DISCUSSION PAPER SERIES

IZA DP No. 1311

Jobs for Young University Graduates: Is It Worth Having a Degree?

Ana Rute Cardoso

September 2004

Forschungsinstitut
zur Zukunft der Arbeit
Institute for the Study
of Labor

Jobs for Young University Graduates: Is It Worth Having a Degree?

Ana Rute Cardoso
IZA Bonn, University of Minho and CEPR

Discussion Paper No. 1311
September 2004

IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
Email: iza@iza.org

IZA Discussion Paper No. 1311
September 2004

ABSTRACT

Jobs for Young University Graduates: Is It Worth Having a Degree?*

This study addresses the question: Are workers who hold a university degree increasingly filling job openings meant for people with lower levels of schooling? It focuses on Portugal, where the higher education system has been expanding at a fast pace and the share of university graduates in total labour force has been increasing, but where the unemployment rate for such workers has also been increasing. The analysis relies on a remarkable dataset covering the entire workforce in manufacturing and services private sectors, to implement the conceptual framework developed by Gottschalk and Hansen (2003). Results indicate that the university wage premium increased and the proportion of university graduates working in non-university jobs declined sharply over time. Therefore, no support is found for the skepticism over investment in higher education. Results are consistent with the idea that skill-biased technological progress taking place in some sectors raises the productivity of workers with higher schooling levels, thus raising their wages, which attracts new workers with high qualifications.

JEL Classification: J21, J31, J24, I20

Keywords: higher education, youth, job creation, labour market trends

Ana Rute Cardoso
IZA
P.O. Box 7240
53072 Bonn
Germany
E-mail: cardoso@iza.org

* Funding from *Fundação para a Ciência e a Tecnologia* (contract POCTI/ECO/37668/2001) is acknowledged. I thank the Ministry of Employment, Statistics Department, for access to the data set. The usual disclaimer applies.

1 Introduction

Are workers who hold a university degree increasingly filling jobs openings meant for people with lower levels of schooling? The question became increasingly relevant as the higher education system expanded in most countries and the labour market showed in some of them signs of incapacity to absorb all the newly graduates. Concern over labour market trends for university graduates was voiced most strongly in the USA, for example by Hecker (1992) and Shelley (1994). In Europe the issue has been discussed in the wider framework of trends in overeducation or bumping down, i.e. to which extent workers with high schooling levels are accepting jobs requiring lower skills and therefore forcing low skilled workers into unemployment (see for example the contributions on different countries gathered in Borghans and Grip (2000), or Hartog and Oosterbeek (1988) for The Netherlands).

However, it is puzzling that concerns over labour market trends for newly graduates have spread precisely when their wage premium for such workers was increasing sharply in several countries (see for example Katz and Murphy (1992) and Levy and Murnane (1992) for the USA, Machin (1998) for the UK and Gottschalk and Smeeding (1997) for an international perspective). Rising returns to university education cast doubt on the idea that graduate workers are increasingly taking jobs for which they are overqualified.

Gottschalk and Hansen (2003) present a clear response to this apparent contradiction. Their study relies on a simple but powerful theoretical model and on its very straight empirical implementation. It deals specifically with the labour market of young college graduates in the USA, using a precise definition of college jobs. They conclude that college graduates have not, in the USA, been increasingly taking jobs meant for workers with lower skills. Using a different methodology, Tyler *et al* (1995) had previously underlined that same point.

How far does the experience of young North-American university graduates extend to other countries? Is the skepticism about their labour market prospects

unjustified also elsewhere, namely in Europe? Portugal is a particularly adequate country for this analysis. Indeed, its higher education system has been expanding sharply and the proportion of university workers in total labor force has increased remarkably (figures 4 and 5 in appendix). However, the unemployment rate of university graduates also increased at a fast pace during the 90s, even though it departed from a relatively low level (see the trend in figure 6 and the comparison with other OECD countries in table 2). Doubts about the relevance of investing in a higher education degree were therefore commonly expressed. The puzzle is most intense in Portugal, because the returns to university education increased remarkably during the 80s and early 90s, as widely documented in Machado and Mata (2001), Cardoso (1999) or Hartog *et al* (2001). Moreover, the country still presents very low levels of educational attainment, which renders more surprising the doubts about raising university attendance.

Kiker and Santos (1991) have anlysed overeducation in Portugal, putting forward the hypothesis that a country whose educational attainment is increasing fast may have in the short run, due to coordination problems between employers and workers, pockets of overeducation, a mismatch they foresee would decline over time. A subsequent paper by Oliveira *et al* (2000) finds empirical support to the hypothesis that overeducation and undereducation are short-term disequilibria driven by technological progress, and are likely to take place in a country that is modernising its productive structure and improving the educational achievement of its labour force. This line of reasoning would lend support to the expectation that, at least after a certain moment in time, university graduates in Portugal would not be increasingly accepting non-university jobs. Checking this hypothesis can provide insight into trends in other middle-income countries, in particular those whose economy is modernising and where the educational structure of the workforce is improving.

