

Research Department

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SMOOTH EURO CHANGEOVER, HIGHER PRICES? RESULTS OF A SURVEY AMONG  
DUTCH RETAILERS

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## ABSTRACT

Smooth euro changeover, higher prices? Results of a survey among Dutch retailers

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The Dutch changeover to euro banknotes and coins proceeded both remarkably smoothly and rapidly. After one week, over 90% of all cash payments were being made in euro. Fears of the payment system breaking down, always rampant among businesses and the public alike, did not materialise. Fears of price rises on the other hand, were not entirely unfounded, as evidenced by a survey held by the Bank among retailers in January. The changeover from guilders to euro has pushed consumer prices up by 0.2-0.4%, in part because retailers passed the ensuing costs on to their customers, but also because prices were rounded up towards attractive europrices. In time, the introduction of the euro will presumably lead to lower prices.

Key words: Euro cash-changeover, survey, price impact of cash-changeover

JEL codes: E31

## SAMENVATTING

Soepele overgang op de euro, hogere prijzen? Uitkomsten van een enquête onder Nederlandse detaillisten

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Nederland is opvallend soepel op de chartale euro overgestapt. De overgang van gulden naar euro is in razend tempo verlopen. Al na één week vond meer dan 90% van de contante betalingen in euro plaats. De angst voor storingen in het betalingsverkeer, steevast hoog scorend bij bedrijven én particulieren, bleek ongegrond. De vrees voor prijsstijgingen blijkt daarentegen niet geheel uit de lucht gegrepen. Dit kan worden opgemaakt uit een in januari van dit jaar in opdracht van de Bank gehouden enquête onder detaillisten. De omprijzing van guldens naar euro's heeft tot een verhoging van de consumentenprijzen van 0,2 tot 0,4% geleid. Dit is deels het gevolg van een doorberekening van de invoeringskosten en deels het resultaat van afrondingen naar mooie prijzen. Op de langere termijn zal de invoering van de euro vermoedelijk tot prijsverlagingen leiden.

Trefwoorden: Invoering chartale euro, prijseffecten van euro-invoering, enquête

JEL codes: E31



## 1 INTRODUCTION

On 1 January 2002, E day, the Netherlands switched to euro banknotes and coins. Ten years had passed since the Treaty of Maastricht was signed, which laid the basis for the single currency. The enthusiasm for the new currency was considerable. On the stroke of midnight, people crowded round cash dispensers, eager to see the new banknotes. Twenty-four hours later, a record number of transactions had been registered. The complimentary euro kit, collected by more than 90% of the Dutch population aged 6 and over in December, had helped to warm the public to the changeover.

These were the first signs of an almost spotless and speedy changeover from the guilder to the euro. After one week, over 90% of cash payments were being made in euro.

This was the good news. On the downside, there were persistent reports of major price rises as a result of the changeover. These were said to be unjustified, with prices being rounded upwards. Surveys held by the Nederlandsche Bank in the run-up to the introduction of the euro had shown that consumers had been increasingly worried on this score, incidentally not just in the Netherlands. In the other EMU countries, too, such fears abounded.

In order to gain insight into the nature of the price rises recorded since 1 January 2002, and to gauge the first experiences after the changeover, the Bank held a representative survey among 900 retailers. These included a variety of shops: supermarkets, bakeries, butchers, clothes and shoe shops, as well as furniture shops, but also hairdressers, beauty parlours, restaurants and hotels. The interviews took place in the third week of January. The main results are presented here.

## 2 THE CHANGEOVER IN PRACTICE

### *Preparations completed in time*

Early last year, the authorities were still worried that the changeover preparations in the Netherlands were progressing unduly slowly. The European Commission, too, urged Europe's business sector to press ahead. These concerns were justified, because little progress had been made in 2000. Having made a considerable investment to make their businesses millennium-proof, entrepreneurs seemed to need a breather before tackling the next big event. In the course of 2001, however, it became clear that the corporate sector had seriously set to work. By mid-2001, large and medium-sized Dutch businesses had completed 80% of their preparations and small businesses 60%. In the retail trade, the degree of preparedness ranged from around 60% in the non-food sector to nearly 70% in the food industry. On the first working day in January it became clear that Dutch entrepreneurs had completed their preparations in time. Theirs was a major feat, and a considerable contribution to the successful introduction of euro banknotes and coins. This was especially true of the retail trade, shops being the first to be confronted with the massive changeover to cash payments in euro.

