WAGE AND PRICE DYNAMICS IN PORTUGAL AN INTEGRATED APPROACH USING QUALITATIVE DATA*

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1. INTRODUCTION

A correct definition of economic policies in general and monetary policy in particular requires a deeper understanding of the characteristics and determining factors underlying wage dynamics. When the exchange rate is no longer available to bring about adjustments, wage flexibility becomes a fundamental requirement for ensuring an adequate adjustment to shocks, whether symmetrical or asymmetrical, within a monetary union. Indeed, even though a number of reforms in labour markets have been put into place in various euro area countries, there are striking differences remaining in collective bargaining procedures and other labour market institutions (Du Caju *et al.*, 2008). In addition, wages are also an important determinant of firms' prices. Recent microeconomic research, both qualitative and quantitative, suggests that those sectors with a higher labour cost share, such as services, typically show a greater rigidity in prices (Fabiani *et al.*, 2006 and 2007, Altissimo *et al.*, 2006, Alvarez *et al.*, 2006). Against this background, the Eurosystem set up in 2006 a research network entitled Wage Dynamics Network (WDN) aiming at study more in depth the features and sources of wage and labour cost dynamics in the euro area and their implications for monetary policy.[1] One of the lines of research of this network consisted in analysing data from surveys among firms relating to their price and wage setting behaviour. It is within this context that this article details the findings of a survey carried out by the Banco de Portugal in the first half of 2008 within the scope of its participation in the WDN.

One of the main advantages of using surveys is their flexibility. There is the possibility of questioning firms directly on a number of points relating to the way they set prices or wages, such as the main obstacles to freezing or cutting wages, the most important factors determining wages or the ways they react to significant changes either in demand or in production costs. This type of information, for instance, cannot be obtained from large administrative databases such as the Ministry for Labour and Social Solidarity Personnel Database (*Quadros de Pessoal* - QP) or the Social Security Wage Data-

* This article was developed within the context of the Wage Dynamics Network (WDN). This is a Eurosystem research network, bringing together researchers from the European Central Bank and the 24 national central banks of the countries that make up the European Union. The aim is to analyse the characteristics and crucial elements in how wage dynamics work in the euro area and look into the implications for monetary policy. Several members of the Banco de Portugal staff represent the Bank in the network along with the author. They are Cláudia Duarte, Carlos Robalo Marques, Álvaro Novo and Pedro Portugal. The author received many comments and suggestions and would like to thank his colleagues at the Research department - Nuno Alves, Mário Centeno, Ana Cristina Leal, Carlos Robalo Marques, Pedro Portugal and Carlos Santos - along with other participants in the WDN. Special thanks are due to Vasco Gonçalves and Daniela Miranda of the Universidade Lusíada de Lisboa for their excellent contribution, both in the analysis of databases and in their work with the companies involved. Thanks are also due to Fátima Teodoro, Pedro Prospero Luís and Maria Lucena Vieira for their IT input at various stages of the project. And last but not least, thanks to all the firms that took part. Without their collaboration, this study would not have been possible. The opinions expressed in this article are the sole responsibility of the author and do not necessarily reflect the position of the Banco de Portugal or the Eurosystem.

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(1) More detailed information on the aims of the WDN can be found on the European Central Bank website at http://www.ecb.int/home/html/researcher_wdn.en.html. The work presented in the conference that was held on 24 and 25 June 2008 with the main results of the WDN can be found on http://www.ecb.int/events/conferences/html/wage_dynamics_network.en.html.

base (*Base de Dados do Registo de Remunerações da Segurança Social* - BDRR).[2] Quite clearly, surveys that are not conducted directly with the firms may well throw up a number of problems. These relate both to the low response rate normally obtained and to the possibility of ill-judged interpretation of the questions raised. Apart from this, the responses may be coloured by other factors, such as the way questions are formulated or the economic outlook in which they occur. As a final point, this kind of survey is not based on regular revisits, and this makes it impossible to create time series that allow for an assessment of how the variables being analysed change over time.

This article is structured in the following way. Section 2 describes some of the institutional characteristics of the labour market that is being reviewed. The analysis is based on information from the survey, and includes such things as the importance of collective contracts or the relative importance of the so-called wage cushion in Portugal. There is also a comparison between the architecture of the wage bargaining process in Portugal and the rest of Europe. Section 3 presents some stylised facts about the dynamics of prices and wages in Portugal, as well as the link between the two. Section 4 looks at the evidence on wage rigidity (real and nominal) and describes some of adjustment strategies used by firms as an alternative to changes in base wages. Section 5 looks at the reaction of firms to different types of shocks. Finally, section 6 sets out the main stylised facts that have been identified. Annex 1 details the process of sample selection, the questionnaire and the way the survey was conducted.

2. SOME ASPECTS OF THE INSTITUTIONAL ARCHITECTURE OF WAGE BARGAINING IN PORTUGAL

The institutional framework of wage bargaining plays an important role in determining the dynamics of wages and, in general, of the labour market itself. Druant *et al.* (2008) show that labour market institutions influence the frequency and timing of wage changes, while Messina *et al.* (2008), Babecký *et al.* (2008) and Dickens *et al.* (2007) show that the institutional framework is also an important determinant of downward wage rigidity. In addition, institutions seem to influence the reaction of firms to shocks, as suggested by Bertola *et al.* (2008), as well as the degree to which firms use available adjustment policies to reduce labour costs. This is documented in Babecký *et al.* (2008). There is in fact a vast body of literature that looks at the impact of the institutional frameworks where decisions are taken on wages as a result of the wage bargaining process (including decisions on wage levels, wage dispersion and rigidity).[3]

(2) The Ministry for Labour and Social Solidarity Personnel Database are collected annually by the Strategy and Planning Department of the Ministry of Labour and Social Solidarity from all Portuguese companies. The data is therefore tantamount to a census and is an extremely important source of information for a microeconomic analysis of the labour market in Portugal, making it possible to undertake longitudinal analysis of firms and employees. Another very useful source is the Social Security Wage Database. The information is collected on a monthly basis and is permanently updated. It provides important data for an assessment of short-term movements in the labour market.

(3) For a summary of the recent literature on the subject, see Freeman (2007).

In spite of the importance given to the role of institutional wages, the information available from international sources is rather scarce.[4] The survey that was produced provides information on a range of institutional characteristics that may influence wage decisions in Portugal, among them the degree of centralised decision-making, collective contract coverage or the relative importance of contracted wages. The main conclusions relating to wage institutions in Portugal are summed up below.

