Consumer price rigidities in Lesotho: the role of outlet characteristics and competition[1]

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Abstract

This paper extends the microeconomic empirical evidence on price-setting in emerging economies using micro price data and outlet survey data for Lesotho, a small low-income landlocked economy in Southern Africa. The paper looks at how price-setting behaviour differs by outlet size, location and type. It also analyses the various sources of price changes and price rigidities, including the effect of competition on the frequency of price changes. Our results reveal many similarities and some important differences in price-setting behaviour between outlets in Lesotho and those in advanced economies. The flexibility of prices in Lesotho is comparable to that of the US, but higher than in South Africa. Prices change more often in large outlets and less frequently in outlets where labour costs are an important component of costs. Implicit contracts with consumers and co-ordination failure in the setting of prices across competitors rank highly as sources of price rigidity, while menu costs and explicit contracts are found to be relatively unimportant. Cost shocks have a stronger influence on price increases than price decreases, while shocks to market conditions (demand and competitor's price) are more relevant for price decreases than for price increases. These results corroborate findings in advanced economies. However, contrary to theoretical expectations and other empirical findings, no consistent relationship between the frequency of price changes and the perceived competition in the market is found.

Key words: Price rigidity, competition, survey data, micro price data, emerging economies

JEL: E30, D40, D21, L21

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1. Introduction

Evidence of price rigidities is widespread. Prices are found to be sticky and price increases and decreases often respond asymmetrically to cost and demand shocks (Blinder *et al*., 2008; Peltzman 2000). Accounting for these rigidities poses challenges to economic theory (Carlton, 1989; Blinder, 1991; Blinder *et al.*, 1998; Peltzman, 2000), macro models (Klenow and Malin, 2011) and the conduct of economic policies such as monetary policy (Greenslade and Parker, 2012).

A wide range of price data underpins the empirical research on price-setting. Some studies analyse price-setting behaviour using the micro price data used to construct consumer price and producer price indices (Bils and Klenow, 2004; Dhyne *et al.*, 2006; Alvarez and Hernando, 2007b; Klenow and Kryvtsov, 2008; Nakamura and Steinsson, 2008; Bunn and Ellis, 2012), while others make use of barcode data (Midrigan, 2009; Bunn and Ellis, 2012) or scraped price data from websites (Cavallo, 2012). Other studies, led by Blinder (1991) and Blinder *et al.* (1998) for the US have drawn on price-setting surveys. These include Fabiani *et al.* (2006) and Álvarez *et al*. (2006) for the Euro area and Hall *et al.* (1997, 2000) and Greenslade and Parker (2012) for the United Kingdom.

Despite the growth in the empirical literature, there is strikingly little evidence on price setting behaviour within emerging economies. Klenow and Malin (2011) only record six micro price data based studies of emerging economies (Brazil, Chile, Colombia, Mexico, Sierra Leone and South Africa) and only three (Mexico, Romania and Turkey) that have used firm survey data. Yet, price setting behaviour of firms in emerging economies, where economic shocks are frequent, inflation rates are often high and variable, and weak infrastructure, poor distribution networks and 'thin' markets create frictions to price adjustments, can be expected to be very different to firms in advanced economies (Nchake *et al*., 2014).

This study extends the microeconomic empirical evidence on price-setting in emerging economies with a focus on Lesotho, a small low-income landlocked economy in Southern Africa. For instance, we look at how price-setting behaviour differs by outlet size, location and type. We also study factors that drive price changes and provide insight into why price increases and decreases respond asymmetrically to cost and demand shocks. Finally, we

look at how price-setting, particularly the frequency of price changes, is related to competition and outlet characteristics.

Our results reveal many similarities in price-setting behaviour between outlets in Lesotho and those in advanced economies. The flexibility of prices in Lesotho is comparable to that of the US, but higher than in South Africa. As found in other studies, prices change more often in large outlets and less frequently in outlets where labour costs are an important component of costs. Implicit contracts with consumers and co-ordination failure in the setting of prices across competitors rank highly as sources of price rigidity, while menu costs, attractive thresholds, bureaucratic rigidities and explicit contracts are found to be relatively unimportant. As found by Fabiani *et al*. (2006) for the Euro area, cost shocks have a stronger influence on price increases than price decreases, while shocks to market conditions (demand and competitor's price) are more relevant for price decreases than for price increases.

We also find some important differences. The market structure for consumer goods and services in Lesotho is characterised by a high degree of imperfect competition. A very high proportion of outlets apply mark-ups over costs when setting prices. Contrary to theoretical predictions and empirical findings (Carlton, 1986; Rotemberg and Saloner, 1987; Hannan and Berger, 1991; Powers and Powers, 2001; Álvarez and Hernando, 2007b), we find no consistent relationship between the frequency of price changes and the perceived competition in the market.

This study is unique, both in its focus on an emerging African economy and its use of a database that combines historical product level price data with firm survey data. The micro price database consists of monthly consumer prices for 391 products collected from 506 retail and services outlets in Lesotho over the period January 2011 to December 2012. The outlet survey data is drawn from face-to-face questionnaires administered to managers/owners of 441 of these outlets.[2] The survey questionnaire contains detailed information on firm attributes, price-setting behaviour, competition and costs. The integrated database combines the richness of the micro price data in terms of product range and time dimension with detailed information on outlet characteristics and manager responses to how prices are set, reviewed and changed. This allows for a more precise testing of the determinants or

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[2] The survey sample is large relative to other studies, particularly when taking into account the relative sizes of the economies. For example, the Blinder (1991) and Blinder *et al*. (1998) survey covered approximately 200 firms in the US, the survey of UK firms used by Greenslade and Parker (2012) covered 693 firms and the Euro area study by Fabiani *et al*. (2006) covered 11 000 companies in 9 countries. All these studies covered mostly producers, with relatively few retail or services outlets.

correlates of price setting behaviour than is possible in other studies that use either micro price or price-survey data.

The rest of the paper is organised as follows. In section 2, we discuss the outlet survey and micro price data used in the paper. Section 3 explores the dynamics of pricing strategies according to the responses in the survey data. Section 4 uses the survey data to evaluate the relevance of alternative theories of price rigidities and asymmetries in price setting. Section 5 then draws on the micro-price data to estimate some of the main determinants of the frequency of price changes, including the role of competition and outlet attributes. Finally, Section 6 concludes the paper.

2. Data

Outlet price-setting survey

The price-setting surveys were designed to collect detailed information on outlet characteristics, with a particular focus on how prices were set and changed. The survey questionnaire included modules on general background information (age of outlet, location, ownership), assets (for example, ownership of fridges, vehicles), sales and prices (sales value and setting of prices), competition (number of competitors, constraints to entry), transport and supplies, finance, employment and labour (number of employees, wages) and productivity (detailed information on costs).[3]

The survey was administered during the first two weeks of March and April 2013, under the supervision of a work team consisting of academics and PhD scholars based at the University of Cape Town. The initial sample of the survey consisted of the 774 retail and services outlets that the BOS use for the collection of CPI monthly price data across regions of Lesotho. This is not necessarily a representative sample of retail outlets in Lesotho. The selection of firms by the BOS is not random and firms are selected based on their willingness to provide price data and to ensure adequate coverage of the products included in the CPI basket.

Various outlets were excluded from the interview process. Outlets from which product prices were collected once or twice a year, such as taxi fares, housing rent, petrol and diesel were dropped. As economic theory of price-setting is based on the actions of a profit-maximising firm, we also excluded businesses that are subject to regulatory controls such as

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[3] The questionnaire was designed using the World Bank Enterprise Survey questionnaires and those of Blinder (1991) and Fabiani *et al.* (2006). The survey questionnaire and additional details on the implementation of the survey are available from the authors upon request.

water and electricity companies, hospitals and schools (except for driving schools). Other outlets were excluded as they were closed during the survey period. In total the final sample consisted of 535 outlets.

Interviews were conducted by professional data collectors, employed by the Bureau of Statistics Lesotho to collect price data on a monthly basis for the construction of the CPI in Lesotho. The survey was administered to either the manager or the owner of the outlet. A total of 436 outlets (343 retail outlets and 93 services outlets) were successfully surveyed, a response rate of 81.5 per cent.[4]

Table 1 presents some the descriptive statistics on various characteristics of the surveyed outlets. Most of the outlets are small in size (59 per cent of retail outlets and 67 per cent of services outlets), employing less than 5 employees in total. Medium sized outlets employing between 5 and 20 employees account for 31.9 per cent of the retail outlets and 24.7 per cent of services outlets. Less than 10 per cent of the surveyed outlets are large (more than 20 employees).

