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FORMAL SECTOR PRICE DISCOVERIES: RESULTS FROM A DEVELOPING COUNTRY

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Formal Sector Price Discoveries: Results from a Developing Country

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Abstract

We present results of 1189 structured interviews about price-setting behavior of firms in the manufacturing and services sector in Pakistan. Our discoveries are that frequency of price change is considerably high, lowering the real impact of monetary policy. The remaining price stickiness is explained by firms caring about relative prices and the persistence of shocks. 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. Firms with connections with the informal sector, especially through demand, have a lower probability of price adjustment.

I 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

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economies have devoted much resources to empirical study of price stickiness.[2] 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 1189 face-to-face structured interviews carried out in 2009 to 2011 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[3] employs more than 70% of non-agricultural labor force.[4]

To the authors' knowledge, features 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 our survey the first exercise of its kind jointly conducted by a central bank and statistical agencies. Furthermore, this study is a good test for the universality of a great number of price theories developed by economists over the last few decades.

A few words on the macroeconomic situation of Pakistan at the time of the interviews (Dec 2009-Jun 2011) 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 one year of survey in Sindh was 14%; which is 4-6% above Pakistan's 50 year trend. During the fiscal year 2010 (i.e. July 2009-June 2010) real GDP was projected to grow at 4% and the annual unemployment rate was 5.5%.[5] Monetary policy was conducted under a dirty-float with an implicit inflation and growth rate targets of 9% and 3.3% respectively.

We establish twelve stylized facts about price-setting behavior in Pakistan's formal manufacturing and services sectors and compare them with pervious work where possible:

Fact 1 The median frequency of price changes in the manufacturing and services sector is 6 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 Prices are rigid downwards and more so for the services sector; a result consistent with previous work;

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

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

[4]Pakistan Labor Force Survey 2009-10.

[5]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.

Fact 3 Formal firms are relatively more sensitive and promptly accommodate to changes in (a) overall cost in particular that of energy and intermediate inputs, (b) competitors' prices and (c) exchange rate. 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 4 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 is 33%;

Fact 5 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 6 37% of owners reported that prices are benchmarked to competitor's price, while 47% 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 7 The manufacturing sector–where costs of raw material account for 70% of total cost– responds more to cost shocks relative to the services sector– where labor costs account for 40% of total cost;

Fact 8 All firms, big or small, use backward and forward-looking information sets in making price decisions. In particular, 46% of firms use a combination of backward and forecast information while only 29% 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 9 43% of formal firms interviewed interact with the informal sector either through demand or supply channels;

Fact 10 Economies of scale, customer preferences and market power motivates formal firms to remain in the formal sector;

Fact 11 According to formal firms, tax exemptions and weak enforcement are the main reasons for the existence of informal sector;

Fact 12 Formal firms with frequent interaction with the informal sector tend to have relatively lower probability of price change suggesting that interactions with informal economy serve as shock absorbers; in particular demand shocks.

This paper presents results with the US and the Eurozone where possible and is organized as follows. Section II presents the research design. Sections III-VII discuss various aspects of pricing. Section VIII presents caveats of our study while a final Section concludes.

II   The Research Design

We adopted structured-interviews approach for our survey for three reasons: complexity of questionnaire, potential poor response rate through traditional mail and the fear that questionnaire might not reach the appropriate person. Generally, lower response rates does not necessarily indicate any bias, especially if distributed systematically across the sample. However, we apply a post stratification scheme based on firms' size and economic activity to reduces this bias. This proved important as we had a lower response rate for larger firms. Other surveys such as Kwapil et al. (2005) and Loupias and Ricart (2004)also find similar large firm behviour. 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.

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[6] 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

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

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.[7] 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 June 2011. The study began in Punjab in December 2009 and ended in March 2010. In Sindh, it was launched in June 2010 and ended in June 2011. The services sector interviews in Sindh are currently ongoing.

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.[8] 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; Pakistan's largest metropolis. The final questionnaire was then translated into the local language. Selected questions from questionnaire are attached in Appendix B.

