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Abstract

We explore wage flexibility in a developing country and compare our results to what has been found in similar studies using European data. In particular, we conduct a survey of 1189 firms in Pakistan to analyse the determinants of wage rigidity. We find that the existence of competitive wages and an interaction with the informal economy are statistically significant determinants of wage stickiness. While the role of competitive wages is similar to what has been found in studies of European firms, the latter find a much larger role for turnover, collective bargaining and employment protection. In contrast, in Pakistan we find that firms hiring from the informal sector are significantly more flexible in changing their wages. This suggests that the informal sector adds to the wage flexibility of the formal sector.

1. Introduction

The objective of this paper is to study wage rigidity in Pakistan. Pakistan differs from the more developed countries where similar studies have been performed in that the system of unemployment benefits is absent, labour unions are very weak, a modern welfare state is non-exisistent, there is a large underground economy and poverty is widespread. It shares with many European countries the existence of significant firing costs, in particular in the public sector.

We report the results of 1189 face-to-face structured interviews carried out in 2009 to 2011 with managers in formal firms in the manufacturing and service sectors of Pakistan.[1] Only *regular* employees are included making our results comparable to similar research done in the developed countries. We start by reviewing the literature and then turn to describing our survey before describing our results on wage setting, the frequency of wage adjustments, wage setting rules and the determinants of wage flexibility.

2. Literature

Our structured interviews enable us to study reasons for downward wage rigidity in Pakistan (as Bewley (1999), Blinder and Choi (1990), Agell and Lundborg (1995), Campbell and Kamlani (1997) and Zoega and Karlsson (2006)) but we also focus on the frequency of wage changes rather than just the reasons why firms do not cut wages in recessions. We harmonize our questions with the European Central Bank survey enabling us to make direct comparisons. The ECB conducted a survey of 17000 firms in 17 countries, which was performed in 2007-2008.[2] The results are described in Druant et al. (2012), Galuscak et al. (2010), Babecky et al. (2009, 2012), and Bertola et al. (2012). Of particular interest to us is the presence of nominal wage rigidity.[3]

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[1] By formal it is meant that our firms are officially registered, tax liable and also report data to employment agencies. Therefore, these firms necessarily are a part of the official GDP and employment statistics.

[2] The countries included are Austria, Belgium, Czech Republic, Estonia, France, Greece, Hungary, Italy, Ireland, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Slovenia, Slovakia and Spain. The German survey was not fully harmonized with the others. In 2009 similar surveys were also conducted for Slovakia, Cyprus, Bulgaria and Malta.

[3] While there are few studies explaining the frequency of wage changes there is a much larger number of paper that focus on the frequency of price changes. To name a few of those, Rotemberg (1982) and Carlton (1986) studied price stickiness in the U.S., Cecchetti (1986) studied the frequency of changes of newspaper prices in the U.S., Blinder et al. (1998) presented the results of a survey of American firms, Asplund et al. (2000) studied gasoline prices, Hall et al. (2000) used survey data in the UK, Bils and Klenow (2004) study the frequency of price change of 350

Druant et al. (2012) describe the nature and sources of nominal rigidities in Europe. They focus on the frequency of price and wage changes; the prevailing mechanism of adjustment, in particular its timing and the degree of synchronization; and the cross-sectional variability of rigidity measures with respect to firm-specific characteristics, product-market features and labour market institutions. When it comes to wage setting, these authors find evidence of time-dependent rules with more than half documenting that wage changes are concentrated in a particular month. They also find significant variability in wage setting across firms and sectors. Wages turn out to be more flexible when bargaining is decentralised, when the coverage of collective bargaining and the stringency of employment-protection legislation is low and where the share of high-skilled and white-collar workers is smaller.

In this paper we are interested in exploring the frequency of wage changes and the determinants of wage flexibility in a develping country that differs in fundamental ways from the European economies. To facilitate a comparison we will structure our questions based on Druant (2006, 2012). The wage setting enviornment in Pakistan differs from what we find in the European countries mainly in that labour unions in Pakistan are weak, a modern welfare state is non-existent and there is a large informal or underground economy.

3. The survey

The survey was conducted in the provinces of Punjab and Sindh between December 2009-March 2010 and June 2010-October 2011 respectively. For security reasons, smaller provinces were exlcuded. The survey was carried out in collaboration with the statistical agencies of Pakistan, which also conducted a pilot study before launching the formal interviews.[4] The questions were directed at regular employees defined as workers on formal contracts, registered with social-security or the *Employment and Old Age Benefit Institute* (EOBI), and recorded in firms' official documentation.

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categories of goods and services in the U.S., Amirault et al. (2005) studied price stickiness in Canada and more recently Fabiani et al. (2007) and Álvarez (2008) report the results of a study of pricing decisions in the euro area.
[4] For a further quality check, economists from the Central Bank randomly audited 10% of live interviews.