Table 1: Descriptive statistics by outlet characteristics, share total responses

	Retail	Services	Total
	Share of total responses (per cent)		
Firm size			
Small (<5 employees)	50.9	62.5	53.4
Medium (6-20 employees)	39.3	27.3	36.7
Large (>20 employees)	9.8	10.2	9.9
Ownership			
Mosotho	52.0	93.3	60.9
South African	9.6	1.1	7.8
Chinese	27.9	1.1	22.1
Indian	7.1	2.2	6.1
Other	3.4	2.2	3.2
Outlet type			
Chain	56.1	52.9	55.4
Not a chain	43.9	47.1	44.6
Location			
Rural	46.6	25.0	42.0
Urban	53.4	75.0	58.0

Note: The sub-category rows in each column sum to 100 per cent

The majority of the surveyed outlets are owned by Lesotho nationals (61.3 per cent), but the share is substantially higher in services (93.4 per cent) than in retail (52.3 per cent).

The remaining retail outlets are owned by Chinese (27.7 per cent), South African (9.5 per cent), Indian (7.1 per cent) and other (3.4 per cent) nationals.

Just over half of the surveyed outlets are branches of retail or services chains.[5] These chain store branches tend to be relatively large with a median (mean) employment of 5 (9.8) full-time or part-time workers compared to 3 (7.1) for other outlets. Most of the branches are from chain stores that originate in Lesotho, but 14 per cent of them originate from South Africa. These South African chains are also substantially larger than the other chain stores averaging 20 employees per store compared to between 4 and 7 employees per store. This reflects the relative importance of South African supermarkets and services chains in regional markets.

Like in most emerging economies, many of the outlets, particularly the retail outlets, are located in rural areas (42.2 per cent of all outlets are in rural areas) reflecting the high proportion of the population living in rural areas.[6]

Micro price data

The historical product price data for these outlets was also provided by the BOS. The price data covers a relatively short period from January 2011 to December 2012.[7] Each individual price record (termed price quote) for an item has information on the date (month and year), retail outlet, district, product (including brand in many cases) and unit codes and the price of that item. We were also provided with the outlet name sheet that enabled us to merge the micro price data with the outlet survey responses. This approach therefore makes it possible to trace the pricing history of individual items within each retail outlet over the period. A limitation of the data is that it is not possible to identify price changes in response to temporary promotions and seasonal sales. All price changes in the data are therefore treated as regular changes.

Table 2 presents a breakdown of the price records by major product group. The data in the table covers all products (391) and all outlets (506) and is not restricted to the sample of outlets for which survey data has been collected. The sample consists of over 400 000 price quotes and 391 product items. Just over 40 per cent of price quotes are made up of food

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[5] A chain store is a group of retail or services outlets that deal in the same products, share a brand and central management and usually have a standardised business method and practice.

[6] According to the World Bank Development Indicators, the rural population made up 72 per cent of the total population in Lesotho in 2012.

[7] The base sample of firms used by the BOS to construct the CPI was revised in early 2010. Many data points during 2010 are missing. We therefore excluded 2010 from the analysis. For an overview of price-setting from March 2002 to December 2009 using micro price data for Lesotho, see Nchake *et al.* (2014).

products, although these products only make up 29 per cent of the total number of distinct product items in the sample. This discrepancy arises from relatively large number of food retailers included in the sample of outlets. Of the remaining major groups, household operations (cleaning products, polish, mops and brooms), household furniture and equipment and non-alcoholic beverages make up relatively high shares price quotes.

Table 2: Price records by major group, Jan 2011 to December 2012

	Price quotes		Product items	
	Number	Per cent	Number	Per cent
Food	171,430	42.2	109	27.9
Non-alcoholic beverages	30,792	7.6	17	4.3
Alcoholic beverages	8,448	2.1	14	3.6
Tobacco and narcotics	6,552	1.6	2	0.5
Clothing and footwear	25,632	6.3	49	12.5
Fuel	7,296	1.8	11	2.8
Household furniture and equipment	35,592	8.8	63	16.1
Household operations	45,888	11.3	18	4.6
Transport equipment	2,232	0.6	11	2.8
Personal care	45,742	11.3	27	6.9
Medical care and health expenses	624	0.2	8	2.0
Recreation and culture	1,488	0.4	10	2.6
Accommodation	192	0.1	3	0.8
Transport services	792	0.2	10	2.6
Other goods and services	23,472	5.8	39	10.0
	406,172	100.0	391	100.0

Note: Sample runs from January 2011 through December 2012. Education services, water and electricity are not included. The product groups are based on a modification of the Classification of Individual Consumption by Purpose (COICOP) to separate out goods and services.

3. How are prices set?

Differences in price-setting behaviour across outlets reflect different strategies that firms use in pricing their products. In this section, we first explore the main price-setting rules adopted by Lesotho retail and services outlets. We then examine how the competitiveness of the market and various outlet characteristics (location, size, ownership) affect the choice of price-setting rule.

Price-setting rules

The questionnaire addresses the outlet's price-setting rule by directly requesting them to indicate whether they set the price of their main product or service independently (as a mark-up over costs or based on their main competitor's price) or whether it is regulated by

government or business councils or set by head office/parent company.[8] The question pertains to the main product of each outlet, but this on average constitutes 79.5 per cent of the total value of sales of each outlet, so is broadly representative of the outlets general pricing behaviour. Table 3 presents the results.

Table 3: How do you set price of your main product or service?

Variable	Share of total responses (%)
Mark-up over costs	71.5
Government	3.4
Business council	4.3
The parent company/ Head quarters	14.6
Main competitor's price	6.2

The data reveals that the majority of outlets (71.5 per cent) apply a mark-up over costs when setting prices. The relative importance of mark-ups in determining prices is similar to that of the Euro area by Fabiani *et al.* (2006) (54 per cent) and Germany (73 per cent) and Spain (80 per cent) in particular. Other countries where mark-up pricing is found to be important include Netherlands (56 per cent), Portugal (65 per cent) and the UK (57 per cent) (see Alvarez *et al.* (2006), Alvarez and Hernando (2007a) and Greensdale and Parker (2012)). Amongst emerging economies, mark-up pricing or oligopolistic pricing dominates price setting rules in Turkish firms (Şahinőz and Saraçoğlu, 2008) and Romanian firms, especially in the case of large firms (74 per cent) (Copaciu *et al.*, 2010).

Only 6.2 per cent of outlets in Lesotho set prices according to their main competitor's price. This is substantially lower than the findings for the Euro area (27 per cent) (Fabiani *et al.*, 2006) and the UK where 68 per cent of firms regarded their competitor's price as important or very important in determining their prices (Greensdale and Parker, 2012). For the remaining outlets in Lesotho prices are set by government (3.3 per cent), the parent company or head office (14.5 per cent) or business council (4.3 per cent). The relatively high proportion of prices set by the head office reflects the prominence of chain stores in the retail market in Lesotho.

Overall, the results suggest that retail and services outlets in Lesotho operate within an imperfectly competitive market. Although direct comparisons with other countries are difficult given differences in firm composition, the extent to which market are imperfect appears to be greater than that found in advanced economies. However, we also find evidence

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[8] The main product in this context is defined as the product that generates the highest turnover of the business and is defined within different product groupings as listed in appendix 3.

of heterogeneity across firms in price-setting rules adopted. In what follows, we try to isolate some of the outlets characteristics associated with differences in price setting behaviour.

Price-setting rules, competition and outlet characteristics

Table 4 summarises the price setting strategies of outlets according to characteristics of the outlet such as size, ownership, and location. Price-setting rules followed by outlets differ significantly according to the characteristics of the outlet. Compared to retail outlets, services outlets are more likely to set prices according to competitor prices than through a mark-up over cost. The share of outlets that fix prices as a mark-up over cost falls as the size of the firm increases, but this does not necessarily reflect the effect of market power. The share of firms setting prices according to the main competitor's price does not rise with the size of the firm. Rather, the setting of prices by business councils and the head office of the parent company are the main alternatives to mark-up pricing in large firms.

Ethnicity of ownership and location also matter for price-setting strategies (Craig *et al.* (1984); Hoch *et al.*, 1995; Dhar and Hoch, 1997; Neslin *et al.*, 1995; Shankar and Bolton, 2004). Prices are set by the parent company in half of the South African owned firms reflecting the presence of chain-stores in this group. Close to 90 per cent of Chinese owned firms use mark-up pricing, while a relatively high proportion (20 per cent) of Indian owned firms set prices according to their competitor prices. Outlets in rural areas are more likely to set prices as a mark-up over cost, whereas in urban areas prices in a relatively high proportion of outlets are set according to their competitor's price or by the head office. The latter reflects the importance of the South African retail and services chains in the urban areas of Lesotho. Finally, whether the outlet is situated in a shopping centre/mall or not, appears to have no significant bearing on price-setting rules adopted.