Sampling

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 provides details of the sample. As of June 2011, 1189 structured interviews were completed. Of these interviews, 1025 are from the manufacturing sector with 286 (that is 28%) out of 1025 from the Sindh province. The services sector accounted for 14% of the sample but this percentage 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 the survey.

The frame for the manufacturing sector consists of all firms which reported in the last census 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 International Standard Industrial Classification (ISIC) economic

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[7]These agencies are well-equipped for this exercise as they conduct the census of the manufacturing sector in Pakistan.
[8]See www.imf.org.

activity codes from 15 to 36 (excluding 30).[9] 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 formal 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/ non-dormant status of firms. We, therefore, impose the 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 identify a 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 cautiously as they only reflect price-setting behavior for selected services and not from a well-defined sample frame. We, therefore, present services sector results separately as well.

TABLE 1

The sample

	Manufacturing	Services	Total
Small	573	103	676
Medium	291	40	331
Large	161	21	182
Total	1025	164	1189
Sindh Representation	28%	37%	

Notes: Position as 30th June 2011

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 also we had low response rate from larger firms so data needed to be adjusted for firm size as well. Furthermore, aggregated results appear under nomenclature 'total' in our Tables. For this, we reweighed the data on the basis of sector weights in the population. The Appendix contains details of the post stratification scheme.

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

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[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.

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	86	14	100
% Replacement	18	15	18

†: this percentage is used for reweighing the manufacturing and services sector estimates

III   The Environment

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 back to conduct the interview at a later date.

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 77 % and 85 % respectively. Furthermore, national market was the main market for 95% of manufacturing and 86% of services sectors firms for their main product in our sample. This implies that our survey results 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[†]
Reference Market			
i. International	5	14	27
ii. Local Market (City and Surrounding Areas)	33	37	
iii. National Market excluding (ii).	62	49	
iv. ii+iii	95	86	73
% Turnover in Pakistan			
41-60	16	6	
61-80	29	7	
81-100	45	74	
Market Share			
Top firm	5	11	
Top four firms	13	22	
Top ten firms	17	22	
Not among the top 10 firms	37	41	
Main Customer and long-term relationship			
Other Firms	79	34	75
Customers	20	58	21
Public Sector	2	8	3
All long term relationships	56	36	70
Perceived Degree of Competition			
Very High	47	56	26
High	26	24	35
Medium	22	15	21
Weak	2	3	17

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

As for the interaction with customers, majority (80% on average) of manufacturing sector firms sell their main product to other firms. While in services sector 58% 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 (56% manufacturing and 36% 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 medium or weak competition is 24% and 18% 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 37% and 41% of firms in manufacturing and services sector respectively place themselves not to be amongst the top ten firms.

In sum, one infers 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.

IV A Profile of Price Setting

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.[11] In previous section, we found indications of imperfect competition

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

in Pakistan. This result is further consolidated by the finding in Table 4 that 34% and 63% of firms in the manufacturing and services sectors reported applying the markup rule of pricing. Overall, 47% 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 44% and 29% 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[†]		
Manufacturing	34	58
Services	63	43
Total	47	51
Competitors Price		
Manufacturing	44	38
Services	29	57
Total	37	48
Other[‡]		
Manufacturing	22	4
Services	8	0
Total	16	2

†: Includes markups that are constant and variables including those to customers

‡: Includes 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 these features we ignore prices determined by government. The academic literature identifies three methods of evaluation: (i) at regular time interval Taylor (1980)and Calvo (1983) (ii) on the basis of specific events Barro (1972), Sheshinski and Weiss (1983) and Caplin and Leahy (1997) and (iii) a combination of the former two. 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 9% of firms review generally at regular time intervals, while also accommodating for specific events. This implies that 60% 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 the regularity of price reviewing.

TABLE 5
Price assessments (% of responses)

	Pakistan	Euro Zone
Purely Time-Dependent		
Manufacturing	54	32
Services	47	
Total	51	34
Purely State-Dependent		
Manufacturing	27	
Services	21	
Total	24	
Generally Time-Dependent but also Event Based		
Manufacturing	11	46
Services	7	
Total	9	46
Purely Time-Dependent		
Small	50	
Medium	52	
Large	57	

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[12] 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, 24% of the firms change their prices within a month; a number 50% and 14 % greater than what is found in studies on the Euro area and US respectively. We also discover in Table 6, that at disaggregated level, manufacturing sector prices are much 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 two 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.