The manufacturing sample is drawn from data registers for census of manufacturing industries (CMI). Economic activity codes from 15 to 36 (excluding 30 since this sector – ioffice equipment and computers – does not have any private firm) are covered in the *Pakistan-Standard-Industrial-Classification* (PSIC) system.[5,6] Similarly, firm size in the manufacturing industry was defined on the basis of employment; firms in the manufacturing sector were split into three employment brackets: 10-50, 51-250 and more than 250 employees defined as small, medium and large firms respectively. Based on these criteria, a random sample of 1200 manufacturing firms was drawn from 63 mutually exclusive strata, along with a 50 per cent extra replacement sample.[7]

Pakistan has no formal database for the service sector. To overcome this issue, we used the database of the *Securities and Exchange Commission of Pakistan* (SECP) which maintains a list of all firms registered with them. Yet, the SECP register has its own limitation; it lacks information on firm size and whether firms are dormant or non-dormant. Before utilizing the SECP database we applied filters to circumwent this limitation[8]. Our final service sector sample of 270 firms includes firms from transport and telecommunication, hotels and restaurants and education and health care services, while construction, real state, financial services, wholesale and trade sectors were dropped due to the problem of defining their main service.[9] This is because for services like financial services, construction, retail and trade the type of service may change with every transaction.

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[5] The activities are: 15-(food products & beverages), 16-(tobacco products), 17-(manufacture of textiles), 18-(wearing apparel), 19-(leather products), 20-(wood & wood products), 21-(paper & paper products), 22-(publishing, printing & reproduction), 23-(petroleum), 24-(chemicals & chemical products), 25-(rubber & plastics products), 26-(other non-metallic mineral products), 27-(basic metals), 28-(fabricated metal products), 29-(machinery & equipment N.E.C.), 31-(electrical machinery & apparatus N.E.C.), 32-(radio, TV & communication equipment), 33-(medical & optical instruments), 34-(motor vehicles & trailers), 35-(other transport equipment), 36-(furniture).

[6] These economic activities are in line with the *International Standard Industrial Classification* (ISIC).

[7] In case of non-response, a firm from a particular stratum was randomly replaced by another firm from the same stratum to maintain an unchanged sectoral representation.

[8] For example, to minimize the chance of selecting dormant firms from a very large database, we only selected firms that had been registered within the last ten years and if registered before that time period have reported to the SECP at least once in the last ten years.[8] Also to avoid too many small firms, firms with paid-up capital of more than RS. 2,000,000 (USD 23500) were selected.

[9] This is because we used the same sample for a separate price-setting survey where it was necessary to include firms involved in economic activities that could not be clearly identified in term of product/service.

To draw valid inferences from the population, we perform post stratification to control for closure, non-responses and possible economic activity shifts. We have also dropped observations when firms were pure exporters since we are only interested in firms that operate in the domestic markets. Furthermore, large firms suffered from a low response rate but their decisions are likely to be more important. As a result, the observations required adjustment for firm size as well. These adjustments were done differently for the manufacturing and service sector because the data came from separate sources. [10]

With population frame, economic activity and firm size serving as pivots, we draw a stratified-random sample for each sector. We summarise the sample in Table 1 below where the first two lines describe the size of the manufacturing and the service sectors, lines 3 and 4 show how large the sample is in terms of aggregate output and employment in Pakistan and the remaining lines show the composition of the sample based on the location and size of firms and the type of workers.

Table 1. Sample Details

	Manufacturing	*Services*	*Total*
Overall economy			
% GDP shares in Pakistan 2009	18.3	53.1	71.4
% of employment share[a]	13.2	14-16.4	27.2-29.6
Sample			
% of GDP represented in sample[b]	12.2	13-15	25.2-27
% of sector representation in sample	86	14	100
Sindh Representation	28%	37%	
Small	55.9	62.8	56.9
Medium	28.4	24.4	27.8
Large	15.7	12.8	15.3
White Collar	10.7	62.2	32.8
Skilled Blue Collar	63.4	33.3	50.5
Unskilled Blue Collar	25.9	4.5	16.7

a: These employment estimates include informal employment.
b: This percentage is used for reweighting the manufacturing and services sector estimates.

The estimates for the aggregate economy are presented as weighted averages based on the sectoral contribution of manufacturing and service sectors to GDP. Generally, the manufacturing

and service sectors combined accounted for 71.4% of GDP in 2009, while taking only into consideration the sub-sectors covered in our interviews. Our sample is a good representation of decision-makers that produce 25.2-27 per cent of GDP and that of formal sector wage-earners in our chosen sectors. Specifically, out of 1189 respondents, the sample of 1025 in the manufacturing sector turns out to be 9 per cent of the overall target population, but the sample from the service sector is smaller and based on a derived population. We use final post-stratification to reduce sectoral bias as per their contribution towards GDP. Interestingly, the employment shares of these two economic sectors are consistent with their GDP shares, hence all the estimates reported can be interpreted as both weighted by respective shares in GDP and/or employment.

