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TRADE & JOBS IN PORTUGAL: A MICROECONOMIC APPROACH

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Abstract

The Portuguese economy presents a low unemployment rate when compared to its European counterparts and it has been claimed that this is partly due to the slow restructuring of the economy, which has been keeping its specialisation in traditional industries, some of them major exporting industries. This study analyses job creation and job destruction at the firm level across skill groups, during the 1980s and the 1990s. The major aim is to explore the role of international trade against alternative explanations of job flows, providing an answer to the question: did international trade help sustain the employment of particular groups of workers, namely the least skilled, in the Portuguese economy? Could conditions in international markets therefore have contributed to keep a low unemployment rate? A matched data set on workers and firms is used, which includes a direct measure of the skill of the worker. Results indicate that technology indicators are more relevant determinants of job flows than conditions in international product markets. Indeed, import prices have no impact on job creation or job destruction for the unskilled or on job creation for the skilled. Higher export prices lead to job creation for the skilled labour force, thus pointing to a certain skill upgrading.

JEL: F16.

Keywords: job creation; job destruction; trade; skills.

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1. Introduction

The unemployment rate, declining from 9% in 1985 to 5% in 1999, is one of the lowest in the European Union, in sharp contrast with neighbouring Spain. Wage dispersion, on the other hand, increased sharply. The rise in wage inequality was comparable to the US and the UK, as the Gini index for hourly wages increased by 17% between 1985 and 1994, slightly declining afterwards. In particular, university graduates saw their wages relative to high school graduates rise strongly, while their employment figures more than doubled. In general, wage premia increased sharply for skilled workers, despite their rising supply. Nevertheless, workers at the bottom of the wage ladder saw their wages grow as fast as the median wage in the economy, as opposed to the trend in the US.

Portugal's low unemployment rate, together with rising wage dispersion, would render this economy close to the deregulated and flexible *American model.* In fact, the country has been ranked as one of the OECD economies with the highest wage flexibility, as real wages respond to the macroeconomic conditions, namely the unemployment rate (OECD, 1992), and to the conditions prevailing at the firm level (Cardoso, 2000).

However, Portugal shares with its European counterparts several aspects of the institutional framework in the labour market. In contrast with the flexibility of wages, employment rigidity has been claimed to be a major characteristic of the country, despite the reduction in employment protection that took place in the 1980s, when legislation was passed to ease layoffs and to facilitate the use of short-term contracts. Minimum wages are enforced, collective bargaining is extensively applied and extension mechanisms are widespread, with agreements signed by trade unions being automatically extended to non-unionised workers.

Marimon and Zilibotti have analysed the contrast between the unemployment rates in Portugal and Spain, claiming that it is due to the different pace of restructuring of the two economies, and their capacity to absorb the labour force dismissed from agriculture – labour costs increased slowly in Portugal, as opposed to Spain, while employment grew rapidly in traditional industries such as the textiles (Marimon and Zilibotti, 1998: 143, 144, 150). Given the role of traditional industries, in particular textiles, in the Portuguese international

specialisation, trade could have contributed to sustain the employment of certain groups of workers.

This study explores the dynamics of job flows across skills at the firm level in Portugal, searching for their determinants, to explore in particular the role of international trade against alternative explanations. Did the conditions in international product markets help sustain the employment of particular groups of workers, namely the least skilled, in the Portuguese economy? Can any lessons be drawn from what has been presented as a *success story* concerning the reduction of unemployment?

A remarkable data set matching yearly data on workers and firms is used. Gross job flows at the firm level for different skills are computed, instead of looking at net employment changes at the aggregate level. Moreover, a direct measure of the skill of the worker is used, instead of the dichotomous classification of the labour force into production and non-production workers most often taken as a proxy for the skill. The impact of different factors on job flows is evaluated by estimating a system of seemingly unrelated equations.

Section 2 overviews changes in the Portuguese economy, while section 3 discusses the results on job flows. Concluding comments are presented in section 4.

2. Trade and the Labour Market in Portugal: An Overview of Recent Trends

Portugal has traditionally been an open economy, since it has been a founding member of the European Free Trade Association (EFTA). Its openness was reinforced after joining the European Community in 1986, when the member countries, in particular Spain, increased their role as Portuguese trading partners. Exports increased, but the rise in imports was more pronounced. In fact, an increase in consumption resulted from the availability of a wider variety of products and from expectations of a rise in permanent income. The high import contents of the country's exports also contributed to that outcome.

Figure 1. Openness of the Portuguese economy, 1960-1999

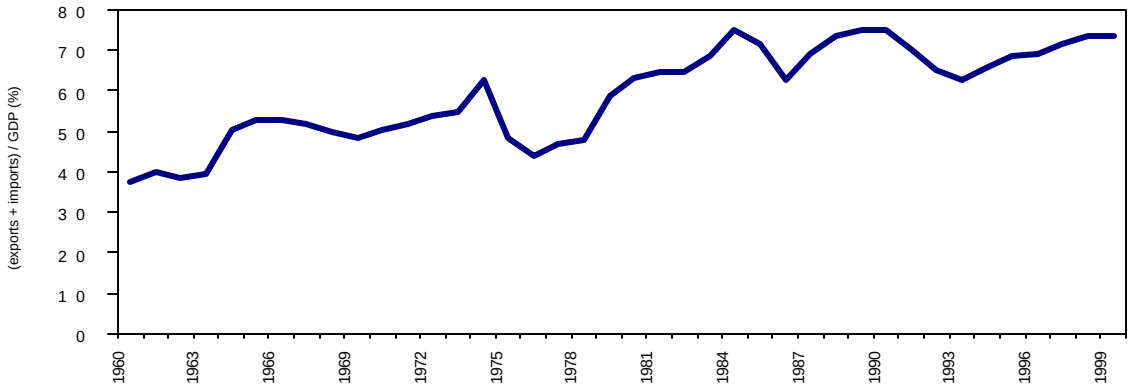
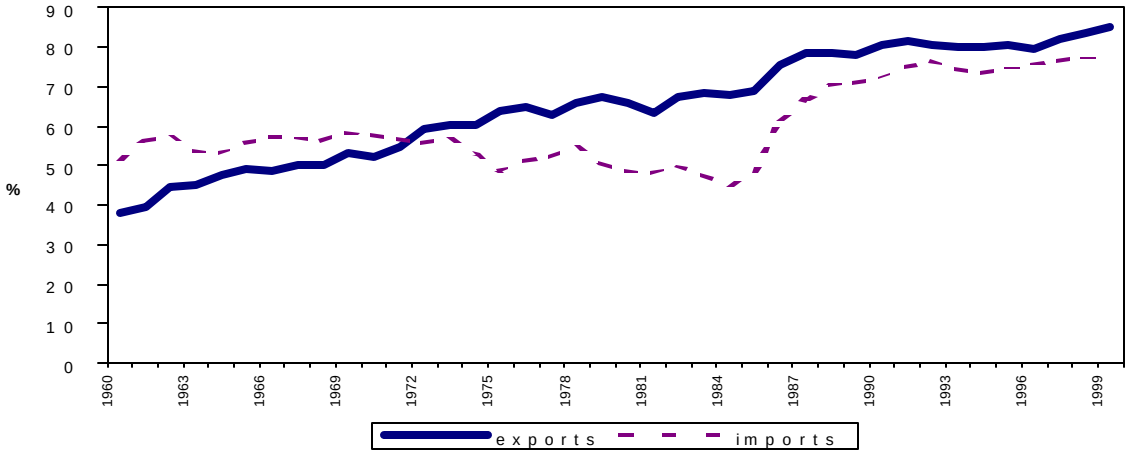


