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What hides behind an unemployment rate: Comparing Portuguese and US unemployment

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WP 3-98 April 1998

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What hides behind an unemployment rate: Comparing Portuguese and U.S. unemployment.

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April 17, 1998

Abstract

Over the last 15 years, Portugal and the United States have had the same average unemployment rate, about 6.5%. But behind these similar rates hide two very different labor markets. Unemployment duration in Portugal is more than three times that of the United States. Symmetrically, the flow of workers into unemployment in Portugal is, in proportion to the labor force, less than a third of what it is in the United States.

Relying on evidence from Portuguese and U.S. micro data sets, we show that these lower flows come in roughly equal proportions from lower job flows, and from lower worker flows relative to job flows. We then argue that these differences plausibly come from high employment protection in Portugal. We finally show how, looking across countries, higher employment protection is associated with lower flows and higher unemployment duration. In short, high employment protection makes economies more sclerotic; but because it affects unemployment duration and flows in opposite directions, it has an ambiguous effect on the unemployment rate.

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* MIT and NBER, and Banco de Portugal respectively. We thank Hoyt Bleakley, Tito Boeri, Peter Diamond, Chris Foote, Larry Katz, Bruce Meyer, and Andrei Shleifer for comments and help, the NSF for financial assistance.

Figure 1 plots the evolution of unemployment rates in Portugal and in the United States since 1983. In light of the high unemployment rate in most European countries, the figure yields a striking conclusion: Over the last 15 years, Portugal and the United States have had roughly the same average rate of unemployment, about 6.5%.

This is however where the similarities end. A closer comparison reveals a very sharp difference between the two labor markets. The duration of unemployment in Portugal is more than three times that of the United States. Symmetrically, the flow of workers into unemployment is, in proportion to the labor force, less than a third in Portugal of what it is in the United States. More informally, if the image of U.S. unemployment is one of a way station between jobs, the image of Portuguese unemployment is that of a stagnant pool, with low flows in and out, and long unemployment duration.

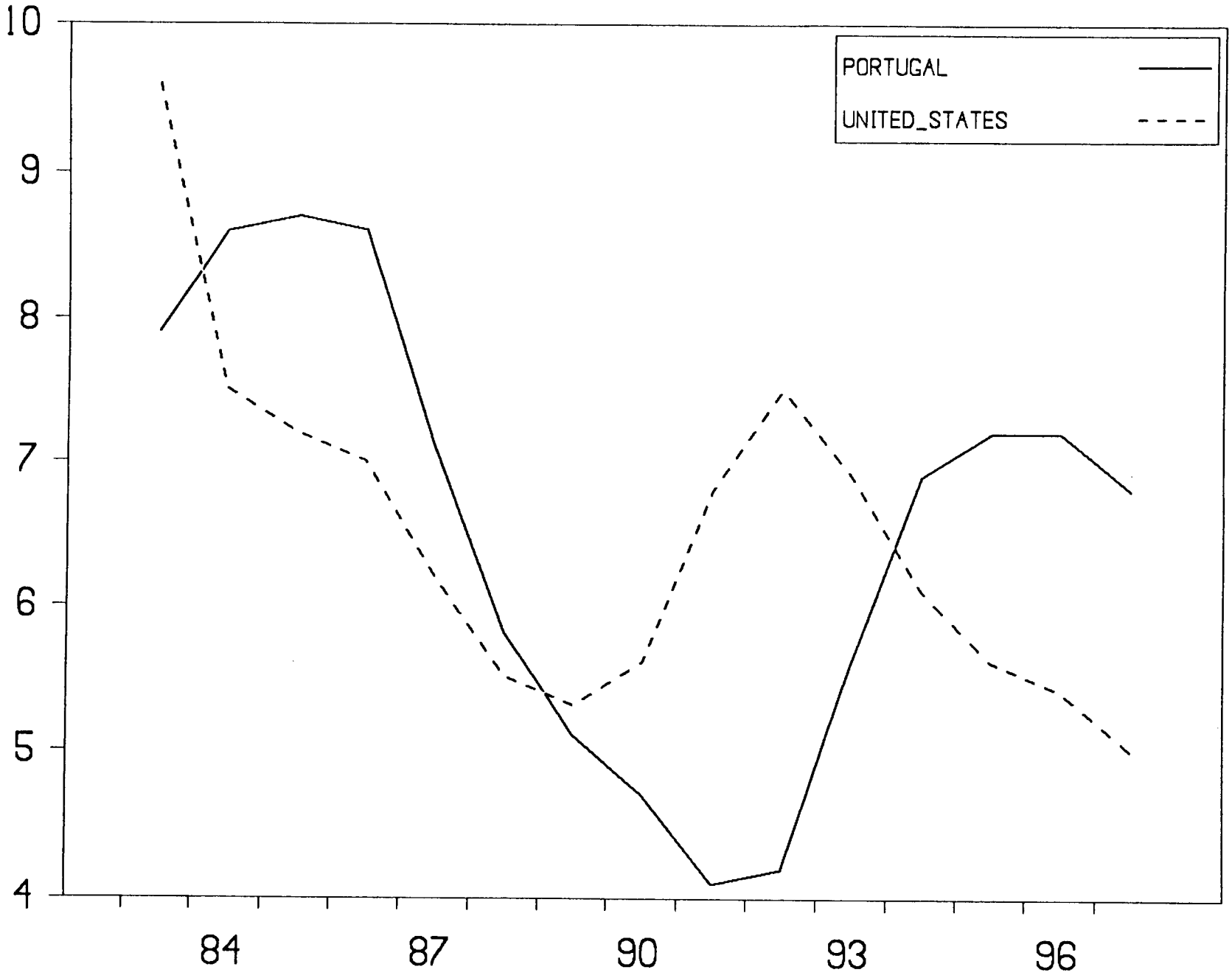
The purpose of our paper is to further characterize the differences, and offer a tentative explanation, namely the importance of employment protection in Portugal. It is organized in four sections.

Sections 1 and 2 are empirical and primarily descriptive. As a matter of logic, low flows of workers in and out of unemployment can come from a combination of three factors:

- Low flows of job creation and job destruction.
- Low worker flows given job flows.
- Low flows of workers through unemployment relative to either job-to-job movements, or movements through non-participation.

Thus, using evidence from Portuguese micro-data sets and U.S. evidence collected by others, we compare job flows and the structure of worker flows across the two countries. Such international comparisons are always difficult because of differences in available data sets and methodology. We pay particular attention to these difficulties. Section 1 looks at job flows, Section 2 at worker flows. We conclude

Unemployment rates in Portugal and the U.S., 1983-1997



that the low flows in and out of unemployment in Portugal reflect in roughly equal part low job flows, and low worker flows relative to job flows. The third potential factor, low worker flows through unemployment relative to job-to-job movements, does not appear to play an important role.

We then argue in Section 3 that these facts, taken together with the high duration of unemployment, point to the importance of high employment protection in Portugal. To do so, we develop a simple model aimed at capturing the effects of employment protection on the labor market. We show how employment protection decreases job flows, decreases worker flows even more, and increases unemployment duration, thus fitting the basic facts of the Portuguese labor market.

Assessing whether and how our conclusions extend to other OECD countries would require doing the same type of data analysis for each country as we do here for Portugal. We have not done so. But we provide in Section 4 what we find to be tantalizing evidence of the role of employment protection in explaining differences in the nature of unemployment across countries. We construct for each OECD country the average flow into unemployment—as a proportion of the labor force—and average unemployment duration, for the period 1985-1994. We then regress each of these two variables on the index of employment protection developed by the OECD in its Jobs Study. We find a strong negative relation between the flow into unemployment and the degree of employment protection, and a similarly strong positive relation between unemployment duration. Employment protection appears to have strong effects on reallocation and the nature of unemployment. But the effect on the unemployment rate, the product of flow times duration, turns out to be both theoretically and empirically ambiguous.

Our paper is related to the growing literature on the nature of flows in the labor market, the role of employment protection, and differences between U.S. and European labor markets. It sheds some light on two puzzles in that literature:

- Following the work of the OECD [1987], and of Davis and Haltiwanger for

the United States, researchers have constructed measures of job creation and destruction for a number of European countries (see Davis et al. [1996] for an early survey). The prior belief was that employment protection would lead to lower rates of creation and destruction in Europe relative to the United States. But the constructed measures—typically annual rates of job creation and destruction— have turned out to be surprisingly similar across countries. Our examination of Portugal and the United States provides a potential explanation. *Annual rates* of creation and destruction are indeed slightly higher in Portugal than in the United States (although they become lower when controlling for the different distributions of firm sizes in the two countries); but *quarterly rates* are much lower in Portugal than in the United States, suggesting that the effect of employment protection is primarily to reduce transitory employment variations, much less permanent ones.

- Despite the rhetoric about Eurosclerosis, empirical research has had a hard time documenting much effect of employment protection legislation on the unemployment rate across countries.[1] A number of theoretical papers have already pointed out that this should not be seen as a surprise: employment protection is likely to increase unemployment duration, but also to decrease flows, leading to an ambiguous effect on the unemployment rate (for a discussion, see for example Blanchard and Katz [1997]). This paper shows that the two effects of protection —on flows and on duration— are indeed strongly visible in the data.[2] Employment protection affects the nature of reallocation and of unemployment; it just does not affect the unemployment rate very much.

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1. See for example Lazear [1990].

2. Table 1 in Boeri [1995] also shows the negative correlation between flows and employment protection across OECD countries.

1 Job flows

We have two goals in this section. The first is to construct job flows for Portugal. The second is to compare them to the corresponding constructs for the United States.