The selection rests upon per strata shares to population. However, sample size was deliberately increased for the smaller strata to raise the power of the statistical inference. We asked CEOs to break down their labour force into three socio-occupational categories: (i) white collar, (ii) skilled blue collar and (iii) unskilled blue collar. Regular employees accounted for 66% of all workers in firms in our sample, implying that our results reflect the wage-setting pattern for the representative group of workers we visited. In particular, skilled blue collar employees account for the main occupational group in the manufacturing sector in the sample (63 per cent) while in the service sector it is white collar employees (62 per cent). Looking at the data by firm size we find that small and medium sized firms employ mostly skilled blue-collar workers while large firms employ mostly white-collar workers as regular employees.

Employment belonging to the manufacturing and service sectors account for 47.1% of the labour force in Pakistan[11]. However the focus of the paper is formally registered employers in the service and manufacturing sectors and these account for 18.3 per cent of the total labour force. Dropping the formal/informal distinction, wage-earners category is the predominant work-type

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[11] Pakistan Labour Force Statistics. 2008/9.

category, accounting for 33.8% of the labour force in Pakistan. Therefore, our survey focuses on the top two non-agricultural sectors in the formal economy and the top work-type category..

4. Wage setting and levels

We find in Table 2 that 2 per cent and 91 per cent of firms ranked unions and company owners as either important or very important for wage-setting respectively.

Table 2. How important are the following in wage related decisions in your company?

	Mean Score[a]	% important[b]
Owners of the company	1.41	91.1
Executive management of parent company	2.79	45.4
Unions	3.92	2.2

a: 1, 2, 3 and 4 denote "very important," "important," "of minor importance" and "unimportant"
b: percentage of firms responding "important" or "very important"

We asked CEOs to indicate the wage bracket of their main occupational group. Results in Table 3 show that a majority of firms choose to reward their employees close the minimum-wage level announced by the government.[12] We also find that mean manufacturing sector wages are lower than average wages in the survey. In particular, we find that the wages of 70 per cent of firms in manufacturing are clustered close to the minimum wage level. In the service sector however, the wage distribution has a higher variance as well as higher average wages. Although the official minimum wage is binding in Pakistan we observe that 10.2 per cent of firms admitted paying wages lower than the official minimum wage rate. Notice that the bulk of employees in the minimum-wage category are unskilled workers of small firms.

Furthermore, wage comparisons across the main occupational groups reveal interesting, although not unexpected, results. The white-collar group has the highest wage of 15-25 thousand rupees while the average wages of skilled and unskilled blue-collar are in the lower brackets.

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[12] In the Punjab survey, the minimum wage limit is rupees 6000, while it was revised to 7,000 at the time we started doing the Sindh survey. We therefore, revised upwards the lower two brackets wage to: 7000 or below and 7001-10,000 while the remaining categories remained unchanged.

Notice how the wages of skilled blue-collar employees are concentrated near the minimum wages (for 67 per cent of firms). The dispersion of the average increases positively with firm size.

Table 3. Average (monthly) Wage Distribution (Percentage)

Wage in thousand Rupees	≤ 6	6-10	10-15	15-25	> 25	Average Wage Group
Pakistan	10.2	52.7	15.7	14.6	6.9	10-15
By Socio-occupation						
White collar Employees	1.3	24.7	21.9	33.2	19.0	15-25
Skilled-Blue Collar Employees	9.8	67.0	14.7	7.3	1.2	6-10
Unskilled-Blue Collar Employees	28.8	64.6	6.6	0	0	6-10
By Economic Activity						
Manufacturing	17.4	69.1	10.5	2.8	0.3	6-10
Services	0.8	31	22.5	30.2	15.5	10-15
By Firm Size						
Small	11.1	55.8	14.6	14.9	3.5	10-15
Medium	7.1	51.8	22.4	7.1	11.8	10-15
Large	4.3	26.5	19.7	17.9	31.7	15.25

Other than the basic wage, we also asked firms about the use of bonuses in their organizations. About 57 per cent of firms reported giving bonuses to their employees. We then asked CEOs about the reasons for using such incentives. The most common reason these firms cited for giving bonuses is the sharing of profits. Around 36 per cent of firms give bonuses based on profits and this is more popular in firms with a large number of employees. The second most common reason given for paying out bonuses, cited by 29 per cent of firms, is the celebration of religious festivals irrespective of profits and individual performance. Finally, a quarter of bonuses are linked to individual performance. These performance-based bonuses are more common for production workers, 34 per cent skilled blue collar employees whose output is easily observable getting them.. Annual traditional bonuses are more common for unskilled workers with 43 per cent of such workers being rewarded this way.

5. Wage Adjustment Decisions

The main questions on wage dynamics in our survey are centered on the frequency of wage changes and the rapidity with which wages respond to shocks. Managers were asked to state the frequency of wage changes as either (i) quarterly (ii) bi-annually (iii) annually (iv) once in every two years or (v) never. Our frequency variable is non-continuous and a composite one and it is deliberately designed this way so that a comparison could be drawn with other similar studies, such as Druant et al. (2012). Table 4 shows the frequency of wage changes based on the distribution of wage changes from our menu of frequencies and compares it with countries in their study.