Table 4: Price setting strategies by firm characteristics (per cent)

	Mark-up over costs	Government regulated	Business council	The parent company/ Head quarters	Main competitor's price	Total
Services/retail**						
Retail	74.5	2.5	3.4	15.4	4.3	100
Services	60.7	6.7	7.9	11.2	13.5	100
Outlet type**						
Chain	63.4	3.5	2.6	21.6	8.8	100
Non-chain	81.0	3.3	6.5	6.0	3.3	100
Size*						
Small (5 employees or less)	75.1	2.8	5.6	10.0	6.4	100
Medium (6-20 employees)	66.1	4.7	0.8	22.0	6.3	100
Large (>20 employees)	65.8	2.6	7.9	18.4	5.3	100
Ethnicity of owner**						
Mosotho	71.1	4.8	6.0	12.0	6.0	100
South African	43.8	0.0	3.1	50.0	3.1	100
Chinese	88.8	1.1	2.2	4.5	3.4	100
Indian	64.0	4.0	0.0	12.0	20.0	100
Location						
Within a shopping centre/Mall	69.3	5.0	3.0	13.9	8.9	100
Other	72.4	3.0	5.0	14.3	5.3	100
Rural/urban*						
Rural	78.6	2.3	5.2	9.2	4.6	100
Urban	65.5	4.3	3.8	18.7	7.7	100

Notes: Pearson Chi square tests of independence of outlet characteristics and price setting rules were conducted for each category of characteristics. * and ** denote rejection of the null hypothesis of independence at the 95 per cent and 99 per cent confidence level.

The degree of competition is also widely found in other empirical research to be an important determinant of a firm's price-setting rule (Álvarez and Hernando, 2007b; Fabiani *et al.*, 2006; Copaciu *et al.,* 2010). We explore whether similar relationships are evident for Lesotho using various indicators of competitiveness. These include the number of competitors faced by the outlet in their local area, as in Hall *et al.* (2000), Aucremanne and Druant (2005) and Apel *et al.* (2005), the distance in terms of minutes required to walk to their main competitor (Hock *et al*., 1995) and, following Álvarez and Hernando (2007b) measures of market competition inferred from outlet responses to actual or potential changes in competitor's prices. These inferred competition measures include whether an outlet reduced prices in response to the lowering of a competitor's price, and whether an outlet regarded reductions in a close competitor's price as important or very important in terms of influencing them to lower their price. [9]

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[9] According to survey responses, 8.8 per cent of outlets face no competition in their local markets, 75 per cent face between 1 and 5 competitors and 16 per cent of compete with 6 or competitors or above. Competing firms

We restrict the sample of outlets to those that have a clear independent price-setting policy, i.e. those outlets that adopt a mark-up over cost or competitor pricing rule. Table 5 summarizes the relationships.[10]

Table 5: Price setting strategies by degree of competition to the firm (per cent)

	Mark-up over costs %	Main competitor's price %	Total %	Observations Number
Distance to competitor				
Within 5 minutes	91.5	8.5	100	200
Between 6 and 10 min	91.2	8.8	100	57
More than 10 minutes	88.6	11.4	100	35
*Number of competitors**				
none	100.0	0.0	100	28
Less than 2	91.6	8.4	100	107
Between 3 and 5	94.0	6.0	100	134
Between 6 and 10	84.8	15.2	100	33
More than 10	78.9	21.1	100	19
*Reduce price in response to lowering of competitor's price***				
No	94.5	5.5	100	220
Yes	81.4	18.6	100	70
*How important is reduction in close competitor's price in terms of influencing you to lower price**				
Unimportant	97.7	2.3	100	151
Minor importance	88.1	11.9	100	36
Important	87.8	12.2	100	56
Very important	75.0	25.0	100	68

Notes: Pearson Chi square tests of independence of outlet characteristics and price setting rules were conducted for each indicator of competitiveness. * and ** denote rejection of the null hypothesis of independence at the 95 per cent and 99 per cent confidence level.

A negative relationship is found between the share of firms following a mark-up pricing rule and the degree of competition for all indicators of market competitiveness, with the exception of distance to competitors. The relationship is clearly illustrated in Figure 1 that plots the share of firms using mark-up and competitor pricing rules according to number of competitors each outlet faces. Less than 10 per cent of outlets facing fewer than 6 competitors use competitor pricing rules compared to just over 21 per cent for those facing more than 10 competitors. The relationship with competitor pricing strategies is even stronger when using

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appear to be clustered in neighbouring areas with 66 per cent of outlets stating that their main competitors were within 5 minutes walking distance of their outlet. 38 per cent of managers reported that a reduction in a close competitor's price was important or very important to their decision to lower prices. Close to a quarter (23 per cent) of outlets reduced prices of their main products in response to price reductions by their domestic competitors during 2012.

[10] It is possible that mark-up or competitor pricing rules are adopted by the head office of outlets or the business councils, but we are unable to identify if this is the case. A substantially lower proportion of outlets (19 per cent compared to 24 per cent for all other outlets) whose prices were set by business councils or the head office said they reduced prices in response to reductions in a competitor's price suggesting that most of these outlets do not pursue a competitor price rule.

indirect measures of competitiveness such as whether outlets reduced prices in response to lower competitor prices (5.5 per cent vs. 18.6 per cent) and the importance of reductions in competitor prices in influencing the outlet to lower its own price.

Figure 1: Price setting according to mark-up pricing and main competitor by degree of competition
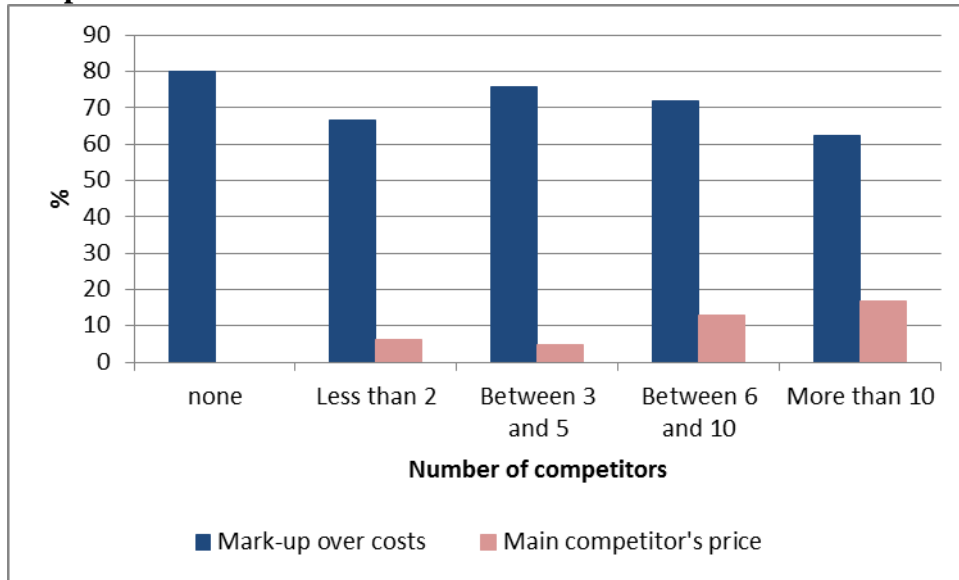
Note: The sample only includes outlets that set prices according to a mark-up or competitor pricing rule.

The competitiveness of the environment has a strong influence on the price-setting rules adopted by retail and services outlets in Lesotho. The more competitive the environment, the more likely an outlet sets prices according to its competitor's price. This relationship corroborates similar findings in other countries such as the Euro area (Fabiani *et al.*, 2006). However, the overall share of outlets pursuing competitor pricing strategies is low relative to these countries. Very few firms set prices according to competitor's prices. What may account for this is the relatively low number of competitors each outlet faces as well as the high share of outlets located in rural areas where high transports costs enable outlets to segment product markets.[11]

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[11] In the UK survey analysed by Hall *et al*. (2000), only 33 per cent of firms faced from zero to 5 competitors, compared to 84 per cent in Lesotho. Their sample also includes manufacturing, construction and other services, so may not be directly comparable.