To achieve the first, we rely on two data sets. The first is an annual data set, "Quadros de Pessoal", collected by the Ministry of Employment, that gives point-in-time employment levels, for all Portuguese establishments, yearly. This allows us to construct annual measures of job creation and job destruction, for each year from 1983 to 1995. The second is a quarterly data set, the "Employment Survey", that gives point-in-time employment levels for a sample of Portuguese establishments, quarterly. From that survey, we construct a probability weighted sample, from which we construct series for job creation and job destruction for each quarter from 1991-1 to 1995-4. (Further details about the data sets, and the construction of the series, here and below, are given in the data appendix.)

1.1 Manufacturing

Given that the LRD, the main data set available to compute job flows for the United States, covers only manufacturing, we start by looking at job creation and destruction for Portuguese manufacturing. We construct all series using the same definitions as Davis et al. [1996]. The resulting series for job creation and job destruction, from 1983 to 1995, are plotted in Figure 2.

The figure shows that, as would be expected, job creation is procyclical, job destruction countercyclical; both series appear to trend upward, but the series are too short to be confident about the presence of such a trend.

The average values of the two series and their components (job creation due to entries or to expansions in continuing establishments, job destruction due to exits or to contractions in continuing establishments) are given in line 1 of Table 1.

Annual job creation/destruction

Manufacturing, 1983-95

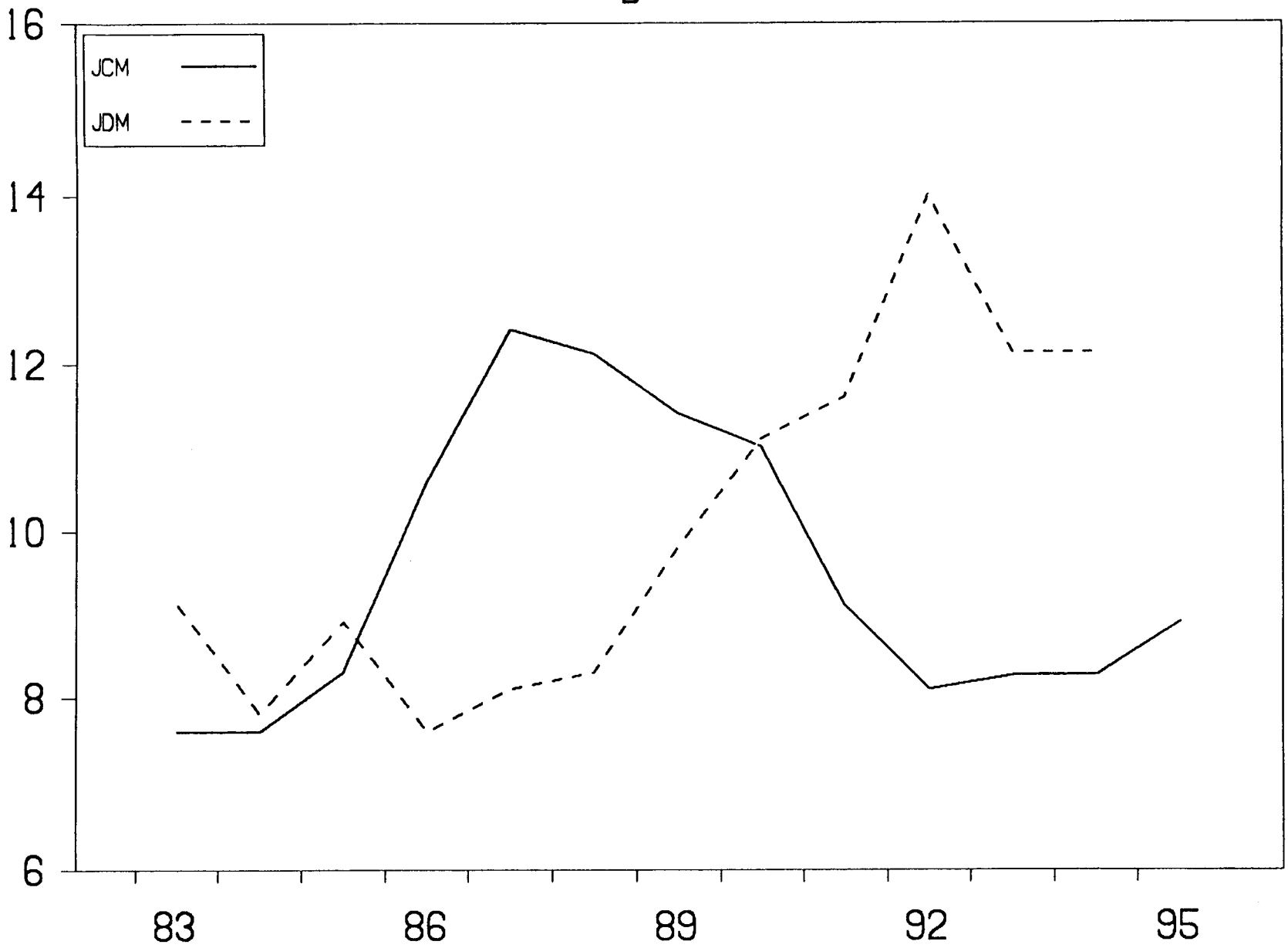


Table 1. Annual job creation and destruction, Manufacturing, Portugal and the United States

	Job Creation			Job Destruction			Sum
	Entry	Expansion	Sum	Exit	Contraction	Sum	
Portugal							
1. All	5.3	6.1	11.4	5.5	6.3	11.8	23.2
2. ≥5 emp	4.9	5.7	10.6	5.3	6.3	11.6	22.2
3. *size adjusted*	(3.0)	(4.5)	(7.5)	(4.2)	(5.9)	(10.1)	(17.6)
United States							
4. ≥5 emp	1.5	7.4	8.9	2.5	7.7	10.2	19.2
5. Ratio P/U.S.			1.19			1.13	1.16

All numbers: Percentage of employment. Averages over the relevant period.

Line 1. From the Quadros de Pessoal, 1983-1995. Includes all establishments.

Line 2. Same source. Excludes establishments with less than 5 workers.

Line 3. Same source. But uses U.S. instead of Portugal establishment employment size shares to construct size-adjusted job creation and destruction.

Line 4. From Davis and Haltiwanger, for 1973-1993.

Line 5. Ratio of numbers in line 2 to numbers in line 4.

The series reported in line 1 include all manufacturing establishments. The U.S. series constructed by Davis and Haltiwanger exclude firms with less than 5 workers. Thus, for comparison, we give, in line 2, the numbers for job creation and destruction in Portugal excluding establishments with less than 5 workers (these firms account for 3.4% of manufacturing employment in Portugal). Small establishments tend to have more volatile employment; excluding them leads to slighly lower numbers for creation and destruction.

Given that job creation and destruction typically decrease with establishment size, and that Portugal has a larger proportion of small firms than the United States (for example, establishments with less than 50 employees account for 32% of manufacturing employment in Portugal, compared to 14% in the United States), we carry out the following exercise. We divide establishments in class sizes (following the grid size in Davis and Haltiwanger, Table 4-1), compute job creation and destruction for each class size, and then compute overall job creation and destruction, using *U.S.* rather than Portuguese shares of employment in each class. In short, this computation gives "firm size adjusted" job creation and destruction for Portugal. The results are shown in line 3.

Finally, line 4 gives the U.S. numbers, from the updated data base constructed by Davis et al. [1997] from the LRD for the period 1973-1993.

The comparison of Portuguese and U.S. numbers yields three sharp conclusions (The average values correspond to different time spans across the two countries. Comparing mean values for the period over which both sets of observations are available, 1983-1993, yields the same conclusions):

- First, annual job creation and destruction are actually higher in Portugal as in the United States. Comparing line 2 and line 4, job creation in Portugal is equal to 119% of the U.S. value, job destruction to 113% of the U.S. value. This observation is in line with the findings of other studies, which have found that annual job creation and destruction appears to be often as large

or larger in Europe as in the United States[3]

- Second, the high rates in Portugal reflect in large part smaller firm size, and associated higher job turnover. Comparing line 3 and line 4, "size adjusted" job creation in Portugal is equal to 84% of the U.S. value, job destruction to 99% of the U.S. value.
- Third, the composition of both creation and destruction is quite different across the two countries. The proportion of job creation due to entries and the proportion of job destruction due to exits are both about twice as large in Portugal as in the United States.

  This difference could be due to measurement issues, with firms either simply misreporting their identification numbers, or actually going the process of closing and reopening in order to avoid various legal obligations. As described in the appendix, to deal with the first problem, we eliminate temporary exits, establishments that disappear from the sample but reappear later on. Also as described in the appendix, we have explored a number of checks on the series, and concluded that most of the entries and exits are indeed genuine. If so, one hypothesis is that employment protection—the role of which we shall explore at more length below—, may lead to less employment adjustment in continuing firms, but at the cost of more closings of existing firms.