Figure 2. Share of the European Union in Portuguese external trade, 1960-1999



Source: Commission Européenne, 1998.

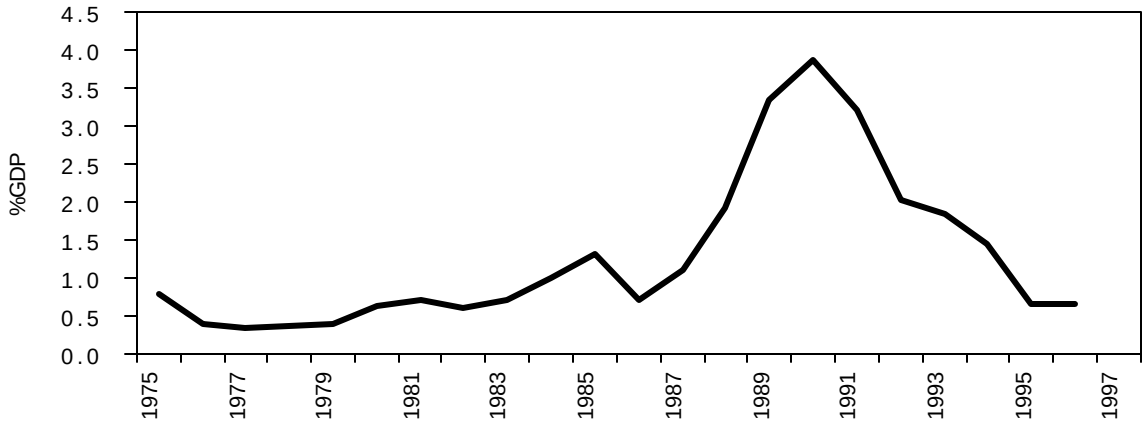
The impact of increased openness on job flows for skilled and unskilled workers is not clear-cut. First of all, the general discussion on the impact of trade on the labour market has most often taken for granted the classification of countries into the *North* and the *South.* The relevance of a less simplistic picture has been stressed by Minondo (1999), when analysing Spain as a middle-income country. Also, the theoretical and empirical debate over this issue still remains heated.[1]

[1] See for example Wood (1994, 1995), Haskel and Slaughter (1998), Leamer (1994), Hanson and Harrison (1999), Anderton and Brenton (1999) versus Baldwin (1995), Desjonqueres et al. (1999), Lucke (1999) or Dewatripont et al. (1999).

Moreover, specific aspects of the Portuguese economy render unclear the impact of trade on job flows across skills. As trade with European countries increased, the relevance of the New Industrialised economies as Portuguese trade partners decreased. When compared to most European Union countries, Portugal is an economy relatively abundant in unskilled labour. According to trade theory, the increased openness could therefore have led to growing specialisation in goods intensive in low-skilled labour, increasing the demand for unskilled labour and its relative wage.

However, incentives to the modernisation of the productive structure followed accession to the EU, and a boom in foreign direct investment took place. As a result, the endowments of the country underwent slight change, with capital reinforcing its role in the productive process.

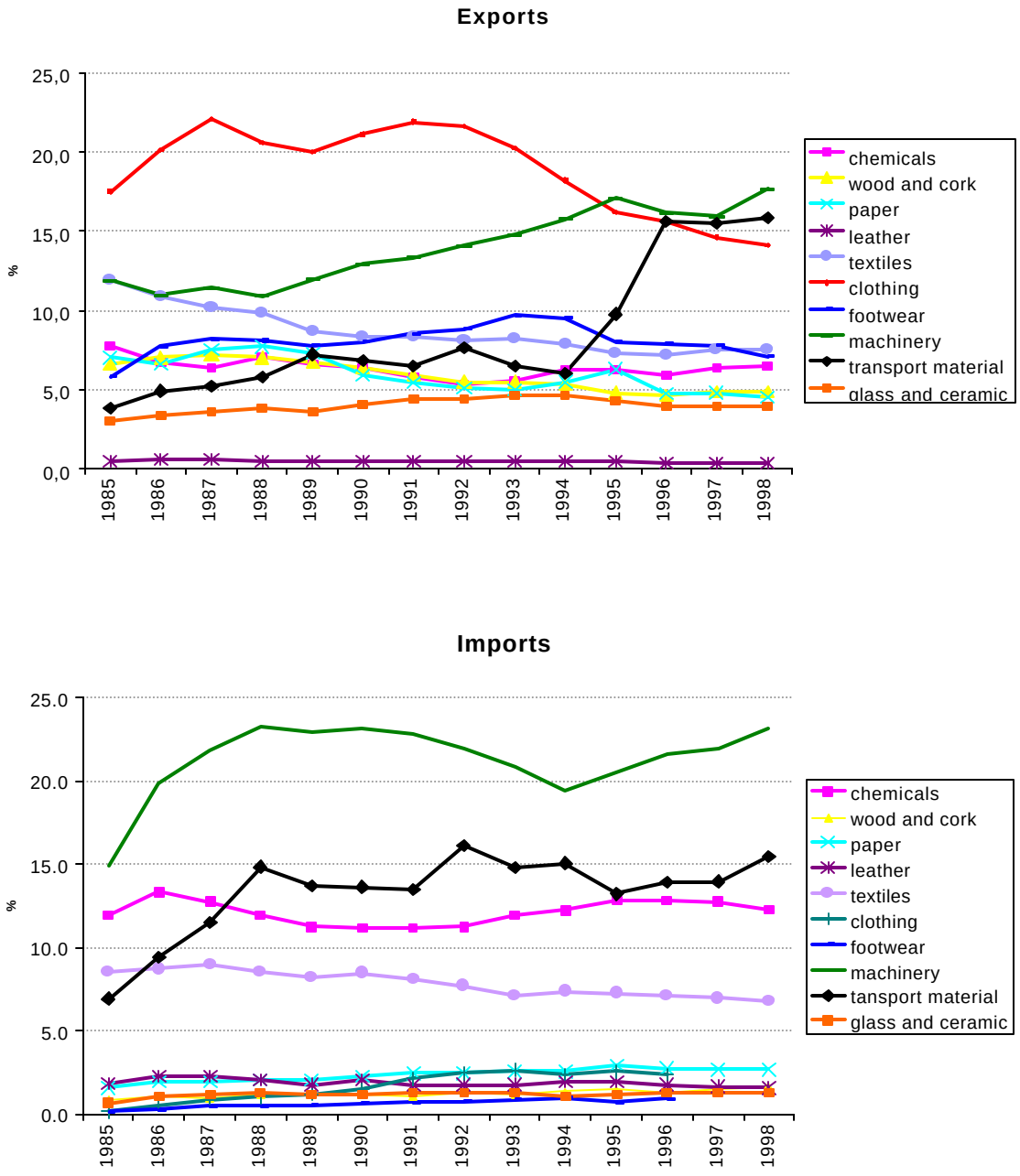
Figure 3. Foreign direct investment inflows



