CHAPTER 12

Wages and Human Capital: Evidence from the Portuguese Data

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1 Introduction[1]

The aim of this study is to analyse the applied research into wage formation in the Portuguese labour market. The paper focuses on wages and endeavoures to determine if the results of several research studies are similar, that is, if they are robust to different data sets, equation specifications and estimation procedures. Additionally, the paper gives the opportunity to gain deeper insight into the behaviour of the labour market in Portugal.

The estimation results come from market wage functions. The unit of observation in the data sets is the individual. The estimation of individual's wages shows results that are similar, not only in the direction, but also in the magnitude of the individual's human capital endowment influence on wages. Years of education, experience and tenure have positive estimated effects that hold the same magnitude from one study to another. Of the three, education has the highest influence on wages. Regularities can also be found in the influence of the individual's age, firm size, job qualification and region.

Wage differentials by gender can be decomposed into two effects: the proportion of the differential due to different endowments of personal attributes – the attribute effect; and the proportion of the differential due to different returns to the personal attributes – the price effect. The decomposition of the wage differential by gender in price effects and attribute effects leads to the conclusion that the former effect is the stronger one. Wage inequality seems to have increased in the last years. In addition, analysis of the wage structure shows that the workers at the upper end of the wage distribution have a higher return to the years invested in school.

All the studies estimate wage functions for Portugal and discuss the process of wage formation, especially the role played by hu-

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man capital. Each of the studies then focuses on the analysis of specific points or adds insights on related topics, as is briefly highlighted in what follows.

Cardoso (1998) studies the impact of the employers' heterogeneity on wage inequality.

The fact that the worker's attributes are not equally rewarded over the wage distribution is addressed in the papers of Hartog et al. (1998) and Machado and Mata (1998).

In Hartog et al. (1995) the wage formation in the Azores is related to the wage bargaining settings and labour market institutions.

In the work of Kiker et al. (1997) and Santos (1995) the influence of overeducation and undereducation on wages is fully elaborated – a topic also studied in Kiker and Santos (1991).

Wage differentials by gender are analysed in Kiker and Santos (1991), Martins (1991), Vieira (1992) and Vieira and Pereira (1993) with a decomposition into attribute effects and price effects in order to assess the existence or not of discrimination by gender. Kiker and Santos (1991) undertake this decomposition in relation to wage differences by sector of employment in addition to gender.

Lima et al. (1996) provide some results regarding females' behaviour in the labour market. The determinants of the decision to participate in the labour market and the supply of working hours are estimated and discussed. The study by Martins (1996) is also about females' behaviour in the labour market. The author proves that the estimation results are sensitive to the economic and statistical specification of the females' labour supply. Both studies consider married women.

Pereira and Lima (1996) estimate a market wage rate and hours-of-work functions. The study is carried out for both male and female partners in a couple. The same set of questions about him/her and about his/her partner was directed to only one member of the couple. The main point was to verify whether or not both sets of answers were coherent with the same model.

The tax system influence on females' labour market participation is discussed in Marques and Pereira (1995a,b) and Marques (1993). Different fiscal simulations are carried out to study

womens' sensitivity to the income tax. Marques and Pereira (1995b) extend the results of their previous study (1995a) in order to include the estimation of a labour supply function. Several estimation methods are implemented and discussed.

Psacharopoulos (1981) estimates the returns of education, both private and social returns, and discusses the differences between the private and the public sector.

Santos (1995) follows the generalisation of the human capital model in including the role of occupation. This topic is also found in Vieira (1992) and Vieira and Pereira (1993). The authors analyse the wage differential determinants in the Azores islands.

Vieira et al. (1997) study the wage structure and job level allocation in Portugal and their evolution during the 1980s and early 90s. The results of the research are matched with the transformations of the Portuguese economy during this period.

