Did European Labor Markets Become More Competitive in the 1990s? Evidence from Estimated Worker Rents

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Unemployment has been very high in a number of European countries for almost three decades. Many economists ascribe the problem to lack of competition in labor markets plagued by institutional rigidities, such as employment protection, generous unemployment benefits, compression in relative wages as a result of collective bargaining, and so on. Few countries have removed these rigidities, however. Instead, governments have developed a lot of (often very costly) policies with dubious effects, including permanent budget deficits, relief jobs in the public sector that do little to enhance the job prospects of the long-term unemployed, and voodoo economics such as working-time reduction. Some marginal reforms may have had an effect, as in the case of the liberalization of temporary contracts in Spain and other countries in the 1980s and 1990s or France's recent reform of its unemployment benefit system to monitor job search efforts. A detailed look at the history of labor market reforms in several European countries reveals the following characteristics. First, reforms are numerous and amount to an accumulation of small changes. Second, some reforms tend to increase labor market flexibility, while others tend to reduce it. Third, it is quite difficult to assess the magnitude of the impact of individual reforms and, in particular, whether they have made European labor markets more competitive.

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The degree of labor market competition may also be affected by developments such as increases in product market competition as a result of deregulation or increased openness to international trade. Such changes may help reduce European unemployment and thus spare painful reforms of the labor market—although groups that benefit from labor rigidities have an interest in blocking these changes.[1] Consequently, labor market competition might increase even in the absence of labor market reforms.

Rather than looking directly at policy measures, this paper looks at the evolution of some quantitative measures of labor market competition. Specifically, I look at the evolution of two very different measures of labor market competition in a number of European countries between 1994 and 2000. The first measure captures interindustry differences in wages, while the second is a proxy for the welfare difference, in present discounted value terms, between the employed and the unemployed.

1. Rents and Their Meaning

I define the rent of an employed worker as the present discounted value of his or her expected flow of future incomes, minus the present discounted value of the income flow of an unemployed worker with similar characteristics. This measure indicates how uncompetitive the labor market is. In a perfectly competitive labor market, the unemployed would be able to underbid the employed to the point that people would be indifferent between being employed or unemployed. That may mean full employment, in which case an unemployed person would immediately find a job, such that his or her situation would in effect be no different from that of an employed person. Alternatively, it may mean that the wage has fallen to the level of unemployment benefits (adjusted for the disutility of effort), in which case there is voluntary unemployment in the sense that the unemployed are indifferent about getting a job.

The rent also identifies how much workers lose when they lose their job. In a no-rent society, the risk of job loss is not a risk at all. People are insured against it by the perfectly competitive labor market, which makes them indifferent between working and not working.

1. See Blanchard and Philippon (2003) for an analysis.

All the implications of job loss being painful derive from the fact that employed workers have rents.

Rents may originate from microeconomic frictions, which prevent the labor market from being competitive. The theoretical literature identifies a number of channels. The efficiency wage theory, for example, states that it is costly for firms to monitor their workers' effort level.[2] They therefore prefer to pay above market-clearing wages so as to deter shirking. This theory implies that the rent will rise in line with the severity of the informational problems associated with observing effort. The insider-outsider theory, in turn, states that firms have sunk specific investments in locating and training workers, which generates a hold-up problem.[3] Once the investment is paid for, the worker can expropriate part of it by asking above market-clearing wages. This theory predicts that rents will be higher for jobs requiring larger specific investments ex ante.[4] It also predicts that larger rents will be accompanied by greater workers' bargaining power —that is, the share of the total surplus that they are able to appropriate, although there is no straightforward empirical equivalent of that parameter. The search-and-matching theory extends the insider-outsider theory to a general equilibrium framework in which there is a per-unit-of-time cost of maintaining a vacancy and in which the rate at which vacancies are filled depends on the ratio between the stock of unemployment and the stock of vacancies.[5] The tighter the labor market, the longer it takes to fill a vacancy—which raises both the sunk costs of hiring and rents. The theory thus predicts a positive relation between rents and labor market tightness. It also predicts that higher rents raise the cost of vacancies and lower the efficiency of the process of matching workers and firms. Finally, union-wage-setting models directly generate rents, as unions act as monopolies in the labor market.

All these models further predict that a number of labor market regulations affect the rent. Firing costs increase the rent under all of the models. In the efficiency wage model, it makes it more costly to dismiss workers when they have been caught shirking, which raises the rent that must be paid to deter the behavior. In the insider-outsider model,

2. See Shapiro and Stiglitz (1984); Solow (1979); Schlicht (1978).

3. See Lindbeck and Snower (1988); Blanchard and Summers (1986); Layard, Nickell, and Jackman (1990).

4. The macroeconomic consequences of the degree of specificity in investments are explored by Caballero and Hammour (1998).