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[12]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.

TABLE 6

Actual price changes

	Pakistan	Euro Zone	US
Total			
Median Number of Price Changes in a Year	3	1	1.4
Implied Median Spell of Price Change in Months†	4	12	8.6
% of Firms that Change Price Within a Month	23.9	15.9	20.9
Quarterly Calvo Probabilities using Median Duration‡	0.25	0.75	0.65
% of Firms that Review their Prices With a Month	72.9	26	26
Median Price Change per Year			
Manufacturing Sector	6		
Services Sector	2		
Small	3		
Medium	2		
Large	3		
Median Downward Price Changes over period of 5 years			
Total	2		
Manufacturing Sector	5		
Services Sector	1		

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

$\ddagger$: 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 smaller ones.

Price adjustments downward show a different pattern. Median price cuts happen once a year for manufacturing sector, while for services sector this is only true over a long period of five years. Overall, for both manufacturing and services sector price cuts tend to occur after two and half year showing considerable downward price rigidity.

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 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. 1, 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 17% 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 emerging markets such as 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
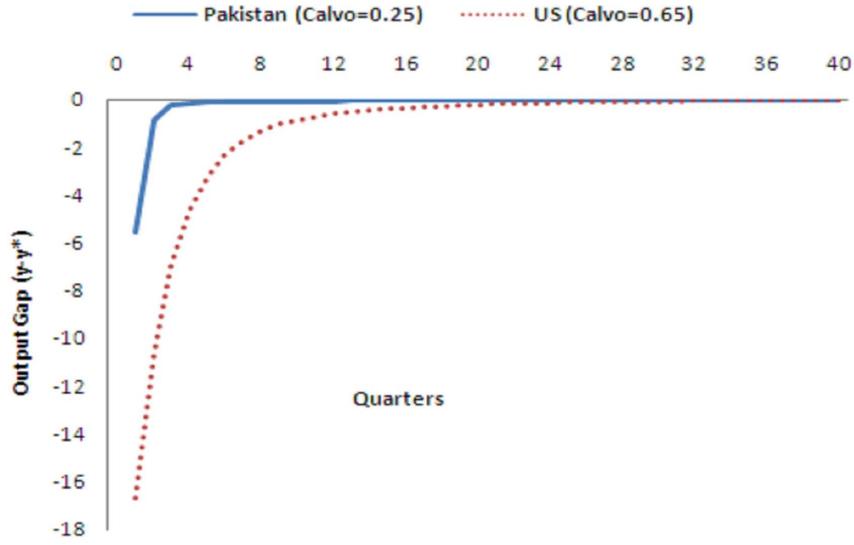
Figure 1: The impact of an interest-rate shock on the output gap $(y - y^*)$.

potential reason behind the puzzle is the frequency of price reviews. Price review within a month is the most common practice in the Pakistani markets, where for US and Euro area the same proportion is only one-quarter of firms. The time dependent firms with very high frequency of price reviews indicate that despite the time dependent rule, the probability of re-optimizing 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.

Next we ask what stops firms 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.

Ranking reasons 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	2		1[†]
Procyclical Elasticities	When times are good customers become more price sensitive	4	5		6
Habit Formation	When times are good share of non-habitual customers with higher price elasticities increases	5	6		

†: 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 top five explanations for the manufacturing sector and the services sector. For comparison, we also present the results from U.S. and Euro zone.

The top three explanations for delaying price adjustment are: (i) firms prefer to act once they have observed how their peers behave (82% of the firms ranking this aspect important or better) i.e. firms care about relative prices (ii) the fear of customer retaliation (48% of the firms ranking this aspect important or very important) and (iii) the perception that shocks might be of temporary nature (44% 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 see Table 7B in the Appendix.

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 64% of firms choosing it) and it is that firms refrain from reducing prices during bad times as it hurts their cash flows.

These results are reasonable for Pakistan considering its higher frequency of price changes. For example, it is hard to imagine a formal price-agreement in the manufacturing sector when the typical price duration is only 2 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 third most mentioned reason for price stickiness.

