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Formal Sector Price Discoveries: Preliminary Results from a Developing Country

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Abstract
We present preliminary results of 1086 structured interviews about price setting behavior of the formal firms in the manufacturing and services sector of Pakistan. Our key discoveries are that frequency of price change is considerably high in Pakistan, lowering the real impact of monetary policy. Price rigidity is explained mainly by firms caring about relative prices and the persistence of a given shock. The exchange rate and cost shocks are more important than financial and demand shocks for both setting prices and also the readiness with which these pass-through to the economy. Large firms change prices more frequently compared to smaller firms. Formal sector firms, especially medium sized firms, interact more with informal sector firms through the demand and supply channels. Formal firms highly connected with the informal sector have lower frequency of price changes. Formal sector firms hold lack of taxes and compliance with tax regime, i.e. enforcement, as the main reasons for the existence of the informal sector.

Key Words: *Nominal Price Rigidity; Price Setting; Shock Dissemination; State and Time Dependant Rules; Informal Economy*
JEL: E5; F4; O1

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1. Introduction

The idea of sticky prices is at the heart of modern day macroeconomics for explaining economic fluctuations over the short horizon. It implies that instead of being vertical the aggregate supply curve is upward sloping. Therefore, fluctuations in aggregate demand can cause fluctuations in output. This setup is fundamental for monetary policy as it determines the extent to which money growth, with its influence on aggregate demand, can influence the real economy. As it is commonly implied that lengthier the period between price changes the greater the influence of monetary policy. Therefore it is quintessential to empirically establish the extent and the nature of sticky prices.

Until recently there had been a gap between theoretical explanations of price-stickiness and studies of their empirical importance. Partly in response to this gap and partly because of the apparent success over the last two decades of monetary policy in curbing inflation, central bankers and academics of advanced economies have devoted much resources to empirical study of price stickiness[1]. To name a few studies Rotemberg (1982), Carlton (1986), Cecchetti (1986), Kashyap (1995), Blinder (1991), Blinder et al. (1998), Taylor (1999), Aspland, Eriksson and Freiberg (2000), Hall, Walsh and Yates (2000), Bils and Klenow (2004), Levy, Datta and Bergen (2002), Amirault et al. (2005) and more recently Fabiani et al. (2007) and Nakamura and Steisson (2008). This large literature for U.S. and European countries shows that the degree of price-stickiness is considerable and pricing strategies are complicated.

However, the corresponding effort to study price-stickiness in developing economies leaves much to be desired. Such a study is all the more important in light of the growing literature that documents for the contrasting features of the developing world such as: (i) *procyclical* monetary policies, (ii) persistence of inflation levels in the double-digits and (iii) higher than average volatilities of annualized inflation rates (see especially Agénor and Montiel (2010) and Frankel (2010) and the literature therein). Furthermore, with the expected rise of the emerging markets as world economic engines it will become increasingly important to study in detail the behavior of their product markets and the extent to which they differ from that of the developed world.

In this paper, we present results of 1086 face-to-face structured interviews carried out in 2009 & 2010 with entrepreneurs representing the formal firms in the manufacturing and services sector of Pakistan. By formal it is meant that our firms are officially registered, tax liable and also report data to employment agencies. Therefore, these firms necessarily take part in the official GDP and employment statistics. This study is comparable to similar research work in developed countries in that key questions were benchmarked and drawn from the pioneering works by Blinder (1991) and Blinder et al. (1998) for the U.S. and Fabiani et al (2007) for the Euro area. The interviewers inquired about the nature of the product market, frequency of price reviews and price changes, key explanation for price-stickiness, dissemination of economic shocks, and the nature of interaction with the informal sector entrepreneurs. Understanding the linkages with the informal sector is important given that in Pakistan informal economy[2] employs more than 70% of non-agricutural labor force [3] .

To the authors' knowledge, features of current survey such as the scale of structured interviews (only Blinder et al. (2007) for US, Amirault et al. (2005) for Canada and to a smaller extent Loupias and Ricart (2004) for France used structured interviews), sectoral coverage, updated list of price theories and questions on the informal sector makes it the first exercise of its kind jointly conducted by the central bank and the statistical agencies of Pakistan. Furthermore, this study is a good test for the universality of a great number of price theories developed by economists over the last two decades.

A few words on the macroeconomic situation of Pakistan at the time of the interviews (Dec 2009-Dec 2010) before the presentation of key results. In November 2008, Pakistan entered a 23 month IMF program (the 11th since 1988) after a balance-of-payments crisis in May 2008. The average annualized inflation rates for Pakistan during the three months of the interviews in Punjab was 12.5%, and five months of survey in Sindh was 14%; which is 4-6% above Pakistan's 50 year trend. During the fiscal year 2010 (i.e. July

[1] For example, the European Central Bank has a large team working under the ageis of ' Inflation Persistence Network' to study prices.

[2] with its output evaluated at least one-third of reported GDP (see Arby, Hanif and Malik (2010))

[3] Pakistan Labor Force Survey 2009-10.

2009-June 2010) real GDP was projected to grow at 4% and the annual unemployment rate was 5.5%[4]. Monetary policy was conducted under a dirty-float with an implicit inflation and growth rate targets of 9% and 3.3% respectively.

We establish eleven stylized facts about price-setting behavior in Pakistan's formal manufacturing and services sectors and compare them with Fabiani et al. (2007) where possible:

Fact 1. The median frequency of price changes in the manufacturing and services sector is 4 and 2 times a year respectively. The equivalent figures are 1 and 1.4 times a year in Europe and US respectively. This result translates to at least one-quarter of Pakistan's GDP being repriced 3 times a year.

Fact 2. Formal firms are relatively more sensitive and promptly accommodate to changes in (a) overall cost in particular that of energy and intermediate inputs, (b) exchange rate and (c) competitors' prices. However changes in demand and financial-costs matter less. This is consistent with previous literature for developed countries with the main difference being that labor costs relative to energy costs were found to be more relevant for them;

Fact 3. Time dependent price rules are more common than state-dependent ones, with 51% of firms using the former; while for developed economies the same figure was 33% ;

Fact 4. The top three reasons for delaying price changes upwards are: (a) the fear that other firms will not follow (b) the uncertainty that shocks might be temporary and (c) the fear of customer retaliation. The first and the third reasons are in line with the results from developed economies;

Fact 5. 32% of owners reported that prices are benchmarked to competitor's price, while 54% reported setting prices on the basis of constant or variable markup. The same figures stand at 27% and 52% respectively for developed countries. However, there is considerable imperfect competition in all types of economies;

Fact 6. The manufacturing sector–where costs of raw material account for 56% of total cost– responds more to cost shocks relative to the services sector– where labor costs account for 40% of total cost;

Fact 7. All firms, big or small, use backward and forward-looking information sets in making price decisions. In particular, 53% of firms use a combination of backward and forecast information while only 19% use pure forecasts. In contrast, the use of forecast information is considerably higher in developed countries with 55% of firms relying on it;

The remaining facts are particular to the linkages between formal and informal sector as viewed by formal sector entrepreneurs:

Fact 8. 46.8% of formal firms interviewed interact with the informal sector either through demand or supply channels;

Fact 9. Economies of scale, customer preferences and market power motivates formal firms to remain in the formal sector;

Fact 10. According to formal firms, tax exemptions and weak enforcement are the main reasons for the existence of informal sector;

Fact 11. Formal firms with frequent interaction with the informal sector tend to have relatively lower frequency of price change suggesting that interactions with informal economy serve as shock absorbers.

This paper is organised in the following way. Sections 2 and 3 discuss sampling issues and how businessmen reacted to our interviews. Sections 4-7 discuss various aspects of pricing. Section 8 presents the caveats of our study while a final Section concludes.

2. The Research Design

Generally, there are three approaches to obtaining information on price stickiness at the firm level: (i) using secondary data from which one may infer stickiness (ii) sending surveys through e-mail or post (iii) conducting one-on-one structured interviews. The first approach has the concern that data on economic outcomes is not sufficiently detailed in Pakistan at the firm level for a meaningful study on prices. The second approach has the concern that unlike in western countries, the concept of obtaining qualitative information through e-mail and post is relatively new in Pakistan which might lead to low response rates. Also, there is

[4]The unofficial unemployment rates are higher but they are hard to assess as 70% of the typical non-agricultural $household's$ working hour are spent in the informal sector.

no guarantee that the survey would be filled by a suitable person in the organization. The main concern for the third approach is that it is costly (especially for large sample size like ours) and the length of the survey process may be longer.