5. See, for example, Mortensen and Pissarides (1994).

it acts as a sunk cost, as it must be paid to get rid of any workers in order to replace them with others. Minimum wages directly increase the rent for those employed workers for whom they are binding. Work rules may also increase rents to the extent that they impose specific investments on firms and more generally reduce competition among workers.

Product market regulation also affects rents. By increasing monopoly power, regulation increases a firm's total revenue per worker; the rent is increased as long as the workers have some ability to seize part of that revenue. Under union-wage-setting models, workers' rents are linked to product market competition via a simple law of derived demand. A more regulated product market implies a lower price-elasticity of demand for each firm, which in turn implies a lower wage-elasticity of labor demand and thus a higher wage.

I now briefly discuss the political consequences of rents.[6] The observation made above, that rents show how much workers lose when they lose their job, implies that in an economy with rents, workers have a general aversion to job loss—the more so, the greater the rent. Incumbent employees tend to oppose policies that threaten their jobs and to promote policies that protect them. That incentive would be absent in an economy without rents. If rents differ among workers, then workers will support different policies, with workers with greater rents in favor of increasing protection.

This implies that greater rents heighten support for employment protection legislation. Since employment protection itself also tends to increase rents, the system involves a mutual feedback mechanism. Beyond that, any shift that tends to increase rents should enhance support for employment protection. Thus, political support for employment protection should be higher after a hike in the minimum wage, after a period of tight labor markets, or after any technological or organizational change that reduces a firm's ability to monitor workers or raises its required specific investment in a job.

Rents also easily generate political-economic complementarities between different labor market institutions. By a political-economic complementarity between institution A and institution B, I mean that the political support for institution A is greater if institution B is in place, and vice-versa. As I just argued, institutions that create (or increase) rents increase the political support for employment protection. Employment protection itself, however, increases the political

6. See Saint-Paul (1997, 2000, 2002) for an analytical treatment.

support from employed workers for institutions that create rents, because it reduces their exposure to unemployment and thus their prospects of losing the rent. Political-economic complementarities imply that a comprehensive labor market reform will have more support than a piecemeal approach.

While rents increase the support for institutions that directly increase employment protection, they also have a pervasive effect on the way people view most policy changes. When the rent is high, incumbent employees have a vested interest in opposing policies that threaten their jobs. This means that any policy change that implies some labor reallocation will face greater political opposition in economies with high rents.[7] This applies to trade liberalization, changes in the level and structure of government spending, and so on. In other words, rents tend to generate a bias in favor of the status quo in virtually any policy area.

The story of labor market flexibility in Europe in the 1990s is very much that of a half-full, half-empty glass: measures that increased labor flexibility alternated with measures that reduced it. As a result, rents will not necessarily have fallen, but their evolution in a given country may illustrate which reforms had the strongest effects. At the same time, increased trade integration and deregulation in product markets is a clear trend that should push rents downward.

2. Measuring Competition in European Labor Markets

There are various ways to assess whether European labor markets are becoming more competitive. One possibility is to construct indices of labor market regulation and look at their evolution over time in different countries. This approach has mostly been pioneered by the Organization for Economic Cooperation and Development (OECD).[8] The reliability of these indices depends on how quantitative the underlying variables are, together with the accuracy of the researcher's assessment of the importance of a given change in regulation. In some cases, it is easy to construct an index because the regulation being measured has a clear quantitative definition. This is the case, for example, for unemployment benefits, for which fairly

7. See Saint-Paul (1996b).

8. Typical examples include Grubb and Wells (1993) and the OECD's job study (1994).

reliable indices of replacement ratios have been constructed. Even in such a case, however, the index is not fully accurate because it fails to capture the diversity of individual situations and the way the unemployment benefit system is actually administered. Constructing indices of more qualitative regulations such as employment protection is obviously even more complicated. These indices do well in cross-sectional comparisons, but they are more problematic for assessing evolutions over time.[9] For example, in the 1990s many countries moved back and forth in the liberalization of temporary contracts, and this was sometimes accompanied by moves in the opposite direction concerning the degree of protection for permanent contracts. It is not easy to determine whether employment protection goes up or down if a reform makes it harder to use temporary contracts but at the same time eases the conditions under which a permanent worker may be dismissed.

