can all be expressed in monetary terms, for instance, in euros. Hence, given y , w , and w^r , one can readily obtain the worker's surplus, the firm's surplus, and the total surplus. Notice further that the wage cancels out in the total surplus.

Based on these definitions, we can characterize the key difference between a perfectly competitive (or "perfect" for short) and an imperfect labor market:

- A *perfect labor market* is one where there is no total surplus associated with the marginal job. Neither the worker nor the firm enjoys any rent with respect to their outside options. In other words, it is a market where $y = w$ and $w = w^r$, so that also $y = w^r$; that is, wages are ultimately immaterial at the equilibrium: they simply align the value of the job to the employer to the reservation wage of the worker. Put another way, employers and workers are indifferent between continuing or terminating any job relationship. Losing a worker for an employer or losing a job for an employee is not a big deal. Another worker or job can be found instantaneously without suffering any loss in profits or reduction in well-being. The market is transparent, workers and firms are perfectly informed about wages and labor services offered by other firms, and there are no *frictions* or costs (e.g., no time related to job search and no transportation costs when going to job interviews) involved in the matching of workers and vacancies, that is, of labor supply and demand.
- An *imperfect labor market* is one where there are rents associated with any given job, so that the total surplus is positive. Wages are, in this context, a rent-splitting device. They decide which fraction, if any, of the surplus goes to the employer, and which fraction, if any, goes to the worker. In an imperfect labor market wage setting is therefore of paramount importance. Depending on the market power of employers or workers, wages can bring either one of

the two surpluses to zero while allowing the other party to enjoy a rent. The above implies that at least for one of the parties involved in the employment relationship, job destruction is a big deal—it involves a loss. Imperfect labor markets are associated with frictions, informational asymmetries, or market power at least on one of the two sides of the market.

Finally, we have the definition most widely used in this book:

- A *labor market institution* is a system of laws, norms, or conventions resulting from a collective choice and providing constraints or incentives that alter individual choices over labor and pay. Single individuals and firms consider the institutions as given when making their own individual decisions. To give an example, an individual has limited choice over the number of hours of work to be supplied when working time is determined via a collective choice mechanism. As discussed in chapter 5, regulation of working hours is an institution aimed, *inter alia*, at coordinating the allocation of time to work, leisure, or home activities across and within households. Because of their foundations in collective choices, institutions are the by-product of a political process. Often, institutions are established by laws, but this does not need to be the case. For instance, collective bargaining institutions (chapter 3) are most frequently regulated by social norms and conventions rather than by formal legislation. What matters is that they constrain individual choice. For instance, they make the wage exogenous for the single worker or employer.

Labor market institutions operate by introducing a *wedge* between the value of the job for the firm and the reservation wage of the individual. In other words, they can create rents even in perfect labor markets. At the same time, in imperfect labor markets, they can also be a rent-reducing device. As rents are already there, they can be diminished by a proper set of institutions. Clearly, jobs can be created only if both workers and employers make some nonnegative surplus. Institutions can therefore destroy or create jobs, depending on whether they raise the reservation wage of workers above the value of a job for the employer. If $y < w^r$ in all jobs, then a labor market cannot operate.

To characterize the wedge introduced by labor market institutions, we need to derive from first principles the reservation wage of the workers and the value of a job for the employer. This is the task set out for the next section.

1.2 The Reservation Wage and the Value of a Job

Individuals participate in the labor market and supply labor services if they can get some nonnegative surplus from working. Thus, their reservation wage must be lower than or equal to the wage offered in the labor market. How is the reservation wage defined? Consider an individual whose utility function is defined over consumption c and leisure l , which are both assumed to be normal goods: $U(c, l)$, whose partial derivatives are $U_c, U_l > 0$. The individual allocates the endowment of time, say l_0 , alternatively to work h hours earning at the hourly wage w , or to

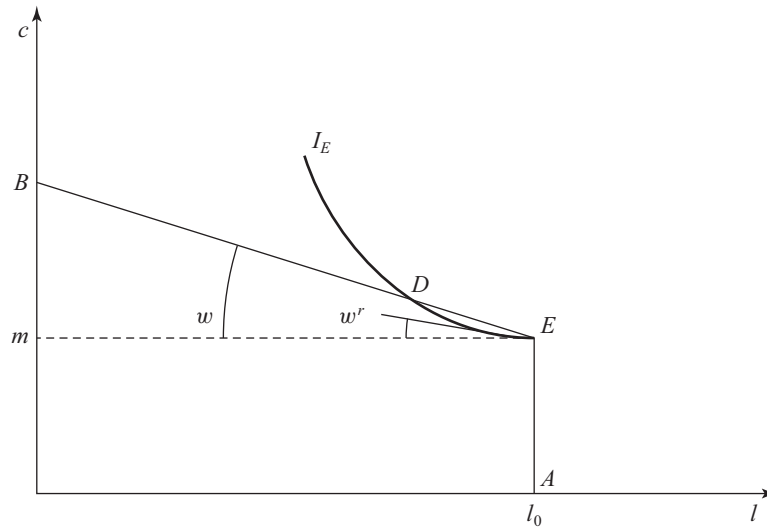


FIGURE 1.3 Reservation wage

leisure (clearly, $h = l_0 - l$). Define nonlabor income (the income when working zero hours) as m , and take the price of the consumption good as the numeraire (the price of c is 1 euro).

The *budget constraint* is given by

$$c \leq m + wh.$$

In the consumption/leisure space this constraint has a kink that corresponds to the level of nonlabor income, as depicted in figure 1.3. When $m = 0$, the budget constraint is a straight line crossing the horizontal axis at l_0 , where no hours of work are supplied and hence income to buy consumption goods is zero. To the left of the kink at point E , income grows at rate w , because each additional hour of work yields an extra hourly wage.

The utility function can be graphically represented as a set of *indifference curves*. Each curve maps the combinations of consumption and leisure that yield the same level of utility to the worker. Because utility is increasing in both arguments, the indifference curves are negatively sloped: more consumption is needed to compensate the worker for the loss of an hour of leisure, and vice versa. The degree of convexity of these curves is decreasing with the degree of substitutability between labor and leisure. Because of our assumptions, indifference curves do not intersect, and utility is increasing farther away from the origin.

The reservation wage w^r is given by the slope of the indifference curve crossing the kink of the budget constraint at E , evaluated precisely at the point where the individual allocates m euros to the purchase of consumption goods and works zero hours. Any wage w lower than the reservation wage will not be accepted by the individual, because the marginal value of leisure (the reservation wage) exceeds its opportunity cost (the market wage). Conversely, when $w > w^r$, as in figure 1.3,

the individual who is maximizing utility will work some hours and devote the remaining time to leisure.¹

This definition of the reservation wage applies to conditions in which the individual can choose freely how many hours to work and how many hours to devote to leisure. In real life individuals rarely have an unconstrained choice of h . They have, at best, some leverage in deciding among a subset of possible hours of work, for example, between full-time and part-time jobs. This is because there is an institution (mandatory working-time legislation or collective bargaining agreements regulating working hours) that imposes, via a collective choice mechanism, constraints on individual decisions.

The reservation wage with restrictions on hours no longer coincides with the slope of the indifference curve at the kink of the budget constraint (see box 1.1). The reservation wage with restrictions on hours can be graphically represented as the slope of the segment going from the kink of the budget constraint (point E) to the locus where the indifference curve through the (m, l_0) pair crosses the vertical hours constraint, as depicted by point F in figure 1.4. This hours-constrained choice yields a lower level of utility than the unconstrained choice, provided that the latter, at the market wage, involves some positive number of hours of work; otherwise the hours constraint is not binding.²

BOX 1.1

The Reservation Wage with and without Constraints on Hours

When there are no constraints on the choice of hours, the reservation wage is given by the condition

$$\left(\frac{U_l}{U_c}\right)_E = w^r, \tag{1.1}$$

where U_l and U_c denote the marginal utility of leisure and consumption, respectively, and their ratio is the marginal rate of substitution between consumption and leisure. The rate is evaluated at the locus of zero hours of work (E in figure 1.3), where the individual is buying consumption goods by drawing only on nonlabor income.

An individual free to choose how many hours to work equates the marginal rate of substitution to the market wage. Hence, when $w^r = w$, the individual is indifferent between working and not working. When $w^r < w$, the optimal choice of hours h^* is greater than zero. When $w^r > w$, $h^* = 0$.