4. Price stickiness: Theory and evidence

Price rigidities

Individual outlets do not adjust prices continuously. Prices tend to be sticky implying a resistance to change despite changes in the economic environment (Amirault *et al.*, 2006). As outlined in Blinder (1991) and summarized in Fabiani *et al.* (2007), theoretical literature provides different explanations for price rigidity.[12] Below, we summarise the most relevant theories to this study.

   a. Explicit contracts. In this theory, prices are sticky as firms have explicit contractual arrangements with their customers (written or oral) in which they guarantee to offer certain products at specific prices. These contracts are utilised to build long-run customer relationships to stabilise future sales and reduce future uncertainty and costs for customers. Price changes occur when contracts are re-negotiated or renewed.

   b. Implicit contracts. As with explicit contracts, firms desire long-term relationships with customers, but in this case no formal agreement with the customer is established. Consumers are resistant to price increases, but more so when increases are perceived as unfair, as when firms raise prices in response to demand shocks (Okun, 1981; Rotemberg, 2005). Firms try to signal 'loyalty' to customers and avoid antagonizing them by changing prices as infrequently as possible, or only in response to cost shocks.

   c. Co-ordination failure. In this theory firms are hesitant to change prices for fear of other firms not responding similarly. The intuition is that the firm assumes that if it were to raise its price, it would lose customers as no other firm would follow suit. On the other hand, if the firm were to decrease its price, it would not increase its market share as all competitors would follow suit. Without a coordinating mechanism that allows firms to move together, prices remain rigid.

   d. Physical cost of changing price (menu costs). Menu costs theories were derived on the assumption that retailers may be reluctant to change prices due to costs associated with changing prices (Sheshinski and Weiss, 1977). Firms only adjust prices once the expected additional profits exceed the menu costs. As shown by Mankiw (1985), even small menu costs can lead to nominal rigidities with large macroeconomic effects.

   e. Psychological attractive thresholds. Firms set their prices at psychologically attractive thresholds, for example, R9.99 instead of R10.00. This gives rise to price stickiness

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[12] See Carlton (1989) on why standard models of competitive and imperfectly competitive market structures are insufficient to explain why demand and costs shocks do not transmit seamlessly through to price changes.

as firms postpone price adjustments in face of small shocks as they do wish not to deviate from the pricing point.

To empirically test the relevance of these theories among retailers in Lesotho, outlets were asked to rank the importance of each of the above theories in their decision to delay an increase in the price of their main product or service. The respondents could choose from among four categories: unimportant (1), minor important (2), important (3) and very important (3). The numbers in parentheses indicate the score used to calculate a mean score assigned by outlets to each theory. **Error! Reference source not found.** reports the mean scores as well as the share of outlets that selected important or very important. The score and shares are presented separately for retail and services outlets.

Table 6: Outlet reasons for deferring price increase

Theory	Mean score			Share important and very important (per cent)		
	Retail	Services	Total	Retail	Services	Total
Coordination failure	2.3	2.1	2.3	46.0	38.6	44.4
Explicit contracts	1.5	1.5	1.5	14.3	12.6	13.9
Implicit contracts	2.7	2.5	2.7	57.7	51.1	56.3
Attractive thresholds	1.6	1.4	1.6	15.8	11.4	14.8
Menu costs	1.5	1.5	1.5	17.3	17.0	17.3
Bureaucratic rigidities	1.4	1.5	1.4	11.7	14.9	12.4
Other	1.3	1.5	1.3	12.8	16.7	13.6

Notes: Outlets were asked the following question: *Which of the following factors might stop you from increasing the price of your main product/service*? Respondents could indicate their degree of agreement choosing from among four categories: unimportant (1), minor importance (2), important (3) and very important (4). The numbers in parentheses indicate the score used to calculate the mean score.

Implicit contracts are found to be the most important source of price rigidity with a mean score of 2.7 and 56.3 per cent of outlets citing this as an important or very important reason for delaying price increases. Both retail and services outlets ranked this theory most highly. This result suggests that firms avoid harming long-term relationships with their customers by keeping prices as stable as possible.

The fear that outlets will lose customers to competitors that do not also raise prices is also found to be an important reason why retail and services outlets do not raise prices (a score of 2.3 and a share of 44.4 per cent of outlets citing this as important or very important reason). This result is surprising as the analysis of price-setting rules earlier revealed few firms that follow their competitor's prices when setting their own prices. Other explanations for price rigidity appear to be far less relevant with few firms ranking these as important or very important. These include menu costs (17.3 per cent), attractive thresholds (14.8 per

cent), explicit contracts (13.9 per cent) and bureaucratic rigidities (12.4 per cent). The rankings of the various theories are very similar across retail and services outlets.

The results are broadly consistent with other survey based studies. Fabiani *et al.* (2006) and Greenslade and Parker (2012) also find that implicit contracts and coordination failure are the main explanations for price rigidity in the Euro area and UK, respectively. Amongst emerging economies for which data are available, implicit contracts rank high in Romania (Copaciu *et al.*, 2010) and Pakistan (Malik *et al.*, 2008) and for sales of consumer durable goods in Turkey (Şahinőz and Saraçoğlu, 2008). Unlike our study, explicit contracts are ranked highly in Romania (Copaciu *et al.*, 2010), UK (Hall *et al.*, 1997), the Euro area (Fabiani *et al.,* 2006) and Pakistan (Malik *et al.*, 2008). Finally, the relatively low importance attributed to menu costs and attractive thresholds in Lesotho corroborates the similar findings initially found for the US (Blinder, 1991) and subsequently for the UK, Euro area, Romania and Pakistan (Hall *et al.*, 1997; Fabiani *et al.*, 2006; Copaciu *et al.,* 2010; Malik *et al.*, 2008). Lack of similar price-setting surveys in other African and Asian economies, prevents a comparison with firms in these regions.

Asymmetries in price reactions

Additional insights on the sources of price stickiness are provided by questions asking outlets to assess the importance of different cost and demand factors that lead to an increase or decrease in the price of their main product. Price-setting surveys have generally shown that cost shocks are a more important source of price increases than price decreases (Peltzman, 2000), while demand shocks and competitor's prices contribute more readily to price decreases. This asymmetry in price reactions is found in the US (Peltzman, 2000), Euro area (Fabiani *et al.*, 2006; Avarez *et al.*, 2006), Romania (Copaciu *et al.*, 2010), Turkey (Şahinőz and Saraçoğlu, 2008) and the UK (Hall *et al.*, 1997). Such asymmetries can have macroeconomic implications as the consequences for the real economy may differ in response to monetary policy expansions or contractions (Hall *et al.*, 1997).

The results for Lesotho presented in Table 7 broadly corroborate these findings. The table presents the mean score and the share of outlets that found each factor to be important or very important in increasing or reducing their prices. While changes in the costs of raw materials were cited as the most important factor influencing an outlet's decision to change prices, its importance is relatively stronger for price increases (score of 3.3) than price decreases (score of 2.8). Rising labour costs are the second most important factor leading to a price increase (score of 2.1), but lower labour costs are the least important factor driving

price decreases. After raw material costs, changes in market conditions (demand shocks and competitor's prices) are important sources of price decreases.

This ranking of factors affecting price changes for Lesotho is very similar to the average ranking of the 9 Euro area country studies presented in Fabiani *et al*. (2006). Like their study, the results are not sensitive to differences in outlet type (retail or services) or size, with one exception: in the case of raw material costs retail outlets are more likely than services outlets to lower prices in response to lower material costs. This may be anticipated as raw materials constitute a higher share of costs in retail outlets than services outlets where labour costs are relatively important. We also test whether outlet price responses cost and demand shocks differ according to the level of perceived competition, but find no consistent relationships.[13]

Table 7: Factors influencing and outlet to reduce or to increase the price of their main product?

	Price increases		Price decreases	
	Score	Share	Score	Share
Labour costs	2.1	38.2	1.7	20.1
Raw material costs	3.3	83.0	2.8	62.8
Financial costs			1.9	29.3
Demand	1.7	22.8	2.3	45.1
Competitor's price	1.8	24.0	2.1	37.5
Other	2.1	40.5	2.2	42.4

Notes: Outlets were asked the following question: *Which of the following factors are likely to lead to an increase (a decrease) in the price of your main product/service*? Respondents could indicate their degree of agreement choosing from among four categories: unimportant (1), minor importance (2), important (3) and very important (4) where the numbers in parentheses indicate the score used to calculate the mean score. With one exception the Pearson chi-square tests of independence fail to reject the null hypothesis of independence in responses across retail and services outlets. In the case of raw material costs, the exception, retail outlets are more likely than services outlets to lower prices in response to lower material costs.