V   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 | |
	↑†‡	↓	p-value*	↑	↓	p-value*	↑	↓
Raw Material Cost	1.3*	2*	0.00	3***	3****	0.00	2	2
Energy Cost	2*	2**	0.00	2.5***	3****	0.00		
Competitor's Price	2*	2*	0.03	3***	3***	0.00	3	2
Exchange Rate	2.5**	3**	0.00	2**	2***	0.00		
Demand Changes	3***	2**	0.00	3***	3****	0.24		
General Price Level	3**	3**	0.18	3***	3****	0.00		
Labor Cost	3***	3***	0.00	3***	3****	0.00	2	3
Financial Cost	3***	3***	0.00	3****	3****	0.00	3	3
Labor Productivity	3***	3***	0.05	3.5****	4****	0.92		

‡: 1, 2, 3 and 4 denote very important, important, of minor importance and unimportant respectively
†: asterisk denote *incorporated within three months, **incorporated within six months, ***incorporated within nine months, **** incorporated within a year.
*: Refers to null hypothesis that the mean lag of price adjustment for a given factor for price increase is equal to price decrease.
↑ and ↓: Refer to increase and decrease in price respectively.

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 5 & 1 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 general price level in manufacturing sector, and demand changes and labor productivity for services sector.

In Table 9, we present the breakdown of firms' cost structure in 2009. We find that local and imported raw-material costs account for 70% 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	60	8	39
Imported Raw Material Cost	10	8	9
Energy	13	12	13
Labor	11	40	23
Other	6	32	17

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, 46% of firms use a combination of past and future information. Combining this information with firms using only historical data, 71% of the firm use backward-looking information. Breaking up this figure in sectors, we find that 71% and 70% 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	27	22	25	32
Forecast	29	30	29	55
An Average of Past and Future	44	48	46	

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

VI   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 hence improve competitiveness, (iii) the legalist view of de Soto (1989 and 2000), which says that cost, time and effort of legislation is at the source of informal sector and (iv) voluntarist view akin to Hirschman (1970), 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; a connection 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 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. Together these imply that Dixit-Stiglitz setup is most relevant for modeling the formal sector. 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? (mean score[†])

	Manufacturing	*Services*	*Total*	*Importance[‡]*
Economies of Scale	1.6	1.7	1.6	91%
Customer Preferences	1.8	1.6	1.7	87%
Market Power	2.2	2.1	2.2	79%
Favorable Government Policies	2.4	2.3	2.3	66%
Access to Bank Credit	2.6	2.2	2.5	67%
Access to International Market	3.2	2.2	2.9	48%

†: 1, 2, 3 and 4 denote very important, important, of minor importance and unimportant
‡: 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 sector. 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[†])

	Manufacturing	*Service*	*Total*	*Importance[‡]*
Product Standardization	1.8	2.4	2.0	74%
Entry-Exit is Costly	2.1	2.5	2.2	62%
Discriminatory Energy Charges	1.9	2.7	2.2	62%
Labor Regulations	2.1	2.8	2.4	63%
Employment and Old Age Benefit Contributions	2.2	2.8	2.4	58%
Bureaucratic Hurdles	2.5	3.0	2.7	43%
Price Regulations	2.6	3.0	2.8	46%
Rental Charges	3.0	3.2	3.1	30%

†: 1, 2, 3 and 4 denote very important, important, of minor importance and unimportant
‡: 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 22% 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 22% of the firms report interacting with informal firms through demand and supply channels. The results from the services sector are expected in that the informal sector may find it tough to reproduce and/or co-produce intangible goods provided by their formal counterparts.

By looking at these results from the viewpoint of firm-size reveals that overall firms have similar levels of interaction with the informal sector through demand or supply channels. But there are subtle differences in the type of interaction. In particular, small and medium sized firms have much bigger supply-side interlinkages when compared with larger firms while the opposite is true for demand-side interactions.

