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WAGE DYNAMICS NETWORK

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by Fernando Martins

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PRICE AND WAGE SETTING IN PORTUGAL

LEARNING BY ASKING[1]

by Fernando Martins[2]

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1 This paper was developed within the context of the Wage Dynamics Network (WDN), a Eurosystem research network, bringing together researchers from the European Central Bank and from 24 European Union national central banks, with the main aim of analyzing the main features of wages and labour cost dynamics in the euro area and look into their implications for monetary policy. The author received many helpful 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 firms involved. Thanks are also due to Fátima Teodoro, Pedro Próspero Luís and Maria Lucena Vieira for their IT input at various stages of the project. 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.

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Wage Dynamics Network

This paper contains research conducted within the Wage Dynamics Network (WDN). The WDN is a research network consisting of economists from the European Central Bank (ECB) and the national central banks (NCBs) of the EU countries. The WDN aims at studying in depth the features and sources of wage and labour cost dynamics and their implications for monetary policy. The specific objectives of the network are: i) identifying the sources and features of wage and labour cost dynamics that are most relevant for monetary policy and ii) clarifying the relationship between wages, labour costs and prices both at the firm and macro-economic level.

The WDN is chaired by Frank Smets (ECB). Giuseppe Bertola (Università di Torino) and Julián Messina (World Bank and University of Girona) act as external consultants and Ana Lamo (ECB) as Secretary.

The refereeing process of this paper has been co-ordinated by a team composed of Gabriel Fagan (ECB, chairperson), Philip Vermeulen (ECB), Giuseppe Bertola, Julián Messina, Jan Babecký (CNB), Hervé Le Bihan (Banque de France) and Thomas Mathä (Banque centrale du Luxembourg).

The paper is released in order to make the results of WDN research generally available, in preliminary form, to encourage comments and suggestions prior to final publication. The views expressed in the paper are the author's own and do not necessarily reflect those of the ESCB.

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CONTENTS

Abstract

This paper presents the main findings of a survey conducted on a sample of Portuguese firms. The main aim was to identify some relevant characteristics about the dynamics of prices and wages in Portugal. The most important conclusions are: i) changes to wages are more synchronized than changes to prices; ii) most wages are defined using inflation as a yardstick, even though there are no formal rules; iii) the wages of most workers are defined in terms of sector-related collective agreements; iv) a considerable proportion of workers receive wages above those been agreed under the collective agreement; v) firms make frequent use of other mechanisms to cut payroll costs as a way of overcoming the restrictions imposed by downward nominal wage rigidity.

JEL classification codes: D21, E30, J31.

Key Words: survey data, wage rigidity, price rigidity, indexation, institutions.

Non technical summary

An appropriate definition of economic policies in general and monetary policy in particular requires a deeper understanding of the characteristics and determining factors underlying wage dynamics. For a member of a monetary union like Portugal, where the exchange rate instrument is no longer available to bring about adjustments, wage flexibility becomes a fundamental requirement for ensuring an adequate adjustment to economic shocks.

This has been a topic of intense debate in Portugal where, following a large GDP contraction in 2009, the unemployment rate has reached the two-digit psychological threshold for the first time. From the point of view of the euro area as a whole, even though a number of reforms in labour markets have been put into place in various countries, there are striking differences remaining in collective bargaining procedures and other labour market institutions. In addition, wages are also an important determinant of firms' prices. Recent microeconomic research suggests that those sectors with a higher labour cost share, such as services, typically show greater price rigidity. 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 and also presented in this paper are consistent with these findings.

All 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 the information from a survey conducted in 2008, this paper presents 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 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 slightly higher than one year - about 2 months less than in the euro area and 2.0 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.

1 Introduction

An appropriate definition of economic policies in general and monetary policy in particular requires a deeper understanding of the characteristics and determining factors underlying wage dynamics. For a member of a monetary union like Portugal, where the exchange rate instrument 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. This has been a topic of intense debate in Portugal where, following a large GDP contraction in 2009, the unemployment rate has reached the two-digit psychological threshold for the first time in many years. From the point of view of the euro area (EA) as a whole, even though a number of reforms in labour markets have been put into place in various countries, there are striking differences remaining in collective bargaining procedures and other labour market institutions (see, for instance, Caju et al. (2008)). Besides this, 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 (see, for instance, Altissimo et al. (2006) and Fabiani et al. (2006, 2007)).

It is within this context that this paper 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. The main aim of the paper is to identify some relevant characteristics about the dynamics of prices and wages in Portugal. One natural criticism that can be pointed out is that it addresses too many issues at the same time and none of them is analysed in depth. In this context, I believe that those seeking for a theoretical model and exhaustive econometric estimations may feel a bit disappointed. However, this is far from being the target of the paper. Besides the innovative features of the dataset used, the main strength of the paper is precisely the richness of the facts reported. Many of them are consistent with previous findings about wage and price setting in Portugal while others are completely new. Of course, a different and equally interesting approach could have been followed by narrowing the scope of analysis and focusing on some specific issues addressed in the survey. This is the approach followed by Dias, Marques and Martins (2011) and Dias, Marques, Martins and Silva (2010) who on the basis of a similar qualitative database analyse some specific features of firms' pricing behaviour in Portugal.

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 Database (*Base de Dados do Registo de Remunerações da Segurança Social* - BDRR)[1]. Moreover, 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.

The remaining of the paper is structured in the following way. Section 2 details the process of sample selection, the questionnaire and the way the survey was conducted. Section 3 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 size of the so-called wage cushion, i.e. the difference between effective and contracted wages in Portugal. There is also a short comparison between the architecture of the wage bargaining process in Portugal and the rest of Europe. Section 4 presents some stylised facts about the dynamics of prices and wages in Portugal, as well as the link between the two. Section 5 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 6 looks at the reaction of firms to different types of shocks. Finally, section 7 sets out the main stylised facts that have been identified.