Table 4. Frequency of wage changes

	Less than Annual	Annual	Greater than Annual
Euro area	11.4	59.5	26.4
Non-Euro area	14	59.5	23.2
Total EU [a]	12.1	59.7	28.2
By Economic Activity (all EU)			
Manufacturing	12.3	59.1	26.5
Services	10.9	59.8	23.1
Pakistan [b]	2.7	84.8	**12.5**
By Socio-occupation			
White collar	1	73.8	**25.1**
Skilled blue collar	3.2	90.6	6.2
Unskilled blue collar	5	88.9	6
By Economic Activity			
Manufacturing	3.5	89.8	6.6
Services	1.6	78.1	**20.4**
By Firm Size			
Small	2.4	85.2	12.3
Medium	8.2	85.9	5.9
Large	0.9	80.3	18.8

a: Estimates from Druant et al. (2012), pages 6-7 relate to the working paper version.
b: Figures weighted by employment weights, rescaled for non-responses.
b: Each firm was assigned the highest frequency of wage change for any reason.

Wages are relatively rigid as nearly 85 per cent of firms reported changing their wages only annually. This figure is higher in Pakistan than in both the euro and the non-euro European economies where only 60 per cent of firms change wages annually. However, more than twice as

many firms in the European countries admit revising wages after a year, 28.3 against 12.5 per cent. The overall implication is that wage rigidity appears greater in Europe than in Pakistan. The longest wage spells are for white-collar employees and the service sector, while the shortest spells are for unskilled workers whose wages change almost annually. An analysis of wage duration across firm size shows that wages are more rigid in large firms, while the shortest wage spells are in medium size firms where wages change every 12.5 months.

Our results show that on average wages revisions occur every 13.5 months in Pakistan. A comparison with Druant et al. (2012) reveals that, as expected, this wage duration is shorter than both in the euro area (15 months) and in the non-euro area (14.7 months). In terms of sectoral differences, wages are revised after 12.7 months in the more flexible product market of the manufacturing sector, for the services sector the average duration is 14.5 months. In Pakistan the frequency of price changes in the manufacturing sector is three times higher[13] when compared with the service sector where price changes occur twice a year. Our finding is consistent with studies such as Cecchetti (1987), Fregert and Jonung (1986), Card and Hyslop (1997) who also observe that higher inflation (i.e. lower price rigidity) and lower wage rigidity go hand in hand. In contrast, the results in Druant et al. (2012) show no significant differences in wage duration between the manufacturing and service sectors but price rigidity between the sectors tends to differ.

In sum, there are wage rigidities in Pakistan but wages are less rigid than in the developed economies. Wages are more flexible in the manufacturing than in the service sector. The empirical evidence presented on wage stickiness has important implications for policy-making in Pakistan since monetary policy is less effective in Pakistan due to its greater wage flexibility.

To continue this point further, let us make the assumption that all features of the Pakistani economy resemble those of the Euro Area economies with the exception of the frequency of wage changes as reported in Table 4 and price rigidities from Choudhary et al. (2011). The latter

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[13] See Choudhary et al. (2011).

reports the latest publicly available information on price rigidities in Euro Area and the U.S as well as results for Pakistan. We plug this information into a dynamic stochastic general equilibrium (DSGE) model of the Euro area as in to Smets and Wouters (2003). Apart from wage rigidity, this model also contains price-rigidity, habit-persistence in consumption and investment adjustment costs, in addition to standard ingredients such as monopolistic competition in the product market, a monetary policy rule and a balanced budget. In Figure 1 we present model-based simulation of the impact of a one standard-deviation interest-rate shock on the output gap. The flat horizontal asterisks-marker line represents the classical position where no wage and price rigidities exist, i.e. monetary policy is irrelevant. Ceteris paribus, we then introduce sticky wages alone and compare the results with having only price rigidity, i.e. the diamond-marker against the continuous solid line in the figure. Here, we find the well known result of Smets and Wouters (2003) that price stickiness is more important than wage stickiness for monetary policy having an impact.[14]

Now let us move to the interesting experiment of comparing Pakistan with the Euro Area, represented by the dash and the dotted lines respectively. To repeat, the idea is to plug price and wage rigidity parameters of the relevant country while calibrating the remaining parameters to those of the Euro Area.[15] It empirically turns out that price and wage rigidities are lower for Pakistan than the Euro Area. We find that the real impact of a policy shock on output for Pakistan is far smaller than in the Euro Area, both on impact and in the dynamic sense. Indeed, in the Euro Area output falls 0.4 below its potential and effects of a policy shock dies out (with 5 percent recovery remaining to be precise) only after the 20th quarter. In the case of Pakistan output drops by 0.29 and the majority of recovery happens by the 11th quarter.