Still another aspect that may render the analysis on Portugal interesting is the availability of a very rich dataset, gathered annually by the Ministry of Employment and covering approximately two million workers. Given the mandatory

nature of the survey, the population of firms with wage-earners in manufacturing and the services private sector is covered. Reported data on the worker include the detailed occupation, schooling, gender, age, skill, and earnings split into several components.

Section 2 briefly describes the conceptual framework developed by Gottschalk and Hansen (2003), on which this study relies. Section 3 describes the data set used. Section 4 defines university jobs. Results are presented in sections 5 to 7 and concluding comments are presented in section 8.

2 Conceptual framework

The theoretical model by Gottschalk and Hansen (2003) (from now on referred to as GH) leads to the definition of college and non-college jobs, explains the allocation of workers to jobs, and predicts the impact of technological progress on this allocation.

The economy is made-up of two types of jobs: college and non-college ones. College and non-college workers are assumed to be perfect substitutes in the production process, even though their productive efficiency is different. In formal terms one has that

$$Q_j = F_j(K_j, \alpha_{jc}L_{jc} + \alpha_{jn}L_{jn}) \tag{1}$$

and

$$\frac{\alpha_{1c}}{\alpha_{1n}} > \frac{\alpha_{2c}}{\alpha_{2n}}, \tag{2}$$

where j is the sector (college or non-college), Q stands for output, K is capital, L_{jc} is the number of college workers in sector j, and similarly L_{jn} is the number of non-college workers in sector j; α is the efficiency parameter. College workers have a comparative advantage in production in sector 1, the college sector, whereas in sector 2 their productivity is closer to that of non-college workers. A profit maximizing firm in sector j will choose to hire college and non-college workers depending on their relative prices within the sector, i.e. depending on the college

wage premium prevailing in the sector. The following condition will be fulfilled:

$$\frac{W_{jc}}{W_{jn}} = \frac{\alpha_{jc}}{\alpha_{jn}}. \tag{3}$$

It follows from equations 2 and 3 that college workers will earn a higher wage premium in the college sector than in the non-college sector. This condition leads to a clear definition of non-college jobs —those that pay a low wage premium to college graduates.

On the supply side, workers have heterogenous education (college or non-college) and heterogenous preferences. Their choice to be in the college or non-college sector depends on the relative wages offered them across sectors and on their preferences. Some college workers may therefore choose to be in the non-college sector. However, an increase in the relative wage paid by a certain sector to college workers would attract more college workers. Such would be the effect for example of technological progress. If skill-biased technological progress occurs in sector j, raising the productive efficiency of college workers, α_{jc}, their wages will go up and more college workers will be attracted. More details on the model can be found in GH (2003: 450-453).

3 Data set

Quadros de Pessoal matches firms and workers in the Portuguese economy and they are gathered annually by the Ministry of Employment, based on an inquiry that every firm with wage-earners is legally obliged to fill in. The period 1986 to 1999 is analysed. Reported data cover all the personnel working for the firm in a reference week of the year. Public administration and domestic service are not covered, and the coverage of agriculture is low given its low share of wage-earners. For manufacturing and the services private sector, the mandatory nature of the survey leads to the coverage of the population of firms with wage-earners. Approximately two million workers and 200 thousand firms are covered each year.

Reported variables include the worker's gender, age, schooling, detailed occupation, date of admission into the company, monthly earnings (split into several

components), and duration of work; and the firm's location, industry, employment, sales, ownership, and legal setting.

The analysis concentrates on manufacturing and services jobs. Workers, both male and female, holding a high school degree (requiring 11 or 12 years of education during the period under analysis) or a university degree (requiring 15 to 17 years of education) were kept for analysis.[1] The integration of youngsters into the labour market is the focus of attention, and therefore just workers with up to 10 years of labour market experience are retained. Potential labour market experience is computed as $age - education - 6$.

Occupations are coded in the database using the National Classification of Occupations (CNP, version 1994), which follows the International Standard Classification of Occupations (ISCO, version 1988). Until 1995 a different classification was used by the data source. Conversion to the new classification was performed according to Portugal, MESS (1994) issued by the data provider. The current analysis relies on occupations defined at the three-digit level, which yields 92 occupations.[2]

Computations were ran using alternatively just full-timers or both full- and part-timers. A worker is considered full-timer if (s)he works at least 35 hours a week.