Fears that the payment system would break down, which had invariably figured prominently in earlier euro surveys held among businesses and the public, were not borne out. Nearly 90% of the shopkeepers interviewed did not come up against problems during the changeover. Only 8% experienced minor inconvenience in the form of a shortage of euro banknotes and coins, unfamiliarity with the new currency and malfunctioning electronic payments. These problems arose relatively often in shops selling daily necessities. It is hardly surprising that of the shopkeepers who cited unfamiliarity as a major inconvenience, many had introduced double-currency price tags at the eleventh hour. Not having had time for a dry run, they suffered the consequences in the first weeks following the changeover. Still, a sigh of relief must have swept through the food shops. As late as July 2001, one-third of them still feared serious complications and/or bottlenecks in the days following the changeover.

For 80% of all retailers, it was business as usual on 2 January. Only 7%, nearly all of them small shops presumably wishing to watch from the sidelines, were closed for the week.

It is interesting that in the second and third week of January some supermarkets saw turnover of over 10% up on last year <sup>1</sup>. Consumers may have failed to appreciate the true value of the new currency, spending euro as if they were guilders, or may simply have multiplied euro prices by two. This phenomenon was not observed in the non-food retail trade, where the range of goods is more expensive. As consumers are more alert when buying dearer products, they probably converted the euro prices into guilders more accurately.

Slightly more than half (57%) the shopkeepers believe that consumers have become more price-conscious as a result of the introduction of the euro. This greater awareness is incidentally less evident in shops where consumers buy their daily necessities. This too confirms the impression that the public was – as yet – spending euro as if they were guilders. In this context, it may be noted that customers were not significantly influenced by the early or late introduction of double-currency pricing.

Thanks to the changeover to the euro, the public has become alive to relative prices within the EU. On the Internet, there are numerous sites offering comparisons of the prices of popular goods. It is, however, too early to tell whether the euro is inducing customers to shop across the border. Research shows that so far consumers have been stimulated to shop elsewhere not so much by price differences as by a desire for variety <sup>2</sup>.

The survey also shows that the favourable economic situation of recent years has enticed Dutch consumers to spend more. This is the impression gained by chain stores (48%), as compared with 34% who did not observe this development, and 16% who believe that consumers have become more price-conscious.

A small majority (57%) does not have the impression that cash payments have increased recently. The food sector is relatively less inclined to think so. This confirms the picture emerging from earlier euro surveys, namely that consumers have been unloading part of their cash holdings while shopping. This did not pose extra problems. Retailers furthermore do not believe that consumers paid with large denominations more often than usual. If they did, this was notably the case in general food stores and in the non-food sector (furniture and household appliances, building materials etc.). Half of these

<sup>1</sup> On 31 January 2002, both Het Financieele Dagblad and NRC contained an article about the higher turnover recorded by supermarkets consequent on the changeover to the euro.

<sup>2</sup> On 7 February 2002, Algemeen Dagblad published an article on how the euro stimulates cross-border shopping.

transactions involved 100-guilder notes. 250- and 1000-banknotes each accounted for a quarter of all cases, albeit that the latter were hardly used in food shops, if at all. There is, however, a clearly discernible correlation between the size of the shop and the use of 250-guilder notes: the larger the shop, the more often customers paid with these notes.

Thanks to the rapidity of the changeover in the Netherlands, practically no inconvenience was caused by an excess of banknotes and coins. Retailers' fears of long queues at the cash registers, a recurring theme in earlier euro surveys, did not materialise. Small wonder that no less than 97% of those surveyed were satisfied with the preparations made.

In July 2001, over 90% of retailers said that they had been optimally informed on how the changeover from the guilder to the euro could proceed successfully. This has clearly borne fruit. The changeover's success can undoubtedly be ascribed in part to the effective information campaign, as well as the alacrity with which consumers switched to paying with euro.

### 3 HIGHER PRICES ATTEND CHANGEOVER TO THE EURO

Over the past few months, a large number of complaints reached the euro desk of the consumers' organisation and the various complaints desks installed by the media, to the effect that prices have been considerably rounded upwards. The survey, too, shows that these are not mere incidents. Nearly half the retailers interviewed in the survey raised their prices when euro came to figure more prominently in pricing than guilders. One in 25 retailers interviewed admitted having raised prices by 10% on that occasion. Consumers believe these price adjustments to have been caused exclusively by the euro, because the price rises coincided with the changeover to euro prices. As will be explained in more detail later, businesses combined the changeover to euro prices with their regular price adjustments, which ensue from higher costs.