It is thus useful to pursue a different approach, namely, to look at direct quantitative indicators of worker's rents. The drawback is that this approach does not specify which reforms have been implemented; workers' rents may fall under a number of labor market reforms, product market reforms, or the sheer pressure of international competition. It does, however, provide an idea of the evolution of the true degree of competition in labor markets, and it can help one avoid misclassifying a policy change or taking one seriously when it actually has only second-order effects on labor market flexibility or when is not enforced. To measure rents, I use two different approaches: the interindustry approach and the transition approach, which are described in the next two sections.

3. The Interindustry Approach

The first approach exploits variation of wages across industries. This empirical regularity was much studied in the 1980s and 1990s, following Krueger and Summers (1988). The literature shows that these differentials are not associated with compensating differentials for working conditions or nonwage benefits or with unobservable worker heterogeneity. On the other hand, they are correlated with a number of industry characteristics—such as union density, capital

9. Indeed, indices such as the one in Bertola (1990) are typically used for cross-sectional studies.

intensity, and product market competition—that are likely to be associated with the rent that can be extracted by workers and their power to do so. In other words, there is a strong presumption that differences in wages between industries represent differences in rents rather than anything else. Therefore, I analyze the evolution of labor market rents over time in a number of European countries by looking at trends in the estimated coefficients of a wage equation, in an individual data set, with industry dummies. If rents are falling over time, then I expect the dispersion in these coefficients across sectors to be falling, too: in a rent-free economy, they would all be equal to zero. Assuming that the least-paying sector is more or less perfectly competitive, I define an average rent by looking at the employment-weighted average of the difference between a sector's coefficient and that of the least-paying sector. That alternative measure captures changes in the rent that are due to labor reallocation from high-rent to low-rent sectors, whereas the dispersion measure gives an indication of the evolution of the rent in a given sector.

The data is the European Household Panel Survey. The advantage of this data set is that it includes data on wages, individual characteristics, and labor market status, which are consistent across countries and available for all European Union (EU) members. Its panel dimension allows me to control for unobserved heterogeneity among individuals by making use of fixed-effect estimators. The drawbacks are that it has fewer observations than a typical national labor-force survey and that data for Germany and the United Kingdom are not available after 1996.

I estimate wage equations for each of the countries, in which each observation is an individual at a given date. The specification is

$$\ln w_{it} = b_0 ED3_{it} + b_1 ED2_{it} + b_2 AGE_{it} + b_3 AGE_{it}^2 + b_4 MARRIED + b_5$$
$$+ \sum_{s=2}^{T}\sum_{k=1}^{N} c_{ks}\left(ID_{it}^{k} TD_{it}^{s}\right) + \sum_{k=2}^{N} c_{k1}\left(ID_{it}^{k} TD_{it}^{1}\right) + c_0 \qquad (1)$$

where TD^s is a time dummy for date s ($TD_{it}^{\ s} = 1$ if $t = s$ and 0 otherwise); ID^k is an industry dummy for industry k ($ID_{it}^{\ k} = 1$ if individual i works in industry k at date t and 0 otherwise); T is the number of periods; and the other variables are self-explanatory.

The above equation can be estimated with and without individual fixed effects. The fixed effects eliminate potential sources of bias like unobserved heterogeneity among workers. If workers with greater

unobserved ability are more likely to work in certain industries, then part of the industry dummy reflects the return to unobserved ability rather than a rent. The earlier literature finds that interindustry wage differentials are typically robust to the introduction of individual fixed effects, although the coefficients are somewhat smaller than when the specifications are run without fixed effects.[10]

Next, I construct synthetic indicators of labor market rents by first defining the spread indicator for any date, s, as

$$SPREAD_S = \max_k c_{ks} - \min_k c_{ks} \ .$$

This equation captures the difference in wages for similar workers in the best-paying and the worst-paying sectors. If the worst-paying sector is interpreted as perfectly competitive, then the spread indicator is a measure of the highest rent paid to workers in that economy, irrespective of the number of workers who earn the rent.[11] It would fail to capture a reduction in rents stemming from a fall in the employment share of the best-paying sectors. I therefore also compute an average rent indicator ($ARENT$) for date s as follows:

$$ARENT_s = \frac{\sum_{k=1}^{N} n_{ks}\left(c_{ks} - \min_j c_{js}\right)}{\sum_{k=1}^{N} n_{ks}} \ ,$$

where n_{ks} is the number of people employed in industry k at date s and where $c_{jkN} = 0$ by extension.[12]

$ARENT$ measures the average rent earned by a worker in that economy, as compared with the least-paying sector. If that sector is competitive, $ARENT$ also provides an idea of the welfare difference, in annuity terms, between an employed person and an unemployed person.