Gross monthly earnings were computed alternatively as

$$mw1 = bw + sen + reg \tag{4}$$

$$\text{or } mw2 = bw + sen + reg + overtw, \tag{5}$$

where bw stands for base-wage, sen are seniority-indexed components of pay, reg are other regularly paid components and $overtw$ is payment for overtime. Wages were deflated using the Consumer Price Index. Wage outliers have been dropped.[3]

[1] For simplicity, throughout the text the word university will be used to refer to the higher education system, which in Portugal is made up of Universities and Politechnical Schools. The latter could until 1997 award only bachelor degrees, and comprised in 1999 approximately 30 percent of the students attending higher education.

[2] After exclusion of agriculture, Public Administration and residual occupations.

[3] Wages below the monthly national minimum wage for trainees aged up to 17, adjusted for the number of hours worked, were considered outliers, as well as wages above 10 times the percentile 99 of the distribution. These restrictions lead to dropping just 0.19 percent of the observations in the database under analysis.

The results reported below refer to the concept of wage in equation 4 (regular monthly wage) and the population of both full- and part-timers. This choice was determined by the possibility to establish direct comparisons with the results obtained for the USA by GH. All the conclusions hold irrespective of the concept of wage and working population used.[4]

4 Definition of university jobs

A (log) wage regression has been ran for each year and each 3-digit occupation, with the following independent variables: gender, experience and its square, a dummy for part-time worker (just in the sample that includes both part- and full-timers), and a dummy for university education. The estimated coefficient on university education and its significance are relevant parameters in the analysis that follows.

University jobs are defined as:

- those that hire almost exclusively university graduates (at least 90 percent of the workforce);
- for the remaining occupations, those that pay a university wage premium above the threshold 0.10[5]; the wage premium must be statistically significant at the 10 percent level.

This procedure adapts the proposal by GH and is believed to be more straightforward and more reliable. They have estimated wage premia, for each period t, for occupations that had at least 50 college and 50 non-college workers once periods t, $t+1$ and $t-1$ were pooled together. If that sample size were not achieved, occupations would be merged at the next level of aggregation in the classification of occupations. This procedure aimed at obtaining a sufficiently large sample of workers to enable estimation, and was an indirect way to obtain reliable estimates. As a result of the pooling of observations across three years to run each regression,

[4] All the results non-reported here are available from the author upon request.

[5] Other alternatives have been checked and the results, available from the author upon request, are robust to the choice of threshold. The results reported are comparable to GH.

no results were available for the initial and final periods in their dataset. Given that sample size is less of a problem in the dataset used in the current study, it is feasible to use data for one single year to estimate the wage premia, while checking directly the precision of the estimates by imposing a threshold on the significance level. Excluding occupations with a non-significant wage premium (or with a significant premium below 0.10) leads to dropping less occupations in this analysis than the procedure of GH would.

Note two further points. First of all, the same partition of occupations (CNP94 at the 3-digit level) is consistently used throughout the period under analysis. Secondly, the classification of an occupation into university job is allowed to vary over time, depending on the evolution of its wage premium. In fact, the requirements of the job may change, namely as a result of technological progress. Both of these aspects are major requirements in the method by GH.

5 Rising wage premium for university graduates

Young university graduates were entitled in Portugal to a rising wage premium relative to high school graduates, from 1986 to mid-90s (see figure 1). After mid-90s, their wage premium started declining. That trend matches the evolution of overall wage dispersion detected in the country by other studies.

Computation of the university wage premium separately for each occupation each year yields the results in table 3 in appendix (for the initial and final periods). The table reports as well the significance of the estimated wage premia, the percentage of university workers absorbed by each occupation, and its average wage for college workers. The table hints on a widespread increase in the wage premium of university graduates, in particular in those occupations commonly associated with "university jobs". Occupations with a higher average wage for university graduates are also those offering a higher university wage premium, as illustrated by the correlation coefficient of 0.60 in 1986 and 0.56 in 1999. Those values are considerably higher than detected for the USA (0.33).

Figure 2 provides a more clear picture of the trend in the occupational uni-

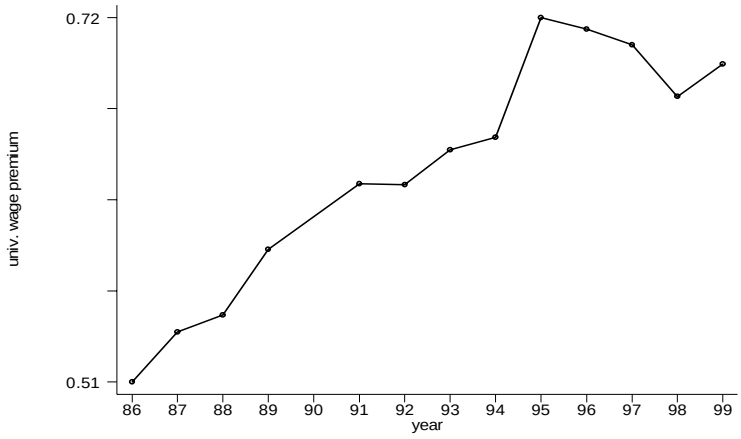

Figure 1: University wage premium for youngsters entering the labour market, 1986-99. Source: Computations based on Portugal, MTSS (1986-1999). Notes: Computations included university and high school graduates with up to 10 years of labour market experience. The graph reports the coefficient of the university dummy variable in a log wage regression estimated for the overall sample (all occupations).

versity wage premium. Between 1986 and 1999, college workers clearly shifted to occupations paying them a higher wage premium. Both this trend and the shape of the distributions are very similar to those reported for the USA by GH. One also finds that in both countries young workers holding a university degree hold jobs that yield a wide range of wage premia.