However, we decided to adopt structured interviews approach for our survey mainly for three reasons: complexity of questionnaire, potential poor response rate through traditional mail and fear that questionnaire might not reach the appropriate person. Lower response rate does not necessarily indicate any bias, especially if distributed systematically across sample. We have lower response from large firms as in other surveys such as Kwapil et al. (2005) and Loupias and Ricart (2004), our post stratification scheme for firms' size and economic activity in manufacturing sector reduced this bias. Despite the higher cost, face-to-face interviews are considered to produce higher quality results and a higher response rate. They also reduce the possibility of fluke answers, provide direct access to the suitable individual and allow interviewers to carry out a longer list of queries. On balance, structured face-to-face interviews approach appeared most suitable for our survey.

Overall, the literature recognizes the potential of Blinder's unorthodox survey approach. Indeed, no less than 17 developed countries have used impersonal questionnaires (via e-mail or post) to study the pricing pattern[5] in the manufacturing and services sectors. Nonetheless, with all qualitative surveys (structured interviews or otherwise) there is the danger of misinterpretation by respondents with the slightest change in the wording of the questions leading to disproportionate responses. In many cases respondents may use intuition rather than what they do in practice to respond to the questions.

In full recognition of the possibility that these challenges might be more acute for a developing country, we teamed up with statistical agencies of Pakistan. They selected experienced interviewers with local know-how and contacts to conduct our survey. The State Bank provided focused training (both theoretical and practical) to the interviewers for complex real world situations, where they need to elaborate and explain the questions for clarity. State Bank also conducted two separate pilots before launching the study. For a further quality check, economists from the State Bank randomly audited 10% of live interviews.

The face-to-face interviews took place between December 2009 and December 2010. The study began in Punjab in December 2009 and ended in March 2010. In Sindh, it was launched in June 2010 and ended in November 2010 (for manufacturing only). The services sector interviews in Sindh are currently ongoing.

2.1. The Questionnaire

The questionnaire is benchmarked to Blinder (1991) and the collection of studies in Fabiani et al. (2007). This is imperative as it allows us to draw parallels between developing and developed economies. In line with previous work, section A of our questionnaire contains questions on the general profile of the firm as well as queries on the types of customer and the nature of competition in their respective market. Section B, C, and D contain questions on various aspects of price setting of the main product–one with highest domestic sales. Section E contains queries on existing theories of price-stickiness and dissemination of shocks. Section F contains queries on the interlinkages between formal and informal sector.

In order to better capture the ground realities of Pakistani economy, the questionnaire was customized in following ways: First, we asked formal firms about their interactions and views on informal sector. Second, we asked entrepreneurs to provide us with a breakdown of their cost structure. Third, in the section on price-dissemination we paid particular attention to the effects of external shocks on prices. Indeed, Pakistan is exceptionally vulnerable to external shocks with 11 IMF programmes since 1988[6]. This is important as little is known about shock transmission in developing countries at the micro level.

On testing side, the newly designed questionnaire was tested between ourselves and crucially on a separate sample of 50 randomly selected firms in Karachi. Subsequent to these trials, we rephrased and re-sequenced certain questions to improve comprehension and fluidity of the interviews. The final questionnaire was then translated into the local language. (selected questions from questionnaire are are attached in Appendix B).

[5] The U.S. used structured interviews.

[6] See www.imf.org.

2.2. Sampling

In collaboration with the statistical bureaus of Sindh and Punjab[7], we covered the 'formal' manufacturing and services sector in the provinces of Punjab and Sindh. The other two provinces of the country (Balochistan and Khyber-Pakhtun Khwa) were avoided due to safety reasons at the time of the interviews. Our focus on the lager provinces and sectors ensures that our results are a good representative of the pricing pattern of formal sector in Pakistan.

Table 1 provide details of the sample. As of November 2010, 1086 structured interviews were completed. Of these interviews, 980 are from the manufacturing sector with 243 (that is 25%) out of 980 from the Sindh province. The services sector accounted for 10% of the sample but this fraction will rise given the ongoing interviews in Sindh. In practice, most of the price setting surveys in Euro area are biased towards industry, due to the nature of price survey. Our bias towards manufacturing sector is not misleading when one considers that the official consumer price index in Pakistan, is skewed towards tangible over non-tangible goods with the former contributing 56.6% and the latter contributing 23.1% respectively to the CPI basket[8]. We now discuss the sampling methodology of the manufacturing sector followed by that of the services sector.

The frame for the manufacturing sector was provided by Bureau of Statistics which was the primary source of information for our sample selection. This frame consists of all the firms that have reported in the last cencus of manufacturing industries (CMI). The manufacturing sector is dominated by certain type of economic activities as well as having a greater share of small sized firms. Therefore, a purely random sample would run the risk of having a biased sample towards these activities and firms. To overcome this problem, stratified random sampling was used. The firms were stratified on the basis of economic activity and firm size. The manufacturing sample covers firms with economic activity codes from 15 to 36 (excluding 30) according to Pakistan Standard Industrial Classification (PSIC)[9]. These economic activities are in line with International Standard Industrial Classification (ISIC). The population of firms for above mentioned sub-sectors of manufacturing sector was split into three categories of employment brackets: 10- 50, 51-250 and more than 250 employees. On the basis of these classifications, a random sample for manufacturing sector was drawn from 63 mutually exclusive strata. We drew a sample of 1200 firms for the manufacturing sector in Sindh and Punjab, along with a replacement-sample representing 50% of the original sample was also drawn to cover the possibility of non-response. In case of non-response, a firm from a particular stratum was replaced by another firm from the same stratum to maintain sectoral representation.

The sampling for services sector is more complicated in that there is no population frame of firms in services sector easily available to us. Therefore, we used the database of Securities and Exchange Commission of Pakistan (SECP) which maintains a complete list of firms registered with them. However, the SECP frame lacks information on firm size and dormant or non-dormant status of firms. Therefore, we imposed following constraints on the sample selection in the services sector. First, to minimize the chance of selecting dormant firms from a massive database, we only selected firms that had been registered within the last 10 years and if registered before that time period have reported to SECP at least once in the last 10 years[10]. Second, to avoid small firm bias, only firms with paid-up capital more than RS. 2,000,000 (USD 23500) were selected in our sample . Third, we only included firms involved in economic activities where it is possible to clearly identify their main service. A random sample of 270 firms was selected from transport and telecommunication, hotels and restaurants, education and health care services on the basis of sectoral distribution. With above limitations, results for services sector should be interpreted very carefully as they only reflect price-setting behavior for selected services and not from a well-defined sample frame.

[7] These agencies are well-equipped for this exercise as they conduct the census of the manufacturing sector in Pakistan

[8] The remaining account for rent in the CPI basket.

[9] 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).

[10] Every firm registered with SECP has the obligation to report its statistics on annual basis but few do so on regular basis

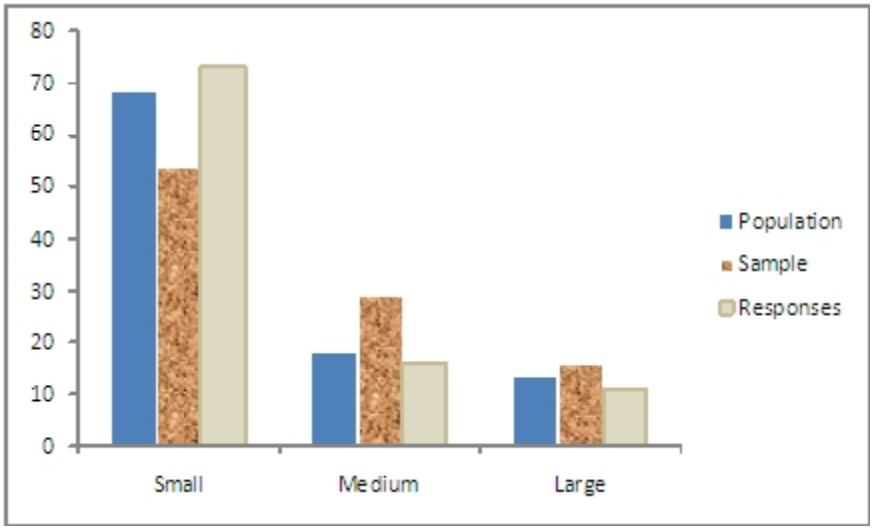

Figure 1: Comparison of Percentage Shares of Small, Medium and Large Firms in Population, Sample and Survey Respondents in Manufacturing Sector

Table 1. The Sample

	Manufacturing	Services	Total
Small	555	69	624
Medium	269	24	293
Large	169	13	182
Total	980	106	1086
Sindh Representation	25%	0%	

a. Position as November 2010

A few thoughts on the sample size before we discuss the results. The sample size of 1086 manufacturing and services sector firms makes our survey the fifth largest price survey among the existing European and U.S. surveys. Also, to best of author's knowledge this survey is first of its kind for an emerging economy like Pakistan. The covered sample of 980 firms in the manufacturing sector is about 9 % of the target population, which is well above the usual convention of choosing a sample of about 5 % of the population. However, sample for the services sector was selected as a small proportion of a pseudo-sample because of non-availability of any formal frame. In order to make sure that the sample was well representative of the population, we allocated the sample according to strata shares in population. However, for strata with very small share in population, sample size was deliberately increased to be able to make stronger statistical inference for them. The allocated sample was then drawn randomly from sample frames. For very small stratum, we included all of the firms from such strata in our sample.