In general, the results reveal that cost shocks are more relevant in influencing price increases than price decreases, while shocks to market conditions (demand and competitor's price) are more relevant for price decreases than for price increases. Fabiani *et al*. (2006) argue that this asymmetry is consistent with the importance of implicit contracts as an explanation to price rigidity as found in the preceding section. In addition, like the Fabiani *et al*. (2006) study, the evidence of asymmetric responses to demand shocks found in Lesotho

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[13] As found in Fabiani *et al*. (2006), when the degree of competition faced by an outlet is inferred from the importance an outlet attaches to reductions in a competitor's price in explaining its own price decreases, we find that outlets in highly competitive markets are more responsive to changes in the underlying factors. When measuring competitiveness using alternative indicators such as the number of competitors faced by a firm or whether a firm actually reduced its price in response to a price reduction of its competitor, we find no significant relationship.

extend the earlier finding of asymmetry in response to cost shocks in the US by Peltzman (2000).

5. Outlet characteristics and the frequency of price changes

Evidence of price rigidities is also revealed by the frequency at which outlets change prices. In this section, we draw on the micro price database to analyse the extent and determinants of the frequency of price changes by retail outlets in Lesotho.

Frequency of price changes

A stylized fact emerging from micro price studies is the tremendous amount of heterogeneity in the frequency of price changes across products (Klenow and Malin, 2011). This is also evident in the Lesotho data. Table 8 presents the mean and median frequencies and implied durations of price changes in Lesotho by major group. The data sample covers the period January 2011 to December 2012 and includes all price quotes, not only those from the outlets included in the survey.

On average, 28.5 per cent of consumer prices are changed in a given month in Lesotho. Individual prices therefore change on average every 3.5 months, which is slightly longer than the 3.2 month duration estimated by Nchake *et al*. (2014) for Lesotho during the earlier period March 2002 to December 2009. One explanation is the lower levels of inflation in the latter period, which may have led to fewer price changes by outlets.[14]

Compared to other countries, the flexibility of prices in Lesotho is similar to that of the US where between 25 and 36 per cent of prices are changed in a given month (Klenow and Kryvtsov, 2008; Klenow and Malin, 2011), but is greater than the 15 to 20 per cent found for the Euro area (Dhyne *et al.*, 2006; Álvarez *et al.*, 2006), UK (Bunn and Ellis, 2012) and South Africa (Creamer *et al.,* 2012).

As found in the international literature, the frequency of price changes varies widely across products. It is lowest for transport services (21 per cent) and highest for fuel products (45.8 per cent). Food products also have a relatively high frequency of price change (29.2 per cent), while services on average have relatively low frequencies.

When the frequency of price change is split into price increases and price decreases, prices increase more frequently than they decrease (16.2 per cent vs. 12.2 per cent), but this

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[14] While Nchake *et al.* (2014) find no relationship between frequency and inflation in Lesotho, they find a positive association between the frequency of price increases and inflation and a negative association between inflation and the frequency of price decreases.

apparent asymmetry may arise from the moderate levels of inflation in Lesotho during this period. Nevertheless, the data indicates that reductions in prices constitute an important component of pricing behaviour in retail outlets.[15]

Table 8: Mean and median frequency of price change by Major Group)

	Mean frequency (%)	Median frequency (%)	Implied mean duration (months)	Implied median duration (months)	Number of products
Food	29.2	26.0	3.43	3.85	109
Non-alcoholic beverages	24.8	25.4	4.03	3.93	17
Alcoholic beverages	21.8	20.6	4.60	4.86	14
Tobacco and narcotics	34.6	34.6	2.89	2.89	2
Clothing and footwear	24.7	24.6	4.05	4.06	49
Fuel	45.8	38.3	2.18	2.61	11
Household furniture and equipment	31.5	31.7	3.17	3.15	63
Household operations	35.6	38.5	2.81	2.59	18
Transport equipment	36.5	39.1	2.74	2.56	11
Personal care	28.8	30.5	3.47	3.28	27
Medical care and health expenses	20.2	21.1	4.96	4.74	8
Recreation and culture	25.5	24.8	3.92	4.04	10
Accommodation	25.4	26.1	3.94	3.83	3
Transport services	21.0	21.4	4.77	4.68	10
Other goods and services	24.1	24.6	4.14	4.06	39
Total	28.5	27.0	3.51	3.70	391

Note: Sample runs from January 2011 through December 2012. Education services, water and electricity are not included. Frequencies are calculated as the simple average (median) of $Freq_{ik}$ across the product items. The standard deviation reflects the simple or weighted average of the standard deviation of $Freq_{ik}$ across outlets within each product item. Implied durations are calculated as the inverse of the mean or median frequency. $Freq_{ik}$ is the mean frequency over the period January 2011 to December 2012 of product i in outlet k. The Major Groups are based on an adjustment to the Classification of Individual Consumption by Purpose (COICOP) to separate out goods and services.
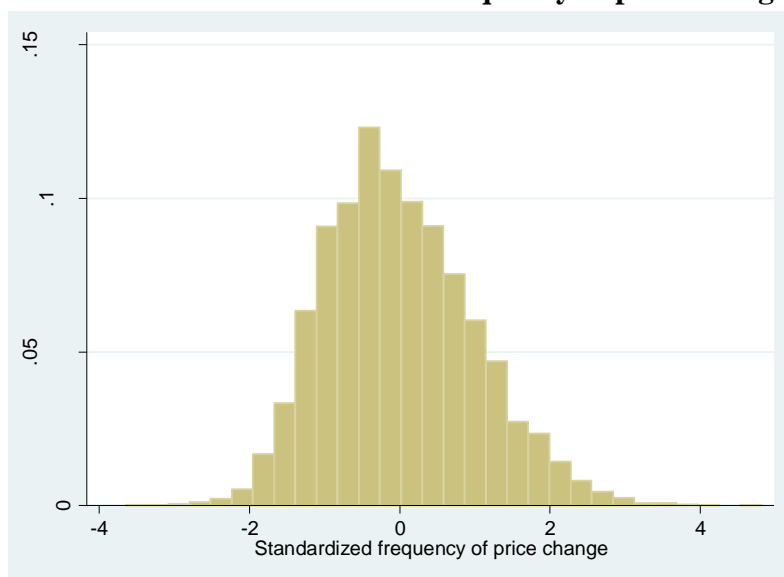
Finally, the frequency of price changes differs enormously across outlets even when they are retailing the same product. This can be seen in Figure 2 that plots the distribution of standardized frequencies of price change:

$$z_i = \frac{F_{ik} - \mu_k}{\sigma_k}$$

where F_{ik} is the frequency of price change by outlet k of product i from January 2010 to December 2012, μ_k is the average of F_{ik} in product k, and σ_k is the standard deviation of the frequency of price changes in k. As shown in the figure, the frequency of price change by an outlet is often large compared to the average frequency of price change by outlets within the same product line.

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[15] Nchake *et al.* (2014) calculate that 44 per cent of the variation in retail price inflation in Lesotho can be traced back to variation in the inflation contribution of price decreases.

Figure 2: Distribution of standardized frequency of price changes

This heterogeneity in the frequency of price changes within product lines is consistent with international evidence (Powers and Powers, 2001) and is indicative of the importance of differences in market structure, consumer demand, firm characteristics and the cost of changing prices. It is this variation in price setting behaviour across outlets retailing the same product that the survey is unique in being able to explain.

Outlet attributes and the frequency of price changes

Various explanations have arisen for the heterogeneity in price changes across products. These include the frequency and magnitude of cost and demand shocks, the level and variability of inflation and differences in price collecting methods of statistical agencies (Klenow and Malin, 2011: 254).

Firm-specific attributes also help to explain the observed differences in the frequency of price changes across outlets operating within narrowly defined product markets. For example, consumer prices are found to be more flexible in large outlets, such as supermarkets and department stores (Buckle and Carlson, 2000; Amirault *et al.*, 2006; Klenow and Malin, 2011; Greenslade and Parker, 2010). Firms in which labour costs make up a relatively high proportion of total costs change prices less frequently as wage changes typically take place once a year (Álvarez and Hernando, 2007a). Shops that are located in low density areas change their prices less frequently while those that are located in clustered areas change their

prices more frequently (Shankar and Bolton, 2004). Further, firms that are able to store inventories adjust to shocks through changes in inventories rather than through output and price changes leading to a reduction in price fluctuations (Blinder, 1982).

An additional explanatory factor is market structure (Carlton, 1986; Powers and Powers, 2001; Álvarez and Hernando, 2007b). As shown theoretically by Rotemberg and Saloner (1987) and empirically using micro price data by Carlton (1986), Hannan and Berger (1991), Powers and Powers (2001) and Lunnemann and Mathä (2005) firms adjust prices more frequently in responsive to costs shocks the more competitive the market.[16] These results are corroborated by the price-survey studies of Hall *et al*. (2000), Álvarez and Hernando (2005 & 2007b), Fabiani *et al*. (2006) and Hoeberichts and Stokman (2006).