We turn next to the quarterly evidence, still for manufacturing. For Portugal, using the "Employment Survey", we can construct series for quarterly job creation due to expansions, and job destruction due to contractions, for the period 1991 to 1995. The mean values of the flows are given in line 1 of Table 2. While the data set does not allow us to construct series for job creation due to entry, and job destruction due to exit, we construct rough estimates of mean entry and exit rates from annual numbers. For entries, we simply use the annual rate divided by four. For exits, matters are more complex. As firms which exit tend to have decreases

3. See for example, Bertola and Rogerson [1997], or OECD [1994], Chapter 6.

Table 2. Quarterly job creation and destruction, Manufacturing, Portugal and the United States

	Job Creation			Job Destruction			Sum
	Entry	Expansion	Sum	Exit	Contraction	Sum	
Portugal							
1.	**1.2**	**2.0**	**3.2**	**1.0**	**2.9**	3.9	**7.1**
2. *memo: annual 1*	(4.8)	(4.7)	(9.5)	(6.8)	(7.1)	(13.9)	(23.4)
3. *memo: annual 2*		(4.0)			(7.5)		
United States							
4.	**0.6**	**4.8**	**5.4**	**0.8**	**4.9**	5.7	**11.1**
5. *memo: annual*	(1.5)	(7.5)	(9.0)	(2.5)	(7.8)	(10.3)	(19.3)
6. **Ratio P/U.S.**			**0.59**			0.68	**0.63**
7. *memo: annual*			(1.05)			(1.34)	(1.21)

All numbers: Percentage of employment. Averages over the period. Sources:

Line 1. Quarterly changes. Expansions and contractions, from Quarterly Employment survey, 1991:1 to 1995:4. Entries and exits computed from annual data as in Table 1, line 2, but for 1991:1 to 1995:4, divided by 4. Exits further adjusted as described in the appendix.

Line 2. Annual changes, constructed as in Table 1, but for 1991:1 to 1995:4.

Line 3. Annual changes (expansions and contractions only), constructed from the Employment Survey.

Line 4. Quarterly changes. Davis and Haltiwanger, 1972:2 to 1988:4.

Line 5. Annual changes, constructed as in Table 1, but for 1972:1 to 1988:4.

Line 6. Ratio of number in line 1 to number in line 4. Line 7: Ratio of number in line 2 to number in line 5.

in employment in the quarters preceding their exit, some of the "job flows due to exits" in annual data show up as "job flows due to contractions" in quarterly data. The adjustment we use thus scales the annual exit rate appropriately and is described in the appendix.

For comparison with the previous table, we report in line 2 as memo item 1 the numbers for annual job creation and destruction, computed in the same way as in Table 1, line 1, but over the same period as for the quarterly rates.

For purposes of assessing comparability between the annual and the quarterly data sets, we compute annual numbers for both expansions and contractions from the quarterly data set. Details are given in the appendix. The results are reported, as memo item 2, in line 3.

In lines 4 and 5, we do the same for the United States. Line 4 gives the numbers constructed from the LRD by Davis and Haltiwanger for the period 1972:2 to 1988:4. Corresponding annual numbers are given in line 5.

One issue to keep in mind in comparing the two sets of numbers is that the quarterly LRD results are for production workers only (about 70% of all workers for the period at hand), while the Portuguese numbers are for all workers; we do not have the information needed to create series just for production workers for Portugal. Another issue is the fact that the time periods for the two countries are quite different. Indeed they do not overlap: The Portuguese data start in 1991, the U.S. data end in 1988. But the mean values of the flows for the United States appear quite stable over time; results are nearly identical when using, say, only the 1980s. Thus, this may not be a major issue.

Comparison of the two sets of numbers, and of these numbers with those in Table 1 yields an important conclusion:

In contrast to the results using annual numbers, quarterly job creation and job destruction are substantially lower in Portugal than in the United States. Quarterly

job creation in Portugal is equal to 59% of the U.S. value, job destruction to 68% of the U.S. value.

The interpretation of the difference between quarterly and annual results is a simple one: movements in firm employment in the United States have a much larger transitory component than in Portugal. We see this finding as suggestive of an important role of employment protection in Portugal. Think of firms' desired employment as having both a transitory and a permanent (unit root) component. The higher the cost of adjusting employment, the more firms will smooth the transitory component; but they will have little choice other than to adjust to the permanent one. The lower the frequency at which we look at employment changes, the more important will be the permanent component relative to the transitory component, and thus the smaller will be the effect of employment protection on employment movements (Think for example of the transitory component as a seasonal: only by looking at quarterly changes would we see the effects of employment protection.)

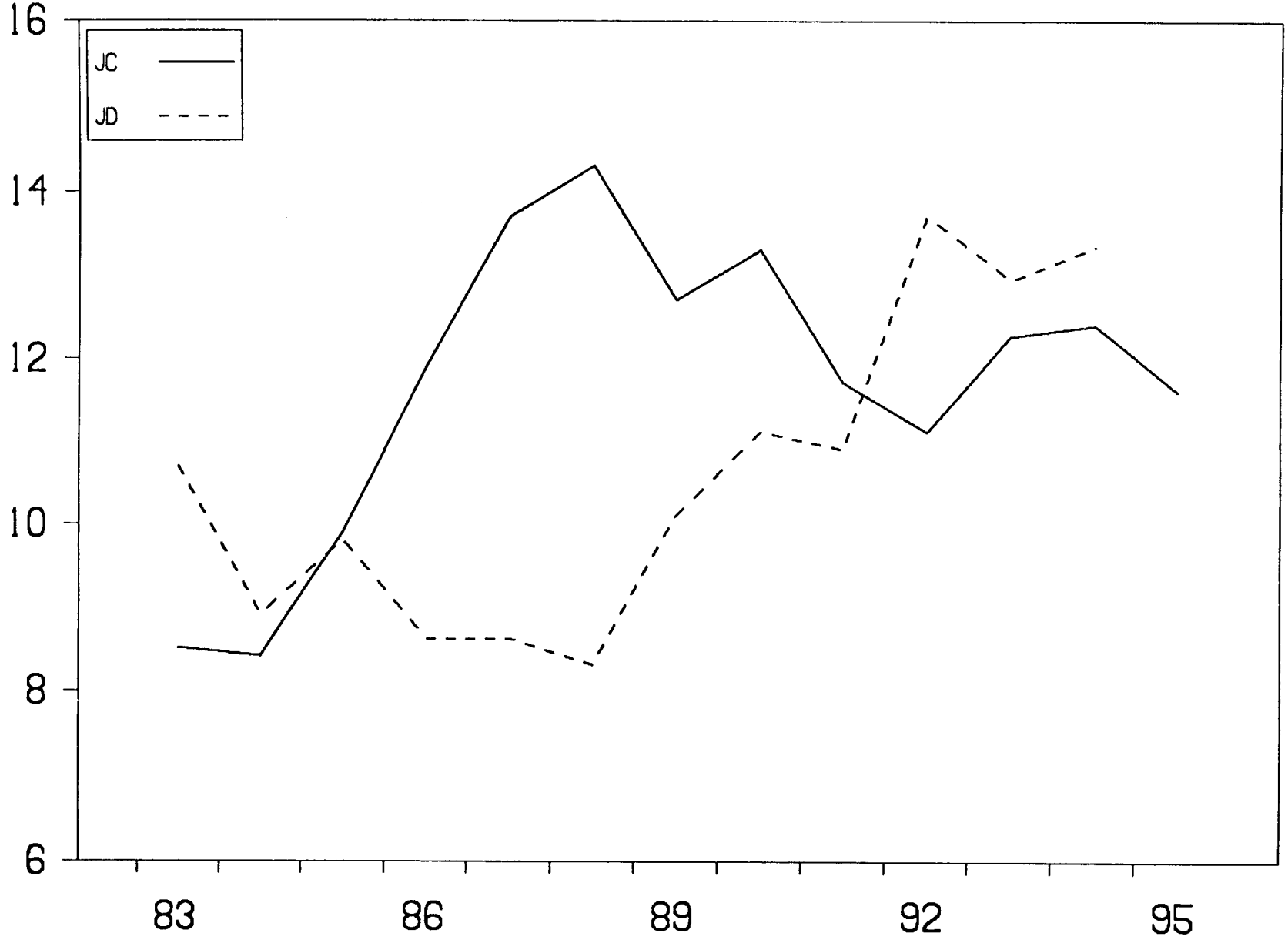
We do not know whether a similar result holds for other European countries. To the extent that it does, this may give a key to the puzzle of the similar annual job creation/destruction measures on both sides of the Atlantic mentioned earlier. Employment protection may lead firms to smooth quarter-to-quarter movements, but the effect may be much smaller when looking at year-to-year movements.

1.2 All sectors

As the Portuguese data sets cover all sectors, we can carry the same exercises for the Portuguese economy as a whole. The problem in comparing them to the United States is in the lack of an appropriate counterpart data set for the United States. But, one can still get a sense of the relative magnitudes. The basic conclusion is that the main results obtained for manufacturing apply to the overall economy.

Annual job creation/destruction

All firms, 1983-95



For Portugal, we construct annual data for job creation and destruction in the same way as we did for manufacturing. Figure 3 shows the evolution of job creation and destruction from 1983 to 1995; there is again a clear cyclical pattern, and perhaps a trend. Average values for the flows and their components are given in line 1 of Table 3. Average values, excluding firms with less than five workers, are given in line 2.

Not only does Portugal has a higher proportion of smaller firms than the United States, but the sectoral composition of employment is different. Agriculture, a sector with higher job creation and destruction than the others, is for example larger in Portugal than in the United States. Thus, following the logic followed in Table 1, we construct firm size *and* sector adjusted job creation and destruction numbers, using U.S. size/sector shares for employment (see the appendix for details). The results are reported in line 3.