10. See Saint-Paul (1996a) for a survey.
11. For date $s = 1$, the formula is slightly different:
$SPREAD_1 = \max(\max_k c_{k1}, 0) - \min(\min_k c_{ks}, 0)$.
12. For $s = 1$ the formula is again slightly different:

$$ARENT_1 = \frac{\sum_{k=1}^{N} n_{k1}\left(c_{k1} - \min(\min_j c_{j1}, 0)\right)}{\sum_{k=1}^{N} n_{k1}} .$$

Once these indicators are constructed, I look at their evolution over time in each country. One shortcoming with the data used is that they are only available for seven consecutive years (three for Germany and the United Kingdom), which may cause problems if there are long lags between reforms and their effects on labor market competition. I also perform another exercise, namely, looking at wage differentials across size categories of firms rather than industries, using the same methodology.

4. The Transition Approach

The second approach, in the spirit of Cohen (1999), estimates a dynamic process for individual transitions between employment and unemployment and uses the estimated coefficients to compute the present discounted value of being employed and the present discounted value of being unemployed for any given category of worker. The difference between the two represents the total rent of the employed.

Assume that for a given category of workers, individuals move between two states, employed and unemployed. The transition rate from employment to unemployment is s; the transition rate from unemployment to employment is h. The income in unemployment is b, and the income in employment is w. The real interest rate is r. Workers are risk neutral.

Then, the evolution equation for the value of being employed, V_e, defined as the expected present discounted value of income flows when employed, is the following:

$$rV_e = w + s(V_u - V_e) + \dot{V}_e \ .$$

Similarly, the evolution equation for the value of being unemployed, V_u, is

$$rV_u = b + h(V_e - V_u) + \dot{V}_u \ .$$

In the steady state, the total rent—defined as the difference between the utility of the employed and that of the unemployed (that is, by $Q = (V_e - V_u)$—is

$$Q = \frac{w - b}{r + s + h} \ .$$

Another concept of interest is the cost per unit of time to the employer of having to pay the rent, Q, in addition to the worker's alternative wage. It is given by the annuity equivalent of the rent, Q, that is, $q = (r + s)Q$:

$$q = \frac{(r+s)w - b}{r+s+h} .$$

While the total rent, Q, is measured in terms of workers' welfare, the annuity rent q expresses the same concept from the point of view of the firm's labor cost. The rent, q, tells us how much firms have to pay workers per unit of time in addition to their alternative wage, rV_u: $q = w - rV_u$. The two differ because welfare can be transferred to workers not only in the form of wages, but in the form of job security. The rent, q, goes up with s, because a higher job loss rate reduces the welfare of unemployed workers, since their prospective jobs do not last as long. It goes down with h for the opposite reason. In contrast, Q falls with s, because the employed workers are worse off when their jobs are insecure, all else equal. Nevertheless, the gap between their wage and their alternative wage widens.

In principle, if I can estimate transition rates between employment and unemployment, as well as the income of the employed and the unemployed, then I can compute Q and q.

The most important shortcoming with that approach is that if w, b, s, and h have different cyclical elasticities, variations in q and Q over a period of a few years are as likely to result from the influence of business cycles as from underlying changes in the degree of labor market competition. To control for that possibility, I pool all the countries together and impose a common response of these variables to country-specific business cycle conditions. This leads to the following specification:

$$Y_{it} = \sum_{j=1}^{P} CD_{it}^{j} \left(a_{j0} + a_{j1} SB_{it} \right) +$$

$$\sum_{j=1}^{P} \left(b_0^j ED3_{it} + b_1^j ED2_{it} + b_2^j AGE_{it} + b_3^j AGE_{it}^2 + b_4^j MARRIED + b_5^j SEX_{it} \right.$$

$$\left. + \left(\mathrm{c}_0 U_{it} + \mathrm{c}_1 U_{it-1} + c_2 \ln GDP_{it} \right) \right. \qquad (2)$$

where Y_{it} is one of the four variables of interest, w, s, b, and h (defined below); and P is the number of countries. There are three blocks. The first block captures the country-specific evolution of Y over time,

where CD_{it}^{j} is a country dummy. The second block captures the effect of individual characteristics, assuming country-specific responses. The third block captures the effect of the business cycle: U_{it} is the unemployment rate in the country where the individual observation is located, and GDP_{it} is the country's real *GDP*. The coefficients are assumed common across countries, which allows identification. The structural break dummies, SB_{it}, are defined by

$$SB_{it} = 0 \quad \text{if} \quad t \leq t_0$$
$$SB_{it} = 1 \quad \text{if} \quad t > t_0 \ . \tag{3}$$

These allow me to compute the country-specific change in *w*, *s*, *b*, and *h* between the two subperiods defined by equation (3).