1. This definition of the reservation wage separates employment from nonemployment. When the reservation wage is higher than the market wage, the individual is simply not working. In the dynamic search model setting of chapters 10–13, a reservation wage separates employment from unemployment: individuals having a reservation wage higher than the wage offered to them will not accept the job offer and will search for alternative employment. In other words, according to our proposed definitions, they will be unemployed.

2. The reasons hours are regulated, although such institutions apparently reduce the well-being of an individual, are discussed in chapter 5.

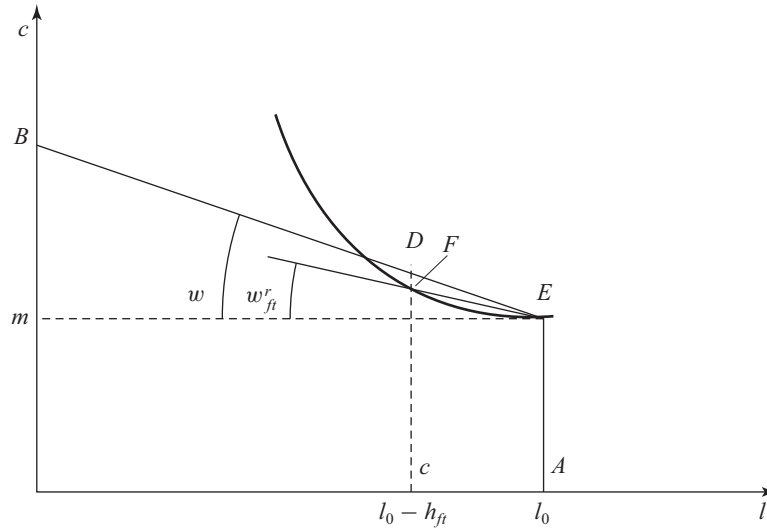


FIGURE 1.4 Reservation wage with a constraint on hours

Consider now a constrained choice. Suppose for simplicity that individuals actually have no choice over working hours and can only work h_{ft} hours, corresponding to a full-time job. The reservation wage will now be implicitly defined as the wage that would make the individual indifferent between not working at all and working exactly h_{ft} hours, that is,

$$U[m + w_{ft}^r h_{ft}, l_0 - h_{ft}] = U(m, l_0). \quad (1.2)$$

The interpretation of this condition is that when $w = w_{ft}^r$, the constrained choice is on the same indifference curve that intersects the zero-hours locus. In other words, the individual is indifferent between working exactly h_{ft} hours and not working at all.

More important, the reservation wage of an individual who is constrained in terms of hours of work (w_{ft}^r) is higher than that of an individual free to choose hours of work (w^r). Because of the concavity of the utility function, the slope of the indifference curve increases as we move to the northwest along the same indifference curve. The labor supply decision of the individual will now obey a simple rule: supply h_{ft} hours if $w \geq w_{ft}^r$, or do not offer labor services (supply zero hours) otherwise.

If the wage increases, more individuals will be tempted to enter the labor market. Hence, in terms of the number of individuals, a wage increase will always lead to an increase in labor supply. Once an individual has entered the labor market, the effect of a wage increase is ambiguous, as there are two compensating effects:

1. Income effect: if the wage goes up with the same hours of work, income goes up. If leisure is a normal good, individuals will buy more leisure, thereby reducing their hours of work.
2. Substitution effect: if the wage goes up, the price of leisure goes up, causing consumption of leisure to go down and working hours to increase.

With leisure as a normal good, the income effect negatively affects labor supply. The substitution effect is always positive on the hours worked. The overall effect depends on the relative magnitudes of income and substitution effects. Generally, the substitution effect dominates for low-wage earners, while the income effect is most important for high-wage earners. Only if leisure is an inferior good will the income and substitution effects reinforce each other. Then, a wage increase always leads to an increase in working hours. At the participation margin, the income effect is irrelevant. Since the substitution effect is positive, an increase in the wage will always lead to an increase in the probability that an individual enters the labor market.

1.2.1 From Individual to Aggregate Labor Supply

Consider now a plurality of individuals who may well have different preferences about consumption and leisure and varying endowments of nonlabor income. The reservation wage will then vary across individuals, depending on their nonlabor income, as well as on their preferences about leisure and work. As discussed in chapter 7, time spent outside work can also be devoted to (unpaid) activities, such as household tasks generating goods and services that increase the welfare of the household. For instance, some workers may have childcare responsibilities, which increase their reservation wage.

Denote by $G(w)$ the fraction of individuals of working age with a reservation wage equal to or lower than w . By multiplying this fraction by the number of persons of working age, we obtain the *aggregate labor supply* schedule. Insofar as work involves some effort, the percentage of individuals willing to work will be increasing with the wage offered to them. Thus, we expect $G(w)$ to be monotonically increasing with w . By construction, $G(w)$ also takes values only in the interval bounded from below by 0 (nobody is willing to take the job at a wage lower than the lowest reservation wage) and above by 1 (when nobody of working age has a higher reservation wage). It is certainly possible that more than one individual has the same reservation wage, in which case aggregate labor supply will involve some flat segments. It is also plausible that some individuals, for example, a rich heiress, would not work whatever the wage offered to them.

Many surveys, such as labor force surveys, in several OECD countries ask respondents about the lowest wage at which they would be willing to take a full-time job offer. This reported reservation wage is an empirical proxy for our w^r . Longitudinal data (observations of the same individuals at different times) suggest that respondents take this question quite seriously. For instance, individuals observed to be unemployed at a given date and employed at the time of the next interview generally work at a wage that is not lower than the reservation wage stated in the

first place. (Needless to say, it is possible that individuals revise downward their reservation wage when they perceive that their human capital is depreciating or they no longer have family responsibilities, but this does not seem to happen very frequently.) Thus, individuals appear to follow consistently a reservation wage policy in their labor supply decisions (they accept only jobs offering $w \geq w^r$).

1.2.2 The Value of a Job

Production takes place by combining labor with capital. In the short run, capital is fixed, so that there is no possibility to substitute labor with capital. Suppose that there is only one type of worker from the standpoint of a firm; that is, labor is homogeneous.³ A profit-maximizing firm will hire workers up to the point where y , the value of the marginal job, equals the marginal cost of labor, that is, the wage. In a competitive market all firms will take this wage as given. Hence all firms will also have the same y at the equilibrium, and the *aggregate labor demand* will simply add up the number of jobs in each firm, yielding the same y . Put another way, y provides the *marginal willingness to pay* of firms for labor services or their *inverse labor demand* schedule $y(L)$. To obtain labor demand, we simply have to substitute y with w and solve for L . Formally, we set $y(L) = w$ and solve for L , obtaining $L^d(w)$.

Can we say anything about the slope of this labor demand function? By the law of diminishing marginal returns, the marginal product of labor is declining with the number of jobs for each individual firm. If not only the labor market but also the product market is competitive, then each firm will sell the product of labor at a given price, independently of the level of output. In this case the labor demand function will have the same slope as the (declining) marginal productivity of labor; that is, it will be decreasing with L , the quantity of labor being used. If instead firms have some monopoly power in product markets, the value of the marginal product of labor will include an additional term that captures the change in price associated with the extra output produced by the additional job, multiplied by total output.⁴ Intuitively, when a firm faces a downward-sloping product demand curve,

3. Notice that we could as well assume that workers differ in terms of productivity but that these differences are fully offset by wage differentials, so that each employer is indifferent between hiring a high-productivity or a low-productivity worker.

4. Formally, for a competitive firm (superscript c), the value of the marginal product of labor VMP is

$$VMP^c = pf_L,$$

where p is the (given) price at which output can be sold, and f_L is the marginal product of labor. For a firm operating in a noncompetitive product market, we have instead

$$VMP = pf_L + p_L f y,$$

where p_L is the marginal effect on prices of the increase in the quantity produced by the firm associated with the use of an additional unit of labor, from which it follows that $VMP = VMP^c$ when $p_L = 0$; that is, the firm is also a price-taker in product markets. Because p_L is negative, labor demand of a monopolist will always be to the left of the demand curve of a competitive firm. Notice further that the difference between y^c and y is increasing in f , hence in the amount of labor being used. Thus, the labor demand of a monopolist will be steeper than that of a competitive firm.

increasing production lowers prices of all units being sold. The less competitive the product market is, the stronger will be the decline in prices associated with an increase in the quantity of jobs and output. By the same token, more competition in product markets involves a flatter labor demand curve.

To summarize, independently of the product market structure, labor demand L^d will be declining with wages, or the inverse labor demand, $y(L)$, will be declining with L . When product markets are noncompetitive, labor demand will be less responsive to wage changes (steeper labor demand).