For the United States, the only available source of information for firms outside of manufacturing is from the states' unemployment insurance systems. This information has been examined by a number of researchers, Leonard [1987] for Wisconsin from 1978 to 1982, Anderson and Meyer [1993] for eight states from 1978 to 1984, and more recently Foote [1997] for Michigan from 1978 to 1988. Because of differences between firm-based data and unemployment insurance-based data, the results from these studies cannot be directly compared to the Portuguese numbers.[4] But they can be used to get a sense of the ratio of job creation/destruction for the economy as a whole relative to that in manufacturing, and to adjust the LRD manufacturing numbers accordingly. This is what we do here. Unfortunately, the results of the three studies cited above differ substantially: the ratio of job turnover for the economy as a whole relative to manufacturing is 1.28 in Leonard, 0.99 in Anderson and Meyer using annual data (1.11

4. For a discussion of the differences between LRD and UI-based numbers, see for example Foote [1997]

Table 3. Annual job creation and destruction, All sectors, Portugal and the United States

	Job Creation			Job Destruction			Sum
	Entry	Expansion	Sum	Exit	Contraction	Sum	
Portugal							
1. All	7.8	7.1	14.9	6.4	7.3	13.7	28.6
2. $\geq$5 emp	6.5	6.3	12.9	5.8	7.6	13.4	26.3
3. *size/sector adj*	(5.7)	(5.2)	(10.9)	(4.3)	(4.7)	(9.0)	(19.9)
United States							
4.	1.5-2.0	7.4-9.8	8.9-11.8	2.5-3.3	7.7-10.2	10.2-13.5	19.2-25.3
5. Ratio P/US			1.09-1.44			0.99-1.31	1.03-1.36

All numbers: Percentage of employment. Averages over the relevant period.

Line 1. From the Quadros de Pessoal, 1983-1995. Includes all establishments.

Line 2. Same source. Excludes establishments with less than 5 workers.

Line 3. Same source. But uses U.S. employment size and sectoral shares to construct size-sector adjusted job creation and destruction (see appendix).

Lines 4. Estimates of U.S. job creation and destruction constructed using Davis-Haltiwanger annual numbers, 1973-1993, from table 1, multiplied by 0.99 and by 1.33 respectively (see text).

Line 5. The two values for the ratio correspond to the ratios of line 2 to the two numbers in line 4.

using quarterly data), and 1.33 in Foote. Thus, we construct two sets of numbers for the United States. The first is obtained by multiplying the manufacturing numbers by 0.99 —the Anderson-Meyer adjustment—, the second by multiplying by 1.33—the Foote adjustment. The pairs of numbers are given in line 4.

The table yields two conclusions.

- Rates of job creation and job destruction for the economy as a whole in Portugal are higher than in manufacturing. Using lines 1 in Tables 1 and 3 gives a ratio of job turnover for the economy as a whole relative to manufacturing equal to 1.23; using lines 2 in Tables 1 and 3, that is excluding firms with less than 5 employees, gives a ratio of 1.18

- Annual job creation and destruction appear to be higher in Portugal than in the United States. Composition plays an important role: when adjusted for firm size and sector composition, the Portuguese numbers for job reallocation (job creation plus job destruction) fall towards the lower bound of the range for the United States.

The last step is to construct quarterly rates of job creation and destruction for the economy as whole. Line 1 in Table 4 gives the results for Portugal, constructed in the same way as for manufacturing earlier. Line 2 gives the range of corresponding U.S. numbers for two different adjustment factors, 1.11—the quarterly Anderson-Meyer number— and 1.33—the Foote number.

This table suggests that, adjusting the data in both countries as best as we can, *quarterly job creation and job destruction for the economy as a whole, are substantially lower in Portugal than in the United States. Depending on the adjustment factor used to inflate manufacturing results for the United States, the ratio ranges from 0.66 to 0.55 for job creation, from 0.62 to 0.51 for job destruction.*

Table 4. Quarterly job creation and destruction, All sectors, Portugal and the United States

	Job Creation			Job Destruction			Sum
	Entry	Expansion	Sum	Exit	Contraction	Sum	
Portugal							
1.	1.8	2.2	4.0	1.1	2.8	3.9	7.9
United States							
2.	0.7-0.8	5.3-6.4	6.0-7.2	0.9-1.1	5.4-6.5	6.3-7.6	12.3-14.8
3. Ratio P/U.S.			0.55-0.66			0.51-0.62	0.53-0.64

All numbers: Percentage of employment. Averages over the period.

Line 1. Quarterly changes. Expansions and contractions, from Quarterly Employment Survey, 1991:1 to 1995:4. Entries and exits computed from annual data as in Table 3, line 2, but for 1991:1 to 1995:4, divided by 4. Exits further adjusted as described in the appendix.

Line 2. Quarterly manufacturing numbers from Davis and Haltiwanger, 1972:2 to 1988:4, multiplied by 1.11 and 1.33 respectively (see text).

Line 3. The two values correspond to the ratios of the numbers in line 1 to each of the two numbers in line 2.

2 Worker flows

In a well functioning economy, many separations are not due to desired changes in the level of employment of the firm, but rather to match-specific problems. Workers no longer like the job they hold, or firms no longer like the worker. Thus, worker flows typically exceed job flows. We focus in this section on these worker flows and their relation to job flows, in both Portugal and the United States.

Two data sets are available for Portugal. One is the "INE" household survey, comparable in design to the U.S. CPS, but quarterly instead of monthly. The other is the "Employment Survey" described and used earlier: because firms are asked not only about quarterly net changes in employment, but also about gross changes, the data set can be used to construct internally consistent job and worker flows for *continuing* firms.

We start, in Table 5, with a comparison of numbers based on household surveys.

Quarterly worker flows for Portugal can be constructed for the period 1993:2 to 1996:4 by matching adjacent INE surveys. By using observations on workers in adjacent quarters, we can construct flows from employment to unemployment, to non participation, and to other employment. (One of the strengths of the survey is that it allows to compute employment to employment movements; the appendix gives details of construction.) The resulting mean values of quarterly worker flows from employment are given in column 1 of Table 5. Line 1 gives the value of worker outflows for all workers. To look at a universe of workers consistent with that in the firms' surveys, line 2 gives the value of worker outflows for all workers except public employees (a large proportion of total employment, with lower turnover than in the private sector), the self employed, and private household employees.

Information from questions on the length of tenure in current employment can be used as a rough check on the reliability of estimated worker flows: if the Portuguese economy had been in steady state during the period, the rate of outflow would be equal to the inverse of tenure. Thus, the second column gives the mean value of

the inverse of average tenure over the sample; the numbers are reasonably close to those in the first column.

Quarterly worker flows from employment for the United States are constructed by multiplying the monthly numbers from Blanchard and Diamond [1990] by 3. Those numbers were in turn constructed as the sum of flows from employment to unemployment and non participation, constructed from the CPS for the period 1968:1 to 1986:5 and adjusted by Abowd-Zellner, plus estimated employment-to-employment flows. Two remarks are needed here. First, during that period, employer identification numbers were not recorded in the CPS, so that the estimates of employment-to-employment flows are rough estimates based on retrospective information from workers; the range of values reported in Table 5 for worker flows from employment in the United States reflects the range of estimates in Blanchard and Diamond.[5] The other is whether, for the purposes of comparison between the two countries, we should compare (the raw) Portuguese numbers to raw or to Abowd-Zellner adjusted flows for the United States. To the extent that many spurious transitions in monthly estimates are likely to be reversed in the following month, we believe that the problem of spurious transitions is likely to be more serious with cumulated monthly transitions than with quarterly transitions, and thus that it is better to add the Abowd-Zellner adjusted than the raw series.

The numbers for job destruction in Portugal in the third column are constructed in the same way as in Table 4, but for the period closest to that used to measure

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5. Since 1994, a new question in the CPS allows computation of employment-to-employment movements. The series of employment-to-employment movements from 1994:1 to 1996:12 has been constructed by Hoyt Bleakley, in unpublished work at the Boston Federal Reserve. The raw series, i.e. not corrected for potential measurement error bias implies a ratio of employment to employment flows to initial employment of about 2.5% for the period, higher than the mean upper bound of the range estimated by Blanchard and Diamond for the earlier period 1968-1986, namely 1.6%. We have not tried to reconcile these numbers here.

Table 5. Quarterly worker outflows (from household surveys) and job destruction (from establishments' surveys). Portugal and the United States

	Worker outflows	Inverse tenure	Job destruction	Ratio worker/job
Portugal				
1. All workers	3.1	2.6% per quarter		
2. excl pub emp	4.1	3.4% per quarter	3.9	1.1
United States				
3.	11.1-14.1		6.3-7.6	1.4-2.2
4. Ratio P/U.S.	0.21-0.28		0.51-0.62	

All numbers: Percentage of employment, unless otherwise indicated. Averages over the relevant period.

Column 1. Worker outflows: Portugal, from INE household survey, 1993:2 to 1996:4; United States: from CPS, 1968:1 to 1986:5, adjusted in Blanchard and Diamond [1990]; the range reflects upper and lower bounds on the estimates.

Column 2. Portugal. Inverse tenure: inverse of average tenure in quarters, from INE, 1993:2 to 1996:4.

Column 3. Job destruction: Portugal, constructed as in Table 4, line 1, but for 1993:2 to 1995:4. United States: from lines 2 and 3 in Table 4.

Line 1. Portugal. Includes all workers. Line 2. Excludes public employees, the self employed, and private household employees.

Line 4. Ratio of number in line 2 to each of the two numbers in line 3.

worker flows, 1993:2 to 1995:4. The range of values for the U.S. number reflects the uncertainty about the adjustment factor when going from manufacturing to all sectors. The last column gives the ratio of worker outflows to job destruction in each case.

Table 5 yields two conclusions:

- Worker outflows in Portugal barely exceed job destruction. The ratio of worker outflows to quarterly job destruction is only 1.1 (recall however that the two numbers come from different sources, household surveys for the first, firm surveys for the second. The evidence presented in the next table, which comes from a common source, suggests that this number is on the low side, but not by very much.) In contrast the ratio of worker outflows to quarterly job destruction in the United States ranges from 1.4 to 2.2.
- As a result of both low job flows, and low worker flows relative to job flows, worker flows (as a proportion of employment) stand in Portugal at 21 to 28% of U.S. levels.