6 Declining proportion of university graduates in non-university jobs

Table 1 reports the results of a probit model on the probability that a university graduate holds a non-university job. Jobs were coded as university according to the procedure described in section 4. The independent variables are: gender, the unemployment rate (by year and gender), and a quadratic time trend.

The time trend clearly indicates that young university graduates in Portugal are since mid-80s increasingly *less* likely to take jobs meant for workers with lower schooling levels. Figure 3 provides a visual description of this result. From 1986 to 1999, the probability that a young university graduate was employed in a non-university job declined sharply.

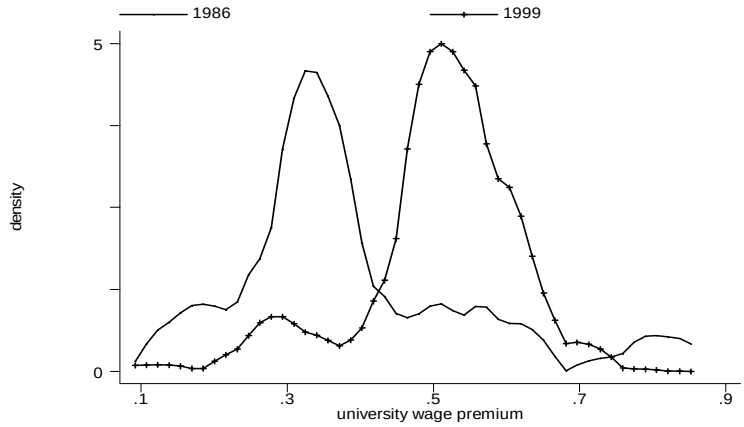

Figure 2: Distribution of youngsters holding a university degree, according to the university wage premium in the occupation, 1986-99. Source: Computations based on Portugal, MTSS (1986-1999). Notes: For occupations defined as university jobs because over 90 percent of their workforce are college graduates, no wage premium was computed. Only estimated wage premia significant at the 10 percent level were considered.

Table 1 also indicates that graduate women are more likely to hold a non-university job. The result on the unemployment rate does not fit expectations, as it indicates that university graduates are less likely to take non-university jobs when the unemployment rate is higher. However, this could result from using the overall economy unemployment rate (by gender) as a regressor, which, as figure 6 shows, is not a good predictor of the unemployment rate for university graduates in Portugal.[6]

The labour market trends for new university graduates reported in this section indicate that concerns about the capacity of the productive system to absorb new university graduates and skepticism about the expansion of the higher education system are as misplaced in Portugal as they are in the USA. For either country, results are consistent with the idea that skill-biased technological change taking place in some sectors raises the productivity of workers with higher schooling levels, thus raises their wages, and attracts them to such jobs. The results on Portugal also lend support to the hypothesis by Kiker and Santos (1991), according to which a possible mismatch in the labour market revealed by overeducation, in a

[6]However, data constraints dictated that specification of the model, since the unemployment rate specifically for university graduates is not available for every year under analysis.

	coefficient (1)	marginal impact (2)
female	.147	.005
	(.013)	
unemployment rate	-.018	-.001
	(.004)	
year	-.049	-.002
	(.005)	
year squared	-.001	
	(.0004)	
constant	-1.59	
	(.027)	
Obs.	385228	

Table 1: Probability that a youngster holding a university degree is employed in a non-university job, probit model, 1986-1999. Source: Computations based on Portugal, MTSS (1986-1999). Notes: The variable year was entered as (year-1986). The marginal impacts were computed at sample means; for gender, it refers to the change in probability as the dummy changes from 0 to 1.

country modernising its economy and improving the educational structure of its labour force, will tend to decline over time. They are also in line with the work by Portugal (2004) showing that, costs and benefits evaluated, the investment in a university degree definitely pays off in Portugal.

7 Are university graduates flowing to university jobs, or are the jobs changing classification?

Two different forces could have driven the result on the declining proportion of university graduates in non-university jobs. On one hand, graduates could be filling exactly the same jobs, but those jobs could increasingly be classified as university jobs (as their wage premium would increase and surpass the threshold defined). On the other hand, the classification of jobs could have remained unchanged, but graduates could have switched the type of jobs they were taking, from non-university to university ones. GH propose a decomposition of the change in the proportion of university graduates in non-university jobs that will be followed here.