2 The database

2.1 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

[1]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 firms. 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.

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 participate[2]. Compared with the survey conducted in 2006 in the context of the Banco de Portugal participation in the Inflation Persistence Network (see Martins (2010)), 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 to be drawn from each 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. These firms represented around 35 per cent of total employment in Portugal. Tables A.1 and A.2 in the appendix show further details on the sample coverage.

2.2 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 (the English version of the questionnaire sent to the firms is attached to the paper). The opportunity provided by the survey was also used to include some additional questions, as a way

[2]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.

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 between effective and contracted wages), the relevance of labour legislation and collective contracts as limiting factors in wage bargaining and questions on price setting (based on the the 2004 survey experience), 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 the 2004 survey, 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 number 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[3]. 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 1,499 valid questionnaires received, which corresponde to a 32 per cent reply rate. 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.

[3]A help line was set up for firms to request clarification. They were able to use telephone, fax or e-mail.

3 Some aspects of the institutional architecture of wage bargaining in Portugal

The Portuguese Constitution provides the juridical principles of collective bargaining and grants unions the right to negotiate[4]. The effects of the agreements are formally recognized and considered valid sources of labour law.

Concerning the bargaining mechanisms, a distinction should be made between the conventional regime and the mandatory regime. Conventional bargaining results from direct negotiation between employers' and workers' representatives. A mandatory regime, on the other hand, does not result from direct bargaining between workers and employers, being instead dictated by the Ministry of Labour. The Ministry can extend an existing collective agreement to other workers initially not covered by it or it can create a new one, if it is not viable to extend the application of an existing document. A mandatory regime is applied when workers are not covered by unions, when one of the parties involved refuses to negotiate or bargaining is obstructed in any other way[5]. Therefore, the impact of collective bargaining goes far beyond union membership and the distinction between unionized and non-unionized workers or firms becomes unimportant.

Collective negotiations are usually conducted at the industry or occupation level. The law does not establish mechanisms of coordination between agreements reached in different negotiations. However, preference is given to vertical over horizontal agreements, and the principle of the most favourable condition to the worker generally applies.

Since most collective agreements are industry-wide, covering companies with very different sizes and economic conditions, their contents tend to be general, setting minimum working conditions, in particular the base monthly wage for each category of workers, overtime pay and the normal duration of work. Underlying the bargaining process there is a mandatory minimum monthly wage which sets the minimum floor for wage negotiations[6].

[4]Portugal (2006) and Marques et al. (2010) provide a detailed description of the Portuguese wage bargaining system.

[5]Beyond the existence of compulsive extension mechanisms, voluntary extensions are also possible, when one economic partner (workers' representative or employer) decides to subscribe to an agreement which it had initially not signed.

[6]Currently, there is a unique legal minimum wage that applies to all workers. Workers formally classified as apprentices receive just 80 percent of the full rate. The minimum wage is updated annually by the parliament, under government proposal. Decisions on the level of the minimum wage are taken on a discretionary basis, usually taking into account past and predicted inflation and after consulting the social partners. For 2011, the minimum monthly wage was set at 480 euros

The Portuguese system of industrial relations apparently presents features of a centralized wage bargaining system[7]. Massive collective agreements, often covering a whole industry, predominate in the economy, while firm-level collective bargaining covers a low proportion of the workforce. Moreover, trade union confederations, employers' federations and the Government meet at the national level each year to set a guideline for wage increases (the so-called social concertation). Yet, this guideline is not mandatory and merely guides the collective bargaining that follows. However, the fragmented nature of the trade union structure, the fragmented employers' associations and the multiplicity of bargaining units provides the system with a certain degree of decentralization. Even though collective bargaining in Portugal takes place at a sectoral level and most workers are covered by the bargaining system due to the existence of mandatory extensions, the coordination between bargaining units is rather limited. In fact, the right to negotiate is given upon every employer or employers' association and to every trade union (regardless of the number of affiliated members they represent), and the parties have the possibility of choosing the level of negotiation - regional, occupational, industrial or national. This leads to the existence of a diffuse and complex system of wage bargaining with negotiation fragmented and agreements multiplied.

The institutional framework of wage bargaining is usually seen as playing an important role in determining the dynamics of wages and, in general, of the labour market itself. Druant et al. (2009) show that labour market institutions influence the frequency and timing of wage changes, while Babecky et al. (2009*a*) 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. (2010), as well as the degree to which firms use available adjustment policies to reduce labour costs. This is documented in Babecky et al. (2009*b*). 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)[8].

[7]Caju et al. (2008) perform a cluster analysis and identify three groups of countries using information collected following a questionnaire to national central banks. The first group (Austria, Denmark, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal and Sweden) mainly consists of countries with a broadly regulated system of wage bargaining. This group is characterized by the existence of extension procedures and a high level of collective agreement coverage, a dominance of sectoral wage bargaining and the general absence of coordination. The second group (Belgium, Cyprus, Finland, Luxembourg, Slovenia and Spain) exhibits the same general wage setting characteristics as the previous group, but, in addition, some form of indexation, intersectoral agreements and the role of government are all more important. Finally, the third group (Czech Republic, Estonia, Hungary, Japan, Lithuania, Poland, the UK and the US) gathers the countries where the wage bargaining system is largely deregulated.

Despite the importance given to the role of institutional wages, the information available from international sources is rather scarce[9]. The survey 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 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 (Figure 1)[10]. 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[11]. 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 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 (Figure 2). The level of coverage is particularly high in the financial services and tends to increase with the size of the firms.