The role of education and human capital in general is analysed in Silva (1985). The author surveys several education systems and relates them to the labour demand. São Pedro and Baptista (1992) also study the role of education as an accumulation of human capital and discuss the impact of education on labour productivity. The private sector and the public administration sector are analysed separately.

This chapter is organised as follows. Section 2 introduces the estimation procedures that can be found in the research papers reviewed. The third section describes the several data sets used. The estimation results are analysed in the fourth part of this chapter. Finally, some concluding comments are made.

2 Estimation procedures

The basic procedure to estimate wage functions is the ordinary least squares (OLS) technique. Some of the studies extend this estimation procedure due to the different issues that are analysed therein. The objective of this section is to point out these main extensions. The fourth section, where the results are discussed, gives more information about these procedures. Table A1 in the Appendix lists the variables used in the estimation of wage equations in each of the studies reviewed.

The estimation procedure in Cardoso (1998) consists of the implementation of a multilevel regression model that allows the presence of employer-specific characteristics. This model accounts for the different wage policies followed by each firm, that is, the rewards of each of the workers' human capital components. The data used matches the employer with the employee.

Hartog et al. (1998) and Machado and Mata (1998) make use of quantile regression techniques, a breakthrough from the OLS estimation.

Kiker and Santos (1991), Santos (1995), Vieira (1992), and Vieira and Pereira (1993) use a two-step estimation procedure to address the impact of job qualification (occupation) on wages.

Lima et al. (1996), Marques (1993), Marques and Pereira (1995a,b), Martins (1996) and Pereira and Lima (1996) use estimation procedures to correct for the selection bias that arises when the wage is only observable for those individuals that work, as is the case of women, whose participation rate in the labour market is far less than one.

The wage variable is classified by categories in Lima et al. (1996) and Pereira and Lima (1996). The problem is solved by the use of an algorithm instead of the OLS.

In Marques (1993) and Marques and Pereira (1995a) a human capital wage function is estimated at 20 and 40 hours of work in order to compute an after-tax wage. Marques and Pereira (1995b) extend these results in order to include the estimation of a labour supply function. Several estimation methods are implemented and discussed.

3 Data sets

The data sets are all cross-sectional. In Portugal there is a scarcity of data available for research, and although some studies use more than one year of data, it is impossible to track the individuals from one year to another. Table A2 in the Appendix shows the sample sizes by gender, survey year and the source data set.

The survey, *Quadros de Pessoal* (QP), that the Ministry of Employment annually collects from the Portuguese firms is the data

source used in several studies. These surveys include the data collected in questionnaires that are sent to Portuguese firms every year. Every firm with more than five employees (one employee after 1994) gives information about the workers' personal characteristics and a firm characterisation. The firm is required by law to respond to the survey.

The data set studied in Lima et al. (1996) and Pereira and Lima (1996) comes from a survey ordered by the *Direcção-Geral da Família* (DGF), in 1994. The total sample comprises 706 couples with at least one child under 18 years of age living at home, and is fully analysed in Mendes et al. (1995). It is a sample broken down by region and populational dimension by place, and obtained by direct interview in the residence of the individuals. At least one of the couple members is between 25 and 54 years of age.

In Marques and Pereira (1995a,b) and Marques (1993) the data set is *Inquéritos aos Dados do Emprego* (IE), 1990, third quarter, from the Portuguese national institute of statistics (*Instituto Nacional de Estatística*). In the sample used, only married women whose husbands participate in the labour market are considered. The same type of data set is used by Martins (1996) but for 1991.

São Pedro and Baptista (1992) use two sets of data. One of the sets is for public servants from a survey conducted by the *Direcção Geral da Administração Pública* (DGAP) in 1988. The other is for workers in the private sector from two surveys, both conducted in 1988: *Quadros de Pessoal* mentioned above and *Inquéritos Anuais às Empresas* (IAE) from the Portuguese national institute of statistics.

4 Estimation results

The main estimation results of the research are discussed in this section. The findings related to the estimation of wage equations are numerous as a result of the extended set of explanatory variables.