A second shortcoming with the approach is that it is difficult to get reliable estimates of *b*, the unemployment benefit payments, from the data. The problem is that the database is silent about the flow of unemployment benefits payments. Rather, unemployment benefits payments are reported for the whole year, and there appears to be a lag between unemployment spells and the actual payment of corresponding benefits. My attempts to solve this issue using econometric methods failed in that they yielded estimates for Δb that are not plausible for many countries and that do not match the evolution of unemployment benefits replacement ratios over time as estimated by the OECD.

I therefore use equation (2) only for estimating Δw, Δs, and Δh. The three variables of interest are defined as follows: $\ln w_{it}$ is the log of individual earnings for an employed person, in which case the regression is estimated using only observations such that the individual is employed at *t* (regression 1); ED_{it} is a dummy equal to 1 if the individual is employed at *t*, in which case the regression uses only observations such that the individual was unemployed at $t - 1$ (regression 2); and UD_{it} is a dummy equal to 1 if the individual is unemployed at *t*, in which case the regression uses only observations such that the individual was employed at $t - 1$ (regression 3). The coefficient a_{j1} represents the change in the relevant variable between the two subperiods. As for Δb, I use estimates of the benefit replacement ratio, $\rho = b/w$, in the first subperiod as reported by Nickell (2003).[13]

13. One problem with that study is that its estimate of the replacement ratio for Italy in the second subperiod is unreliable. A discussion by the author with Pietro Ichino suggests progressive moving toward a replacement ratio of 0.4 in the second subperiod, starting in 1997, and a value of 0.26 in the first one, while estimating a version of equation (1) yields an increase in $\Delta \ln \rho$ of just 0.02 between the two subperiods. As a reasonable compromise, I take $\rho = (0.26 + 0.40)/2 = 0.33$ in the second subperiod.

For any country, this allows me to compute the average change in the total rent:

$$\frac{\Delta Q}{Q} \approx \frac{w}{w-b}\Delta \ln w - \frac{b}{w-b}\Delta \ln b - \frac{\Delta h}{r+s+h} - \frac{\Delta s}{r+s+h} \ ,$$

or, equivalently,

$$\frac{\Delta Q}{Q} \approx \Delta \ln w - \frac{\rho \Delta \ln \rho}{1-\rho} - \frac{\Delta h}{r+s+h} - \frac{\Delta s}{r+s+h} \ .$$

This number is computed using the average unconditional values of w, b, h, and s in the first subsample ($t = 1,\ldots S$) and $r = 0.03$. Similarly, I can compute the change in the rent in annuity terms:

$$\frac{\Delta q}{q} \approx \Delta \ln w - \frac{\rho \Delta \ln \rho}{1-\rho} - \frac{\Delta h}{r+s+h} + \frac{h \Delta s}{(r+s+h)(r+s)} \ .$$

5. Results I: The Interindustry Approach

The estimated industry coefficients are highly significant and typically range up to 50–60 percent. In some cases the number of observations is too low in a given time × country × industry cell, and the coefficient cannot be used. I have therefore dropped Luxembourg, Greece, and years 1999 and 2000 for Belgium. Also, the Panel stops in 1996 for Germany and the United Kingdom, and it starts in 1995 for Austria and in 1996 for Finland. Finally, the Netherlands includes what is probably an aberrant observation in 1998, owing to a sharp drop in the estimated industry dummy coefficient for textiles.

The tables in this section report the results for the two rent indicators, *SPREAD* and *ARENT*. In table 1, the *SPREAD* measure fluctuates in all countries, but it does not seem to follow any clear trend. In other words, the rent of the best-paid workers relative to their characteristics does not seem to vanish. The exceptions are Austria, where rents seem to go down, and Finland and the Netherlands, where they go up. Overall, the results confirm the findings of Krueger and Summers (1988) that interindustry wage differentials are quite persistent over time.