The total price rises effected for various reasons when the euro prices were introduced diverge materially between the various retail sectors (see Chart 1). In the catering industry, for instance, prices have undergone above-average rises. In supermarkets, on the other hand, much more moderate price rises have been recorded. The overall impression is therefore less pronounced: the total price rise, roughly weighted with turnover shares, is 1.4%.

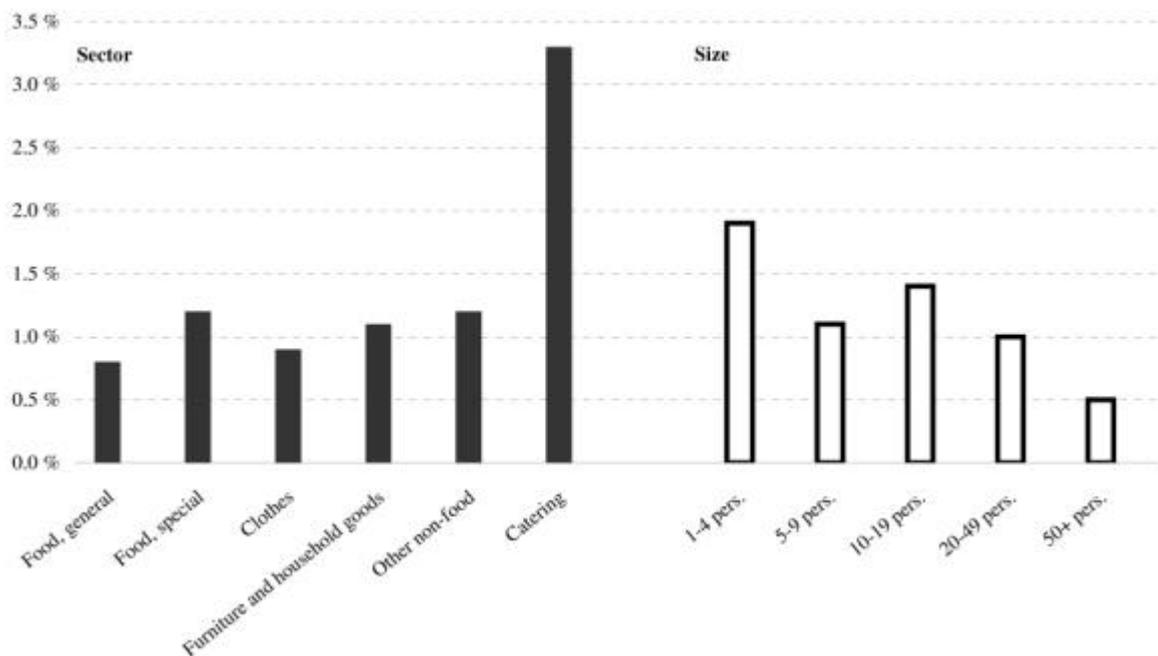
More in general, it is worth noting that small shops effected above-average price rises, of around 2%, compared with over 1% in shops with 5 or more employees. Here competitiveness seems to have played a major role. Earlier surveys showed that large shops, supermarkets in particular, are confronted with fierce competition. Smaller shops and catering businesses, however, say that they face much less competition.

The magnitude of the price rises reported within the retail trade is also correlated with shops' willingness to double-price their ranges. According to the survey, 15% of businesses failed to show both currencies. In this group of mostly smaller shops, the range of goods has become nearly 3% dearer. Shops showing prices in both guilders and euro raised their prices by less than half that percentage. This is an indication that the agreement reached between the consumers' organisation, the organisation of small and medium-sized enterprises, and representatives of the retail trade about what information should be given to the public has had a disciplining effect.

Finally, it is worth noting the price-setting behaviour of retailers selling goods at attractive or psychological prices. On average, retailers wielding neatly rounded or psychological prices, who switched to attractive euro prices in one go, raised their prices by 3%. This is true of a quarter of such shops. Other retailers, who had switched to attractive euro prices earlier or did so gradually, raised their prices by 1.6%. Sectors where psychological prices are of minor importance raised their prices even less (1.1%).