In what follows we use the integrated micro price-survey data to identify outlet attributes associated with the frequency of price changes. The advantage of this database is that it combines detailed product-level price data for each outlet with the in-depth information on the various characteristics of that outlet. In analysing the frequency of price changes, we are therefore able to control for product heterogeneity far more precisely than in other survey based studies.[17]

Table 9 presents a summary of the mean frequency of price change by outlet characteristic. The frequencies are based on a sample of 370 of the surveyed outlets for which the monthly micro-price data could be matched.

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[16] These models assume a fixed cost of changing prices that include both menu costs and the customer antagonization costs of Okun (1981) and Rotemberg (2005). In this framework, the flatter the slope of the perceived demand curve facing the firm, the larger the profit incentive of the firm to change prices in response to cost shocks. Flatter demand curves are anticipated in more competitive markets and thick-product markets where the infra-marginal consumer is relatively price sensitive (Powers and Powers, 2001). This framework is easily extended to allow for demand curves where the slope of the demand curve is flatter for price increases than for decreases (Hannan and Berger, 1991).

[17] The price-setting survey studies are generally based on a small sample of diverse and non-overlapping products, one for each firm. Estimation using this data can lead to biased estimates. For example, perishable food products are characterised by a relatively high frequency of price change internationally (Dhyne *et al.,* 2006; Klenow and Malin, 2011) as well as in Lesotho (Nchake *et al*. 2014). If perishable food markets are relatively competitive, as may be expected in emerging economies where barriers to entry into informal markets are low, then cross-product (outlet) estimates of the frequency of price changes on perceived competition would be biased upwards. Similarly, if smaller firms are systematically attracted to retailing certain types of products, and are less likely to change prices more frequently, this can bias estimates of product-specific frequency in price changes.

Table 9: The mean frequency of price changes by outlet attribute

	Frequency of price change	Frequency of price increases	Frequency of price decreases
Services/retail			
Retail	29.7	17.6	12.1
Services	24.2	13.7	10.5
Size			
Small (<5 employees)	28.9	17.0	11.9
Medium (6-20 employees)	29.6	17.6	12.0
Large (>20 employees)	31.0	18.5	12.5
Chain			
Yes	29.4	17.5	11.9
No	30.0	17.6	12.4
Location			
Within a shopping centre/Mall	30.7	18.1	12.6
Private Location	29.3	17.4	11.9
Taxi rank/street/open space	27.0	16.1	10.8
Rural/urban			
Rural	29.7	17.6	12.0
Urban	29.5	17.4	12.1

Note: The sample comprises 370 outlets (301 retail and 69 services outlets) and 378 products. The sample of price data runs from January 2011 through December 2012. See prior tables for further details on calculation of frequencies.

The table reveals little variation in the frequency of price changes by outlet attribute. As is found in the literature, prices change more frequency in retail outlets (29.7 per cent) than services outlets (24.2 per cent) and are marginally higher in large outlets (31 per cent) compared to small outlets (28.9 per cent). Outlets within shopping centres also change their prices more often than those located in taxi ranks or on the street. These relationships also hold for the frequency of price increases and decreases. However, we find no clear relationship between frequency of price changes and being part of a chain or location in rural or urban areas.[18]

Turning towards market competition, Table 10 presents the mean frequency of price changes according to direct and indirect measures of the competitiveness of the environment faced by the outlets. Contrary to the findings of Hall *et al*. (2000), Álvarez and Hernando (2005 & 2007b), Fabiani *et al*. (2006) and Hoeberichts and Stokman (2006), we find no systematic relationship between the frequency of price changes, price increases or price decreases and perceived competition faced by the outlet. For example, contrary to expectations the frequency of price changes in outlets facing less than 2 competitors (30 per cent) is higher than outlets facing more than 10 outlets (28.7 per cent), but the difference is

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[18] Using the longer series of price data from 2002 to 2009, Nchake *et al*. (2014) find a significantly lower frequency of price changes in rural areas compared to urban areas.

not significant. As predicted by the theory, outlets with competitors in close proximity (within 5 minutes walking distance) change prices more frequently than outlets with more distant competitors (more than 10 minutes walking distance), but again the difference is not statistically significant.

Table 10: The mean frequency of price changes and competition

	Frequency of price change	Frequency of price increases	Frequency of price decreases
Competition			
None	29.9	17.6	12.3
Less than 2	30.0	17.6	12.4
Between 3 and 5	29.4	17.6	11.9
Between 6 and 10	29.1	17.4	11.7
More than 10	28.7	17.1	11.6
Distance to competitor			
Within 5 minutes	29.7	17.7	12.0
Between 6 and 10 min	29.4	17.4	12.0
More than 10 minutes	27.0	15.6	11.5
How important is reduction in close competitor's price in influencing you to lower price?			
Important/very important	29.7	17.5	12.2
Minor/Unimportant	29.3	17.4	11.9
What stops you from increasing price - fear competitor's price will remain fixed			
Important/very important	29.5	17.4	12.1
Minor/Unimportant	29.7	17.7	12.0
Did you reduce price in response to reduction in price by competitor?			
No	29.9	17.7	12.2
Yes	28.4	16.9	11.4

Note: The sample comprises 370 outlets (301 retail and 69 services outlets) and 378 products. The sample of price data runs from January 2011 through December 2012. See prior tables for further details on calculation of frequencies.

Regression analysis

To test the robustness of these relationships to the inclusion of other factors, we regress the frequency of price change at the outlet level on a number of explanatory variables. To deal with functional form and inference concerns when using bounded data such as the frequency of price changes as the dependent variable, we follow Álvarez and Hernando (2007b) and use the quasi-maximum likelihood (QML) approach of Papke and Wooldridge (1996) to estimate models with fractional dependent variables. Following this approach, we express the frequency of price change as a bounded nonlinear function of the explanatory variables using a logistic cumulative distribution function:

$$freq_{ik} = \frac{e^{x\beta}}{1 + e^{x\beta}} \, .$$

The coefficients are then estimated using a Bernoulli quasi-maximum likelihood estimator.[19]

The set of explanatory variables includes three alternative indicators of perceived competition: (a) the reported number of competitors (*Number of competitors*), (b) a dummy variables for whether a firm reduced their price in response to a competitor's lower price (*Reduced price*), and (c) a dummy variable equal to one if the firms assesses that the fear competing firm's prices will remain fixed as important or very important in stopping their own price increases (*Fear fixed competitor price*).[20]

To capture the importance of cost and demand drivers of price changes, we follow Álvarez and Hernando (2007b) and include dummy variables that equal 1 if firms assessed as important or very important the role of labour costs (*Labour costs*) and Material costs (*Material costs*) in driving price increases. Given the asymmetry in responses found earlier, we include a variable capturing whether the outlet regarded demand shocks (*Demand*) as important or very important in driving price decreases.[21] Finally, other outlet attributes were accounted for through the inclusion of dummy variables for location in urban areas (*Urban*) and/or malls (*Mall*), whether the firm was a services outlet (*Services*) and/or part of a chain (*Chain*), firm size, and firm ownership of fridges (*Fridge*) and storage facilities (*Storage*).

Table 11 presents the regression results for data at two different levels of aggregation. In columns (1) to (3) the dependent variable is the frequency of price change of product i in outlet k. In column (4), the product-level frequency data are aggregated up to the outlet level so that the dependent variable is the average frequency of price change of all of that outlet's products. All estimates include district fixed effects and product fixed effects. Note that because frequency is expressed as a non-linear function of the explanatory variables the coefficients should not be interpreted as elasticities.[22]

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[19] An alternative approach is to model the log-odds ration as a linear function (i.e. E(log[freq/(1-freq)]|**x**) = **x**β), but this approach requires adjustments when the frequency takes on values of 0 or 1, as is the case in our data.
[20] In other estimates we included measures of competitiveness based on (a) whether a firm's price is determined by the main competitor's price, and (b) the outlet's assessment of the importance of reductions in competitor's prices in leading to a reduction in their own prices. The coefficients on the competitiveness variables were not significantly different from zero. We also interact the number of competitors with firm size, but the coefficients on competition and the interaction are insignificantly different from zero.
[21] In other regressions we included labour and material costs as shares of total sales value. The sample size was much reduced in these estimates as many firms did not provide the cost information. We also test for the robustness of the relationships when excluding the perception based material, demand and labour cost indicators. The results remain broadly the same.
[22] The partial effect of variable x_1 on the expected frequency can be calculated as $\beta_1 \exp(\mathbf{x}\beta)/[1+\exp(\mathbf{x}\beta)]^2$ (Papke and Wooldridge, 1996: 628).