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[14] The result is in contrast to what is found in Christiano et al (2005) for example. This is because the latter incorporates the cost channel; highlighting the role of labor costs and how these are financed.
[15] We adopt this approach as it allows a direct model-based comparison and data issues for other calibrated parameters are immense for Pakistan.
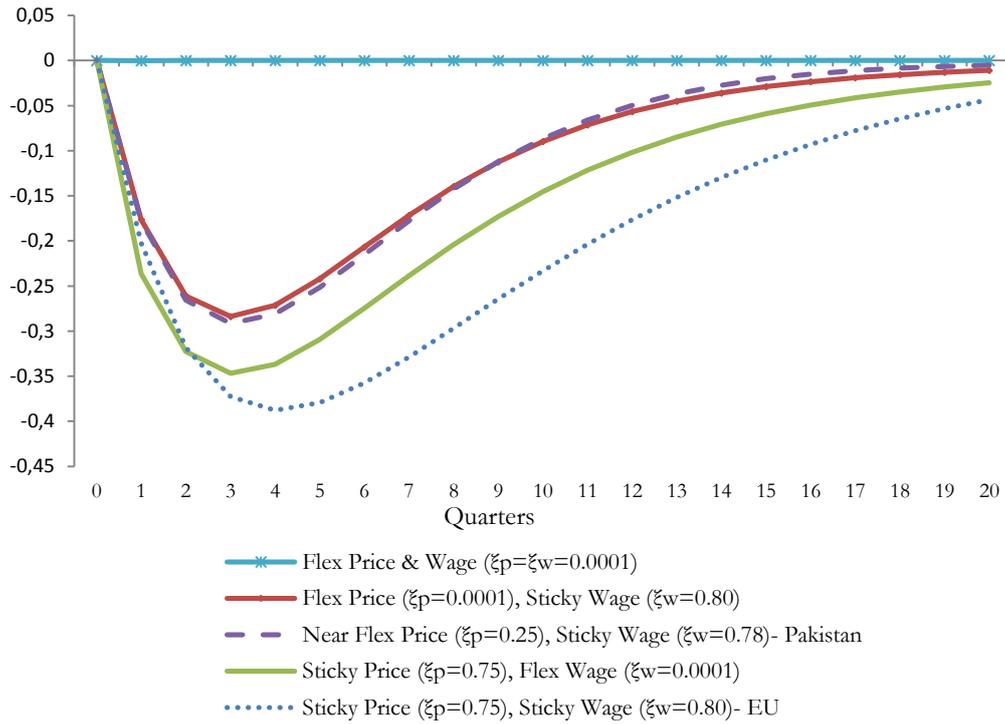
Figure 1. The Impact of an interest-rate shock on the output gap *(y-y*).*

This exercise goes to show that given the caveat of assuming that the economic structure of Pakistan mimics the Euro area of Smets and Wouters (2003) with the exception of price and wage rigidities, monetary policy is effective for Pakistan but its initial impact on output is smaller and the effect lasts for a shorter period.

In our line of inquiry, we also asked managers about the most common reason for the frequency of wage changes discussed above. Almost 90 per cent of the managers cited tenure as being the reason and 89 per cent of these managers also admitted changing wages at an annual frequency. Tenure based wage changes are less common for white-collar employees and large firms (78 per cent). Inflation based wage revisions were observed for 60 per cent of the firms and most of these are conducted at an annual frequency (87 per cent of firms). Here again white-collar employees are less likely to be compensated for inflation (52 per cent of managers admitting to it). In contrast, Druant et al. (2012) shows that wage changes are most commonly due to inflation especially in Austria, Belgium and Spain where 80 per cent of firms change wages

annually or more frequently due to inflation. We should note that these countries differ from Pakistan in that they are among the richest countries in the world measured by GDP per capita, have lower levels of steady-state inflation and strong labour unions whereas Pakistan is around 150th place in income per capita, has high inflation and almost very limited labour union power.

6. Rules

We now turn to the pattern of wage changes, which determines the way nominal disturbances are incorporated into wages which in turn determines the persistence of real effects of aggregate nominal perturbations. The results in Table 5 indicate that almost 77 per cent of firms use purely time-dependent rules and an additional 13 per cent follow these rules under normal circumstances. This finding is consistent with Euro-area surveys but there 61 per cent used time-dependent rules. However, in the non-euro area the picture is different with only 34 per cent of managers claiming to follow these rules.

Table 5. Time and State Dependent Wage Revision Rules *(percentage)*

	Time Dependent	State Dependent	Both
Pakistan	77.3	9.8	12.9
By Socio-occupation			
White collar	73.8	12.9	13.4
Skilled blue collar	79.1	9.3	11.5
Unskilled blue collar	78.9	5.1	16.1
By Economic Activity			
Manufacturing	80.3	5.0	14.7
Services	73.1	16.3	10.6
By Firm Size			
Small	76.6	10.9	12.5
Medium	83.7	7.0	9.3
Large	77.6	2.6	19.8

The existence of time-dependent rules implies that wage changes may be concentrated in specific months. This is important, as the exact timing of wage decisions and shocks co-determine the strength of shock transmission.[16] Relative to other surveys, there is strong evidence for the

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[16] Olivei and Teneryro (2008) find that the adjustment to shocks actually depends on the timing of wage changes and economic disturbances. They show that monetary policy innovations in Japan that occur during the first half of the year, when most wages are reset, have a relatively smaller effect on output than those occurring later in the year.

concentration of wage changes. Indeed 83 per cent of firms revise wages in a given month whereas only 54 per cent of firms do so in Druant et al (2012). We also asked managers exactly which months they prefer the most and the results show that wage changes are clustered around July (the start of fiscal year) or January (the beginning of the financial year).

