

Comparison of price stickiness in the euro area and Estonia

Aurelijus Dabušinskas, Martti Randveer

Eesti Pank

Estonia pst 13 15095 Tallinn

Phone: 3725096402

E-mail address: randveer@epbe.ee

Abstract

In this paper, we compare the importance of different hypothesis of price stickiness in Estonia with the results of similar research in the euro area summarized by Fabiani et al. (2005). The relevance of various hypothesis of price stickiness that emerges from our survey are quite similar to those in the euro zone. As in the euro area, the most important reasons for price stickiness are the existence of explicit and implicit contracts, coordination failures among firms and the prevalence of cost-based pricing. These results indicate that the main impediments for more frequent price adjustment are associated with the price change rather than the price review stage of the price setting process.

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1. Introduction

In this paper, we compare the importance of different hypothesis of price stickiness in Estonia with the results of similar research in the euro area summarized by Fabiani et al. (2005). In 2003 and 2004, nine central banks of the European System of Central Banks carried out price setting surveys in the framework of the Inflation persistence network (IPN), a joint research project on inflation persistence in the euro area and its member countries.¹ Although the national surveys were prepared largely in a decentralized way, the degree of coordination among the researchers was sufficient to make the surveys comparable in terms of a number of common issues investigated. On this basis, Fabiani et al. (2005) derived twelve stylized facts that generalize the key characteristics of price setting behaviour and price stickiness in the euro area. In the present paper, we will concentrate on one of those stylized facts – namely what is the importance of various hypothesis of price stickiness. Since basically all survey-based inference on price setting and price stickiness to date is based on research in more developed and mature economies than Estonia, we deem the comparison to be of interest. At the same time, given the wealth of empirical evidence provided by the IPN on price

¹ The nine countries were Austria, Belgium, France, Germany, Italy, Luxembourg, the Netherlands, Portugal and Spain.

setting in the euro area, this seems to be the first survey-based investigation of price stickiness in a new member state, a future candidate of the euro club.

The methodology of studying price setting by a means of business interviews has been popularized by Blinder (1991) and Blinder et al. (1998) who applied it for analyzing price setting in the US. The potential of this approach has prompted similar studies in other countries, e.g. the UK (Hall et al., 2000), Sweden (Apel et al., 2005), Canada (Amirault et al., 2004) and, most recently, the nine euro area countries covered by the IPN. Since we were particularly interested in making our survey comparable to the latter, we designed the survey drawing heavily on the questionnaires used by the IPN participant countries.²

The survey of price setting in Estonia was conducted via the Internet by the Estonian Institute of Economic Research (EKI) in September 2005. Our contract with the Institute foresaw that the Institute would deliver at least 200 responses and that the sample would cover the goods sector, the trade sector and the services sector in approximately equal proportions. Since the response rate was low, the Institute had to send the questionnaire out to more than 1,000 firms. To increase the response rate, basically all firms were contacted by telephone at least once; in a number of cases it was done more than once. The final sample consists of 208 responses.

The paper is organized as follows. Section 2 overviews the introductory part of the questionnaire, which was designed to provide some general information about the firm and its market. The relative importance of various explanations for price stickiness is examined in Section 3. Section 4 summarizes the main results of the paper and provides some conclusions.

2. General information about the firm and its market

We start by discussing the basic characteristics of firms and their markets, respectively. Among other things, the first set of questions provides information about the distribution of sample firms by sector and size, and thus tells us about the representativeness of our sample of the Estonian economy. The second set focuses on characterizing the market structure that firms operate in, since that is likely to have important implications price stickiness.