**Chart 1 Total price rise, generated by different factors, upon switch to euro prices**

By sector and size



### 3.1 Were the price rises caused by the changeover?

The price rises were caused by the changeover to the euro in those cases where retailers passed the costs of making their businesses euro-proof on to their customers (channel 1). The euro may also be to blame if the new prices were rounded off upwards (channel 2). The survey shows that the price rises were accounted for by a range of factors besides the introduction of the euro, which included overheads such as wages and cost prices.

A rough indication of the importance of the first channel may be provided by the changeover costs reported by the retail trade. Now that the euro conversion has been completed, the actual costs can be gauged more accurately. The retail trade has footed a changeover bill totalling around EUR 0.9 billion, around 1% of their annual turnover. Although the bulk of these costs was incurred in 2001, retailers passed only a small part on in their prices (10%) in that year. The costs will presumably be spread over several years. Assuming this period to be three years, retail prices this year and the next two years would be 1/3 percentage point higher than if the changeover costs were not passed on. In terms of the consumer price index (CPI), this scenario makes for price rises of 0.15 percentage point in the years 2002-2004. It must be remembered that the retail trade provides around 45% of the total package of goods and services figuring on the consumer price index <sup>3</sup>. This effect will disappear after 2004. In other words, inflation may undergo a one-off increase of just over 0.1 percentage point this year because retailers pass their changeover costs on to their customers, while in 2005 inflation would decline to the same extent.

Retailers were asked to indicate the importance of the various considerations underlying the determination of the new euro prices. It is worth noting that small shops see rounding to attractive euro prices as a more important reason to raise prices than larger shops. Generally speaking, the answers given show that though euro-related considerations played a major role, higher overheads of various sorts figured even more prominently in retailers' price-setting. This is also borne out by the fact that 80% of the shops switching from attractive guilder prices to attractive euro prices combined this move with their regular price adjustments. During these rounds, prices would in any case have been adjusted for increases in overheads.

### 3.2 A euro effect?

Just as price rises accompanying the changeover to euro prices cannot be wholly ascribed to the euro, they are not accounted for exclusively by cost movements either. There is a euro effect, as evidenced by the considerable number of 'suspicious' price changes observed by consumers and the consumers' organisation, and the remarkably large number of price adjustments in sectors facing little competition. Such an effect also shows up in the model-based inflation forecasts regularly made by the Bank. The inflation forecast for January, which allows for movements in wage costs as well as energy,

<sup>3</sup> The remainder of this package of goods and services consists mainly of housing costs, water, gas, etc. (29%), transport (11%), consumption-related taxes and government services (5%), insurance and communication (5%).

commodity and import prices up to and including December 2001 comes out below the CPI figure of 4.0% for February published on the 8th of that month. Even if allowance is made for the surprisingly strong rise in the prices of vegetables and fruit around the turn of the year, the forecast error for inflation in January exceeds the usual uncertainty margins.

### **3.3 The magnitude of the euro effect**

Although the survey does not give direct information about the magnitude of the euro effect, the effect can be estimated indirectly <sup>4</sup> on the basis of the statistical link between the price rises effected by shops when they switched to euro prices, and their characteristics (sector and size), price-setting behaviour (such as the frequency of price adjustments), and the importance attached by retailers to the different considerations underlying price determination (such as wage costs, cost prices, passing on euro conversion costs and rounding). The influence of each of these factors on price rises was quantified with the aid of a regression analysis of the survey data. The euro effect can then be calculated as the price rise which would have taken place if retailers had had to base their price decisions on euro-related factors only.

It may be concluded that on average retail prices went up by some 0.5-0.9% as a result of the changeover, in other words, the changeover to the euro as a whole caused prices on the Dutch CPI to go by 0.2-0.4 %. Broken down by rounding to attractive prices, on the one hand, and passing on the costs of the euro changeover to consumers, on the other, rounding accounts for about two-thirds of the effect, while the remainder may be attributed to changeover costs.