To sum up, we learn that wages are rigid in Pakistan but less so than found in comparable surveys in the European economies. Nominal wages in the manufacturing sector are less rigid than in the services sector. When wages do change, they do so at a 12 month time interval and on a set date typically at the start of the financial (January) or the fiscal year (June).

7. Asking about Wage Rigidity Theories

We now address reasons for wage rigidity. For this assessment, we have the benefit of decades of research on theories of wage rigidity. In most cases, the empirical validity of these theories is not easy to assess as the available data is often not sufficient to distinguish between individual theories. For example it is not possible to quantify the notion of morale, shirking or fairness. As a result, Kaufman (1984) and Blinder and Choi (1990) initiated a distinct strand of literature by asking wage-setters directly about what prevents them from cutting wages, based on a selection of theories proposed by economists.[17]

Based on these theories, we presented managers with a series of short statements in common language and asked them to rank the importance of those statements from very "important," "important," "of minor importance" to "not important" (scaled from 1 to 4 respectively) for the decision not to cut wages. The statements are taken from Druant et al. (2012) in order to facilitate a comparison with studies of more developed countires. Table 6 reports the weighted mean scores along with an international comparison.

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[17] Other notable contributions using this methodology, mostly for developed countries, are Capmbell and Kamlani (1997), Agell and Lundborg (1995) for Sweden, Babecky et al. (2009) and Druant et al. (2009) for Europe wide surveys and Zoega and Karlsson (2006) for Iceland.

Table 6. Rating Theories on Wage Stickiness

Theories	Mean Score [a]	% important [b]	p-value [c]	EU-Mean Score [d]
Adverse selection (quit version)	1.8	84.2	0.000	1.7
Gift exchange	1.9	81.7	0.016	2
Relative wages	2.0	81.1	0.937	2.4
Efficiency wages – effort	2.0	79.8	0.000	1.9
Adverse selection (hire version)	2.3	59.3	0.972	2.2
Insider-outsider theory	2.3	61.7	0.009	
Turnover model	2.4	56.6	0.000	2.2
Implicit contracts	2.5	54.6	0.000	2.6
Collective agreements	3.1	33		

a: 1, 2, 3 and 4 denote very important, important, of minor importance and unimportant.
b: Percentage of firm rating the theory as important or very important.
c: Refers to the null-hypothesis that theory s mean score is equal to the theory just ranked below.
d: Excludes Germany and Greece. Source: Montornès and Saures-Leroy (2009), P. 43.

The overall results indicate that the efficiency wage model, in particular adverse selection (quit version), considerations of morale (gift exchange), relative wages and the shirking models as the top three deterrents to cutting wages. However, a detailed look at the data reveals other interesting results.

The adverse selection model remained the most important for wage revisions, with 84.2 percent of firms ranking it as a high importance factor (either as important or very important). These firms avoid lowering wages out of fear of losing their better workers. However, we found less success with the hire-version of the adverse selection model, coming in at fifth place, still around 60 percent of firms considered it a high importance factor. Labor morale, which includes the gift-exchange model, is the second highest ranked theory preventing wage cuts, 81.7 per cent of firms ranked that either important or very important . The third and fourth relevant theories are relative wage concerns and the wage-effort relationship; the two theories are statistically indistinguishable. Collective wage agreements received the weakest support of the models and this supports the conventional wisdom that wages are predominantly negotiated in an individual

wage-bargaining' system. The turnover-training model came third last, which implies that concerns about keeping productive individuals override a desire to save on training costs overall.

The reasons for wage rigidity may vary across different occupational groups, firm size and economic activity in the product market (see Campbell and Kamlani,1997, and Agell and Lundborg, 1995). The adverse selection (quit version) received top rank for not cutting wages except for unskilled blue-collar employees. This is to be expected as wages for such workers are covered by the minimum-wage law. The quit-version of the adverse selection theory also remains a top ranked theory for the higher cadre pool i.e. white collar and skilled blue collar employees. Overall however, the top four theories remain robust among all the sub classification of size, occupation and economic sector, with minor changes across groups. Interestingly, the shirking model is more relevant for skilled blue-collar workers where output is not easily observed. Relative wages are more relevant for white-collar workers for whom there exist usually few options within firms so they have very few people to make intra firm comparisons (see Agell and Lundborg, 1995).