1.2.3 A Perfect Labor Market Equilibrium

Figure 1.5 depicts a downward-sloping labor demand together with an upward-sloping aggregate labor supply. In a perfect labor market the equilibrium wage level w^* will lie at the intersection of the two curves. It is important to notice that there is only one wage level being determined at the equilibrium in this context. Thus, workers with a reservation wage strictly lower than w^* will realize a positive surplus from participating in the labor market. The sum of all these individual surpluses is given by the shaded area (W_s) below the equilibrium and above the labor supply curve. Firms will also realize some surplus or profits. This is depicted as the shaded area (F_s) above the equilibrium wage and below the labor demand schedule.

Workers with a reservation wage larger than w^* will instead decide not to work. In other words, $L^* = G(w^*)$ will be the *employment rate* (the fraction of the working-age population holding a job), while $1 - G(w^*)$ will be the equilibrium *nonemployment rate*. Notice that the equilibrium wage level may well be in a flat segment of the labor supply curve. In this case there will be individuals with $w^r = w^*$ who are not working, even if they are willing to work at the equilibrium wage. These individuals are, strictly speaking, *unemployed*, as denoted by the segment U in the right-hand panel of figure 1.5, although they do not suffer any welfare loss from not working ($w^r = w^*$ means that they are just indifferent between working and not working). All other nonemployed individuals are *inactive*, according to the internationally accepted definitions of labor market status reviewed in section 1.1.

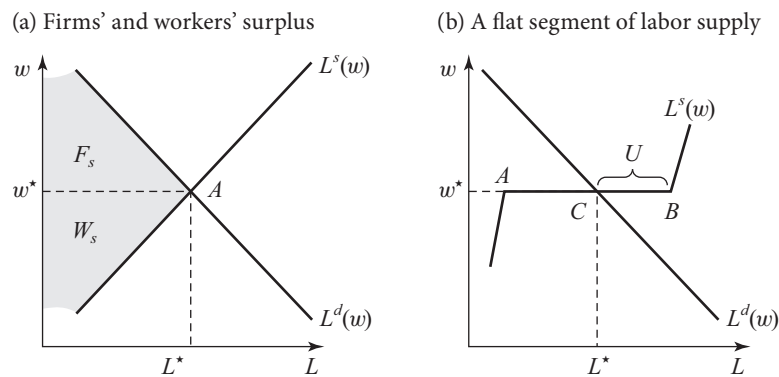


FIGURE 1.5 Equilibrium in a competitive labor market

1.3 Labor Market Institutions

We are now ready to describe how labor market institutions operate. According to our definition, they are outcomes of collective choice mechanisms that interfere with the exchange of labor services for pay. They do so by introducing a wedge between the reservation wage of the workers and the value of a job, that is, between the labor supply and labor demand schedules. Thus, even in a perfect labor market, the marginal job may involve a rent, either for the employer or the worker.

1.3.1 Acting on Prices

Let us give a few examples of how labor market institutions operate. Formal descriptions are provided in technical annex 1.6. An institution like the *minimum wage* (see chapter 2) sets a lower bound \underline{w} to the wage paid to individual workers. By doing so, it changes the slope of the labor supply schedule, preventing employer-firms from hiring workers at a lower wage than the minimum wage, even when the reservation wage of those supplying labor services is lower than \underline{w} . The actual labor supply faced by employers is now represented by the dotted line in the top panel of figure 1.6. The latter coincides with the reservation wage schedule only to the right of $L^s(\underline{w})$ (point *C* in the figure). Notice further that the segment $L^s(\underline{w}) - L^d(\underline{w})$ denotes *unemployed* individuals, that is, persons who are not working but who would be willing to work at the equilibrium wage. Insofar as their reservation wage is lower than \underline{w} , these individuals will not be indifferent between working and not working. In other words, unlike in a competitive and institution-free labor market, we now have strictly a welfare loss associated with unemployment. Put another way, even the marginal worker (job) enjoys a rent; her wage is higher than her reservation wage, $\underline{w} - w^r > 0$.

There are various ways to implement a minimum wage. In some countries there is a statutory minimum wage set by the government. In other countries a trade union (see chapter 3) imposes floors for wages via collective wage agreements in specific industries. Collective bargaining is itself an institution that interferes with wage setting not only by setting minima for pay but also by affecting wages above these minima, for example, by imposing egalitarian wage scales. When unions are present in the workplace, employers face a labor supply schedule that departs from the reservation wage of each individual worker. Unions thus impose on employers the payment of a *mark-up* over the reservation wage of individuals. Again we will have therefore an equilibrium involving a rent for the marginal worker-job.

Taxes on labor (chapter 13) are another institution that introduces a wedge between reservation wages and the value of labor productivity. They reduce labor demand but also labor supply, because some individuals drop out of the labor force who would be willing to work in the absence of taxes. This means lower employment and participation, but in a competitive labor market there is no unemployment unless the net wage happens to be in a flat segment of the labor supply schedule.

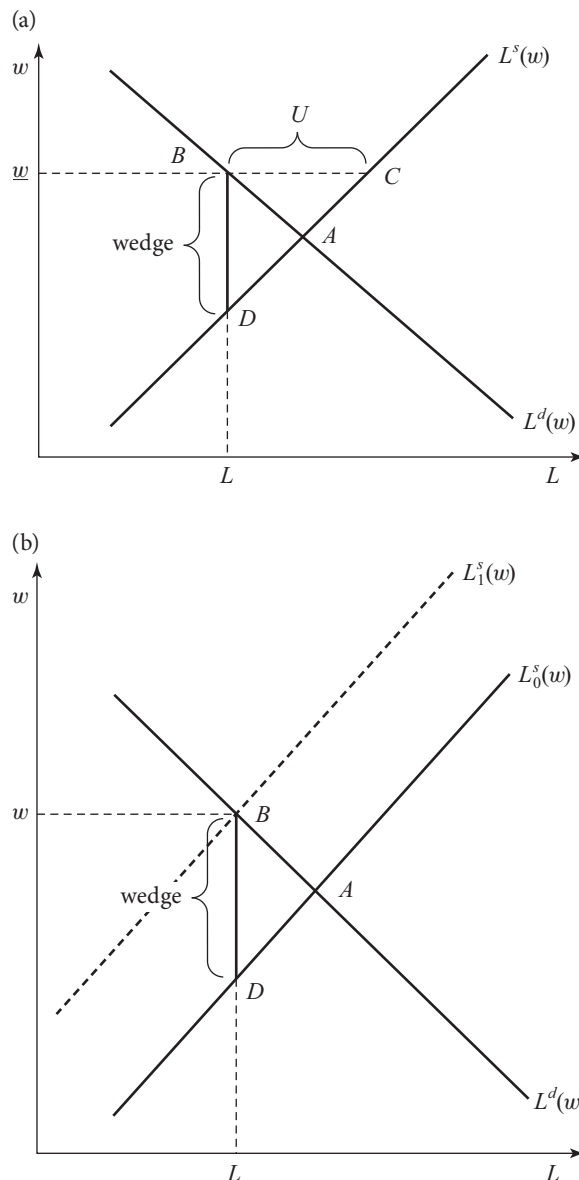


FIGURE 1.6 (a) Price-based and (b) quantity-based institutions and the wedge

The proceeds of labor taxes are generally used to finance retirement plans (chapter 6), family allowances (chapter 7), and UBs (chapter 11). All *nonemployment benefits* (subsidies provided conditional on not working) shift labor supply upward, reducing the employment rate and the size of the labor market. Part of this reduction in employment is accommodated by an increase in unemployment, and the remaining part by an increase in inactivity. The magnitude of the effects on inactivity and unemployment depends on the institutional details, notably on

whether payments are contingent on nonemployment or require some job search effort (e.g., UBs may be accompanied by the activation measures outlined in chapter 12, which implement work tests, eliciting job search effort, for those receiving the benefits).

1.3.2 Acting on Quantities

Minimum wages, trade unions, taxes, and UBs operate mainly on the price of labor. They directly introduce a wedge between y and w^r by forcing employers to pay more than the reservation wage of the marginal job or workers to receive less than the labor cost paid by employers. Other institutions act on the quantity of labor being supplied or demanded and hence introduce a wedge only indirectly, because the actual or *effective labor supply* faced by employers departs from the cumulative distribution of individuals' reservation wages.