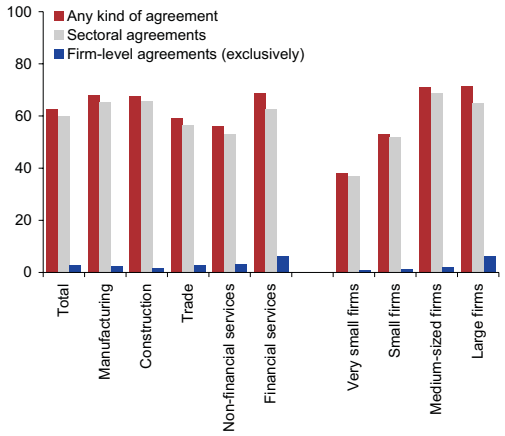
The wages of most workers, above all those in larger firms, are determined by in the context of collective agreements at the sectoral level. In around 60 per cent of firms wages are set through agreements of this nature, although in only 30 per cent of the cases are the firms directly involved in the negotiations (Chart 1).[5] Furthermore, 9.7 per cent of the firms apply firm-level wage agreements: in 6.9 per cent firm-level and sectoral agreements coexist, whereas in 2.8 per cent firm-level agreements are exclusive. As might be expected, collective wage agreements are more important in larger firms.[6] There is little difference between the sectors analysed.

The share of workers covered by collective agreements (either sectoral or firm-level) is significant, and it is considerably higher than the estimates for the union density. This phenomenon is frequently explained by a simple fact: although in legal terms the agreements are only binding for unionised workers and firms affiliated to employers associations, the collective agreement is typically extended to all the workers and firms in a specific sector. This can be done on a voluntary basis, or through extension procedures issued by Ministry for Labour and Social Solidarity. According to the Employment Outlook of

Chart 1

FIRMS WITH WAGES SET UNDER COLLECTIVE WAGE AGREEMENTS

As a share of all surveyed firms; unweighted results



Source: Survey on wage setting in Portugal (2008).

(4) The OECD has probably the most comprehensive database in this field. It provides quantitative information on an array of developed countries relating to the percentage of cover through collective contracts, unionisation rates, the importance of minimum wages and the degree of coordination and decentralisation of decisions (see, for example, Elmeskov *et al.*, 1998)

(5) Unless otherwise stated, all the results shown are weighted in terms of the relative size of each firm measured on the basis of the number of workers. Blank replies were excluded.

(6) In the context of the analysis firms were split according to their size into the following categories: i) very small firms (between 10 and 19 workers); ii) small firms (between 20 and 49 workers); iii) medium-sized firms (between 50 and 199 workers); and iv) large firms (more than 199 workers).

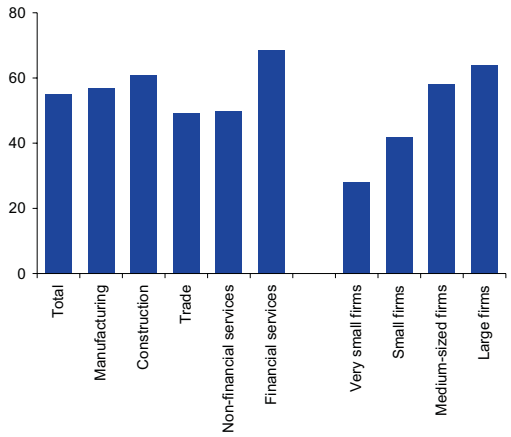
the OECD, in 2004, union density in Portugal in 2000 stood at 24 per cent (compared with 61 per cent in 1980 and 32 per cent in 1990). More recent data, from the International Social Survey Programme, published in the Labour Relations White Book, point to a 17 per cent rate in 2007. These figures are considerably lower than the average percentage of workers covered by collective agreements as found in our survey (Chart 2). The level of coverage is particularly high in the financial services and tends to increase with the size of the firms.

It is worth noting, however, that the wage scale agreed in the context of collective wage agreements is taken in many cases merely as a reference. Indeed, a significant number of firms pay wages above those agreed under collective wage agreements (Chart 3). The difference between effective wages and contracted wages, the so-called wage cushion (Portugal, P., 2006), is particularly high in financial services.[7] Cardoso and Portugal (2005) estimate that the effective wages in 1999 exceed contracted wages in amount that varies between 20 and 50 per cent. The figure obtained in the survey is 25 per cent. From the point of view of the firms, the way this cushion is handled makes it a strategic buffer against adverse shocks, in particular in a context where downward nominal wage rigidity turns out to be an active constraint.

Chart 2

SHARE OF WORKERS COVERED BY COLLECTIVE WAGE AGREEMENTS

As a percentage of total workers in the sample

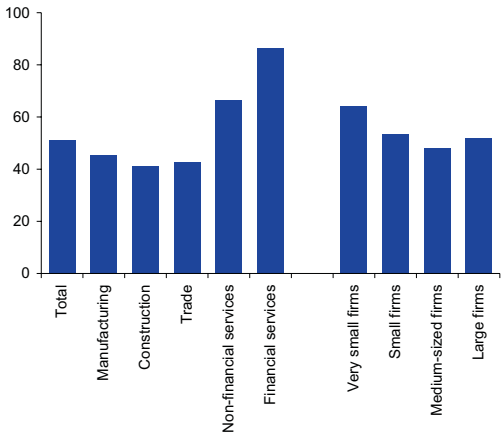


Source: Survey on wage setting in Portugal (2008).

Chart 3

SHARE OF WORKERS WITH BASE WAGES ABOVE THE WAGE SCALE

As a percentage of workers with wages set under collective wage agreements



Source: Survey on wage setting in Portugal (2008).

3. THE BEHAVIOUR OF PRICES AND WAGES: DURATION AND INTERACTION

As mentioned before, one of the most robust facts coming out of recent microeconomic evidence points to the fact that those sectors with higher labour cost shares tend to show a higher degree of price rigidity. This in turn is frequently suggested as sign of greater wage rigidity. Business services – a

(7) Financial services include the banking sector and the insurance companies.

sector where the labour cost share is typically high – are often cited as an example where the degree of price flexibility is strongly affected by wage rigidity.

The findings from our survey seem to be consistent with this conclusion. An analysis of price frequency shows that around 70 per cent of firms do not change prices more than once a year; with percentage being particularly high in the case of non-financial services (Chart 4).

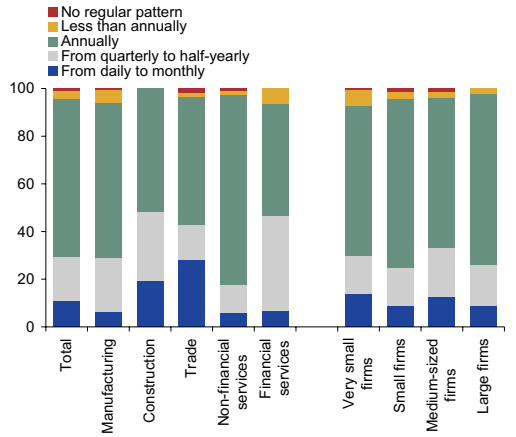
Moreover, in non-financial services, unlike other sectors, there is a predominance of time-dependent rules. Here, price revisions are typically carried out at specific moments of the year and, unlike state-dependent price setting rules, they do not depend on current economic conditions (Chart 5). In the presence of shocks, time-dependent rules typically lead to greater price rigidity. Another way of assessing price rigidity, alternative to the more common approach based on frequency analysis, is to find out directly from the firms what is speed of price reactions to significant changes in costs or demand. In line with previous evidence, Chart 6 points to greater rigidity in non-financial services, with firms here taking on average between 8.1 and 9.3 months to adjust their prices, depending on the type of shock. This analysis excludes those firms that apply time-dependent pricing rules strictly which account for about 25 percent of the total sample. The findings also show that firms appear to react more quickly to positive shocks on the cost side and negative shocks on the demand side.