One problem of Table 5 is that the numbers for worker and job flows come from different sources. A more reliable set of estimates for worker flows relative to job flows in Portugal can be obtained by relying on a common source, namely the "Employment Survey". Quarterly worker outflows from employment and inflows to employment, as well as job creation and destruction series can be constructed for the period 1991:1 to 1995:4 (recall however that these numbers include neither job creation and worker inflows due to entry, nor job destruction and worker outflows due to exit). The mean values of the series for all sectors, and for manufacturing firms only, are given in lines 1 and 2 of Table 6.

No comparable data set exists for the United States. In line 3, we give, with some trepidation, the results of the Anderson-Meyer study of worker flows and job flows based on unemployment insurance records. The trepidation comes from the numerous differences in the nature of the data sets in the Portuguese and the U.S. studies, and from the fact that the Anderson-Meyer estimates of worker flows

Table 6. Quarterly worker flows and job creation/destruction, from data on firms. Portugal and the United States

	Workers out	Job destruction	Workers in	Job creation	Ratio
Portugal					
1. All sectors	4.3	3.0	3.6	2.3	1.5
2. Manufacturing	4.0	2.9	3.2	2.1	1.4
United States					
3. All sectors	17.8-23.0	7.9	16.7-21.9	5.1	2.6-3.4

All numbers: Percentage of employment. Averages over the period. Sources:

Column 5. "Ratio" is the ratio of the sum of worker in and outflows (columns 1 and 3) to the sum of job creation and job destruction (columns 2 and 4)

Line 1. Portugal, from Employment survey, 1991:1 to 1995:4 (the numbers do not include worker and job flows due to either entry or exit of firms.)

Line 2. Same, for manufacturing only.

Line 3. United States: range of values from Anderson and Meyer (see text). As discussed in the text, the Portuguese and U.S numbers are not strictly comparable.

are high compared to all other estimates for the United States. The table gives two numbers for worker flows. The second number in each case is the original Anderson-Meyer estimate; the first number gives the estimate subtracting the largest estimated bias according to Anderson and Meyer, namely 5.2%.

This table yields one main conclusion. The ratio of worker flows to job flows in Portugal is a bit higher than in the previous table, between 1.5 and 1.6. But it is much lower than the range of 2.6 to 3.4 implied by the Anderson-Meyer results for the U.S. ratio.

Flows through unemployment

From Table 5, the ratio of worker flows in and out of employment in Portugal relative to the United States is between 0.2 and 0.3. This ratio is roughly equal to the ratio of flows into unemployment between the two countries. Thus, it does not look as if the third potential factor listed in the introduction, namely low flows through unemployment relative to either movements directly from employment to employment, or movements through non participation, plays an important role. But we can get some direct evidence as well. Using the household surveys, we can construct, for each country, movements from employment to either other employment, unemployment or non participation, and look at the proportion of flows from employment that goes through unemployment.

The available evidence on implied quarterly flows from employment is presented in Table 7. The numbers for Portugal are from INE, for the period 1993:2 to 1996:4. Line 1 gives the flows for all workers. Line 2 excludes public employees, the self employed, and private household employees. Line 3 gives the numbers for the United States from Blanchard and Diamond, for the period 1968:1 to 1986:1.

The numbers in the table confirm our earlier conclusions. Flows from employment to unemployment account for 33% of total flows from employment in Portugal, 40% when excluding public employees. The corresponding numbers for the

Table 7. Quarterly worker flows out of employment. Portugal and the United States

	E to U	E to N	E to E	Sum	Ratio (E to U) to Sum
Portugal					
1. all workers	1.0	1.0	1.0	3.0	0.33
2. excl pub emp	1.6	1.1	1.3	4.0	0.40
					(E to U) to Sum
United States					
3.	3.9	4.8	2.4-5.4	11.1-14.1	0.28-0.35

All numbers: Percentage of employment. Averages over the period. Sources:

Line 1. Portugal. From INE household survey, 1993:2 to 1996:4.

Line 2. Same, excluding public employees, the self employed, and private household employees.

Line 3. From CPS, 1968:1 to 1986:5, as adjusted in Blanchard and Diamond [1990], monthly numbers multiplied by 3.

United States range from 28 to 35%. The proportions of flows from employment going through unemployment thus appear similar across the two countries.[6]

3 An interpretation based on employment protection

From our empirical examination, we draw the following conclusions:

- Despite the fact that the Portuguese and U.S. unemployment rates are roughly similar, the nature of unemployment in the two countries is very different: The duration of unemployment is more than three times longer in Portugal than in the United States The flows in and out of unemployment are more than three times lower in Portugal than in the United States.
- Low flows in and out of unemployment in Portugal appear due to two main factors. Job flows in Portugal are about 1/2 to 2/3 of what they are in the United States. And worker flows relative to job flows in Portugal are also roughly 1/2 to 2/3 of what they are in the United States.

How does one explain these differences? While there are surely many factors at work, the natural explanation seems to us to be the very high degree of employment protection in Portugal.

Employment protection, which is actually enshrined in article 53 of the Constitution, is high in Portugal. The rules and costs of employment protection are described in Bover et al. [1997]. In short, the legislation on collective dismissals imposes a long, complex, and costly process on employers. Severance pay is one month pay per year of tenure, subject to a minimum of three months. More importantly, firms have to follow a sequence of time-consuming and potentially production-disruptive administrative procedures (advance notice, report on the

6. To the extent that they extend to other countries, these results shed doubt on the conjecture by Boeri [1995] that the low flows through unemployment in Europe hide high job-to-job movements.

financial and technical reasons, negotiations with the representatives of the employees, rules on the selection of displaced workers,...). Based on procedural inconvenience, the size of severance pay, and the difficulty of dismissal (as of the late 1980s), the OECD ranked Portugal in its Jobs Study as the country with the highest degree of employment protection (out of 16 countries).[7] Other rankings (for example, Bertola [1990]) also put Portugal at or close to the top, together with Spain and Italy. (The United States, when included, is always at the bottom of the rankings).

In a number of countries, governments have attempted to reduce the adverse effects of employment protection on firms by allowing them to offer fixed-term contracts, at the end of which workers can be dismissed without costs. Fixed-term contracts have however been limited in Portugal. There are sharp restrictions on their scope, and they are still subject to severance pay. In the OECD ranking of the strictness of fixed-term contracts, Portugal ranks 8th out of 16. In 1996, fixed-term contracts accounted for only 12.5% of employment in Portugal.[8]

Higher employment protection naturally delivers lower job creation and destruction, lower worker flows relative to job flows, and longer duration of unemployment. It also implies that a low unemployment rate may hide a highly sclerotic economic structure. The purpose of the model below is to show the logic behind these propositions. Building a fully articulated model with both endogenous layoffs and endogenous quits would be a substantial task. The model below starts

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7. See Table 6-5 of the OECD Jobs Study.

8. Readers may wonder why we focus on employment protection, and not on other institutional aspects of the labor market. The answer is that this appears to be the main dimension in which Portugal differs from the European average. Unemployment benefits used to be very low; while they have increased, they are still modest by European standards. The minimum wage stands at 42% of the average wage, again a relatively low number. For more on the characteristics of the Portuguese labor market, see for example Bover et al. [1997].

short of explicit microfoundations, but embodies what we see as the major mechanisms at work while remaining easily tractable.

The firms' side

Think of firms as collections of jobs. Assume that jobs face idiosyncratic productivity shocks. Assume that hiring workers can be done instantaneously and at no cost (i.e ignore problems of matching on the side of firms). Assume that firing workers however entails a cost per worker. Let G be the firing cost; think of it as a cost (time and money lost in legal procedures), not a transfer to workers.[9]

Under these assumptions, the higher the firing cost, the lower the critical value of productivity at which firms decide to terminate a job and layoff a worker, thus the smaller the rate of job destruction, x —equivalently, the layoff rate. We can thus write

$$x = x(G; .) \quad ; x_G < 0 \tag{3.1}$$

where the dot is there to remind us that layoffs depend on other variables, from the parameters of the distribution of shocks to the interest rate and so on.[10]

In steady state (we shall only look at steady state), employment is constant: job destruction must be offset by job creation. This implies that the wage paid by firms must be such as to allow firms to break even (a condition called the zero net profit

9. Whether G is a transfer from the firm to the worker or a cost to the firm-worker pair raises a number of well-known issues (see for example Lazear [1990]). If G is a transfer to workers, firms may be able to extract a payment from workers before they hire them, thereby cancelling all or part of the effects of G. The assumption needed for the results below to go through is that G is either a cost, or if it is a transfer, cannot be fully offset by ex-ante payments by workers to the firm.

10. There exists a number of explicit derivations of such a relation in the literature. See for example Hopenhayn and Rogerson [1993], Bertola and Caballero [1994], Mortensen and Pissarides [1997], Blanchard [1997].

or free entry condition in the literature.) The higher the firing cost, the lower the wage that firms can afford to pay. Call this wage the "feasible wage". Thus, we can write:

$$w = \phi(G; .) \quad \phi_G < 0 \tag{3.2}$$

The feasible wage is a decreasing function of employment protection. Again, the dot is there to remind us that other variables, such as the interest rate for example, belong to this relation.