Source: Jimeno *et al.* (2000), citing IMF, Balance of Payments Statistics.

The strong export orientation of foreign investment had an impact on the profile of Portuguese exports, which slowly shifted away from traditional products such as textiles, clothing and footwear, towards machinery, and transportation material, whose share in exports increased from 16% in 1985 to 31% in 1997. On the imports front as well, machinery and transport material increased their share, due in particular to the strong import-contents of the exports, and to the growth of investment in general.

Figure 4. Export and import orientation, Portugal, 1985-1998



Source: Portugal, ME (1996, 1997, 1998, 2000).

Meanwhile, the skill composition of the Portuguese working population changed, with the share of professionals, highly skilled and skilled personnel increasing, and the share of the least skilled declining.

Table 1. Employment by skill levels, 1985 and 1997 (%)

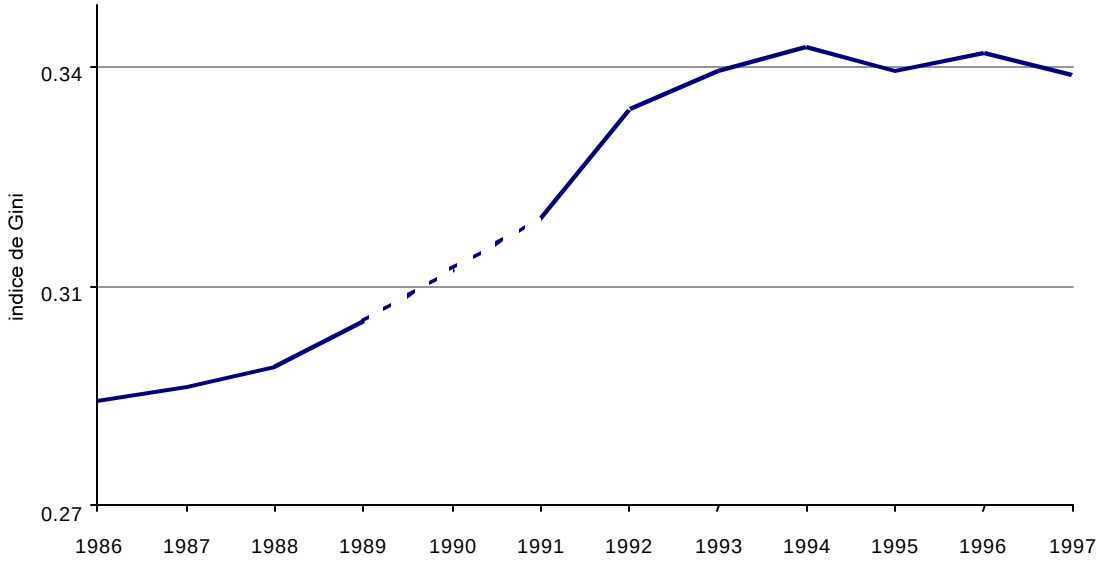
	Managers, professionals	Foremen, supervisors	Highly-skilled	Skilled	Semi-skilled	Unskilled, apprentices
1985	3.9	4.5	4.1	41.9	20.0	25.6
1997	6.9	4.1	6.1	44.6	16.9	18.9

Source: Computations based on Portugal, MTS, DETEFP (1985, 1997).

Note: Shares do not sum up to 100 due to missing values.

Wage dispersion increased until 1994, associated in particular with a rising wage premium for University graduates.

Figure 5. Wage dispersion, Portugal, 1986-1997



Source: Portugal, MTS (1986 to 1997).

3. Job Creation and Job Destruction

Job flows (Table 2) suggest that the Portuguese labour market is very dynamic. Indeed, between one and two out of ten jobs are destroyed every year, whereas job creation occurs at a similar pace. Large flows of job creation coexist with large flows of job destruction, both higher than reported for most other countries, for example the US (Davis and Haltiwanger, 1990), Canada (Baldwin *et al.*, 1998), Norway (Salvanes, 1995), Finland (Vainiomaki and

Laaksonen, 1999), or The Netherlands (Broersma and Gautier, 1997).[2] Over the period, net job creation achieved high values, as job creation exceeded job destruction.

Table 2. Job flow rates, Portugal, 1986-97 (%)