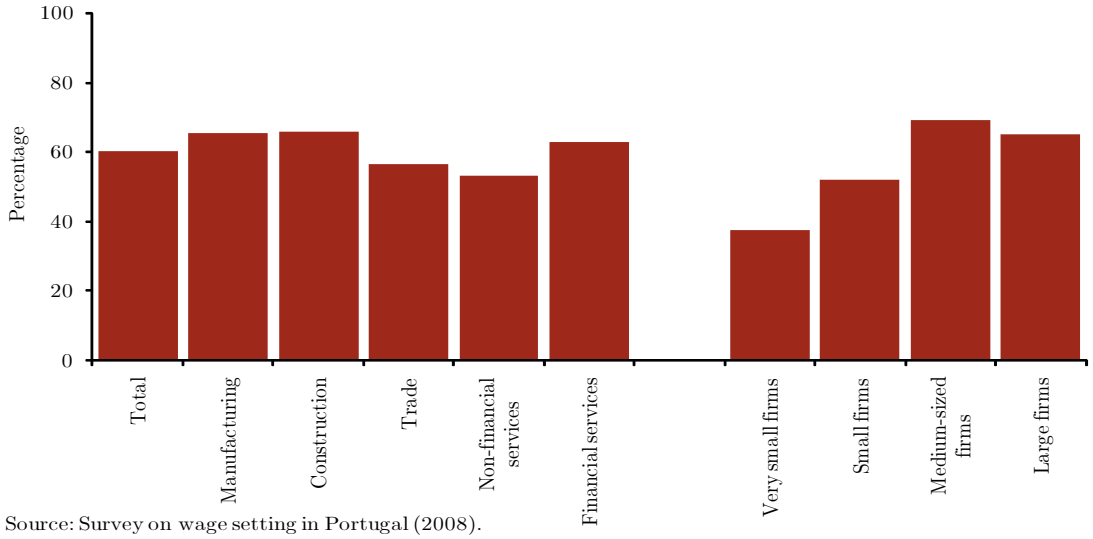
[8]For a summary of the recent literature on the subject, see Freeman (2007).

[9]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))

[10]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.

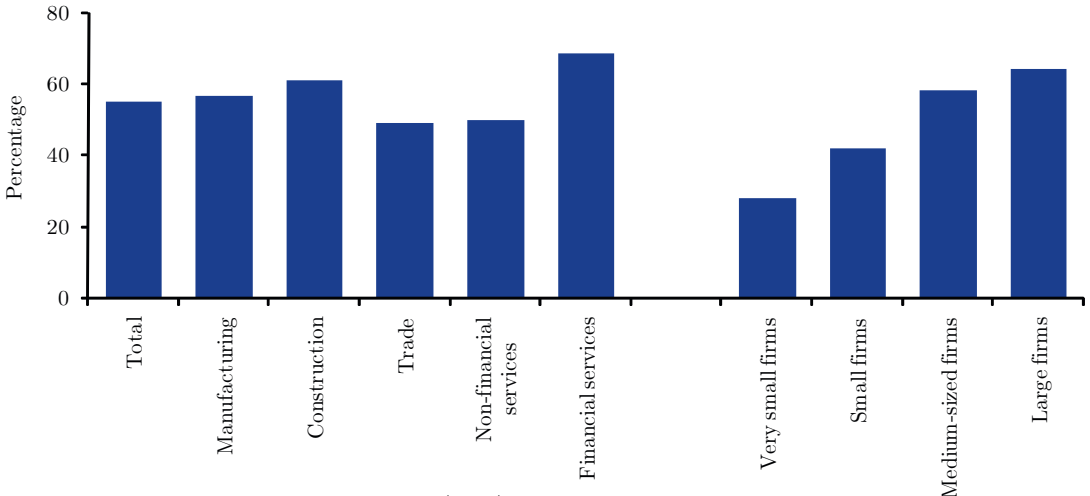
[11]In the context of the analysis firms were split according to their size into the following categories: i) very small firms (between 10 and 19 workers); ii) small firms (between 20 and 49 workers); iii) medium-sized firms (between 50 and 199 workers); and iv) large firms (more than 199 workers).

Figure 1: Share of firms with wages set under sectoral collective wage agreements (as a percentage of all surveyed firms)



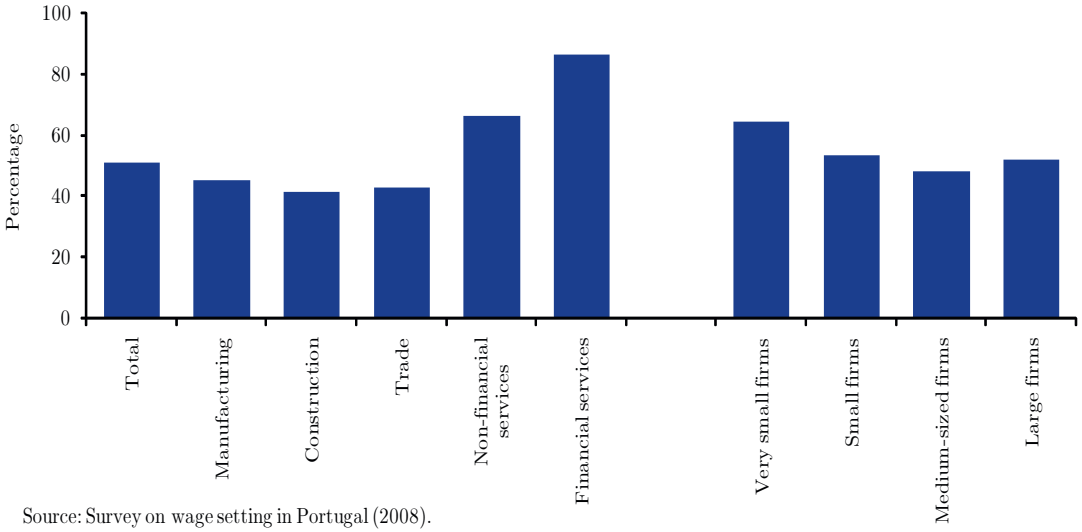
Source: Survey on wage setting in Portugal (2008).