8. The determinants of wage rigidity

We now move on to study the factors that can explain differences in the level of wage rigidity across firms in Pakistan. Our dependent variable is the degree of stickiness based on the frequency of wage changes. It takes value 1 if the firm changes wages more frequently than a year, 2 if wages are revised annually and 3 if wage changes are less frequent yearly. Hence, our dependent variable is increasing in the degree of stickiness. We explain this stickiness using three broad categories of variables: firm cost structure and product- and labour market characteristics.[18] This specification is commonly used for developed economies for wage-setting, see for example Druant et al (2006, 2012) and the literature therein.

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[18] In all regressions we control for firm size, occupational category, economic activity and geography. For firm size we include dummies for small and large size firms.

The first set of explanatory variables, included in column 1 of Table 7, includes dummy variables for small firms, large firms, firms located in Punjab, while collar jobs, skilled blue collar jobs and manufacturing. The results indicate that wages are significantly more rigid in large firms, in contrast to what was found in Druant et al. (2012). Wages are also more sticky in white collar and skilled blue collar jobs, as opposed to unskilled blue collar jobs as found in Druant et al. (2012), and less rigid in manufacturing. However, we should note that the coefficients of these variables are not very significant.The European study finds that wages in manufacturing are more flexible than in the services while they are even more flexible in construction.

The cost structure explanatory variable is proxied by (i) share of labor in total costs, (ii) share of basic wages in the total wage bill and (iii) use of alternative cost cutting strategies (Column 2). Firms with higher flexibility of cost structure are more capable of absorbing labor cost shocks, and hence less likely to change wages. However, we see no effect of the flexibility of the cost structure on wage rigidity in our data. This is consistent with the results of Druant et al. (2012) To test how the product market affects wage rigidity, in column 3, we add two variables for competition in product-market and firms' exposure to international markets.[19] As is the case for more developed economies, the competition variables do not come out as important factor for wage stickiness, a result in sync with Druant et al. (2012), Babecky et al. (2012) and Lozev et al (2011) who use a similar methodology. Similarly exposure to international product markets does also not affect wage rigidity significantly.

We now turn to labor market variables captured by workforce turnover and competitive pressures emanating from competitors' wage shocks. The results are shown in column 4. Though competition in the product market does not seem to be related to wage stickiness; wages of competing firms play an important role in lowering wage stickiness. This is consistent with results for European countries, see Montornes and Saunder-Leroy (2009). The wage stickiness literature usually relates higher workforce turnover to lower wage rigidity, as in Druant et al (2012), but our

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[19] The data for these variables are obtained from Choudhary et al. (2011).

data do not support the significance of employees' turnover for wage rigidity. This find is important and in sync with Elsby's (2009) model. In a country with high steady-state inflation firms do not have to worry about the long-run consequences of current wage decesions regardless of the firm-worker seperation likelihood.

We also included a variable for the incoming labor force from the informal sector. This novel data was available from the question on reliance on the informal labour market for hiring labour. The significant negative regression coefficient indicates that firms hiring from the informal sector are significantly more flexible in changing their wages. This suggests that the informal sector adds to the flexibility of the formal sector, which is a novel result. Many previous studies argue that the informal economy helps the formal sector reduce costs (see Batini, Levine and Lotti, 2010). Estevo and Filho (2012) also provide empirical evidence on the importance of informality in increasing wage flexibility in Brazil using a different methodology and non-survey data; however, they define informality in term of informal wage contracts, while our survey treats informality at the firm level. Our results differ from these studies as our dependent variable measures upward wage revisions and the flexibility of wages directly due to interaction with the informal economy is due to hiring from the informal sector.

We have found that the existence of competitive wages and hiring from the informal sector contributes to wage flexibility. In column 5 we add the share of high-skilled workers (sum of white collar and skilled blue collar employees) and a dummy variable for individual wage negotiations. Neither of these variables turns out to have a significant coefficient at the 5% level of significance. In contrast, Druant et al. (2012) find that collective agreements make wages more flexible.

The last two columns in the table include two additional factors; indexation to inflation and minimum wages. The regression results do not show any significant effect of the indexation of wages to prices. To analyze the effect of minimum wages on wage rigidity, we include a dummy variable which takes the value 1 if minimum wages are either an important or a very important

factor for taking wage decisions. While firms have been documented to state that changes in the official minimum wage level are important for the upward revision of wages (see Ahmed et al. 2012), our regression results do not show any significant effect of the stated importance of minimum wages for the frequency of wage changes. This result may be explained by the fact that minimum wages are revised less frequently than a year, and when they do change most firms incorporate them within 3 months, both those paying minimum wages and also those paying wages above the minimum wage level. Therefore, a priori, differences in the frequency of wage changes across firms and the importance of minimum wages should not be related and this is what we find.