As a complement to this evidence, the survey looked into the link between the frequency of price changes and the frequency of wage changes. The aim was, in particular, to get answers to the following questions: i) how does the frequency of price changes compares with the frequency of wage changes? ii) is there any synchronisation between changes in prices and changes in wages? and iii) are there significant differences across sectors regarding the frequency and timing of wage and price changes and their relationship?

Chart 4

FREQUENCY OF PRICE CHANGES

As a share of surveyed firms;
unweighted results

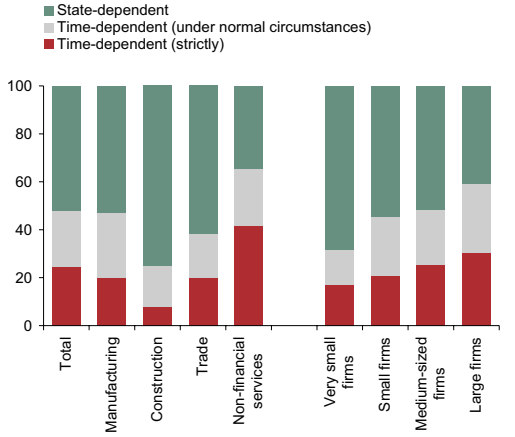


Source: Survey on wage setting in Portugal (2008).

Chart 5

PRICE-SETTING RULES: TIME-DEPENDENT VS. STATE-DEPENDENT PRICE SETTING

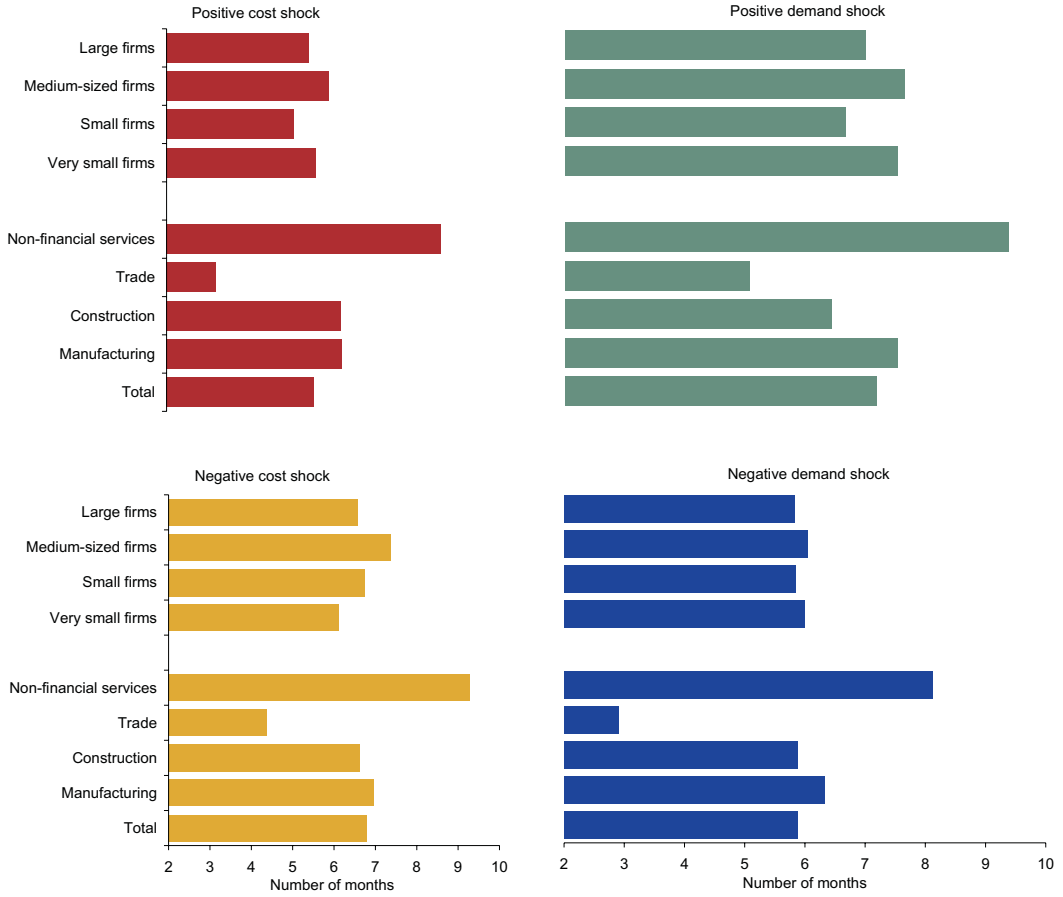
As a share of surveyed firms;
unweighted results



Source: Survey on wage setting in Portugal (2008).

Chart 6

SPEED OF PRICE REACTION TO DEMAND AND COST SHOCKS
Excluding firms that apply time-dependent pricing rules strictly



Source: Survey on wage setting in Portugal (2008).

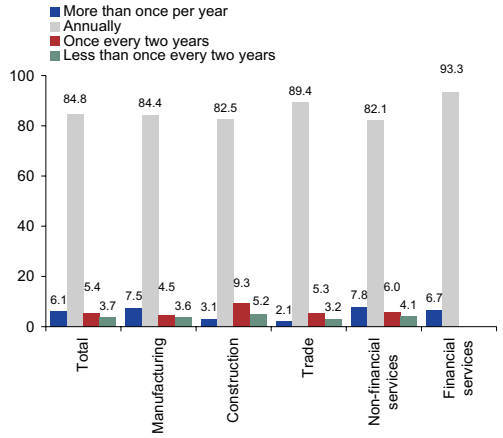
The approach used in the analysis of price change frequency was different from the procedure for wage change frequency. In terms of prices, the firms were asked directly about the frequency of change, while for wages the frequency of change was analysed through three different questions: the changes stemming from moves in inflation, changes deriving from tenure and those related to other factors. One composite variable was calculated for the three motivations, defined as the highest frequency of wage changes for each firm, irrespective of the specific determining factor. Results show that the wages of most workers (85 percent) are changed only once per year (Chart 7)

In order to simplify the comparison, a proxy for the average duration of wage and price spells was computed by simply multiplying each point category by its respective frequency. For those categories expressed though intervals the mid-point was assumed. Table 1 shows that prices in financial services, construction and trade have short durations when compared to manufacturing and other non-financial services. However, the results obtained for the financial sector should be interpreted with some caution, not only because the concept of reference in this sector may not be absolutely clear, but also be-

Chart 7

FREQUENCY OF WAGE CHANGES

Percentage of workers



Source: Survey on wage setting in Portugal (2008).