Looking first at the competition effects, we find no consistent relationship with the frequency of price changes. Outlets that reduced prices in response to a competitor's reduction in price were significantly less likely to change prices over the period January 2011 to December 2012. In contrast, firms in more competitive environments as revealed using the *Fear fixed competitor price* indicator changed prices more frequently. No significant relationship is found when using the reported number of competitors as the indicator of the competitiveness of the environment.

This lack of consistency in the relationship reflects the danger of using perceived measures of the competitiveness of the environment and alternative exogenously derived indicators of market competition (e.g. the national register of firms) may be better suited to the task. Indicators of the entry or exit of competitors may also provide an additional source of variation to identify the effect on price-setting behaviour. These areas are left for future research.

Looking at the remaining coefficients, we find a convex relationship between the frequency of price changes and the size of firms. Large firms are more likely to change prices compared to small firms, but medium sized firms are less likely to change prices.[23] This relationship holds using both the disaggregated and aggregated data. The higher frequency of price changes for large firms corroborates the international empirical evidence (Klenow and Malin, 2011).

Our results for the variables proxying the cost structure corroborate those for the Euro area by Álvarez and Hernando (2007b). As expected, firms that place a greater importance on changes in labour cost in driving price changes, adjust prices less frequently. Wage changes generally take place once a year leading to a more stable cost structure. In contrast, outlets where material costs make up a relatively high share of total costs are expected to change prices more frequently as material costs are more volatile. The significant positive coefficient in the first regression supports this view, although the relationship is not robust to changes in measure of competitiveness or aggregation of the data to the outlet level (column 4).

We also estimate negative and significant coefficients on the demand variable. Outlets that emphasised the importance of demand shocks in *reducing* their prices were less likely to change prices than other outlets. This may reflect the relative stability of demand compared to costs over the period and hence the lower frequency of price changes by these outlets.

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[23] We test the robustness of this relationship using the natural logarithm of the number of employees and its square as the variables for outlet size. A convex relationship between firm size and frequency is estimated.

Further, the data cover a period of modest recovery in response to the financial crisis, so these outlets may have faced few negative demand shocks over the period.

Finally, prices in outlets that are part of a retail or services chain are relatively flexible, but are less flexible if the outlet is located in a mall. The impact of storage facilities on price flexibility is mixed. Prices change less often in outlets that own fridges, but more often if the outlet has storage facilities. The sign on the coefficient of ownership of fridge is consistent with the argument proposed by Blinder (1982), while that on ownership of storage facility is not.

Table 11: Determinants of price flexibility

	(1)	(2)	(3)	(4)
Dependent variable: Frequency of price change	Disaggregated outlet by product level data			Aggregated outlet level data
Explanatory variables				
Measures of market competitiveness				
Number of competitors	0.004			-0.010
	(0.003)			(0.008)
Reduced price		-0.069***		
		(0.023)		
Fear fixed competitor price			0.044**	
			(0.019)	
Other variables				
Firm size: Medium	-0.053**	-0.034	-0.044*	0.104
	(0.025)	(0.026)	(0.025)	(0.071)
Firm size: Large	0.085**	0.077*	0.075**	0.224**
	(0.039)	(0.042)	(0.038)	(0.095)
Raw materials	0.062**	0.014	0.042	0.012
	(0.029)	(0.033)	(0.030)	(0.080)
Labour costs	-0.046**	-0.050**	-0.052**	-0.119**
	(0.020)	(0.021)	(0.020)	(0.058)
Demand	-0.065***	-0.065***	-0.069***	-0.046
	(0.021)	(0.022)	(0.021)	(0.060)
Services outlet	-0.028	-0.086	-0.055	-0.217
	(0.099)	(0.100)	(0.101)	(0.217)
Chain	0.050**	0.068***	0.052**	0.069
	(0.022)	(0.023)	(0.021)	(0.055)
Fridge	-0.217***	-0.200***	-0.227***	0.047
	(0.044)	(0.047)	(0.044)	(0.146)
Storage	0.047**	0.056**	0.043*	0.140**
	(0.023)	(0.025)	(0.023)	(0.071)
Mall location	-0.056**	-0.021	-0.041	0.003
	(0.028)	(0.030)	(0.027)	(0.071)
Urban	0.016	0.003	0.020	0.043
	(0.024)	(0.026)	(0.023)	0.104
Constant	-0.995***	-0.969***	-0.977***	-0.988***
	(0.087)	(0.092)	(0.086)	(0.223)
Observations	6,973	6,110	6,952	299
Pseudo R-squared	0.38	0.38	0.38	0.39
AIC	0.87	0.88	0.87	1.00
BIC	-58162.60	-49961.71	-57978.40	-1511.03
Log likelihood	-2693.25	-2362.19	-2685.66	-117.29
Product fixed effects	Y	Y	Y	Y

Notes: Only products falling within the main product category identified by the outlet are included in the estimates. All estimates include district fixed effects and product fixed effects. Small outlets (5 employees or

less) are the omitted category in the firm size variable. Medium firms employ 6 to 20 employees, while large firms employ above 20 workers. See main text for definition of explanatory variables. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

6. Conclusion

This paper extends our understanding of price-setting behaviour in emerging economies, focussing specifically on Lesotho. The empirical analysis draws on a unique database that combines product level prices with outlet level survey information.

The survey data suggest that most retail and services outlets in Lesotho operate within an imperfectly competitive market. The large majority of outlets (72 per cent) apply a mark-up over costs when setting prices, while very few outlets (just over 6 per cent) set prices according to the price of their main competitor. The latter firms tend to operate in more competitive environments, as perceived by the firm, and are more likely to be located in urban areas. This finding is consistent with international evidence (Fabiani *et al.*, 2006).

Implicit contracts are cited by outlets as the most important source of price rigidity. The fear of antagonizing and harming long-term relationships with their customers causes outlets to delay price increases, providing support for the theories of Okun (1981) and Rotemberg (2005). The fear that outlets will lose customers to competitors that do not also raise prices is also an important reason provided for deferring price increases. This result is surprising given the low number of firms that follow their competitor's prices when setting their own prices. Other explanations for price rigidity such as menu costs, attractive thresholds, bureaucratic rigidities and explicit contracts are found to be relatively unimportant sources of price rigidities.

We also provide evidence of asymmetries in price responses to cost and demand shocks. Like Fabiani *et al*. (2006) for the Euro area, cost shocks are revealed to be more relevant in influencing price increases than price decreases, while shocks to market conditions (demand and competitor's price) are more relevant for price decreases than for price increases. This asymmetry provides support for the role of implicit contracts as a source of price rigidity.

Finally, we use the historical micro price data for each firm to analyse the frequency of price changes over the period January 2011 to December 2012. As found in Nchake *et al*. (2014), the frequency of price changes varies enormously across products and outlets. Compared to many other countries, prices appear to be relatively flexible in Lesotho. We then

use this data to investigate the influence of outlet-specific attributes and competition on the frequency of price changes. Large firms change prices relatively frequently, while firms in which labour costs are an important determinant of price changes, change prices less frequently. These results corroborate those found in Fabiani *et al*. (2006) for the Euro area. However, we find no consistent relationship between the frequency of price changes and perceived competition in the market. Alternative measures of competition obtained independently of the firm may prove to be a better method of identifying the impact of competition on price-setting behaviour.

References

Álvarez, L. J. & Hernando, I. (2004). Price setting behaviour in Spain: Stylised facts using consumer price microdata. *European Central Bank Working Paper*, No. 416.

Álvarez, L.J. & Hernando, I. (2007a). The price setting behaviour of Spanish firms: Evidence from survey data. In: Fabiani, S., Loupias, C., Martins, F., Sabbatini, R. (Eds.), Pricing decisions in the Euro Area: How firms set prices and why. Oxford University Press, Oxford, UK.

Álvarez, L.J. & Hernando, I. (2007b). Competition and price adjustment in the Euro Area. In: Fabiani, S., Loupias, C., Martins, F., Sabbatini, R. (Eds.), Pricing decisions in the Euro Area: How firms set prices and why. Oxford University Press, Oxford, UK.

Alvarez, L., Dhyne, E., Hoeberichts, M., Kwapil, C., Le Bihan, H., Lunnemann, P., Martins, F., Sabbatini, R., Stahl, H., Vermeulen, P. & Vilmunen, J. (2006). Sticky prices in the Euro Area: A summary of new micro evidence. *Journal of the European Economic Association,* 4 (2-3), 575-584.