Table 2 reports the results for the *ARENT* measure. Most countries display no clear upward or downward trend for the estimated

average rent. In the cases of Spain and Italy, the measure is remarkably stable. Again, the rent seems to have gone down in Austria, and to have gone up in Finland.[14]

Table 1. Evolution of *SPREAD*

	Year						
Country	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*
Austria	–	0.59	0.55	0.40	0.46	0.42	0.37
Belgium	0.24	0.20	0.26	0.23	0.23	–	–
Denmark	0.27	0.31	0.26	0.17	0.33	0.31	0.26
Finland	–	–	0.24	0.23	0.23	0.25	0.35
France	0.45	0.40	0.41	0.37	0.42	0.38	0.45
Germany	0.53	0.43	0.43	–	–	–	–
Ireland	0.67	0.61	0.57	0.59	0.79	0.56	0.70
Italy	0.47	0.35	0.44	0.36	0.40	0.42	0.41
Netherlands	0.33	0.32	0.33	0.30	0.63	0.46	0.42
Portugal	0.49	0.54	0.51	0.58	0.50	0.53	0.53
Spain	0.55	0.54	0.54	0.56	0.55	0.56	0.60
United Kingdom	0.66	0.57	0.62	–	–	–	–

– Data do not cover this year.

Table 2. Evolution of *ARENT*

	Year						
Country	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*
Austria	–	0.47	0.36	0.30	0.35	0.34	0.26
Belgium	0.12	0.08	0.17	0.13	0.13	–	–
Denmark	0.17	0.14	0.18	0.09	0.20	0.21	0.15
Finland	–	–	0.16	0.16	0.14	0.18	0.27
France	0.23	0.18	0.20	0.16	0.22	0.18	0.21
Germany	0.32	0.29	0.26	–	–	–	–
Ireland	0.47	0.40	0.37	0.38	0.45	0.41	0.50
Italy	0.20	0.18	0.20	0.19	0.18	0.20	0.17
Netherlands	0.15	0.21	0.19	0.13	0.45	0.22	0.17
Portugal	0.14	0.15	0.15	0.18	0.14	0.15	0.16
Spain	0.24	0.20	0.19	0.20	0.22	0.21	0.23
United Kingdom	0.40	0.31	0.32	–	–	–	–

– Data do not cover this year.

14. One shortcoming is that the results are substantially driven by the difference between the agricultural sector and all other sectors, as the former pays considerably lower wages than the rest. This would not be a problem if, for example, the agricultural sector pays no rent at all—such that people are indifferent between working in that sector and being unemployed—while all other sectors pay rents that are similar. However, no clear pattern emerged when I dropped the agricultural sector from my computations of the rent indicators.

These results may be driven by sectors with too few observations, which would imply a potentially volatile associated coefficient. To check for that, I constructed alternative estimates of *ARENT* and *SPREAD*, which use only sectors with more than a hundred observations in the first wave. This means that the variables are defined using a different set of industries in different countries, but that is unimportant here because I am not comparing the average level of the rent across countries. The results for *ARENT* (reported in table 3) are slightly different from those of table 2. Rents now seem to go down in Ireland and perhaps France and Italy, and to go up again in Finland, with no clear pattern elsewhere. In particular, they no longer seem to be falling in Austria.

The usual problem of unobserved heterogeneity among workers also applies. I therefore also computed the fixed effect estimator. One problem, though, is that if people do not move much between industries, then such a panel, with relatively few periods and observations, is likely to present fixed effects that are highly collinear with the vectors of industry dummies. The following results should thus be taken with caution. As shown in table 4, the estimated spread is quite volatile, although there is still evidence of a downward trend in rents in Austria. Also, in many countries, rents computed using the fixed effect estimators are smaller than under random effects, as expected.

When fixed effects are applied to the average rent, a few strange phenomena arise, like the quasi-disappearance of the average rent in

Table 3. Evolution of *ARENT*, Robust Definition

	Year						
Country	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*
Austria	–	0.06	0.04	0.04	0.04	0.07	0.07
Belgium	0.06	0.08	0.08	0.09	0.07	0.12	0.05
Denmark	0.06	0.06	0.07	0.05	0.06	0.06	0.06
Finland	–	–	0.04	0.03	0.04	0.04	0.09
France	0.24	0.16	0.16	0.15	0.19	0.19	0.18
Germany	0.13	0.11	0.11	–	–	–	–
Ireland	0.20	0.23	0.14	0.15	0.13	0.11	0.11
Italy	0.20	0.17	0.20	0.18	0.18	0.19	0.17
Netherlands	0.08	0.06	0.06	0.06	0.12	0.05	0.08
Portugal	0.12	0.13	0.12	0.15	0.12	0.13	0.14
Spain	0.23	0.19	0.18	0.19	0.21	0.20	0.22
United Kingdom	0.22	0.25	0.20	–	–	–	–

– Data do not cover this year.