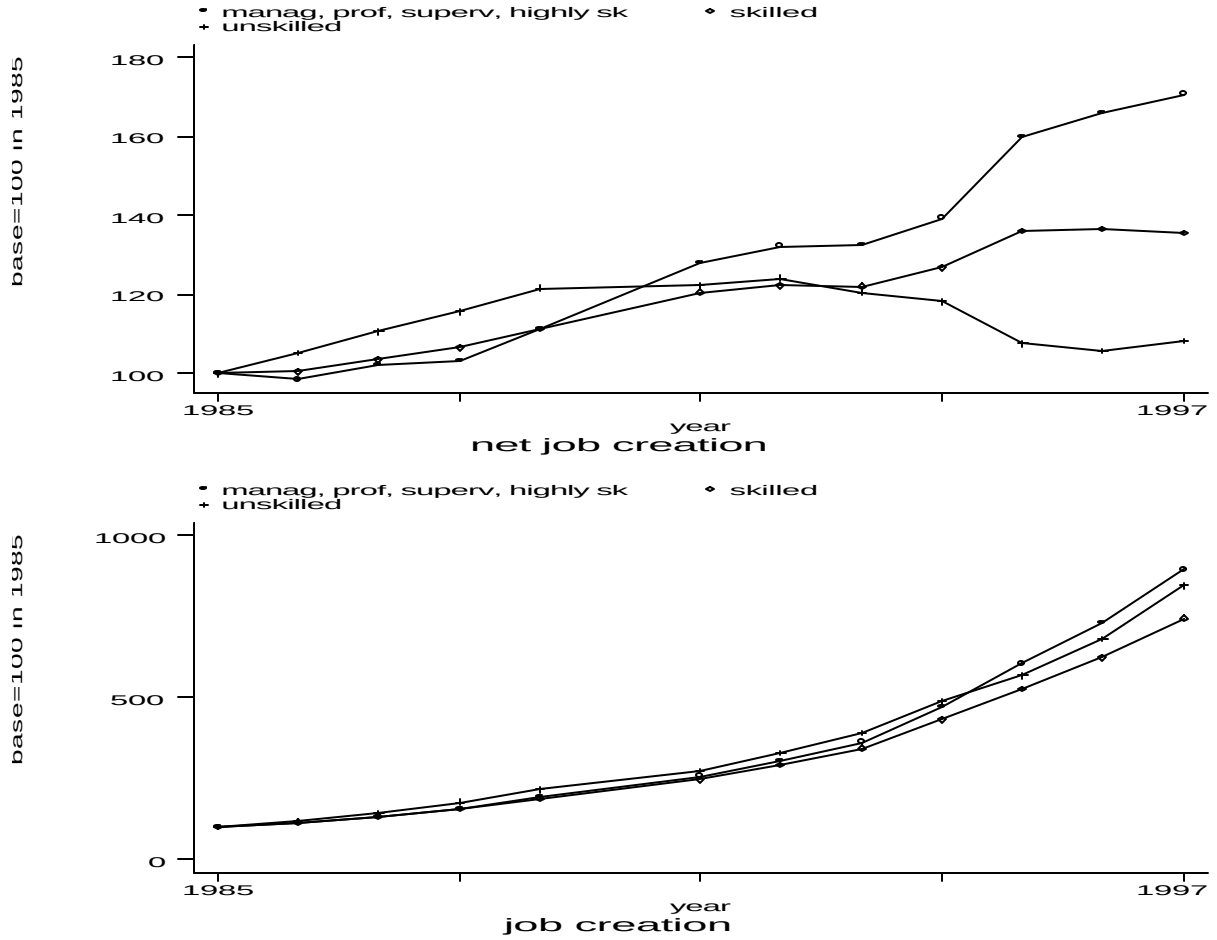
	Job creation	Job destruction	Net job creation	Job reallocation
Yearly mean	14.5	12.4	2.1	26.8
Std. deviation	2.6	3.0	1.8	5.5

Source: Computations based on Portugal, MTS, DETEFP (1985-1997).
Note: The appendix describes in detail the concepts used.

Similar measures were computed for different skills separately, revealing that the aggregate figures in Table 2 conceal considerable heterogeneity across skills (Figure 6). Between 1985 and 1997, the Portuguese economy was particularly dynamic at creating jobs on both ends of the skill spectrum – unskilled workers, as well as professionals and the highly skilled. However, job destruction was particularly severe for the unskilled. As a result, net job creation achieved highest rates for professionals and highly skilled workers, while the unskilled labour force, subject to much higher job reallocation, barely kept in 1997 its employment level of mid-eighties. This contrast across skill groups got increasingly wider after the 1993 recession.

Figure 6. Job flows by skill level, Portugal, 1985-1997

[2] Blanchard and Portugal (2000) had access to data on quarterly job flows as well and found that quarterly job flows are lower in Portugal than in the US.



Source: Computations based on Portugal, MTS, DETEFP (1985-1997).

Note: Note that a firm may increase the size of a particular group of workers (job creation for that group), while decreasing the size of another group (job destruction for that group), leaving unchanged the overall size of its labour force (no job creation and no job destruction for the labour force as a whole). Therefore, the sum of job creation over skill groups may be larger than the economy's overall creation. The same holds for job destruction.

Among the major exporting industries, different trends can be detected. Job growth in the clothing industry favoured the most skilled – with higher turnover for professionals and the highly skilled, and lower turnover for the skilled – while the size of the unskilled labour force remained stable. The general trend in this industry may indicate a certain upgrading of its production. Employment growth in the footwear industry favoured as well workers with the highest skills, but net job creation took place for skilled and unskilled personnel as well. The textiles have been destroying jobs at the bottom of the qualification ladder, while sustaining the employment of professionals and the highly skilled, in every case with relatively low rates of job reallocation. A similar trend is followed by machinery, with intermediate levels of job reallocation. The transport equipment industry has been a net job destroyer throughout the

skill spectrum.

Footwear is therefore the only exporting industry that expanded the size of its unskilled labour force. The idea of exporting industries as major absorbers of unskilled labour thus starts fading away.

Table 3. Average yearly job flows by industry and skill, Portugal, 1985-1997

	Managers, prof, high skilled			Skilled			Unskilled		
	Job creation	Job destruction	Net job growth	Job creation	Job destruction	Net job growth	Job creation	Job destruction	Net job growth
Food, bev	1.19	1.18	**1.01**	1.16	1.16	**1.00**	1.15	1.17	**0.98**
Leather	1.20	1.19	**1.01**	1.26	1.23	**1.02**	1.14	1.15	**0.98**
Textiles	1.14	1.14	**1.00**	1.12	1.13	**0.98**	1.09	1.14	**0.95**
Clothing	1.23	1.18	**1.05**	1.19	1.14	**1.05**	1.21	1.20	**1.01**
Footwear	1.28	1.20	**1.08**	1.18	1.14	**1.04**	1.17	1.13	**1.04**
Wood, cork	1.21	1.19	**1.02**	1.18	1.17	**1.01**	1.16	1.18	**0.98**
Paper	1.18	1.16	**1.01**	1.17	1.17	**1.00**	1.15	1.17	**0.98**
Glass, cer.	1.17	1.13	**1.04**	1.14	1.14	**1.00**	1.15	1.15	**1.00**
Chemicals	1.13	1.13	**0.99**	1.13	1.15	**0.97**	1.14	1.19	**0.93**
Machinery	1.16	1.15	**1.01**	1.17	1.15	**1.02**	1.18	1.20	**0.96**
Transp eq	1.12	1.13	**0.98**	1.11	1.13	**0.98**	1.15	1.17	**0.98**
Furniture	1.28	1.23	**1.05**	1.23	1.17	**1.06**	1.22	1.20	**1.02**
Base met.	1.12	1.15	**0.96**	1.08	1.14	**0.94**	1.11	1.17	**0.93**

Source: Computations based on Portugal, MTS, DETEFP (1985-1997).