Figure 2: Share of workers covered by collective wage agreements (as a percentage of total employment in the sample)



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

Figure 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).

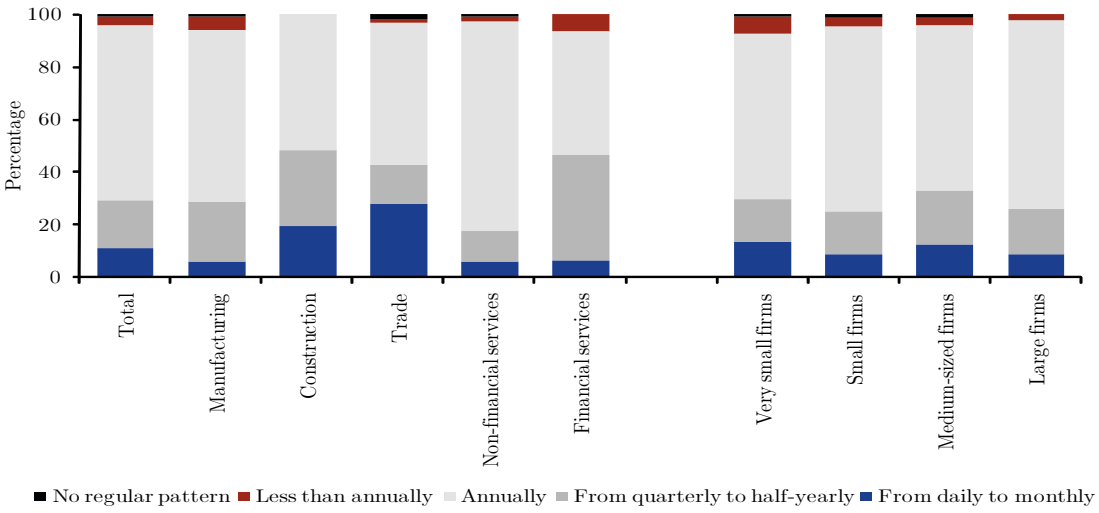
It is worth noting, however, that the wage scale agreed in the context of collective wage agreements is taken in many cases merely as a reference. Indeed, a significant number of firms pay wages above those agreed under collective wage agreements (Figure 3). The share of firms paying this wage cushion is particularly high in financial services[12]. 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.

4 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 (see Altissimo et al. (2006); Fabiani et al. (2006)). This in turn is frequently suggested as sign of greater wage rigidity. Non-financial services - a 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

[12]Financial services include the banking sector and the insurance companies.

Figure 4: Frequency of price changes
(as a percentage of total employment in the sample)



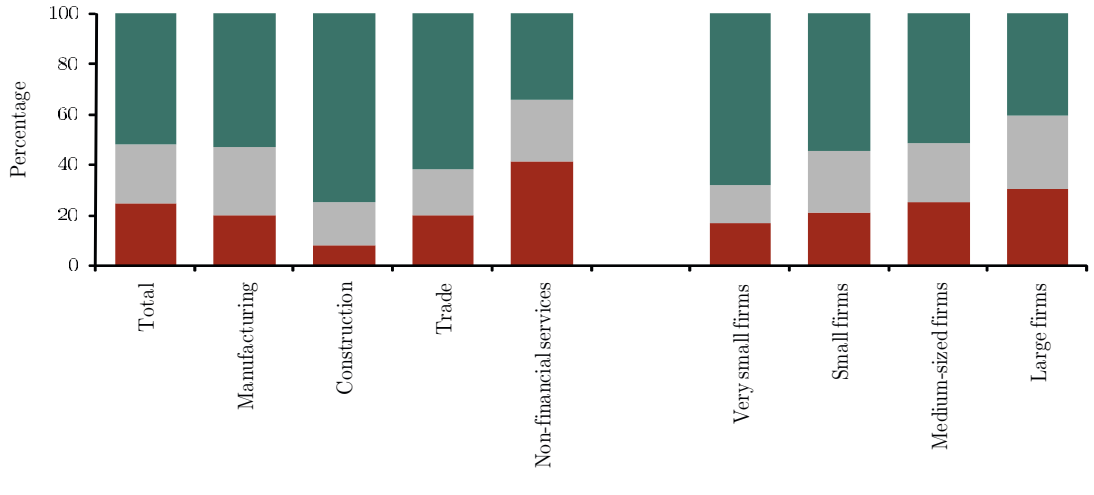
Source: Survey on wage setting in Portugal (2008).

wage rigidity. Dias, Marques, Martins and Silva (2010) show that the cost structure is an important determinant of how fast firms react to cost and demand shocks shocks. In particular, they present evidence that firms with higher shares of labour costs react slower to demand and cost shocks. In addition, Altissimo et al. (2006) show that firms with higher labour cost shares tend to exhibit lower frequencies of price adjustment. The findings from our survey seem to be consistent with these conclusions. An analysis of price frequency shows that around 70 per cent of firms do not change prices more than once a year; with this percentage being particularly high in the case of non-financial services (Figure 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 (Figure 5). In the presence of shocks, time-dependent rules typically lead to greater price rigidity. Dias, Marques and Martins (2011) show that the frequency of price changes and the speed of price reaction to shocks of time-dependent firms is significantly lower than that of state-dependent firms, while firms that are both time- and state-dependent rank in between.