As mentioned in the introduction, our sample was designed to cover three sectors of the economy — industry, trade and services — in approximately equal proportions. We decided to exclude the construction sector on the grounds that it would be especially difficult for construction firms to define their main product.³ The sectoral composition of our sample and, for comparison, the sectoral coverage of the IPN surveys are described in Table 1. In terms of its absolute size, our sample of 208 firms is the smallest, but that is

² See Fabiani et al. (2005) and country-specific studies: Austria (Kwapil et al., 2005), Belgium (Aucremanne and Druant, 2005), France (Loupas and Ricart, 2004), Italy (Fabiani et al., 2004), Luxembourg (Lünnemann and Mathä, 2005), the Netherlands (Hoeberichts and Stokman, 2005), Portugal (Martins, 2005), and Spain (Alvarez and Hernando, 2005).

³ The same argument applies in the case of providers of financial services, which were not covered by our survey either.

not the case if we compare the number of surveyed firms by sector.⁴ As acknowledged by Fabiani et al. (2005), the majority of IPN surveys were clearly biased toward industry (manufacturing), but since this particular bias is far less prominent in our sample, the difference in sectoral coverage should certainly be kept in mind when comparing our and IPN results.⁵

Table 1. Sectoral coverage, percent (number of firms in brackets)

	BE	DE	ES	FR	IT	LU	NL	AT	PT	EURO AREA⁽¹⁾	EE
Industry	38	100	45	100	65	18	18	76	85	62	35
	[753]	[1228]	[833]	[1662]	[215]	[41]	[219]	[661]	[999]	[6611]	[73]
Trade	24		25		14	21	22			12	32
	[478]		[467]		[46]	[48]	[271]			[1310]	[67]
Services	18		30		20	38	60	24	15	21	33
	[364]		[557]		[68]	[89]	[756]	[212]	[174]	[2220]	[68]
Construction	20				1	23				4	
	[384]				[4]	[54]				[442]	
Total	100	100	100	100	100	100	100	100	100	100	100
	[1979]	[1228]	[1857]	[1662]	[333]	[232]	[1246]	[873]	[1173]	[10583]	[208]

Notes: (1) Percentages for the euro area are computed on the basis of the absolute figures reported in square brackets, which are the sum of the firms in each category over the nine countries.

If we look at the sectoral distribution of samples by country, ours is quite similar to the Spanish one but differs very much from the German and French surveys, which cover only manufacturing. For this reason, it might seem that the comparison of our findings with those of individual IPN countries should be done at the sectoral rather than the aggregate level. However, for basically all the major characteristics of price setting and price stickiness considered in their paper, Fabiani et al. (2005) report the corresponding GDP-weighted average measures that they interpret as describing the typical pricing behaviour in the euro area as a whole. Since we are certainly interested in reflecting this aspect of their message in our comparison, we proceed as follows. In the series of tables below, we present our results for Estonia next to the corresponding characteristics of price setting for the the euro area as a whole and its constituent countries as reported by Fabiani et al. (2005). When considering aggregate measures, we focus mostly on the comparison of the figures for Estonia and the euro area and pay less attention to the pairwise comparison of the Estonian indicators vis-a-vis those of individual euro area countries. At the cost of completely ignoring the small versus large economy dimension in such comparisons, we let the aggregation of the intra euro area

⁴ For example, the number of trade firms in our sample is larger than in the samples of Italy and Luxembourg; the number of service firms is the same in our and the Italian sample.

⁵ According to the Estonian Business Registry data for 2002, manufacturing firms constituted 14.2, services firms (excluding electricity, water and gas supply) 35.0 and trade firms 31.3 percent of all firms. Hence, in terms of the *number* of firms by sector, our sample overstates the significance of manufacturing but not as much as some national IPN surveys.

figures alleviate the issue of different sectoral coverage in IPN samples and average-out other country-specific influences. On the other hand, whenever the data are available, we present and discuss the characteristics of price setting and price rigidity at the sectoral level. Since the problem of disparity in sectoral coverage basically disappears in such cases, the pairwise cross-country comparison of various indicators becomes more appropriate.