In this context, however, several remarks are in order. To begin with, a quarter of the businesses surveyed was unable or unwilling to give information about the price rises effected by them at the time of the switch to euro prices. In part, this has to do with them being dependent on their head office for price setting. It may be noted, however, that the other retailers who did not state the percentages of their price increases do indicate that the price adjustments were considerably influenced by the costs of the changeover and rounding to attractive prices. Finally, the survey was held among retailers only, whereas the consumers' organisation noted that the local authorities have also effected euro-related

<sup>4</sup> A more detailed explanation to the calculations can be found in the Appendix.

price rises (parking fees, etc.). Given the latter two arguments, the euro effect may have been slightly underestimated.

*Euro effect concentrated around turn of the year*

The survey held by the Bank among retailers in March of last year showed that most shops would be making the switch to psychological prices towards the end of 2001 or at the beginning of this year. It also showed that – to save further costs – retailers would be combining these price adjustments with their regular price rises. This is borne out by the latest survey. Over 80% of shopkeepers who rely on attractive prices indicated that they adopted appealing euro prices when effecting their regular price adjustments. Fewer than 10% of the retailers advanced or postponed their regular price rounds. This means that the regular pricing patterns were not significantly disturbed by the changeover. The survey and recent data published by Statistics Netherlands furthermore show that in December most retail prices were still denominated in attractive guilder prices. This is not surprising as the guilder was still the leading currency in payments in 2001. The switch to appealing euro prices and the concomitant price rises consequently surfaced notably in the CPI's figure for January.

*Changeover will presumably lead to lower prices in the longer term*

Although, according to the survey, the introduction of the euro led to higher prices, in time prices should be going down. First of all, prices will begin to fall as soon as businesses have depreciated their euro-related investment. In addition, the calculations mentioned earlier do not make allowance for the price-lowering effect of the changeover. Numerous studies have compared prices between countries. They show that the prices for the same product may differ widely between countries. These differences may be accounted for by transport costs, consumer preferences and productivity, as well as national legislation, taxes, non-competition clauses etc. The switch to the euro will, however, enhance price transparency and euro area competition. Price discrimination between countries, which is often the result of imperfect competition, will consequently be thwarted and price differences will decline. In this context, it is interesting to note that the price differences in the United States, an area of comparable size with a single monetary policy, are much smaller than those in the euro area. Furthermore, the euro will act as a catalyst for the removal of the existing institutional differences or barriers. Apart from the price-lowering effects of price transparency, various surveys show that Dutch businesses expect the changeover to the euro to have major advantages in that a simpler administration will lower overheads, exchange rate risks will no longer have to be hedged etc. These cost cuts will also translate into lower prices.

#### 4 CONCLUSIONS

The main conclusions to be drawn from the survey are:

- The retail trade, too, is of the opinion that the changeover to the euro has proceeded virtually without a hitch. In spite of a slow start, entrepreneurs managed to complete their preparations in time;
- Consumers unloaded part of their cash holdings during their daily shopping rounds. Payments made over the past few months were rarely made with larger denominations than usual;
- Conversion of retail prices to euro has raised the Dutch CPI by 0.2-0.4%. This euro effect was the result of changeover costs being passed on to consumers, and prices being rounded upwards;
- In time, the introduction of the euro should lead to lower prices.

## APPENDIX ESTIMATION OF EURO PRICE EFFECTS

The effect of the euro on prices cannot be derived simply from the price changes recorded at the time of the changeover. Price changes are usually caused by a variety of factors. Retail price adjustments are accounted for by market developments and various cost movements. As these price determinants change continually in a market economy, only their combined effect on prices can be observed. In general, retailers do not immediately adjust their prices to changes in market conditions or costs because of sizeable menu costs. It means recalculating costs per product, analysing the various market segments and fitting the new prices into the business's marketing strategy and financial objectives. Finally, the products have to be repriced, physically as well as in all advertisements. Retailers will consequently have combined repricing of their products in euro with their regular price adjustments. As explained in the main text, the survey shows that this is exactly what happened.

Additional information is thus required to determine the euro effect on prices. In order to obtain this information, the Bank commissioned a representative survey among 876 Dutch retailers in early January of this year, enquiring into the motives behind their price adjustments. Retailers were notably asked to state the average percentages by which they had raised their prices when the euro became the leading currency in communications with their consumers. They were also asked to indicate the importance of the various factors underlying their price adjustments. These factors, viz. 'higher wage costs', 'higher purchase prices', 'passing on euro changeover costs', 'higher overheads', 'rounding to attractive euro prices' and 'improvement of margin', had to be rated on a scale from 0 (unimportant) to 10 (very important). The retailers were also asked what percentage of their costs of changing over to the euro they had passed on in their prices prior to January. The survey further contained questions on price-setting in general and the changeover to euro prices in particular. How often are prices adjusted on average? Was the changeover to euro prices combined with a regular price adjustment? Did retailers immediately switch to attractive euro prices? If so, when? Finally, the survey covered particulars such as the sector of the business and the number of employees<sup>5</sup>.