Can one say something about the relative strength of the effects of firing costs on the layoff rate and the feasible wage? The answer is in general no. Intuitively, the effect of G on x depends on the density of shocks around the critical value of productivity below which firms decide to layoff, while the effect of G on w depends on the cumulative distribution of productivity shocks up to the critical value of productivity.[11]

Bargaining

Assume that wages are set by bargaining between workers and firms. Then the wage will depend at least on three factors:

- The level of unemployment benefits, b: the higher the level of unemployment benefits, the higher the bargained wage.
- The exit rate from unemployment, e. The higher the exit rate from unemployment, the less costly it is to become unemployed and thus the stronger the workers in bargaining, the higher the bargained wage. The fact that the

11. In Blanchard [1997] for example, the two derivatives take a particularly simple form. Let λ the Poisson parameter governing the rate at which jobs receive productivity shocks. Let $F(y)$ be the cumulative distribution from which levels of productivity are drawn after a shock, $f(y)$ be the associated density function, and y^* the critical level of productivity below which firms layoff the worker. Let r be the interest rate. Then, $dx = -\lambda r f(y^*)dG$, and $dw = -\lambda F(y^*)dG$.

relevant labor market variable is the exit rate from unemployment rather than the unemployment rate is true of most models, including bargaining models such as Diamond [1982] or efficiency wage models such as Shapiro and Stiglitz [1984]; it plays an important role below.

- The firing cost, G. Typically, higher firing costs will strengthen the hand of workers in bargaining, leading to a higher wage for given labor market conditions.

Thus, we write:

$$w = b + f(e, G; .) \quad f_e > 0, f_G > 0 \tag{3.3}$$

The bargained wage is increasing in unemployment benefits, in the exit rate from unemployment and in the firing cost. Once again, the dot stands for all other relevant variables.

The last two equations are identities. The exit rate from unemployment is equal to the ratio of hires to unemployment (the implicit assumption is that all hires are from unemployment; we return to this assumption below.)

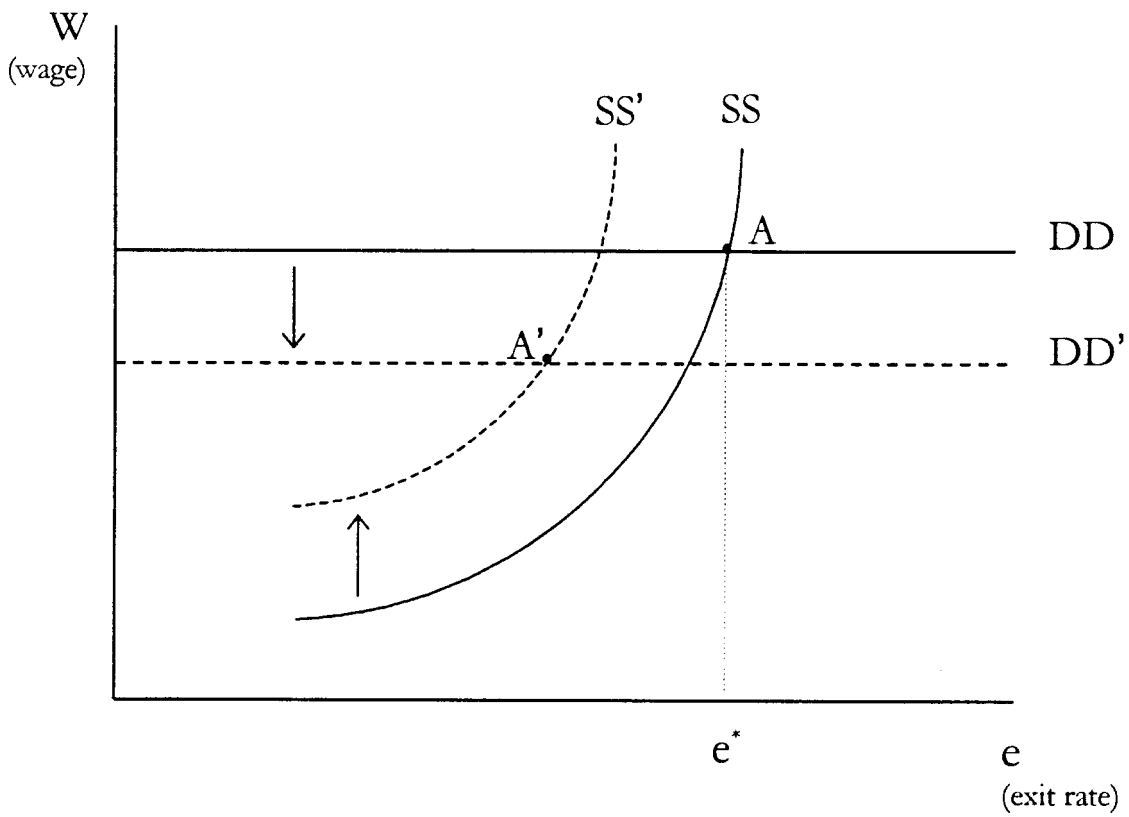
$$\epsilon \equiv h/u \tag{3.4}$$

where h is the flow of hires, and u is unemployment. And, for employment to be constant, hires must be equal to layoffs plus quits. Taking the labor force to be equal to one, and thus employment to equal $(1 - u)$:

$$h \equiv (1 - u)(x + q) \tag{3.5}$$

where x is the layoff rate and q is the quit rate.

For the time being, we take the quit rate as given, so that flows of workers h will move one-for-one with job flows $(1 - u)x$. Later on, we shall endogenize q, so that we can look at the effect of employment protection on the ratio of worker to job flows (one of the main differences between the Portuguese and U.S. labor


W
(wage)
SS'
SS
A
DD
A'
DD'
e*
e
(exit rate)

markets.)

Equilibrium flows, duration, and unemployment

The structure of the model is such that it can be solved recursively:

First, the *equilibrium exit rate*, e^* must be such as to reconcile the bargained wage and the feasible wage:

$$\phi(G) = b + f(e^*, G)$$

or, solving out for the equilibrium exit rate:

$$e^* = e(G, b) \quad e_G \equiv (\phi_G - f_G)/f_e < 0, \quad e_b \equiv -1/f_e < 0 \qquad (3.6)$$

The equilibrium can be characterized graphically. Figure 4 plots the wage, w, against the exit rate, e. The feasible wage, given by (3.2), is independent of e, and the relation is thus drawn as the horizontal line DD. The bargained wage is increasing in the exit rate, and the relation is drawn as the upward sloping line, SS. The equilibrium is at point A.

An increase in employment protection shifts both relations. It decreases the wage that firms can afford to pay, and thus shifts DD down. It increases the bargained wage for given labor market conditions, and thus shifts SS up. For both reasons, the equilibrium exit rate must decrease: worse labor market conditions are needed to reconcile stronger wage demands with a lower feasible wage.

Thus, stronger employment protection leads to a lower exit rate from unemployment, or equivalently to higher unemployment duration. What about the unemployment rate itself? From the two identities above, we have:

$$u^* = \frac{x^* + q}{e^* + x^* + q} \qquad (3.7)$$

There are two effects at work. The first is that, as G increases, the equilibrium exit rate e^* decreases (equivalently, its inverse, unemployment duration, increases). This increases the unemployment rate. The second however is that, as G increases, the equilibrium job destruction rate x^* decreases, leading to lower flows into unemployment.

Can we tell whether the increase in unemployment duration will dominate the decrease in job flows? In general, we cannot, and this traces back to our earlier discussion of the relative size of the effects of G on the layoff rate and on the feasible wage. Depending on the shape of the distribution of productivity shocks, the effect of employment protection on job flows may be small, in which case the net effect of employment protection will be to increase unemployment[12]; or the effect on job flows may be large, in which case the net effect of higher employment protection may be a *decrease* in unemployment.

To summarize, employment protection unambiguously leads to an increase in unemployment duration and to a decrease in job flows. As a result, the effect on the unemployment rate is ambiguous.[13]

Endogenizing the quit rate

12. Suppose for example that all productivity shocks are such that, after a shock, the productivity of a job is equal to zero. Then, leaving aside the case where employment protection is so high that firms find it less costly to keep the worker despite zero productivity, employment protection will not affect job flows. It will therefore unambiguously increase the equilibrium unemployment rate.

13. One should be careful to distinguish between the effect on unemployment and the effect on efficiency. The presumption is that, unless the zero-firing-cost economy generates a high level of inefficient separations in the first place, higher employment protection will decrease efficiency, whatever its impact on unemployment. Because of its reduced form aspect, the model we use here just cannot be used to answer questions of efficiency or welfare.

To think about the issue of worker flows relative to job flows, we need to endogenize the quit rate. The simplest way to do so is to assume that matches are subject to match-specific shocks that affect the disutility of the job for the current worker, but not the underlying job productivity. Then, for a sufficiently bad shock workers will want to quit. If we maintain the assumption that quits are to unemployment, then the quit rate will depend on labor market conditions, or more specifically, on the exit rate from unemployment. Thus we assume:

$$q = q(e) \tag{3.8}$$

The characterization of the equilibrium is still straightforward. As, by assumption, the quit rate affects neither the feasible nor the bargained wage, the equilibrium exit rate is unaffected, and still given by (3.6). The unemployment rate is still given by:

$$u^* = \frac{x^* + q^*}{e^* + x^* + q^*}$$

But now changes in employment protection have an additional effect on the unemployment rate, through their effect on q^*. As before, increases in employment protection decrease the exit rate from unemployment and decrease the layoff rate. But in addition, through the effect of the exit rate on the quit rate, they also reduce the quit rate.

Thus, compared to the earlier case, increases in employment protection lead to a larger decrease in flows into unemployment, and thus to a lower unemployment rate than before. They lead to a decrease in what has been called "excess worker reallocation", that the difference between worker flows $(x + q)$ and job flows (x), which, here, is simply equal to quits. Their effect on the ratio of worker flows to job flows, $(x + q)/x$ is however ambiguous, as increases in G lead to a decrease in both x and in q. Intuitively, the relative size of the two effects depends on the shape of the density function of shocks to jobs and to matches, something which is left undefined here, and about we know very little in practice.

In short, endogenizing the quit rate does not change the previous conclusion that increases in employment protection increases unemployment duration and decrease flows into unemployment. It implies in addition that, as quits also decrease, flows into unemployment will decrease beyond the direct effect of employment protection on layoffs. All these implications fit well the Portugal-U.S. comparison.