Next, we compare the composition of our and IPN samples in terms of firm size. In addition to being an important criterion for cross-checking the representativeness of a given sample, the distribution of firms by their size may have some influence on the calculated average characteristics of price stickiness. In Table 2, the size of firms is measured by the number of employees, and for comparison purposes, the distribution of this variable is presented in terms of three size intervals: from one to 49, from 50 to 199, and, finally, 200 or more employees. Although Table 2 indicates that we have relatively fewer respondents in the category of firms with 200 or more employees compared to the synthetic sample of the euro area, in general our sample is quite similar to the majority of samples investigated by the IPN. In sum, we feel we can conclude that there are no significant comparability problems in terms of this dimension.⁶

Table 2. Firm size, based on the number of employees, percent

	BE	DE	ES	FR	IT	LU	NL ⁽¹⁾	AT	PT	EURO AREA⁽²⁾	EE
1 - 49	75	29	43	18	-	41	81	53	38	47	53
50 - 199	17	35	23	43	39	47	19	28	37	29	36
>=200	8	36	34	39	61	12		19	25	24	11

Notes: (1) In the Netherlands, the size classes are defined as follows: 1-49; >50. (2) Percentages for the euro area are computed on the basis of absolute figures, which are the sum of the firms in each category over the nine months.

One important decision that had to be made when designing the survey was choosing the definition of the *main product*, the product that firms had to focus on in their responses. The individual surveys of the IPN varied somewhat in this respect, since some

⁶ This is not to say that the sample distribution of firms by size adequately characterizes the population of all firms in Estonia. Masso et al. (2004) describe the distribution of all Estonian firms by the number of employees using the Estonian Business Registry data from 1995 to 2001. According to their Table A1 (and after adjusting the figures provided in it for the firms with zero or not reported number of employees), we find that the first size category — from 1 to 49 employees — accounts for 93.5 percent of all firms. The population share of the second size category cannot be calculated from this table exactly, but we can infer that firms with 50–249 employees account for 5.8 percent in the population of all firms. Clearly, our sample is significantly biased toward larger firms, but since the same seems to be true for most of the IPN samples (perhaps with the exception of Belgium and the Netherlands), the bias should not matter very much for our comparison exercise as such.

defined the main product as the one generating the biggest turnover in total sales, while others concentrated on the dominant product in domestic sales (Fabiani et al., 2005). Given that ultimately we were interested in gaining more understanding about inflation in Estonia, we decided to concentrate on price setting in the domestic market and defined the main product with reference to sales in Estonia.⁷ To avoid confusion, we also declined asking firms about the distribution of their sales of the main product between the national and foreign markets. For this reason, we are not able to measure the degree of “openness” in the sales of firms in our sample and compare this characteristic of Estonian firms with the corresponding results reported by Fabiani et al. (2005), although we nevertheless present their findings in the top panel of Table 3.

Table 3. Market structure, percent

	BE	DE	ES	FR	IT	LU	NL	AT	PT	EURO AREA ⁽²⁾	EE ⁽⁷⁾
1. Main market for the main product Industry ⁽³⁾											
- domestic	55	78	82	64	73	63	72	69	67	72	-
- foreign	45	22	18	36	27	37	28	31	33	28	-
2. Main customer											
- other firms	56	89	62	66	73	-	-	84	84	75	39
- consumers	40	7	36	30	25	-	-	9	12	21	61
- public sector	4	4	2	4	2	-	-	7	4	3	-
3. Firm-customer relationships ⁽⁴⁾											
- long term	78	57	86	54	98	84	-	81	84	70	67⁽⁶⁾
- occasional	22	43	14	46	2	16	-	19	16	30	33
4. Perceived competition ⁽⁵⁾											
- very low	18	19	26	19	10	17	5	20	8	17	2
- low	22	23	19	17	25	17	25	18	21	21	2
- high	30	34	24	38	37	34	49	30	38	35	65
- very high	30	24	30	25	29	32	22	32	32	26	30

Notes: (1) Re-scaled figures excluding non-responses. (2) Weighted averages (GDP weights). (3) Only the information under item 1 of the table refers to the industrial sector; the other three samples refer to the whole sample in each national survey. (4) In the case of Belgium, France and Italy, this refers to relationships with other firms. (5) Measured by the importance a firm gives to competitors' price when considering reducing its own price. (6) Firms in trade excluded. (7) In the case of Estonia, the firms were directly asked about the degree of perceived competition.