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, Figure 6 points to greater rigidity in non-financial services, with firms

Figure 5: Price-setting rules: time-dependent vs. state-dependent price setting (as a percentage of total employment in the sample)



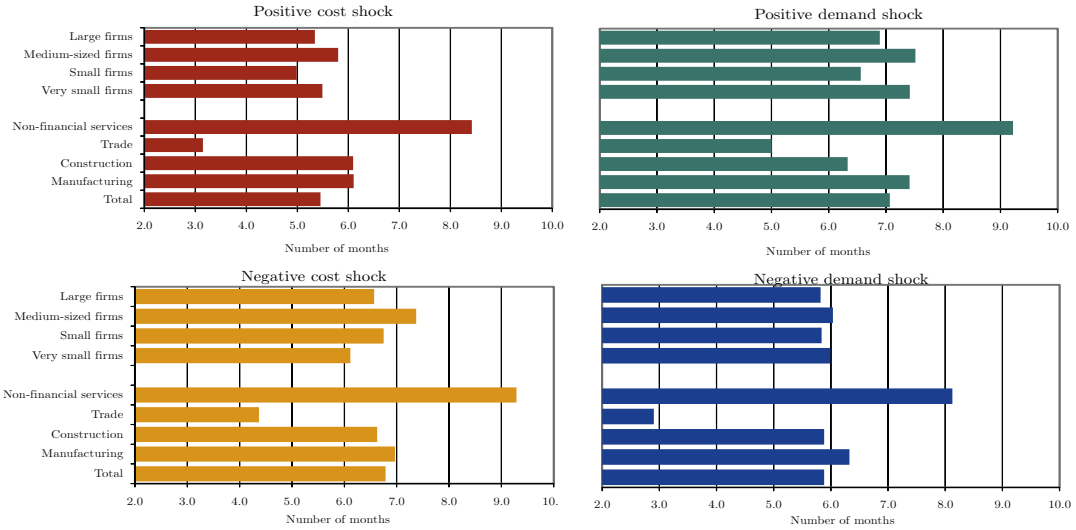
Source: Survey on wage setting in Portugal (2008).

here taking on average between 8.1 and 9.3 months to adjust their prices, depending on the type of shock[13]. 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? 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 (downward-biased) measure was calculated for the three motivations, defined as the highest frequency of wage change for each

[13]By estimating a panel-ordered probit model, Dias, Marques, Martins and Silva (2010) find that the lags of price adjustments vary with the sector, product, and firm characteristics, namely the cost structure of the firm, the type of pricing policy, the competitive environment, the different factors of competitiveness, or the type of good.

Figure 6: Speed of price reaction to demand and cost shocks
(excluding firms that follow time-dependent pricing rules strictly)



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

firm, irrespective of the specific determining factor. Results show that the wages of most workers (85 percent) are changed only once per year (Figure 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[14]. 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 price in this sector may not be absolutely clear, but also because 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[15]. When compared with the EA as a whole, price spells in Portugal are apparently slightly longer.

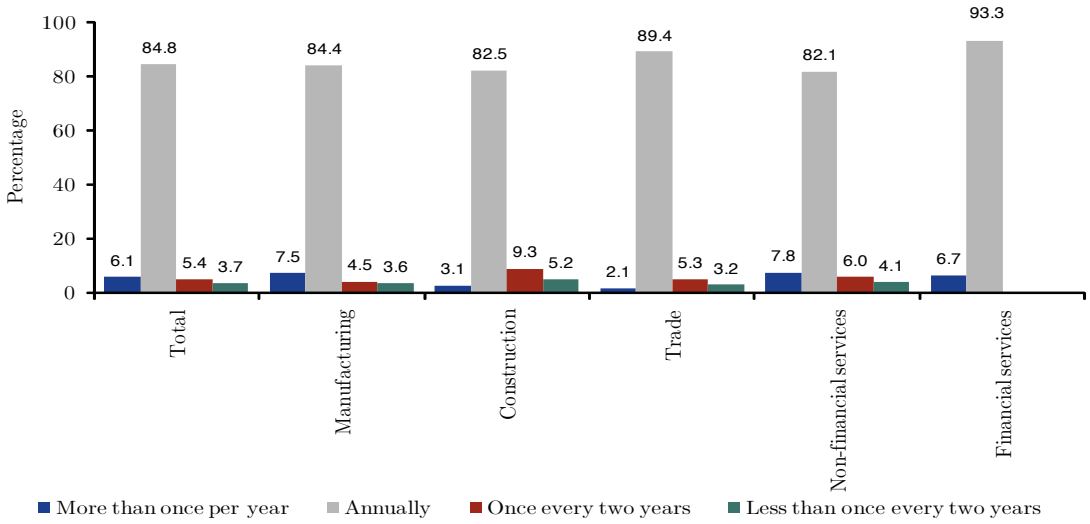
As expected, the average duration of wage spells is higher than that of price spells (at least about 2.0 months on average), and it also shows a smaller sector variability[16]. When compared with the EA as a whole, wages remain constant for

[14]Others more complex distribution-based techniques were also used to assess the robustness of these durations. Even though the results vary somewhat with the distributional assumptions, those differences were qualitatively of minor significance.

[15]As mentioned in section 2, 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.