The dependent variable in the estimations of the wage equation is the logarithm of the individual's wage – in most studies defined as the gross monthly wage. The individual receives this wage from his/her supply of hours to the labour market. The results presented in the following tables show the estimated coefficients of these

wage equations; that is, the marginal increase in wages, in per cent, caused by an increase in the corresponding variable: education, experience, tenure or age.

The variable pertaining to education refers to attendance in formal schooling. Experience refers to the years of labour market experience in general (or otherwise specified) and tenure refers to the years of experience in the current firm. These variables can be considered as proxies of the individual's endowments of human capital.

4.1 Education, experience, tenure and age

The estimated coefficients associated with education, total working experience and tenure can be considered as being fairly robust, as demonstrated by their values in Tables 1, 2 and 3, respectively. Notice that the origin of the data that generated the results of the estimation is diverse and that the estimation procedure implemented is not always the same. Nevertheless, some issues must be noted.

The results from Vieira (1992) are for the Azores, and one should thus presume a different labour market setting.

The definition of the experience variable is not uniform across the several wage equations estimated. In Pereira and Lima (1996) the variable measures the total working years that the individual reported in the survey. In all of the other studies the lack of this variable in the data sets led to the construction of a variable defined as the individual's age minus six (years) minus years of education, and, in Kiker and Santos (1991), Santos (1995) and Silva (1985), minus years of tenure. Pereira and Lima (1996) include the individual's age as an independent variable in the wage equation because that variable captures additional information given that the individual's experience is directly observed. In Tables 2 and 4, the lower coefficients associated with men's experience, when compared with the values obtained in other studies, can be highlighted with the coefficients associated with men's age.

When the wage equation is extended to include variables such as firm size, the individual's occupational level inside the firm, and sec-

tor of activity, the coefficients associated with years of education are lower and fall into the range [3.5% – 6.5%]. This fact can explain the lower coefficients found in Vieira et al. (1997), where the wage equation includes firm size, firm age and firm ownership in the set of explanatory variables. The specification of the wage equation considered in Tables 1–4 is what could be labelled as basic, given that it includes only the variables related to the individual's human capital characteristics, and the major exception is the study just mentioned.

In Martins (1996) the interaction term between experience and education included as an independent variable can explain the higher coefficients found in that paper.

The estimated coefficients from São Pedro and Baptista (1992) in Tables 1 and 2 are for workers in the private sector. When the data set with public servants is used, the coefficients are 5.7, 3.4, and -0.04, respectively.

Note that some of the studies mentioned in the introduction do not appear in Tables 1–4: Lima et al. (1996), Marques (1993), Marques and Pereira (1995b), and Vieira and Pereira (1993). That

Table 1. Wage equation: Years of Education

	Year	Education (%)		
		Female	Male	All
Martins (1991)	1977	8.0	7.3	-
Psacharopoulos (1981)	1977	8.4	7.5	9.1
Machado and Mata (1998)	1982	-	-	7.1
Vieira et al. (1997)	1982	-	-	6.2
Silva (1985)	1983	9.1	8.9	9.1
Kiker and Santos (1991)	1985	10.4	9.4	10.0
Santos (1995)	1985	9.6	9.0	9.5
Vieira et al. (1997)	1986	-	-	5.9
São Pedro and Baptista (1992)	1988	-	-	8.3
Hartog et al. (1995)	1989	-	7.0	-
Vieira (1992)	1989	8.9	10.8	9.6
Marques and Pereira (1995a)	1990	11.1	-	-
Martins (1996)*	1991	14.0	-	-
Vieira et al. (1997)	1992	-	-	7.2
Machado and Mata (1998)	1994	-	-	7.7

Note: * The equation includes an interaction term between education and experience with an estimate equal to -0.24.