Amirault, D., Kwan, C. & Wilkinson, G. (2006). Survey of price-setting behaviour of Canadian companies. *Bank of Canada Working Paper*, No. 2006-35.

Apel, M., Friberg, R. & Hallsten, K. (2005). Micro foundations of macroeconomic price adjustment: survey evidence from Swedish firms. *Journal of Money, Credit and Banking*, 37(2), 313–38.

Aucremanne, L. & Druant, M. (2005). Price-setting behaviour in Belgium: What can be learned from an ad hoc survey. *European Central Bank Working Paper,* No. 448.

Aucremanne, L., Brys, G., Hubert, M., Rousseeuw, P.J. & Struyf, A. (2002). Inflation, relative prices and nominal rigidities. *National Bank of Belgium Working Paper*.

Bils, M. & Klenow, P. J. (2004). Some evidence on the importance of sticky prices. *Journal of Political Economy, 112*(5), 947-985.

Blinder, A.S. (1982). Inventories and sticky prices: More on the micro-foundations of macroeconomics. *American Economic Review*, 72(3), 334-348.

Blinder, A.S. (1991). Why are prices sticky? Preliminary results from an interview study. *American Economic Review*, 81 (2), 89–100.

Blinder, A. S., Canetti, E., Lebow, D.E. & Rudd, J.B. (1998). *Asking about prices: A new approach to understanding price stickiness.* Russell Sage Foundation Publications.

Buckle, R. & Carlson, J. (2000). Menu costs, firm size and price rigidity. *Economics Letters*, 66, 59–63.

Bunn, P. & Ellis, C. (2012). Examining the behaviour of individual UK consumer prices. *Economic Journal*, 122, F35-F55.

Bunn, P. & Ellis, C. (2012). How do individual UK producer prices behave? *Economic Journal*, 122(558), F16-F34.

Carlson, J. A. (1992). Some evidence on lump sum versus convex costs of changing prices. *Economic Inquiry*, 30, 322–331.

Carlton, D. W. (1986). The Rigidity of prices. *American Economic Review*, 76, 637-658.

Carlton, D. W. (1989). The theory and the facts of how markets clear: is industrial organization valuable for understanding macroeconomics?. *Handbook of industrial organization*, *1*, 909-946.

Cavallo, A. (2012). Scraped data and sticky prices. unpublished paper, MIT Sloan, Harvard University.

Copaciu, M., Neagu, F., & Braun-Erdei, H. (2010). Survey evidence on price-setting patterns of Romanian firms. *Managerial and Decision Economics*, *31*(2-3), 235-247.

Craig, C.S., Ghosh, A. & McLafferty, S. 1984. Model of the retail location process: A review. *Journal of Retailing*, 60(1): 5–36.

Creamer, K., & Rankin, N. A. (2008). Price setting in South Africa 2001-2007-stylised facts using consumer price micro data. *Journal of Development Perspectives,* 1(4): 93-118.

Creamer, K., Farrell, G. & Rankin, N. (2012). What price-level data can tell us about pricing conduct in South Africa. *South African Journal of Economics,* 80(4), 490-509.

Dhar, Sanjay K. & Hoch, Stephen J. (1997). Why store brand penetration varies by retailer. *Marketing Science*, 16(3), 208–227.

Dhyne, E., Álvarez, L. J., Le Bihan, H., Veronese, G., Dias, D., Hoffmann, J. & Vilmunen, J. (2006). Price changes in the Euro Area and the United States: Some facts from individual consumer price data. *The Journal of Economic Perspectives,* 20(2), 171-192.

Fabiani, S. Gattulli, A. & Sabbatini, R. (2003). Price stickiness in Italy. *Mimeo*, Bank of Italy.

Fabiani, S., Gatulli, A. & Sabbatini, R. (2007). The pricing behavior of Italian firms. New survey evidence on price stickiness. In: Fabiani, S., Loupias, C., Martins, F., Sabbatini, R. (Eds.), Pricing decisions in the Euro Area: How firms set prices and why. Oxford University Press, Oxford, UK.

Fabiani, S., Druant M., Hernando I., Kwapil C., Landau B., Loupias C., Martins F., Mathae T., Sabbatini R. & Stokman A. (2005). The pricing behaviour of firms in the Euro area: New survey evidence. *European Central Bank Working Paper,* No. 535.

Fabiani, S., Druant M., Hernando I., Kwapil C., Landau B., Loupias C., Martins F., Mathae T., Sabbatini R. & Stokman A. (2006). What firms' surveys tell us about price-setting behaviour in the euro area. *International Journal of Central Banking*, 2(3), 3–47.

Greenslade, J. V. & Parker, M. (2012). New insights into price setting behaviour in the UK: Introduction and survey results. *The Economic Journal,* 122(558), F1-F15.

Hall, S., Walsh, M. & Yates A. (1997). How do UK companies set prices? *Bank of England Working*, No. 67.

Hall, S., Walsh, M. & Yates, A. (2000). Are UK companies prices sticky? *Oxford Economic Papers*, 52(3), 425–46.

Hannan, T. H. & Berger, A. N. (1991). The rigidity of prices: Evidence from the banking industry. *American Economic Review, American Economic Association*, 81(4), 938-45.

Hoeberichts, M. & Stokman, A. (2006). Pricing behaviour of Dutch companies: Results of a survey. *ECP Working Paper* No. 607.

Hoch, S. J., K., Byung Do, Montgomery A. & Rossi P. (1995). Determinants of store-level price elasticity. *Journal of Marketing Research*, 32, 17–29.

Klenow, P. J. & Malin, B. A. (2011). Microeconomic evidence on price-setting. In B. Friedman and M. Woodford (eds.), *Handbook of Monetary Economics*, edition 1, volume 3, chapter 6, 231-284.

Klenow, P. J. & Kryvtsov, O. (2008). State-dependent or time-dependent pricing: Does it matter for recent US inflation? *The Quarterly Journal of Economics,* 123(3), 863-904.

Lünnemann, P., & Mathä, T. Y. (2005). Consumer Price Behaviour in Luxembourg: Evidence from Micro CPI data. *European Central Bank Working Paper* No.541.

Malik, W. S., Satti, A. H. & Saghir, G. (2008). *Price setting behaviour of Pakistani firms: Evidence from four industrial cities of Punjab*. The Pakistan Development Review, 47(3), 247-266.

Mankiw, N. G. (1985). Small menu costs and large business cycles: A macroeconomic model of monopoly. *Quarterly Journal of Economics*, 100, 529–538.

Nakamura, E. & Steinsson, J. (2008). Five facts about prices: A re-evaluation of menu cost models. *The Quarterly Journal of Economics,* 123(4), 1415-1464.

Nchake M.A., Edwards L. & Rankin N. (2014). Price setting behaviour in Lesotho: Stylised facts from consumer retail prices, *ERSA working paper* No. 417.

Neslin, S. A., Powell, S. G., & Stone, L. S. (1995). The effects of retailer and consumer response on optimal manufacturer advertising and trade promotion strategies. *Management Science,* 41(5), 749–766.

Okun, A. M. (1981) *Prices and quantities: A macroeconomic analysis*. Washington, D.C.: The Brookings Institution.

Papke, L. & Wooldridge, J. (1996). Econometric methods for fractional response variables with an application to 401(k) plan participation rates. *The Journal of Applied Econometrics,* 11, 619-632.

Peltzman, S. (2000). Prices rise faster than they fall. *Journal of Political Economy*, 108(3), 466-502.

Powers, E., and Powers, N., (2001) The size and frequency of price changes: Evidence from grocery stores. *Review of Industrial Organization*, 18(4), 397-416.

Rotemberg, J. & Saloner, G. (1987). The relative rigidity of monopoly pricing. *American Economic Review*, 77(5), 917–26.

Rotemberg, J. (2005). Customer anger at price increases, changes in the frequency of price adjustment and monetary policy. *Journal of Monetary Economics*, 829-852.

Şahinőz, S. and Saraçoğlu, B. (2008) Price setting behaviour in Turkish industries: Evidence from survey data. *Turkish Economic Association Discussion paper* 2008/3.

Shankar, V. & Bolton, R. N. (2004). An empirical analysis of determinants of retailer pricing strategy. *Marketing Science,* 23(1), 28 - 49.

Sheshinski, E. & Weiss, Y. (1977). Inflation and costs of price adjustment. *Review of Economic Studies*, 44(2), 287–303.

Suvanto, A. & Hukkinen, J. (2002). Stable price level and changing prices. *mimeo*, Bank of Finland.

Yates, A. (1998), "Downward nominal rigidity and monetary policy", *Bank of England Working Paper*.