One can consider a number of extensions, although the reduced form nature of the model eventually stands in the way. We shall briefly mention two.

The first is that the quit rate may affect both the layoff rate and the feasible wage: the lower the quit rate, the less firms can use attrition to avoid having to pay firing costs, and thus the higher the shadow cost of employment protection.[14] In that case, as has been shown by Saint-Paul [1995], there may be multiple equilibria. A low quit rate may lead to a low feasible wage, leading in turn to a low equilibrium exit rate. A low equilibrium exit rate leads in turn to a low quit rate. Even leaving this case aside, taking this effect into consideration will increase the effect of employment protection on unemployment duration.

The second is that to recognize that many quits are likely to be to another job, rather than to unemployment. Suppose that workers can search on the job. Then, for sufficiently bad match-specific shocks, workers will prefer to become unemployed rather than stay in the job. But for smaller shocks, they will prefer to stay and search while employed. The question is how employment protection will affect the two critical values, the value at which workers start searching on the job, and the value at which workers prefer to become unemployed. It appears however that, in general, little can be said without more knowledge of the distribution of shocks. Thus, our earlier empirical finding that the proportions of flows from employment going through unemployment are roughly similar in Portugal and in the

14. The layoff rate may also directly affect the quit rate. If being laid-off comes with severance pay but quitting does not, workers may decide to wait for a lay-off rather than quit.

United States is not inconsistent with the presence of high employment protection in Portugal.

4 A glimpse at other countries

One way to strengthen our argument that employment protection explains much of the difference between the Portuguese and the U.S. labor markets would be to look at a larger group of countries. This would however require doing for each country the kind of empirical work we have done for Portugal, and will have to wait.

A simple exercise can however be carried out, that of looking, across countries, at the relation between flows through unemployment and unemployment duration on the one hand, and the degree of employment protection on the other. The results of this exercise are presented in Figure 5.

Monthly flows into unemployment are constructed as the average number of workers unemployed for less than one month, for the period 1985-1994, divided by the average labor force during the same period, for each OECD country. The source for these data is the OECD duration data base.[15].

Unemployment duration is constructed as the ratio of the average unemployment rate for the period 1985-1994 to the flow into unemployment constructed above.

The employment protection index, "EPL", is taken from the OECD Jobs Study, Table 6-7, column 5; this index is a ranking of 21 countries, going from low to high protection, and constructed as an average of indices constructed by the OECD and other researchers. The value of the index is 1 for the United States and 19 for Portugal (20 for Spain, 21 for Italy)

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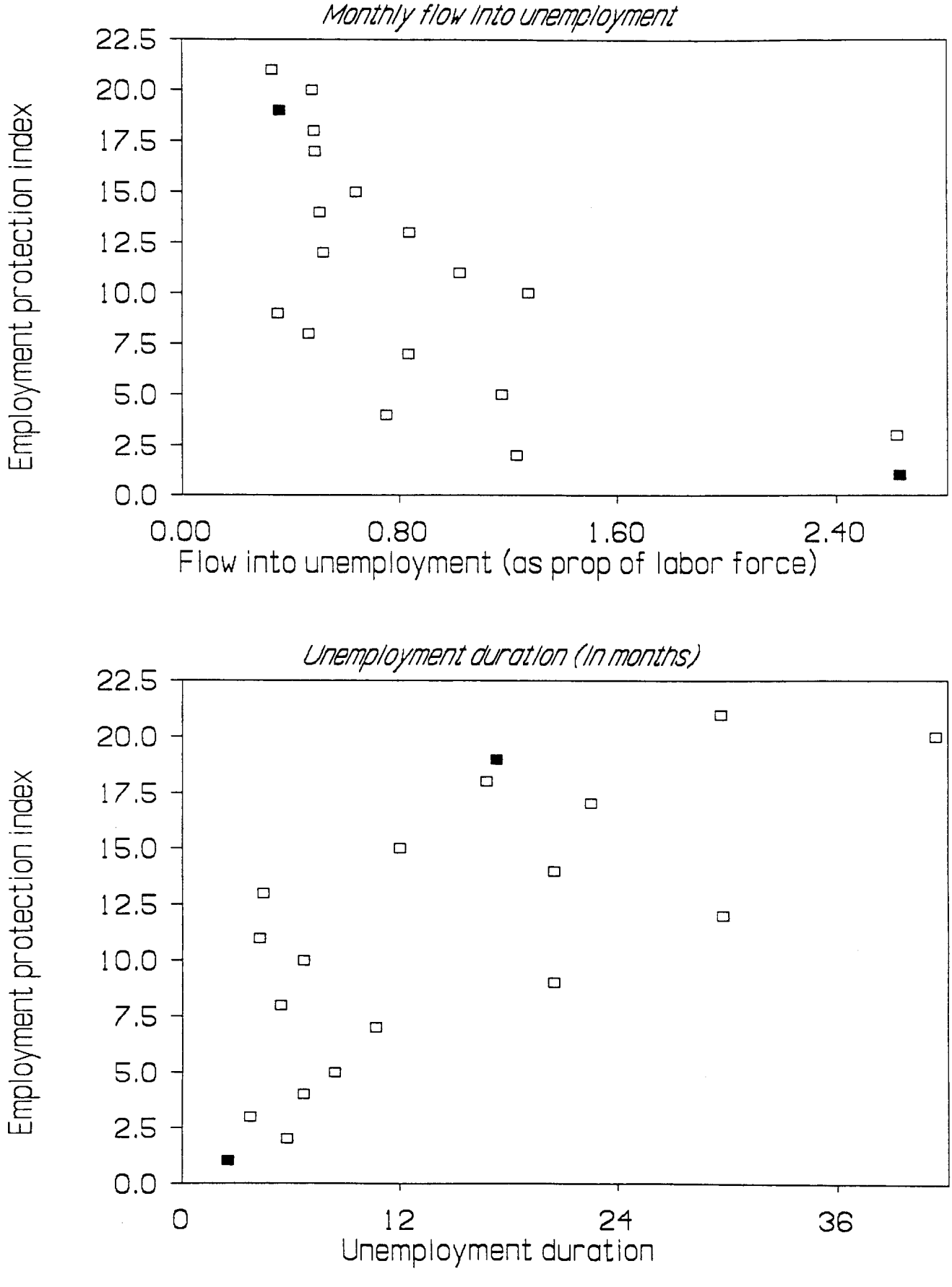
15. The numbers for Finland in that data base are for the number of workers unemployed two months or less. We simply divide this number by 2.

Figure 5. Unemployment and employment protection



The top part of the figure shows a clear negative relation between the flow into unemployment and employment protection. The bottom figure shows a clear positive relation between unemployment duration and employment protection. The points corresponding to Portugal and the United States are indicated by black squares.

Regressions of the log flow and the log duration on the employment protection index give:[16]

$$\begin{aligned} \text{log flow} &= 0.50 \quad -0.074 \text{ EPL} \qquad \bar{R}^2 = 0.55 \\ &\qquad\quad (t = -4.8) \\ \text{log duration} &= 1.26 \quad +0.098 \text{ EPL} \qquad \bar{R}^2 = 0.54 \\ &\qquad\quad (t = 4.7) \end{aligned}$$

Thus, an increase in employment protection leads to a decrease in flows, and a decrease in duration. But the two effects largely cancel each other when looking at unemployment. The implied coefficient in a regression of log unemployment on EPL is only .023, with a t-statistic of 1.3.

5 Conclusions

Looking at the Portuguese and U.S. labor markets, we have shown how a similar unemployment rate can hide profoundly different labor markets.

We have shown how unemployment in Portugal reflects much lower flows and much higher duration than in the United States. We have shown how these flows, in turn, reflect much lower job flows, and much lower worker flows given job flows in Portugal than in the United States.

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16. The results using levels are very similar. We report regressions using logs because it makes it easier for the reader to infer what happens to the log of the unemployment rate, which is just the sum of log flow and log duration.

We have argued theoretically that these differences may come from much higher employment protection in Portugal than in the United States. We have shown how, looking across countries, higher employment protection appears to be associated with lower flows through unemployment and higher unemployment duration.

Our conclusions raise in turn a number of issues. There are at least two we want to explore further:

The first is that of the efficiency cost of employment protection in Portugal. One overly strong way of stating our results is that employment protection eliminates three out of every four desirable separations in Portugal.[17] One would expect such reduction to have large efficiency effects on output and welfare. At the same time, one of our results is that employment protection does not appear to have much effect on year-to-year movements in firm level employment. If this is the case, can the smoothing of intra-year variations have a very large effect on efficiency?

The second is the "Spain versus Portugal" puzzle (see Blanchard and Jimeno [1995]). Given that both Spain and Portugal have high employment protection (although the large increase in the proportion of workers under fixed-term contracts in Spain, now up to 35% compared to 10 to 15% in Portugal, is rapidly changing the nature of that labor market), why are the unemployment rate outcomes so different? (In Figure 5, Spain is the country with the highest unemployment duration, and an EPL value of 20.) Our model suggests that any outcome is possible depending on the distribution of shocks; but this is not a very appealing answer. Differences in unemployment insurance may hold one of the keys. Evidence from Castillo et al. [1997] suggests that the relative consumption level of the unemployed is lower in Portugal than in Spain. This could explain the

17. Three ways in which this statement is overly strong. It assumes that the reduction in flows is fully due to employment protection. It takes the United States as the natural benchmark. And it assumes that all these separations would be efficient.

higher unemployment duration in Spain. Another tentative explanation is that high employment protection may affect not only the level and the nature of the equilibrium rate of unemployment, but also its dynamics. If this is the case, higher unemployment in Spain than in Portugal may reflect in part the effects of a different set of shocks over the last 20 years. This however remains to be shown, both theoretically and empirically.