For instance, regulations on working hours (see chapter 5), restrictions to immigration (see chapter 9), or an increase in the compulsory schooling age (education policies are discussed in chapter 8) cut away a segment of the population of working age. It is plausible that most of the individuals who can no longer supply labor under these restrictions (e.g., women after maternity, first-time job-seekers, and migrants) have a relatively low reservation wage; that is, for them, $w^r < w^*$. Thus, the quantitative restrictions cut away a segment of labor supply to the left of w^* , involving a shift to the left of the entire schedule, as depicted in the bottom panel of figure 1.6. The new equilibrium will feature higher wages and less employment, just as in the case of institutions that act on prices. Once more, labor market institutions operate by introducing de facto (in this case indirectly) a wedge between the value of the marginal product of labor and the reservation wage. By reducing the segment of the population for which $w > w^r$, they reduce the size of the labor force, the employment rate, and in some cases (e.g., migration restrictions) also the working-age population. At the same time, they create rents, allowing at least one segment of the labor market—employers or workers—to enjoy at the equilibrium a surplus with respect to their outside options.

Another common quantity restriction in industrialized countries is *employment protection legislation* (EPL) (see chapter 10). This legislation makes it more costly for employers to adjust the number of workers in a firm in response to shocks. Unlike payroll taxes, EPL involves taxes and transfers to workers that are paid only in case of dismissal. Employers must pay social security contributions to employ labor, and they reduce employment in the face of higher payroll taxes if labor demand is downward sloping. But they can avoid paying firing costs by choosing a stable employment path around a level that may be slightly lower or even higher on average than what would obtain, for the same wage and contributions level, in the absence of EPL. This does not imply that firms should be happy to do so: by definition, when firms fail to equate w to y for the marginal job, they earn lower profits. In this sense it is quite reasonable to think of EPL as imposing a tax on employers. Still, EPL does not reduce profits through lower average employment

levels but rather through poor synchronization of productivity and wages around roughly unchanged average levels.

1.3.3 Institutional Interactions

As just argued, EPL that imposes dismissal costs acts mainly on labor market flows. It does so by reducing the incentives for firms to shed labor. It is perhaps a little less intuitive that EPL also reduces incentives to hire: if employers anticipate that layoffs will be difficult or costly, they should try to reduce the amount of labor shedding called for by future labor demand downturns or wage upturns. This means hiring fewer people from the start. Because both firings and hirings decline, the net effect on employment and unemployment levels is ambiguous.

Yet EPL may indirectly affect employment by giving more power to trade unions in wage bargaining, and in this case the impact is likely to be unambiguous. Stronger bargaining power of workers shifts the labor supply faced by employers upward, increasing the equilibrium wage and reducing aggregate employment. In other words, EPL negatively affects employment by interacting with other institutions, such as collective bargaining institutions.

These institutional interactions can be complex, and there can be many of them, given that there are several possible combinations of institutions in place. At the end of each chapter, we discuss the interactions that appear to us most relevant. Unavoidably the list is not exhaustive. The important thing to remember at this stage is that one should never confine the analysis to the simple direct effect of one institution on the labor market. We live in labor markets in which institutions never operate in isolation.

It is customary to describe the institutional landscape of OECD countries in terms of a *cluster of institutions*. For instance, the so-called Nordic model (Denmark, Finland, the Netherlands, and Sweden) features generous nonemployment benefits combined with rather strict activation policies and the involvement of unions in the administration of UBs. Another example is the Southern model (including Greece, Italy, Portugal, and Spain), which features traditionally relatively strict EPL, early retirement provisions, and a rather strong influence of trade unions.

These different clusters of institutions involve very different labor market outcomes. As shown in figure 1.7, for both men and women there is wide variation across OECD countries in employment and unemployment rates. The cross-country variation in unemployment rates is very much the same for men and women, but the variation in employment rates is substantially larger for women than it is for men. For men (top panel of figure 1.7) there is a clear negative relationship between employment and unemployment rates. For women (bottom panel of figure 1.7) this cross-country negative relationship is less strong. Turkey is a clear outlier with a very low employment rate of prime-aged women. In addition, the lower panel of figure 1.7 shows that the same employment rate can be achieved at less than 5 percent or at unemployment rates above 20 percent. This suggests that it is important not to neglect labor force participation effects, notably among women.

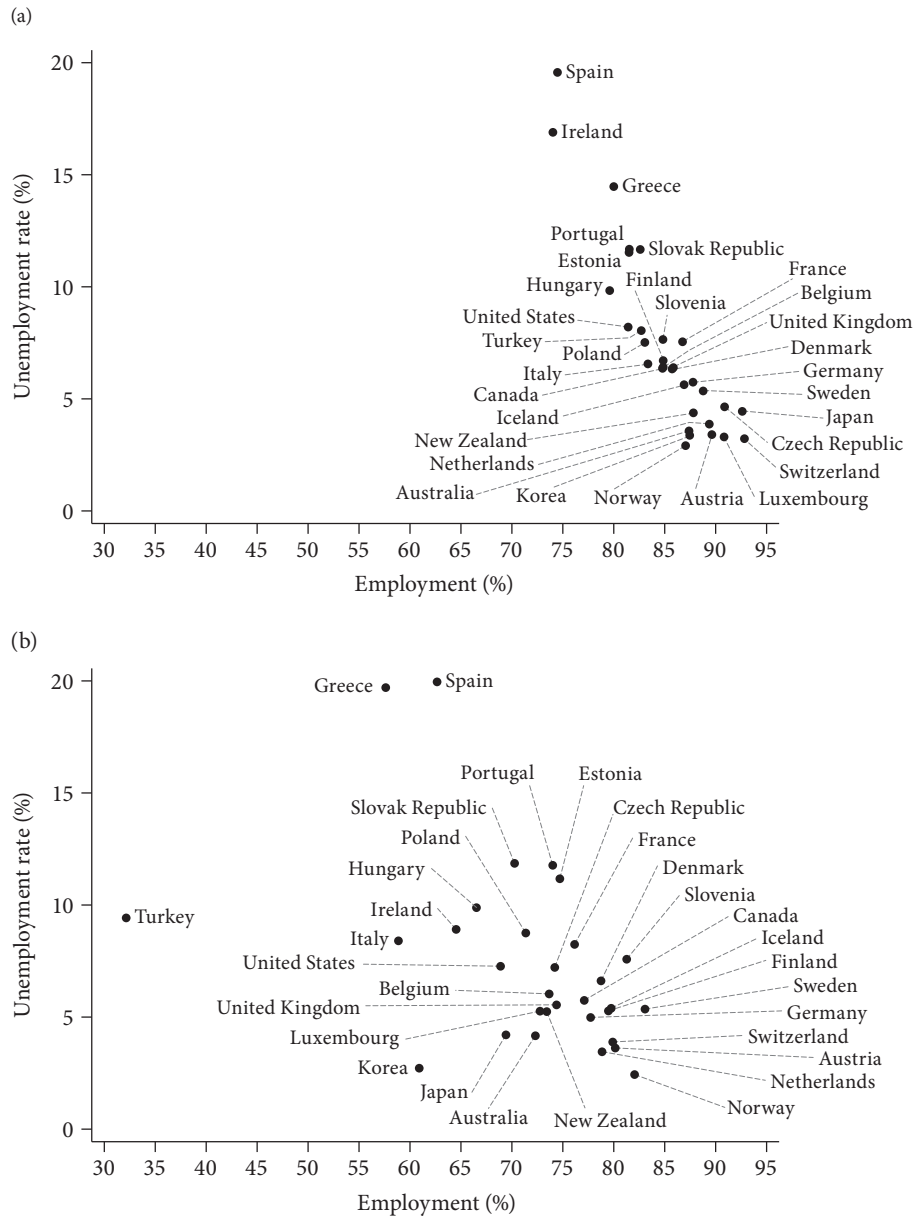


FIGURE 1.7 Employment and unemployment rates in OECD countries: (a) prime-aged men, (b) prime-aged women, 2011

1.3.4 Why Do Labor Market Institutions Exist?

Because all labor market institutions introduce a wedge between labor demand and supply, they reduce the size of labor markets. If the labor market is competitive, there will be an efficiency loss, because in principle, by increasing the size of the labor market and redistributing the surplus, it should be possible to make everybody better off. The obvious question is then why these institutions are so

important in modern labor markets. They are certainly not imposed by Heaven. They are introduced by democratically elected governments. If voters did not like these institutions, they would sooner or later be removed. If these institutions reduce the size of the economic pie, then it should be possible to make everybody happier (or at least as happy) without them.