On the other hand, we inquired about a number of other important characteristics of the markets firms operate in, for which our results can be compared with those documented in the IPN surveys, namely, the distribution of customers by customer type (firms, consumers or the public sector), the distribution of customers by the type of firm-customer relationship (occasional and regular customers), and the degree of perceived competition in the main market. As Table 3 shows, about 60 percent of the demand faced

⁷ In the questionnaire, we suggested (but did not insist) that the main product would be the one generating the highest turnover in the Estonian market. We also suggested that the good should correspond to something that is considered to be one category in the decision making of the firm with regard to pricing.

by our sample firms is attributed to firms; the remaining 40 percent — to consumers. Hence, even though according to this measure, our survey describes predominantly producer prices, the bias toward producer prices is not as strong as in the case of the IPN surveys, in which firms accounted for 75 percent of the customer base on average. Note also, that the weight of producer prices in some national IPN surveys, e.g. 89 percent in Germany and 84 percent in Austria and Portugal, exceeded this average considerably. Since there can be some important differences between producer and consumer price setting, the fact that our sample is not as skewed toward producer prices as some IPN surveys is worth keeping in mind when comparing our results with individual IPN surveys, although the issue seems to be less relevant if the synthetic IPN sample for the euro area as a whole is used as a benchmark.⁸

According to Table 3, IPN and our surveys are quite similar in terms of the reported nature of firm-customer relationships. Specifically, the share of regular customers is approximately 70 percent in the synthetic sample of the euro area as well as our sample.⁹ It is important to note, however, that we did not ask trade firms to answer this question. We did so after being warned¹⁰ that these firms would interpret it as asking about the number of customers holding the so-called “client cards.” Since such an interpretation of the question was indicative of a very specific understanding of the issue, we decided to drop this question from the questionnaire designed for trade firms.¹¹ This exception notwithstanding, the responses reveal that in our sample of firms, as much as 67 percent of customers are perceived to be regular and only 33 percent of them are considered to be occasional.

Finally, the bottom panel of Table 3 provides information on the strength of competition in the main market. To make the comparison of our results with those of the IPN possible, we also measure the degree of competition indirectly, by looking at the importance that firms assign to competitors’ prices when setting their own price. In particular, we asked the respondents to evaluate the following statement: “The market is very competitive; therefore, we set our price in accordance with the market price level.” The set of possible qualitative answers included “irrelevant”, “of little importance”, “important” and “very important”, which we map into the assessment of the degree of competition as “very low”, “low”, “high” and “very high”, respectively. It turns out that the main market has very low or low degree of competition in the case of only 14 percent

⁸ The effect of the customer type on price setting behaviour is not always clear. Consider the frequency of price changes, for example. On the basis of the micro prices underlying the CPI and PPI indexes in Portugal, Dias et al. (2004) conclude that consumer prices are changed more frequently than producer prices. However, using analogous micro price data for Spain, Alvarez et al. (2005a) conclude just the opposite. Interestingly, there is no stylized fact comparing the frequency of price adjustment between consumer and producer prices in Alvarez et al. (2005b), the paper summarizing the new micro evidence on price stickiness obtained by the IPN. Instead, the paper emphasizes the presence of (a certain pattern of) heterogeneous flexibility *within* consumer and producer prices but not *between* them.

⁹ As in IPN surveys, our questionnaire did not provide a precise definition of a regular customer, allowing firms to decide this on their own. In contrast, Hall et al. (2000) defined long-term customers as those dealing with the firm for at least five years.

¹⁰ By the analysts of EKI involved in organizing the survey.