### **Estimation method**

The euro effect was estimated on the basis of these data in two steps. In step one, it was assumed that the price adjustment made by a business at the time of the changeover to the euro was partly underlain by structural factors. These structural factors, which might explain the magnitude of the price

<sup>5</sup> A distinction was made between: (1) food (general), (2) food (specialised shops), (3) clothes and shoe shops, (4) shops selling furniture, household goods and building materials, (5) the catering business and (6) other.

adjustment, include the frequency of the price adjustments effected by the business; the influence on pricing of wage costs, purchase prices, improvement of the margin and other overheads; the relevance for pricing of the changeover costs and rounding to attractive euro prices; the speed with which the business switched to attractive euro prices; the sector; and the size of the business. The relation between the price adjustment at the time the euro became the leading pricing currency and the systemic factors can be described by the regression equation

$$\Delta p_i = \sum_j x_{ij} \mathbf{b}_j + \mathbf{e}_i \quad (1)$$

In this equation,  $\Delta p_i$  is the price adjustment effected by retailer  $i$ ,  $x_{ij}$  the price determinant  $j$  applied by this retailer,  $\mathbf{b}_j$  a coefficient indicating what effect structural factor  $j$  has on the price adjustment and  $\mathbf{e}_i$  the random, non-systematic component of the price rise effected by business  $i$ . The unknown coefficients  $\mathbf{b}_j$  can then be estimated with the survey data.

In step two, the magnitude of the effect of euro-related factors on prices is determined, because equation (1) can be rewritten as

$$\Delta p_i = \sum_{j=1}^{J_1} x_{ij} \mathbf{b}_j + \sum_{j=J_1+1}^{J_2} x_{ij} \mathbf{b}_j + \sum_{j=J_2+1}^J x_{ij} \mathbf{b}_j + \mathbf{e}_i \quad (2)$$

The first term on the right of equation (2) measures the effect of the general factors (size of business, sector, wage costs, etc.) on the price adjustment observed. The second shows the effect of the euro costs on the price adjustment (e.g. the effect of the percentage of these costs which have been passed on) and the third measures the effect of rounding to attractive euro prices on the price adjustment (e.g. the effect of the immediate switch to attractive euro prices). In sum, the second and third terms represent the total euro effect on the price adjustment effected by business  $i$ . As the coefficients  $\mathbf{b}_j$  are estimated in step one, it is then straightforward to calculate the individual components of the price adjustment.

The effect of individual factors on the Dutch consumer price index (CPI) is finally calculated as the weighted average of the effects on all businesses. The weights applied correspond with the weights – in the CPI – of the goods and services offered by the business.

### **Model specification and estimation results**

In order to arrive at a reliable estimation of equation (1), a general to specific approach was adopted, starting from a very general and flexible specification, which included *all* factors mentioned. The specification was notably flexible where the relevance assigned to the various price-determining factors by retailers was concerned. As the scale of assessment used by the retailers is qualitative in nature, a separate dummy variable was introduced for each of the possible answers. In addition, several variables were added to the model which quantify differences between sectors with regard to rounding and passing on the costs of the euro changeover.

The model was then simplified with the aid of statistical tests. The estimation results for the coefficients in equation (1) for the simplified model are shown in Table 1. The restrictions imposed by this simplified model, compared to the general model, are not rejected by the likelihood ratio test at the 5% level.

Table 1 presents the relevant explanatory factors behind a business' price adjustments at the time of the changeover: the sector, the business' size, the wage costs developments, the percentage of euro changeover costs passed on in prices, the importance attached by the retailer to passing on euro costs in price adjustment, and the question whether the retailer immediately switched to attractive euro prices in January 2002. The coefficients estimated for the separate factors are statistically significant, even if a robust estimation is applied for the standard deviation. According to these results, businesses in the catering industry raised their prices by on average 1.5% more than businesses in other sectors which are comparable in terms of all other factors. Compared with large businesses, the prices charged by retailers with 1-4 employees rose 0.7% more. Every percent of the changeover costs passed on by retailers at the time of the switch to euro prices raised their prices by on average 0.018%. Retailers who attached importance to passing on the euro changeover costs in their prices (a score of 5 or more on the 0-10 scale), raised their prices by about 0.6%. Finally, businesses immediately switching to attractive euro prices in January 2002 raised their prices 1.2% more than their competitors who were less eager to adopt attractive euro prices or opted to raise their prices gradually.