We offer three arguments for the existence of labor market institutions:

1. *Efficiency*. A first-best competitive labor market outcome is unattainable; there are second-best arguments justifying the presence of these institutions.
2. *Equity*. In the absence of nondistortionary taxes and transfers, these institutions are best suited to achieve some redistribution that is supported by voters.
3. *Policy failures*. There are failures in the political process that make it possible for minority interest groups to succeed in imposing their preferred institutions on majorities who would be better off without them.

Often these three reasons coexist, but we discuss them separately for the sake of simplicity. We confine ourselves here to a few illustrations of how these mechanisms operate. Later chapters contain a thorough discussion of the rationale for each institution.

Efficiency

Labor market institutions exist because there are *market imperfections* that prevent the institution-free equilibrium from attaining the competitive equilibrium outcome. In practice, a perfect labor market does not exist. Labor markets are far from competitive, because there are important informational asymmetries between employers and employees, as well as externalities (i.e., goods produced and consumed that are not subject to market interactions). In both cases—*asymmetric information* and *externalities*—labor markets violate the transparency and complete market properties of a perfect labor market. Well-designed labor market institutions, in this context, may remedy these failures of markets and increase the size of the pie compared with the *laissez-faire* outcome.

Equity

Even when institutions reduce the size of the economic pie, they may make one side of the market (those supplying labor services or those purchasing them) strictly better off than it would be without the institutions. In principle, redistribution could also be achieved by taking the *laissez-faire* outcome and then taxing employers or employees and transferring the proceeds to the other side of the market. In practice, however, redistribution via *lump-sum taxes and transfers* is not possible, because redistributive policies can only rely on information—on signals, which can be altered at will by individuals. Thus, any type of redistribution is unavoidably distortionary, and labor market institutions, such as distortionary labor taxes and transfers, can be the most efficient way to redistribute.

Policy Failures

Because of these redistributive properties of institutions, there are also instances in which some powerful minorities succeed in imposing a set of institutions on a majority of citizens. This happens particularly when the benefits of an institution are concentrated in a small segment of the population while the costs are spread over a very large crowd of individuals. Under these conditions, groups organized as a lobby may succeed in influencing political decisions disproportionately.

A Few Examples

In practice, labor market institutions perform several functions at once: they remedy market failures but, at the same time, affect the income distribution or meet the requests of specific interest groups. For example, in the absence of perfect capital markets, the welfare of risk-averse individuals can be increased by offering insurance against the risk of income fluctuations. Job loss is one of the occurrences against which workers could be protected. However, no private insurer will ever want to provide insurance against unemployment, because *moral hazard* and *adverse selection* stand in the way of these potential contractual arrangements. Workers would not try as hard to avoid unemployment and find new jobs if they were covered against the negative consequences of the event by purchasing insurance at a given market price (moral hazard), and workers who know that their unemployment risk is particularly high would make the scheme unprofitable for insurance providers and unattractive to workers with average risk (adverse selection). This explains why collective action (institutions) tries to remedy the inequitable or unfair labor market treatment of workers who, lacking insurance, become or remain unemployed despite their best efforts. UBs and EPL are remedies for this failure of markets. By supplying insurance, however, they involve some trade-offs. For instance, provision of insurance in the presence of asymmetric information unavoidably decreases productive efficiency. Workers have no less incentive to decrease their jobseeking effort when they are covered by social rather than private insurance, and protection from supposedly unfair developments unavoidably decreases the labor market's speed of adjustment.

While remedying a market failure, EPL and UBs transfer resources from employers to employees, creating a vertical redistribution of income. Most of the institutions analyzed in this book address distributional tensions by attributing a larger share of the economic pie to workers or to nonworking individuals and extracting surplus from employers. Minimum wages, restrictions on hours of work, collective bargaining institutions, and unions respond to distributional concerns by assigning a larger share of the pie to workers even at the cost of generating overall a smaller pie. At the same time, these institutions remedy market imperfections, such as the presence of monopsonistic power of firms and externalities in the wage-setting process and in bargaining over hours. Migration restrictions also have a well-defined distributional objective: they insulate native workers from competition from foreign workers. Their presence can also be explained in terms of market failures associated with interactions with other institutions. In the presence of minimum wages, migrants may crowd out native workers, or migrants

who do not find a job may exert a negative fiscal externality on the native population by drawing nonemployment benefits without perhaps having contributed to their financing. Taxes on labor are often progressive, which suggests that they pursue vertical redistribution. At the same time, however, they can be rationalized by interactions with other institutions: someone has to pay for nonemployment benefits, active labor market policies, family policies, and formal education.

In technical annex 1.6 we provide a simple formalization of the redistributive role of labor market institutions. We model a competitive market with a government caring about income distribution or agents bargaining over wages, and we obtain the optimal size of an institution. Institutions are not always optimally sized, because specific interests prevail. Strict employment protection, for instance, involves large implicit transfers from the unemployed to employees or to some categories of employees who are de facto insulated from competition from *outsiders*. More broadly, the combination of price and quantity institutions that is present in many labor markets is successful in protecting *insiders* from negative labor market developments: not only are wages compressed and stable, but also tenure lengths of regular workers are clearly much longer in more rigid labor markets. Unsurprisingly, it is the insiders who oppose reforms of these institutions, even when they are a minority and when the optimal size of the wedge (operating the desired amount of vertical income distribution) would be lower. Often labor market institutions tend to privilege minority subsets of the market's labor force. Such policy failures can emerge over time as economies are hit by shocks (Blanchard and Wolfers 2000) or the economic environment is altered (Ljungqvist and Sargent 2003). The model in technical annex 1.6 suggests that the redistributive properties of institutions should be adjusted to the economic environment in which they operate. If product markets become more competitive, then redistribution involves higher costs in terms of forgone efficiency (Bertola and Boeri 2002). Under these conditions, it is better to pursue the same distributional objectives by imposing a smaller wedge between labor demand and labor supply. But policy failures may make this adjustment more difficult or altogether prevent it.

1.4 Reforms of Labor Market Institutions

As stressed earlier, it is always important to recognize that institutions fulfill a useful purpose from the point of view of at least some economic agents. Otherwise it would hardly be possible to see why they were introduced in the first place and why they are frequently reformed.

Labor market institutions have been subject to frequent policy changes in the past 30 years. This activism can be preliminarily characterized by looking at cardinal indicators of institutional intensity—notably some widely used indexes devised by the OECD—whose properties and shortcomings are discussed in detail in various chapters. Figures 1.8 through 1.11 display the level of these indexes in the mid-1980s or mid-1990s (horizontal axis) and for the most recent observation available (vertical axis). Countries located below the bisecting line through the origin have reduced over time the level of any given institution, whereas those located

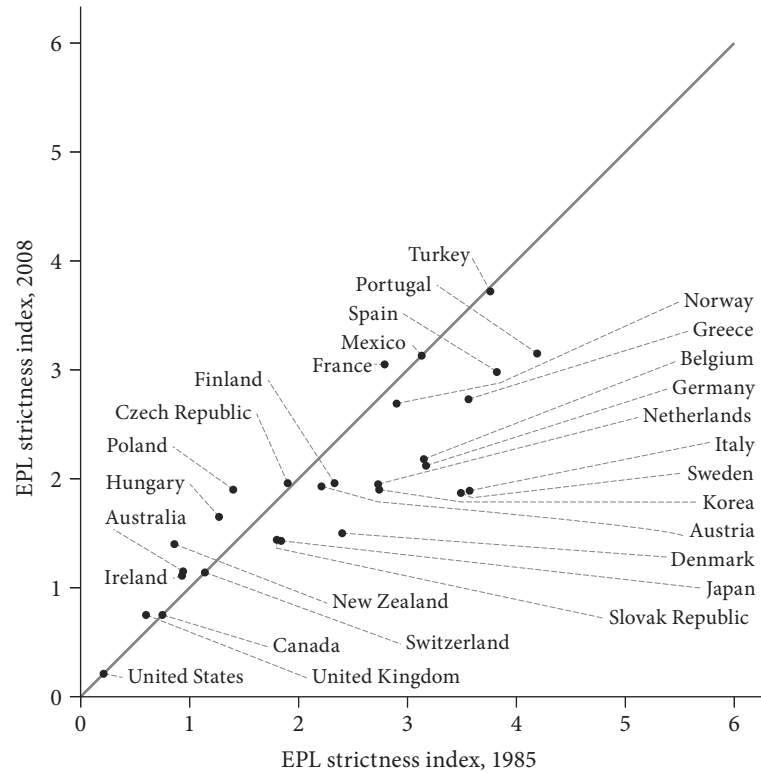


FIGURE 1.8 Evolution of the index of strictness of EPL

above the diagonal have increased it. Only countries located along the bisecting line have been keeping their institutions unchanged with respect to the initial year of observation.