¹¹ To our knowledge, such customer cards are issued mostly by big retail chains. In that case, the narrow interpretation of the question would have biased our results.

of firms, while the remaining firms split equally between those that operate in the markets with high and very high competitive pressure. If compared with similar measures reported by the IPN for the euro area, our findings strongly suggest that competition is more widespread in Estonia. This result is the first in a set of other indications revealed by the survey that price setting is on average more flexible in Estonia than in the euro area.¹²

3. Price stickiness

There exist many theories that aim to explain nominal price rigidity. However, as noted by Blinder (1991) and Blinder et al. (1998), assessing the empirical validity and relevance of different theories in this research area has proved to be particularly difficult. Partly because some theories are observationally equivalent, partly because the explanations are often based on the behaviour of certain variables that we cannot observe and measure. As an alternative, Blinder (1991) proposed using business surveys as a means to investigate price stickiness and even to inquire about the empirical relevance of respective economic theories. Following that work and the surveys undertaken by the IPN, we also included into the questionnaire a set of questions asking firms to evaluate the relevance of a number of proposed explanations for what makes them refrain from or postpone price changes. In particular, we inquired about nine out of ten different reasons for nominal rigidity investigated by the IPN. The fact that different studies have implemented these inquiries using very similar questions and evaluation scales makes comparing our results and previous findings relatively easy. As pointed out by Blinder et al. (1998), this question represents the most direct way of learning about the existence and degree of price stickiness in the economy. In this context, it is particularly interesting to compare our results with those in Fabiani et al. (2005).

The first column of Table 4 provides a list of explanations of price stickiness we asked firms to evaluate. The first two, referred to as implicit and explicit contracts, focus on the firm-client relationship and hypothesize that prices are not changed either because firms think that their customers prefer stable prices and thus expect that firms will guarantee price stability implicitly or because there are legally binding contracts or other explicit agreements that specify prices for some period of time, respectively. The explanation under the "cost-based pricing" entry stipulates that firms delay price changes because they wait until their costs change and only then adjust prices accordingly. The hypothesis that firms do not alter prices because they are not sure that their competitors will follow suit is named co-ordination failure in Table 14. The idea that prices signal quality, and therefore firms refrain from lowering prices because they think that customers will perceive that as an indication of the product quality being degraded is listed as "Judging quality by price." Note that this explanation is applicable only for explaining downward price rigidity. The next explanation suggests that firms keep prices

¹² We also inquired about the degree of *perceived* competition directly, requesting the firms to choose one of the four descriptions of competition in their main market: "very low", "low", "average", "high", and "very high". Only 4 percent of firms indicated that competition is very low or low; 65 percent of them described it as average and high, and 30 percent as very high. These assessments are more subjective, but they reinforce the results based on the interpretation of responses about the importance of competitors' price.

constant because they change the effective price of their product by adjusting other, less transparent characteristics of the product such as delivery terms and conditions. We also inquired if the firms think that certain specific costs associated with changing prices represent the reason for adjusting prices relatively infrequently. Although our previous findings already established that price reviews are more frequent than price changes, we nevertheless asked firms to consider the hypothesis that prices are changed infrequently because of information costs associated with recalculating the optimal price. Finally, we inquired about the importance of attractive pricing (pricing thresholds) for nominal price stickiness.

Table 4. The ranking of explanations for price stickiness

	EURO AREA⁽¹⁾	US	SW	UK	EE (?)	EE (?)	EE (total)
Implicit contracts	1	4	1	5	<u>1</u>	<u>2</u>	2
Explicit contracts	2	5	3	1	<u>2</u>	<u>5</u>	3
Cost-based pricing	3	2	2	2	<u>3</u>	<u>1</u>	1
Co-ordination failure	4	1	4	3	<u>4</u>	<u>4</u>	4
Temporary shocks	5						
Judging price by quality	6	12		10		<u>3</u>	5
Change non-price factors	7	3		8	<u>6</u>	<u>6</u>	6
Menu costs	8	6	11	11	8	8	8
Costly information	9		13		<u>7</u>	<u>9</u>	9
Pricing thresholds	10	8	7	4	<u>5</u>	<u>7</u>	7

Notes: (1) The ranking of theories is based on the unweighted average of countries' scores. (2) The case of price increases. (3) The case of price decreases.