Let us now turn to the determinants of job creation and job destruction across skill groups at the firm level. For the purpose of this analysis, the labour force has been grouped into two categories: skilled workers (managers, professionals, foremen, supervisors, highly skilled and skilled personnel) and unskilled workers (semi-skilled, unskilled personnel and apprentices).

The model to be estimated evaluates in particular the relevance of the following forces on firm level job flows: conditions in international product markets, to capture demand shocks; technological level of the industry and pace of technological change, captured by a proxy variable, the share of computer professionals (engineers, programmers and operators) in total employment; market structure, represented by the degree of industrial concentration; the size, age, ownership structure (foreign or national) and location of the firm. The dependent

variables are the absolute value of the employment growth rate for each skill group in the firm. A seemingly unrelated regression model was estimated, with one equation for each skill group. Its specification and the results are detailed in the Appendix. The impact of the technological level of the industry on job flows by skill level is worthy of note. Technologically more advanced industries present high levels of job creation for the unskilled, which are nevertheless offset by high levels of job destruction. Thus, a higher technological level in the industry just increased the reallocation of the unskilled labour force, not having led to a rise in unemployment. For the skilled labour force, job creation and job destruction are both higher in technologically more advanced industries, but the contrast in job creation is more pronounced[3]. Such firms have therefore been expanding the size of their skilled labour force, when compared to firms in technologically less advanced industries. Results by Vainiomaki and Laaksonen had stressed that, as opposed to the technological progress unemployment view, according to which technological progress would be capital-biased, replacing jobs, "the bulk of job losses occurred in technologically backward sectors, and job creation is positively related to technological advancement" (Vainiomaki and Laaksonen, 1999: 86). The results on Portugal lend support to that view – a high technological level is associated with net job creation for the skilled labour force, with no impact on net employment for the unskilled. After controlling for the technological level of the industry, technological change does not reveal an impact on job flows for the unskilled.

The impact of import prices on job flows in Portugal is weak, consistent with evidence found by Freeman and Revenga for other European countries (Freeman and Revenga, 1999). Indeed, import prices contributed to neither job creation nor job destruction for the unskilled labour force. The much-discussed impact of falling import prices on the national labour markets therefore does not seem to have operated in Portugal. The impact of falling import prices on job creation for the skilled is also negligible. Nevertheless, when faced with competition in the form of declining import prices, the national producers seem to stick to their skilled labour force, reducing job destruction for that category of workers, and in that sense increasing their specialisation in skilled labour.

[3] The coefficients of the technology variable on its own and interacted with job destruction have opposite signs, but the absolute value of the former coefficient is larger.

Export prices have a positive and similar impact on job creation for unskilled and skilled workers. However, for the unskilled, rising job creation is offset by rising job destruction, whereas for skilled workers job destruction is not affected by export prices.[4] The impact of more favourable international demand conditions for the country's exports therefore seem to increase turnover for the unskilled labour force, with increased job reallocation, but with similar effects on job creation and destruction, which lead to null net employment growth for the group. This fact, together with rising job creation and unchanged job destruction for skilled workers as export prices rise, could reflect a certain upgrading in the quality of Portuguese exports.

Foreign and national companies present similar rates of job creation for skilled workers, and similar rates of job destruction for the unskilled.[5] However, they differ in interesting ways. During the period under analysis, foreign companies destroyed skilled jobs at a slower pace, and they created unskilled jobs at a faster pace than national companies. The growth of foreign companies in the tradable industries, when compared to national companies, was therefore based on retaining skilled workers and recruiting unskilled ones.

Larger and older firms present lower rates of job creation and job destruction, therefore revealing less turbulence. These results are valid for either category of workers. Davis *et al.* (1994) have argued that job creation rates are larger for smaller firms, but so are job destruction rates, resulting in a link between firm size and net job creation in the US that is not clear. The same pattern holds for Portugal, but based on the results reported, it can be claimed that larger firms were net job destroyers during the period under analysis. Serrano and Malo (1997) also found that, in a sample of large Spanish firms, job reallocation decreases with firm size, with job creation decreasing but job destruction increasing, the latter fact in contrast with the evidence reported for Portugal and for the US.

[4] The null hypothesis that the sum of the coefficients on export prices and its interaction with the destruction dummy is zero could not be rejected for the skilled labour force.

[5] A test of the hypothesis that the sum of the coefficients on foreign and foreign interacted with the destruction dummy is equal to zero in the unskilled regression could not reject the null hypothesis. Therefore, the behaviour of foreign companies cannot be distinguished from that of national companies when it comes to job destruction for that category of workers.

The impact of the average wage level paid by the firm on job flows is different depending on the skill considered. Firms paying high wages to the unskilled have been dynamic at creating jobs for the unskilled, but have destroyed at a comparable rate. For skilled workers, firms paying high wages present high rates of job creation but even higher rates of job destruction. High paying firms in tradable industries therefore seem to have sustained the size of their unskilled labour force during the period under analysis, while being net destroyers of skilled jobs, once compared to low paying firms and after several other factors are controlled for.

Regional factors present a similar effect on job creation and job destruction, both for the unskilled and skilled labour force (see the insignificant coefficients on the interaction of the destruction dummy with the regional dummies). The inland region and the Algarve, the omitted category, presented higher rates of job creation and destruction for both skill categories.

4. Conclusion

This study has used a matched employer-employee data set to quantify and explain job flows at the firm level across skills, which were evaluated using a direct measure of the degree of complexity and responsibility of the job performed and the type of knowledge required. Several determinants of job creation and job destruction previously presented in the literature were analysed, namely: conditions in international product markets, technological conditions, and firm attributes that can capture institutional factors, such as the type of ownership of the company, its age, size and location.

Technology indicators seem more relevant determinants of job flows than conditions in international product markets. Indeed, firms in technologically more advanced industries have expanded job opportunities for the skilled labour force, as job creation took place at a faster pace than job destruction. For unskilled workers, on the other hand, a higher technological level in the industry is associated with higher reallocation, but job creation and job destruction offset each other.