France, Spain, and Italy (see table 5). Again, the measure seems highly volatile, but there is still a downward trend in Austria.

To conclude, no country demonstrates a clear trend. There is mild evidence of falling rents in Austria and Ireland, but it is not robust across estimators. If I had to choose a preferred estimation, however, I would opt for that of table 3, which is based on the least volatile estimates of the interindustry dummies. That table suggests a sharp drop of rents in Ireland but not elsewhere.

Table 4. Evolution of *SPREAD*, Fixed Effects

	Year						
Country	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*
Austria	–	0.39	0.28	0.20	0.27	0.26	0.11
Belgium	0.15	0.11	0.24	0.13	0.19	–	–
Denmark	0.30	0.41	0.28	0.32	0.41	0.31	0.26
Finland	–	–	0.28	0.22	0.26	0.20	0.17
France	0.29	0.25	0.32	0.24	0.32	0.27	0.28
Germany	0.31	0.35	0.38	–	–	–	–
Ireland	0.49	0.40	0.35	0.36	0.66	0.56	0.60
Italy	0.30	0.19	0.28	0.18	0.26	0.27	0.26
Netherlands	0.37	0.23	0.43	0.31	0.73	0.54	0.55
Portugal	0.13	0.10	0.17	0.13	0.12	0.16	0.18
Spain	0.40	0.16	0.12	0.24	0.18	0.30	0.32
United Kingdom	0.65	0.41	0.38	–	–	–	–

– Data do not cover this year.

Table 5. Evolution of *ARENT*, Fixed Effects

	Year						
Country	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*
Austria	–	0.31	0.21	0.15	0.23	0.19	0.08
Belgium	0.10	0.05	0.13	0.08	0.10	–	–
Denmark	0.16	0.17	0.15	0.22	0.21	0.18	0.21
Finland	–	–	0.14	0.08	0.13	0.06	0.09
France	0.06	0.05	0.09	0.07	0.09	0.07	0.08
Germany	0.18	0.21	0.23	–	–	–	–
Ireland	0.28	0.22	0.19	0.22	0.30	0.47	0.37
Italy	0.08	0.07	0.09	0.07	0.06	0.07	0.06
Netherlands	0.12	0.17	0.31	0.06	0.41	0.18	0.20
Portugal	0.07	0.06	0.10	0.06	0.07	0.10	0.11
Spain	0.06	0.05	0.04	0.07	0.08	0.08	0.10
United Kingdom	0.32	0.19	0.18	–	–	–	–

– Data do not cover this year.

5.1 Size Effects

While interindustry wage differentials are the most widely documented and discussed phenomenon, one may also want to look at wage differentials in other dimensions. Hence, I also present results from partitioning by firm size instead of by industry (see tables 6 and 7). I replaced the industry dummies with two size dummies for the regression, corresponding to three size categories: fewer than 100 employees, 100–500 employees, and more than 500 employees. The results look somewhat more plausible and of better quality than those obtained based on interindustry differences, but unfortunately they do not confirm the early results. Rather, they suggest that rents are declining in Belgium, France, Ireland, Italy (mildly), Portugal, and the United Kingdom, while they seem to be rising in the Netherlands and Spain—two countries where unemployment actually fell over the period! Rents are stable in other countries. Thus, the only country for which these estimates support those of the previous section is Ireland.

To conclude, the interindustry approach does not suggest a systematic pattern of falling rents in Europe. When it does for a given country, the decline does not seem to be related to any fall in unemployment in the corresponding country. Finally, breaking down industries by sector of activity or firm size generates different results. The only inference, if any, that one can confidently make from the exercise is that rents have fallen in Ireland.

One potential problem with the approach is that labor market liberalization may have conflicting effects on the estimated rents. On the one hand, it eliminates pure rents that are not the return to productive ability. On the other, it removes wage compression induced by regulation and collective bargaining, which may widen wage differentials by increasing the return to unobserved ability, match-specific human capital, and so on. If these latter factors are more present in some industries than others, then measured interindustry differences may well widen. A fixed effects estimator does not solve that problem: a given individual will earn different returns in different years if these years are associated with a different regulatory environment.

My provisional conclusion, however, is that there is no firm ground for believing that European labor markets have generally become more competitive in the 1990s on the basis of these estimates.