9. Conclusions

To sum up, in this paper we find novel results on wage determination in a developing economy. We have learned that wages are rigid in Pakistan but less so than found in comparable surveys in the European economies. Moreover, nominal wages in the manufacturing sector are less rigid than in the services sector. When wages do change, they do so at a 12 month time interval and on a set date typically at the start of the financial (January) or the fiscal year (June). We find that 35 and 45 per cent of wage revisions take place at the beginning of the financial and the fiscal year respectively. While 83% of wage changes are reported to take place in any given month. These results suggest that there is some concentration in wage revisions but at economy-wide level wages are not synchronized. A similar pattern is found in European surveys where however only 54 per cent of managers admit wages change in a given month;

We have also found that competitive wages and hiring from the informal economy are significant determinants of wage stickiness. We have run regressions for wage revisions due to inflation, tenure and other factors separately and found that competitive wages and the informal economy retain their significance when these variables are added. In comparison, Druant et al. (2012) emphasize the role of collective bargaining and weaker employment protection in

contributing to wage flexibility in the European labor market. Our survey provides evidence does not find support for the role of those variables in Pakistani labor markets.

Table 7. Results of Ordered Probit Regression

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Small	0.476 *	0.466	0.491	0.556 *	0.580 *	0.515	0.597 *
	(0.238)	(0.243)	(0.262)	(0.277)	(0.273)	(0.278)	(0.249)
Large	0.662	0.667	0.814	0.949 *	1.065 *	0.916 *	0.879
	(0.478)	(0.467)	(0.463)	(0.435)	(0.437)	(0.449)	(0.455)
Punjab	-0.463 *	-0.434	-0.476	-0.418	-0.388	-0.422	-0.453
	(0.235)	(0.239)	(0.261)	(0.247)	(0.251)	(0.257)	(0.251)
White Collar	0.668 *	0.649	0.646	0.485	0.720	0.473	0.547
	(0.333)	(0.339)	(0.342)	(0.361)	(0.481)	(0.374)	(0.361)
Skilled Blue Collar	0.251	0.242	0.214	0.250	0.402	0.236	0.339
	(0.241)	(0.242)	(0.235)	(0.233)	(0.386)	(0.255)	(0.244)
Manufacturing	-0.310	-0.321	-0.350	-0.162	-0.130	-0.261	-0.360
	(0.248)	(0.258)	(0.247)	(0.326)	(0.307)	(0.246)	(0.263)
Labour Cost Share		0.0000595	0.000158	0.00302	0.00362		
		(0.000608)	(0.000514)	(0.00579)	(0.00553)		
Alternative Cost Cutting		0.151	0.190	0.145	0.139		
		(0.221)	(0.219)	(0.208)	(0.208)		
Share of Basic Wage			0.00751	0.00548	0.00628	0.00570	0.00514
			(0.00534)	(0.00489)	(0.00486)	(0.00507)	(0.00514)
Product Market Competition			-0.178	-0.206	-0.193	-0.192	-0.336
			(0.266)	(0.245)	(0.256)	(0.259)	(0.259)
Exports			0.197	0.149	0.168	0.0650	0.0349
			(0.363)	(0.298)	(0.285)	(0.315)	(0.342)
Turnover of Workforce				0.0243	0.0771	0.0421	0.160
				(0.200)	(0.202)	(0.206)	(0.208)
Competitive Wage				-0.572 **	-0.596 **	-0.575 **	
				(0.197)	(0.194)	(0.207)	
Informal Sector				-0.684 ***	-0.664 ***	-0.687 **	-0.882 ***
				(0.206)	(0.201)	(0.218)	(0.238)
Share of high skill workers					-0.00259		
					(0.00669)		
Individual Wage Negotiations					-0.389		
					(0.234)		
Indexation to Inflation						-0.0593	-0.0656
						(0.181)	(0.186)
Minimum Wage Law							0.0747
							(0.0945)
Observations	1189	1180	1170	1129	1127	1088	1047
Pseudo R^2	0.100	0.095	0.109	0.188	0.201	0.194	0.189
χ^2	22.09	20.93	23.56	39.16	41.23	37.51	35.74

* p<0.05, ** p<0.01, *** p<0.001
Standard errors are in parantheses.

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Post Stratification

In the case of the manufacturing sector, the observations are adjusted using the procedure in Kwapil et al. (2005) and Martins (2005) where data points were re-weighed by sub-sector of economic activity and firm size in that

$$w_h = \frac{\dfrac{P_h}{P}}{\dfrac{S_h}{S}}$$

where, w_h, P_h, P, S_h and S denote the weight of the hth stratum, the number of employees in the population in stratum h, the total number of employees in the population, the number of employees in the firms interviewed in stratum h and the total number of employees in all the responding firms respectively.

Post-stratification is more complex for the services sector because the SECP database does not include information on employment. However, we had information of authorized paid-up capital from SECP database which can be used as a proxy for firm size. We therefore split firms in services sector on the basis of authorized paid-up capital as small, medium and large firms according to less than Rs.15000000, Rs.15000000-50000000 and greater than Rs.50000000 respectively. The responses for the services sector in this paper are therefore reported by post stratification using the following weights

$$w_h = \frac{\dfrac{C_h}{C}}{\dfrac{o_h}{o}}$$

where w_h, w C_h, C o_h and o denote *hth* stratum weight, the paid-up capital of the firm in the population in stratum h the total paid-up capital of firms in the population frame, the paid-up capital of the firms interviewed in stratum h and the total paid-up capital of the firms in the sample.