Table 1

AVERAGE DURATION OF PRICE AND WAGE SPELLS

In months

	Prices	Wages
Total	10.3	12.8
Manufacturing	10.1	12.6
Construction	7.4	13.7
Trade	8.4	12.5
Non-financial services	11.4	13.2
Financial services	6.8	12.1
Very small firms	9.6	14.6
Small firms	10.0	14.3
Medium-sized firms	9.4	13.8
Large firms	10.5	12.5
Memo:		
Euro area	9.6	14.7

Sources: Druant *et al.* (2008) and Survey on wage setting in Portugal (2008).

cause the questionnaire was filled in during a period of turmoil in the international financial markets and this may have coloured in some way the replies from the institutions concerned.[8] When compared with the euro area as a whole, price spells in Portugal are apparently slightly longer.

As expected, the average duration of wage spells is higher than that of price spells (at around 2.5 months), and it also shows a smaller sector variability. When compared with the euro area as a whole, wages remain constant for an average period that is around 2 months shorter. Druant *et al.* (2008) show that the differences between European countries in terms of wage durations are significant, though they are relatively slight in terms of sectors. The opposite is true for prices, where the differences between countries are of only minor significance, but significant in terms of sectors. These results are consistent with the evidence that differences between firms in terms of frequency of price adjustments are determined to a large extent by their degree of competition and their labour cost share, while differences between frequencies of wage changes is to a large extent a reflection of national institutional factors.

Another equally relevant factor in the assessment of firms' flexibility when they face changes in their economic environment is the degree of synchronisation between price changes and wage changes. In order to obtain empirical evidence on this point, firms were asked whether changes to their prices occur without any defined time pattern or if, on the contrary, those changes occur largely in specific months of the year. According to the information obtained, in 37 per cent of firms price changes are

(8) As mentioned in the Annex, the questionnaire that was sent to banks was somewhat different from the base version. The biggest difference was in the section related to price setting. In particular, firms were asked to take as a reference price the interest rate applied to their main credit product, assuming a customer with average risk.

concentrated in specific months of the year, and 64 per cent of these firms adjust their prices in January (Chart 8).

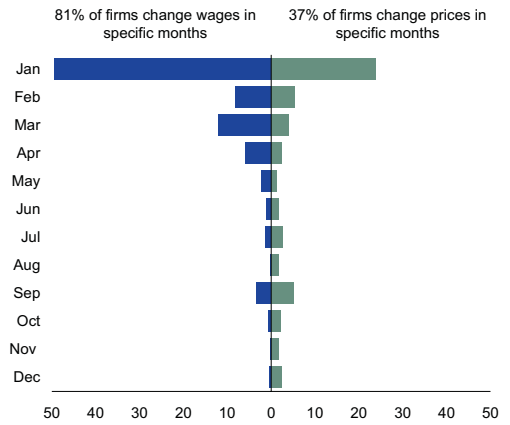
Firms were also asked whether changes to wages occurred in specific months of the year or whether there was no temporal pattern defined. The results show that the degree of concentration of wage changes is considerably higher than that of prices, with 81 per cent of wages changed in specific months of the year. January is the month with the largest number of changes. The fact that most decisions on wages are made in January is probably institutional by nature, both at sectoral level and at firm level, a reflection of collective labour conventions.[9]

Firms were also asked about the possible connection between the timing of their price setting and wage setting decisions. The intensity and direction of this connection is illustrated in Chart 9. The results suggest that there is some degree of synchronisation between the timing of price and wage changes, with around 50 per cent of firms recognising that a link does exist. However, only 20 per cent admit that the link is strong: in 7 per cent the decisions are taken at the same time, in 9 per cent changes in prices are taken only after wages are set, and in 4 per cent changes in wages occur only after prices are set. In contrast, in around half of the firms there does not seem to be any link between the timing of both decisions. However, the lack of synchronisation between the two decisions at the micro level does not necessarily imply that the behaviour of inflation is irrelevant when it comes to setting wages. As mentioned in Section 2, around two-thirds of firms take inflation into consideration when

Chart 8

CONCENTRATION OF WAGE AND PRICE CHANGES

As a share of all surveyed firms with valid responses; unweighted results



Sources: Survey on wage setting in Portugal (2008).
Note: Values computed as a share of all firms with valid responses. The sum of percentages exceed the proportion of firms that change wages or prices in specific months as they could choose more than one month.

(9) The big convergence of changes in wages in specific periods of the year may also have an impact on the way that monetary policy decisions affect the real economy. Olivei and Tenreyro (2008) quote, for example, the case of Japan, where most firms fix their wages between February and May each year (the so-called "Shunto" or great offensive). Results show that a monetary policy shock in the first half of the year – when wages are more flexible – produces less of an impact on economic activity than one towards the end of the year.

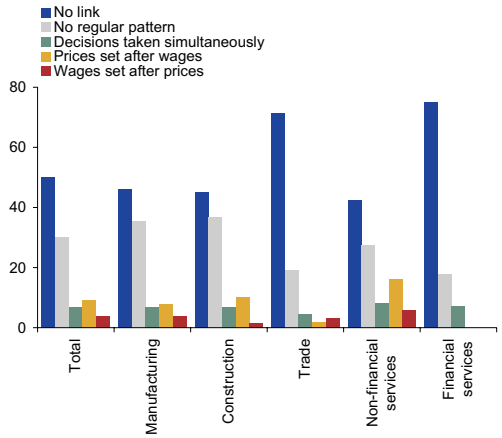
setting their base wages. In addition, survey results show that, among the several factors affecting the frequency of wage changes, inflation is the one triggering most frequent wage adjustments in frequencies greater or equal to one year (Chart 10).

The existence of wage indexation mechanisms is another factor affecting the way price changes are transmitted to wages. The survey includes two questions that are geared to assessing the way the inflation behaviour is reflected in firms' base wages. In the first, firms were asked if the issue of inflation was a consideration when they set their base wages. If yes, they were asked to indicate whether the inflation behaviour is reflected automatically in base wages, for instance through an explicit indexation rule, or if it is used only as a non-formal reference for wage setting. Firms should also indicate if the most relevant inflation for setting base wages is the past or the expected rate. Table 2 shows that the wages of around 65 per cent of workers are set with inflation as a point of reference, though in most cases this is done only informally. This figure is higher than the average for the euro area, though less than in some countries, such as Spain or Belgium. In these, unlike Portugal, the bargaining systems are characterised by strong automatic wage indexation mechanisms (see European Central Bank, 2008, for a summary of the importance of wage indexation in several euro area countries). On the other hand, expected inflation seems to be more relevant in Portugal than past inflation. This goes against the trend in most other countries, where past inflation is of greater importance (Druant *et al.*, 2008).