Table 2. Wage equation: Years of Experience

	Year	Experience (%)			Experience Squared (%)		
		Female	Male	All	Female	Male	All
Martins (1991)	1977	3.3	5.4	-	-0.04	-0.1	-
Psacharopoulos (1981)	1977	-	-	5.1	-	-	-0.07
Machado and Mata (1998)	1982	-	-	4.4	-	-	-0.06
Vieira et al. (1997)	1982	-	-	4.2	-	-	-0.1
Silva (1985)	1983	3.0	3.6	3.7	-0.06	-0.07	-0.07
Kiker and Santos (1991)	1985	2.4	2.5	2.9	-0.04	-0.04	-0.05
Santos (1995)	1985	2.3	2.4	2.9	-0.04	-0.04	-0.05
Vieira et al. (1997)	1986	-	-	3.9	-	-	-0.09
São Pedro and Baptista (1992)	1988	-	-	4.8	-	-	-0.06
Vieira (1992)	1989	3.2	5.1	4.5	-0.05	-0.08	-0.07
Marques and Pereira (1995a)	1990	3.0	-	-	-0.03	-	-
Martins (1996)*	1991	5.4	-	-	-0.06	-	-
Vieira et al. (1997)	1992	-	-	3.4	-	-	-0.07
Pereira and Lima (1996)	1994	3.4	1.7	-	-0.08	-0.04	-
Machado and Mata (1998)	1994	-	-	3.0	-	-	-0.04

Notes: Years of experience are defined as the individual's age minus six (years) minus years of education, and, in Kiker and Santos (1991), Santos (1995), and Silva (1985), minus years of tenure.

* The equation includes an interaction term between education and experience with an estimate equal to -0.24.

Table 3. Wage equation: Years of Tenure

	Year	Tenure (%)			Tenure Squared (%)		
		Female	Male	All	Female	Male	All
Psacharopoulos (1981)	1977	3.5	3.1	-	-0.06	-0.05	-
Machado and Mata (1998)	1982	-	-	1.0	-	-	-0.01
Vieira et al. (1997)	1982	-	-	0.7	-	-	-0.04
Silva (1985)	1983	5.4	5.5	5.2	-0.10	-0.10	-0.10
Kiker and Santos (1991)	1985	3.3	3.7	3.5	-0.04	-0.05	-0.04
Santos (1995)	1985	3.4	3.7	3.6	-0.10	-0.10	-0.04
Vieira et al. (1997)	1986	-	-	0.8	-	-	-0.07
Hartog et al. (1995)	1989	-	1.0	-	-	-	-
Vieira (1992)	1989	1.4	1.1	1.9	-	-	-
Vieira et al. (1997)	1992	-	-	0.8	-	-	-0.08
Machado and Mata (1998)	1994	-	-	1.2	-	-	-0.02

Table 4. Wage equation: Age

	Year	Age (%)			Age Squared (%)		
		Female	Male	All	Female	Male	All
Hartog et al. (1995)**	1989	-	7.2	-	-	-0.08	
Pereira and Lima (1996)	1994	2.8*	4.6	-	-0.03*	-0.04	-

Notes: * Coefficient not significant at any reasonable level.
** The equation does not include experience.

is because they have roughly the same results as those reported by, respectively, Pereira and Lima (1996), Marques and Pereira (1995a), and Vieira (1992).

The signs of the coefficients in Tables 1–4 are as expected. Education has a positive effect. The influence of the variables mentioned in Tables 2–3 is a quadratic one, indicating diminishing returns to on-the-job training.

It is relatively hard to draw conclusions about the *difference by gender* in the coefficients. Kiker and Santos (1991), Martins (1991), Vieira (1992) and Vieira and Pereira (1993) study wage differentials by gender in relation to the wage equation. The results indicate that the price effect explains a higher proportion of the wage differential. A possible interpretation can be the existence of discrimination against women in the Portuguese labour market. The analysis carried out in Martins (1991) is somewhat different but the results indicate that the differential is due to different returns to experience and not to different returns to education for the year 1977. Additionally Machado and Mata (1998) found that women earn less than men do over the whole wage distribution and that these wage differentials are higher in better paid jobs.