TABLE 13
Linkages with the informal sector

	Manufacturing	Services	Total	Small	Medium	Large
No interaction	41.5	77.8	56.3	56.3	56.1	57.4
Demand Only	32.1	16	25.5	24.2	23.2	37.4
Supply Only	7.7	3.8	6.2	6.9	6.1	0.9
Demand and Supply	58.5	22.2	43.7	43.7	43.9	42.6
Market Share	24.8	30	26.2			
Share in Total Cost	35.8	15.3	30.2			

On the demand side, we find in Table 13 that on average the market-share of the informal firms in the manufacturing is one quarter, while for services sectors it 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 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 is ranked third. Surprisingly, the least important factor for the firms to exist in the informal sector is lack the of resources.

TABLE 14
Factors contributing to the existence of the informal economy (mean scores[†])

	Manufacturing	Services	Total	Importance[‡]
Lack of Taxes	1.6	1.9	1.7	84%
Tax Compliance/Enforcement	1.9	2.2	2.0	82%
Simple Production Process	1.9	2.6	2.1	74%
Costless Entry and Exit	2.0	2.6	2.2	67%
Low Labor Cost	2.1	2.3	2.2	68%
Corruption	2.0	2.8	2.3	62%
Lack of Resources	2.2	2.7	2.4	61%

†: 1, 2, 3 and 4 denote very important, important, of minor importance and unimportant
‡: 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 level of interaction with the informal sector also display greater degree of nominal price-rigidity (we discuss shortly). These 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 the informal sector.

VII Econometrics of Pricing

To test the robustness of some of our results, we now examine how the number of price changes per year depends on certain features of the market structure using simple OLS regressions. The features we incorporate rest on earlier discoveries and also well-known textbook theories namely: (i) firms with higher share of market are less likely to change their prices (ii) firms claiming to be in highly competitive markets 'mark-to-market' and hence adjust their prices more frequently (iii) customer-markets, where firms with a larger proportion of direct sales to clients on regular basis, have stickier prices, (iv) firms with flatter marginal cost curve are less likely to change their prices, (v) less commonly known works of Moser (1978) and Castells and Portes (1989) argue for the structuralist view that firms in the informal economy assist larger enterprizes in the formal sector enabling them to improve competitiveness and (vi) Hirschman (1970)'s voluntarist idea that firms stay out of the formal sector out of choice.

To reflect these discoveries in our empirical model the following variables are used. To capture the size of the firm, we have introduced two dummies for firm size, *MEDIUM* (set to 1 if number of employees are between 51 to 250 for manufacturing and paid-up capital between Rs. 15-50 mln for services sector) and *LARGE* (set to 1 if firm has more than 250 employees for manufacturing sector and paid-up capital more than Rs. 50 mln for services sector). Type of economic activity is captured by *MANUF* dummy which is set to 1 for firm belonging to manufacturing sector and zero otherwise. The dummy *PROVINCE* is set equal to 1 for province of Punjab. The dummy variable for market share *MARKET* takes the value 1 if firm is among top four firms and 0 otherwise. The share of turnover generated through direct sales to consumers is captured in variable *HH*. The dummy *INF* takes the value 1 if firm has some interaction (either from demand or supply sides) with informal sector of economy. The dummy for exporting firms *EXP* takes value 1 if firm is exporting its main product and 0 otherwise. The Ordinary Least Square regression with frequency of price changes on the left-hand-side, y, yields the following results.

$$
y = \underset{(15.24^{**})}{36.6} - \underset{(6.35)}{9.9}\,\text{MEDIUM} - \underset{(13.02)}{1.5}\ \ \text{LARGE} + \underset{(15.8)}{23.4}\,\text{MANUF} - \underset{(11.2)}{5.3}\,PROVINCE - \underset{(8.7^{**})}{17.3}\,\text{MARKET}
$$
$$
- \underset{(6.80^{**})}{14.2}\,\text{EXP} - \underset{(8.25^{**})}{18}\ \ \text{INF} - \underset{(0.16)}{0.22}\,\text{HH} + \text{error}
$$

(1)

R^2: 8.4%   Number of observations= 1099   s.e.= brackets.