[16]The composite wage duration measure shown in Table 1 was computed on the basis of the

Figure 7: Frequency of wage changes
(as a percentage of total employment in the sample)



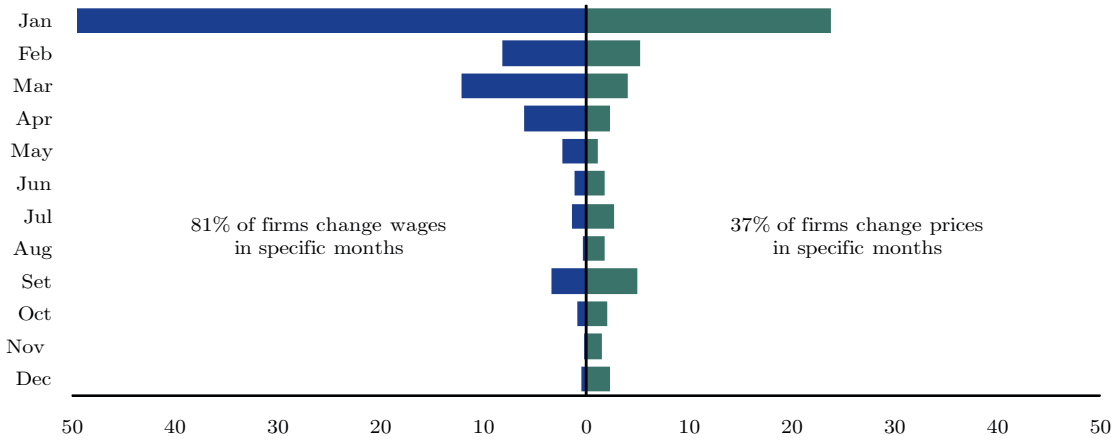
Source: Survey on wage setting in Portugal (2008).

Table 1: Average duration of wage and price spells
(in months)

	Price duration	Composite wage duration	*Memo:* Wage durations due to Inflation	Tenure	Other factors
Total	11.2	12.9	17.8	25.9	18.5
Manufacturing	10.9	12.7	16.1	26.0	17.9
Construction	7.7	13.9	21.9	22.2	19.3
Trade	11.2	11.3	16.3	27.5	19.2
Business services	11.7	13.1	19.3	26.5	18.4
Financial services	7.4	11.9	12.7	18.4	22.0
Very small firms	10.9	15.0	20.3	25.0	20.2
Small firms	11.5	14.6	19.2	23.7	20.1
Medium-sized firms	11.0	14.1	18.5	25.2	18.7
Large firms	11.3	12.4	17.4	26.2	18.4
Memo:					
Euro Area	9.6	14.7	-	-	-

Source: Druant et al. (2009) and Martins (2009).
Results weighted by employment.

Figure 8: Concentration of price and wage setting decisions
(as a percentage of total firms in the sample; unweighted results)



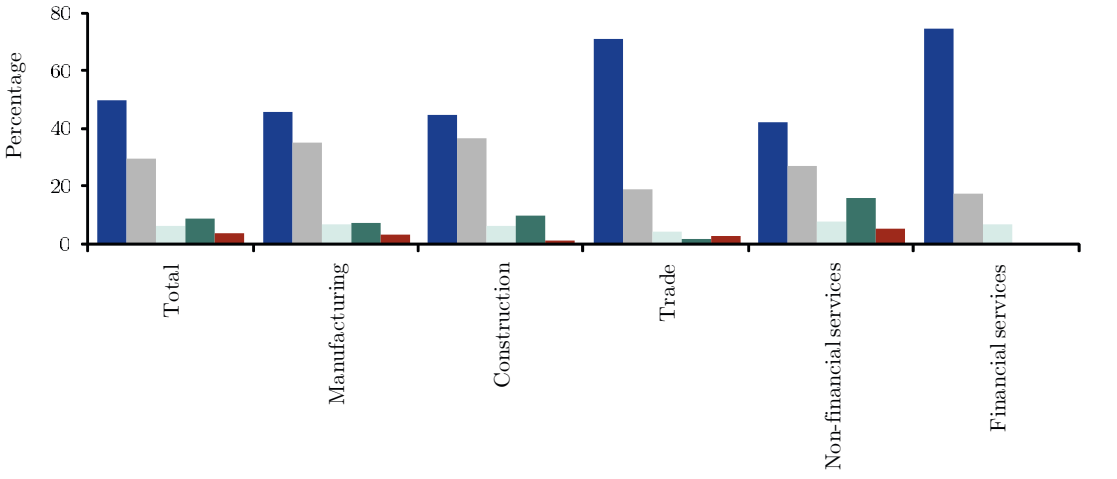
Source: Survey on wage setting in Portugal (2008). Values computed as a share of all firms with valid responses. The sum of percentages exceed the proportion of firms that change wages or prices in specific months as they could choose more than one month.

an average period that is around 2 months shorter. Druant et al. (2009) 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 concentrated in specific months of the year, and 64 per cent of these firms adjust their prices in January (Figure 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

highest frequency of wage change for each firm, irrespective of the specific determining factor (inflation, tenure or other). This measure is somewhat downward biased.