Table 6. Evolution of *SPREAD*, Size Differentials

	Year						
Country	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*
Austria	–	0.10	0.08	0.06	0.08	0.10	0.09
Belgium	0.11	0.12	0.12	0.12	0.12	0.09	0.06
Denmark	0.07	0.08	0.09	0.08	0.09	0.06	0.08
Finland	–	–	0.08	0.10	0.09	0.09	0.12
France	0.20	0.22	0.22	0.25	0.24	0.18	0.16
Germany	0.24	0.25	0.26	–	–	–	–
Ireland	0.24	0.20	0.21	0.16	0.15	0.10	0.13
Italy	0.09	0.09	0.08	0.08	0.08	0.08	0.06
Netherlands	0.07	0.07	0.08	0.10	0.09	0.12	0.10
Portugal	0.12	0.10	0.14	0.11	0.09	0.08	0.07
Spain	0.11	0.15	0.15	0.14	0.16	0.14	0.17
United Kingdom	0.16	0.13	0.12	–	–	–	–

– Data do not cover this year.

Table 7. Evolution of *ARENT*, Size Differentials

	Year						
Country	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*
Austria	–	0.03	0.02	0.02	0.02	0.02	0.02
Belgium	0.05	0.05	0.05	0.04	0.05	0.03	0.01
Denmark	0.03	0.02	0.02	0.02	0.02	0.02	0.02
Finland	–	–	0.02	0.02	0.02	0.02	0.03
France	0.06	0.07	0.07	0.04	0.05	0.04	0.03
Germany	0.08	0.08	0.08	–	–	–	–
Ireland	0.07	0.06	0.06	0.03	0.03	0.02	0.03
Italy	0.02	0.02	0.02	0.01	0.01	0.01	0.01
Netherlands	0.03	0.03	0.03	0.04	0.04	0.05	0.04
Portugal	0.01	0.01	0.02	0.01	0.01	0.01	0.01
Spain	0.03	0.01	0.03	0.03	0.03	0.03	0.03
United Kingdom	0.10	0.07	0.06	–	–	–	–

– Data do not cover this year.

6. Results II: The Transition Approach

This section presents the results of the transition approach to measuring rents. Unfortunately, they are not much more conclusive than the previous exercise, in part because of data problems.

Table 8 reports the evolution of rents under four alternative measures. The two unadjusted rents are defined in section 4. The two adjusted rents deflate the unadjusted ones to allow for growth. (They subtract the expected difference in GDP between the two subperiods on the basis of average GDP growth between 1980 and 2000.) If the rents grow slower than the

Table 8. The Transision Approach

	Unadjusted		*Adjusted*	
Country	$\Delta Q/Q$	$\Delta q/q$	$\Delta Q/Q$	$\Delta q/q$
Austria	0.0139	–0.0200	–0.0580	–0.0900
Belgium	–0.0450	0.1490	–0.1130	0.0800
Denmark	0.0450	–0.0450	–0.0230	–0.1100
Finland	–0.0100	–0.1890	–0.0870	–0.2670
France	0.0480	–0.0580	–0.0110	–0.1100
Ireland	0.0956	0.1940	–0.0840	0.0144
Italy	0.0500	0.0000	–0.0100	–0.0600
Portugal	0.1330	0.0810	0.0258	–0.0256
Spain	0.1120	0.1460	0.0226	0.0563

economy, in the long run they account for a negligible fraction of labor costs and the economy converges toward a competitive labor market. Thus, the first two columns express rents in real consumption units, while the last two columns express them relative to GDP.

A first aspect of the results is that they are not very robust: rents are quite sensitive to whether the specification allows for growth, and the evolution of the total rent, Q, often diverges from that of the rent per unit of time. This suggests that changes in the separation rate, s, play a quantitatively important role in the results (in that an increase in s reduces Q but increases q, all else equal). The evolution of rents again is not closely related to that of unemployment over the period. However, the adjusted $\Delta Q/Q$ does a better job than the other measures; its correlation with the change in unemployment is 0.3. This measure would thus appear to be the preferred one. On that basis, these estimates suggest a more optimistic conclusion than the interindustry approach: rents fall significantly in four countries (Austria, Belgium, Finland, and Ireland), and they fall moderately in three other countries (Denmark, France, and Italy).

7. Conclusion

This paper has provided some quantitative evidence on the evolution of labor market competition in Europe in the 1990s, based on various estimates of labor market rents. The results are rather inconclusive, probably as a result of the quality of the data. A general conclusion is that there is no strong evidence that labor markets became either more or less competitive in any European country over that period. One exception seems to be Ireland, though, for which a number of estimated rents fell significantly over the period.

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