6 Data appendix

This appendix describes the three Portuguese data sources used and the methodology employed to obtain the measures of job and worker flows in each table.

6.1 The Quadros de Pessoal survey

The first data set, *Quadros de Pessoal* is based on an annual survey conducted by the Portuguese Ministry of Employment; it covers all establishments with wage earners. Answering this survey is mandatory, and the survey collects detailed information on both the wages and the characteristics of each individual employee (regular wages, subsidies, hours worked, date of admission, age, gender, schooling, qualification level, part-time status, occupation, type of collective agreement, promotions, etc.) as well as basic information about the establishment and the firm (size, ownership, shipments, SIC codes, location, etc.). Each year the survey collects information on around 140,000 establishments and 2 million individuals.

By law, this information is then sent to the statistical department of the Ministry of Employment, is supplied to the employer association, and is made available to every worker in a public space of the establishment. This last requirement facilitates the work of the services of the Ministry of Employment that monitor compliance of firms with the law (e.g. illegal work). The administrative nature of the data and its public availability imply a high degree of coverage and reliability.

The Ministry of Employment has been conducting this survey since 1982 and the employment and wage data refer to the month of March for the period 1982-93 and the month of October since 1994. In our analysis we will use information for the period 1982 until 1995. The raw data that we use is organized in three data sets corresponding to the level of aggregation of the information: individual-level, establishment level, and firm level.

Constructing expansions and contractions

To obtain the number of jobs created due to the expansion of employment and the number of jobs destroyed due to the contraction of employment in existing establishments, we use the information on total employment on two consecutive years for continuing establishments. This is possible because each establishment, when it first reports to the survey, is given an identifier number. The Ministry of Employment is especially careful in trying to avoid giving a new number to an establishment already in the file, using a number of routines (for the most part, based on the location of the establishment) designed for this purpose.

Constructing entries

Since the ID firm numbers are assigned sequentially, new firms can be identified by comparing their identifier number with the highest identification number in the previous year. A similar procedure is used to identify the creation of a new establishment within a multi-establishment firm since establishment ID numbers are also given by order of creation within the firm.

A number of issues arise here. First, some firms report to the survey with a delay. We have made no attempt to retime the date of birth because the available information is insufficient to do so. Evidence on the tenure of the workers suggests that most of the new firms first report to the survey within a year. Second, despite the care used by the statistical department of the Ministry of Employment in giving new ID numbers, false entries may still occur. As a check, we have used the information from the tenure of the worker with the longest (and/or the second longest) tenure in the firm.[18] This check invalidated less than 10% of entries.

Constructing exits

We identify an exit whenever an establishment fails to report to the survey. However errors inevitably occur. In particular, some establishments temporarily fail to respond, or to respond in time. Temporary exits are relatively rare events in the

18. This check obviously could not be used for new establishments within multi-establishment firms.

Quadros de Pessoal survey and, typically, do not last for more than one year. Accordingly, we assume that observed temporary exits do not represent true exits and impose the condition that an establishment never again reports to the survey (that is, until October of 1995) for this to be considered a true exit. In the case of temporary exits, we construct missing employment numbers by interpolation using the two closest available numbers.

We then compute the various job flows using the methodology employed by Davis et al. [1996]: The *entry rate* is the sum of employment at time t in new establishments, divided by total employment. The *exit rate* is the sum of employment at time $t-1$ over exiting establishments, divided by total employment. The *expansion (contraction) rate* is the sum of changes from $t-1$ to t in employment over all continuing establishments with increasing (decreasing) employment, divided by total employment. In each case, total employment is constructed as the average of employment at time $t-1$ and at time t.

The survey covers all sectors of the economy. For comparison with the United States, we also construct the same series for manufacturing only, and for firms with five or more employees.

For comparison with the United States, we also construct firm size and sector adjusted job flows. For manufacturing, we divide establishments in class sizes, following the grid size in Davis and Haltiwanger, Table 4-1. We then compute job creation and destruction for each class size, and then compute overall job creation and destruction, using U.S. rather than Portuguese shares of employment in each class (using the numbers in part 2 of Davis and Haltiwanger's Table 4-1. For the economy as a whole, we follow the same method, but using the size grid, the size and the sectoral composition from Table 846, Statistical Abstract of the United States, 1997.

6.2 Inquérito ao Emprego Estruturado (Employment Survey)

The second data set, *Inquérito ao Emprego Estruturado*, is a quarterly survey of establishments also run by the Portuguese Ministry of Employment, for the purpose of collecting information about job and worker turnover. It also contains detailed information on the composition of the establishment work force: employment by age, gender, type of contract (open-ended, fixed-term, or temporary contracts), and part-time status.

The sample is designed to include all establishments with 100 or more employees, and establishments with 1-99 employees with probabilities that increase with the size of the establishment (according to five size groups). We use these probabilities to properly weight each plant in order to obtain a representative sample. Each year the sample is obtained from the Quadros de Pessoal survey and it covers all firms with wage earners in all sectors of the economy with the exception of agriculture and fishery.[19] On average, for the period 1991-1995, the Employment Survey surveyed around 6,000 establishments each quarter.

Job flows

We compute quarterly expansion and contraction rates in the same way as with the annual survey. Given the sampling design however (the sample is only refreshed annually), we cannot construct quarterly series for job flows due to entries or to exits. In tables 2 and 4, we construct quarterly flows due to entries simply as one fourth of the annual flows. The treatment of exits is more complex. If firms decrease employment steadily before finally exiting, some of the flows categorized as "job flows due to exits" in annual data will appear as "job flows due to contractions" in quarterly data, until the firm finally exits. For example, if a firm has employment of 30 in quarter 1, 10 in quarter 2 and exits in quarter 3, the number for the "job flow due to exits" using annual data will be equal to 30. But, of this 30,

19. Since it is a survey of firms, it does not include the public administration.

20 will appear in quarterly data as a "job flow due to contraction" in an existing firms. It is easy to show that, if exits are staggered over the year, and the employment in exiting firms decreases linearly before exit, the right computation for the quarterly exit rate is as one-fourth the annual exit rate, times a correction factor of 0.4. If instead the employment decline is concentrated at the time of exit, then the correction factor is 1.0 (equivalently, there is no need for a correction). Based on other work by one of the authors on exiting firms (Portugal et al. [1997], we use a correction factor of 0.6.

For comparison with the United States numbers, we also compute job flows just for manufacturing, and just for firms with five or more employees.

For comparison with annual job flows from expansions and contractions from the Quadros de Pessoal, we construct changes in employment at each firm from quarter $t-4$ to quarter t, and then construct series for expansion and contraction series in the standard way.

Worker flows

The other strength of this data set is the fact that establishments are asked about gross worker flows. That is, the survey contains information on the number of workers that either exited or joined the establishment over the course of the previous quarter. In addition, such flows can be decomposed according to a number of reasons: job creation, job substitution, return from a temporary exit, job destruction, voluntary exits, and temporary exit.[20]

We use this information to construct gross worker inflows and outflows. Since the temporary exits are, for the most part, due to sick and maternity leave we exclude them from the worker gross flows.[21] Our measure of quarterly worker inflows is

20. Temporary exits are not temporary layoffs. There are no temporary layoffs in Portugal, despite legislation introduced in the early 1980s with the purpose of making them available to firms.

21. Temporary exits account for less than 10% of flows.

the sum of the number of workers joining establishments during quarter t, minus returns from temporary exits, divided by average employment at times $t-1$ and t. Similarly, the measure of quarterly worker outflows is simply the sum of the number of workers leaving establishments in quarter t, minus temporary exits, divided by average employment in quarters $t-1$ and t.

6.3 Inquérito ao Emprego (INE Household Survey)

The third dataset is a CPS type household survey conducted by the Instituto Nacional de Estatística (INE). Every quarter the INE surveys around 40,000 individuals to obtain information about the labor market. The basic structure of the survey follows the instructions of Eurostat, making the definitions of the basic labor market indicators identical to those in other European countries (e.g., employment, unemployment, inactivity). We had access to the raw data from the INE survey for the 1992-1996 period.

Each quarter, 1/6 of the sample is rotated out. Thus, each quarter, we can compute the labor status of a worker in quarter $t-1$ and t for 5/6 of the workers in the current sample.[22] Preliminary work on the relevance of labor status measurement error (of the type documented by Abowd and Zellner for the United States) has led us to believe that this is not a serious issue in this survey. We find negligible evidence of inconsistencies in the observed labor market transitions. One reason may be a high—18 percent—re-interview rate.

The computation of the quarterly transitions of employment to unemployment (EU), employment to inactivity (EI), unemployment to employment (UE), and inactivity to employment (IE) is conventional. For example, the flow of workers from employment to unemployment is equal to the number of workers reporting being employed in quarter $t-1$ and reporting being unemployed in quarter t,

22. To make sure that we were tracking the same individual, we used a number of filters beyond the ID number: the order number, age and gender.

divided by total employment at $t - 1$.

We define an employment to employment (EE) transition as a situation where: first, the worker was employed in the previous quarter; second, there is an increment in the reported total number of jobs held to date; third, the reported tenure in the current job is less than or equal to 3 months; and fourth, the worker reports moving directly from another job. Transitions that satisfy the first three criteria but not the fourth are allocated proportionately to (EU) flows and to (EI) flows.

In order to make the universe of workers comparable to that of firms in the quarterly Employment survey, we also compute these flows excluding from the sample self-employed workers, public servants (that is, workers from the Public Administration, Education, Health, and Sanitation sectors), and private household employees. The results for this smaller sample are reported in line 2 of Table 7.

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