The change in the proportion of university workers in non-university jobs will be decomposed into: the change in the classification of jobs; the flow of graduates between job types. Consider first the occupations classified in 1986 as non-university

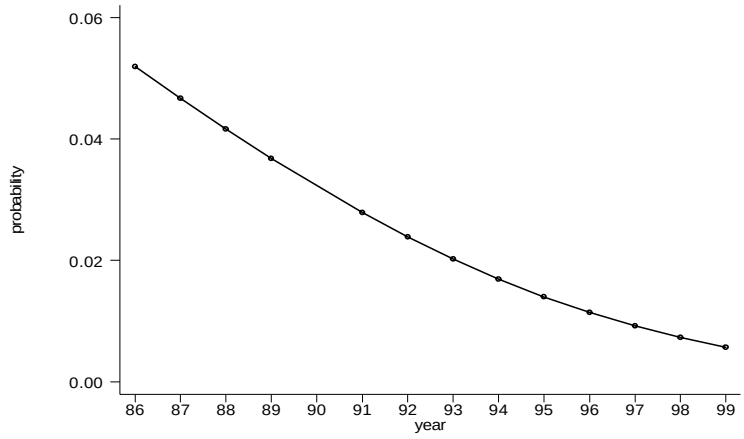

Figure 3: Probability that a youngster holding a university degree is employed in a non-university job, 1986-1999. Source: Computations based on Portugal, MTSS (1986-1999). Note: Marginal effects computed at sample means.

occupations. Taking that classification as fixed, compute the share of university workers that would in 1999 be in a non-university job ($share_{99base86}$). The difference between this share and the actual share in 1986 ($share_{86base86}$) gives the impact of changes in the allocation of workers ceteris paribus ($CAlloc$), since the classification of occupations has been held constant. The overall change ($CTot$) in the proportion of graduates in non-university jobs is computed using the classification of occupations in the respective year ($share_{99base99} - share_{86base86}$). The impact of changes in the classification of occupations is obtained by difference, as $CClassif = CTot - CAlloc$.

Changes in the allocation of university graduates across occupations account for 18 percent of the total change in the proportion of university graduates in non-university jobs. The remaining is accounted for by upgrading of occupations, from non-university to university jobs, because their wage premium for graduates increased. Once again, the trend is remarkably similar to the USA, where changes in the allocation of workers accounted for 22 percent of the overall trend, leading GH to conclude that both factors were important driving the overall trend.

8 Conclusion

As in several other countries, the claim that new university graduates are increasingly forced to accept job offers meant for workers with lower schooling levels has been widespread in Portugal. The paper checked that assertion, analysing specifically the labour market for young university graduates when compared to workers holding just a high school diploma. A database covering all the workforce in the Portuguese manufacturing and services private sector has been used.

Results indicate clearly that the experience of the USA, where young graduates are *not* increasingly found in non-college jobs, is shared by other countries, including one where the higher education system expanded very sharply and the unemployment rate of university graduates increased. Indeed, the wage premium for university graduates increased and the share of university graduates in non-university jobs declined over time in Portugal. These results are consistent with the idea that skill-biased technological progress leads to an upgrading of jobs, rendering workers with high skills more productive, and therefore raising their wage premium relative to workers with lower skills.

References

Barreto, António (1999). *Situação Social em Portugal.* Database available at Instituto de Ciências Sociais, Universidade de Lisboa, web page http://www.ics.ul.pt.

Borghans, Lex and Andries de Grip (2000). *The Overeducated Worker? The Economics of Skill Utilization.* Cheltenham, UK: Edward Elgar.

Cardoso, Ana Rute (1999). Firms' wage policies and the rise in labor market inequality: the case of Portugal. *Industrial and Labor Relations Review*, 53(1): 87-102.

Gottschalk, Peter and Michael Hansen (2003). Is the proportion of college workers in noncollege jobs increasing? *Journal of Labor Economics*, 21(2): 449-471.

Gottschalk, Peter and Timothy M. Smeeding (1997). Cross-country comparisons of earnings and income inequality. *Journal of Economic Literature*, 35: 633-687.

Hartog, Joop and Hessel Oosterbeek (1988). Education, allocation and earnings in the Netherlands: overschooling? *Economics of Education Review*, 7(2): 185-194.

Hartog, Joop, Pedro T. Pereira, and José A. C. Vieira (2001). Changing returns to education in Portugal during the 1980s and early 90s: OLS and quantile regression estimators. *Applied Economics*, 33, 1021-1037.

Hecker, Daniel E. (1992). Reconciling conflicting data on jobs for college graduates. *Monthly Labor Review*, 115(7): 3-12.