Chart 9

SYNCHRONISATION BETWEEN PRICE AND WAGE SETTING DECISIONS

As a share of all surveyed firms; unweighted results

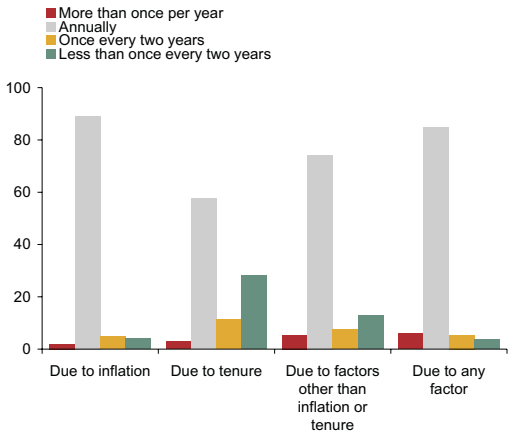


Sources: Survey on wage setting in Portugal (2008).

Chart 10

FREQUENCY OF WAGE CHANGES

As a percentage of total workers in the sample



Source: Survey on wage setting in Portugal (2008).

Table 2

HOW INFLATION BEHAVIOUR IS REFLECTED IN FIRMS' BASE WAGES

As a percentage of total workers in the sample

	Automatically		No formal rule		Total
	Past inflation	Expected inflation	Past inflation	Expected inflation	
Total	1.8	4.8	15.4	42.7	64.6
Manufacturing	3.2	5.9	15.3	44.6	69.1
Construction	1.6	2.7	11.9	31.0	47.2
Trade	0.4	2.0	26.8	43.6	72.9
Non-financial services	1.7	5.9	7.6	39.6	54.8
Financial services	0.0	1.2	37.7	56.5	95.5
Very small firms	2.9	5.9	8.7	20.0	37.5
Small firms	4.2	2.7	10.1	18.6	35.5
Medium-sized firms	2.2	2.0	15.1	29.1	48.4
Large firms	1.6	5.9	15.7	47.7	70.9

Source: Survey on wage setting in Portugal (2008).

4. WAGE RIGIDITY: EVIDENCE OF AND MECHANISMS FOR ALTERNATIVE ADJUSTMENTS

4.1. Survey evidence on downward (real and nominal) base wage rigidity

The concept of nominal wage rigidity is frequently associated with legal or contractual constraints which hinder firms from reducing the wages of their workers[10]. In Portugal, there has been a legislative framework since the 1950s barring firms from reducing wages, which would suggest a high degree of downward nominal wage rigidity in Portugal.

The questionnaire contained two questions with the main aim of assessing the extent to which the possibility of firms reducing their base wages or increasing them below the inflation rate is constrained by legal or contractual factors.[11] The first of these questions, firms were asked if they would have considered the possibility of changing their base wages in 2006 (the reference year in the survey) in an amount below the one that was agreed. If the answer was affirmative, firms should indicate the desired change in base wages. As a measure of downward nominal base wage rigidity it was considered the share of firms that would like to reduce their base wages, while the share of firms that would like to increase their base wages below the inflation rate was used as a measure of downward real base wage rigidity.

(10) A current has been developing recently in the literature on the issue of wage rigidity stemming from the availability of longitudinal databases such as the QP and the BDRR. In the context of this literature, nominal wage rigidity is normally illustrated through empirical distributions of wage changes, where there is an almost total absence of negative wage variations and a notable mass of probability at zero (see Portugal, 2006, and Duarte, 2008). This restriction, however, does not eliminate the possibility of firms reducing real wages in response to adverse shocks. All that is necessary for this is to make sure that the (non-negative) variation in nominal wages is less than the expected rate of inflation. Given this, real wage rigidity is usually measured as the proportion of workers with a wage variation rate close to the expected rate of inflation. In the absence of real rigidity, the wage variation of these workers would be more moderate.

(11) These two questions were only included in the Portuguese version of the questionnaire.

Results show that a small fraction of firms would consider the possibility of reducing their base wages in 2006 if there were no legal or contractual restrictions. These firms account for 1.6 per cent of total employment in the sample (Table 3), with this share being higher in firms applying collective wage agreements, in manufacturing and smaller firms. On the other hand, those firms that would have considered the possibility of increasing their base wages in 2006 below the inflation rate in that year account for 4.4 per cent of total employment in the sample.

Following the pioneering work of Blinder and Choi (1990), Babecký *et al.* (2008) present an alternative approach to assess nominal and real wage rigidity. In their work, and based on the information collected in the common questionnaire developed in the context of the WDN, downward nominal wage rigidity is defined as the share of firms that state they have frozen wages at least once in the past five years. The hypothesis that is assumed is similar to the one used by Dickens *et al.* (2007), who assumed that firms that freeze their workers' wage would, in the absence of nominal rigidity, be accepting a cut in wage. This hypothesis assumes, of course, that those firms that never froze their workers' wages over the five years prior to the survey do not consider the impossibility of reducing nominal wages as an active restriction. In relation to real rigidity, the choice of an indicator is not nearly so clear-cut. Babecký *et al.* (2008) consider as a yardstick for the real rigidity of wages the percentage of firms that accept the existence of an automatic connection between the variation of their wages and inflation (past or expected). This is clearly a measure that restricts the degree of real rigidity and, as such, any findings should be treated with caution. The results show that nominal rigidity is markedly more prevalent in the firms under review than real rigidity (Table 4). These findings are in line with those obtained for the United States and for the United Kingdom, but different from those found in many euro area countries. It should be noted that the evidence adduced for various European countries using these two indicators reveals considerable differences,

Table 3

INDICATORS OF DOWNWARD NOMINAL AND REAL BASE WAGE RIGIDITY

As a percentage of total workers in the sample

	Firms that would like to have their base wages reduced	Firms that would like to have their base wages increased by an amount below the inflation rate
Total	1.6	4.4
Manufacturing	3.4	4.9
Construction	1.2	0.3
Trade	0.4	11.8
Non-financial services	1.2	3.1
Financial services	0.0	0.0
Very small firms	2.9	3.9
Small firms	4.8	6.9
Medium-sized firms	2.5	3.5
Large firms	1.2	4.6
Collective wage agreements:		
Yes	1.9	5.5
No	1.0	1.8

Source: Survey on wage setting in Portugal (2008).

Table 4

ALTERNATIVE INDICATORS OF DOWNWARD NOMINAL AND REAL BASE WAGE RIGIDITY

Percentage of total workers in the sample

	Firms that have frozen their base wages at least once over the last 5 years	Firms with formal wage indexation
Total	23.7	6.6
Manufacturing	16.3	9.1
Construction	13.5	4.3
Trade	14.2	2.4
Non-financial services	38.0	7.6
Financial services	0.0	1.2
Very small firms	11.9	8.2
Small firms	18.3	9.5
Medium-sized firms	18.1	7.7
Large firms	25.7	6.1
Collective wage agreements:		
Yes	23.9	5.8
No	23.3	8.7
Memo:		
Euro area	8.4	16.2

Sources: Babecký *et al.* (2008) and Survey on wage setting in Portugal (2008).

both in relation to nominal and real rigidity (see Babecký *et al.*, 2008). Nominal rigidity is, apart from Portugal, particularly strong in the Czech Republic, Estonia, Germany and the Netherlands, while it is markedly weaker in Belgium, Greece and Poland. Moreover, real rigidity is significant in Belgium and Spain, countries where wage indexation is a common practice, in France and in Hungary, but not relevant in Italy, Greece, Poland, Estonia and Slovenia.