Figure 9: Synchronisation between price and wage setting decisions
(as a percentage of all surveyed firms; unweighted results)



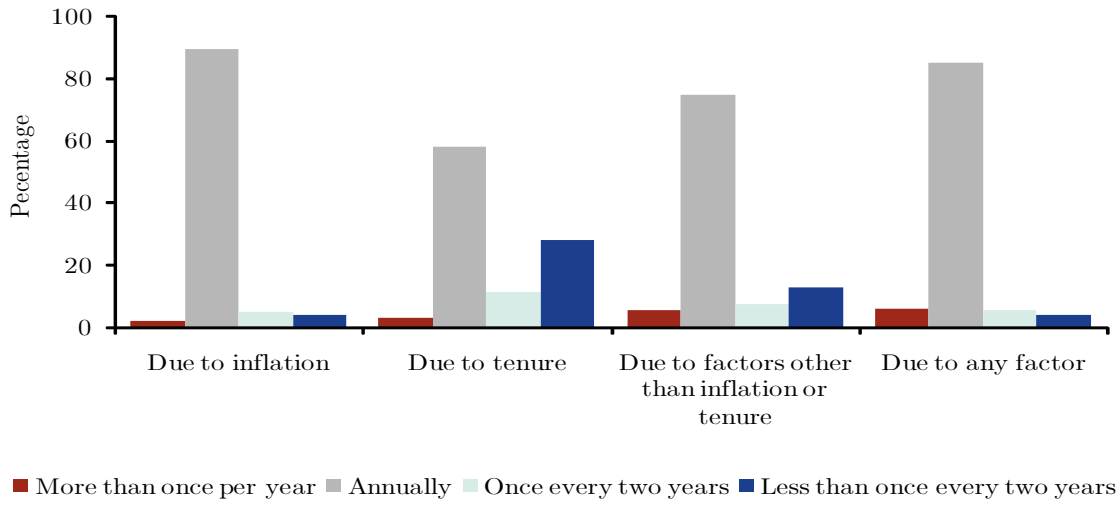
Source: Survey on wage setting in Portugal (2008).

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[17]. 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 Figure 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 connection 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. 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 (Figure 10).

[17]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.

Figure 10: Frequency of wage changes
(as a percentage of total employment in the sample)



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

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 EA, 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 EA 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. (2009)).

Table 2: How inflation behaviour is reflected in firms' base wages (in percentage)

	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
Business 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: Druant et al. (2009) and Martins (2009).
Results weighted by employment.

5 Wage rigidity: evidence and alternative adjustment mechanisms

5.1 Evidence on downward (real and nominal) 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[18]. 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[19]. 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

[18] 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.

[19] These two questions were only included in the Portuguese version of the questionnaire.

Table 3: Indicators of downward nominal and real base wage rigidity
(in percentage)

	Firms that would like to have their base wage reduced	Firms that would like to have their base wage increased below the inflation rate
Total	1.6	4.4
Manufacturing	3.4	4.9
Construction	1.2	0.3
Trade	0.4	11.8
Business 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). Results weighted by employment.

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. 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), Babecky et al. (2009*a*) present an alternative approach to assess nominal and real wage rigidity. In their work, 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.

Babecky et al. (2009*a*) consider as a yardstick for the real rigidity of wages the percentage of firms that accept the existence of an automatic connection between

Table 4: Alternative indicators of downward nominal and real wage rigidity (in percentage)

	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
Business 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:		
EA	8.4	16.2

Source: Babecky et al. (2009*a*) and survey on wage setting in Portugal (2008). Results weighted by employment

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 EA countries. It should be noted that the evidence adduced for various European countries using these two indicators reveals considerable differences, both in relation to nominal and real rigidity (see Babecky et al. (2009*a*)). 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)[20].

[20]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.

Table 5: Main obstacles to wage cuts/freezes
(in percentage)

Factors	Score[a]	Factors	Score[a]
Wage agreements and legislation[b]	3.58	Impact on firm's reputation	2.93
Impact on workers' morale	3.44	Wages may become non competitive	2.92
Impact on workers' performance	3.39	Difficulties in attracting new workers	2.83
Impact from unexpected changes in wages	3.37	Hiring and training costs of new workers	2.73
Risk of losing the best workers	3.29		

Source: Survey on wage setting in Portugal. Results weighted by employment.
[a]Average score on a scale from 1 ("Irrelevant") to 4 ("Very relevant") weighted by employment. [b]This factor is only relevant for wage cuts.

5.2 Alternative adjustment mechanisms

In an environment of sticky prices and wages, non-wage labour costs become na important adjustment tool to exogenous shocks, acting as a buffer to negative demand shocks on firms' employment (see Chen and Funke (2003)). Indeed, 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.

6 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

Table 6: Alternative strategies to reduce labour costs
(in percentage)

	Reduce monet. benefits	Reduce non-monet. benefits	Change shifts policy	Reduce pace of promotions	Hire new workers at lower wages	Reduce number workers	At least one strategy
Total	20.1	19.2	12.8	27.6	24.0	56.6	70.5
Manufact.	17.2	11.0	13.2	14.1	23.2	57.1	70.3
Constr.	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
Bus. serv.	16.5	22.1	13.9	26.0	20.6	53.2	69.8
Finan. serv.	41.1	40.0	0.0	77.9	41.5	82.3	87.2
Firms' size:							
Very small	5.1	4.4	3.0	9.4	5.3	30.7	44.7
Small	15.7	10.2	7.4	14.9	15.5	40.4	57.6
Medium	17.2	9.1	13.1	14.8	19.5	42.7	62.9
Large	21.2	22.6	13.0	31.8	25.8	61.4	73.5
Coll. agr.:							
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:							
EA	20.6	-	21.4	25.2	38.8	$20.7^{(a)}$	63.5

Source: Babecky et al. (2009*b*) and survey on wage setting in Portugal (2008). Results weighted by employment.

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)

Table 7: Firms' reaction to unanticipated shocks

	Demand shock		Cost shock		Wage shock	
	Score[a]	Share[b]	Score[a]	Share[b]	Score[a]	Share[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: Babecky et al. (2009*b*) and Survey on wage setting in Portugal. Results weighted by employment.
Notes: [a]Average score on a scale from 1 ("Irrelevant") to 4 ("Very relevant") weighted by the number of workers. [b]Firms that consider the shock as being relevant or very relevant (as a percentage of total employment in the sample.)