To draw valid inferences for population on the basis of this sample, it was necessary to post-stratify the data to control for possible selection biases due to either closure of some selected firms, firms being sole-exporter of their product or firms shifting to new economic activity. Similarly, large firms' decisions are likely to be more important but we had low response rate from larger firms so data needed to be adjusted for firm size as well. Following Kwapil et al (2005) and Martins (2005) for Austria and Portugal, manufacturing sector weights were redefined to sub-sector of economic activity and size of firm. The weight w_h represents the weights of hth stratum

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

where, P_h is the number of employees in the population in stratum h, P is the total number of employees in the population. Similarly, S_h is the number of employees in the firms interviewed in stratum h and S is total number of employees in all the responding firms.

For services sector, the information set available was not enough to post-stratify in parallel with the manufacturing sector. Therefore, responses for the services sector in this paper are reported only by weighting it to base stratum weight ($\frac{N_h}{N}$), where N_h is the number of firms in stratum h and N is total number of firms in the population.

The above individual weighing schemes for the manufacturing and services sectors do not account for their share in the economy. This means that to make inferences about price-setting for the aggregate economy, especially for those results[11] that can be aggregated, we must reweigh the results on the basis of economy-wide sector weights on the basis of Table 2. We poststratified the data of manufacturing and services sector by their respective weights in population, these results are reported under 'total' in our subsequent analysis.

Generally, manufacturing and services sectors combined accounted for 71.4% of GDP in 2009. However, taking only into consideration the subsectors that are covered in our interviews, our final sample is representative of decisions-makers that produce 25.2–27 % of GDP. The under-representation of services sector is noticeable but common in other international price related studies as well. This is because it is not straight forward to define the main product for some services sector firms. Services like financial services, construction, retail and trade were not included where product usually changes with every transaction. Also, in our case the sample frame for the services sector was not available. Given the list of subsectors in the manufacturing and the services sectors, on aggregate we believe to have captured a true picture of '*price-setting*' in Pakistan with identifiable products.

Table 2. The Overall Representation

	Manufacturing	Services	Total
% GDP in Pakistan 2009	18.3	53.1	71.4
% of GDP represented by our sample	12.2	13-15	25.2-27
% of sector in our sample	90	10	100
% Replacement	18.3	19.8	18.4

3. Businesses Reaction

Firm owners in developing countries are reluctant to come into contact with government agencies due to mistrust and the potential of extortion from government officials.

To overcome this concern we first convinced Chambers of Commerce in Lahore and Karachi and the Ministry of Industries to endorse our project and let our interviewers use their blessing when contacting selected firms. Second, we ensured that each firm was interviewed by a well-prepared senior interviewer. Third, each interview was preceded by providing a full guarantee that data collected will reside only in the hands of the State Bank and only results at an aggregate level will be released. Fourth, the Central Bank's emphasis and desire to understand the blackbox of business decision-making were explained with the option of contacting the higher authorities of the State Bank at the time of interviews. Finally, we provided personal appreciation letters on the behalf of the Governor of the State Bank at the end of the study.

Once the firm owners were convinced about the objectives of the study we found them to be frank and appreciative of the initiative taken by the SBP to connect with the ground realities of firm-level decision making. As in the case of Blinder (1991), we also found firms eager to open a dialogue with the Central Bank and talk openly about sensitive issues such as their cost and demand structures and their interaction with the informal economy. On one memorable occasion, the interviewers were presented with inflation forecasts based on sound econometrics! In majority of the cases, interviews were conducted once the company bosses had agreed to be interviewed. In a few cases, we were asked to leave our questionnaire behind and come

[11] Note that not at all questions can be aggregated since they may simply be sector specific . For example costs breakdown in manufacturing sector are naturally different from that of services sector and therefore can not be aggregated. Similarly, cost specific shocks and their ramifications for pricing can not aggregated in a sensible way.

back to conduct the interview at a later date. The longest interview lasted three hours only because the company owner was eager to participate in the interview and interact with our economist.

4. The Environment

To a great extent price determination and its adjustment depends on the market structure. The structured interview approach addressed this issue by asking about firm size, importance of the main product for the firm, firm's position in the market, and the quality of firm's relationship with customers.

The questions focused on the dominant product of a given firm in terms of turnover in Pakistan . In manufacturing and services sector we found turnover generated by main product to be 76 % and 85 % respectively. Furthermore, national market was the main market for 92% of manufacturing and services sectors firms for their main product in our sample. This implies that our survey reults present a representative picture of pricing pattern at the firm level in Pakistan. This suits our needs as we are primarily interested in understanding the pricing-pattern in Pakistan. International penetration of the main product in Pakistan is at least three times lower compared to the Euro zone.

Table 3. Market and Competition of the Main Product

	Manufacturing	Services	*Euro Zone Average*[a]
Reference Market			
i. International	8	8	27
ii. Local Market (City and Surrounding Areas)	28	33	
iii. National Market excluding (ii).	64	60	
iv. ii+iii	92	92	73
% Turnover in Pakistan			
41-60	16	13	
61-80	29	13	
81-100	44	67	
Market Share			
Top firm	8	17	
Top four firms	18	18	
Top ten firms	23	21	
Not among the top 10 firms	50	44	
Main Customer and long-term relationship			
Other Firms	79	34	75
Customers	19	60	21
Public Sector	2	7	3
All long term relationships	57	42	70
Perceived Degree of Competition			
Very High	50	48	26
High	26	33	35
Medium	20	13	21
Weak	4	7	17

a: Weighted by country's GDP in Fabiani et al. (2007).

As for the interaction with customers, majority (79% on average) of manufacturing sector firms sell their main product to other firms. While in services sector 60% of the firms directly deal with final customers. This implies that the results of our interviews refer to producers prices for the manufacturing sector and customer prices for the services sector. European and U.S. price surveys have found very similar features. Furthermore, for firms in our sample majority of customers (57% manufacturing and 42% services) tend to be repeat customers. However, the share of repeat customers in our sample of Pakistani firms is less than Europe, where 70% of sales are based on long-term clients.

Table 3 eludes to the degree of competition in manufacturing and services sectors. Majority of firms perceive that market competition is high or very high in the industry. The share of firms claiming to operate

in a weak or very weak competition is 24% and 20% for manufacturing and services sector respectively. This implies that markets are more competitive in Pakistan than in Euro zone where 40% of firms perceive competition to be weak. This finding is further corroborated by the fact that 50% and 40% of firms in manufacturing and services sector respectively place themselves not to be amongst the top ten firms.

In sum, one infers from the empirical evidence that there is a monopolistic environment in Pakistan with firms usually having long-term relationship with customers. However, this environment is more competitive than Europe and the proportion of firms with long-term relationship with customers is smaller. The implication is that Pakistan should have a lower degree of price rigidity compared to developed countries, which is precisely what we turn to next.

5. A Profile of Price Setting

Most keyensian economists believe that the slow adjustment in prices and wages play an important role for explaining economic fluctuations. However, there is an alternative view of New-classical economists who argue that prices are flexible, even in the short-run, and that explanations for economic fluctuations must be found elsewhere in factors such as technology shocks and preferences. These two differing views fundamentally affect the choice of the critical assumption of perfect vs. imperfect competition in product and labor markets for the purpose of building representative model of the economy. Therefore, it is essential to get a solid empirical grasp on the extent and the nature of price and wage stickiness in Pakistan. This section is devoted to price-setting behavior of firms in our sample, namely, the basis on which prices are set, revised and their frequencies.[12] In previous section, we found indications of imperfect competition in Pakistan. This result is further consolidated by the finding in Table 4 that 38% and 71% of firms in the manufacturing and services sectors reported applying the markup rule of pricing. Overall, 54% of our representative decision-makers that produce one-quarter of GDP use the markup rule. Surprisingly, the word 'markup' is commonly used in Pakistan to denote unit profit margin in local-language . A further 45% and 18% of manufacturing and services sector firms reported following their competitors in setting prices. Overall, the numbers are not too different from the results in Europe, with the main difference being the use of markup rule in services sector in Pakistan is relatively higher, which implies that prices should change with greater frequency in the manufacturing sector.