The major impact of international trade on the Portuguese labour market occurred via exports. Higher export prices increase job creation and destruction for the unskilled, thus increasing turnover, but with no impact on net employment growth. For the skilled labour force, rising export prices results in rising job creation and unchanged job destruction, pointing to a certain upgrading in the quality of Portuguese exports.

On the other hand, the impact of import prices on job creation and job destruction for the unskilled is negligible, just like their impact on job creation for skilled workers. Rising foreign competition in the form of declining import prices just reduces job destruction for the skilled labour force. The trade results therefore point to an economy slowly increasing its specialisation in skilled labour.

Appendix

A. Data on labour

Quadros de Pessoal is a data set gathered annually by the Ministry of Employment and Solidarity, based on an inquiry that every establishment with wage-earners is legally obliged to fill in. By design, public administration and domestic work are not covered by the database and in practice neither is agriculture. For the remaining sectors, *Quadros de Pessoal* (QP) is a very reliable source of information, being in fact a census of firms and their workers. Reported data match the firm and each of its workers. Data on the firm include the industry, share of foreign capital and location. Data on the worker include schooling, occupation, skill, earnings, and the duration of work. Each firm entering the database is assigned a unique identifying number and it can thus be followed over time.

B. Contents of each skill category

Skill is particularly relevant for this study, as it reports the degree of complexity and responsibility of the job performed and the type of knowledge required. The concept has been legally defined (Portugal, 1978: 994) and it has been used in studies of wage inequality and job assignment (see for example Vieira, Hartog and Pereira (1997) and Vieira and Pereira (1993)). The following categories are defined in this study:

Managers and professionals[6]: Definition of the policy of the company, planning and organisation, involving high level of responsibility. Requires knowledge and study of complex technical issues.

Foremen and supervisors: Supervision of a group of workers, according to instructions defined higher up in the hierarchy. Requires thorough training and specialisation in one field.

Highly skilled: Performance of complex technical tasks. Requires thorough training and specialisation, including theoretical and practical knowledge.

Skilled: Performance of somewhat complex, not repetitive and well defined tasks, according to instructions received, requiring knowledge of their execution plan. Requires training, including theoretical and practical knowledge.

Semi-skilled: Performance of non-complex, usually repetitive tasks. Requires training in a narrow field, including practical, elementary knowledge.

Unskilled: Simple tasks, requiring knowledge that can be acquired in a few days.

C. Trade data

Data on trade is gathered by the National Statistical Office. Harmonised chronological series for groups of products are regularly published by the Ministry of the Economy, Trade Directorate, covering information on trade volumes and prices. Paasche indices are computed for prices. Trade volumes are computed using data on values and prices. In 1993, methodological changes were introduced in the procedure for reporting trade between European Union members, and therefore the series before and after that date may suffer comparability problems.

D. Sample sizes, 1986, 1997 and pooled sample

Successive restrictions imposed on data set	Employment			Firms		
	1986	1997	Pooled sample	1986	1997	Pooled sample
Full dataset, wage earners	1 470 154	1 876 219		91 107	189 380	
Tradable industries	612 891	597 983	7 087 610	23 497	33 110	339 309
Continuing firms with workers in both skill groups in period *t* and changing group sizes	464 590	415 334	5 164 423	4 330	5 921	61 217

Source: Computations based on Portugal, MTS-DETEFP (1985 to 1997).

E. Concepts used

Job flows are quantified using the standard methodology (Davis et al., 1996). Job creation and destruction are calculated as firm level net employment changes over a year:

$$\Delta X_{ft} = X_{ft} - X_{f,t-1} \quad ,$$

where X stands for the employment level, f is the firm and the subscript t denotes the time period. Job creation occurs when employment at a firm increases and job destruction takes place once employment at a firm decreases. Firms with unchanged employment contribute neither to job creation nor job destruction.

[6] The two top categories in the Portuguese classification were aggregated.

Job flows are expressed as rates, dividing through by a measure of the firm size:

$$g_f = \frac{\Delta X_f}{Z_f} \ .$$

g stands for the firm-level employment growth rate and $Z_f = .5\left(X_{ft} + X_{f,t-1}\right)$ is the average of employment in periods *t* and *t-1*. This measure ranges from –2 to +2 and it handles contraction and expansion symmetrically. In particular, firm start-ups and shutdowns have growth rates of +2 and –2, respectively.

Let *s* denote the sector to which the firm belongs, such as an industry or region. Gross job creation in sector *s* at time *t*, C_{st}, equals employment gains summed over all firms in the sector that expand or start up between *t-1* and *t*; gross job destruction, D_{st}, equals employment losses summed over all firms that contract or shut down between *t-1* and *t*:

$$c_{st} = \frac{C_{st}}{Z_{st}} = \sum_{f \in S+} g_{ft} \cdot \frac{Z_{ft}}{Z_{st}} \qquad \text{and} \qquad d_{st} = \frac{D_{st}}{Z_{st}} = \sum_{f \in S-} \left| g_{ft} \right| \cdot \frac{Z_{ft}}{Z_{st}}$$

The sum of job creation and destruction equals job reallocation:

$$R_{st} = C_{st} + D_{st} \ ,$$

and the corresponding rate is computed as

$$r_{st} = c_{st} + d_{st} \ ,$$

providing a summary measure of the heterogeneity in employment flows across firms.

F. Econometric model

A seemingly unrelated regression model was estimated. The following two equations were estimated, with *i* referring to the skill group (1 for skilled and 2 for unskilled workers):

$$\log\left(\left|g_{if}\right|\right) = \beta_{i0} + \beta_{i1} for_f + \beta_{i2} siz_f + \beta_{i3} age_f + \beta_{i4} w_{if} + \beta_{i5} reg_f + \beta_{i6} conc_f + \beta_{i7} tec_f + \beta_{i8} \Delta tec_f + \beta_{i9} ep_f + \beta_{i10} mp_f + \beta_{i11} yr +$$
$$+ \beta_{i12} d_{if} + \beta_{i13} d_{if}\, for_f + \beta_{i14} d_{if}\, siz_f + \beta_{i15} d_{if}\, age_f + \beta_{i16} d_{if}\, w_{if} + \beta_{i17} d_{if}\, reg_f +$$
$$+ \beta_{i18} d_{if}\, conc_f + \beta_{i19} d_{if}\, tec_f + \beta_{i20} d_{if}\, \Delta tec_f + \beta_{i21} d_{if}\, ep_f + \beta_{i22} d_{if}\, mp_f + \beta_{i23} d_{if}\, yr + \varepsilon_{if}$$

where *g* is the employment growth rate, *for* is a dummy variable (1 if the company is foreign owned), *siz* refers to the size of the firm, defined as $Z_f = .5\left(X_{ft} + X_{f,t-1}\right)$. *Age* is the age of the firm, *w* denotes real average monthly wage and *reg* is a set of regional dummy variables

defining the location of the firm. *Conc* refers to the degree of market concentration in the industry – the employment share of the 4 largest firms. *Tec* is a proxy for the technological level of the industry – the share of computer workers (computer engineers, programmers and operators); technological change is proxied by Δtec, the change in the previous variable. *Ep* and *mp* are export and import prices, respectively, both referring to the industry. *Yr* is a set of year dummy variables; *d* is a dummy variable, equal to one if the firm contracted its employment level for that skill group, which has been interacted with every other regressor, to distinguish between the determinants of employment expansion and employment contraction. In the final specification of the model, the international price variables and the proxy for technological progress were lagged one year.