When the wage estimation uses *education levels* instead of education years the results are difficult to compare due to different level definitions and equation specifications. Some consistencies can be found, however, such as: one more level completed leads to a wage increase; the higher wage increase is associated with the attendance at technical (baccalaureate, 3 years in the university) and university levels (5 years in the university); and during the 1980s and early 90s, the wage premium increased, especially in the case of those with higher levels of education, while individuals with

fewer years of education saw a tendency towards lower wage premiums.

The results in the above tables are ranked by survey year. There is no clear trend on the human capital rewards, which reveals the need for more research on this issue.

The *wage distribution* is a closely related topic. Hartog et al. (1998) and Machado and Mata (1998) estimate the wage equation at specific points of the wage distribution, namely the points that define the deciles of the distribution. This mode of estimation, the quantile regression, is richer and allows assessing the impact of the covariates at these specific points. Instead of getting one coefficient for each covariate, as shown in Tables 1–4, both studies produce a range of coefficients for each covariate. The range of coefficient values clearly demonstrates that an ordinary least squares estimation masks the differences in the returns to education: workers in the higher quantiles of the wage distribution have higher returns.

The estimation performed in Cardoso (1998) reveals that *wage inequality* has risen from 1983 to 1992. The change in the employers' wage policies leads to this result. That is, the worker's attributes, namely schooling, tenure, gender and newly-hired, were rewarded in a more inequalizing way.

4.2 Undereducation and overeducation

Kiker et al. (1997), Santos (1995) and Kiker and Santos (1991) include variables in the wage estimation that capture the individual's undereducation and overeducation. Santos (1995) provides several over(under)education indicies and performs alternative wage estimation with them. The same line of research is pursued and extended in Kiker et al. (1997). These variables are related to the matching between the individual's education and the skills requirement of his/her job. The results are as follows: an individual with an overeducation earns less than if he/she was adequately assigned with respect to his/her educational skills; an overeducated individual earns more than individuals assigned to the same job but with the required level of education; the reverse is true for the undereducated workers.

Hartog et al. (1998) use quantile regressions to address the problem of mismatch between the required level of education and the level of education acquired by the worker. The results confirm the ones mentioned above. In addition, one can assess how the coefficients change along the wage distribution. The difference between the rewards of the overeducated and the penalties of the undereducated increase from the lower to the higher quantiles.

4.3 Sample selection bias

The fact that only wages for those individuals that participate in the labour market are observable leads to a sample selection bias in the wage estimation. This bias is more pronounced when the participation probability is far less than one, as is the case for women. As a result, a measure of this selection bias, the so-called inverse Mills' ratio or hazard rate, should be included in the right-hand side of the wage regression. The studies by Lima et al. (1996), Lima and Pereira (1996), Marques (1993), Marques and Pereira (1995a,b) and Martins (1996) are the ones that include this variable in order to correct for sample selection bias in female wages. The other studies do not use selection bias corrected regression because the data sets contain only individuals who supply a positive amount of hours to the labour market. Nevertheless, the first mentioned studies are not conclusive: for example, Pereira and Lima (1996) and Marques and Pereira (1995b) both find positive coefficients, but in the former study the coefficient is not statistically significant while in the latter, it is.

4.4 Other variables

The wage equations are usually extended to include other factors that cannot be labelled as components of the individual's stock of human capital. Nevertheless, they are instruments for the behaviour of firms, among other things, and so add information about how the pay policies can vary. The comparison of basic human capital regressions with those that include this type of variables shows also that the estimated coefficients associated with the human capital variables are in some cases sensitive to this inclusion. As a result the following variables are discussed: job qualification, region, firm size, firm age, and hours of work.