Table 4. Price Rules

	Pakistan	Euro Zone
Markup[a]		
Manufacturing	38	58
Services	71	43
Total	54	51
Competitors Price		
Manufacturing	45	38
Services	18	57
Total	32	48
Other[b]		
Manufacturing	17	4
Services	11	0
Total	14	2

a: Include markups that are constant and variables including those to customers
b: Include prices determined by association and the government.

These results firmly establish the existence of imperfect competition in Pakistan and hence that firms set prices themselves. The feature to establish next are the foundations of price reassessments. To establish

[12] We deal with wage-stickiness in a separate paper.

these features we ignore prices determined by government. The academic literature identifies three methods of evaluation: (i) at regular time interval (ii) on the basis of specific events and (iii) a combination of the former two. Formally, the first two modes are known as time-dependent and state-dependent pricing rules respectively. In the case of former the time-interval may be fixed as in the staggered-price model of Taylor (1980) and Calvo (1983). In the case of the latter, a large difference between original and optimal price triggers firms to change prices as in Barro (1972), Sheshinski and Weiss (1983) and Caplin and Leahy (1997). It is also possible for firms to mix both methods of price adjustment. Indeed, it is reasonable to expect firms to accommodate for specific changes even when they generally adhere to a time interval for price changes; this idea was first debated in Hall et al. (2000) then further taken by Apel et al. (2005).

In Table 5, estimated weighted average of firms that review their prices at regular time-intervals is 51% and a further 10% of firms review generally at regular time intervals, while also accommodating for specific events. This implies that 61% of the firm change prices on the basis of time-dependent rules. These numbers are similar to Blinder et al. (1998) for US and Hall et al. (2000) for UK where the figures are 60% and 70% respectively. In contrast, European figures from Fabiani et al. (2007) of 34% and for Sweden of 44.8% in Apel et al. (2005) are far lower. This difference may be due to their market structure with a significantly higher proportion of long term customers and also the fact that Sweden and Euro zone had lower inflationary environment at the time of their surveys. Therefore, for firms in their sample prices reviews were only necessary on specific occasions. In the case of Pakistan, 50 year trend inflation of 8% implies that it is imperative for firms to reassess prices more regularly. Table 5 also provides a breakdown for the manufacturing and services sectors, and firm size. Note that both sectors are similar in the way prices are reviewed. Moreover, the firm size is positively correlated with regular price reviewing.

Table 5. Price Assessments (% of responses)

	Pakistan	Euro Zone
Purely Time-Dependent		
Manufacturing	50	32
Services	52	
Total	51	34
Purely State-Dependent		
Manufacturing	28	
Services	22	
Total	25	
Generally Time-Dependent but also Event Based		
Manufacturing	13	46
Services	6	
Total	10	46
Purely Time-Dependent		
Small	46	
Medium	62	
Large	65	

We now turn our attention to measures of prices stickiness. This is crucial as it determines the extent to which monetary policy can have real impact on the economy. As discussed earlier, frequent changes in prices lower the length of price spells by making the aggregate supply curve steeper. In Table 6, we discuss the key measure of price-stickiness by directly asking entrepreneurs about their actual number of price changes in a typical year. The median[13] number of price changes in Pakistan is three times a year for at least one quarter of its GDP. This is almost 3 times what is found in the developed world. This implies that median spell of a price change is 4 months. Furthermore, 32.5% of the firms change their prices within a month; a number twice as large as the Euro zone and one and half times greater than what is found in studies on the US. We also discover in Table 6, that at disaggregated level, manufacturing sector prices are

[13] The mean would be a misleading measure of central tendency as some firms change their prices on continuous basis. For these firms we assume that prices change on daily basis to simplify our analysis.

twice as more flexible than prices in the services sector and firm size positively impacts the median frequency of price changes. This implies that for manufacturing goods the duration of price spells is no longer than three months. The latter results are also found in the developed economies but their significance is not as sharp. It is also noticeable that small firms and large firms have similar median number of price changes. An explanation for this fact is provided by anecdotal evidence that smaller firms tend to closely follow larger competitors for changing prices in Pakistan.

Table 6.Actual Price Changes

Total	Pakistan	Euro Zone	US
Median Number of Price Changes in a Year	3	1	1.4
Implied Median Spell of Price Change in Months[a]	4	12	8.6
% of Firms that Change Price Within a Month	32.5	15.9	20.9
Quarterly Calvo Probabilities using Median Duration[b]	0.25	0.75	0.65
% of Firms that Review their Prices With a Month	70	26	26
Median Price Change per Year			
Manufacturing Sector	4		
Services Sector	2		
Small	3		
Medium	2		
Large	3		

a: This is ratio of 12 and median of number of price changes in a year.

b: The probability that firms do not re-optimize the prices they charge during a quarter

In sum, there are price rigidities in Pakistan but far less than what is found in developed economies. There is higher degree of price rigidity in the services sector compared to the manufacturing sector. Large firms change prices more frequently than medium firms. Finally, firms facing lower competition change their prices less frequently. These results may also be confirmed by running a simple cross-section regression with price-frequencies on the left-hand-side and a host of explanatory variables on the right-hand-side (see Apel et al (2005)). Howewer to minimise space we deal with this technical analysis in a separate paper.

The empirical evidence presented on price stickiness with higher frequency of price change, have important implications for policy-making in Pakistan. First, monetary policy would have smaller impact on real economy than found in an environment with lower frequency of price change. This happens because a smaller proportion of firms will have their actual prices different from the optimal levels. This implies that prices are fully reoptimized within a short-period of time giving the policy maker a very small window of opportunity to affect output.

To reiterate this point further, let us make the unlikely assumption that all features of the Pakistani economy resemble that of the U.S. economy with the exception of different frequency of price change as in Table 6. We plug this information in a simple quarterly Dynamic Stochastic General Equilibrium (DSGE) model of U.S. In our version, nominal price rigidity is the only source of friction with other standard ingredients of monopolistic competition in the product market, monetary policy and balanced budget. In Fig. 2, we present the impact of a one standard-deviation interest rate shock on the output gap. The real impact of a policy shock on output for Pakistan is smaller with the brunt of its effect dying out within three quarters. While on the other hand for the US case output falls 15% below its potential and effects of policy shock dying out only after the 17th quarter. This simple exercise goes to show that using the assumption of nominal price-rigidity to explain economic fluctuations and persistence in real variables in Pakistan may not be the best idea.

Second, the higher frequency of price changes calls for policy-making and analysis to be based on data that is at a frequency better than quarterly and quarterly at worst. This is confirmed by the Calvo probabilities in Table 6 which show that prices are optimized by a quarter.

Third, the finding that time-dependent rules are also applicable to high-frequency price changing economies with relatively high inflation has not been documented previously in the literature to our knowledge. The potential reason behind the puzzle is the frequency of price reviews. Price review within a month is the

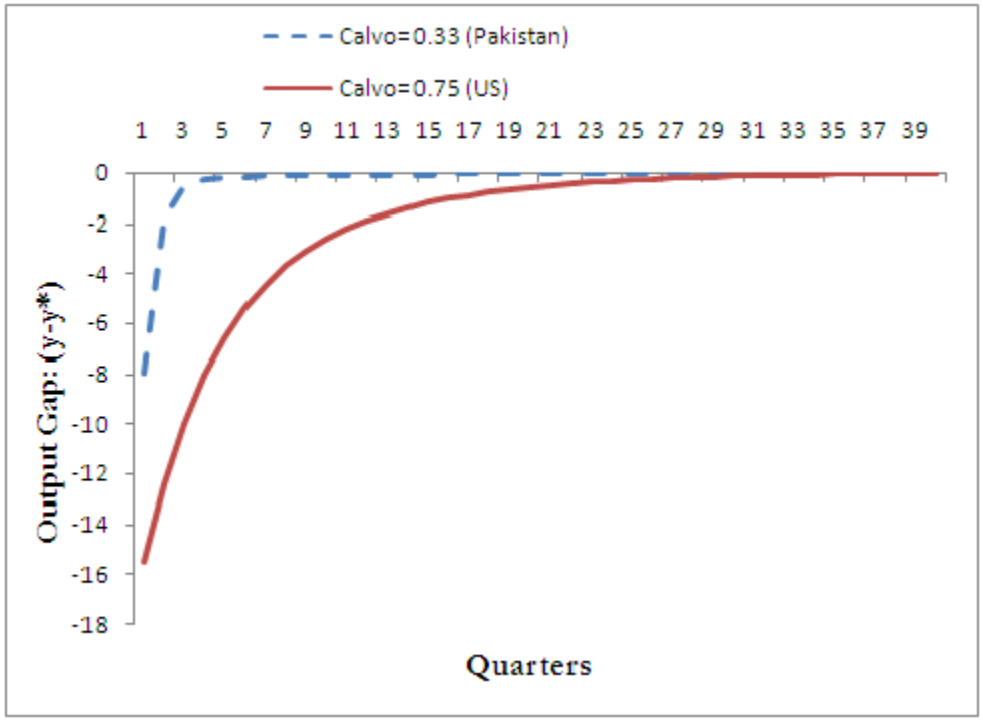

Figure 2: The impact of an interest-rate shock on the output gap $(y - y^*)$.

most common practice in the Pakistani markets, where for US and Euro area the same proportion is only one quarter of the firms. The time dependent firms with very high frequency of price reviews indicate that despite the time dependent rule, the probability of reoptimizing prices increases with significant differences between original and optimal prices. The behavior of such firm is likely to resemble state dependent firms. Note that our pattern of pricing appears not to be conditioned by the choice of year as the firms provided similar answers to what they actually did in 2008 and 2009.