The results are reported in Table A1.

Table A1. Regression of job flows at the firm level across skill groups, trading industries, 1986-97

Seemingly unrelated regression

Equation	Obs	Parms	RMSE	"R-sq"	Chi2	P
sk	61217	45	1.05849	0.1873	13581.74	0.0000
unsk	61217	45	1.071983	0.1514	10403.09	0.0000

	Coef.	Std. Err.	z
skilled			
foreign	-.0368587	.0258162	-1.428
size	-.0011586	.0000359	-32.276
age	-.0178226	.0002844	-62.674
wG1	.0001159	.0000635	1.825
regNL	-.2058493	.0197054	-10.446
regCL	-.1846535	.0209137	-8.829
regLVT	-.0900363	.020958	-4.296

C4emp	-.0019149	.0010594	-1.808
tec	.2359472	.0250596	9.415
Dpclag	-.0008881	.0002593	-3.425
epplag	.0036605	.0009537	3.838
mpplag	-.0018167	.0015926	-1.141
year87	.0180166	.0282663	0.637
year88	.190185	.0275958	6.892
year89	.1746457	.0277306	6.298
year91	-.2957744	.0274675	-10.768
year92	.0092445	.0309907	0.298
year93	-.092388	.0290541	-3.180
year94	.0442863	.0280431	1.579
year95	.0681425	.0284355	2.396
year96	-.1426508	.029015	-4.916
year97	-.1936822	.0289826	-6.683
dG1	-1.123205	.227829	-4.930
dG1for	-.1815647	.0384221	-4.726
dG1size	.0004759	.0000436	10.909
dG1age	.0084151	.0004134	20.355
dG1wG1	.000245	.0000989	2.478
dG1NL	.0087842	.0297043	0.296
dG1CL	.0074865	.0314779	0.238
dG1LVT	.0124229	.0312688	0.397
dG1C4emp	.0006129	.0015844	0.387
dG1tec	-.1262576	.0375456	-3.363

dG1Dpclg | -.0003465 .0004101 -0.845

dG1epplg | -.0036086 .0014375 -2.510

dG1mpplg | .0083309 .0023924 3.482

dG1y87 | -.0505789 .0420019 -1.204

dG1y88 | -.1185811 .0407423 -2.911

dG1y89 | -.130094 .0417185 -3.118

dG1y91 | -.1145986 .0412433 -2.779

dG1y92 | .131473 .0451745 2.910

dG1y93 | .1633154 .0415669 3.929

dG1y94 | .0405643 .0412487 0.983

dG1y95 | -.1559405 .0442027 -3.528

dG1y96 | .0666041 .0421809 1.579

dG1y97 | .1428225 .0419985 3.401

_cons | -.8031478 .1497782 -5.362

. ———————————————————————————

unskilled|

foreign | .0550164 .0275993 1.993

size | -.0010519 .0000378 -27.792

age | -.0176403 .0003086 -57.161

wG2 | .0007347 .000077 9.536

regNL | -.1427445 .0217139 -6.574

regCL | -.2524713 .0230164 -10.969

regLVT | .0037559 .0229892 0.163

C4emp | .0001148 .0011633 0.099

tec | .3312518 .0274018 12.089

Dpclag | .0004638 .0002947 1.574

epplag	.0040908	.0010576	3.868
mpplag	.0020017	.0017828	1.123
year87	-.0207737	.0289766	-0.717
year88	.0949094	.0284997	3.330
year89	.0467902	.0292863	1.598
year91	-.3941449	.0292259	-13.486
year92	.0264484	.0331828	0.797
year93	-.0420661	.0309799	-1.358
year94	.0901916	.0298149	3.025
year95	-.0642094	.0321766	-1.996
year96	.0231539	.0304555	0.760
year97	-.0074221	.0300067	-0.247
dG2	-.4165903	.2237729	-1.862
dG2for	-.0942532	.0375136	-2.513
dG2size	.0004193	.000045	9.326
dG2age	.0078458	.0004081	19.226
dG2wG2	-.0000372	.0001029	-0.361
dG2NL	.030118	.029245	1.030
dG2CL	.0376905	.0310139	1.215
dG2LVT	.0473912	.0309347	1.532
dG2C4emp	.0065161	.0015627	4.170
dG2tec	.0037963	.03622	0.105
dG2Dpclg	.0002729	.0003943	0.692
dG2epplg	-.0008624	.0014144	-0.610
dG2mpplg	-.0018133	.002361	-0.768

dG2y87	.0210521	.0421912	0.499
dG2y88	.0614589	.0408101	1.506
dG2y89	.0690417	.0413114	1.671
dG2y91	.1039777	.0407874	2.549
dG2y92	.1948397	.0451672	4.314
dG2y93	.2751039	.0419452	6.559
dG2y94	.1936145	.0412267	4.696
dG2y95	.3681022	.0428411	8.592
dG2y96	.2089982	.0420159	4.974
dG2y97	.1792548	.0417921	4.289
_cons	-1.493937	.1711538	-8.729

Source: Portugal, MTS-DETEFP (1986 to 1997).

Note: Breusch-Pagan test of independence of residuals across equations: Chi-squared(1)=11918.92.

References

Anderton, Bob and Paul Brenton (1999), "Did outsourcing to low-wage countries hurt less skilled workers in the UK?" in P. Brenton and J. Pelkmans (eds.), *Global Trade and European Workers*, London: MacMillan.

Baldwin, Robert E. (1995), "The effect of trade and foreign direct investment on employment and relative wages," National Bureau of Economic Research Working Paper 5037.

Baldwin, John and Timothy Dunne and John Haltiwanger (1998), "A comparison of job creation and job destruction in Canada and the United States," *Review of Economics and Statistics*, 80(3): 347-356.

Bentivogli, Chiara and Patrizio Pagano (1999), "Trade, job destruction and job creation in European manufacturing," *Open Economies Review*, 10: 165-184.