We consider the following four institutional indicators: the index of strictness of EPL, the summary generosity measure of UBs, the ratio of active labor market policy (ALMP) expenditure to GDP, and the total tax wedge on low wages. The first two measures are widely used in the literature: they draw on detailed information about national regulations and are increasing in the strictness of EPL and generosity of UBs. Details on the OECD “Overall strictness of EPL” index are offered in chapter 10. The summary generosity measure is defined as a simple average of the de jure gross replacement rates over the first 2 years of an unemployment spell, still drawing on OECD data. The ALMP budget includes a variety of so-called activation programs providing job counseling, placement, and subsidized hiring typically at low durations of unemployment or among youngsters and sanctioning with benefit reductions those who did not actively seek employment (see chapter 12 for details). Finally, the total tax wedge on low pay captures a wide array of employment-conditional incentives (ECI) introduced to increase incentives to work at relatively low wages. It relies on detailed information on national tax and benefit systems collected in the OECD tax database (see chapter 13). Reference is made to a single worker earning two-thirds of the average worker pay.

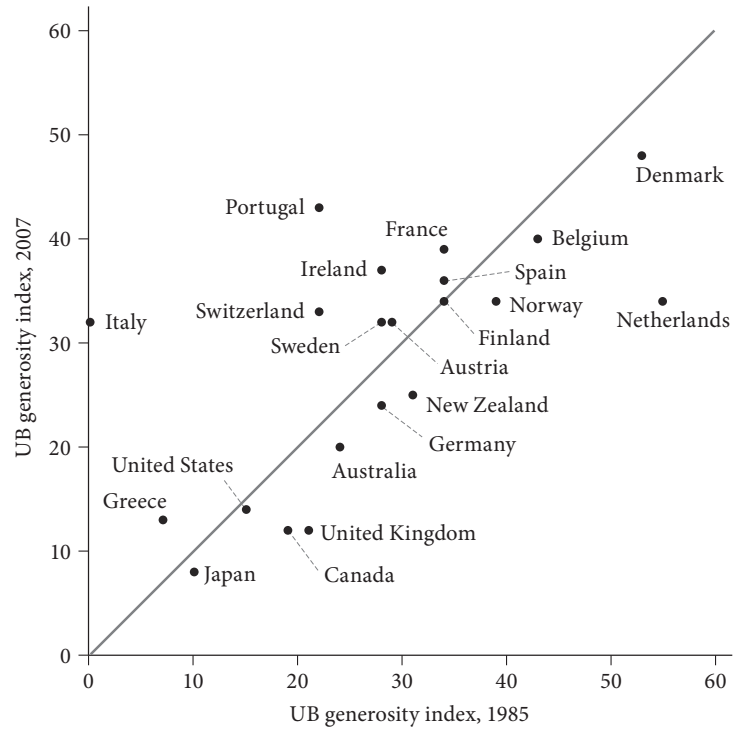


FIGURE 1.9 Evolution of summary generosity measure of UBs

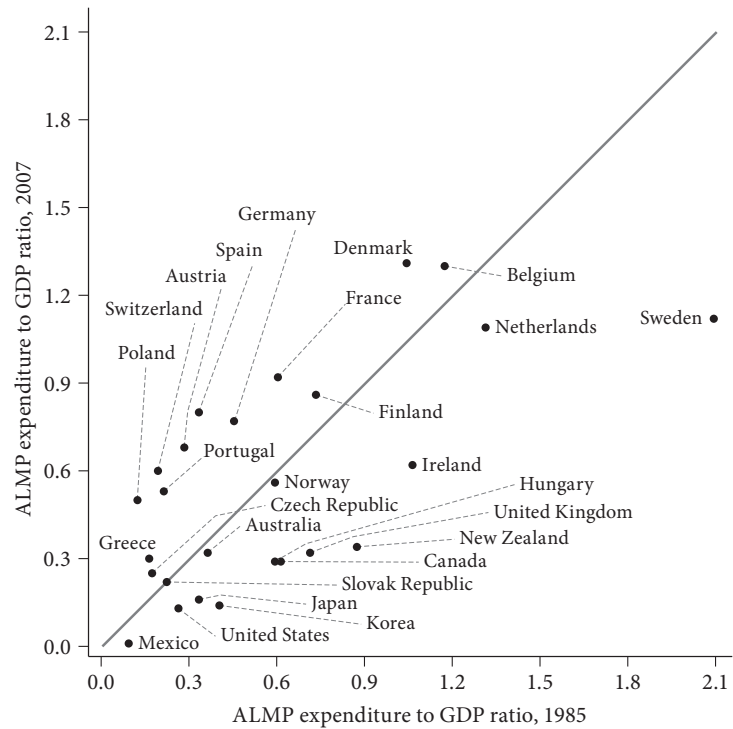


FIGURE 1.10 Evolution of ALMP expenditure to GDP ratio

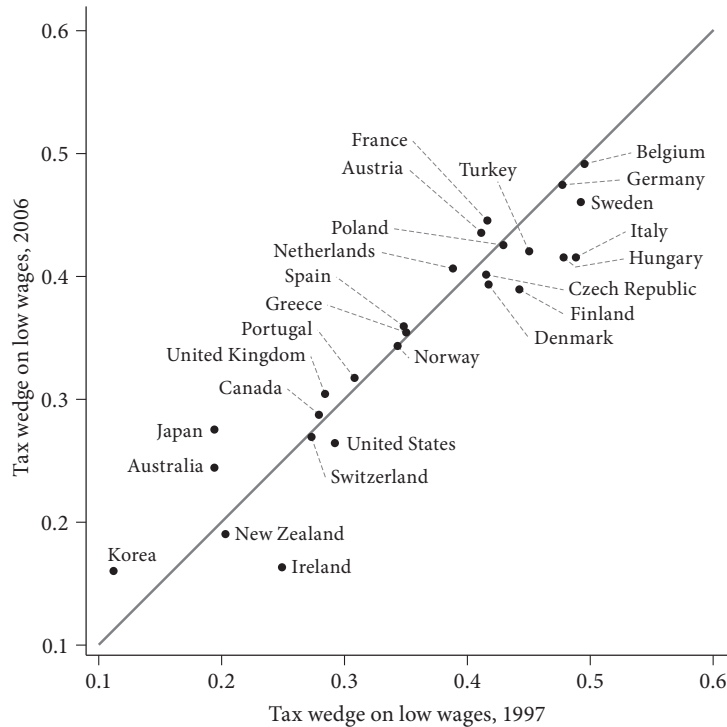


FIGURE 1.11 Evolution of the total tax wedge on low wages

The message delivered by these figures is one of much activism. There are only 3 countries (out of 28) that did not change EPL over time, only 1 country (out of 21) that did not modify UB generosity, 1 country out of 26 that did not adjust the size of ALMP programs, and 1 country out of 26 that did not adjust taxes and benefits for low-wage earners (although the available series cover only a 10-year period in this case).

Table 1.1 provides information on the number and characteristics of reforms carried out in the EU in the field of labor market and social policies during 1980–2007. It draws on the “Social Policy Reform Inventory,” assembled by the Fondazione Rodolfo Debenedetti (recently in co-operation with the Institute for the Study of Labor [IZA]), which takes stock of reforms carried out in Europe in the field of EPL, UBs, activation programs, ECI, and early retirement plans. The full details on each reform are offered on the webpage of the Fondazione Rodolfo Debenedetti (www.frdb.org).

Many reforms of labor market institutions are taking place. In the observation period almost 883 reforms were counted in just 14 countries, that is, more than 2 reforms per year and country. In the areas of UB and EPL as well as in early retirement there are many reforms going in both directions, increasing and decreasing the wedge. This may be related to political opposition to reforms. There is much more consistency in activation programs and ECI reforms.

Most reforms, however, appear to reduce the wedge. This holds for each policy area. Moreover, the share of reforms reducing the wedge is increasing over time

TABLE 1.1 Number of labor market reforms by orientation and scope in Europe, 1980–2007

Reform area	Number	Effect on the wedge (%)		Scope of the reform (%)	
		Decreasing	Increasing	Two-tier	Complete
EPL	199	56	44	52	48
UB	253	55	45	46	54
AP	242	95	5	64	36
ECI	124	91	9	60	40
ER	65	58	42	75	25
Total	883	72	28	56	44

Source: Fondazione Rodolfo De Benedetti–IZA Social Policy Reforms database.