Katz, Lawrence F. and Kevin M. Murphy (1992). Changes in relative wages, 1963-1987: supply and demand factors. *Quarterly Journal of Economics*, 107(1): 35-78.

Kiker, B. F. And Maria C. Santos (1991). Human capital and earnings in Portugal. *Economics of Education Review*, 10(3): 187-203.

Levy, Frank and Richard J. Murnane (1992). U.S. earnings levels and earnings inequality: a review of recent trends and proposed explanations. *Journal of Economic Literature*, 30(3): 1333-1381.

Machado, José A. F. And José Mata (2001). Earnings functions in Portugal 1982-1994: evidence from quantile regressions. *Empirical Economics*, 26: 115-134.

Machin, Stephen (1998). Recent shifts in wage inequality and the wage returns to education in Britain. *National Institute Economic Review*, 166, 87-96.

OECD (1997). *Employment Outlook 1997.* Online at http://www.oecd.org.

OECD (2002). *Employment Outlook 2002.* Online at http://www.oecd.org.

Oliveira, M. Mendes de, M. C. Santos and B. F. Kiker (2000). The role of human capital and technological change in overeducation. *Economics of Education Review*, 19: 199-206.

Portugal, Instituto Nacional de Estatística (1981, 1991, 2001). *Recenseamentos da População e da Habitação.*

Portugal, Instituto Nacional de Estatística (2004). Web page http://www.ine.pt.

Portugal, Ministério do Emprego e da Segurança Social (1994). *Classificação Nacional das Profissões, Adenda, versão 1994.* Lisboa: MESS, Instituto do Emprego e Formação Profissional.

Portugal, Ministério do Trabalho e da Segurança Social (1986 to 1999). Quadros de Pessoal. Data in magnetic media.

Portugal, Pedro (2004). Mitos e factos sobre o mercado de trabalho português: a trágica fortuna dos licenciados. *Boletim Económico*, Março. Lisboa: Banco de Portugal, p. 73-80.

Shelley, Kristina J. (1994). More job openings - even more new entrants: the outlook for college graduates, 1992-2005. *Occupational Outlook Quarterly*, Summer: 5-9.

Tyler, John, Richard J. Murnane and Frank Levy (1995). Are more college graduates really taking 'high school' jobs? *Monthly Labor Review*, 118(12): 18-28.

Appendix: Additional tables and figures

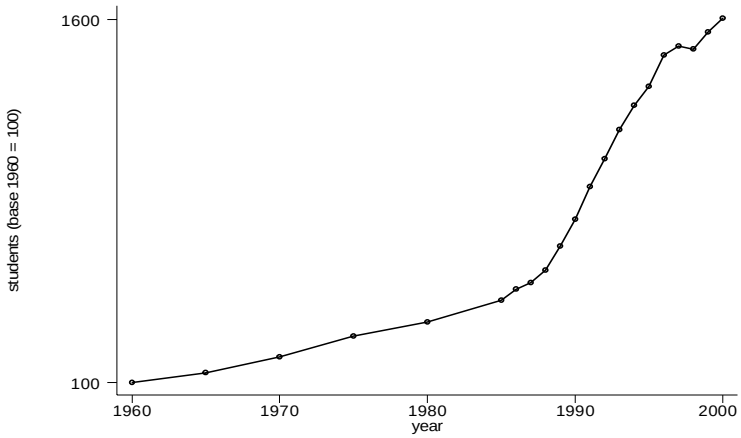

Figure 4: Enrollment in higher education, Portugal, 1960-2000. Sources: 1960/1980 - Barreto (1999); 1985/2000 - Portugal, INE (2004). Note: Year refers to the beginning of the academic year.

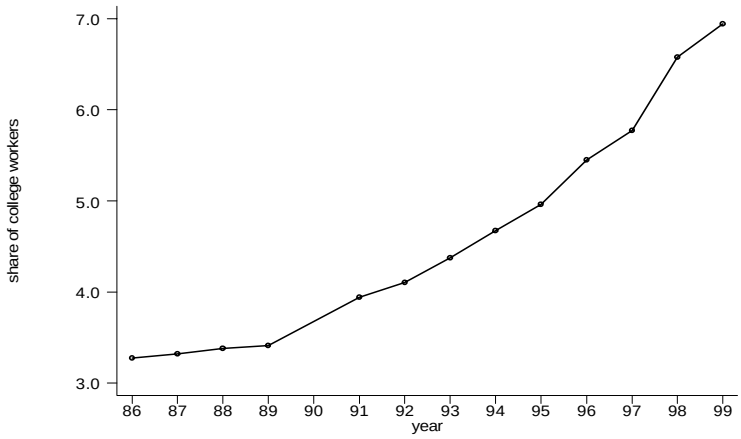

Figure 5: Share of the workforce holding a higher education degree, Portugal, 1986-1999. Source: Computations based on Portugal, MTSS (1986-1999).