The number of changes in price are significantly less for firms with higher market share. We also find weak evidence (p-value: 0.16) for customer market theory (Phelps and Winter, 1970) that reckons that firms with higher share of consumers tend to have stickier prices. In a similar vein, firms exporting their main product also tend to change prices less frequently as well as those interacting with the informal sector (Fact 12). We estimated different combinations of eq. (3) using the given set of variables, our results appear robust to these modifications. The explanatory power of the regression remains very low (8.4 %) due to the diversity of market environment in our economic activities (Apel et al, 2005 also faced similar difficulties).

Previously in Table 8 we showed that overall cost related factors topped the explanations for upward price adjustment. Next, using a probit regression we estimate the extent to which this key decision is influenced by (for positive costs shock only[13]) the set of independent variables in eq. (3). The left-hand-side variable in this scenario would be the decision to change prices upwards due to a positive a cost shock. This is captured by the dummy, c, set to 1 if firms ranked overall cost as very important or important for adjusting price upwards.

---

[13]With downward rigid prices positive cost shocks are more relevant compared with negative ones

$$c = \underset{(0.32)}{0.5} + \underset{(0.21)}{0.20}\,\text{MEDIUM} + \underset{(0.53)}{0.45}\,\text{LARGE} + \underset{(0.25^*)}{0.43}\,\text{MANUF} - \underset{(0.219)}{0.24}\,\text{PROVINCE} - \underset{(0.28)}{0.01}\,\text{MARKET}$$
$$+ \underset{(0.35^*)}{0.62}\,\text{EXP} + \underset{(0.2)}{0.32}\,\text{INF} - \underset{(0.003^*)}{0.001}\,\text{HH} - \underset{(0.25^{**})}{0.5}\,\text{MC} + \text{error} \tag{2}$$

R^2: 16.3%   Number of observations= 1167   s.e.= brackets

Probit results show that probability of changing prices upwards, given a positive cost shock, is higher for firms belonging to the manufacturing sector as well as for those that export their main product. This result mainly reflects the composition of their cost structure. The probability of changing prices upwards tends to decreases for firms coming into direct contact with consumers in their overall customer base supporting the customer market theory with (p-value = 0.06). This is contrary to the last model. Furthermore, flatter marginal costs imply lower probability of pass-though to prices where the variable, MC, is a dummy set to 1 for those firms indicating costs being rigid as output expands. Finally, we find that in terms of pass-through to price of costs shocks, any type of interaction with the informal sector is unimportant. This result does not bode well with the structuralist view of the informal sector which emphasizes the role of informal sector on the cost side of formal sector firms.

Next we consider the same exercise as in eq. (4) but for a demand shock, i.e. factors that determine the probability of revising prices upwards given a positive demand shock. This effect is captured by the dummy, d, which is set to 1 for firms ranking demand shocks as being either important or very important for upwards price revisions and zero otherwise. The result are as follows:

$$d = \underset{(0.28)}{0.15} - \underset{(0.19^{**})}{0.45}\,\text{MEDIUM} + \underset{(0.31)}{0.22}\,\text{LARGE} + \underset{(0.241)}{0.12}\,\text{MANUF} + \underset{(0.2)}{0.12}\,\text{PROVINCE} - \underset{(0.22^{***})}{0.85}\,\text{MARKET}$$
$$+ \underset{(0.28)}{0.33}\,\text{EXP} - \underset{(0.2^{**})}{0.49}\,\text{INF} - \underset{(0.003^{***})}{0.01}\,\text{HH} + \text{error} \tag{3}$$

R^2: 12.7%   Number of observations= 1167   s.e.= brackets

Eq. (5) indicates that the probability of price-increments fall significantly following a positive demand shock when firms have higher market share, interact more with consumers directly and the informal sector and belong to the medium-size firm category. The above evidence tends to support the voluntarist view of the informal economy in that influence on formal sector firms' prices is being exerted by competition from firms in the informal economy.

VIII   Caveats

The main caveat of this study is the services sector sampling frame. The frame for services sector was manually constructed using a database that lacked information on number of employees and standard economic code classification but reported data on paid up capital. We also excluded firms that have not reported in last ten years and selected firms with paid up capital of more than Rs. 2,000,000 introduced a bias for larger services sector firms. For the former, this consideration would not matter more if the missing services sector firms are distributed evenly across different economic activities. For the later, note that given our small sample size for services sector it would not have been possible to make statistically significant inference from a very large population of small firms.