Note: AP = activation program; ER = early retirement.

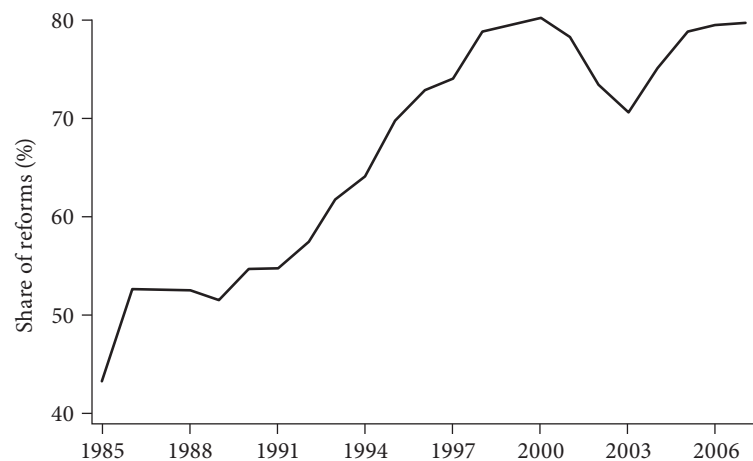


FIGURE 1.12 Share of reforms decreasing the wedge

Note: 5-year backward weighted moving average.

(figure 1.12). This trend can be explained as a reaction to pressures arising from product market competition, which, by flattening the demand for labor, increase the employment bias of labor market institutions (Bertola and Boeri 2002). At the same time, greater competition in product markets increases the political resistance to the downscaling of institutions protecting against labor market risk. Social norms or cultural factors supporting redistributive (typically, wage compressing) institutions may become more important at times of globalization (Agell 1999). This helps explain why several reforms also go opposite to the direction implied by increased product market competition. Moreover, several empirical studies (e.g., Rodrik 1998; Wacziarg and Welch 2003) found a positive correlation between exposure to product market competition—measured in terms of trade openness—and the presence of redistributive institutions, pointing to stronger demand for protection in competitive environments.

Reforms can also be categorized by considering whether they are two-tier or complete. In particular, we can look at the *target share*, that is, the share of the

population potentially affected by the reform which was actually targeted by the reform. If the “treatment group” of the reform represents less than 50 percent of the potentially eligible population (i.e., it is only young people out of the entire working-age population or temporary workers out of the total dependent employment), then the reform was classified as a *two-tier reform*. As shown by table 1.1, two-tier reforms are predominant in all institutional areas except UBs. Not all two-tier reforms necessarily increase the dualism of regulatory regimes, as they may also reduce pre-existing asymmetries among the different regimes. However, four two-tier reforms out of five actually widen the asymmetries in regulatory regimes.

Whatever the reasons for the reforms of labor market institutions, many of them occur every year. This offers a great opportunity to understand their effects on the labor market. In this book we often refer to studies that use reforms as *policy experiments*, allowing researchers to better isolate the effects on the labor market of any specific institution and identify the underlying causal relationships. Often not only do institutions affect labor market outcomes, but also the underlying conditions of the labor market affect the institutions. The labor market itself gives rise to political pressures to introduce, preserve, or reform these institutions.

At the same time, it is important to be aware that most reforms are marginal and they may frequently involve the creation of two-tier regimes with the coexistence of reformed and unreformed segments of the labor market. Studying the interactions between these segments and defining a theory of two-tier reforms providing guidance to empirical work in this area is perhaps one of the most challenging areas of research in labor economics.

1.5 Review Questions and Exercises

1. What happens to the participation rate if unemployment goes up?
2. Who are the discouraged workers?
3. Why is the wage elasticity of labor supply always positive for nonparticipants?
4. What happens to labor supply if wages go up and leisure is an inferior good?
5. Why is the reservation wage higher with restrictions on hours?
6. What is the difference between a two-tier and a complete reform?
7. Provide clear examples of price-based and quantity-based labor market institutions.
8. Under what conditions can labor market institutions increase labor market efficiency?
9. Why is labor demand called derived demand?
10. Why is the labor supply curve always upward sloping?
11. Andrea’s utility function is $U(C, l) = (C - 40) \times (l - 40)$, where C denotes consumption and l leisure. Andrea earns 10 euros per hour, can at most work 84 hours per week, and has no nonlabor income.

- (a) Please display Andrea's budget line. Would it be different if she had some nonlabor income?
 - (b) What is Andrea's marginal rate of substitution when $l = 50$ and she is on her budget line?
 - (c) What is Andrea's reservation wage?
 - (d) Compute the amount of consumption and leisure, C^* and l^* , that maximize Andrea's utility.
12. Mike's preferences over consumption C and leisure l are given by $U(C, l) = Cl$. The hourly wage is 20 euros and there are 168 hours in the week.
- (a) Write down Mike's budget constraint and graph it.
 - (b) What is Mike's optimal amount of consumption and leisure?
 - (c) What happens to employment and consumption if Mike receives 200 euros of nonlabor income each week?
13. (Advanced) Revenues of employers are given by

$$f(L) = \frac{A}{1-\eta} L^{1-\eta},$$

with $0 \leq \eta < 1$, in which L is labor input and A and η are constants. Labor supply is specified as $L^s = w^{\frac{1}{\varepsilon}}$, where ε is a constant.

- (a) Show that a government trying to maximize the joint surplus obtains the perfect labor market outcome.
- (b) Specify the outcome of Nash bargaining over the market surplus, where β represents the bargaining power of the workers.
- (c) Show under which conditions the bargaining outcome is equal to the perfect equilibrium outcome.
- (d) Assume that employers have all the bargaining power, then illustrate that the magnitude of their power depends on the slope of the labor supply curve.
- (e) Provide an intuition for these results.

1.6 Technical Annex: A Simple Static Framework

A simple static model originally developed by Bertola and Boeri (2002) can be valuable in characterizing equilibriums in competitive labor markets, as well as the role of labor market institutions.

1.6.1 A Competitive Labor Market

In the model below a crucial role is played by labor demand and supply elasticities, defined as the percentage change in labor demand and supply, respectively, associated with a 1 percent change in the wage. On the demand side of the market, profits are maximized when the marginal wage cost w is equal to the marginal

value of production y . In the short run (when capital is fixed) there is no loss in generality in assuming that the marginal value of a job is a decreasing (at a constant elasticity) function of the employment rate L , that is, $y = AL^{-\eta}$, where A is an index of the production function, and the index of the (inverse) labor demand elasticity η takes values between 0 (flat labor demand at A) and 1. We can then write the labor demand schedule as

$$L^d = \left(\frac{A}{w}\right)^{\frac{1}{\eta}}. \quad (1.3)$$

The supply side of the labor market is given by the cumulative distribution function of the reservation wages, which is, by construction, increasing with w . We assume also that this schedule has a constant-elasticity functional form so that

$$L^s = G(w) = w^{\frac{1}{\varepsilon}}. \quad (1.4)$$

The elasticity parameter may range between 0 (in which case the labor supply is flat and normalized to unity) and plus infinity: larger values of ε denote increasingly inelastic labor supply schedules, and as ε tends to infinity, labor supply becomes perfectly vertical.

We consider first the equilibrium in a competitive and wedge-free labor market, where $y = w^r = w^*$. By equating the two schedules, solving for L , and substituting the result in the labor supply function, we obtain

$$L^* = (A)^{\frac{1}{\varepsilon+\eta}}, \quad w^* = A^{\frac{\varepsilon}{\varepsilon+\eta}}. \quad (1.5)$$

It is easy to show that this equilibrium maximizes the total surplus from labor exchange. The profit of the employer is equal to the difference between the area under the demand curve and the labor costs:

$$\int_0^L Ax^{-\eta} dx - wL = \frac{A}{1-\eta} L^{1-\eta} - wL. \quad (1.6)$$

Similarly, the total surplus of workers is given by

$$wL - \int_0^L x^\varepsilon dx = wL - \frac{L^{\varepsilon+1}}{\varepsilon+1}. \quad (1.7)$$

Maximizing the joint surplus (the *sum* of the firm's profits and of the workers' surplus from employment),

$$\begin{aligned} \max_L \left(\left[\frac{AL^{1-\eta}}{1-\eta} - wL \right] + \left[wL - \frac{1}{\varepsilon+1} L^{\varepsilon+1} \right] \right) \\ = \max_L \left(\frac{AL^{1-\eta}}{1-\eta} - \frac{1}{\varepsilon+1} L^{\varepsilon+1} \right), \end{aligned} \quad (1.8)$$

yields the wedge-free, perfect labor market wage and employment levels (1.5). Hence the competitive outcome has the desirable property of maximizing the total surplus of production over the opportunity cost of employment, or the size of the economic pie generated by the labor market. Since maximization entails equality at the margin of the value of a job for the employer and workers' reservation wages, the competitive outcome also features no welfare loss from unemployment. Yet as long as w^* lies on a flat segment of the function $G(w)$, at the equilibrium there may be individuals unemployed, meaning in this particular case that they are indifferent between working and not working.