Job qualification

In the surveys from the Ministry of Employment there is a classification of occupations (jobs) according to the task performed and the skills required. From this classification a measure of the job complexity and responsibility is constructed, that is, the job qualification (level). Each job level could be considered as a layer in a hierarchy defined in terms of increasing responsibility and task complexity. It is a variable defined at a point scale where each point corresponds to a job level, as in Kiker and Santos (1991). It is also defined as a set of dummies, each dummy being related to a job level. This last definition appears in all of the other studies that use job qualification (see Table A1 in the Appendix). There are three sets of results from these studies: the coefficients associated with the variable job level included in the wage equation; the coefficients associated with several variables affecting the allocation probabilities across job-level equations; and the coefficients of specific wage equations, one for each job level and corrected for selectivity bias. The results are described below.

Firstly, when the individual moves to a higher job level, he/she receives a higher wage. Secondly, years of education have a positive effect on the individual's probability of being allocated to a higher job level. Experience and tenure have a weaker positive effect, although a conclusive statement is harder to assert. Finally, the coefficients associated with years of education, experience and tenure are positive in all of the level-specific wage equations. In nearly all cases, the move to a wage equation that corresponds to a higher job level increases the coefficients. This is especially true concerning years of education.

The individual's wage is only observed given his/her job assignment. This selectivity can give rise to a problem of inconsistent least squares estimates. The variable that corrects for this selectivity bias has an associated coefficient that, in most cases, is not statistically significant. This means that the individual's probability of being allocated to a specific job level is not correlated with the error term of the wage equation for that level.

Region

Dummy variables for the different Portuguese regions are found in Kiker and Santos (1991), Santos (1995), and Vieira et al. (1997).

The principal conclusions that can be drawn from the associated coefficients are: in Lisbon wages are higher than in the other regions of Portugal; the North and Centre of Portugal have the lowest wages, especially in the 1990s when compared with the mid-80s; in the South (the regions of Alentejo and Algarve) there is an intermediate situation.

Kiker and Santos (1990) run one equation on each Portuguese region and find different coefficients for the same variable set leading to an interpretation that there is a regional imbalance.

Firm size

Firm size is defined in relation to the number of employees in each firm. The coefficients of the dummies that characterise firm size and that are included in the wage estimations all point in one direction: the larger the firm is, the higher are the individuals' wages. Vieira et al. (1997) and Hartog et al. (1995) use the logarithm of firm size and arrive at the same result. In Vieira et al. (1997), the logarithm of *firm age* is also included. The associated coefficient is negative.

Hours of work

Hours of work is a variable used in the studies referred to in Table A1 of the Appendix. The variable is defined as the logarithm of working hours. The estimated coefficients associated with this variable are positive and less than one. The only exceptions are the studies by Vieira (1992) and Vieira and Pereira (1993), where the coefficient is negative in the female wage equation. Note that this result is for the Azores islands.

5 Conclusion

The estimation results of the applied research on Portuguese wages are robust. The reviewed studies use different estimation settings. The data sets, equation specifications and estimation procedures differ, but some important results for the labour market in Portugal are achieved nevertheless. If the findings are the same in the various studies, then one can be more confident that they are a true approximation of the real picture.

Years of education, experience, tenure, age, firm size and job qualification are all variables with a positive influence on the individual's wage. The region where the individual lives has a precise influence: wages increase if the worker lives in Lisbon and decrease if he/she lives in the North or Centre of Portugal, other things being equal. The squares of experience, tenure and age have a negative impact on wages. The different rewards for the individual's attributes are more important in explaining higher male wages than are the individual's different endowments of attributes.

The specific pay policies of the employers are one of the explanations for the rise in wage inequality. The studies on the wage structure also point to the existence of different pay policies along the wage distribution. Workers with higher wages have higher returns to education.

These results are an encouragement to do future research. A comparison with other countries shows the need to pursue the study of the Portuguese labour market.