These results naturally raise an important question for developing economies such as Pakistan. Models based on time-dependent rules with fairly low frequency of aggregate price change and where these changes are staggered are the mainstay of monetary economics for explaining persistence in inflation and output. To see how, consider the following example. Imagine every firm in Pakistan change prices on an agreed date, let say the first day of each month. In this environment, if the central bank increases money supply to boost aggregate demand in the middle of the month then output will be higher until prices are revised (that is the first day of the following month) at which point the boom will end. Now imagine, firms do not revise prices on the same date but stagger them over the year. In this scenario, when a typical firm owner is "due" for a price change, the jump will be smaller because he realizes that not everyone is expected to change price and as a result fears losing customers. Other firms will also act similarly and go for smaller price jumps with the result that relative prices will move slowly. The implication of such behavior by firms is that a monetary policy shock will have a long-lasting effect on output and such price staggering will lead to price levels rising slowly.

The question now is the extent to which this approach is valid for Pakistan? Not so valid according to results of this study. Pakistan reprices its GDP more frequently and therefore nominal-rigidity feature is unlikely to apply completely. A puzzle then emerges for policymakers and researchers alike. Given that policy can not fully impact the real sector or in other words inflation-growth tradeoff is weak, how does one explain persistence of inflation in Pakistan? We call this the persistence-puzzle and shed some light on it later.

We have already learnt that firms in Pakistan change prices not continuously but more frequently than firms in developed countries, but what stops them from changing prices even more frequently. To answer this question we presented firms with an extensive list of statements, based on a manifold of theories, and asked them to identify the ones that were used in the practical sense for delaying price adjustments.

Table 7A Reason for Price Stickiness

Theories	Description	Pakistan		Europe	US
		Manufacturing	Services		
Coordination Failure	Firms watch what other firms will do first	1	1	4	1
Temporary Shocks	Firms avoid price changes if they perceive a shock (demand or supply) to be transitory	2	4	5	
Risking Customer Relations	Customer might take the price change as exploitative and antagonize	3	3		1[1]
Procyclical Elasticities	When times are good customers become more price sensitive	4	6		6
Habit Formation	When times are good share of non-habitual customers with higher price elasticities increases	5	5		
Constant Unit Cost	When unit cost is constant, price markups do not change	6	8	3	2
Delivery Time	Firms vary delivery lags before they make price adjustment	7	14		
Explicit Contracts	Prices are fixed for a time interval by contract	8	2	2	3
External Financing	In good times external financing is cheaper allowing markups to be constant	9	10	7	
Using Inventories	Firms vary inventories to avoid price adjustments	10	15	7	8
Thick Markets	In good times the ratio of relationship costs to output sold is lower allowing firms to keep markups constant	11	7		
Informal Sector Coordination Failure	Firms watch what competing firms in the informal sector would do	12	9		
Implicit Contracts	Firms have invisible agreement to maintain prices at a certain level	13	11	1	4
Costly Information Gathering	Firms incur cost of acquiring information that would allow them to adjust prices	14	12	9	
Menu Costs	Firms incur cost of adjusting prices	15	13	8	4

1: In US firms were asked, out of freewill, to cite what in general stopped them from changing prices and the largest majority said customer's antagonism.

Firms were asked to evaluate the importance of different pricing theories for their pricing decisions on the scale of: very important, important, of minor importance and unimportant. The responses were coded from

1 to 4 respectively. The responses for the manufacturing and services sector were used to rank different theories. In Table 7A, we present the results of the manufacturing sector and the services sector. For comparison, we also present the results from U.S. and Euro zone surveys.

The top three explanations for delaying price adjustment are: (i) firms prefer to act once they have observed how their peers behave (83% of the firms ranking this aspect important or better) i.e. firms care about relative prices (ii) the perception that shocks might be of temporary nature (46% of the firms ranking this aspect important or very important) and (iii) the fear of customer retaliation (47% of the firms ranking this aspect important or very important). Generally, our results are closer to the US than the Euro zone, Hall et al.(2000) for UK and Apel et al.(2005) for Sweden. This should be expected given that median frequency of price change in the US is relatively higher than elsewhere. The ideas of implicit contracts, costly price adjustments and costly information appear at the bottom of our ranking. The latter two theories performed especially badly in other surveys as well. For details of mean scores, refer to Table 7B in Appendix A.

We also asked firm owners separately if any of the relevant theories in Table 7A hindered them from marking down prices. In response, the top two explanations stayed the same as in Table 7A. However a different theory was ranked third (with 46% of firms choosing it) and it is that firms refrain from reducing prices during bad times as it hurts their liquidity positions.

These results are reasonable for Pakistan considering its higher frequency of price changes. For example, it is hard to imagine a formal price-agreement or costs associated with collecting information in the manufacturing sector, where the typical price duration is only 3 months. However, in the services sector where the median price change is twice a year, explicit contracts make more sense and were also reported as the second most mentioned reason for price stickiness.

6. Factors Determining Price Adjustment

There are four key ingredients of price determination. First, what drives price changes. Second, differences in firm behavior when prices go up as opposed to when they go down. Third, the speed with which different shocks are incorporated into prices. Fourth, the type of information used during the decision making. We have briefly talked about points two and three in the context of demand and supply shocks but we explore each of these aspects in detail below:

Table 8. The importance of factors driving price changes and lags of adjustment

	Pakistan						**Euro Area**	
	Manufacturing			Services			Overall	
	Inc.	Dec.	p-value[c]	Inc.	Dec.	p-value[c]	Inc.	Dec.
Raw Material Cost	1.3*	1.6*	0.00	2.4**	3***	0.00	2	2
Energy Cost	2*	2**	0.00	2***	2.7***	0.00		
Competitor's Price	2*	2*	0.29	2.5***	2.7***	0.00	3	2
Exchange Rate	2**	3***	0.00	2.4***	2.7***	0.00		
Demand Changes	3***	2.5**	0.00	3***	3****	0.00		
General Price Level	3***	3***	0.53	3***	3.4****	0.00		
Labor Cost	3***	3***	0.00	2***	2.7****	0.00	2	3
Financial Cost	3***	3***	0.00	3***	3****	0.00	3	3
Labor Productivity	3***	3****	0.75	3.5****	3.7****	0.00		

a: 1, 2, 3 and 4 denote very important, important, of minor importance and unimportant respectively
b: asterik denote *incorporated within three months, **incorporated within six months, ***incorporated within nine months, **** incorporated within a year
c: Refers to null hypothesis that mean lag of price adjustment for a given factors for price increase is equal to price decrease.

It is important to highlight that firms are more concerned with prices increases than reductions. Indeed, median frequency of price decreases for manufacturing and services sectors firms over the last five years prior

to interview are 3 & 0 respectively. With this in mind, analysis on factors leading to price reductions should be taken with a pinch of salt.

In Table 8, we report reasons which cause price changes and the approximate speeds with which these changes pass-through to prices. The top four reasons for prices to go up or down for the manufacturing sector are raw-material cost, energy cost, exchange rate movements and the competitor's price. For the services sector raw-material cost matters less while labor cost matters more due to their cost structure as we shall explore shortly. In Table 8, we also report how quickly important changes are incorporated in prices for these reasons. The top most important reason for a price change gets incorporated in decision-making within a span of three months; a result we also found earlier but in a separate context. Other relatively less important reasons are part of pricing-system within six months. In the case of the Euro area costs are also more important but with the difference that raw material and labor cost rank higher when prices go up while raw-material costs and competitor's price matter more when prices decrease. These differences due to focus on different costs can be explained by the nature of market and cost structures of the manufacturing and service sector in Pakistan. We do not have equivalent speeds of adjustment available for other countries for comparison.