1.6.2 Labor Market Institutions

As discussed in this chapter, the presence of labor market institutions can be rationalized in terms of market failures as well as distributional tensions, either related to general interest redistribution in favor of workers or special interests of specific categories of workers-citizens. Market failures may arise from imperfect or asymmetric information or because of an excessive concentration of power in the hands of employers (monopsony power), forcing both employment and wages to be lower than at the optimum. Distributional concerns may arise with and without market failures. In the absence of lump-sum redistribution, even equilibriums that maximize the joint surplus (the equilibrium in a competitive economy) do not necessarily address distributional tensions in the economy.

1.6.3 The Wedge

All labor market institutions operate by introducing a wedge between labor supply and demand. Their rationale can be illustrated by comparing the institution-free, laissez-faire, equilibrium with the solution of a government problem involving the choice over the size of this wedge. If the wedge is zero, the solution of the problem coincides with the laissez-faire equilibrium and there is no role for labor market institutions. The size of the wedge measures the deviation of the social optimum (or the equilibrium imposed by bargaining over the distribution of the surplus) from the laissez-faire equilibrium.

In particular, consider an institution introducing a wedge between labor supply and demand in terms of a proportional tax on labor income, t . Suppose that the government maximizes over t a Bernoulli-Nash social welfare function of the type

$$W = \max_t \left(\left[\frac{AL^{1-\eta}}{1-\eta} - w(1+t)L \right]^{(1-\beta)} \left[w(1+t)L - \frac{1}{\varepsilon+1}L^{\varepsilon+1} \right]^\beta \right), \quad (1.9)$$

where the parameter β measures the distribution weight of labor, that is, the importance given by the planner to the (functional) share of the pie going to the workers. Conversely, $(1-\beta)$ is the distribution weight of employers.

By taking the log of (1.9) (a monotonic transformation that does not alter the first-order conditions) and imposing the condition that employers and workers are optimizing their choices over labor and leisure (employers on the labor demand

and workers on their labor supply), we can rewrite the maximization problem as

$$\max_t (1 - \beta) \log \left(\frac{AL^{1-\eta}}{1-\eta} - (1+t)AL^{1-\eta} \right) + \beta \log \left((1+t)L^{\varepsilon+1} - \frac{L^{\varepsilon+1}}{1+\varepsilon} \right), \quad (1.10)$$

where we substituted $w = AL^{-\eta}$ in the definition of the employers' surplus and $w = L^\varepsilon$ in the definition of the employees' surplus, or

$$\max_t (1 - \beta) \log \left(AL^{1-\eta} \left(\frac{\eta - t(1-\eta)}{1-\eta} \right) \right) + \beta \log \left(L^{\varepsilon+1} \left(\frac{\varepsilon + t(1+\varepsilon)}{1+\varepsilon} \right) \right). \quad (1.11)$$

The first-order condition is

$$\frac{AL^{1-\eta}(1-\beta)}{AL^{1-\eta}(\frac{\eta}{1-\eta} - t)} = \frac{L^{\varepsilon+1}\beta}{L^{\varepsilon+1}(\frac{\varepsilon}{1+\varepsilon} + t)}.$$

Then simplifying,

$$\frac{(1-\beta)}{\frac{\eta}{1-\eta} - t} = \frac{\beta}{\frac{\varepsilon}{1+\varepsilon} + t},$$

and then solving for the wedge, we obtain

$$t = \beta \frac{\eta}{1-\eta} - (1-\beta) \frac{\varepsilon}{1+\varepsilon}, \quad (1.12)$$

which implies that the wedge is zero if and only if

$$\frac{\beta}{1-\beta} = \frac{\varepsilon}{(1+\varepsilon)} \frac{(1-\eta)}{\eta}. \quad (1.13)$$

In other words, a laissez-faire equilibrium when governments care about the (functional) distribution of income requires that the ratio of the distribution weight of employees to that of employers equals a product of the labor demand and supply elasticities. The larger is ε , the lower the elasticity of labor supply will be, and the larger the distribution weight of employees justifying a laissez-faire equilibrium should be. Analogously, the larger is η , the lower the elasticity of labor demand will be, and the higher the distributional weight of employers justifying a laissez-faire equilibrium should be. The economic intuition behind these results is that, in line with optimal taxation theory, it is better to tax more the less elastic side of the market, as this maximizes tax revenues. Only a strong distributional concern of this less elastic side of the market could move the equilibrium away from this optimal taxation rule.

Importantly there is no reason to expect a priori that the condition (1.13) is satisfied, as β bears no systematic relationship to labor demand and supply

elasticities. Put another way, it can only be by chance that (1.13) is satisfied. In the general case, when distributional concerns are relevant, it is optimal to have some wedge between labor supply and demand, even at the cost of deviating from the equilibrium, which maximizes the joint surplus. Redistribution is one of the key functions of the labor market institutions discussed in this book. The other cases for labor market institutions arise when the laissez-faire equilibrium does not maximize (1.11) and hence labor market institutions do not necessarily involve an efficiency-equity trade-off.

1.6.4 Product Market Competition and the Employment Bias of Institutions

Notice that the distribution weight compatible with the competitive, laissez-faire equilibrium is decreasing with the elasticity of demand and supply. By the same token, the *disemployment bias* of labor market institutions (the reduction in employment induced by the wedge with respect to the institution-free outcome) is larger in the presence of a larger elasticity of demand. In particular, by denoting by the superscript I the presence of some institution, the disemployment bias is given by the wedge t , where

$$1 + t = \frac{(1 - \eta) + \beta(\eta + \varepsilon)}{(1 - \eta)(1 + \varepsilon)}. \quad (1.14)$$

Let $\mu \equiv 1 + t$ denote the mark-up imposed by institutions over the competitive wage. The above result suggests that the equilibrium with institutions involves lower employment than at the laissez-faire competitive equilibrium when the mark-up is greater than 1.⁵

Suppose now that labor demand becomes more elastic (moving, say, from η_0 to η_1 , where $\eta_1 < \eta_0$), for example, as a result of a globalization shock involving greater competition in product markets. Insofar as labor market institutions do not automatically adjust to the changes in the economic environment, the employment levels before and after globalization (denoted by the subscripts 0 and 1, respectively) are given by

$$L_1^I = A\mu_0^{-\frac{1}{\varepsilon+\eta_1}} < L_0^I = A\mu_0^{-\frac{1}{\varepsilon+\eta_0}}.$$

Thus, if the wedge remains at its optimal level (μ_0) before the globalization shock and does not adjust to the changes in the labor demand elasticity parameter, an increase in product market competition leads to lower employment, and by (1.8) there is a larger employment bias of labor market institutions with respect to the laissez-faire outcome. Increased product market competition may also involve improvements in production technologies (a larger A), such as ones brought

5. When the mark-up is strictly lower than 1, it is labor supply that is the short side of the market. Also in this case there is less employment than at the competitive equilibrium.

about by the externalities associated with having a larger market. This may increase the laissez-faire equilibrium employment level with respect to its level before the shock, shifting the labor demand schedule upward. But under greater product market competition, the employment bias of labor market institutions with respect to the laissez-faire outcome is larger. Put another way, if the rationale for labor market institutions is only in terms of (functional) income distribution, then the wedge should be downscaled after globalization, because there is a steeper efficiency-equity trade-off.

Overall, an increase in product market competition leads to pressures to reduce the wedge that labor market institutions entail with respect to the competitive outcome. At the same time, however, unreformed labor markets have worse employment outcomes than before globalization. Thus, stronger competitive pressures in product markets also increase the risk of job loss, potentially creating strong constituencies against the retrenchment of institutions that protect against unemployment risk, like nonemployment benefits, employment protection, and ALMPs, whose reform pattern is characterized in table 1.1.