Table 8: Strategies to reduce costs: by type of shock and workers' qualification (as a percentage of total employment in the sample)

	After a demand shock		After a cost shock		After a wage shock	
	Skilled	Unskill.	Skilled	Unskill.	Skilled	Unskill.
Reducing:						
Base wages	2.0	1.2	1.5	1.2	-	-
Flexible wage component	28.7	14.2	26.5	13.5	15.2	26.1
Workers permanent contract	5.5	10.2	5.9	9.7	9.1	7.9
Workers temporary contract	16.6	34.8	13.6	30.0	33.3	16.2
Hours per worker	7.2	9.1	5.5	8.0	6.9	4.8
Other costs	40.0	30.5	47.0	37.5	35.5	44.9

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

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.

7 Concluding 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 paper are consistent with these findings. They include the frequency of price changes, the speed of price changes when shocks occur 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 the information from a survey conducted by the Banco de Portugal in the first half of 2008, this paper 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 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 slightly higher than one year - about 2 months less than in the euro area and 2.0 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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Table A1
Sample coverage
(In terms of firms)

	Sectors:														Memo:	
	Total		Manufacturing		Energy		Construction		Trade		Business serv.		Financ. serv.		Share in the pop.	Share of
	N.of empl.	Share (%)	N.of empl.	Share (%)	N.of empl.	Share (%)	N.of empl.	Share (%)	N.of empl.	Share (%)	N.of empl.	Share (%)	N.of empl.	Share of (%)	with 10 or more employees (%)	the whole popul. (%)
Population	107371	100.0	24881	23.2	132	0.1	19804	18.4	26252	24.4	31499	29.3	341	0.3	100.0	33.7
[10;20[	85133	79.3	17251	16.1	67	0.1	17361	16.2	23499	21.9	26831	25.0	124	0.1	79.3	26.7
[20;50[	14899	13.9	4904	4.6	29	0.0	2443	2.3	2753	2.6	4668	4.3	102	0.1	13.9	4.7
[50;100[	6109	5.7	2308	2.1	27	0.0	763	0.7	917	0.9	2018	1.9	76	0.1	5.7	1.9
$[100;+\infty[$	1230	1.1	418	0.4	9	0.0	99	0.1	155	0.1	510	0.5	39	0.0	1.1	0.4
Target.sample	4850	34.1	1872	38.6	25	0.5	657	13.5	841	17.3	1373	28.3	82	1.7	4.5	1.5
[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[	2055	42.4	917	18.9	11	0.2	240	4.9	322	6.6	533	11.0	32	0.7	1.9	0.6
$[100;+\infty[$	1142	23.5	417	8.6	9	0.2	91	1.9	149	3.1	436	9.0	40	0.8	1.1	0.4
Final sample	1497	100.0	546	36.5	16	1.1	202	13.5	260	17.4	440	29.4	33	2.2	1.4	0.5
[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
$[100;+\infty[$	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

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

Table A2
Sample coverage
(In terms of employees)

	Sectors:														Memo:	
	Total		Manufacturing		Energy		Construction		Trade		Business serv.		Financ. serv.		Share in the pop.	Share of
	N.of empl.	Share (%)	N.of empl.	Share (%)	N.of empl.	Share (%)	N.of empl.	Share (%)	N.of empl.	Share (%)	N.of empl.	Share (%)	N.of empl.	Share of (%)	with 10 or more employees (%)	the whole popul. (%)
Population	2504479	100.0	699962	27.9	13936	0.6	330646	13.2	471042	18.8	914257	36.5	74636	3.0	100.0	85.2
[10;20[	732617	29.3	162179	6.5	639	0.0	150022	6.0	192323	7.7	226032	9.0	1422	0.1	29.3	24.9
[20;50[	446907	17.8	149645	6.0	865	0.0	71424	2.9	81411	3.3	140327	5.6	3235	0.1	17.8	15.2
[50;100[	544140	21.7	207806	8.3	2568	0.1	65978	2.6	79103	3.2	181570	7.2	7115	0.3	21.7	18.5
[100;+∞[	780815	31.2	180332	7.2	9 864	0.4	43222	1.7	118205	4.7	366328	14.6	62864	2.5	31.2	26.6
Target.sample	1027215	100.0	302550	29.5	11300	1.1	74719	7.3	161651	15.7	409318	39.8	97677	6.6	41.0	34.9
[10;20[	10274	1.0	2984	0.3	10	0.0	2189	0.2	2568	0.2	2487	0.2	36	0.0	0.4	0.3
[20;50[	26555	2.6	9864	1.0	109	0.0	4689	0.5	5188	0.5	6463	0.6	242	0.0	1.1	0.9
[50;100[	243 389	23.7	109727	10.7	1 317	0.1	27274	2.7	37 122	3.6	64634	6.3	3765	0.4	9.7	8.3
[100;+∞[	746547	72.7	179 975	17.5	9864	1.0	40567	3.9	116 773	11.4	335734	32.7	63634	6.2	29.8	25.4
Final sample	327969	100.0	89434	27.3	9127	2.8	23 873	7.3	31 264	9.5	144274	44.0	29 997	9.1	13.1	11.2
[10;20[	3037	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[	74006	22.6	29 811	9.1	935	0.3	8194	2.5	13184	4.0	20258	6.2	1 624	0.5	3.0	2.5
[100;+∞[	242618	74.0	55636	17.0	8152	2.5	13438	4.1	15 738	4.8	121402	37.0	28252	8.6	9.7	8.3

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