Blanchard, Olivier and Pedro Portugal (2000), "What hides behind an unemployment rate: comparing Portuguese and U.S. labor markets," *American Economic Review*, forthcoming.

Blanchard, Olivier Jean and Peter Diamond (1990), "The cyclical behaviour of the gross flows of U.S. workers," *Brookings Papers on Economic Activity*, 2: 85-155.

Blanchflower, David G. and Burgess, Simon M. (1996), "Job creation and job destruction in Great Britain in the 1980s," *Industrial and Labor Relations Review*, 50(1): 1738.

Broersma, Lourens and Pieter Gautier (1997), "Job creation and job destruction by small firms: An empirical investigation for the Dutch manufacturing sector," *Small Business Economics*, 9: 211-224.

Cardoso, Ana Rute (2000),"Wage differentials across firms: An application of multilevel modelling," *Journal of Applied Econometrics*, 15(4): 343-354.

Commission Européenne (1998), *Économie Européenne*, 66.

Davis, Steven J. and John Haltiwanger (1990), "Gross job creation and destruction: microeconomic evidence and macroeconomic implications," *NBER Macroeconomics Annual*, 5: 123-168.

Davis, Steven J. and John C. Haltiwanger and Scott Schuh (1996), *Job Creation and Destruction*. Cambridge, MA: MIT Press.

Davis, Steven J.and John Haltiwanger and Scott Schuh (1994), "Small business and job creation: dissecting the myth and reassessing the facts," *Business Economics*, 29(3): 13-20.

Desjonqueres, Thibaut and Stephen Machin and John Van Reenen (1999), "Another nail in the coffin? Or can the trade based explanation of changing skill structures be resurrected?", *Scandinavian Journal of Economics*, 101(4): 533-554.

Dewatripont, Mathias, André Sapir and Khalid Sekkat (1999), *Trade and Jobs in Europe: Much Ado About Nothing?*, Oxford: Oxford University Press.

Freeman, Richard and Ana Revenga (1999), "How much has LDC trade affected western job markets?" in Dewatripont, Mathias; André Sapir; Khalid Sekkat (1999) *Trade and Jobs in Europe: Much Ado About Nothing?*, Oxford: Oxford University Press, pp. 8-32.

Hanson, Gordon H. and Harrison, Ann (1999), "Trade liberalization and wage inequality in Mexico," *Industrial and Labor Relations Review*, 52(2): 271-288.

Haskel, Jonathan E. and Matthew J. Slaughter (1998), "Trade, technology and UK wage inequality," mimeo, Queen Mary and Westfield College.

Jimeno, Juan F., Olga Cantó, Ana Rute Cardoso, Mario Izquierdo and Carlos Farinha Rodrigues (2000), "Integration and inequality: Lessons from the accessions of Portugal and Spain to the EU," in World Bank, *Making Transition Work for Everyone: Poverty and Inequality in Europe and Central Asia – Background Papers*. Washington, D.C.: World Bank, pp. 1-47.

Konings, J. and H. Lehmann and M. E. Schaffer (1996), "Job creation and job destruction in a transition economy: ownership, firm size, and gross job flows in Polish manufacturing 1988-91," *Labour Economic*s, 3(3): 299-317.

Leamer, Edward E. (1994), *Trade, wages and revolving door ideas*, NBER Working Paper 4716.

Lucke, Matthias (1999), *Sectoral value added prices, TFP growth, and the low-skilled wage in high-income countries*, Kiel Working Paper 923.

Marimon, Ramon and Fabrizio Zilibotti (1998), "'Actual' versus 'virtual' unemployment in Europe: Is Spain different?", *European Economic Review*, 42: 123-153.

Mata, José (1993), "Firm entry and firm growth," *Review of Industrial Organisation*, 8: 567-578.

Minondo, Asier (1999), "The labour market impact of trade in middle-income countries: a factor content analysis of Spain," *World Economy*, 22(8): 1095-1117.

Mortensen, Dale T. and Christopher A. Pissarides (1994), "Job creation and job destruction in the theory of unemployment," *Review of Economic Studies*, 61: 397-415.

OECD [Organisation for Economic Co-operation and Development] (1992), *OECD Economic Surveys, Portugal, 1991/92*. Paris: OECD.

Portugal, Ministério da Economia, Direcção-Geral do Comércio (1996), *Comércio Internacional, Séries Anuais 1980-1994*.

Portugal, Ministério da Economia, Direcção-Geral das Relações Económicas Internacionais (1997), *Evolução do Comércio Internacional em 1995 e 1996*.

Portugal, Ministério da Economia, Direcção-Geral das Relações Económicas Internacionais (1998), *Evolução do Comércio Internacional, ano de 1997 (versão definitiva)*.

Portugal, Ministério da Economia, Direcção-Geral das Relações Económicas Internacionais (2000), *Evolução do Comércio Internacional, ano de 1998 (versão definitiva)*.

Portugal, Ministério do Trabalho (1978), Decreto-Lei 121 de 2 Junho.

Portugal. Ministério do Trabalho e da Solidariedade, DETEFP (1985 to 1997), Quadros de Pessoal. Data in magnetic media.

Richardson, J. David (1995), "Income inequality and trade: how to think, what to conclude," *Journal of Economic Perspectives*, 9(3): 33-55.

Salvanes, Kjell G. (1995), "The flexibility of the Norwegian labour market: job creation and job destruction in manufacturing 1977-86," Norwegian School of Economics and Business Administration, Institute of Economics Discussion Paper 12/95.

Serrano, Carlos García and Miguel A. Malo (1997), "Worker and job turnover in Spanish large firms," mimeo, Universidad de Alcalá de Henares.

Vainiomaki, Jari and Seppo Laaksonen (1999), "Technology, job creation and job destruction in Finnish manufacturing," *Applied Economics Letters*, 6: 81-88.

Vieira, José António Cabral and Pedro Telhado Pereira (1993), "Wage differentials and allocation: An application to the Azores Islands," *Economia*, 17(2): 125-159.

Vieira, José António, Joop Hartog and Pedro T. Pereira (1997), *A look at changes in the Portuguese wage structure and job level allocation during the 1980s and early 1990s*, Tinbergen Institute working paper 97-008/3. Amsterdam: TI.

Wood, Adrian (1995), "How trade hurt unskilled workers," *Journal of Economic Perspectives*, 9(3): 57-80.

Wood, Adrian (1994), *North-South Trade, Employment and Inequality: Changing Fortunes in a Skill-Driven World*, Oxford: Clarendon Press.

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