The findings obtained from our survey show that legal restrictions do have an impact on reduction or freezing of wages, but workers' morale and performance are equally important in a context where firms have to bring labour costs down (Table 5).[12]

Table 5

MAIN OBSTACLES TO WAGES CUTS/FREEZES

Most important factors		Less important factors	
Factors	**Score [a]**	**Factors**	**Score [a]**
Legislation and collective wage agreements(2)	3.58	Impact on firm's reputation	2.93
Impact on workers' morale	3.44	Risk that wages become little competitive	2.92
Impact on workers' performance	3.39	Difficulties in attracting new workers in the future	2.83
Workers dislike unexpected changes in their wages	3.37	Costs of hiring and training new workers in the future	2.73
Risk that the best workers leave the firm	3.29		

Source: Survey on wage setting in Portugal (2008).
Notes: (a) Average score on a scale from 1 ("Irrelevant") e 4 ("Very relevant") weighted by the number of workers in each firm. (b) This factor is only relevant for wage cuts

(12) Results do not change by much when it is considered only those firms that, in the absence of legal or contractual constraints, would have considered the possibility of reducing their base wages in 2006 or increasing them below the inflation rate.

4.2. Alternative adjustment mechanisms

The importance of wage rigidity clearly depends on the availability of other mechanisms through which firms can reduce their labour costs without changing the base wages. The information obtained from the survey provides unique evidence on the relevant importance of those alternative mechanisms. In this context, firms were asked if had at any time had recourse to ways of cutting labour costs without changing their base wage. These mechanisms include the possibility of reducing or cutting out monetary and non-monetary bonuses, taking on new workers with the same characteristics as those who left but on a lower wage, changing the shifts policy, taking longer over promotions or reducing the number of employees. The firms had the chance to choose more than one of these options.

The results show that around 70 per cent of the firms have already used at least one of these strategies to cut labour costs, above all larger firms and those that apply collective wage agreements (Table 6). Reducing the number of employees is by far the most frequently used alternative, particularly in financial services and in larger firms. Other frequently used mechanisms are taking longer over promotions or introducing a freeze, and hiring workers at wages below those who leave.

Table 6

ALTERNATIVE STRATEGIES TO REDUCE LABOUR COSTS

As a percentage of total workers in the sample

	Reducing monetary benefits	Reducing non-monetary benefits	Changing shifts policy	Slowdown the pace of promotions	Hiring new workers with lower wages	Reducing the number of employees	At least one strategy
Total	20.1	19.2	12.8	27.6	24.0	56.6	70.5
Manufacturing	17.2	11.0	13.2	14.1	23.2	57.1	70.3
Construction	8.5	5.5	8.3	17.1	15.7	47.4	55.4
Trade	28.3	18.6	19.9	30.5	28.5	52.6	68.4
Non-financial services	16.5	22.1	13.9	26.0	20.6	53.2	69.8
Financial services	41.1	40.0	0.0	77.9	41.5	82.3	87.2
Very small firms	5.1	4.4	3.0	9.4	5.3	30.7	44.7
Small firms	15.7	10.2	7.4	14.9	15.5	40.4	57.6
Medium-sized firms	17.2	9.1	13.1	14.8	19.5	42.7	62.9
Large firms	21.2	22.6	13.0	31.8	25.8	61.4	73.5
Collective wage agreements:							
Yes	24.0	24.1	13.7	27.4	23.0	63.4	75.2
No	9.3	6.3	10.7	27.9	27.4	39.0	58.7
Memo:							
Euro area	20.6	-	21.4	25.2	38.8	20.7 [(a)]	63.5

Sources: Babecký *et al*. (2008) and Survey on wage setting in Portugal (2008).
Notes: The sum of each row could exceed 100 percent since firms had the option of choosing more than one strategy. (a) The question asked in many surveys related to those workers that left the firm through early retirement. Hence, the results are not directly comparable with those obtained for Portugal.

5. REACTION OF FIRMS TO SHOCKS

The information gathered from the survey also made it possible to analyse the way firms reacted to unexpected and generalised adverse shocks. Three types of shocks were given: a fall in demand for the main product; a highly relevant rise in the cost of an intermediate good, such as a rise in the price of fuel; and a permanent rise in wages due, for example, to the renegotiation of collective wage agreements. Firms were asked to put a value between 1 ("Irrelevant") and 4 ("Very relevant") on the relative importance of the following four strategies relating to adjustments to the shocks suggested: i) a change to prices; ii) a change to margins; iii) a cut in production; iv) a cut in costs. The results are given in Table 7 and they show that, regardless of the type of shock, a cut in other costs seems clearly to be the dominant strategy. However, adjustments to prices and margins are also used, as opposed to reducing production, which comes in as far less relevant, with the exception of demand shocks. In addition, shocks to demand seem to be those that on average affect firms most forcibly. It should be noted that the strategies used are not mutually exclusive. Firms may combine more than one, and the most frequent combination is to cut other costs at the same time as adjusting prices.

Those firms where the strategy of cutting costs was deemed to be to be relevant or very relevant were asked to indicate the most likely way to reduce those costs, having in mind the three types of shocks and two skill levels. Firms could opt for one of six strategies: i) a cut in base wages; ii) a cut in the flexible components of wages; iii) a cut in the number of workers with permanent contracts; iv) a cut in the number of workers with temporary contracts; v) a cut in the number of working hours; vi) a cut in other costs. Other costs included advertising costs, administrative costs, or the costs of renegotiating prices with suppliers. The results are given in Table 8, which shows that most firms in Portugal put reduction in other costs as the most likely strategy in almost all the scenarios set out. Firms also seem to differentiate between workers according to their skill levels. Apart from cutting other costs, in the event of an adverse shock on demand or on the price of a relevant raw material, firms would opt more for a cut in the flexible components of wages for more qualified workers and a cut in the number of workers with temporary contracts in the case of less skilled workers. Where there is a shock to wages, the relationship between these two strategies and the level of qualifications is inverted.

Table 7

FIRMS' REACTION TO UNANTICIPATED SHOCKS

Adjustment strategies	Demand shock		Cost shock		Wage shock	
	Score [a]	Relevance [b]	Score [a]	Relevance [b]	Score [a]	Relevance [b]
Reduce other costs	3.7	80.9	3.1	71.8	3.1	68.4
Adjusting prices	3.0	64.0	3.0	62.7	2.8	58.1
Reduce margins	3.1	56.7	2.7	47.7	2.7	53.4
Reduce production	3.3	48.9	2.3	23.5	2.2	20.9

Source: Survey on wage setting in Portugal (2008).
Notes: (a) Average score on a scale from 1 ("Irrelevant") e 4 ("Very relevant") weighted by the number of workers in each firm. (b) Firms that consider the shock as being relevant or very relevant (as a percentage of total workers in the sample).