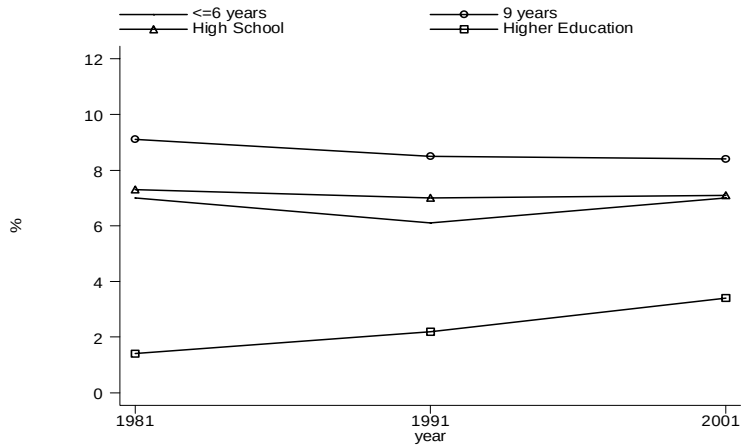

Figure 6: Unemployment rate by schooling level, Portugal, 1981-2001. Sources: Portugal, INE (1981, 1991, 2001).

	1986			1999		
Occupation	univ. wage prem.	% of univ. grads.	average monthly wage (pte)	univ. wage prem.	% of univ. grads.	average monthly wage (pte)
Directors and chief executives	0.08	0.11	70,643	0.50*	0.29	179,202
Production and operations dept. manag.	0.61*	5.95	94,154	0.59*	5.81	145,299
Other departmental managers	0.53*	6.73	92,214	0.69*	3.00	160,492
General managers	0.73*	0.09	72,899	0.48*	1.07	82,434
Computing professionals	0.22*	1.24	87,487	0.57*	3.05	136,221
Nursing and midwifery professionals	0.21*	1.95	49,427	0.10*	0.48	75,448
Business professionals	0.15*	3.58	63,731	0.46*	6.52	95,475
Archivists, librar. and related info prof.	0.36*	0.09	54,447	0.75*	0.04	99,268
Writers and creative or performing artists	0.27*	1.29	61,688	0.42*	1.40	100,895
Physical and engineering science techn.	0.41*	5.03	63,223	0.52*	3.59	91,781
Computer associate professionals	0.46*	3.11	79,960	0.58*	3.57	101,497
Optical and electronic equipment operators	0.13*	0.27	51,031	0.49*	0.20	83,332
Ship and aircraft controllers and techn.	0.06	2.15	109,868	0.17	0.14	158,245
Life science techn., related assoc. prof.	0.29*	1.36	42,974	0.50*	0.21	79,092
Modern health assoc. prof. (exc. nursing)	0.25*	0.61	40,922	0.54*	0.70	74,664
Pre-primary educ. teaching assoc. prof.	0.29*	7.62	37,724	0.30*	3.84	56,915
Special educ. teaching assoc. prof.	-0.07	0.25	48,404	0.60*	0.12	81,909
Finance and sales associate professionals	0.38*	4.05	68,228	0.61*	8.59	102,651
Business services agents and trade brokers	0.43*	0.20	72,274	0.55*	0.39	97,529
Administrative associate professionals	0.33*	10.01	65,787	0.52*	5.80	105,784
Artistic, entert. and sports assoc. prof.	0.15	0.06	44,723	0.04	0.12	72,555
Secretaries and keyboard-operating clerks	0.27*	0.71	40,449	0.39*	1.74	66,672
Numerical clerks	0.35*	19.12	51,495	0.51*	17.92	75,147
Material-recording and transport clerks	0.37*	0.70	51,148	0.46*	0.94	75,277
Library, mail and related clerks	0.07	0.09	43,702	0.18*	0.20	67,417
Cashiers, tellers and related clerks	0.24*	0.27	44,224	0.48*	0.65	71,716
Client information clerks	0.26*	0.44	43,193	0.25*	1.00	51,426
Travel attendants and related workers	0.29*	0.04	98,243	0.28*	0.27	81,312

Continued on next page...