To ensure the comparability of our results with those of previous surveys, we asked the firms to evaluate the relevance of the above explanations according to a 4-point scale that was often used in other studies: 1 – not important, 2 – of minor importance, 3 – important, 4 – very important. Table 4 provides the ranking of the explanations on the basis of the average scores that they received according to this 1–4 scale. Importantly, to capture possible asymmetries, we asked the firms to evaluate the hypotheses in the case of price increases and decreases separately. This enables us to report separate rankings for price increases and decreases, shown in columns EE(p?) and EE(p?), respectively, as well as the overall ranking based on pooled evaluations in Table 4.

It is quite evident from Table 4 that businesses tend to favour more-or-less the same explanations for price stickiness in spite of the fact that surveys are carried out in different countries and using somewhat different questionnaires. For example, the same four theories top the list according to the evidence obtained by the IPN and our survey. In particular, this set includes explanations based on the existence of implicit and explicit contracts, cost-based pricing and coordination failure. The only difference between the top-four rankings is the relative position of the hypothesis about cost-based pricing; it is ranked third in Fabiani et al. (2005) but appears to be the most important reason for price stickiness in Estonia. Note, however, that even this difference disappears if we ask firms

to focus on upward price rigidity; in that case, cost-based pricing drops to the third place and the top-four ordering becomes identical.

Not less interesting implications result if we differentiate the ranking of theories with respect to the direction of price changes, that is, whether the firms are refrained from increasing or decreasing prices. As mentioned above, the top four positions in the ranking corresponding to the upward price stickiness are given to the explanations based on implicit and explicit contracts, cost-based pricing and co-ordination failure. In contrast, the top four theories in the case of downward price stickiness are cost-based pricing, implicit contracts, judging quality by price and co-ordination failure. As a result, the comparison of the two rankings has several interesting implications. First, firms say that they do not want to lower prices unless and until after their costs have declined. Although the same argument is relevant in the case of price increases as well, it is not the most important consideration hindering price adjustment anymore. The understanding that prices should not be raised because customers dislike that is more important for upward price rigidity. Second, the presence of explicit contracts is not that important a cause of *downward* price stickiness, but the implicit understanding that customers prefer stable prices is. Third, judging quality by price ranks third in the list for downward price stickiness. This finding is quite remarkable, as it seems to be rather specific to our survey. Finally, Table 4 hints that pricing thresholds are quite more important for upward price stickiness in our survey than it is generally found to be in the euro area (Fabiani et al., 2005).

At this point, it is useful to consider our main findings concerning the reasons for sticky prices in the light of similar results by the IPN, which Fabiani et al. (2005) generalized. In particular, Fabiani et al. (2005) concluded that implicit and explicit contracts are the most relevant causes of price stickiness in the euro area, followed by cost-based pricing and co-ordination failure. They also noted that the first two explanations support the view that price stickiness largely results from customers' preference for stable nominal prices, and that the four top-ranking explanations taken together imply that the main reasons preventing more frequent price adjustment are related to the price change stage rather than the price review stage of the price setting process. We can confirm, in turn, that the ranking of explanations for price stickiness in Estonia is broadly similar to that in the euro area, so the main implications carry through. We have evidence, however, that cost-based pricing and pricing thresholds are relatively more important reasons for sticky prices in Estonia than in the euro-zone. In addition, our results indicate that there are differences between the most relevant reasons for upward and downward price stickiness. In particular, implicit contracts matter particularly much in the case of the former, while cost-based pricing and judging quality by price are more essential for the latter; the explanation based on the presence of explicit contracts is equally important in both cases.