Table 8

STRATEGIES TO REDUCE COSTS: BY TYPE OF SHOCK AND WORKERS' QUALIFICATIONS
As a percentage of total workers in the sample

Strategies to reduce costs	After a demand shock		After a cost shock		After a wage shock	
	Skilled workers	Unskilled workers	Skilled workers	Unskilled workers	Skilled workers	Unskilled workers
Reduce base wages	2.0	1.2	1.5	1.2	_	_
Reduce flexible wage components	28.7	14.2	26.5	13.5	15.2	26.1
Reduce the number of workers with permanent contracts	5.5	10.2	5.9	9.7	9.1	7.9
Reduce the number of workers with temporary contracts	16.6	34.8	13.6	30.0	33.3	16.2
Reduce the number of hours per worker	7.2	9.1	5.5	8.0	6.9	4.8
Reduce other costs	40.0	30.5	47.0	37.5	35.5	44.9

Source: Survey on wage setting in Portugal (2008).

6. FINAL REMARKS

Recent research points to the existence of a negative relationship between price rigidity and firms' labour cost share. In particular, empirical evidence based on microeconomic data shows that sectors with higher labour cost share are those where changes to prices are less frequent. Other measurements of price rigidity based on qualitative information presented in this article are consistent with these findings. They include the frequency of price changes, the speed of price reaction to shocks or the importance of time-dependent pricing rules. This evidence suggests that a deeper knowledge of wage dynamics is crucial for a better understanding of how prices are determined and, in a more general way, how the monetary policy transmission mechanism works. There are other factors that justify the increasing interest in research in this area. They include the importance of the labour markets in explaining the cyclical behaviour of the economy and the persistence of structural rigidity factors in labour markets. Empirical research is fundamental for the definition of stylised facts on wage dynamics, while theoretical research is important to adequately incorporate the behaviour of labour markets in stochastic models of general equilibrium.

Based on a the information from a survey conducted by the Banco de Portugal in the first half of 2008, this article presented a number of stylised facts on price and wage dynamics in Portugal. These facts are summed up below:

1. *A small fraction of the firms surveyed state that, in the absence of legal or contractual constraints, would consider the possibility of reducing their base wages in 2006 or increase them below the inflation rate;*

2. *Apart from legal and contractual constraints, the impact on workers' morale or performance and the risk that the best workers leave the firm are other important obstacles to wage cuts or freezes;*

3. *Firms frequently make use of alternative mechanisms to reduce labour costs, rather than changes to base wages, with cuts in the number of workers being the most frequent form of adjustment;*

4. *In many firms the wage scale agreed in the context of collective wage agreements is taken in many cases merely as a reference, with a considerable percentage of workers receiving wages above the amount agreed in collective wage agreements;*

5. *Most wages are defined with the behaviour of inflation borne in mind, above all expected inflation, though without any formal rule;*

6. *Changes in wages occur less frequently than changes in prices. If frequencies are converted into durations, it can be seen that the average duration of wages is 13 months – about 2 months less than in the euro area and 2.5 months longer than the average duration of prices;*

7. *Sectoral variability of wage durations is significantly lower than that of prices. This is also found in most European countries;*

8. *Changes to wages are more closely synchronised than changes to prices. 81 per cent of firms concentrate their wage changes in specific months of the year (37 per cent in the case of prices), with a very significant fraction making these changes in January;*

Recent empirical evidence has thrown down a major challenge to researchers. New facts have come to light as a result of analysing large-scale microeconomic databases, either quantitative ones or those based on surveys of firms. This should act as a spur for the scientific community to develop theories that incorporate this new evidence in models of general equilibrium.

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Annex 1. Methodological Issues

Sample selection

The survey was carried out by the Banco de Portugal between September 2007 and June 2008 on a sample covering manufacturing, energy, construction, retail and wholesale trade, transport and communications, education, health, financial services and other business services. All told, there were 46 two-digit NACE sectors. There were 4,850 firms contacted to particpate in the survey.[13] Compared with survey conducted in 2006 in the context of the Banco de Portugal participation in the Inflation Persistence Network (see Martins, 2009), twice the number of firms were contacted and the number of sectors covered was increased significantly, particularly through the inclusion of trade, construction and financial services.

The firms were chosen from those on the Ministry for Labour and Social Solidarity Personnel Database (*Quadros de Pessoal*, QP). Given the prevalence of very small firms in the Portuguese production structure, a pure random selection of firms would clearly have led to over-representation of smaller-scale firms. To solve this, the survey targeted only firms with ten or more workers. Data collection was split into two stages. For the first, it was decided to include all firms with 100 or more workers in the sectors mentioned above. This provided 2,756 firms. The remaining 2,244 were chosen on the basis of random stratification. The total number of firms was divided into three groups according to the number of their workers: i) firms with 10 or more workers but less than 20; ii) firms with 20 or more workers but less than 50; and iii) firms with 50 or more workers but less than 100. Grouping these in the two-digit sectors chosen led to 138 mutually exclusive strata. The number of firms from which stratum was set on the basis of the relative frequency obtained in the QP for 2005. Once this figure was reached, the firms within each stratum were chosen randomly. The final sample included 1,872 firms from manufacturing, 25 from the energy sector, 657 from the construction, 841 from trade, 82 from financial services and 1,373 from other business services, such as education, health, transport and communications. In 2005, these firms represented around 35 per cent of total employment in Portugal (Table A).

Structure and methodology for carrying out the survey

The questionnaire was developed within the scope of the WDN and was based on a set of common questions for all 17 national central banks involved. This was organised in four sections, corresponding to 39 questions[14]. The opportunity provided by the survey was also used to include some additional questions, as a way to look into some specific aspects related to the price and wage setting practices in Portugal, among them the size and importance of the so-called wage cushion (the difference effective and contracted wages), the relevance of labour legislation and collective contracts as limiting factors in

(13) There were 5,000 chosen, but the survey was only sent to 4,850 because it was found à posteriori that some firms had merged and others had closed. In addition, some firms that took part in the pilot survey were not included in the final sample, given that the questionnaire they had received was different in some ways from the final version.

(14) A copy of the questionnaire could be provided upon request.

wage bargaining and questions on price setting (based on the 2004 survey), such as the speed of price reactions following significant changes in costs or demand. An attempt was made to avoid technical language in the questions so that as many people could understand them as possible.

After the sample was set up, in September 2007, a first version of the questionnaire was sent to 30 firms. As in 2004, the pilot questionnaire turned out to be very useful for an initial assessment of how the project was received and whether it was viable. A number of firms were contacted on the basis of the first replies and some questions were rephrased or cut out, making the questionnaire shorter and easier to understand.