It is worth noting that the effect of rounding and of the euro changeover costs is independent of the sector. The price adjustments observed in the catering industry at the time of the changeover may be higher than in other sectors (see Chart 1 in the main text), but they are, so the catering industry dummy in Table 1 shows, partly unconnected to the changeover to the euro and the other factors studied here. In addition, factors such as higher overheads and purchase prices did not have a statistically significant

Table 1 Estimation results regression equation

Variable	$b_j$	Standard deviation a)
<i>General factors</i>		
Constant	0.333	0.211
Catering industry	1.493	0.397
Business with more than 4 employees	-0.700	0.263
'Higher wage costs' relevant for price adjustment b)	0.841	0.243
<i>Factors related to euro changeover costs</i>		
Percentage of euro changeover costs passed on	0.018	0.008
'Passing on of euro costs' important for price adjustment c)	0.578	0.257
<i>Factors related to changeover to attractive euro prices</i>		
Immediate switch to attractive euro prices in January 2002	1.190	0.352
	Number of observations	384
	R <sup>2</sup>	0.23

a) White robust estimator of standard deviation.

b) 'Higher wage costs' rating 3 or higher on the scale of 0-10.

c) 'Passing on of euro changeover costs' rating 5 or higher on the scale of 0-10.

effect on the price adjustments at the time of the changeover. This does not mean, however, that these costs do not play any role in pricing, only that there does not seem to be a systematic correlation between the significance of these costs for pricing and the resulting price adjustment when the effect of wage costs on prices has already been taken into account.

Calculation of the total effect of the euro changeover on the price level by means of the method set out above shows that the CPI has increased by 0.3% on account of euro-related factors. The 95% confidence interval for the euro effect is 0.2-0.4%. Further breakdown of the euro effect on the CPI shows that two-thirds can be attributed to rounding to attractive euro prices and the remainder to passing on of euro changeover costs.

The outcomes of this analysis were tested for econometric robustness in various ways. It was analysed whether the outcomes are distorted because, in the survey, retailers invariably reported the magnitude of the price adjustments in whole percentage points. If the discrete nature of the percentage rises reported is taken into account and an *ordered logit* or *ordered probit* model is estimated, the outcome for the euro effect is barely affected. The sensitivity of the estimated euro effect to reduction of the general model, allowing of a very wide range of factors, to the simple model contained in Table 1, was also examined. The general model would have yielded a euro effect on the CPI of 0.4%, an estimation

which still falls within the 95% confidence interval for the euro effect on the basis of the reduced model. However, overfitting is in evidence in the general model, with statistically non-significant variables having a strong influence on the estimation of the euro effect. Moreover, there is no meaningful economic interpretation for many coefficients in this general model.

As the questions in the questionnaire were fairly detailed, and the survey was conducted by telephone, the respondents could not or would not answer all the questions. Owing to these lacunae, only half the observations could be used for the estimation. The question arises to what extent the results were biased by the selection. Although a bias cannot be ruled out altogether, it is presumably of minor importance. If it exists, however, it would result in under- rather than overestimation of the euro effect. The bias is probably small because not all businesses are free to set their own prices. Obviously, these businesses are unable to state adjustment percentages or assess the significance of the various motives behind price adjustments. It is worth noting, however, that businesses which set their own prices and yet do not mention an adjustment percentage acknowledge the importance of euro-related factors for their pricing decision. If these businesses increased their prices in connection with the euro, but do not wish to admit doing so for publicity reasons, the missing price information could lead to underestimation of the euro effect. Apart from these data, around 15% of observations lack information about the percentage of the euro changeover costs passed on in prices. This highly specific information is presumably not directly available to many respondents, so that the missing data can be partly explained. It cannot be ruled out, however, that those retailers who have already incorporated a major share of their costs in their prices, will be loath to answer the question for fear of negative publicity. Here, too, the euro effect may be underestimated.