It is possible that the differences between our and IPN findings with regard to the most relevant explanations for price stickiness result from differences in the sample coverage. For example, it can be argued that pricing thresholds appear to be more important in Estonia because our sample includes the trade sector and that is not always the case in the IPN country surveys. On the other hand, the possibility that there are systematic differences in the reasons for price stickiness among sectors is an interesting hypothesis in itself. We therefore look into the relative standing of the different

explanations for price stickiness by sector. The average scores that the explanations received in the goods sector, trade sector and services are presented in Tables 5, 6 and 7, respectively.

Table 5. The scores of explanations for price stickiness – goods sector

Goods	BE	DE	ES	FR	IT	LU	NL	AT	PT	EURO AREA⁽¹⁾	EE
Implicit contracts	2,7		2,5	2,2		2,6	2,8	3,1	3,2	2,7	2,7
Explicit contracts	2,6	2,4	2,2	2,7	2,7	2,8	2,6	2,9	2,6	2,6	2,7
Cost-based pricing	2,4	2,2		2,5		2,7		2,7	2,7	2,5	2,7
Co-ordination failure	2,4		2,4	3	2,6	2,1	2,2	2,4	2,9	2,5	2,5
Temporary shocks	1,9	1,9	1,8	2,1	2	1,9	2,5	1,6	2,5	2	
Judging price by quality	1,9		1,7			1,8	2,4	1,8	2,3	2	2,2
Change non-price factors	2		1,4			1,9	2,1	1,6		1,8	2,1
Menu costs	1,5	1,4	1,3	1,4	1,5	1,7	1,6	1,5	1,9	1,5	1,8
Costly information	1,7		1,3			1,7		1,7	1,7	1,6	1,8
Pricing thresholds	1,5		1,3	1,6	1,3	1,6	1,7	1,3	1,8	1,5	2,0

Notes: (1) Unweighted average of countries' scores.

Table 6. The scores of explanations for price stickiness – trade sector

Trade	BE	DE	ES	FR	IT	LU	NL	AT	PT	EURO AREA⁽¹⁾	EE
Implicit contracts	2,4		2,6			2,4	2,6			2,5	2,4
Explicit contracts	1,8		1,9		1,9	2,3	2,3			2,1	2,2
Cost-based pricing	2,5					2,3				2,4	2,6
Co-ordination failure	2,2		2,6		2,7	2,4	2,3			2,4	2,4
Temporary shocks	1,8		1,8		2,1	1,7	2,4			2	
Judging price by quality	2,1		1,8			2,1	2,4			2,1	2,3
Change non-price factors	1,7		1,3			1,8	2			1,7	2,1
Menu costs	1,7		1,6		1,8	1,7	1,9			1,7	2,0
Costly information	1,6		1,4			1,7				1,6	2,0
Pricing thresholds	2,1		1,7		2	2	2,1			2	2,5

Notes: (1) Unweighted average of countries' scores.

Table 7. The scores of explanations for price stickiness – service sector

Services	BE	DE	ES	FR	IT	LU	NL	AT	PT	EURO AREA⁽¹⁾	EE
Implicit contracts	2,7		2,6			2,8	2,8	3	3	2,8	2,9
Explicit contracts	2,7		2,6		3	2,8	2,5	3	2,8	2,8	2,7
Cost-based pricing	2,5					2,8		2,5	2,7	2,6	2,7
Co-ordination failure	2		2,4		2,3	2	2,1	2,1	2,7	2,2	2,6
Temporary shocks	1,7		1,8		1,9	1,7	2,3	1,5	2,2	1,9	
Judging price by quality	2		2			2,3	2,5	1,9	2,2	2,1	2,5
Change non-price factors	1,6		1,3			1,7	1,9	1,8		1,7	2,5
Menu costs	1,4		1,4		1,6	1,9	1,6	1,5	1,9	1,6	1,9
Costly information	1,6		1,3			1,8		1,6	1,7	1,6	1,9
Pricing thresholds	1,6		1,6		1,3	1,7	1,7	1,2	1,9	1,6	2,1

Notes: (1) Unweighted average of countries' scores.