In October, a revised version was sent to all the firms chosen, together with a letter signed by the Head of the Research Department. The letter made it clear, among other things, that the questionnaire should be answered by someone who was very well aware of the range of procedures underlying how wages and prices were determined. More than one person could answer it, as long as there was an overall consistency in the replies. In addition, there was a set of questions specifically for the banking sector. This contained a number of differences from the base version, especially as regards the concept of price in this sector. After receiving the questionnaire, the firms had 15 working days to send their replies, which could be either paper based or through an Internet site specially set up for this purpose.[15] In mid-January 2008, a reminder was sent to all the firms that had to that date not replied.

All the replies were received by June. There were 1,497 valid questionnaires received, a 31 per cent reply rate.[16] This percentage was lower than for the 2004 survey (which had been 55 per cent), but it was higher than original expectations, given that this was a more complex questionnaire, covering a topic that was especially sensitive for some firms, as it is the case of their wage setting practices.

(15) A help line was set up for firms to request clarification. They were able to use telephone, fax or e-mail.

(16) The number of firms that sent completed questionnaires was slightly higher but some had to be ruled out, either because of inconsistencies or because there were simply not enough valid replies.

Table A

SAMPLE COVERAGE (to be continued)

In terms of the number of firms:

		Total		By sectors:										Memo:	
				Manufacturing		Energy		Construction		Trade		Business Services		Financial Services			
		Number of firms	% of total	Number of firms	% of total	Number of firms	% of total	Number of firms	% of total	Number of firms	% of total	Number of firms	% of total	Number of firms	% of total	% of total population of firms with 5 or more employees	% of total population
Population		107 371	100.0	24 881	23.2	132	0.1	19 804	18.4	26 252	24.4	31 499	29.3	341	0.3	100.0	33.7
Number of firms	[10 ; 20[	85 133	79.3	17 251	16.1	67	0.1	17 361	16.2	23 499	21.9	26 831	25.0	124	0.1	79.3	26.7
	[20 ; 50[	14 899	13.9	4 904	4.6	29	0.0	2 443	2.3	2 753	2.6	4 668	4.3	102	0.1	13.9	4.7
	[50 ; 100[	6 109	5.7	2 308	2.1	27	0.0	763	0.7	917	0.9	2 018	1.9	76	0.1	5.7	1.9
	[100 ; +∞[	1 230	1.1	418	0.4	9	0.0	99	0.1	155	0.1	510	0.5	39	0.0	1.1	0.4
Targeted sample		4 850	34.1	1 872	38.6	25	0.5	657	13.5	841	17.3	1 373	28.3	82	1.7	4.5	1.5
Number of firms	[10 ; 20[	805	16.6	227	4.7	1	0.0	173	3.6	205	4.2	196	4.0	3	0.1	0.7	0.3
	[20 ; 50[	848	17.5	311	6.4	4	0.1	153	3.2	165	3.4	208	4.3	7	0.1	0.8	0.3
	[50 ; 100[	2 055	42.4	917	18.9	11	0.2	240	4.9	322	6.6	533	11.0	32	0.7	1.9	0.6
	[100 ; +∞[	1 142	23.5	417	8.6	9	0.2	91	1.9	149	3.1	436	9.0	40	0.8	1.1	0.4
Realized sample		1 497	100.0	546	36.5	16	1.1	202	13.5	260	17.4	440	29.4	33	2.2	1.4	0.5
Number of firms	[10 ; 20[	231	15.4	59	3.9	1	0.1	40	2.7	67	4.5	63	4.2	1	0.1	0.2	0.1
	[20 ; 50[	267	17.8	100	6.7	1	0.1	58	3.9	48	3.2	57	3.8	3	0.2	0.2	0.1
	[50 ; 100[	626	41.8	253	16.9	8	0.5	72	4.8	109	7.3	170	11.4	14	0.9	0.6	0.2
	[100 ; +∞[	373	24.9	134	9.0	6	0.4	32	2.1	36	2.4	150	10.0	15	1.0	0.3	0.1

Table A

SAMPLE COVERAGE (continued)

In terms of the number of employees:

		Total		By sectors:										Memo:	
				Manufacturing		Energy		Construction		Trade		Business Services		Financial Services			
		Number of firms	% of total	Number of firms	% of total	Number of firms	% of total	Number of firms	% of total	Number of firms	% of total	Number of firms	% of total	Number of firms	% of total	% of total population of firms with 5 or more employees	% of total population
Population		2 504 479	100.0	699 962	27.9	13 936	0.6	330 646	13.2	471 042	18.8	914 257	36.5	74 636	3.0	100.0	85.2
Number of employees	[10 ; 20[	732 617	29.3	162 179	6.5	639	0.0	150 022	6.0	192 323	7.7	226 032	9.0	1 422	0.1	29.3	24.9
	[20 ; 50[	446 907	17.8	149 645	6.0	865	0.0	71 424	2.9	81 411	3.3	140 327	5.6	3 235	0.1	17.8	15.2
	[50 ; 100[	544 140	21.7	207 806	8.3	2 568	0.1	65 978	2.6	79 103	3.2	181 570	7.2	7 115	0.3	21.7	18.5
	[100 ; +∞[	780 815	31.2	180 332	7.2	9 864	0.4	43 222	1.7	118 205	4.7	366 328	14.6	62 864	2.5	31.2	26.6
Targeted sample		1 027 215	100.0	302 550	29.5	11 300	1.1	74 719	7.3	161 651	15.7	409 318	39.8	67 677	6.6	41.0	34.9
Number of employees	[10 ; 20[	10 274	1.0	2 984	0.3	10	0.0	2 189	0.2	2 568	0.2	2 487	0.2	36	0.0	0.4	0.3
	[20 ; 50[	26 555	2.6	9 864	1.0	109	0.0	4 689	0.5	5 188	0.5	6 463	0.6	242	0.0	1.1	0.9
	[50 ; 100[	243 839	23.7	109 727	10.7	1 317	0.1	27 274	2.7	37 122	3.6	64 634	6.3	3 765	0.4	9.7	8.3
	[100 ; +∞[	746 547	72.7	179 975	17.5	9 864	1.0	40 567	3.9	116 773	11.4	335 734	32.7	63 634	6.2	29.8	25.4
Realized sample		327 969	100.0	89 434	27.3	9 127	2.8	23 873	7.3	31 264	9.5	144 274	44.0	29 997	9.1	13.1	11.2
Number of employees	[10 ; 20[	3 037	0.9	805	0.2	10	0.0	523	0.2	857	0.3	831	0.3	11	0.0	0.1	0.1
	[20 ; 50[	8 308	2.5	3 182	1.0	30	0.0	1 718	0.5	1 485	0.5	1 783	0.5	110	0.0	0.3	0.3
	[50 ; 100[	74 006	22.6	29 811	9.1	935	0.3	8 194	2.5	13 184	4.0	20 258	6.2	1 624	0.5	3.0	2.5
	[100 ; +∞[	242 618	74.0	55 636	17.0	8 152	2.5	13 438	4.1	15 738	4.8	121 402	37.0	28 252	8.6	9.7	8.3

Source: Survey on wage setting in Portugal (2008).