Table 8 also tests the asymmetry of mean lag of prices changes for given reasons. We find that for most of the reasons it takes significantly longer on average to markdown prices then markup except for few reasons in manufacturing sector such as competitor's price, general price level and labor productivity.

In Table 9, we present the breakdown of firms' cost structure in 2009. We find that local and imported raw-material costs account for 60% of total cost, which explains the presence of exchange rate and local costs as prime forces driving price changes.

Table 9. Percentage of Total Cost in 2009

	Manufacturing	Services	Total*
Local Raw Material Cost	56	17	38
Imported Raw Material Cost	13	6	10
Energy	13	12	12
Labor	11	39	24
Other	7	23	14

*Although done here, it is not advisable to club the costs of two sectors based on their sector weights due to these having a different cost structure.

Next we asked firms about the type of information they use when determining prices of their main product. We focused on asking the extent to which price setting is based on information referring to past, future or a combination of both past and future. This is important as it can shed light on the sources of inflation persistence from the point of view of businesses. According to Table 10, 53% of firms use a combination of past and future information. Combining this information with firms using only historical data, 81% of the firm use backward-looking information. Breaking up this figure in sectors, we find that 72% and 86% firms in the manufacturing and services sector respectively use backward looking rules. The predominance of backward-looking rules in our sample contrasts with that of Fabiani et al. (2007), where the fraction of firms practicing backward-looking pricing relative to those making price decision on the basis of forecasted data is the reverse of what we discovered in Pakistan.

Table 10. Information Type (% of Firms)

	Manufacturing	Services	Total	Euro Area
Historical Data	28	26	28	32
Forecast	25	14	19	55
An Average of Past and Future	47	60	53	

These results on price determination have important policy implications. First, for an economy that reprices at least 12.2% of its GDP (manufacturing sector) four-times-a-year and has lower responsiveness to financial costs compared to exchange rate, inflation stabilization policies should pay more attention to

exchange rate policy. This repricing reflects the cost structure, where one-quarter of the inputs (imported raw material and energy to some extent) have an exchange rate component. Second, frequent repricing by firms may also be a reflection of the lack of trust on the policy-makers to stabilize an economy that has gone through an IMF programme no less than 11 times over the last two decades.

7. Linkages with the informal economy

An innovative part of our survey is that we ask firms about their existence in the formal sector and their connections with the informal sector. Employment in the informal sector accounts for 70% of non-agriculture labor force with 21% of these jobs belonging to manufacturing type activities. Meanwhile, formal sector employment for the manufacturing sector is 20%. Given the size of the informal economy and its overarching presence in the manufacturing sector, it is important to understand the linkages that might exist between the product markets of formal and informal sector.

The literature on the informal sector is mostly concentrated on the labor market (see Perry et al. (2007) for a comprehensive review). The literature reveals four dominant views on the existence of the informal sector: (i) dualist view, which argues that informal sector is comprised of marginal activities Hart (1973), (ii) structuralist view in Moser (1978) and Castells and Portes (1989), which says that firms in the informal economy are subordinates to large enterprizes in the formal sector allowing the latter to cut costs and improve competitiveness, (iii) legalist view of de Soto (1989 and 2000), which says that cost, time and effort of legislation is at the source of informal economy and (iv) voluntarist view, in which entrepreneurs make a conscious decision to remain in the informal sector having done a cost-benefit analysis.

These views lead to a variety of interplay between the formal and informal sector to explain labor market issues in developing countries. We think that these theories are equally important for the product market behavior but this connection remains ignored in the literature. The price-setting behavior in the formal sector, and hence its consequences for inflation and output, would be different for structuralist view as opposed to dualist view. The structuralist view of informality allows formal sector to be more competitive, whereas in the dualist approach the link between formal and informal sector is nonexistent.

Realizing the important role of the interplay between formal and informal sector in determining prices, we asked formal firms in our interviews about their views on the existence of the informal sector. In addition, we also asked them about the extent and nature of their interaction with firms in the informal sector. In order to better understand the informal sector, our next step is to study price determination in the informal economy by talking about prices with informal sector entrepreneurs; a task we take up in a forthcoming paper.

In Table 11, we can see that top three reasons firms are operating in the formal sector are: (i) customer preferences, (ii) economies of scale and (iii) market power. Surprisingly, seeking access to formal financial and overseas market appeared to be of little importance. The results by sector are similar.

Table 11. Why be part of the formal sector?

	Manufacturing	Services	Total	Importance[b]
Customer Preferences	1.78	1.69	1.74	87%
Economies of Scale	1.66	1.98	1.79	87%
Market Power	2.10	2.23	2.16	74%
Favorable Government Policies	2.37	2.66	2.49	58%
Access to Bank Credit	2.56	2.43	2.51	64%
Access to International Market	2.99	2.87	2.94	43%

a: 1, 2, 3 and 4 denote very important, important, of minor importance and unimportant

b: percentage of firm rating the factor as important or very important.

Similarly, we presented firms with a list of possible concerns that they face in the formal economy. We also asked them if there were any concerns that were missing from our list. The mean scores are presented in Table 12. The top three concerns for both the manufacturing and the services sector are: (i) product standardization, (ii) costly entry and exit and (iii) discriminatory electricity charges.

Table 12. Concerns with Staying in the Formal Sector (Mean Scores[a])

	Manufacturing	Service	Total	Importance[b]
Product Standardization	1.80	2.24	2.00	77%
Entry-Exit is Costly	2.04	2.11	2.07	70%
Discriminatory Energy Charges	1.9	2.37	2.12	67%
Labor Regulations	2.08	2.57	2.31	66%
Employment and Old Age Benefit Contributions	2.19	2.8	2.48	57%
Bureaucratic Hurdles	2.46	2.54	2.50	52%
Price Regulations	2.71	3.07	2.88	40%
Rental Charges	3.05	3.11	3.08	29%

a: 1, 2, 3 and 4 denote very important, important, of minor importance and unimportant

b: percentage of firm rating the factor as important or very important.

We now move on to one of the most interesting part of the interview, where we asked firm owners about their linkages with the informal sector. We find in Table 13 that 58% and 34.3% of firms in the manufacturing and services sector respectively interact with the informal economy. To put it in the aggregate context, approximately half of firms that produce one quarter of Pakistan's GDP are affected through demand or supply channels of the informal economy. Naturally, it is important to find out the nature of this interaction. There are three channels of interaction (i) demand channel in which informal firms compete for market share with their formal counterpart, (ii) supply channel in which informal firms supply inputs to formal firms and (iii) combination of (i) and (ii).

For the manufacturing sector 58% of firms are affected by the informal sector through demand and supply channels. The nature of interaction with informal sector is weaker for the services sector with only 34% of the firms reporting interaction with informal firms through demand and supply channels. The results from the services sector are expected in that the informal sector may find it tougher to reproduce intangible goods being produced in the formal counterpart.

By looking at these results from the viewpoint of firm size reveals that medium-sized firms have the largest interaction with the informal sector through demand and supply channels, whereas smaller and especially larger firm are less interlinked. Juxtaposing this result with the finding on median frequency of price changes in Table 5 one comes to the conclusion that medium sized firms, with strongest link to the informal sector, are also the ones with lower frequency of price change – i.e a higher degree of price rigidity. Presumably, such connections allow medium sized firms to delay price adjustment in response to cost shocks, which we found earlier to be the prime culprit behind price adjustments.

Table 13. Linkages with the Informal Sector

	Manufacturing	Services	Total	Small	Medium	Large
No interaction	42	65.7	53.2	53.8	45.6	60
Demand Only	30.2	18.6	24.8	23.4	28.6	27.7
Supply Only	8.3	2.9	5.6	6.6	4.4	1.5
Demand and Supply	58	34.4	46.8	46.2	54.4	40
Market Share	29	36	32			
Share in Total Cost	38	41	39			

On the demand side, we find in Table 13 that on average the market-share of the informal firms in the manufacturing and services sectors is close to one-third. On the supply side, informal sector provides input worth one-third of costs for all those firms using informal economy inputs. When we asked formal firms about why they use the informal sector as a partner in their supply-chain, the top most reply was their 'flexibility' as input suppliers.