... table 3 continued

Occupation	1986			1999		
	univ. wage prem.	% of univ. grads.	average monthly wage (pte)	univ. wage prem.	% of univ. grads.	average monthly wage (pte)
Housekeeping and restaurant serv. workers	0.36*	0.29	47,061	0.28*	0.34	49,942
Personal care and related workers	0.12*	0.38	32,119	0.62*	0.27	74,018
Shop salespersons and demonstrators	0.21*	0.81	33,472	0.26*	1.19	50,502
Building frame and related trades workers	0.27*	0.14	35,980	0.49*	0.09	68,396
Building finishers and rel. trades workers	-0.02	0.02	44,729	0.35*	0.04	58,425
Painters, build. struct. cleaners and rel.	0.05	0.11	28,713	0.32*	0.01	53,609
Metal moulders, welders, etc.	0.75*	1.69	84,965	0.42*	0.07	67,599
Blacksmiths, toolmakers and rel. workers	0.13*	0.25	42,523	0.44*	0.09	75,427
Machinery mechanics and fitters	0.07	0.09	35,796	0.34*	0.03	68,807
Electric, electronic eq. mech. and fitters	0.24*	0.77	52,931	0.43*	0.30	78,826
Potters, glass-makers and rel. trades	0.29*	0.08	51,021	0.50*	0.02	72,190
Printing and related trades workers	0.43*	0.02	55,259	0.33*	0.07	60,283
Food processing and related trades workers	-0.03	0.08	36,451	0.39*	0.04	59,021
Textile, garment, related trades workers	0.07	0.29	28,018	0.42*	0.06	56,930
Felt, leather, shoemaking trades workers	0.31	0.02	37,560	0.42*	0.02	59,307
Mining and mineral-processing plant operat.	0.00	0.02	35,729	0.05	0.01	52,741
Glass, ceramics and related plant oper.	0.60*	0.02	79,290	0.46*	0.01	83,422
Wood processing and papermaking plant oper.	-0.16	0.02	18,019	0.65*	0.01	110,470
Chemical processing plant operators	0.53*	0.60	76,299	0.41*	0.04	100,381
Power production and related plant oper.	0.27*	0.08	70,405	0.22*	0.01	60,417
Metal and mineral products machine oper.	0.32*	0.06	44,072	0.34*	0.01	69,804
Rubber and plastic products machine oper.	0.42	0.01	30,000	0.40*	0.07	74,496
Printing, binding, paper prod. machine oper.	-0.16	0.01	28,100	0.92*	0.06	101,713
Textile, fur, leather prod. machine oper.	0.13*	0.19	36,846	0.32*	0.05	55,265
Food and related products machine operators	0.20	0.05	39,716	0.81*	0.02	100,853
Assemblers	0.36*	0.16	58,300	0.75*	0.23	121,095
Other machine operators and assemblers	0.34	0.02	44,108	0.79*	0.03	116,513
Locomotive engine-drivers and rel.workers	-0.06	0.04	32,647	-0.06	0.00	74,231
Motor vehicle drivers	0.18	0.04	38,515	0.12*	0.05	52,852
Agricultural and other mobile plant oper.	-0.26	0.01	26,700	0.67*	0.02	87,069
Street vendors and related workers	0.43	0.01	55,000	0.17	0.02	58,598
Domestic, related helpers, cleaners	0.09	0.14	28,064	0.04	0.02	39,244
Building caretakers, window relat. cleaners	-0.03	0.02	27,500	0.48*	0.00	62,429
Messengers, porters, doorkeepers and relat.	0.25*	0.24	37,151	0.12*	0.11	42,156
Mining and construction labourers	0.28*	0.02	29,264	0.12	0.01	32,824
Manufacturing labourers	0.10	0.07	37,622	0.11*	0.05	44,559

Table 3: Wage premium, share of university graduates and average wage, by occupation, 1986 and 1999. Source: Computations based on Portugal, MTSS (1986 and 1999). Notes: (*) Significant at 10% level. The wage premium cannot be computed for occupations with no university graduate or non-graduate. Also, it was not computed for occupations with over 90 percent of university graduates, which accounted for 13 percent and 19 percent of the employment of university graduates, respectively in 1986 and 1999. These eight occupations are: mathematicians, statist.; architects, engineers; life science profes.; health profes. (except nursing); secondary educ. teaching profes.; legal profes.; social sciences and related profs.; primary educ. teaching profs.

	1994	2000	% change
Australia	4.5	3.6	-20
Austria	1.7	1.6	-6
Belgium	3.7	2.7	-27
Canada	7.3	3.8	-48
Denmark	5.3	2.6	-51
Finland	8.5	4.7	-45
France	6.8	5.1	-25
Germany	5.4	4.0	-26
Greece	7.6	7.2	-5
Ireland	4.9	1.9	-61
Italy	6.4	5.9	-8
Netherlands	4.3	1.8	-58
New Zealand	2.9	3.6	+24
Norway	2.3	1.9	-17
Portugal	2.5	2.8	**+12**
Spain	15.0	9.5	-37
Sweden	3.6	3.0	-17
Switzerland	3.0	1.3	-57
Turkey	4.1	3.7	-10
UK	3.9	2.1	-46
USA	3.2	1.8	-44

Table 2: Unemployment rate for workers holding a higher education degree, OECD, 1994 and 2000. Sources: OECD (1997, 2002). Note: Refers to persons aged 25-64.