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Appendix

The following table presents all of the variables used in the reviewed studies. It does not mean that they were all included in the same equation at the same time.

Table A1. Wage function: variables included

	Cardoso (1998)	Hartog et al. (1998)	Hartog et al. (1995)	Kiker et al. (1997)	Kiker and Santos (1991), Santos (1995)	Lima et al. (1996), Pereira and Lima (1996)	Machado and Mata (1998)
Age			×			×	
Age squared			×			×	
Years of Education	×	×	×	×	×		×
Levels of Education			×			×	
Experience	×	×		×	×	×	×
Experience squared		×		×	×	×	×
Tenure	×	×	×	×	×		×
Tenure Squared		×		×	×		×
Job Qualification					×		
Log Working Hours		×		×	×		
Sector Public/ Private				×	×		×
Firm Size		×	×	×	×		×
Region		×		×	×	×	
Sector of Activity/ Industry		×	×	×	×		
Other	×	×	×	×	×	×	×
Select. Bias Correction					×*	×**	

Notes: * job level allocation (analysis not made by Kiker and Santos, 1991)
**** labour market participation

Table A1. (continued)

	Marques (1993), Marques and Pereira (1995a,b), Martins (1996)	Martins (1991)	Psacharo-poulos (1981)	São Pedro and Baptista (1992)	Silva (1985)	Vieira (1992), Vieira and Pereira (1993)	Vieira et al. (1997)
Age					×		
Age squared					×		
Years of Education	×	×	×	×	×	×	×
Levels of Education			×	×	×	×	×
Experience	×	×	×	×	×	×	×
Experience squared	×	×	×	×	×	×	×
Tenure			×		×	×	×
Tenure Squared			×		×	×	
Job Qualification						×	×
Log Working Hours			×	×	×		×
Sector Public/ Private							×
Firm Size						×	×
Region							×
Sector of Activity/ Industry							×
Other	×	×					×
Select. Bias Correction	×**					×*	×*

Notes: * job level allocation
** labour market participation

Table A2. Sample size

	Data set	Year	Female	Male	Total
Cardoso (1998)	QP	1983	-	-	26 480
		1992	-	-	36 313
Hartog et al. (1995)	QP	1989	-	7 891	7 891
Kiker et al. (1997)	QP	1991	11 130	19 206	30 336
Kiker and Santos (1991)	QP	1985	10 346	21 823	32 169
Santos (1995)	QP	1985	10 116	21 742	31 858
		1991	11 130	19 206	30 336
Lima et al. (1996)	DGF	1994	480	-	480
Pereira and Lima (1996)	DGF	1994	431	431	862
Machado and Mata (1998)	QP	1982	-	-	4690
		1994	-	-	4974
Marques (1993)	IE	1990	2 322	-	2 322
Marques and Pereira (1995a,b)	IE	1990	2 322	-	2 322
Martins (1991)[a]	QP	1977	308	392	700
Martins (1996)	IE	1991	2 100	-	2 100
Psacharopoulos (1981)	QP	1977	8 756	39 454	42 347
Silva (1985)	QP	1983	85 445	202 988	288 433
São Pedro and Baptista (1992)[b]	QP and IAE	1988	-	-	844 694
	DGAP	1988	-	-	226 891
Vieira (1992)[c]	QP	1989	1 900	2 094	3 994
Vieira and Pereira (1993)[c]	QP	1989	1 900	2 094	3 994
Vieira et al. (1996)	QP	1982	-	-	57 737
		1986	-	-	55 175
		1992	-	-	54 307

Notes: [a] Uses mean values of individual observations.

[b] First row, private sector and second row, public administration.

[c] Data only for the Azores.

DGAP - Direcção Geral da Administração Pública; DGF - Direcção Geral da Família; IAE - Inquéritos Anuais às Empresas; IE - Inquéritos aos Dados do Emprego; QP - Quadros de pessoal.