Finally, we asked firm owners to rank a list of reasons for the existence of the informal economy. The scores are presented in Table 14. According to formal entrepreneurs the top four reasons for the existence of informal sector are are lack of taxes, poor compliance (hence enforcement), simple production process and costless entry and exit respectively for the manufacturing sector. For the services sector, the top two reasons

are same but cheap labor ranked third. Surprisingly, the least important factor for the firms to exist in the informal sector is lack of resources.

Table 14. Factors Contributing to the Existence of the Informal Economy (Mean Scores[a])

	Manufacturing	Services	Total	Importance[b]
Lack of Taxes	1.58	1.59	1.59	90%
Tax Compliance/Enforcement	1.90	1.8	1.86	85%
Simple Production Process	1.93	2.22	2.03	74%
Costless Entry and Exit	1.99	2.11	2.03	75%
Low Labor Cost	2.09	1.98	2.05	72%
Corruption	2.02	2.41	2.15	69%
Lack of Resources	2.29	2.14	2.24	65%

a: 1, 2, 3 and 4 denote very important, important, of minor importance and unimportant

b: percentage of firm rating the factor as important or very important.

Given the above results, one can conclude that according to formal firm owners, the informal sector entrepreneurs are thriving both as producers and as input suppliers. This finding is especially relevant for the manufacturing sector. Furthermore, formal firms with the highest interaction with the informal sector also display greater degree of nominal price-rigidity. These preliminary results tend to support the structuralist view of informality, the idea that there are input-output linkages between the formal and informal sector, and the voluntarist view, the idea that entrepreneurs are choosing to stay out of formal sector, as possible explanations for the existence of the informal economy. However, this can not be conclusive as the results presented here only reflect the view of formal firm owners about the informal sector. The robustness of these findings can only be confirmed with our forthcoming paper on price-setting in informal sector.

8. Caveats

Despite all the interesting results, this study is subject to many shortcomings. The main caveat of this study is the services sector sampling frame. The frame for services sector was constructed using the SECP database that lack information on number of employees and standard economic code classification. To rectify this issue with the services sector frame, economic activities were selected after long process of scrutiny, but still sample selected does not fully cover the services sector. Furthermore, frame construction method that has been discussed earlier might also have introduced biases in the frame. By excluding firms that have not reported in last ten years, we probably excluded many live firms. We thought it was necessary to minimize the enormous cost, also it would not matter more if the missing services sector firms are distributed evenly across different economic activities.

Similarly, selecting firms with paid up capital of more than 2,000,000 introduced a bias for larger services sector firms. However, for a very small sample size reserved for services sector, it was not possible to make statistically significant inference for very large population of small firms anyways. Similarly, the frame differences also affected the weighting scheme for services sector, we, therefore, reported most of the results for manufacturing and secvices sectors separately.

Our Survey was carried out in only two out of four provinces of Pakistan, Balochistan and Khyber Pakhtoon Khwa were excluded from our survey. The main reason for leaving out these two provinces were security concerns at the time of survey. However, the contribution share of provinces in GDP give us hope that this omission would not distort our results, since major share of the GDP is generated by two selected provinces.

Our questionnaire addressed only few questions with reference to any specific year, most of the questions were asked about general behavior without specification of time. However, we can not rule out the possibility that questions were answered in the context of current higher inflation environment prevailing in the country. We have already mentioned that during the survey inflation was 4-6 % above the average historical inflation. Panel survey in normal times can verify or reject the bias fear.

During our survey, another group of researchers came up with a similar but restricted study. Malik, Satti and Saghir (2010) conducted a survey for price setting behavior for four cities of the province of Punjab. However, their study was different from us due to lack of national representation, no proper customization and ignorance of informal economy. However, we take this study as a pilot for our survey in Punjab and find comparable results were consistent with Malik et al. (2010).

Another caveat of the study is the quality of enumerators, unlike Blinder (1991, 1998) who used economics students for survey, we opted for enumerators from the provincial statistical agencies. Using economics students gave Blinder's study an additional advantage as all of the enumerators were fully aware of the economics behind each question and had ability to explain clearly to respondents in case of any confusion. The conceptual background of our enumerators was not very strong so we decided to train them extensively for three days from theoretical framework to dummy exercises. However, we can not rule out the possibility of any misunderstanding. We tried to address this this issue by sending our team with enumerators for 10 percent of the interviews. Also, firms were distributed randomly among all enumerators to avoid systematic enumerator effect in any particular economic sector.

Finally, we acknowledge the possibility that our results may capture the pricing mindset that prevailed post 2008 balance-of-payments crisis in Pakistan. To minimize this concern, we asked firms about price-setting behavior in general. Furthermore, questions for which we thought this concern was of particular importance, we probed whether the reply would have been different in 2007 and 2008. We found there to be little difference between general and year-specific responses. As result, these results were not reported in the paper. However, to eliminate all chances we aim to carry out this exercise sometime in the near future when macroeconomic variables have somewhat steadied.

9. Conclusion

This paper is only a first step towards understanding the price-setting behavior of the formal sector in Pakistan. We describe preliminary results of 1086 structured interviews conducted for the manufacturing and services sectors in the provinces of Punjab and Sindh. The sample for the manufacturing sector is fully representative while the services sector, which is 10% of the total sample, is not representative. Together, these sectors account for 71.4% of GDP in Pakistan. We find that although imperfect competition is a good representation of firm's behavior, frequency of price changes are high enough to question the role of nominal rigidities in explaining business cycle fluctuations in Pakistan. This finding also raise the puzzle of 'inflation-persistence' in Pakistan. The exchange rate is more important than financial costs in price-setting and generally cost shocks matter more than demand shocks. Most firms use backward-looking information while making decision on prices. Also, majority of formal firms interact with firms in the informal sector, however manufacturing sector have a higher level of interaction with the informal sector than the services sector. Finally, formal firms with greater interaction with the informal economy tend to increase their prices less frequently.

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10. Appendix A

Table 7B: Reason for Price Stickiness

	Manufacturing				**Services**		
Theories	Mean Scores[a]	p-value[b]	Imp.[c]	Theories	Mean Scores[a]	p-value[b]	Imp.[c]
Coordination Failure	1.8	0.00	82	Coordination Failure	1.9	0.00	84
Temporary Shocks	2.5	0.04	55	Explicit Contracts	2.8	0.00	45
Risking Customer Relations	2.6	0.08	48	Risking Customer Relations	2.8	0.04	46
Procyclical Elasticities	2.7	0.17	43	Temporary Shocks	3.0	0.00	36
Habit Formation	2.8	0.21	40	Habit Formation	3.1	0.17	32
Constant Unit Cost	2.9	0.29	37	Procyclical Elasticities	3.2	0.00	29
Delivery Time	2.9	0.18	39	Thick Markets	3.4	0.00	23
Explicit Contracts	3.2	0.40	35	Constant Unit Cost	3.5	0.00	13
External Financing	3.1	0.44	34	Informal Sector Coordination Failure	3.5	0.17	15
Using Inventories	3.1	0.54	30	External Financing	3.6	0.00	16
Thick Markets	3.2	0.85	26	Implicit Contracts	3.6	0.00	12
Informal Sector Coordination Failure	3.2	0.00	29	Costly Information Gathering	3.7	0.00	9
Implicit Contracts	3.4	0.00	23	Menu Costs	3.7	0.00	3
Costly Information Gathering	3.6	0.00	11	Delivery Time	3.8	0.00	4
Menu Costs	3.7		8	Using Inventories	3.9		5

a: 1, 2, 3 and 4 denote very important, important, of minor importance and unimportant

b: refers to the null hupothesis that theory's mean score is equal to the theory just ranked below.

c: percentage of firm rating the theory as important or very important.

11. Appendix B

A1. How many products does your firm produce (or sell)? _____

A2. What is your "main product" in Pakistan? _____

A3. In your total turnover/sales, what is the percentage of turnover/sales in Pakistan due to your "main product"? _____%

A4. What is the most important market (in terms of turnover) for your "main product"? (Please circle one option)

11. "Local market" (city & surrounding areas)
12. "National" market
2. International market

A6. With reference to your "main product" and the Pakistani market, how would you rank your firm, in terms of market share?

1. The top firm
2. One of the top 4 firms
3. One of the top 10 firms
4. Not among the top 10 firms
8. Do not know

A7. How would you characterize the degree of competition for your main product in the Pakistani market? (Please circle one option)

1. Very tight
2. Tight
3. Medium
4. Weak
5. Very weak or no competition
8. Do not know

A8. In what percentage, the turnover generated by your "main product" is due to sales to? (There can be more than one answer but the percentages should sum up to 100 percent)

1.	Other firms	_____%
2.	Through retailers/wholesalers	_____%
3.	Through your own distribution network or through network under your control	_____%
4.	Direct sales to consumers including other channels such as catalogues/internet/own shops	_____%
5.	Government	_____%
	Total =	100

A9. With reference to your "main product", what is the share of your regular customers (customers with whom you have been doing business for more than one year) in different groups?