According to Table 5, the four most relevant explanations for price stickiness in the goods sectors of Estonia and the euro-zone as well as their respective rankings are essentially identical to those discussed in the case of aggregate results. As before, the top

of the list is occupied by the explanations referring to implicit and explicit contracts, cost-based pricing and co-ordination failure. In fact, even the previous finding that cost-based pricing matters relatively more in the case of Estonia seems to emerge again. As for the remaining five explanations that do not receive much support, all of them get slightly higher evaluations in our survey than the average scores in the euro area as a whole. However, the 2.0 score that pricing thresholds got in our survey is considerably higher than the 1.5 average score received by this hypothesis in the case of the euro area, suggesting that differently from manufacturing firms in the euro-zone, firms in the goods sector of Estonia do not consider this explanation for sticky prices to be completely irrelevant.

Some important differences in the ranking of explanations for nominal rigidity emerge if we turn to consider the trade sector (see Table 6). In the case of Estonia, cost-based pricing is still the most relevant reason for price stickiness (implicit contracts in the euro area), but it is very closely followed by the explanation referring to pricing thresholds. Somewhat surprisingly, the latter result does not show up in the case of trade firms in the IPN surveys. The average score that the explanation based on pricing thresholds received in the euro area is 2.0, which is higher than the corresponding score in the case of its goods sector (1.5) but considerably lower than both the leading theory in the case of the trade sector in the eurozone (implicit contracts with the average score of 2.5) and the 2.5 average that pricing thresholds scored among the trade firms in our survey. The third and fourth most popular explanations for price stickiness in the trade sectors of Estonia are implicit contracts and co-ordination failure, which lead the list in the case of trade firms of the euro area as well. Finally, note that explicit contracts are rather unimportant for price rigidity according to trade firms in both our and IPN surveys (rank 6 in Estonia and 4–5 in the euro area).

Finally, in the case of the services sector, the four most relevant explanations for price stickiness in the euro area as well as Estonia are implicit and explicit contracts, cost-based pricing and co-ordination failure (see Table 7). Since that is exactly the same set of reasons for nominal rigidity that dominated the list when we considered the rankings at the aggregate level and the goods sector alone, it seems appropriate to conclude that these explanations indeed represent the four major impediments of more frequent price adjustment in both economies. That is particularly so in the case of the explanation referring to the presence of implicit contracts between firms and their customers. According to Table 7, this reason for price stickiness is acknowledged as the most relevant by services firms in our and basically all IPN surveys. Note, however, that there are two explanations, namely, judging quality by price and changing non-price factors, that received considerable support among the service firms in our sample but not in the majority of IPN surveys. The indication that judging quality by price is more relevant for pricing decisions in Estonia is most easily noticeable in the case of services firms, but the same tendency can be noticed in the other two sectors as well (see Tables 5 and 6). All in all, judging quality by price is a more important consideration in the pricing decisions of firms in Estonia than in the euro area.

4. Summary

The ranking of explanations for price stickiness in Estonia is broadly similar to that in the euro area. The most important reasons for price stickiness are the existence of explicit and implicit contracts, coordination failures among firms and the prevalence of cost-based pricing. We have evidence, however, that cost-based pricing and pricing thresholds are relatively more important reasons for sticky prices in Estonia than in the euro-zone. In addition, our results indicate that there are differences between the most relevant reasons for upward and downward price stickiness. In particular, implicit contracts matter particularly in the case of upward price stickiness, while cost-based pricing and judging quality by price are more essential for downward price stickiness; the explanation based on the presence of explicit contracts is equally important in both cases.

The result that implicit and explicit contracts are the most relevant explanations for price stickiness indicates that price rigidities are associated with customers' preference for stable nominal prices. Also the four main explanations for price stickiness suggest that the main impediments for more frequent price adjustment are associated with the price change rather than with the price review stage of the price setting process

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