Another caveat is that the possibility that questions were answered in the context of higher inflation environment prevailing in the country. We have already mentioned that during the survey, inflation was 4-6% above its historical average of 8% and continues to persist at these high levels. There are two points

here. First, 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. And those questions that did involve time we probed whether the reply would have been different in 2007 and 2008. We found there to be little difference. Second, it is reasonable to expect lower price-stickiness in a country with such a high steady state inflation of 8%. This is corroborated by other countries (such as Canada, UK and Turkey) displaying relatively high inflation rates at the time of their surveys and also reporting relatively higher price change frequencies. Combining these two arguments, most results should also apply to normal times. Nevertheless, a fool-proof method of meeting this concern would be to conduct a panel survey in normal times which the central bank is committed to do in the future.

IX   Conclusion

We describe results of 1189 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 14% of the total sample, is less so. 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. 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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X   Acknowledgement

Appendix A: Post-Stratification Scheme

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

$$w_h = \frac{\frac{P_h}{P}}{\frac{S_h}{S}} \tag{4}$$

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 for all the responding firms.

For services sector, the information set available is not enough to justify post-stratification for firm-size on the basis of employment. However, we have information on paid-up capital. We use this information to post stratify for firm size and therefore allowing us to treat both selected economic sectors consistently. We divided firms in services sector on the basis of paid-up capital (in local currency) as small, medium and large firms according to $>$ Rs.15000000, 15000000 - 50000000 and more than $<$ 50000000 respectively.[14] The responses for the services sector in this paper are reported by post stratification, the weights of hth stratum are given by

$$w_h = \frac{\frac{C_h}{C}}{\frac{o_h}{o}} \tag{5}$$

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[14]We can draw comfort from the fact that this categorization has a correlation coefficient of 0.5 with employment categorization used earlier on the basis of employment data we collected from the 'surveyed' sample.

where, C_h is the paid-up capital of employees in the population in stratum h, C is the total paid-up capital of services population frame. Similarly, o_h is the paid-up capital in the firms interviewed in stratum h and o is total paid-up capital of all the responding firms. 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[15] that can be aggregated, we must reweigh the results on the basis of economy-wide sector weights in Table 2. We post-stratified the data of manufacturing and services sectors by their respective weights in population, these results are reported under 'total' in our analysis.

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[15]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.

Appendix B

Table 7B:
Reason for Price Stickiness

Theories	Manufacturing			Theories	Services		
	Mean Scores†	*p-value*‡	*Imp.**		*Mean Scores*†	*p-value*‡	*Imp.**
Coordination Failure	1.8	0.00	84	Coordination Failure	1.9	0.00	79
Temporary Shocks	2.5	0.00	55	Risking Customer Relations	2.8	0.23	41
Risking Customer Relations	2.7	0.89	46	Explicit Contracts	2.9	0.17	44
Procyclical Elasticities	2.7	0.03	44	Temporary Shocks	3.0	0.66	39
Habit Formation	2.8	0.89	40	Procyclical Elasticities	3.0	0.38	40
Constant Unit Cost	2.8	0.20	40	Habit Formation	3.0	0.00	31
Delivery Time	2.9	0.07	41	Thick Markets	3.2	0.01	29
External Financing	3.0	0.00	39	Constant Unit Cost	3.4	0.53	22
Using Inventories	3.1	0.84	30	Informal Sector Coordination Failure	3.4	0.42	22
Explicit Contracts	3.1	0.88	31	Implicit Contracts	3.5	0.57	19
Thick Markets	3.2	0.49	27	External Financing	3.5	0.09	19
Informal Sector Coordination Failure	3.2	0.00	28	Costly Information Gathering	3.6	0.54	12
Implicit Contracts	3.4	0.00	22	Menu Costs	3.6	0.02	5
Costly Information Gathering	3.6	0.00	13	Delivery Time	3.7	0.00	12
Menu Costs	3.7		8	Using Inventories	3.8		6

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

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

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

Appendix C

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