Long-term Customers

1.	Other firms (including retail/wholesale sector):	_____%
2.	Consumers (only for firms which sell their products directly to the public):	_____%
3.	Government	_____%

A12. With reference to your main product what was the cost structure of production in 2009?

1.	Local raw material	_____%
2.	Imported raw material	_____%
3.	Energy	_____%
4.	Labour	_____%
5.	Other cost	_____%
	Total =	100%

B2. How do you normally set the price of your main product? (Please circle one option)

1. We add a constant mark-up to the average variable production costs (cost of labour and cost of the other inputs) and change the price when there is a change in cost (mark-up pricing)
2. Under normal circumstances, we use constant mark up. However, when the variable costs change to such a large extent that they cannot be accommodated in price change, we change the mark-up
3. The market is very competitive; therefore we set our price in accordance with the market price level
4. The price is regulated administratively by the government
5. The price is regulated administratively by the associations
6. The price is negotiated mainly with our customers

B3. Do you base your pricing decisions on data from previous years or on forecasts?

1. Data from previous years
2. On forecasts
3. An average of past data and forecast

C1. We assume that companies review their prices from time to time, but they do not necessarily change them. Do you review the price of your main product.....

1. Regularly?
2. On specific occasions (e.g. when costs change considerably)?
3. In general regularly and also on specific occasions (e.g. significant changes in costs or demand)?
4. We never review prices without the need to change them.

C2. You review the price of your main product regularly. At which intervals do you check the price?

1. Daily
2. Weekly
3. Monthly
4. Quarterly
5. Biannually
6. Yearly
7. Less frequently than yearly

D1. How often do you change the price of your main product on average in a year? _____Times

E1. Which factors would increase the price of your "main product"? (Circle one option in each case)

		Very Important	Important	Of minor Importance	Un-important
1.	An increase in the cost of labour	1	2	3	4
2.	An increase in the cost of raw materials (excl. energy)	1	2	3	4
3.	An increase in energy prices	1	2	3	4
4.	An increase in financial/capital costs	1	2	3	4
5.	A rise in demand	1	2	3	4
6.	An increase in competitors' prices	1	2	3	4
7.	An increase in overall cost of production	1	2	3	4
8.	An increase in general price level	1	2	3	4
9.	A decrease in competition	1	2	3	4
10.	A decrease in labour productivity	1	2	3	4
11.	A depreciation of PKR	1	2	3	4

E2. How quickly do you increase the price of your "main product" in response to the factors mentioned below? (Circle one option in each case)

		Within 1 Month	Within 3 Months	Within 6 Months	Within 9 Months	Within 1 Year	No Change
1.	An increase in the cost of labour	1	2	3	4	5	6
2.	An increase in the cost of raw materials (excl. energy)	1	2	3	4	5	6
3.	An increase in energy prices	1	2	3	4	5	6
4.	An increase in financial/capital costs	1	2	3	4	5	6
5.	A rise in demand	1	2	3	4	5	6
6.	An increase in competitors' prices	1	2	3	4	5	6
7.	An increase in overall cost of production	1	2	3	4	5	6
8.	An increase in general price level	1	2	3	4	5	6
9.	A decrease in competition	1	2	3	4	5	6
10.	A decrease in labour productivity	1	2	3	4	5	6
11.	A depreciation of PKR	1	2	3	4	5	6

E3. Which factors would contribute to a decrease in the price of your "main product"? (Circle one option in each case)

		Very Important	Important	Of minor Importance	Un-important
1.	A decrease in the cost of labour	1	2	3	4
2.	A decrease in the cost of raw materials (excl. energy)	1	2	3	4
3.	A decrease in energy prices	1	2	3	4
4.	A decrease in financial/capital costs	1	2	3	4
5.	A decrease in demand	1	2	3	4
6.	A decrease in competitors' prices	1	2	3	4
7.	A decrease in overall cost of production	1	2	3	4
8.	A decrease in general price level	1	2	3	4
9.	An increase in competition	1	2	3	4
10.	An increase in labour productivity	1	2	3	4
11.	An appreciation in PKR	1	2	3	4

E4. How quickly do you decrease the price of your "main product" in response to the factors mentioned below? (Circle one option in each case)

		Within 1 Month	Within 1 Months	Within 1 Months	Within 9 Months	Within 1 Year	No Change
1.	A decrease in the cost of labour	1	2	3	4	5	6
2.	A decrease in the cost of raw materials (excl. energy)	1	2	3	4	5	6
3.	A decrease in energy prices	1	2	3	4	5	6
4.	A decrease in financial/capital costs	1	2	3	4	5	6
5.	A decrease in demand	1	2	3	4	5	6
6.	A decrease in competitors' prices	1	2	3	4	5	6
7.	A decrease in overall cost of production	1	2	3	4	5	6
8.	A decrease in general price level	1	2	3	4	5	6
9.	An increase in competition	1	2	3	4	5	6
10.	An increase in labour productivity	1	2	3	4	5	6
11.	An appreciation in PKR	1	2	3	4	5	6

E5. Once you have decided that it is necessary to change the price upward of your "main product", which of the factors listed below might lead to a delay in the actual price change? (Please indicate their importance in your firm to each answer by choosing one option per row)

Theories	Reasons for postponing price increase	Very Important	Important	Of minor Importance	Un-important
1.	Firms watch what other firms will do first	1	2	3	4
2.	Firms avoid price changes if they perceive a shock (demand or supply) to be transitory	1	2	3	4
3.	Customer might take the price change as exploitative and antagonize	1	2	3	4
4.	When times are good customers become more price sensitive	1	2	3	4
5.	When times are good share of non-habitual customers with higher price elasticities increases	1	2	3	4
6.	When unit cost is constant, price markups do not change	1	2	3	4
7.	Prices are fixed for a time interval by contract	1	2	3	4
8.	In good times external financing is cheaper allowing markups to be constant	1	2	3	4
9.	Firms vary delivery lags before they make price adjustment	1	2	3	4
10.	Firms vary inventories to avoid price adjustments	1	2	3	4
11.	In good times the ratio of relationship costs to output sold is lower allowing firms to keep markups constant	1	2	3	4
12.	Firms watch what competing firms in the informal sector would do	1	2	3	4
13.	Firms have invisible agreement to maintain prices at a certain level	1	2	3	4
14.	Firms incur cost of acquiring information that would allow them to adjust prices	1	2	3	4
15.	Firms incur cost of adjusting prices	1	2	3	4

F1. Nature of your interaction with the informal sector is that a substitutable product is produced in the informal economy

1. Yes
2. No 2

F5. Nature of your interaction with the informal sector is that a fraction of intermediate good used in production is purchased from the informal economy

1. Yes
2. No 2

F6. The share in the total cost of the informal intermediate good(s) in the production of your main product is: _____ %

F9. What factors motivate you to stay in the formal economy? (Please circle one option)

		Very Important	Important	Of minor Importance	Un-important
1.	Large scale production	1	2	3	4
2.	Customers prefer to buy from registered producers	1	2	3	4
3.	Favorable government policies	1	2	3	4
4.	Access to bank and credit	1	2	3	4
5.	Access to int'l market	1	2	3	4
6.	Market power	1	2	3	4
7.	Other (please specify)_____	1	2	3	4

F10. What issues are associated with operating in the formal sector? (Please circle only one option in each)

		Very Important	Important	Of minor Importance	Un-important
1.	Contribution to EOBI	1	2	3	4
2.	Labour regulations	1	2	3	4
3.	Standardization of product	1	2	3	4
4.	Land charges or rental value	1	2	3	4
5.	Bureaucratic hurdles	1	2	3	4
6.	Discriminatory energy charges	1	2	3	4
7.	Entry-exit is costly	1	2	3	4
8.	Price regulations	1	2	3	4
9.	Other Specify_____	1	2	3	4

F11. In your opinion what factors contribute to the existence of the informal sector? (Please circle only one option in each)

		Very Important	Important	Of minor Importance	Un-important
1.	Low labour cost	1	2	3	4
2.	No taxes	1	2	3	4
3.	Lack of resources (Physical capital, human capital)	1	2	3	4
4.	Corruption	1	2	3	4
5.	Non compliance of existing regulation	1	2	3	4
6.	Cost less entry-exit	1	2	3	4
7.	Simple production process	1	2	3	4
8.	Other Specify _____	1	2	3	4